A BIODIVERSITY SURVEY OF THE ADELAIDE PARK LANDS SOUTH AUSTRALIA IN 2003

BIOLOGICAL SURVEY
SOUTH AUSTRALIA

By

M. Long
Biological Survey and Monitoring
Science and Conservation Directorate
Department for Environment and Heritage, South Australia

2003

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1st Floor, Roma Mitchell House
136 North Terrace, ADELAIDE SA 5000

AUTHOR
M. Long

Biological Survey and Monitoring Section, Science and Conservation Directorate, Department for Environment and Heritage, GPO Box 1047 ADELAIDE SA 5001

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North Terrace and the River Torrens northwards to North Adelaide from the air showing some of the surrounding Adelaide Park Lands
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PREFACE

The importance of this biodiversity survey of the Adelaide Park Lands cannot be overstated.

Our Adelaide Park Lands are a unique and invaluable 'natural' asset. The Adelaide City Council Park Lands Management Strategy recognises the native biodiversity of the Adelaide Park Lands as an irreplaceable resource that must be protected and enhanced.

This biodiversity survey will help us to better manage the Adelaide Park Lands. It will provide a platform from which we can work to enhance this precious resource for the benefit of local flora and fauna and the enjoyment of generations of South Australians and visitors alike.

The survey represents a successful collaboration between Adelaide City Council, the Department of Environment and Heritage and the community.

[INSERT SIGNATURE]

Michael Harbison
Lord Mayor of Adelaide

A Biodiversity Survey of the Adelaide Park Lands, South Australia is a further product of the Biological Survey of South Australia.

The program of systematic biological surveys to cover the whole of South Australia arose out of a realisation that an effort was needed to increase our knowledge of the remaining vascular plants and vertebrate fauna of South Australia and to encourage its conservation. Over the last 18 years, there has been a strong commitment to the Biological Survey by Government and an impressive dedication from hundreds of volunteer biologists.

By 2015, It is anticipated that the Biological Survey will achieve complete statewide coverage.

The Biological Survey of South Australia will be an achievement for which we can be very proud. We will have substantially improved our knowledge of the biodiversity of South Australia to enable biologists in the future to measure the direction of long-term ecological change. This will greatly enhance our ability to adequately manage nature conservation into the future.

JOHN HILL
MINISTER FOR ENVIRONMENT AND CONSERVATION

ABSTRACT

A Biodiversity Survey of the Adelaide Park Lands was commissioned from the Biological Survey and Monitoring Group of the South Australian Department for Environment and Heritage by the Adelaide City Council in August 2002. The survey work, carried out from December 2002 to July 2003 involved the collection and collation of biolodiversity records from a wide range of sources. Standard Geographic Information System layers were created to accommodate mapping of the soils and the pre-European natural vegetation. In addition, site data and more general records for particular areas of the Adelaide Park Lands were entered into the Biological Databases of South Australia.

In addition to existing data, new information was collected on both native and exotic vascular plant species present in each of the 27 individual Parks within the Adelaide Park Lands area. Bat calls were recorded at five locations across the Park Lands and and the data analysed to determine the species utilizing the area. A data set of standard monthly bird surveys across the Park Lands by Mr Bob Watmough from 1974 to the present provided a very valuable insight into the total bird fauna and changes over time.

The existing and, as far as possible, the pre-European flora and fauna of the Adelaide Park Lands was compiled from this data.

514 plant taxa were recorded for the Park Lands of which 60% (309 species) were introduced. With the exception of two remnant River Red Gums known to be part of the pre-European flora, it is difficult to determine which other plants still present might represent the original flora. Using all available data sources, 205 plant species probably indigenous to the area have been recorded. Particular areas of the Park Lands which still contain significant populations of indigenous flora are discussed.

There are 33 mammal species recorded from the Adelaide area, nine are now extinct and six are introduced species. The Adelaide Park Lands now supports ten species of native mammals of which six are bats. In addition, five introduced species occur there.

One hundred and fifty bird species have been recorded from the Park Lands, but many species have become extinct while others have moved into the area since the changes to the environment brought about by settlement.

Eighteen species of reptiles and six species of amphibian are recorded from the Adelaide Park Lands, but a number of reptiles and one frog have not been recorded in the area in recent times.

Finally, a series of conservation recommendations are made to conserve and enhance the remaining native biodiversity of the Adelaide Park Lands.

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ACKNOWLEDGEMENTS

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This project relied upon contributions of information and knowledge from many dedicated naturalists in the Adelaide area. These contributions are highly valued and appreciated.

Steering Committee: Tony Robinson, Jeff Foulkes, Neil Ward, Andrew Crompton, Ross Oke / Ben Moulton

DEH Staff: Jeff Foulkes, Tony Robinson, Stuart Pillman, Helen Owens, Tim Bond, Tim Croft, Peter Lang, Peter Canty, Rowan Urban, Dave Hart, John McDonald, Nick Neagle, Robert Brandle, Iain Malcolm, Ben Sparrow, Lynette Queale, David Armstrong, Deb Hopton and Steve Bowley.

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State Herbarium: Helen Vonow

Adelaide City Council: Neil Ward, Zoe Drechsler, Brenton Isted, Peter Baldacchino and Mike Doonan.

Contributions of Data: Darrell Kraehenbuehl, Penny Paton, Janet Subagio, Michael Sando, Graham Carpenter, SAOA, Phil Bagust, Bob Whatmough, Sue Seacomb, Tim Jury and Roger Grund

Report Editing: Tony Robinson, Zoe Dreschler, Jeff Foulkes,
Neil Ward.

Environment Protection Authority: Steven Walker.

Mammal Club SA: Graham Medlin

Department Human Services: Library Staff

SA Urban Forest Biodiversity Program: Ross Oke, Ben Moulton and Matt Turner

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Adelaide University Boat Shed – Adelaide Boylan

Botanic Gardens – Trevor Christensen and Neville Byrne

West Terrace Cemetery: Trevor Davey and Grounds Staff

Adelaide Zoological Gardens: – Greg Johnston

Government House: Mandy Cashman

SA Water: Paul Mackavoy (AWQC)

Torrens Catchment Management Board: Peter Schulz

INTRODUCTION

Adelaide is well known for its network of park lands and open spaces. Encircling the city, the Adelaide Park Lands are widely accepted as being one of the great 'natural' assets of the city. They provide for a range of uses from recreation and culture, to education and open space. The Park Lands have however, been significantly modified since European settlement, and now contain very little of their original flora and fauna. As a result, the value of the biodiversity of the Park Lands has been significantly modified, although not eliminated. The Park Lands have significant native plants and animals remaining, offering a unique opportunity to protect and enhance these species in the centre of a major city.

Adelaide City Council (ACC) approached the Department for Environment and Heritage (DEH), in August 2002, to jointly conduct a 'Biodiversity Survey of the Adelaide Park Lands'. The survey was a cooperative endeavour to utilise both the skills of the scientific team in DEH and the considerable data and expertise developed over the years of managing the Park Lands by ACC. The Survey was funded by ACC with DEH contributing a matching level of expertise and staffing resources.

The survey is a priority action of the ACC Park Lands Management Strategy, 1999, which aims to protect, nurture and enhance the landscapes of the Park Lands, and of the City of Adelaide Environmental Management Plan – Local Agenda 21, 2000 of which sustainability is the cornerstone. These strategic documents set directions to protect and enhance biodiversity values in the Park Lands:

The principle aim of the Biodiversity Survey was to document the existing native flora and fauna in the Adelaide Park Lands, and bring together knowledge and data collected by many individuals and organisations in the region. In addition, the survey aimed to:

- Predict the biodiversity of the Park Lands pre-European settlement, to assist future planning and management;
- Create specialised biological databases for the Adelaide Park Lands to store existing data, data collected during the survey, and data from future projects in the area;
- Create a Geographic Information System for the Park Lands to visually capture existing data and data collected during the survey, and future projects;
- Identify gaps in existing biodiversity data for the Park Lands and systematically survey some selected biodiversity components using passive techniques, such as ANABAT for recording bats;
- Prepare a final report identifying both the current biodiversity values and identify key areas where further works could enhance these values.

This report also reviews biodiversity survey work conducted in other Australian cities. It reviews the current biodiversity information available for the Adelaide Park Lands. It examines the remaining biodiversity, including flora and fauna in the Park Lands and identifies threats to this biodiversity. Recommendations for the future planning and management of these biodiversity assets are provided.

THE BIOLOGICAL SURVEY OF SOUTH AUSTRALIA

Since the early 1970's, DEH has been conducting systematic biological surveys of the vegetation and vertebrate fauna of large regions of the state, as part of the Biological Survey of South Australia (Playfair and Robinson 1997).

The Biological Survey of South Australia (BSSA) was established under the auspices of the Biological Survey Coordinating Committee (Owens 2000) which comprises of representatives from the South Australian Museum, Environment and Heritage, Plant Biodiversity Centre, SA Research and Development Institute, and Primary Industries and Resources SA. The aim of the survey program is to provide a broad baseline inventory of the state's flora and fauna. The survey program is divided between pastoral and agricultural regions of the State, and records site-s[ecific data with a repeatable methodology. The vegetation surveys are split between two sections of DEH. The Biological Survey and Monitoring section (BSM) undertakes vegetation and vertebrate surveys within the pastoral and agricultural regions of the state. The Environmental Analysis and Research Unit undertakes vegetation surveys only in the agricultural regions

To date many regions of the State have been surveyed; see Armstrong *et al*. 2003 for a complete list. The most relevant to the Adelaide region include a vegetation survey only of the Northern Adelaide Plains (1996) and a vertebrate and vegetation survey of the Mount Lofty Ranges (2003). The information for these surveys is held by DEH.

BIOLOGICAL DATABASES OF SOUTH AUSTRALIA

The survey data collected from around the State is stored in the Biological Databases of South Australia

(BDSA) and DEH is the custodian. Depending on the nature of the survey, the BDSA has different databases within its overall structure for the storage of data, which include – Survey, Opportune, Reserves and other databases such as Plant Population and Roadsides. The databases relevant to this survey include;

- Survey database:

Stores all data collected from Survey quadrats. All physical and biological attributes are entered and it allows for multiple visits to the same site over time.

- Opportune database:

Stored as point-based information, all specimens collected and other geo-coded observations either during a survey but outside of the quadrat, or collected by field workers at anytime.

- Reserves database:

Unlike the Survey and Opportune databases holds data as a polygon or area. This allows species lists for both flora and fauna to be made from within a park or other specified boundary.

- Plant Population database:

Holds point-based information for threatened plant species and populations throughout the state.

ADELAIDE CITY COUNCIL

ACC is committed to the protection and enhancement of biodiversity in the Adelaide Park Lands. The Park Lands Management Strategy, 1999 and City of Adelaide Environmental Management Plan – Local Agenda 21, 2000 provide vision for the management of biodiversity. Preserving and restoring biodiversity are fundamental to maintaining the cultural and natural heritage significance of the Park Lands. The strategies provide direction for sustainable management of the Park Lands which meets this objective whilst balancing the needs of diverse uses, such as recreation. .

This biodiversity survey forms an integral component of ACC's environmental planning. It is a priority action of the Park Lands Management Strategy and Environmental Management Plan and will provide a basis for planning and decision making in the Adelaide Park Lands. Information provided by this survey will guide actions of the Park Lands Management Strategy to protect and enhance biodiversity in the Adelaide Park Lands, such as revegetation and enhancement of native fauna habitat. To further ensure that biodiversity management is an integral aspect of Park Land management, ACC will incorporate actions to improve biodiversity into management plans to be implemented on a park by park scale. ACC is also working to educate the community about biodiversity and to encourage community involvement in its management of the Adelaide Park Lands. This survey will be an invaluable educational tool by which the community can learn about flora and fauna of the Adelaide Park Lands, threats to its survival and ways in which it can be conserved

INTEGRATION WITH OTHER PLANS

The Biodiversity Survey of the Adelaide Park Lands compliments existing planning programs for conserving biodiversity across Metropolitan Adelaide. This Survey is in support of regional planning programs such as the Metropolitan Open Space System and the Park Lands 21 Strategy, which coordinate and set regional priorities for linking open space areas across Metropolitan Adelaide.

The Adelaide Park Lands have been targeted for a revegetation program through the State Government's One Million-Trees Program, which is being coordinated by the South Australian Urban Forest Biodiversity Program (SAUFBP). It is planned that over the next five years that the ACC will plant 100,000 in the Adelaide Park Lands. The Biodiversity Survey will be an integral component, along with the Park Lands Management Strategy, in the identification of suitable sites for re-vegetation and selection of suitable species to plant in this program. The ACC, in conjunction with the SAUFBP will develop Revegetation Plans for each site identified as being suitable for re-planting. Along with these Plans, the ACC will develop a Seed Provenance Policy, to ensure that appropriate seed sources are used in any native plantings in the Adelaide Park Lands and City Squares.

THE ADELAIDE PARK LANDS

Study Area

The study area of this biodiversity survey includes the Park Lands (excluding the Squares) of the City of Adelaide (Figure 1). The boundary is defined by roads including Park Terrace, Fitzroy Terrace and Robe Terrace to the north, Hackney Road, Dequetteville Terrace and Fullarton Road to the east, Greenhill Road to the south, and the railway line and Port Road to the west. The area comprises 720 hectares or 45% of the total city area (Adelaide City Council 2001). The Park Lands have a variety of land uses including recreation, institutional, educational, economic and cultural (Adelaide City Council 1999).

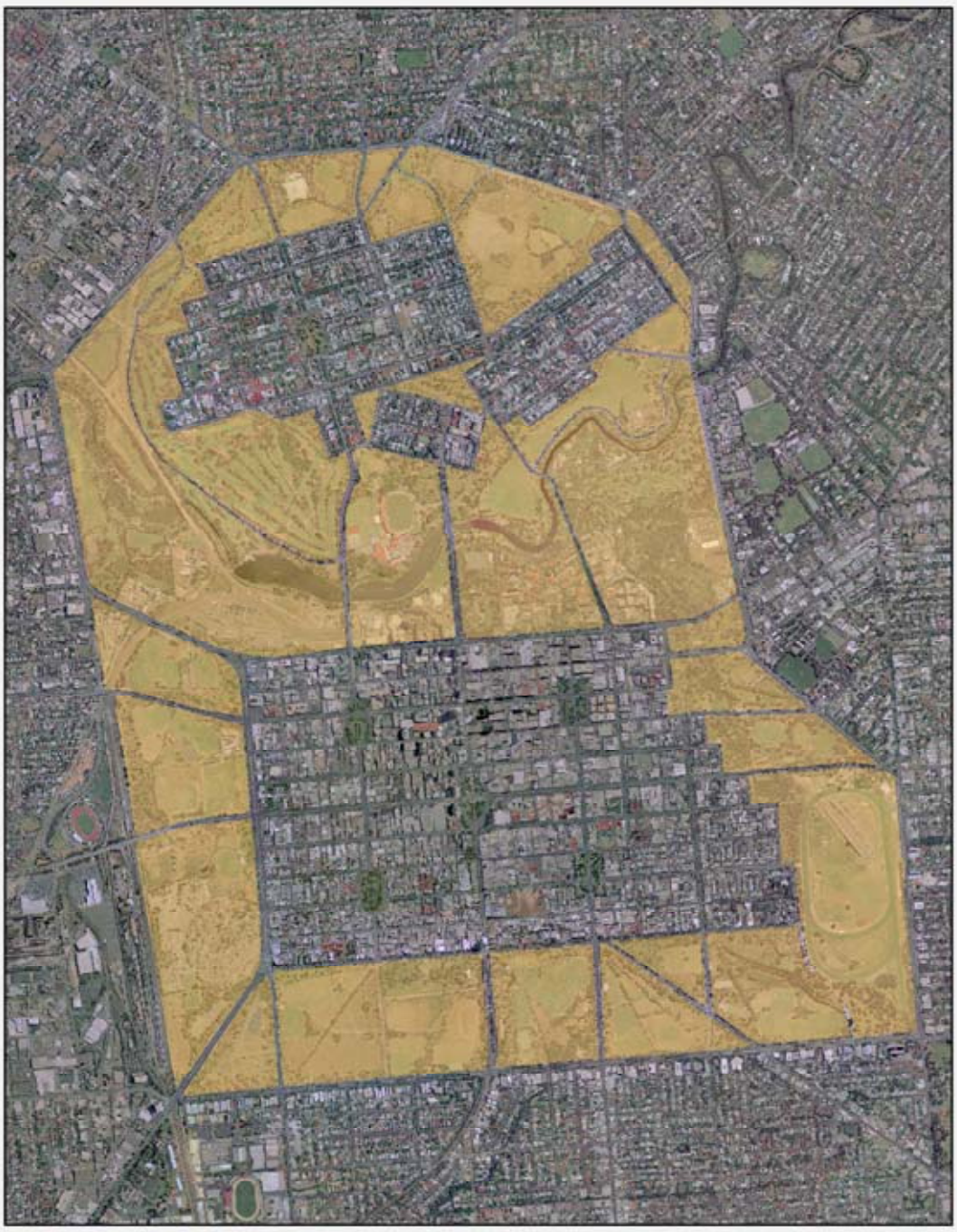

Figure 1.
Adelaide Park Lands Biological Survey Study Area

Study Area

N

0 0.5
Kms

The Adelaide Park Lands were the vision of Surveyor-General Colonel William Light in January of 1837. He originally planned for 931 hectares with the intended purpose of providing 'healthful recreation for the inhabitants of the City' (Adelaide City Council 2001). Light's plan surrounded the central business district and the residential area of North Adelaide with a contiguous park land belt and six city squares (Victoria, Light, Hindmarsh, Hurtle, Whitmore and Wellington). The Park Lands are a distinguishing feature of Adelaide which separate the built-up city centre from the surrounding suburbs. Although they have maintained their original profile as proposed by Colonel Light he only made allowances for areas to be set aside by the colonial government in the Park Lands for nine Government Reserves including a Botanic Gardens, Store House, School, Government Domain, Guard House, Barracks, Hospital, Cemetery and Immigration Square. More area has since been lost to the Park Lands with now more than 60 Government Reserves being established including the Art Gallery, Museum, Universities, Parliament House, railways and roadways to name a few (Adelaide Park Lands Management Working Group 2003).

Administrative boundaries/responsibility
The Corporation of the Adelaide City Council (ACC) has been responsible for the 'care, control and management' of the Adelaide Park Lands (Adelaide City Council 1999) since 1852 under the Municipal Corporation Act for the City of Adelaide 1849 and subsequent Acts

The Adelaide Park Lands are classified as 'community land' and can never be sold or disposed of under the Local Government Act (Adelaide Park Lands Management Working Group Group 2003). However, 24% of the Adelaide Park Lands have been alienated for State and Federal Government purposes such as transport, recreation, education and cultural preservation.e.g. Adelaide Railway Station and Yards, Adelaide Oval, the Art Gallery of South Australia, Adelaide University, Botanic Gardens, West Terrace Cemetery, etc.) (Adelaide City Council 1999). The remaining 76% of the Adelaide Park Lands is community land managed by Adelaide City Council (Adelaide City Council 1999). The administrative boundaries of the Adelaide Park Lands are displayed in Figure 2.

For the purpose of this survey, biodiversity information will be collected and collated for the whole of the Adelaide Park Lands, incorporating areas managed by ACC, State and Federal Government (Figure 2).

History of land use/clearance
The destruction of flora and fauna over the Adelaide Plains has been extensive since European settlement. Land clearance by the first European settlers was staggering, with native vegetation felled for house construction, agriculture and stock grazing. Colonial attitudes to this new country resulted in the early introduction of many non-indigenous plant species. In 1879 the Conservator of Forests, reported to the ACC that:

> '*Perhaps the worst feature of the Park Lands were the numerous eucalypts… The gums as a rule are not very ornamental tress, and besides, those in the Park Lands have a very unhealthy appearance. They should give place to others of a more suitable character'* (Kraehenbuehl 1996).

Native vegetation was also felled, with large River Red Gums lining the Torrens between the Morphett Street Bridge and Hindmarsh being used to fire brick kilns at Hindmarsh. The Park Lands were reserved for military purposes or to keep other unpleasant utilities at a distance, such as the cemetery. Pollution along the River Torrens from tanneries, logging and chemical plants caused irreparable damage to aquatic vegetation (Kraehenbuehl 1996). Destruction was so complete in the Park Lands that hardly any remnants of native plants remain (Kraehenbuehl 1996). The History Trust of South Australia has compiled a series of colonial photographs from 1865 taken by Townsend Duryea. This panorama is considered one of South Australia's most significant historical artefacts, and can be viewed at the website: http://www.fusion.com.au/duryea/ (also see Chapter 4 for a more detailed description). The photographs illustrate the extraordinary extent of clearance in the city area at this early stage of the colonial period.

Aboriginal Occupation
The *Kaurna* people occupy the land on which Adelaide was built, and refer to it as 'Tandanya', or the place of red kangaroos suggesting it was once an important hunting ground (Adelaide City Counci1 1999). The *Kaurna* people deliberately lit large fires in the area, to encourage new tender plant growth which attracted game for hunting (Ellis 1976). It is considered that the open grasslands described by the early colonists in the Adelaide area were a direct result of 'fire-stick farming', with large expanses of shoulder high grasses covering the plains (Ellis 1976).

Figure 2.
Administrative Boundaries of the Adelaide Park Lands

Adelaide City Council Controlled Lands

State or Federal Goverment Controlled Lands

N

0 0.5
Kms

Biodiversity Significance
The Adelaide Plains and nearby Hills have been described by Possingham (1998) as having been the most 'biodiverse landscape in South Australia from a vertebrate fauna perspective'. It had a diverse array of ecosystems, including swamps, woodlands, mallee, grassland and forests, which would have supported a wide variety of vertebrate and invertebrate species. The Park Lands therefore provide a unique opportunity to re-establish some of this original landscape in close proximity to the CBD.

Australia is largely an 'urbanised' country, with the majority of our population living in cities. Urban park lands can often be the main point of contact that people have with nature, and Adelaide is no exception. Possingham (1998) states that '…the Adelaide Park Lands are not just environmentally important but culturally important, and it should showcase distinctive and inspiring South Australian landscapes'.

From a biodiversity perspective, the Adelaide Park Lands in their current state are not particularly significant biologically on a National or State scale. They are however significant at a local scale and Possingham (1998) outlines the Park Lands as significant for biodiversity for the following reasons:

- The Park Lands are in a climate and soil type that is very poorly conserved in South Australia representing a unique opportunity for habitat reconstruction;
- The Park Lands represent an enormous opportunity for environmental education because of their proximity and regular use by a large number of people. The Park Lands provides an opportunity for more frequent encounters with nature for visitors, which often inspires interest and understanding of indigenous landscapes and can spark individual commitment to the environment;
- Large trees and birds are a conspicuous and culturally significant feature of the biodiversity of the Park Lands. The River Torrens and some of the more natural areas have a locally high diversity of species, with the prominent variety of parrots a feature.

PHYSICAL DESCRIPTION
Climate
Adelaide's climate is described as being quite atypical when compared with the State as a whole (Schwerdtfeger 1976). Mt Lofty is considered the single most influential topographic feature that causes Adelaide to experience an overall climate different from similar areas of the State (Schwerdtfeger 1976). Significant orographic winter rains benefit the Mount Lofty Ranges and the Adelaide Plains, which receive an average monthly winter rainfall of 95 mm. Summer sees prolonged dry periods of up to two months with an average monthly rainfall of 19 mm (Schwerdtfeger 1976). The average annual rainfall for the region is around 550 mm (Adelaide City Council 1999).
The seasonal mean maximum temperature ranges from 30°C in summer to 15°C in winter, with seasonal mean minimum temperatures ranging from 19°C in summer to 8°C in winter (Schwerdtfeger 1976).

Soils
Soils in the Adelaide region are well known for their capacity for seasonal movement swelling when moist and shrinking when dry. Early soil maps of Adelaide show Red-brown Earths as being the dominant soil group in the region. Rendzina, Black Earth and podzolized soils are also present in the area (Northcote 1976). Available soil data is at a broad regional scale and this project refined this data to identify and map four main soil types found to be dominant in the area (Figure 3). These include:

- Alluvial Soils - which have no general profile determined, are varied in textures and position in respect to modern channels. They are common along the River Torrens and the rising terraces along the River (Taylor *et al.* 1974).
- Red Brown Earth (Western region – Lower Outwash Plain) – light textured topsoils over well-structured red-brown clay subsoil, generally associated with savannah woodlands (Stace *et al.* 1968).
- Red Brown earth (Eastern region – Upper Outwash Plain) – similar to the description above but with less water-logging problems than those of the western region. Probably characterised more by *Eucalyptus leucoxylon* (Stace *et al.* 1968).
- Brown Soil – typically a sandy or loamy topsoil, gradually increasing to clay loams deep in the profile and occurring in strong association with mallee woodlands (Stace *et al.* 1968).

Further details of this soil classification and the vegetation associations related with these soils can be found in the Vegetation section of this report.

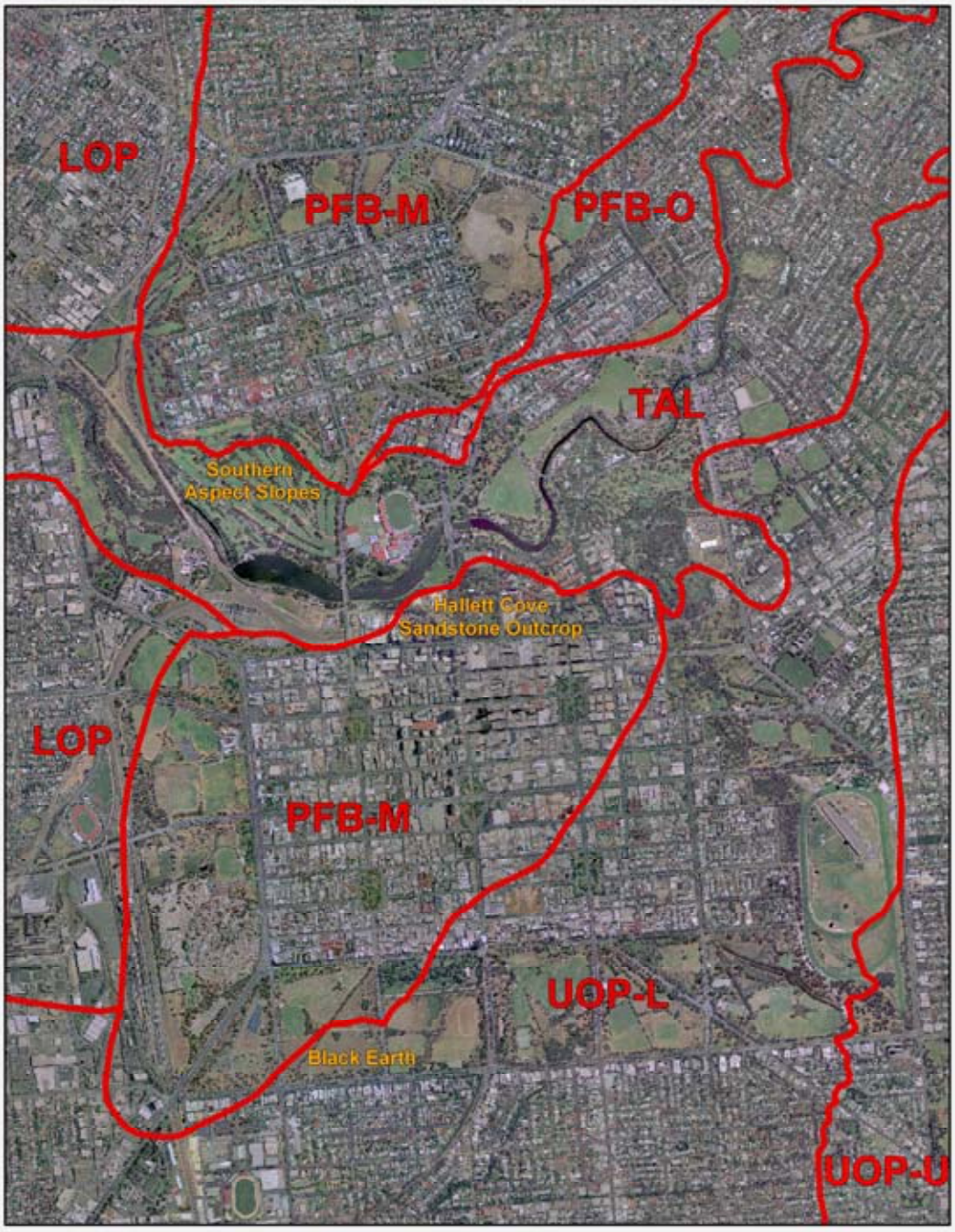

Figure 3.
Soil Boundaries in the Adelaide Park Lands

LOP **Lower Outwash Plain:** Alluvial fan of the River Torrens below the Para Fault with alluvium off Para Fault Escarpment
PFB **Para Fault Block:** Eastward tilting rises and platforms.
PFB-M Mantle of calcareous aeolian material
PFB-O Outwash derived from Para Fault Block and including some older alluvium of River Torrens
TAL Floodplain, terraces and stream channel of River Torrens, including broad floodplain at tributary junctions.
UOP **Upper Outwash Plain:** Coalescing alluvial fans of creeks draining the Eden Fault Block and its escarpment.
UOP-L Lower part of the Upper Outwash Plain
UOP-U Upper part of the Upper Outwash Plain

Current Land Use

The Park Lands today are a result of many and varied land uses (Adelaide City Council 1999); including

- Recreation (playgrounds, sports grounds, golf courses, bowling clubs, zoological gardens, BMX track, netball/tennis courts, water craft recreation, race course, aquatic centre, horse agistment, archery, rowing clubs and car racing)
- Infrastructure (toilets, barbecue areas, power and water facilities)
- Access (roadways, railway, tram-line, bus, temporary major event parking, pedestrian and cycle routes)
- Major event areas (e.g. Glendhi Festival, Womad, International Horse Trials)
- Indigenous culturally significant sites (e.g. Hindmarsh Kaurna Burial Site, Tennyson Bridge Burial Ground)
- Post-colonial culturally significant sites (city squares/gardens, cemetery, olive groves, Veale Gardens, Adelaide Oval, River Precinct, Montefiore Hill)
- Open space with a more 'natural' setting
- Formal gardens
- Business/Institutional
- Residential

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The combination of these land uses defines the Adelaide Park Lands as they are today, and explains their broad appeal to residents and visitors.

Comparison with urban biodiversity management elsewhere in Australia

To place the biodiversity of the Adelaide Parklands in a broader context, a review of biodiversity management policies in a number of other Australian urban areas was carried out. The details are summarised in Appendix I

SURVEY METHODOLOGY

INTRODUCTION

Most of the trees of the Adelaide Park Lands were felled for housing, agriculture and used as firewood during the establishment of Adelaide. However, once the City of Adelaide became established, the early colonists found a need to replace the vegetation that had been lost. Many exotic species were planted in an attempt to create a more European-style landscape. As a result of these early plantings and subsequent plantings, the landscape now constitutes a mixture of exotic and Australian trees and shrubs. The planted Australian species are a mixture of either local or interstate species and, by and large, the provenance of these species is unknown. Much of the area is also set aside for sports and recreation with large open turfed areas dominated by exotic grasses and formal gardens. In spite of this, a variety of naturally regenerating grasses, herbs, lilies and bulbs still occur in some areas.

Standard vegetation, vertebrate and invertebrate sampling quadrats in areas such as the Adelaide Park Lands that are dominated by planted exotic and Australian species do not result in useful data for recording the remnant native species existing in such a landscape. As such, a variety of data sources and methods were used to survey the Adelaide Park Lands and these are detailed in this chapter.

Many dedicated individuals have collected invaluable flora and fauna information in the Adelaide Park Lands. Data collected by these individuals, government and non-government organisations, data derived from literature and new data collections from this survey constitute the information compiled for this report. This chapter details the sources of biodiversity data collected for the Adelaide Park Lands and incorporates survey methodology. Limitations of some of the data sources are also discussed.

INFORMATION SOURCES

Mapping

The Environmental Analysis and Research Unit, Environment and Information Directorate of DEH supplied the majority of the mapping information for this project. This unit holds all of the mapping layers for the State (e.g. cadastre, landcover, contour, drainage, roads, railways etc.) as well as specific data and project-based data (e.g. biological survey sites). The Adelaide City Council supplied administrative mapping layers (e.g. management boundaries). Mapping layers available for the Adelaide Park Lands held by DEH, include:

- Aerial imagery (geo-rectified)
- Cadastre
- Contours
- Drainage
- Pre-European vegetation associations (1:250,000) for the Adelaide Plains (Kraehenbuehl 1996)

Mapping produced or compiled for this project and is available through DEH, includes:

- Soil association boundaries
- Administrative boundaries (Adelaide City Council)
- Adelaide City Council Park areas (Adelaide City Council)
- Project defined areas. These are larger divisions dividing the Park Lands into six main blocks, including North, East, South, West, River and Valley divisions
- Refinement of pre-European vegetation association boundaries (Chapter 4)
- Map of remnant vegetation in Park Six.

The Environmental Information Directorate (Mapland) of DEH hold aerial imagery for the Park Land area from 1949-2001. This imagery is available from a scale of 1:1,000. They also hold the following mapping: Adelaide topography (1914 and 1935-1943) and aerial imagery of six maps presented as a poster, including the years 1949, 1959, 1969, 1979, 1989 and 2001 (DEH 2002).

Historical Records

The historical information collected for plant associations and plant species that once existed over the Adelaide Park Lands were compiled largely from Kraehenbuehl (1996). A pre-European plant species list was compiled for each plant association as identified in Kraehenbuehl (1996) (Chapter 4; Table 4). A pre-European vegetation map for the whole Adelaide Plains is available in Kraehenbuehl (1996) and refinements were made for the Adelaide Park Land area in this project (Figure 14).

Early accounts of flora and fauna information were also collected from Twidale (1976), various volumes of The South Australian Naturalist and South Australian Ornithologist, Warburton (1977), Bushman (1986), South Australian Museum and the State Herbarium. These data sources are referenced in the flora and fauna species lists in Appendices I, IV, V and VI.

Bibliography

A comprehensive bibliography has been established for the Adelaide Park Lands. The complete list is presented in this report. Although this project has attempted to collect as many references to the biology of the Adelaide Park Land area as possible, the list may not have exhausted all avenues. This bibliography was established with searches conducted through the Department of Human Services Library; Barr Smith Library of the University of Adelaide; State Library;

and thesis lists available through University Departments, which are cited herein.

There is also an 'Adelaide Biodiversity Bibliography' compiled by Bishop and Thomas (1999) available through the South Australian Urban Forest Biodiversity Program (SAUFBP). This bibliography lists publications and research regarding biodiversity issues and conservation for the whole Adelaide Metropolitan Area. This bibliography is available through the SAUFBP or can be downloaded from their website at: www.urbanforest.on.net.

Department for Environment and Heritage (DEH)

Biological Databases

DEH had no existing data on the Biological Databases of South Australia (BDSA) for the Adelaide Park Lands. There have been no previous biological surveys conducted in the area by DEH. A Survey number was assigned to the Adelaide Park Lands Biodiversity Survey. This project has now added flora and fauna data to the Opportune and Reserves databases. DEH is the custodian of this data, and it can be accessed through the Biological Survey and Monitoring Group (BSM).

Areas defined for this project have also been added to the BDSA. These areas constitute larger blocks to allow data not localised to a particular point to be entered. Six blocks or Survey Divisions were added and include; North Division, East Division, South Division, West Division, River Division and Valley Division (Figure 5). These divisions were based on those used by Whatmough (1989) for his bird observations in the Park Lands.

The Adelaide Park Lands have also been added to the Reserves system of the BDSA as a Local Government Reserve. This is divided to the level of Adelaide City Council Park boundaries (1-27) (Figure 4).

Site-based flora and fauna data collected during this project has also been entered into the BDSA. These databases can be updated if future flora or fauna collections/observations are made.

State Herbarium

The State Herbarium provided historic and current flora information that was available on their databases for the Adelaide region (Appendix II).

Although the State Herbarium was able to provide data with accurate identifications over a long time-period, this data has some limitations. Some of the old collections can have very general location information, either having old place names which may have changed or no longer exist, or 'Adelaide' is used as the defining locality. All specimens are allocated a geocode, which is based on the accuracy of available information. Specimens with a geocode from 1-4 were included in this report (1 = within 150 metres, 2 = within 1 km, 3 = within 10 km and 4 = within 30 km). Some data from the Herbarium for the Adelaide area could be from planted material, but this might not be clear from the information provided for the specimen (H. Vonow pers. com. 2003). Where possible, cultivated material was excluded from the search. The records from the State Herbarium are provided in Appendix II.

Botanic Gardens

The records held at the Botanic Gardens were searched for any remnant plant species that may still be existing in the Gardens from the time of first European settlement.

South Australian Museum

The South Australian Museum provided historic and current fauna species that have been collected in the Adelaide area (Appendices IV, V and VI). Not all fauna groups have been added to a database by the Museum. Data was provided for mammals, birds, reptiles and amphibians. Data was not collected for fish or invertebrates for this survey. The SA Museum provided records based on specimens collected over many years from the Adelaide area, but as with the State Herbarium, their data also has some limitations to consider. In some instances, especially in the old collections the exact locality is unknown. Instead, 'Adelaide' can be given as the location, with a geocode allocated depending on the accuracy of descriptions available. Specimens with a geocode from 1-4 were used in this report (1 = within 0.03 km, 2 = within 0.3 km, 3 = within 2.0 km and 4 = within 18 km). Some exceptions were made if the geocode was 5 (5 = within 55 km) and it was an old collection with comments made about the locality such as 'Torrens Lake' or 'near Adelaide', these details are included in the comments fields of the species lists (Appendix II). The SA Museum data represents specimens that have been collected over-time, the collections do not necessarily represent every species found from an area, therefore it is important to use a variety of sources to paint a more complete picture of species presence.

Government House

There is no remnant native vegetation remaining in the Government House grounds. They do not keep records of bird species or other fauna species that visit the gardens. One night of trapping was conducted in the gardens, using Elliot traps and Anabat. No other information was collected from Government House.

Figure 4.
Adelaide Park Lands Management Units

Management Units and Numbers

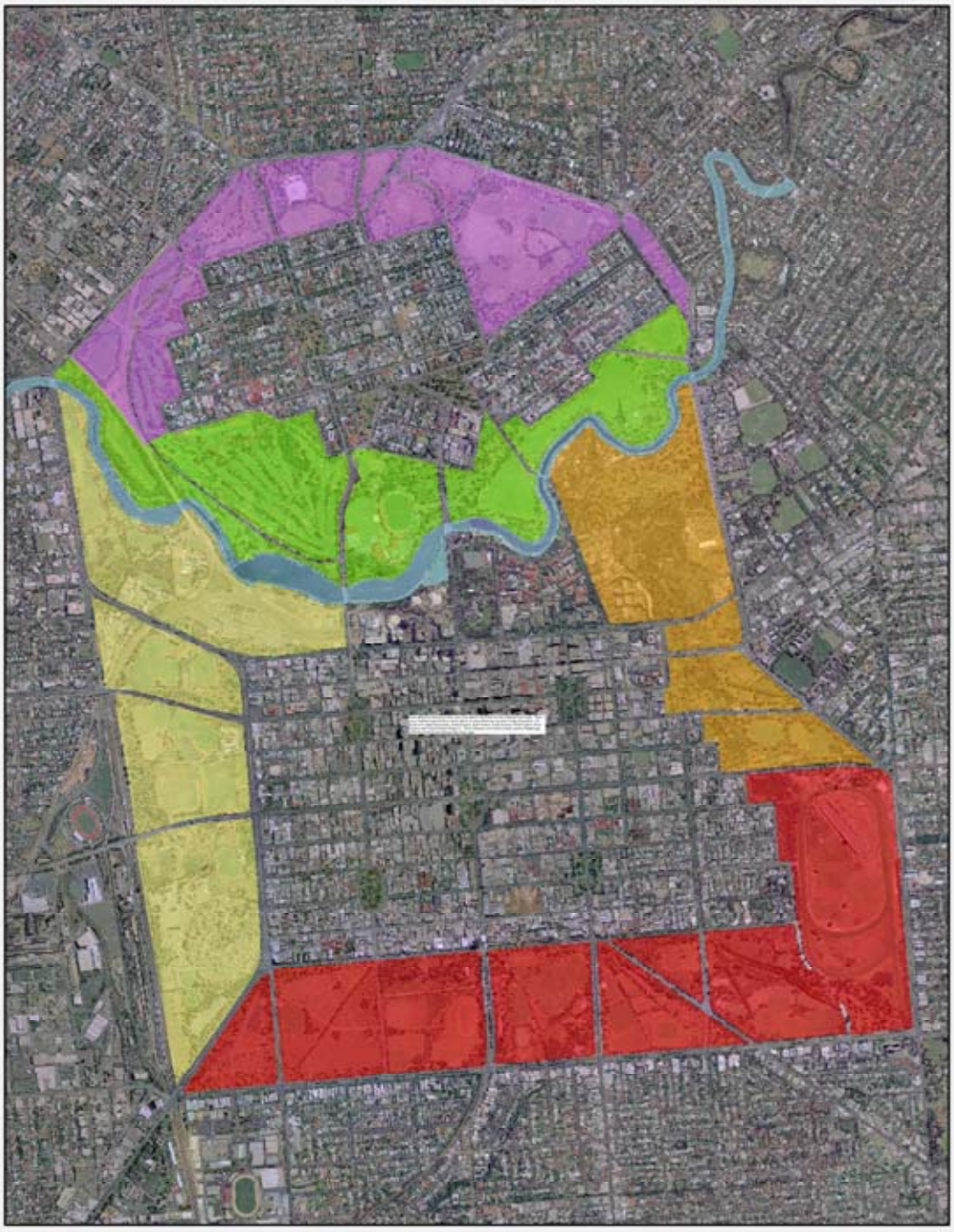

Figure 5.
Adelaide Park Lands Survey Divisions

West Division
South Divsion
North Divison
Valley Division
River Division
East Division

Adelaide City Council (ACC)
The ACC has managed the majority of the Adelaide Park Lands since 1852 (Adelaide Park Lands Management Working Group 2003). The Council has prepared a Park Lands Management Strategy 2000-2036, which provides directions and guidelines for future management. This strategy is the only existing plan for managing the Park Lands (Adelaide Park Lands Management Working Group 2003).

The ACC provided reports from biodiversity related projects conducted in the Park Lands. The ACC also provided information on species planted in each Park, and mapping data, including administrative boundaries and Council Park boundaries.

History Trust of South Australia
The History Trust of South Australia has compiled a series of colonial photographs from 1865 by Townsend Duryea. These photographs constitute a panorama of Adelaide taken from the Adelaide Town Hall and illustrate the extraordinary extent of clearance in the city area from the colonial period. Copies of the original photographs were provided by the History Trust of South Australia for use in this report.

Environment Protection Agency (EPA)
Frog Watch is a program initiated and coordinated by the EPA (www.environment.sa.gov.au/epa/frogcensus) It is a long-term community based survey of frogs throughout South Australia (Walker 2000). A frog census is conducted annually over a one-week period and collects frog recordings from as many different locations possible. Records from the Frog Census were available from 1994-2001 for the Adelaide Park Lands study area. A total of 111 records were collected with five species recorded (Table 13, Chapter 5).

SA Urban Forest Biodiversity Program (SAUFBP)
The SAUFBP was established in 1997 with the main purpose of co-ordinating biodiversity conservation across the Adelaide Metropolitan area (Turner 2001). The SAUFBP aims to protect the remaining native flora and fauna in the Metropolitan area and increase the biomass of locally indigenous species. In 2001, the SAUFBP prepared a report on the biodiversity remaining across Metropolitan Adelaide, including location maps of priority vegetation and remnant bushland sites, species lists and technical information on the region's flora and fauna (Turner 2001). This report was used in the present survey

SA Water
SA Water has not conducted any flora or fauna survey work along the section of the River Torrens that is within the project area. It has however conducted algae surveys and commissioned the Australian Water Quality Centre (AWQC) to carry out some macro-invertebrate work. Aquatic invertebrates were not covered by this terrestrial biopdiversity survey. For more information on this component of the biodiversity refer to, Torrens Catchment Water Management Board (2000).

West Terrace Cemetery
The West Terrace Cemetery has been managed by the Enfield General Cemetery Trust since 1997. Although the Adelaide City Council does not manage the Cemetery, it is an extremely important site for remnant vegetation (Chapter 4). The Cemetery provided remnant plant species lists for this project.

Royal Zoological Society of South Australia
The Adelaide Zoological Gardens have been recording fauna species that are attracted to the zoo from the extra food sources that are available. Bird species including the *Ocyphaps lophotes* Crested Pigeon and various bat species have been monitored. Ant surveys have also been conducted. This data is presented in Chapter 5.

Trees For Life
Trees for Life has Bush Care sites in the Adelaide Park Lands. There are two Bush Care sites in Park 6 in the North Park Lands, where volunteers map remnant plants and encourage regeneration. Species lists were provided for these sites, together with opportune records of remnant vegetation (Figure 24). There is another Bush Care site in the south Park Lands in Park 17, and a dedicated Bush Care volunteer provided a remnant plant species list (Figure 39) and a planted species list for the site. In this area only species propagated from locally indigenous seed are planted.

South Australian Ornithologists Association (SAOA)
The SAOA has been the most active naturalist group in the Adelaide Park Lands. Birds are the most conspicuous fauna in the area, and are very popular with naturalists, tourists and visitors to the Park Lands. The SAOA has compiled bird species lists for the area, and these are available in the SAOA Newsletter. These records were collected and entered onto the Opportune database of the Biological Databases of South Australia for this project.

The SAOA publishes a journal biannually, many species have been recorded for the Adelaide Park Lands in various papers and these were collected and added to the species list in this report (Appendix VI). Many individual club members provided very valuable data for inclusion in this report. Particular reference is made to Mr B. Whatmough who provided nearly 30 years of monthly bird observations in the Park Lands. A detailed description of this work is outlined in this Chapter and Chapter 4. This data is invaluable and has

provided a rare opportunity to analyse species changes over-time.

Park Lands Preservation Association
Members from this association were able to confirm that the only large remnant trees remaining in the Park Lands are the two river red gums in the Botanic Gardens. A member of the Association is also currently trying to match historically significant events to plantings in the Park Lands.

Torrens Catchment Water Management Board
The Board provided references of relevant reports available for the Adelaide Park Land section of the River Torrens. No specific flora and fauna information has been collected by the Board in the study area.

University of Adelaide
Information was compiled from three projects. An Honours student in the Environmental Biology Department looked at changes in flora and fauna assemblages from 1836-present across Metropolitan Adelaide (Tait 2003). A third year Natural Resources Management student assessed use by native and non-native species of tree hollows in the south-east Park Lands (Lucas n.d.). An Honours thesis in Environmental Biology looked into the 'Ecology of Urban Constructed Wetlands' (Outram 1997). Comparisons were made with water quality and macrophytes between those wetlands that were well vegetated with macrophytes compared with those that were not.

University of South Australia
The only Park Land related research found was a report made to the Patawalonga Catchment Water Management Board by the Mosquito Research Laboratory at the University of South Australia in 1998, which was a 'South Park Lands Mosquito Survey' (Kokkin *et al*. 1998). The abundance and species presence was recorded for the south Park Land area.

Flinders University
No specific research projects are being conducted in the Adelaide Park Lands at present but a zoology lecturer, Dr. K. Sanderson has done previous research on bat behaviour in some areas of Metropolitan Adelaide and the Adelaide Hills. Of particular interest to this project is a paper examining if there are differences in bat behaviour between a natural area, in this case Belair National Park, and an urban area. In addition, a research paper by a Bachelor of Science student on ants in the south Park Lands was used.

Biocity: Centre for Urban Habitats
The Centre for Urban Habitats was formed in November 2002 with the aims to promote environmental awareness and to establish environmental research to maintain and renew our ecology in our urban environments. The key aim of the Centre is to conduct research, to provide independent scientific based advice to Local and State Governments and to communicate and exchange this information with the general community. This Centre will therefore be a very important catalyst for the exchange of information and should be approached at the development stage of urban-based projects. Partners in the Centre for Urban Habitats include: University of Adelaide, South Australian Museum, Botanic Gardens, Royal Zoological Society of South Australia, Adelaide City Council and the Capital City Committee. Support is also given from members of The Department for Environment and Heritage, Flinders University and the South Australian Research and Development Institute.

Individuals
Many individuals have contributed valuable information to this project, for both flora and fauna. The information collected by these individuals in many cases has been temporal observations that are extremely valuable for an intensely managed area such as the Park Lands. This information has proved invaluable in making future management recommendations for protecting and enhancing the remnant biodiversity values. A particular mention is due to the following people: fauna contributions - Mr B. Whatmough (birds), Mr R. Grund (butterflies) and Mrs P. Paton (birds): flora contributions – Mr. D. Kraehenbuehl, Mr A. Crompton, Mrs P. Paton, Mrs J. Subagio, Mr M. Sando, Mr P. Bagust, Mrs S. Seacomb and Mr T. Jury, see also Tables 1 and 2 for data that was supplied by individuals and entered into the BDSA.

SURVEY METHODOLOGY

A major component of this survey was to compile existing information from a variety of sources as detailed above. The exercise of compiling existing data shaped some of the survey methodology. For example, collecting new bird data in the time-frame of this survey was considered unnecessary, when 30 years of standard, repeatable bird transect data was available from a dedicated ornithologist in the area. The range of data collection methods used for this project are outlined below.

Flora
Quadrat-based sampling were used in this survey. Instead, reconnaissance style observations of the Park Land area were conducted. In 1996, D. Kraehenbuehl published a pre-European vegetation map encompassing the Adelaide Metropolitan area, including the Adelaide Park Lands (Kraehenbuehl 1996). He has many years of botanical experience in this area and was commissioned for this task. Over a number of weeks excursions were made to each of the ACC Park areas and plant species lists were made, including native and exotic species. An assessment of

each area was made for enhancement with remnant species, and recommendations made for suitable species for planting. The results of this survey are detailed in the Vegetation section of this report. Remnant plant species lists collected by Darrell Kraehenbuehl for each ACC Park area were added to the Reserves database. Table 1 details other data entered into the BDSA and the source.
Exotic species and planted Australian species lists were also made for each ACC Park by D. Kraehenbuehl. These species were not included in the BDSA but were entered in an Excel spreadsheet.

Pre-European Vegetation
Kraehenbuehl (1996), reconstructed patterns of pre-European vegetation for the Adelaide Metropolitan area, from Gawler River to Hallett Cove, from examining collected plant specimens, historical records, art works and photography combined with visits to areas of remaining native vegetation. He also used existing soil maps, adopting soil associations as surrogates for some of the vegetation association boundaries. Kraehenbuehl's (1996) map was able to be refined for the Park Land area. Descriptions of the vegetation, soils and topographic associations of the Park Lands area are spread throughout various chapters of his book. This current project draws together the detail for the original City and Park Lands vegetation into one table (Table 4). Additional information from soil mapping and soil types is also included, along with descriptions of some unusual environments identified for the area (Chapter 4).

Vegetation association refinements from Kraehenbuehl's (1996) map were based on continuing the soil/topographic relationships from Taylor *et al*. (1974) into the Park Lands area. This was achieved through observations of the River Torrens and North Adelaide area, particularly of major breaks of slope and soil types in the area. From this and comments made by Kraehenbuehl (1996), vegetation association boundaries inside the Park Lands were matched with soil association boundaries immediately outside the Park Lands (Figure 14, Chapter 3). Some sub-classes were also added to the broader associations defined by Kraehenbuehl (1996) (Figure 14), which represent changes in soil and drainage over the area. Chapter 4 details the vegetation associations and the sub-classes identified with the species lists for each extracted from Kraehenbuehl (1996).

Table 1.
Source of flora data entered into the Biological Databases of South Australia.

Source	Reserves Database	Opportune Database
Mrs P. Paton	Remnant plant species lists for Parks 7 & 8 and Botanic Park (2003)	Site localities of remnant species in Park 6 (2003)
Mr B. Isted		Records of *Vittadinia blackiii* and *Boerhavia dominii* in North Park Lands (2003)
Mrs J. Subagio	Remnant plant species list in Park 17 (2002)	
West Terrace Cemetery (with Additions from Adelaide Botanic Gardens)	Remnant plant species list for West Terrace Cemetery (2002)	
Mr P. Bagust	Remnant plant species list for West Terrace Cemetery (2002)	
Mr M. Sando	Plant species list of the South Park Lands (2001)	
Mr. A. Carter		Native vegetation survey along the River Torrens (1999)
Crompton, A.W. (1998) *South Park Lands Wetlands Feasibility Project, Native Vegetation Survey*. Prepared for the Patawalonga Catchment Water Management Board.	Remnant plant species lists for South Park Lands, Parks 16, 17, 18, 19, 20, 21, 21W and 22.	
Crompton, A.W. (1997) *Management of Native Vegetation on Park 16*. Report for the City of Adelaide.	Remnant plant species list for Park 16	

FAUNA

A variety of data sources were used for collecting fauna information. Data was collected for mammals, birds, reptiles, amphibians, fish and some invertebrates. Data was collected and added to the BDSA. Table 2 details all of the fauna data collected and added to the Reserves and Opportune databases within the BDSA. The majority of data sources for fauna collection have already been discussed under the appropriate organisation headings, for example SA Museum, EPA etc. (this chapter). However, there are some other specific data collections and methodologies requiring discussion. Mammals

Bats were surveyed during this project using an ANABAT bat detector. ANABAT is a device for listening to the echolocation calls of bats. The detector is connected to a laptop computer which stores each call and can be set-up and left overnight. Most bat calls are out of the frequency range that is audible to humans. As calls are unique species ANABAT allows calls be identified to species level for most species.

The bat detector was set up for five nights at locations where it could be locked-up, sheltered and allow the microphone to be set-up out of a window. Recording sites included five of the six larger divisions (Figure 5): River Division (Adelaide University boatshed); Valley Division (Government House); East Division (Rymill Park); South Division (Park 19); and West Division (West Terrace Cemetery). Recorded data was downloaded from ANABAT each night and species were identified using reference calls from known species in the Mount Lofty Ranges. Mr T. Reardon, South Australian Museum confirmed the calls.

Birds

A dedicated South Australian Ornithological Association member Mr. B. Whatmough has surveyed birds in the Adelaide City Park Lands since 1974. . Transects totalling about 6km are walked in each of the six major parkland divisions (Figure 5). Each transect was walked once a month, usually over two days in the first three weeks of each calender month. No time constraint is placed on visits and deviations for unusual sightings or for checking doubtful identifications are taken (Whatmough 1989 and 1997). Identified birds were counted and recorded from 1974-present. Mr B. Whatmough supplied a compilation of this data from his nearly 30 years of dedicated and repeatable, data collection. A bird species list was provided summarising the months of the year each species was recorded from 1974-2001 from each of the six Park Land divisions. From this data, species changes over nearly 30 years could be analysed by plotting their presence/absence (Chapter 4).

The volume of raw data collected by Watmough could not be entered and analysed in detail in the time frame of this survey. The divisions as used by Whatmough (1989, 1997) have been added to the BDSA and it is hoped that the raw data will be collected and added to the database in the near future. The data is extremely valuable and it is strongly recommended that it be stored in the BDSA, with Mr B. Whatmough being the custodian of the data.

Table 2.
Sources of fauna data entered into Biological Databases of South Australia.

Source	Reserves	Opportune
Mrs P. Paton and Mr D. Paton		Incidental bird records from Adelaide and North Adelaide Park Lands 2000-2003
Mr R. Brandle		Reptile observations in Adelaide Park Lands (2003)
Mrs J. Subagio	Bird species list for Park 17 (2002)	
Pulteney Grammar School with Mr T. Reardon and Mrs S. Seacomb		Bat records from South Park Lands (1998)
SAOA Newsletters		Bird records from SAOA members listed in the club newsletters 1965-1996
Pedler, J.A. and Paton, P.A. (1992) *Avifauna of the Torrens Linear Park.* Report on a survey conducted from November 1991-April 1992		Birds recorded from the Adelaide Park Land section of the River Torrens Linear Park (from raw data)

Reptiles and Amphibians
Members of Biological Survey and Monitoring made observations of reptiles when making casual visits to the Park Lands. EPA frog census data, a long-term community based program run throughout South Australia since 1994 (Walker 2000).was collated for amphibian records.

Insects and Arachnids
Mr R. Grund supplied a list of butterfly species likely to occur in the Adelaide City Park Lands, and made recommendations for which flora species to plant to encourage more butterflies into the area. The SA Museum supplied a species list of spiders occurring in the Park Lands, and literature available on ant species was also compiled (Chapter 5).

TAXONOMY AND STATUS
As the flora and fauna data collected for this project was from a wide variety of sources, it was necessary to standardise the taxonomy and conservation status of the species recorded. The most current sources for taxonomy and status were used in this report. Table 3 provides a summary of the sources used.

Table 3.
Sources of Taxonomy and Status used in report.

Taxonomy		Status		
	Source	**AUS**	**SA**	**Regional**
Flora	Unpublished Census Report (2003) State Herbarium of South Australia, Plant Biodiversity Centre, Adelaide.	2002 Review - ESP Act, 1992 Schedule 1 and 2	2002 Review NPWSA Act, 1972 Updated Schedule 1999	Lang and Kraehenbuehl (1998) '*Plants of particular cons. significance in S A agricultural region'*
Mammals	Robinson *et al*. (2000)	2002 Review - ESP Act, 1992 Schedule 1 and 2	2002 Review NPWSA Act, 1972 Updated Schedule 1999	-
Birds	Robinson *et al*. (2000)	2002 Review - ESP Act, 1992 Schedule 1 and 2	2002 Review NPWSA Act, 1972 Updated Schedule 1999	Carpenter and Reid (1998) unpublished database '*The habitat and Status of birds in South Australia's Agricultural regions'*
Reptiles	Robinson *et al*. (2000)	2002 Review - ESP Act, 1992 Schedule 1 and 2	2002 Review NPWSA Act, 1972 Updated Schedule 1999	-
Frogs	Robinson *et al*. (2000)	2002 Review - ESP Act, 1992 Schedule 1 and 2	2002 Review NPWSA Act, 1972 Updated Schedule 1999	-
Fish	Robinson *et al*. (2000)	2002 Review - ESP Act, 1992 Schedule 1 and 2	2002 Review NPWSA Act, 1972 Updated Schedule 1999	-

RESULTS

VEGETATION

INTRODUCTION

This chapter describes the diversity of flora that existed in the Adelaide Park Lands and records species that are present today. Pre-European vegetation associations that would have existed across the Park Lands are described, along with associated soil descriptions. Some unusual environments are also described. The conservation significance of particular areas within the Park Lands is examined. Additional information is provided for plant species with conservation ratings, either at a National, State, Regional or Local level. Each Park Land site is also described and a native plant species list is provided.

There is little question that the early colonists were extremely efficient at clearing the original natural vegetation of the Adelaide Park Land area for the establishment of the new colony. The site of the City of Adelaide would have been one of the first areas over the plains to lose its original flora. It was an industrious new colony with a rapidly growing population. A German settler, C.A. Sobels, arrived in Adelaide in 1849 and was staggered at the rate of development in Adelaide:

> '*…at first we couldn't believe our eyes and stood as if stunned, for nobody understood how it was possible that a country in such circumstances could have roads and bridges where nine or ten years previously no European had set foot. One saw everywhere the best looking cattle in the world, small huts on every section, and also nice houses in whose gardens we found almonds, apples, plums, peaches and melons. Here one first sees what the English have the capacity for doing.*' Sobels (1849) cited in Kraehenbuehl (1996).

Not only did the rate of building grow rapidly in the new colony, but so did agriculture. Introducing another serious threat to the remaining native vegetation, competition with vigorous weeds. Another interesting observation by botanist von Mueller, 1853:

> *'How perfectly the transforming influence of the imported vegetation acts upon the original flora may be readily observed in the neighbourhood of Adelaide, where the Australian grass now growing only in scattered tufts, has made way for a thick turf of* Poa annua, Briza, Koeleria*, etc.'* Mueller (1853) cited in Kraehenbuehl (1996*).*

In 1865, Townsend Duryea took a photographic panorama of Adelaide from the tower of the Adelaide Town Hall. These photographs provide a visual account of the extent of clearance that had already occurred and offer some clues to the structure of the remaining woodland at that time. Figure 6 is looking North along King William Street. The banks of the River Torrens can be seen and just beyond this are rows of eucalypts that were planted where Pennington Terrace is today. These trees were later removed and replaced with exotic species. Remaining stands of woodland can still be seen in the distance. Figure 7 is looking North toward Kintore Avenue. A forest of River Red Gum (*Eucalyptus camaldulensis* var. *camaldulensis*) stretching toward Walkerville is discernible (Kraehenbuehl 1996).

The foreground of Figure's 6 and 7 illustrate how little vegetation was left in the city streets. Figure 8 is looking east toward the foothills, with St Paul's Anglican Church visible, which still stands today on Pulteney Street. Figure 9 looking east toward Halifax Street, illustrates, as with Figure 8, open fields suggesting the area was cleared years earlier.

The stringybark forests of the Mount Lofty Ranges were exploited very early in settlement. This led to soil erosion on hill slopes and siltation of the River Torrens (Kraehenbuehl 1996). Again, the extent of clearance by 1865 in the Adelaide City area and Park Land area becomes apparent (Figure 8).

Figure 6.
North along King William Street. Rows of eucalypts planted in background.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

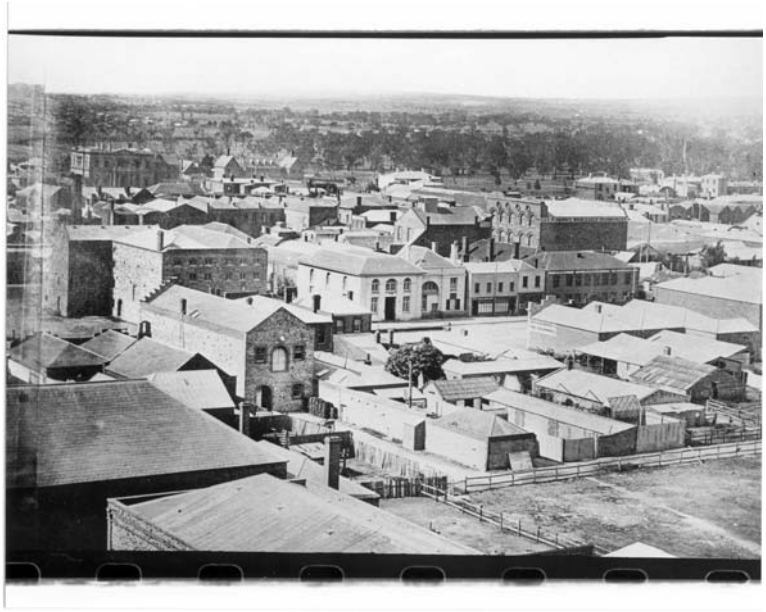

Figure 7.
North toward Kintore Avenue showing River Red Gum forest in distance.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

Figure 8.
Looking East across Pulteney Street, with St Paul's Anglican Church visible.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

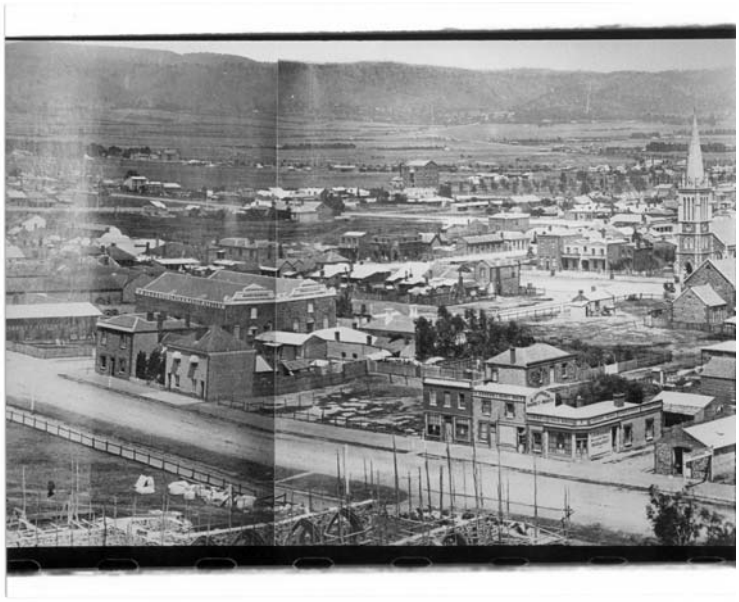

Figure 9.
East toward Halifax Street, a patch of Woodland remains on Halifax Street (top left of figure) where St John's Anglican Church stood and was known as 'St John's in the Wilderness'.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

Figure 10 and 11 are looking south from the Town Hall. Figure 10 shows a number of dead eucalypts in the foreground and the extent of clearance around the city block. Patches of woodland can be seen in the distance. Figure 11 is looking South along King William Street, where it then stopped at South Terrace. Rows of plantings in Victoria Square are in the foreground. This figure is also notable for the large patches of relatively dense woodland remaining at the top of the image, this patch is thought to have been part of the Black Forest (Kraehenbuehl 1996), which was in areas now known as Hyde Park and Goodwood.

Figure 10.
Looking South East toward Halifax Street.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

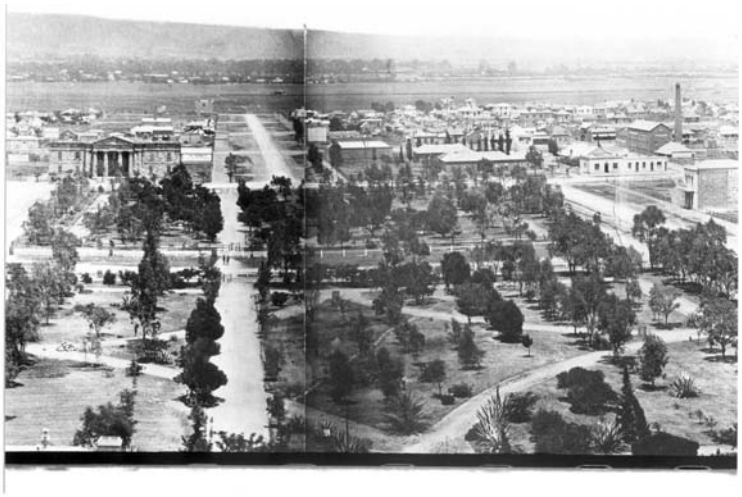

Figure 11.
King William Street looking South. Victoria Square in the foreground with the 'Black Forest' Woodland discernible in the background. Magistrates Court on the left of image.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

The view west of the city is captured in Figure 12, with the now Adelaide Central Mission in the centre of the image. Looking west you can see a large patch of woodland in the distance and in front of this is the low scrub of West Terrace Cemetery. West Terrace Cemetery today provides some clues as to what vegetation existed in the area. It can also be seen from this image that the Park Land area south of the West Terrace Cemetery is completely cleared. Figure 13 exemplifies the bleak scene of clearance west of the city in the Torrens Valley.

Figure 12.
Adelaide Central Mission building in centre of image. The remaining patch of vegetation on the outskirts of the city represents the West Terrace Cemetery.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

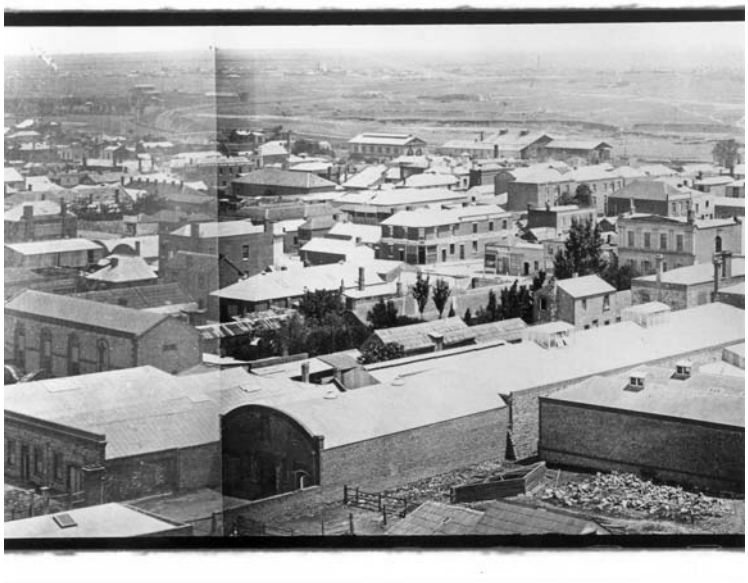

Figure 13.
Looking west over the totally denuded Torrens Valley. The Valley was cleared in the early years for firing brick kilns.
Photo: Townsend Duryea Diorama, 1865. (Source: History Trust of South Australia).

This series of photographs from 1865 provide an invaluable insight into the structure of the woodlands that once covered the Park Land area. It is staggering to see the amount of clearance that had occurred by this period and the early attempts at re-vegetating some of the inner city squares. These photographs helped provide background for the reconstruction of the vegetation communities defined by Kraehenbuehl (1996) for the Adelaide Plains. Description of the original vegetation communities covering the Adelaide Park Lands are presented below and in Table 4.

VEGETATION COMMUNITIES

A re-construction of the original vegetation communities covering the Park Land area was required for this project. Kraehenbuehl (1996) re-constructed the vegetation communities, which existed before European settlement, over the entire Adelaide Metropolitan area. This publication is the basis for the vegetation communities presented in this Chapter. Some modification was made to the original association boundaries as defined by Kraehenbuehl (1996) with refinements made to the broader association categories, as described by this report in Chapter 3. The understorey plant species were extracted from Kraehenbuehl (1996) and arepresented in Table 4. Figure 14 illustrates the vegetation community boundaries that once covered the Adelaide City Park Lands.

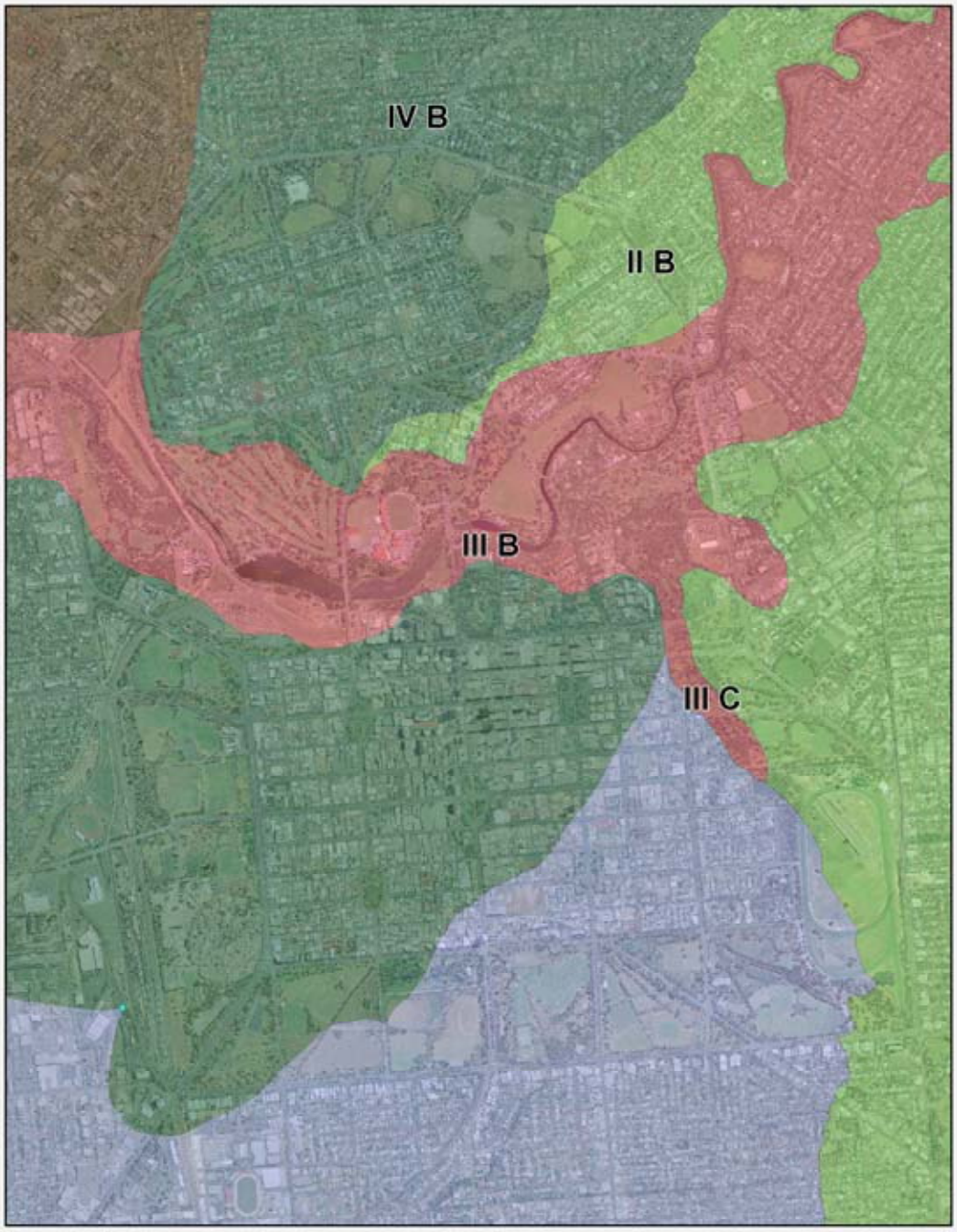

Figure 14.
Pre-European Vegetation Communities of the Adelaide Park Lands

I *E. microcarpa-E. leucoxylon* Woodland
II *E. leucoxylon-E. camaldulensis* Woodland (+ II B)
III *E.camaldulensis* Woodland (+ III B and III C)
IV *E. porosa* Mallee Woodland (+ IV B)
V *Eucalyptus sp. (E. ?porosa)* Mallee Woodland

N
0 0.5
Kms

Table 4.
Pre-European Plant Communities in the Adelaide Park Lands (also refer to Figure 14). Understorey species derived from Kraehenbuehl (1996).

Structure	Understorey	Soil Type	Location	Source
WOODLAND				
I. Eucalyptus microcarpa* – *Eucalyptus leucoxylon* ssp. *leucoxylon **"Black Forest"**	*Allocasuarina verticillata, Bursaria spinosa* ssp. *spinosa, Acacia pycnantha, A. acinacea, A. paradoxa* and *Xanthorrhoea semiplana* ssp. *semiplana*	Red-Brown Earths	East-South Park Lands	
mid stratum	*Dillwynia hispida, Hardenbergia violacea, Dianella revoluta* var. *revoluta, Lomandra densiflora, Scaevola albida, Kennedia prostrata* and *Acaena* sp.			Kraehenbuehl (1996) pg 69 (Heywood Park)
ground stratum	Grasses: *Elymus scaber* var. *scaber, Poa poiformis* var. *poiformis, P. labillardieri* var. *labillardieri, Danthonia setacea* var. *setacea, D. racemosa* var. *racemosa, Austrostipa flavescens*. Sedges: *Carex gunniana, Stackhousia monogyna, Ranunculus lappaceus, Goodenia pinnatifida, Dichondra repens, Lythrum hyssopifolia, Convolvulus erubescens, Oxalis perennans, Vittadinia gracilis, Drosera glanduligera, Cotula australis, Arthropodium strictum* and *Calostemma purpureum.* Orchids: *Diurus behrii, D. pardina, Caladenia tentaculata* and *C. leptochila*.			
II. *Eucalyptus leucoxylon* ssp. *leucoxylon* - *Eucalyptus camaldulensis* var. *camaldulensis*	*Exocarpos cupressiformis, Allocasuarina verticillata* and *Acacia pycnantha*	Red-Brown Earths and Alluvial Soils	East Park Lands	
mid stratum	*Pultenaea acerosa, Dillwynia hispida, Grevillea lavandulacea* ssp. *lavandulacea, Cheiranthera alternifolia, Lomandra multiflora* ssp. *dura, L. nana, L. densiflora, Dianella revoluta* var. *revoluta, Pimelea glauca, P. humilis, Tricoryne elatior, Epilobium hirtigerum* (presumably in damp places), *Gonocarpus mezianus, G. elatus, Senecio quadridentatus* and *Cynoglossum suaveolens*			Kraehenbuehl (1996) pg 90 (Kensington)
ground stratum	Herbs: *Leptorhynchos squamatus* ssp. *squamatus, L. tetrachaetus, Linum marginale, Drosera whittakeri, Goodenia pinnatifida, Maireana enchylaenoides, Arthropodium strictum, A. fimbriatum, Caesia calliantha, Bulbine bulbosa, Calostemma purpureum, Acaena novae-zelandiae* and several *Vittadinia species*. Grasses: *Austrostipa flavescens, A. nodosa, A. semibarbata, Themeda triandra, Elymus scaber* var. *scaber, Enneapogon nigricans, Poa crassicaudex, P. poiformis* var. *poiformis* and five *Danthonia* species. Annuals*: Brachyscome debilis, Siloxerus multiflorus, Triptilodiscus pygmaeus* and *Crassula decumbens* var. *decumbens.*			
IIB. *E. leucoxylon* ssp. *leucoxylon* +/- *E. camaldulensis* var. *camaldulensis*	no understorey species available	Alluvial Soils	Melbourne St. area of North Adelaide	J. McDonald pers. comm. 2002
III. *Eucalyptus camaldulensis* var. *camaldulensis* +/- *E. leucoxylon* ssp. *leucoxylon*	*Leptospermum lanigerum* and *Callistemon sieberi*	Alluvial Soils	River Torrens, general and includes floodplains, terraces and	Kraehenbuehl (1996) pg 81 (river bank)

Structure	Understorey	Soil Type	Location	Source
			banks	
terraces and river banks	*Adriana klotzschii, Agrostis avenacea, Callistemon sieberi, Carex appressa, C. bichenoviana, C. gaudichaudiana, C. inversa* var. *major, Centipeda cunninghamii, Cymbopogon ambiguus, Cynoglossum australe, Cyperus gymnocaulos, Elymus scaber* var. *scaber, Euchiton sphaericus, Goodenia amplexans, Hardenbergia violacea, Lavatera plebeia, Leptospermum lanigerum, Lythrum hyssopifolia, L. salicaria, Maireana brevifolia, Persicaria decipiens, P. lapathifolia, Phragmites australis, Cullen australasicum, Rumex brownii, Samolus repens, Sclerolaena diacantha.*			Kraehenbuehl (1996) pg 84-85 (river bank)
floodplains	*Acacia pycnantha, Arthropodium strictum, Boerhavia dominii, Bursaria spinosa* ssp. *spinosa, Calostemma purpureum, Chenopodium pumilio, Cotula australis, Craspedia variablis, Danthonia caespitosa, Danthonia* sp.*, Dichondra repens, Elymus scaber* var. *scaber, Hardenbergia violacea, Microseris lanceolata, Poa labillardieri* var. *labillardieri, Ranunculus lappaceus, Sclerolaena diacantha, Austrostipa nodosa* and *Themeda triandra*			Kraehenbuehl (1996) pg 84-85 (floodplain - Botanic Park)
IIIB. *E. camaldulensis* var. *camaldulensis* or *Phragmites australis +/- Typha domingensis* river bed	*Acacia retinodes* var. *retinodes, Bolboschoenus caldwellii, Callistemon sieberi, Calystegia sepium, Centella cordifolia, Cyperus gymnocaulos, C. vaginatus, Eclipta platyglossa, Epilobium* sp.*, Goodenia ovata, Gratiola peruviana, Isolepis inundata, Juncus bufonius, J. caespiticius, J. kraussii, J. pallidus, J. pauciflorus, J. sarophorus, Leptospermum lanigerum, Lobelia alata, Lythrum salicaria, Mimulus repens, Myriophyllum crispatum, Panicum effusum* var. *effusum, Persicaria decipiens, P. lapathifolia, Phragmites australis, Potamogeton crispus, P. ochreatus, Samolus repens, Schoenoplectus litoralis, S. pungens, S. validus, Senecio hypoleucus, Typha domingensis, Vallisneria americana* and *Villarsia umbricola* var. *umbricola*			Kraehenbuehl (1996) pg 84-85 (river bed)
IIIC. *Eucalyptus camaldulensis* var. *camaldulensis +/- E. leucoxylon* ssp. *leucoxylon* alluvial flats	*Callitris gracilis, Allocasuarina verticillata, Exocarpus cupressiformis* and *Bursaria spinosa* ssp. *spinosa.* Shrubs*: Dodonaea viscosa* ssp. *spatulata, Xanthorrhoea semiplana* ssp. *semiplana, Hakea rugosa, Grevillea lavandulacea* var. *lavandulacea, Olearia ramulosa, Eutaxia microphylla, Calytrix tetragona, Acacia paradoxa, A. acinacea, Cheiranthera alternifolia, Hibbertia sericea, Dianella revoluta* var. *revoluta, Astroloma humifusum, Goodenia amplexans* and *Pimelea stricta*. Perrenials and bulbs: *Goodenia blackiana, Velleia paradoxa, Lomandra multiflora* ssp. *dura, L. densiflora, L. juncea, Tricoryne elatior, Kennedia prostrata, Gonocarpus mezianus, Haloragis heterophylla, Leptorhynchos squamatus* ssp. *squamatus, Calocephalus citreus, Cheilanthes austrotenuifolia, Geranium potentilloides* var. *potentilloides, Drosera whittakeri, Caesia calliantha.* Orchids*: Caladenia reticulata* and		East Park Lands	Kraehenbuehl (1996) pg 90-91 (Second Creek)

Structure	Understorey	Soil Type	Location	Source
	Thelymitra luteocilium.			
	Grasses*: Themeda triandra, Chloris truncata, Aristida behriana, Agrostis avenacea* and several *Danthonia* and *Austrostipa* species. Reeds*: Phragmites australis*. Sedges: *Isolepis cernua, Schoenus breviculmis, Juncus caespiticius*			
MALLEE WOODLAND				
IV. *Eucalyptus porosa* upper stratum mid stratum	*Acacia pycnantha, A. acinacea, A. ligulata, A.salicina, Allocasuarina verticillata, Pittosporum angustifolium and Santalum acuminatum.* *Dianella revoluta* var. *revoluta, Hardenbergia violacea, Lotus australis, Lavatera plebeia, Enchylaena tomentosa* var. *tomentosa, Atriplex paludosa* ssp. *paludosa, A. semibaccata, A. suberecta, Cyperus gymnocaulos, Vittadinia australasica* var. *australasica, V. gracilis* and *Convolvulus erubescens.* Ground stratum*: Ptilotus spathulatus* form *spathulatus, Maireana enchylaenoides, Goodenia pinnatifida, Oxalis perennans, Asperula conferta, Chenopodium pumilio, Euphorbia drummondii, Juncus bufonius, Calostemma purpureum, Hypoxis glabella* var. *glabella, Arthropodium fimbriatum, A. strictum* and *Bulbine bulbosa.* Grasses: *Aristida behriana, Danthonia caespitosa, Enteropogon acicularis, Puccinellia stricta* var. *stricta, Austrostipa blackii, A. curticoma, A. eremophila, A. elegantissima, A. nodosa* and *A. scabra* ssp. *scabra.*	Solonised Brown Soils	West Terrace Cemetery and adjoining city area	Kraehenbuehl (1996) pg 135 (West Terrace Cemetery, West Park Lands and Mile End Station Yards)
IVB. *E. porosa +/- Callitris preissii +/- Eucalyptus socialis* upper stratum mid stratum	Scattered *Acacia salicina, Eucalyptus dumosa, Allocasuarina verticillata, Exocarpus cupressiformis* and *Myoporum platycarpum* ssp. *perbellum.* Taller shrubs*: Acacia pycnantha, A. acinacea, A. victoriae* ssp. *victoriae, A. ligulata, A. paradoxa, Eremophila glabra* ssp. *glabra, Pittosporum angustifolium, Santalum acuminatum, Leptomeria aphylla, Dodonaea viscosa* subsp. *spatulata* and *Senna artemisioides* ssp. *coriacea.* *Hardenbergia violacea, Eutaxia microphylla, Bursaria spinosa, Rhagodia candolleana* ssp. *candolleana, Dianella revoluta* var. *revoluta, Lomandra densiflora, L. effusa, L. multiflora* ssp. *dura, Cassinia arcuata, Tricoryne tenella* and *Pimelea micrantha*.	Solonised Brown Soils	North Adelaide	Kraehenbuehl (1996) Brooks Scrub and Folland Park, pg 139
ground stratum	*Goodenia pinnatifida, G. willisiana, G. amplexans, Velleia paradoxa, Salsola kali, Carpobrotus rossii, Ptilotus spathulatus* form *spathulatus, Cynoglossum suaveolens, Omphalolappula concava, Vittadinia cuneata* form *cuneata, Helichrysum leucopsideum, Lagenophora huegelii, Leptorhynchos tetrachaetus, Podolepis canescens, Craspedia variablis, Senecio lautus, Brachyscome goniocarpa, Rhodanthe pygmaea* and *Actinobole uliginosum.* Bulbous plants*: Arthropodium fimbriatum, A. strictum, Thysanotus baueri, Microseris lanceolata,*			Kraehenbuehl (1996) Brooks Scrub and Folland Park, pg 139

Structure	Understorey	Soil Type	Location	Source
	Pterostylis mutica, P. aff. *mitchellii, P. robusta* and *Genoplesium rufum.* Grasses*: Aristida behriana, Austrostipa acrociliata, A. multispiculis, A. platychaeta, A. flavescens, A. nitida, A. drummondii, Panicum effusum* var. *effusum, Themeda triandra, Enneapogon nigricans, Elymus scaber* var. *scaber, Danthonia caespitosa* and *Cymbopogon obtectus*			
VERY OPEN WOODLAND				
V. *Eucalyptus* sp. *(probably E. porosa)* ground stratum	*Boerhavia dominii, Arthropodium fimbriatum, A. strictum, Carex gaudichaudiana, Goodenia pinnatifida, Pittosporum angustifolium, Rumex brownii, Senecio cunninghamii* var. *cunninghamii, Erodium crinitum, Teucrium racemosum, Chenopodium pumilio, Wahlenbergia communis, W. luteola, Chloris truncata* and *Aristida behriana.*	Red Brown Earths	Park Lands adjacent Thebarton and Hindmarsh	Kraehenbuehl (1996) pg 197 Western Plains between old red sand dunes and Mile End

SOILS AND UNUSUAL ENVIRONMENTS

Soils

The soils of the Park Lands offer significant clues for defining the pre-European vegetation associations. In addition to the four main soil-types described, three unique environments were also identified. As soil-types were important in discerning the vegetation associations in this project, detailed descriptions of the prominent soils and the unique environments identified for the area are provided.

Alluvial Soils

Alluvial soils are found in the lower reaches of the River Torrens (Figure 3). These soils have no general profile determined and they are common along the River Torrens (Taylor *et al*.1974). Drainage of these soils is rapid, but they can be temporarily waterlogged from surface flooding. They are likely to be fertile with abundant silt deposits. *Eucalyptus camaldulensis* var. *camaldulensis* Woodland would have been associated with this soil (Table 4).

Red Brown Earths (lower Outwash Plain)

These soils are found in the lower part of the Upper Outwash Plain (Figure 3). They are light textured topsoils over well-structured red-brown clay sub-soil with a distinct lime-rich layer immediately below the clay in the subsoil (Stace *et al*. 1968). This soil type is generally associated with savannah woodlands. The *E. microcarpa – E. leucoxylon* ssp. *leucoxylon* Woodland, *E. leucoxylon* ssp. *leucoxylon – E. camaldulensis* var. *camaldulensis* Woodland and the *Eucalyptus* sp. (*E. ? porosa*) Very Open Woodland (Table 4) are identified with this soil in the Park Lands.

Red Brown Earths (upper Outwash Plain)

These soils have similar characteristics to the Red Brown Earth, described above. They have excellent drainage, generally assisted by the slopes on which they occur. These soils supported the Black Forest extending from Wayville towards Burnside as outlined in Kraehenbuehl (1996) and this Chapter. These soils are probably associated more with *E. leucoxylon* ssp. *leucoxylon.* A small area of this soil occurs near Victoria Park Racecourse, but this would not alter the general vegetation association patterns mapped in that area (J. McDonald, pers. comm. 2002) (Figure 14).

Brown Soil of Para Fault Block

Otherwise referred to as Solonised Brown Soils (Figure 3) these are typically sandy or loamy topsoils gradually increasing to clay loams deep in the profile, and with a very thick layer of lime rich material (Stace *et al.* 1968). These soils are not structured and contain little organic material. They have good drainage assisted by the sandy textures (Stace *et al.* 1968). Plants associated with this soil must be tolerant of low fertility and generally include legumes and other mycorrhizal species along with deep-rooted plants (Stace *et al.* 1968). The *E. porosa* Mallee Woodland was recognised as being associated with this soil in the Park Land area (Table 4).

Unusual Environments

At a finer landscape scale than the four main soil types outlined above were some unusual and more restricted environments. The River Torrens in its pre-European state, with ponds, channels and mud islands would have offered various aquatic environments that have been indicated in the vegetation associations of alluvial soils. However, an examination of the geology and landforms also suggests the existence of some unusual terrestrial environments in the Park Lands. These are described below.

Black Earth Soils

Aitchison (1954) mapped a pocket of Black Earth in the South Park Lands. These soils are universally associated with grasslands. Although open grassy areas of the South and East Park Lands were mentioned by early settlers, this pocket in the South Park Lands (Figure 3) may have been a larger patch of grassland, possibly with locally unique species. These soils show extensive wide and deep cracking when dry and they can also be incredibly hard. They can become waterlogged for some time after heavy rain (Stace *et al*. 1968). The nearest Black Earth soils occurring with Red Brown and Brown Soils are at Hillcrest and Gilles Plains, but Kraehenbuehl (1996) makes no mention of a particular soil and vegetation association in these areas.

Hallett Cove Sandstone

This sandstone underlies most of the City area and North Adelaide, but was known to outcrop only on the University grounds (J. McDonald pers. comm. 2002) (Figure 3). It is very 'limey' sandstone comprising many calcareous fossils, and small caverns found during excavations for building foundations (Selby 1984). Extensive outcropping in the Park Lands of the sandstone would have been unlikely. The overstorey vegetation associated with this sandstone would probably have been little different to that in surrounding areas- *Eucalyptus microcarpa* is likely. The understorey species, particularly the groundcover, may have included species tolerant of periodic water-logging.

North Adelaide Slopes

The slopes from the River Torrens up to North Adelaide (Figure 3) are sufficiently steep and long to suggest association with a different vegetation suite. Possible exposure of the Hindmarsh Clay

and the southerly aspect of the slopes (with greater moisture retention) could have potentially given rise to a different plant community. Excavations around the Park Lands have shown that a mantle of sediments was deposited over the slopes and the underlying Hindmarsh Clay is not exposed (J. MacDonald pers. comm. 2002). Early settlers described, the slope up to North Adelaide as being covered in *E. camaldulensis* var. *camaldulensis* Woodland with;

> '*….the magnificent white gum trees which flourished on the banks of the Torrens and up the slope of the Montefiore Hill…*' (Kraehenbuehl 1996).

Alluvial sandy soils have also been deposited against the slope in the past (Selby 1984), probably marking older terraces or former channels. This may have some implications for vegetation community boundary delineation.

The southerly slopes may have had understorey species with slightly higher moisture requirements than elsewhere on the rise.

PLANT ASSOCIATIONS

I. *Eucalyptus microcarpa* Grey Box – *E. leucoxylon* ssp. *leucoxylon* South Australian Blue-gum Woodland

This Woodland would have encompassed the majority of the South Park Lands and extended over the easterly section of the city block (Figure 14). This vegetation association is outlined in Kraehenbuehl (1996) as an extension of the 'Black Forest' that once grew south of the city (Figure 14). Thicker parts of the forest, were described as a 'dense wood with thick scrub undergrowth' and extended into the South Park Lands (Kraehenbuehl 1996). To early settlers 'scrub' generally meant closely growing woody plants (not tree forms) between 5-10 metres, which probably made riding horses difficult (Kraehenbuehl 1996).

This association was dominated by *E. microcarpa*, which likely formed a Closed Woodland, though was probably more open around the city area and graded into the *E. porosa* Mallee Box Woodland of the West Park Lands. This association would have also included Drooping Sheoak (*Allocasuarina verticillata*), with the taller shrubs likely to be Sweet Bursaria (*Bursaria spinosa* spp. *spinosa*), various *Acacia* species and Yacca (*Xanthorrhoea semiplana* ssp. *semiplana*) (Table 4). Low shrubs probably included Red Parrot-pea (*Dillwynia hispida*), Native Lilac (*Hardenbergia violacea*), Black-anther Flax-lily (*Dianella revoluta* var. *revoluta*), Soft Tussock Mat-rush (*Lomandra densiflora*), Pale Fan-flower (*Scaevola albida*) and Scarlet Runner (*Kennedia prostrata*) (Table 4).

The six grass species listed in Table 4, could have been in associated with the Black Earth as described above, which are strongly associated with grasslands.

II. *Eucalyptus leucoxylon* ssp. *leucoxylon – E. camaldulensis* var. *camaldulensis* River Red Gum Woodland

This woodland would have comprised large but scattered eucalypts, with Kangaroo Grass (*Themeda triandra*), wattles and some 'wild scrub' (of unidentified composition) (Kraehenbuehl 1996). This Woodland is likely to have dominated the East Park Lands (Figure 14). Kraehenbuehl (1996) reconstructed the vegetation composition from records for Kensington, as *E. leucoxylon* ssp. *leucoxylon-E. camaldulensis* var. *camaldulensis* over Native Cherry (*Exocarpos cupressiformis*), *Allocasuarina verticillata* and Golden Wattle (*Acacia pycnantha*). It is likely this woodland extended from Kensington into the east Park Lands, with *E. camaldulensis* var. *camaldulensis* probably associated with the alluvial soils of creeks and tributaries to the River Torrens.

It is likely that *E. microcarpa* extended into this area. Its occurrence on similar soils in the nearby city block and its presence at Burnside (Kraehenbuehl 1996: 90) strongly indicates this. Most likely the east Park Lands mark the beginning of a gradual easterly decrease in abundance of *E. microcarpa* and an increase in that of *E. leucoxylon* ssp. *leucoxylon*.

IIB *E. leucoxylon* ssp. *leucoxylon-E. camaldulenis* var. *camaldulensis* of North Park Lands

Taylor *et al*. (1974) mapped Red Brown Earths in Gilberton, which likely extend through the Melbourne Street section of North Adelaide. As with nearby Red Brown Earths, the area also has alluvial soils. Kraehenbuehl (1996) considers areas adjacent the River Torrens near Payneham to have had *E. camaldulensis* var *camaldulensis-E. leucoxylon* ssp. *leucoxylon* stands (pg 96), he also mentions an outlier of *E. microcarpa* at Vale Park, which is on Red Brown Earths according to the Taylor *et al*. (1974) soil map. However, the detailed sources are scant or restricted to the immediate environs of the river and so any description of understorey species is not possible. The association of *E. microcarpa* with Red Brown Earths around the city has weakened here and the area probably carried the *E. leucoxylon* ssp. *leucoxylon-E. camaldulensis* var. *camaldulensis* association (with some *E. microcarpa*) of the east Park Lands (Figure 14).

III. *E. camaldulensis* var. *camaldulensis* Woodland

This association corresponds to the modern river systems, namely the River Torrens and its tributaries with alluvial soils, including river-bank and riverbed vegetation (Figure 14). Kraehenbuehl (1996) devotes an entire chapter to the vegetation of the River Torrens near the city and indicates quite diverse vegetation for this area and mainly concentrated on the stream banks, slopes and bed. A species list is presented in Table 4 for each of these. This Woodland would have included tall and low shrubs, groundcovers and many grass species.

IIIB *E. camaldulensis* var. *camaldulensis* Woodland or *Phragmites australis* Common Reed +/- *Typha domingensis* Narrow-leaf Bulrush Closed Herbland

The stream banks and beds exhibit the most diverse vegetation of the Park Land area. *Eucalyptus camaldulensis* var. *camaldulensis* Woodlands extended along the river (Figure 14) with *Allocasuarina verticillata* or *Eucalyptus leucoxylon* ssp. *leucoxylon* occurring in some areas also. Some areas would have had dense thickets of Silky Tea-tree (*Leptospermum lanigerum*) or River Bottlebrush (*Callistemon siebieri*) lining the banks. Other shrub species are listed in Table 4, with suggestions from historical sources that Australian Hollyhock (*Lavatera plebeia)*, an *Acacia* sp. and *Hardenbergia violacea* were also in some abundance.

Kraehenbuehl (1996) records *Phragmites australis* and/or *Typha domingensis* Closed Herbland as characterising the stream bed. Given the other species listed for along the bed other plant associations may have also existed. These could include Swamp Wattle (*Acacia retinodes* var. *retinodes*) Tall Shrubland or *Cyperus* spp. Sedgelands as well as Herblands dominated by any of the many herbaceous plant species listed for along the bed (Table 4). The identification of the *Phragmites* sp. and/or *Typha* sp. association as the major type, stems from its persistence and prominence along the River Torrens immediately east of the Park Lands.

IIIC *E. camaldulensis* var. *camaldulensis-E. leucoxylon* ssp. *leucoxylon* Woodland of the east Park Lands

The East Park Lands contains a creek flowing NNW toward the River Torrens, probably joining the original course of First Creek. It lies in a relatively broad flat from Rymill Park to the Victoria Park Racecourse and would most likely have had alluvial soils and be associated primarily with *E. camaldulensis* var. *camaldulensis*. However, both *E. leucoxylon* ssp. *leucoxylon* and *E. microcarpa* are possibly associated, because both grew nearby (on the city block and Torrens floodplains) and both occurred along First Creek (Kraehenbuehl 1996: 94). Possible understorey species are those listed in Kraehenbuehl (1996) for Second Creek or Third and Fourth Creeks (Table 4), some of which are the same species listed for adjoining woodlands e.g. *Bursaria spinosa* ssp. *spinosa*, *Acacia pycnantha* and *A. acinacea* Wreath Wattle, as well as many grasses including *Themeda triandra*.

IV. *E. porosa* Mallee Box Mallee Woodland

This vegetation association occurs on the Brown Soils of the Para Fault Block, which are at their southern extremity in the Park Lands area. Little detail is known of this major vegetation association, which occurred in the West Park Lands and extended through North Adelaide and the adjacent North Park Lands. The most detailed information is based on collections and observations at Enfield and in the West Terrace Cemetery. Two minor associations are also likely, as described below.

IVA. *E. porosa* Mallee Woodland of West Park Lands and adjoining city area

Kraehenbuehl (1996: 72) provides the briefest account of the city occurrence of this Woodland, simply naming the association and adding that it likely intermingled with the adjoining *E. microcarpa-E. leucoxylon* ssp. *leucoxylon* association. More information is available for West Terrace Cemetery (Kraehenbuehl 1996: 131), with four *Acacia* species listed as understorey (Table 4). Species lists derived from collections at Mile End (Kraehenbuehl 1996: 135) suggest that the association would have had *Allocasuarina verticillata*, Native Apricot (*Pittosporum angustifolium*) and Quondong *(Santalum acuminatum*) over four *Acacia* spp. with *Hardenbergia violacea*, Austral Trefoil *(Lotus australis*), *Lavatera plebeia,* Ruby Saltbush (*Enchylaena tomentosa* var *tomentosa*). and various *Atriplex* sp. in the lower shrub layer (Table 4). Kraehenbuehl (1996) reports that the site chosen to be West Terrace Cemetery was originally considered unsuitable because of 'land springs close to the surface', indicating that the mallee in that area could have been rather atypical compared with that recorded elsewhere. The West Terrace Cemetery today remains one of the most important sites for remnant vegetation in the Adelaide Metropolitan Area.

IVB. *E. porosa* Mallee Woodland of North Adelaide

This Woodland is on Brown Soils that extend northward through Enfield to Para Hills. No historical natural history documents or collections seem to survive from the North Adelaide area or from suburbs immediately to the North. Much of Kraehenbuehl's (1996) vegetation reconstructions come from observations and collections from the Enfield area, where Brown Soils persist.

It is most likely, that eucalypt Mallee Woodlands characterised this area. Though some early accounts mention abundant pine, with one writer making it clear that one had to pass through North Adelaide to get to where the pines were prominent (Kraehenbuehl 1996: 134). Kraehenbuehl's (1996) collections from and observations at Folland Park and Brooks Scrub show similarity of understorey vegetation with plant communities in and around the city. The presence of *Allocasuarina verticillata*, *Bursaria spinosa* ssp. *spinosa*, *Acacia pycnantha*, *Hardenbergia violacea* and *Themeda triandra* suggest that the species lists from Kraehenbuehl (1996; 141-143) (Table 4) could apply to the North Adelaide area. The native pine may have been present in the Park Lands but was probably not as abundant as it was further north near Enfield.

V. *Eucalyptus* sp. (*E. ? porosa*) Very Open Woodland

This Woodland occurred in the Park Lands adjacent to Thebarton and Hindmarsh on Red Brown Earths. Kraehenbuehl (1996: 196-197) maintains that very little information is available for this area and his discussion is largely drawn from plant collections in the Croydon and Dudley Park areas. However, he believes that Eucalypt Woodlands and Open Herbland/Grasslands grew in the area, with Woodlands being more extensive closer to the Para fault scarp. The *Eucalyptus* sp. cannot be identified with certainty, but is considered to *be E. porosa,* which formed a Mallee Woodland on the adjoining fault scarp and rises of the city block and North Adelaide. The Open Herbland/Grasslands are primarily a *Danthonia* spp.-*Austrostipa* spp. association (Table 4).

CONSERVATION SIGNIFICANCE

Clearly, none of these plant associations exist in the Park Lands today. Similar communities can however still be found elsewhere in South Australia and an understanding of their present conservation status provides a context for the importance of future re-vegetation, not only for the Park Lands but across the greater Metropolitan area.

The *Eucalyptus porosa* Woodland which would have occurred in the North and North-west of the Park Lands is an association recorded as being 'poorly conserved' in South Australia (Neagle 1995). Occurring in agricultural regions of the state, it is difficult to find any of the vegetation associations listed for the Park Lands as being well represented in South Australia. The ancient 'Black Forest' which occurred in the South Park Lands, with its diversity, large spreading trees and in some areas a dense, tall understorey of native grasses is certainly no longer found anywhere in Metropolitan Adelaide or in neighbouring agricultural areas.

Intact river-bank vegetation is also largely absent in the Adelaide Metropolitan area. Many of the Metropolitan creeklines now flow along concrete channels, including those remaining in the Park Lands (Figure 15). First Creek, which flows through the Botanic Gardens, is largely a concrete channel before reaching the River Torrens. First Creek has been so highly modified that it is now very difficult to determine what species would have once existed along its length (Kraehenbuehl 1977). Second Creek is also largely a concrete channel. For a detailed account of the changes to these creeklines see Warburton (1977).

Figure 15.
First Creek is now reduced to a concrete channel.
Photo: M. Long.

As the Park Lands are in such a modified state, and do not contain vegetation associations *per se*, it is more valuable to look at areas that are important. There are significant isolated trees that occur in the Park Lands. Even though the vast majority of them

have been planted since the colonial period, they still offer locally significant environmental values. They provide habitat and food for many fauna species including mammals, birds reptiles and invertebrates and provide other significant benefits, including genetic transfer between other isolated patches of vegetation, soil stabilising, contribute in reducing localised pollution and offer aesthetic benefits in an urban environment.

The linear corridor, along the River Torrens also has significant conservation value. It could be utilised for linking other habitat areas with the Park Lands. However, the control of introduced species also spreading along this corridor is a major management consideration.

Many of the more open 'natural' areas in the North and South Park Lands have many examples of re-generating remnant individual plants. Even though many of these species are not significant at a National or State level they are highly significant in the localised Park Land area. They confirm what species would have existed in these areas and remain an important seed source for future re-vegetation programs.

PLANT SPECIES RICHNESS

A total of 514 plant species were compiled for the Adelaide Park Land area during this survey. Of this total 309 species are introduced, representing 60% of the total species. Introduced species are defined as exotic species and non-locally indigenous Australian species. This survey therefore recorded a total of 183 indigenous native species (excluding the identification of some grasses to species due to the time of the year). Given the poor documentation of most planting programs throughout the Adelaide Park Lands, it is often now quite difficult to distinguish with certainty locally indigenous shrubby and, particularly herbaceous plant species that may be regenerating from a possible seed store in the soil sustained from the pre-European understorey. This total will therefore include a proportion of originally planted species of unknown provenance but representing a species that is thought to be 'indigenous' to that particular site.

Given these constraints, a complete list of the vascular plants occurring within the Adelaide Park Lands is provided in Appendix III, with the sources of the data and conservation rating shown against each species. Detailed comments are also provided for Herbarium records that had not been recorded by this survey or previous vegetation surveys in the area.

A total of 77 families are represented in the Park Lands. Of these, 33 (42%) represent locally indigenous taxa. Of the locally indigenous records the most species rich family is Gramineae (41 taxa) then Leguminosae (22), Myrtaceae (20) and Compositae (20). The next prominent families include Liliaceae, Cyperaceae and Chenopodiaceae each with 13 taxa (Appendix II). Other families worth noting for the area are Juncaceae (8 taxa) and Pittosporaceae (5).

These figures must be treated with caution, as they refer to presence or absencenot abundance data. For rxample, native grasses have the highest species richness, but can be represented by very few individual plants.

Based on these simple presence absence figures however the family composition is probably not unlike that which would have originally existed in the Park Lands, a high richness of grasses, eucalypts and acacia's, with chenopods, lilies and daisies constituting the understorey and sedges and rushes in the water courses. These figures together with detailed study of similar remnant vegetation associations elsewhere in the State now represent our best chance to try and re-constitute something close to the original species composition and abundance in future re-vegetation programs..

SIGNIFICANT PLANT RECORDS FOR THE ADELAIDE PARK LANDS

There are no species recorded for the Adelaide Park Lands with a National conservation rating. There are however State and Regionally listed species recorded as detailed in Table 5.

Table 5.
State and Regionally Significant Plants occurring in the Adelaide Park Lands.

Source of Status: As per Table 3.

Status	SA	REG
Endangered (E)		1
Threatened (T)		4
Vulnerable (V)	2	6
Uncertain (K)		4
Rare (R)	6	16
Uncommon (U)		20
Not yet Assessed (Q)		1

The species listed as Endangered, Threatened and Vulnerable will be discussed in more detail (Table 6), and comments made regarding the State Rare listings. All other species are listed in Appendix III.

Table 6.
Species with State and Regional Conservation Status (regional status based on Southern Lofty Herbarium Region).

Status = Refer to Table 5 for codes and Table 3 for source.
Distribution = Known distribution for South Australian Herbarium Regions and records for the Adelaide Park Lands. NL = Northern Lofty, MU = Murray, SL = Southern Lofty, SE = South-Eastern, E = Eastern, EP = Eyre Peninsula, YP = Yorke Peninsula, KI = Kangaroo Island, LE = Lake Eyre, GT = Gairdner-Torrens, FR = Flinders Ranges, NW = North Western and NU = Nullabor.

Species	Common Name	State Status	Regional Status	Distribution/Comments
Lepidium pseudotasmanicum	Shade Peppercress	V		NL and MU. One Herbarium record collected along River Torrens near Zoological Gardens in 1997
Swainsona behriana	Behr's Swainson-pea	V	E	NL, MU, SL and SE. One Herbarium record collected in 1861 from North Adelaide
Austrostipa exilis	Heath Spear-grass		T	E, EP, NL, MU, YP, SL, KI and SE. Recorded in Park 16 (Crompton 1998) and the South Park Lands (Sando 2001)
Persicaria lapathifolia	Pale Knotweed		T	LE, E, MU, SL and SE. One Herbarium record collected in 1993 from River Torrens opposite the Zoo
Potamogeton ochreatus	Blunt Pondweed	R	T	GT, FR, E, EP, MU, SL, KI and SE. One Herbarium record collected in 1921 from River Torrens below Weir
Teucrium racemosum	Grey Germander		T	NW, LE, GT, FR, E, EP, NL, MU, YP, SL and SE. Recorded in Park 19 & 21W (Crompton 1998); South Park Lands (Sando 2001); Park 17 (this survey)
Acacia salicina	Willow Wattle		V	NW, LE, GT, FR, E, EP, NL, MU and SL. Recorded in the West Terrace Cemetery and the Mile End rail yard (Bagust 2002)
Acacia victoriae ssp. *victoriae*	Elegant Wattle		V	NW, LE, NU, GT, FR, E, EP, NL, MU and SL. Extinct WTC 2002 (Bagust 2002); Recorded in Park 22, 23, 24 probably planted (this survey)
Cymbopogon ambiguus	Lemon-grass		V	NW, LE, GT, FR, E, EP, NL, MU and SL. One Herbarium record from 1903 collected near the Torrens Weir. Recorded in Park 23 probably planted (this survey)
Danthonia carphoides var. *carphoides*	Short Wallaby-grass	R	V	NL, MU, SL and SE. Recorded Park 17 (Crompton 1998); and South Park Lands (Sando 2001)
Pteris tremula	Tender Brake	R	V	FR, EP, MU, YP, SL and SE. One Herbarium record collected in 1970 from the

				bank of the River Torrens
Santalum acuminatum	Quandong		V	NW, LE, GT, FR, E, EP, NL, MU, YP, SL and SE. Recorded WTC (Bagust 2002 & this Survey)

DESCRIPTIONS FOR PLANT SPECIES OF CONSERVATION SIGNIFICANCE

Shade Peppercress (*Lepidium pseudotasmanicum*).
Lepidium pseudotasmanicum is an annual or biennial erect herb, 20-60cm tall (Jessop and Toelken 1986). There has only been one record in the Park Lands for this species, collected along the River Torrens in 1997. This species is not recorded for the Southern Lofty Herbarium Region and was most likely introduced into the area. There are no recorded established populations of this species in the Park Lands.

Behr's Swainson-pea (*Swainsona behriana*)
Behr's Swainson-pea is a small prostrate or ascending perrenial herb to 15cm in height (Walsh and Entwisle 1996). It is usually found in association with grassland and grassy woodlands. Flowers August-January. It is very unlikely that this species would be found growing naturally in the Park Lands. There was only one record found for this species in the Herbarium, it was collected in 1861 from North Adelaide.

Heath Spear-grass (*Austrostipa exilis*)
This species typically grows to 60cm in height and flowers August-November (Jessop and Toelken 1986). Listed as Threatened for the Southern Lofty Herbarium region this species has been recorded in the South Park Lands with significant patches recorded in Park 16 (Crompton 1998). It was not recorded during this survey.

Pale Knotweed (*Persicaria lapathifolia*)
The Pale Knotweed is a tall stout annual to 1m in height, branching with or without a dense soft white tomentum on stem and leaves. It flowers throughout the year (Jessop and Toelken 1986). There is only one record for this species collected in 1993 from the River Torrens opposite the Adelaide Zoo. This species was probably introduced into the Park Land area and it is not known if it still occurs there.

Blunt Pondweed (*Potamogeton ochreatus*)
Potamogeton ochreatus is a perennial species with stems to 4.5m long, with the leaves all submerged. It occurs in still or flowing water to 4.5m deep. Flowers in November and December and less often in August-March (Jessop and Toelken 1986). There is one recorded specimen from the Herbarium collected in 1921 from the River Torrens below the weir. It is unlikely that this species is still surviving in the Park Lands.

Grey Germander (*Teucrium racemosum*)
The Grey Germander (Figure 16) is a perennial herb to 60cm in height. It is often associated with temporarily flooded areas, usually on clay or loam soils. It mainly flowers between July-April (Jessop and Toelken 1986) but can flower all year round (Prescott 1988). This species is surviving in the South Park Lands, from naturally re-generating plants and it has also been planted in some areas, namely Park 17.

Willow Wattle (*Acacia salicina*)
This tall shrub or small tree has drooping branches and long, limp, blue-green, hanging leaves. Its flowers are pale yellow and form incomplete balls. It typically grows in dry woodlands or along creeks or floodplains north of Adelaide and flowers at irregular times however, it is not common in this area (Prescott 1988). This species is present in the West Terrace Cemetery and the Mile End Rail Yard. It would have formed part of the shrub layer of the *Eucalyptus porosa* Woodland that once covered the area to the north and west of the city.

Elegant Wattle (*Acacia victoriae* ssp. *victoriae*)
Acacia victoriae ssp. *victoriae* is a tall dense shrub, leaves bluish or pale-green. It frequently has two sharp spines at the base of each leaf. It grows in Woodland north of Adelaide or mallee on rocky hillsides and along some parts of the coast. It is not common in the area, and it flowers from spring to early summer (Prescott 1988). There are no remnants remaining of this species in the Park Lands or in the West Terrace Cemetery. It has been used in some plantings in the South Park Lands.

Lemon-Grass (*Cymbopogon ambiguus*)
Cymbopogon ambiguus is an attractive scented grass from 30cm to 2m high. It flowers throughout the year (Jessop and Toelken 1986). There is one Herbarium record from 1903 collected near the Torrens Weir. *Cymbopogon ambiguus* was recorded in Park 23 by this survey, but was probably planted, it is unlikely to have naturally established populations in the Park Lands.

Short Wallaby-Grass (*Danthonia carphoides* var. *carphoides*)
Short Wallaby-grass is a small tufted perennial and is regarded as useful in natural pastures despite its

small size. It flowers from October to April (Jessop and Toelken 1986). It has been found in patches in the South Park Lands.

Tender Brake (*Pteris tremula*)
Tender Brake is a terrestrial fern to 1m in height, typically occuring in wet shaded gullies or gorges, sinkholes or in caves (Jessop and Toelken 1986). There is only one record for this species for the Park Lands, collected in 1970 from the banks of the River Torrens. It was most likely introduced to the area and has not established as a population here.

Quondong (*Santalum acuminatum*)
The Quondong is a small attractive tree, with often drooping leaves in pairs. Its fruit is red-brown and has a woody stone. It grows in mallee and was formerly more widespread on the Adelaide plains and foothills. It flowers from spring through to autumn (Prescott 1988). There is an excellent grove of Quondong existing in the West Terrace Cemetery (Figure 17). This remnant is an extremely important seed source for re-vegetation of this species on the Adelaide Plains.

Figure 16.
Grey Germander (*Teucrium racemosum*) is found in the South Park Lands.
Photo: P. Canty.

Figure 17.
An important remnant grove of Quondong (*Santalum acuminatum*) is found in the West Terrace Cemetery.
Photo: M. Long.

SITE DESCRIPTIONS

The following section describes each of the Park Land sites (Figure 4), including location, size, land use and provides a plant species list for each site. In July 2003 the Adelaide City Council adopted Kaurna names for the City Park Lands to come into operation from June 2003 (ACC 2003). Accordingly this new convention is adopted here, but for simplicity on the maps and tables associated with this report the park numbers are used.

Piltawodli Park (Park 1)

Park 1 (Figure 18) is one of the larger sites in the Park Lands, at 76.1 hectares. The North Adelaide Golf Club is the dominant land use in this area. The area is dominated by irrigated fairways and greens and has been systematically planted out with exotic trees and shrubs, mainly Western and Eastern Australian species. A portion of the River Torrens northern bank bordering the Golf Links, near the intersection of War Memorial Drive and Montefiore Road has good stands of remnant Narrow-leaf Bulrush (*Typha domingensis*), Common Reed (*Phragmites australis*) and Large Bindweed (*Calystegia sepium*). The greater majority of this area has however been planted out with a huge variety of exotic and interstate Australian tree and shrub species (Table 7).

Figure 18.
Park 1, North Adelaide Golf Course.
Photo: M. Long.

Padipadinyilla Park (Park 2)

This site (Figure 19) has an area of 17.0 hectares, with turfed areas, ovals and the Adelaide Aquatic Centre. It is bordered by Prospect Road, Barton Terrace West, Jeffcott Road and Fitzroy Terrace. This site has been planted around the ovals with exotic and Australian species (Table 7). A large number of young eucalypt species principally from Western Australia have been planted near some tennis courts and an adjacent oval along Prospect Road. A couple of remnant native grasses were found at this site including an *Austrostipa* sp. Spear-grass and *Chloris truncata* Windmill Grass.

Figure 19.
Park 2, Adelaide Aquatic Centre.
Photo: M. Long.

Kandarilla Park (Park 3)

Covering 3.3 hectares (Figure 20), this is a smaller triangular shaped site bordered by Prospect Road, Main North Road and Fitzroy Terrace. This site has a small oval in its centre which is no longer used. Plantations have occurred around the circumference of the oval with some planting in the centre. The plantings include a mixture of native trees and shrubs including both local and interstate species (Table 7). This site is subject to further planting through the One Million Trees Program by the Adelaide City Council and the SA Urban Forest Biodiversity Program.

Figure 20.
Park 3 is targetted for re-vegetation.
Photo: M. Long.

Kangattilla Park (Park 4)

Park 4 (Figure 21) at 9.4 hectares is bordered by Barton Terrace East, Lefevre Road, Main North Road and O'Connell Street. The area has two ovals with large, wide plantations of mixed exotic and native shrub and tree species bordering each (Table 7). Some of the more open areas have been colonised by patches of possibly two *Austrostipa* sp.

Figure 21.
Park 4 bordered with plantings.
Photo: M. Long.

Ngampa Yerta Park (Park 5)
This Park (Figure 22) is planted up in corridors with Australian native species, with a large number being indigenous to that part of the city. A number of Western Australian species e.g. *Hakea laurina* and *Hakea* sp. and other species from mallee areas have also been used. The area has two relatively small ovals used for cricket, with the plantations bordering them. The area is 8.0 hectares, and is bordered by Robe Terrace, Medindie Road, Lefevre Road and Main North Road. The open grassed area of the oval's have ?remnant colonies of *Chloris truncata* and possibly two species of *Austrostipa*.

Figure 22.
Park 5 has many locally indigenous flora species.
Photo: M. Long.

Nanto Womma Park (Park 6)
This park is one of the larger sites of the Park Lands with an area of 42.1 hectares (Figure 23). Bordered by Kingston Terrace, Lefevre Terrace, Medindie Road and Robe Terrace, the area is predominantly used for horse agistment and has some turfed areas and tennis courts. Pockets of planted exotic and interstate native species are fenced off from the horses throughout the park. There is a Trees for Life Bush Care site in Park 6 where a number of native plants are maintained by dedicated volunteers in the area. There are also a number of fine River Red Gums (*Eucalyptus camaldulensis* var. *camaldulensis*), alongside Kingston Terrace. This site is one of the more 'natural' sites of the Park Lands and has an impressive diversity of possibly remnant locally indigenous grass species (Table 7). Opportunistic records of remnant flora were made for Park 6 by Mrs P. Paton (Figure 24) with the species for each site listed in Appendix III. The site naturally supports quite a diversity of remnant plants, including Wingless Fissure-plant (*Maireana enchylaenoides*), *Vittadinia gracilis* Woolly New Holland Daisy, Common Vanilla-lily (*Arthropodium strictum*), Kidney Weed (*Dichondra repens*) and Clammy Goosefoot (*Chenopodium pumilio*). The plant species associated with the Opportune sites on Figure 24 are listed in Appendix III.

Figure 23.
Park 6 is grazed by horses but has some pockets of remnant flora species.
Photo: M. Long.

Kuntingga Park (Park 7)
This area has large plantations of old Olive trees (*Olea europaea* ssp. *europaea*) (Figure 25) probably dating back to the 1840's and likely have some form of heritage listing. It is only a small area of 2.8 hectares, bordered by Park Road, Melbourne Street and Mann Road. The olive plantation has an understorey of exotic grasses, but there are a few open areas of red loam soils with colonies of native grass species including *Chloris truncata*, *Austrostipa* spp., Wallaby-grass (*Danthonia* spp). and Native Wheat-grass (*Elymus scaber* var. *scaber*). There are some other native species surviving mostly in the non –irrigated northern section of this park (Table 7). Small trees of olives have been planted in places where some of the large olive trees have died. There are a few other exotic plantings at this site as listed in Table 7.

Figure 24.
Opportunistic Vegetation Sites in the Northern Adelaide Park Lands

Figure 25.
Park 7 has some native grasses.
Photo: M. Long.

Barnguttilla Park (Park 8)
Park 8 (Figure 26) also has a large plantation of old olive trees. The area has been mainly turfed with introduced grasses like Kikuyu (*Pennisetum clandestinum*), but has a small plantation of exotic, interstate and South Australian species at its southern end (Table 7). It covers 1.9 hectares, and is bordered by Park Road, Melbourne Street and Mann Road.

Figure 26.
Park 8 is an old Olive (*Olea europaea*) grove.
Photo: M. Long.

Tidlangga Park (Park 9)
This site includes a medium sized turfed oval (Figure 27) belonging to Prince Alfred College, it is bordered by Bundeys Road, MacKinnon Parade and Hackney Road, with an area of 5.7 hectares. It has an area of planted Australian tree and shrub species with about 100 young *Eucalyptus leucoxylon* ssp. *leucoxylon* South Australian blue-gum, 3-4 m high that are interspersed by a number of *Acacia pycnantha* Golden Wattle trees. There is also a mixture of exotic and Australian tree species (Table 7) and a nice stand of mature planted *Eucalyptus camaldulensis* var. *camaldulensis* at the North West corner of the site.

Figure 27.
Park 9 is largely a sporting field.
Photo: M. Long.

Warnpangga Park (Park 10)
This is a large open area (19.0 hectares) containing ovals, the Adelaide Archery Club, and the Adelaide City Council nursery. The site is bordered by War Memorial Drive, Bundeys Road, MacKinnon Parade and Frome Road. There are scatterings of exotic and Australian native species planted in various patches within this site. Near the Adelaide Archery Club on the corner of War Memorial Drive is a triangular plantation of trees of exotics and interstate Australian species (Table 7). Other areas of planted species can be found in the vicinity of the nursery, including a long hedge of Kaffir Apple. surrounding the nursery. Many Lemon-scented Gums (*Eucalyptus citriodora*) have been planted along War Memorial Drive along with the occassional Sugar Gum (*Eucalyptus cladocalyx*). The only native herbaceous plants observed were along War Memorial Drive and include Tar-vine (*Boerhavia dominii*) and Berry Saltbush (*Atriplex semibaccata*). A section of this park along the River Torrens behind the Adelaide Zoo, retains a more 'natural' character (Figure 28).

Figure 28.
The River Torrens behind the Adelaide Zoo.
Photo: M. Long.

Tainmundilla Park (Park 11)
This area (78.5 hectares) includes Botanic Park (Figure 29), the Adelaide Botanic Gardens and the Adelaide Zoological Gardens. Plant species lists were not made for these areas except for some native species recorded in Botanic Park, mainly along the River Torrens (Table 7). Only two remnant River Red Gum (*Eucalyptus camaldulensis* var. *camaldulensis*) exist along First Creek in the Botanic Gardens today, these are thought to be the only remnants of this species surviving in the Park Lands (Figure 29). No other remnant species are recorded for the Botanic Gardens. There was question if a large 'tree-form' of Sweet Bursaria (*Bursaria spinosa*) was a remnant. No records could be found to indicate this, and it was probably planted as there are some other unusual species for the gardens found in the same vicinity (T. Christensen, pers. comm. 2003). There were a couple of other remnant River Red Gums in Botanic Park but they died a few years ago (T. Christensen, pers. comm. 2003).

Figure 29.
One of the two surviving pre-European River Red Gum (*Eucalyptus camaldulensis*) in the Park Lands.
Photo: M. Long.

Figure 30.
Park 11 Botanic Park.
Photo: M. Long.

Karrawirra Park (Park 12)
This area (55.5 hectares) (Figure 30) is the site of The University of Adelaide and it encompasses the River Torrens, Government House and the Army Barracks. Due to the nature of this area, being largely built-up, no species lists were made for this site.

Figure 31.
Park 12 South of the University Foot Bridge.
Photo: M. Long.

Kadlitpinna Park (Park 13)
Also known as Rundle Park (6.5 hectares) (Figure 31) it is an intensely irrigated site, dominated with many examples of exotic tree species (Table 7). It is bordered by Botanic Road, Dequetteville Terrace, Rundle Road and East Terrace. A section of First Creek, which runs through this park, has dense stands of *Typha domingensis* and a robust rush (*Juncus* sp.).

Figure 32.
Park 13 Rundle Park is dominated by exotic species.
Photo: M. Long.

Mullawirraburka Park (Park 14)
Also known as Rymill Park (Figure 32) is bordered by East Terrace, Bartels Road, Dequetteville Terrace and Rundle Road and covers an area of 15.5 hectares. The focal point of this park is the Rymill Lake, which is a popular site for picnicking with barbecues provided. The area is dominated with a mixture of exotic and native tree species with exotic grasses (Table 7). The park also has a series of garden plots that line the route of the old Norwood Tram Line.

Figure 33.
Park 14 Rymill Park is a popular site for recreation.
Photo: M. Long.

Ityamaiitpinna Park (Park 15)
Covering 18.5 hectares (Figure 33), this park is bordered by Wakefield Street, East Terrace, Bartels Road and Dequetteville Terrace. The area has two playing fields owned by Christian Brothers College, an old olive plantation at the southern end of the site and plantings of exotic and interstate tree species (Table 7). First Creek flows through this site before going through the Botanic Gardens. The creekline is dominated by introduced weed species, with some natives including *Typha domingensis* and the occassional *Juncus* sp. clumps.

Figure 34.
Park 15 has an old Olive (*Olea europaea*) grove.
Photo: M. Long.

Bakkabakkandi Park (Park 16)
This is a large site at 72.0 hectares, which includes Victoria Park Racecourse. The area is bordered by Wakefield Road, Fullarton Road, Greenhill Road and East Terrace. A large area adjacent to Greenhill Road, and south of the Victoria Park Racecourse (Figure 34) has excellent communities of *Austrostipa* sp., *Chloris truncata*, *Elymus scaber* var. *scaber*, Native Sorrel (*Oxalis perennans*) and *Chenopodium pumilio*. Opportune vegetation records (Figure 35) were collected at this site by Mrs J. Subagio, these species are listed in Appendix III. A large number of mature *Eucalyptus cladocalyx* also occur here with a mixture of other exotic tree species (Table 7). Also in the area a number of native indigenous species have been established (Table 7). The racecourse area has been continuously mowed and the central area is used for sports such as lacrosse. Virtually no native grasses have survived except for a few plants of *Austrostipa* sp. and a *Danthonia* sp. An area more than 0.1 hectares at the southern end of Victoria Park Racecourse was cordoned off approximately three years ago to protect some Pink-garland Lily (*Calostemma purpureum*), Vanilla-lily (*Arthropodium* sp.), a few Early Star-lily (*Wurmbea dioica* ssp. *dioica*), Tiny Star (*Hypoxis glabella* var. *glabella*), Fat Spear-grass (*Austrostipa gibbosa*), *Dichondra repens* and *Oxalis perennans* (J. Subagio pers. comm. 2003). These plants were found by Michael Sando, however the bunting has since been removed (J. Subagio pers. comm. 2003) and the plants were not found at the time of this survey.

Along the western boundary of this site are large avenues (Figure 36) of *Eucalyptus camaldulensis* var. *camaldulenis*, *Eucalyptus cladocalyx* and some Western Australian Eucalypt species. No middle or understorey plants occur here. The Park Lands Creek (Figure 37) which runs through the southern section of this site, is largely infested with weed species and is very eroded. Some native species

are found here including a couple of Hairy Willow-herb (*Epilobium hirtigerum*) found by T. Jury (J. Subagio pers. comm. 2003).

Figure 35.
Park 16 South of the Victoria Park Racecourse.
Photo: M. Long.

Figure 36.
Avenue of eucalypts in Park 16.
Photo: M Long.

Figure 37.
Park Lands Creek in Park 16.
Photo: M. Long.

Tuttangga Park (Park 17)
This site bordered by Greenhill Road, Hutt Road, South Terrace and Beaumont Road is very well wooded in parts and also has some large open turfed areas, tennis courts and the South Australian Croquet Association Lawns. It covers an area of 31.6 hectares. An area adjacent Glen Osmond Road has a mixture of native and exotic tree species and has patches of native grassland including at least two *Austrostipa* sp. a *Danthonia* sp. and *Dichondra repens*. Areas along Hutt Street are planted with exotic and native Australian tree species such as *Eucalyptus citriodora* and Red-flowering Ironbark (*E. sideroxylon* ssp. *sideroxylon*). A small area toward the south-east corner of the Park has been planted with a number of Yaccas (*Xanthorrhoea semiplana* ssp.).

Along South Terrace, opposite St Andrew's Hospital, is a Trees for Life Bush Care site (Figure 38). This site is flagged off for protection and many indigenous species have been re-introduced into the area by dedicated conservationists (Figure 39) (Table 7). The site is an excellent example of species that would have represented the 'Black Forest' that once encompassed this area.

Park 17 also has the Park Lands Creek running across it. There are seven very old trees of *Eucalyptus camaldulensis* var. *camaldulensis* along the watercourse, the area also has splendid little clusters of *Austrostipa* and *Chloris* grass species. A few plants of Jersey Cudweed (*Pseudognaphalium luteoalbum*) were also found along this creek by T. Jury (J. Subagio pers.comm. 2003).

Figure 38.
Trees For Life Bush Care Site in Park 17.
Photo: M. Long.

Figure 39.
Opportunistic Vegetation Sites in the South-eastern Adelaide Park Lands

Wita Wirra Park (Park 18)
This is a triangular shaped park covering 8.6 hectares, surrounded by Glen Osmond Road, South Terrace and Hutt Street. The area is a mixture of open turfed areas, formal gardens, including the Japanese Himeji Gardens (Figure 40), and pockets of planted exotic and Australian tree species (Table 7).

Figure 40.
Park 18 is a mixture of formal gardens and sporting fields.
Photo: M. Long.

Pityarrilla (Park 19)
Park 19 is a large triangular shape of 23.0 hectares, bordered by Glen Osmond Road, Greenhill Road and Unley Road. The site is a network of playing fields bordered by rows of plantings. There is a small triangular area in the south-east section of the park which has been planted out with mature trees such including, *Eucalyptus leucoxylon* ssp. *leucoxylon*, *E. citriodora*, *E. cladocalyx*, *E. camaldulensis* var. *camaldulensis* and exotic species such as Radiata Pine (*Pinus radiata*) and English Ash (*Fraxinus excelsior*). These plantings are spaced a large distance from each other. Along Hutt Street there are fenced off plantings of indigenous species for example *Acacia pycnantha* and Native Apricot (*Pittosporum angustifolium*), there are also some patches of native grasses in this area including *Chloris truncata* and *Austrostipa* spp. The remainder of this site has been planted out with a large variety of native and exotic tree species (Table 7). Some areas are roped off to protect re-generating native plants and other individual species have been staked, for example Vanilla-lilly (*Arthropodium* sp.) (Figure 41).

Figure 41.
Vanilla-lilly (*Arthropodium* sp.), naturally regenerating in Park 19.
Photo: M. Long.

Kurrangga Park (Park 20)
Covering 30.1 hectares, this park is bordered by South Terrace, Unley Road, Greenhill Road and Peacock Road. This area is intersected by several drainage channels and has large areas of open turfed terrain. An impressive forest of *Eucalyptus camaldulensis* var. *camaldulensis* can be found along Greenhill Road (Figure 42). Several *Austrostipa* sp., *Oxalis perennans*, *Elymus scaber* var. *scaber*, *Danthonia* sp. and Black-anther Flax-lily (*Dianella revoluta* var. *revoluta*), which may have been introduced to the western side of this site some years ago. The usual mix of exotic and Australian tree species can be found planted throughout the rest of the site (Table 7). There is a large avenue of Kurrajong (*Brachychiton populneus*) lining a bicycle path through this park. The small watercourses flowing through this site are colonised by *Typha domingensis*, *Cyperus* sp. Sedge and *Juncus* sp.

Figure 42.
River Red Gum (*Eucalyptus camaldulensis* var. *camaldulensis*) forest in Park 20.
Photo: M. Long.

Walyo Yerta Park (Park 21)
Park 21, covering 62.0 hectares, is surrounded by Peacock Road, South Terrace, Greenhill Road and Goodwood Road. The area is intersected by Sir Lewis Cohen Avenue, with the western half of the site referred to as 21 West. The area along South Terrace is set aside for formal gardens including, Veale Garden and a rose garden. The remainder of the site has large open playing fields with avenues of planted exotic and Australian tree species bordering. The western part of this site is similar to 21 West with limestone close to the surface with native herbs and grasses present (Table 7). It is possible that this site is where the *Eucalyptus porosa* Mallee Box Woodland became intermingled with *E. microcarpa* Grey Box Woodland (D. Kraehenbuehl pers. comm. 2003).

Park 21 West is used for overflow parking for the Royal Adelaide Show Grounds. This site is largely open with a mixture of planted exotic and interstate trees (Table 7) around the periphery with an avenue crossing diagonally across the park. In areas adjacent Goodwood Road there are a number of native harbaceous species growing on limestone soil overlayed by shallow red loams. Here several *Austrostipa* sp. (Figure 45), at least two *Danthonia* sp., *Chloris truncata*, *Arthropodium* sp. *Maireana enchylaenoides*, *Oxalis perennans*, *Chenopodium pumilio*, *Atriplex semibaccata* and *Dichondra repens* can be found. These species were recorded opportunistically during this project (Figure 43) and listed in Appendix III. Three areas have been roped off in this park to protect the indigenous species from mowing and spraying during Adelaide City Council maintainence.

Figure 43.
Park 21 West has many native species regenerating, including many grasses (*Austrostipa* sp.).
Photo: M. Long.

Wikaparndo Wirra Park (Park 22)
A relatively small (15.1 hectares) (Figure 44) triangular park bordered by Goodwood Road, Greenhill Road and Anzac Highway. A large section of this park is taken up with netball courts and much of the central section is used for car parking for special events and overflow parking for the Royal Adelaide Show Grounds. As with many of the other sites there are plantings in the peripheral areas of the park with mainly exotic species (Table 7). There are a couple of native species (Table 7) existing at this site and a robust patch of *Austrostipa* sp. is fenced off. Other indigenous species have been recorded opportunistically (Figure 45 and Appendix III).

Figure 44.
Park 22 is largely used for carparking and netball courts, it has some native species.
Photo: M. Long.

Figure 45.
Opportunistic Vegetation Sites in the South-western Adelaide Park Lands

Wirranendi Park (Park 23)
Covering 57.4 hectares, the focal point of this site is the West Terrace Cemetery and other areas of the site include open turfed areas to the north of the Cemetery, netball courts to the south, patches of planted trees and a drainage creek that leads to a deep water-holding area. The site is bordered by Anzac Highway, West Terrace, Burbridge Road and the Railway line to the west.

The West Terrace Cemetery is remarkable in that nearly 20 species of indigenous native mallee woodland type species have survived into the 21st Century. This site is used for seed collections for re-vegetation programs around Metropolitan Adelaide, and has provided important clues to the formation of the original mallee woodland that once covered this area. Much of the vacant ground around gravesites were planted out early in the 19th and 20th Centuries with exotic trees and shrubs and other Australian species, some non-indigenous to the site (Table 7). There are however many indigenous species still extant in the Cemetery and these are listed in Table 7. Some of the native bulbous species have however become extinct in the Cemetery, including: Pussy-tails (*Ptilotus spathulatus* form *spathulatus*), Common Woodruff (*Asperula conferta*), *Chenopodium pumilio*, Toad rush (*Juncus bufonius*), *Hypoxis glabella* var. *glabella*, Brush Wire-grass (*Aristida behriana*), *Chloris truncata,* Spiny Flat-sedge (*Cyperus gymnocaulos*), Sticky New Holland Daisy (*Vittadinia australasica* var. *australasica*) and Woolly New Holland Daisy (*V. gracilis*) (D. Kraehenbuehl pers. comm. 2003).

There are very old Southern Cypress Pine (*Callitris preissii*) trees that surround the Catholic Chapel building. D. Kraehenbuehl examined these trees, and believes that they may represent a remnant coppice of *C. preissi,* as they are very old and not the sort of trees that colonists of the 19th Century would have planted. There are also some very large specimens of Mallee Box (*Eucalyptus porosa*) existing in the Cemetery. Near the centre of the Cemetery is a very impressive grove of *Santalum acuminatum* (Figure 17), which provides an important seed source for the Metropolitan area. There is also a good population of Umbrella Bush (*Pittosporum angustifolium*) (Figure 46), *Acacia ligulata* and dense stands of *Austrostipa* spp. (Figure 47) located near the child burial section, and *Dianella revoluta* var. *revoluta* (Figure 48).

Figure 46.
Native Apricot (*Pittosporum angustifolium*) is surviving well in the West Terrace Cemetery.
Photo: M. Long.

Figure 47.
Native grasses (*Austrostipa* sp.) in the West Terrace Cemetery.
Photo: M. Long.

Figure 48.
Black-anther Flax-lily (*Dianella revoluta* var. *revoluta*) growing between grave sites.
Photo: M. Long.

An area south-west of the Cemetery has been planted out with a large number of non-indigenous native tree species (Table 7). The majority of these are Western Australian and New South Wales species. There is a plantation west of the Cemetery near the Mile End Railway Yards that has been

planted with local indigenous species. The species chosen in this plantation reflect species that would have formed the Mallee Woodland that once occupied this area, and include such species as Wreath Wattle (*Acacia acinacea*), *A. pycnantha*, Kangaroo Thorn (*A. paradoxa*), Umbrella Bush (*A. ligulata*), *Callitris preissii*, *Dianella revoluta* var. *revoluta*, Native Lilac (*Hardenbergia violacea*), *Eucalyptus porosa*, Twiggy Daisy-bush (*Olearia ramulosa*), Short-leaf Blueush (*Maireana brevifolia*) and Lemon-grass (*Cymbopogon ambiguus*). *Chloris truncata* was also found occurring naturally in the area.

An area north of the West Terrace Cemetery has a drainage creek that leads to a deep waterhole that is lined with *Typha domingensis* and Common Reed (*Phragmites australis*) (Figure 49). An area near the waterhole has been planted out with species similar to those listed above.

Figure 49.
Water-holding area in Park 23, lined with Bulrush and the Common Reed (*Typha* sp. and *Phragmites* sp.).
Photo: M. Long.

Tambawodli Park (Park 24)
This site is bordered by Sir Donald Bradman Drive, West Terrace, Mile End Railway Yards and Glover Avenue. Covering an area of 35.7 hectares, it is the site of Adelaide High School and many playing fields (Figure 50) some of which are used for large events such as the Glendhi Festival. The site has been replanted with many species of native trees and shrubs (Table 7). A small gully depression, near Bakewell Bridge, has a stand of *Eucalyptus camaldulensis* var. *camaldulensis*.

The site is a classic example of the post 1950 era when all sorts of interstate tree species were planted together with exotic species (D. Kraehenbuehl pers.comm. 2003).

Figure 50.
The site of Adelaide High School, Park 24.
Photo: M. Long.

Narnungga Park (Park 25)
This area is predominantly sportsfields, bordered by Glover Avenue, West Terrace, Port Road and Railway Lines. There are mixed plantings of exotic and interstate native tree species (Figure 51) around the periphery of the site (Table 7).

Figure 51.
Park 25 is predominantly sporting fields.
Photo: M. Long.

Tarndanya Womma Park (Park 26)
Park 26 covering 54.1 hectares (includes Parks 28 and 29), incorporates sections to the south and north of the River Torrens between North Terrace, King William Street, Pennington Terrace and Montefiore Road. The south section of the River Torrens is covered with buildings including, the Adelaide Convention Centre and the Festival Theatre, and the vegetation is dominated with foreign tree plantings. The banks of the River Torrens are virtually non-existent and are dominated by exotic grass species (Figure 52). Along the north bank of the River Torrens there is a planted garden terrace with a number of Australian native species for example, *Anigozanthus* sp. Kangaroo Paw and Rosemary Grevillea (*Grevillea rosmarinifolia*) (Table 7). Along the actual banks of the River Torrens some trees of Swamp Wattle (*Acacia retinodes* var. *retinodes*) and a few shrubs of Silky Tea-tree (*Leptospermum lanigerum*) have been planted.

Some indigenous native plants exist along this section of the River Torrens and include, *Eucalyptus camaldulensis* var. *camaldulensis*, *Typha domingensis*, Large Bindweed (*Calystegia sepium*) and remarkably one large colony of the pink flowering Slender Knotweed. (*Persicaria decipiens*).
The remaining area of Park 26 is the Adelaide Oval precinct (Figure 53). The areas surrounding this include planted gardens containing a number of exotic species (Table 7). Areas along Montefiore Road toward the statue of Colonel Light are avenues of *Eucalyptus sideroxylon* ssp. *sideroxylon* and *E. citriodora*.

Figure 52.
Park 26, Linear Park Bikeway.
Photo: M. Long.

Figure 53.
View from Montefiore Hill, Park 26.
Photo: M. Long.

Tulya Wodli Park (Park 27)
Park 27 (118.1 hectares) (Figure 54) is the site of the historic Adelaide Gaol, South Australian Police Barracks, Bonython Park and a large section of the River Torrens. This site is situated between Port Road, Railway Lines and War Memorial Drive. This site is dominated by planted exotic species. The horse paddocks adjacent the Police Barracks have been planted out with now very old olive trees and a mixture of exotic and native Australian tree and shrub species (Table 7).

Some native Australian species exist along the banks of the river at this site, namely *Typha domingensis*, *Calystegia sepium* a few *Cyperus* or *Juncus* species and several large colonies of *Persicaria decipiens*. The Torrens Lake (Figure 55) is also part of site 27, this area is used for recreation and sporting activities.

Figure 54.
Park 27 is a large site mainly used for recreation.
Photo: M. Long.

Figure 55.
Torrens Lake in the heart of the city.
Photo: M. Long.

DISCUSSION
As can be seen from the Park descriptions above, the majority of the Park Lands are dominated by a mixture of planted exotic and Australian native species. The plantings generally surround either the periphery of the park land area or playing fields, and generally consist of larger trees planted in groups, with individual trees planted up to two metres apart from one another. Many of the plantings in the Park Lands of native Australian trees have consisted of Western Australian eucalypt species (Table 7), which are generally attractive trees and popular in urban settings. *Eucalyptus camaldulensis* var. *camaldulensis* has also been planted in many areas, many of these trees were planted in early settlement. *Eucalyptus cladocalyx* and *E. citriodora* have also been planted in many areas, both are large ornamental gums and are commonly used as avenues along walking and cycling paths. Some other large Australian native

species that are abundant in the Park Lands include Kurrajong (*Brachychiton populneus*) and Moreton Bay Fig (*Ficus microphylla*). There has also been quite substantial plantings of Australian native shrub species including, *Acacia*, *Melaleuca, Grevillea, Callitris* and some Western Australian *Hakea* and *Callistemon* species.

Exotic species are also plentiful in the Park Land area. Large trees such as Pepper-tree (*Schinus areira*), Aleppo Pine (*Pinus halepensis*), Radiata Pine (*P. radiata*) and Athel Pine (*Tamarix aphylla*) are some of the more conspicous and abundant species. Olive (*Olea europaea* ssp. *europaea*) is also very common, with some areas dedicated as olive groves. Exotic grasses such as Kikuyu (*Pennisetum clandestinum*), Buffalo Grass (*Stenotaphrum secundatum*) and Couch Grass (*Cynodon dactylon* var. *dactylon*) dominate the ground stratum. These grasses are found around the whole Park Land area and have not been listed routinely for each park in Table 7.

The occurrence of remnant flora species in the Park Lands is limited. Table 7 highlights in bold those species that occur naturally, with native grasses being most common and widespread. Natural regeneration of remnant species occurs most frequently in the West Terrace Cemetery (Park 23), Park 21 West, Park 21, Park 17, Park 16 and Park 6. Regeneration of many of these species occurs in the more open areas of the parks. For example, Park 21 West has many seedlings of *Arthropodium* sp. *Convolvulus* sp. Bindweed and *Austrostipa* sp. that have naturally regenerated.

In the past, records of plantings made by the Adelaide City Council have been extremely limited. There has also been no recording of seed provenance for the majority of plantings. Many of the local native Australian species that have been planted are of unknown seed provenance. Current re-vegetation programs in the Park Lands are however addressing these issues and re-vegetation plans are being produced and care taken to use only locally indigenous species of local seed provenance.

It is remarkable that despite the pressures of clearance, disturbance, invasive weeds and intensive management regimes of mowing and spraying that there are any naturally occuring species at all. Although their diversity and abundance is low relative to the richness that would have once existed in the area, some significant pockets still remain. West Terrace Cemetery is an excellent example, providing a vital seed source for future re-vegetation programs of locally indigenous plant species.

Table 7.
Plant Species Recorded for Each Adelaide Park Land Site 1-27 (see Figure 4 for location of Sites)

*introduced to the Southern Lofty Herbarium Region

Bold = Species found naturally regenerating in Park Lands

Species	Common Name	Endemic	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21W	22	23	24	25	26	27
Acacia acinacea	Wreath Wattle				x		x											x	x							x	x	x		
*Acacia baileyana**	Cootamundra Wattle																	x												
Acacia brachybotrya	Grey Mulga-bush		x																											x
Acacia cyclops	Western Coastal Wattle						x																							
Acacia hakeoides	Hakea Wattle						x																							
*Acacia iteaphylla**	Flinders Ranges Wattle	SA				x				x							x		x	x	x	x	x		x	x				x
Acacia ligulata	Umbrella Bush				x	x	x											x				x				x	x			x
*Acacia melanoxylon**	Blackwood																									x	x			
Acacia notabilis	Notable Wattle						x																							
Acacia paradoxa	Kangaroo Thorn				x		x											x								x	x			
*Acacia pendula**							x										x			x			x	x	x					x
Acacia pycnantha	Golden Wattle			x	x	x	x				x							x	x		x	x	x	x		x				x
Acacia retinodes var. *retinodes*	Swamp Wattle																												x	x
Acacia salicina	Willow Wattle																									x				
*Acacia saligna**	Golden Wreath Wattle	WA	x	x	x													x		x		x	x	x					x	x
Acacia sp.												x			x															
Acacia victoriae ssp. *victoriae*	Elegant Wattle																									x	x			
*Acer pseudoplatanus**	Sycamore	USA	x	x											x	x														
*Acmena smithii**	Lillypilly	NSW														x							x							
Agapanthus sp.*	Agapanthus	South African														x							x						x	
*Agonis flexuosa**		WA	x	x																			x							
Allocasuarina verticillata	Drooping Sheoak					x	x											x	x		x	x	x	x		x	x			x
Anigozanthus sp.*	Kangaroo Paw	WA																											x	
*Araucaria bidwillii**	Bunya Pine	QLD					x					x																		
*Araucaria excelsa**	Norfolk Island Pine	Norfolk Island																					x							x
Araucaria sp.*																			x		x	x								x
Artemisia sp.*	Wormwood	Europe																												x
Arthropodium fimbriatum	Nodding Vanilla-lily																		x							x				
Arthropodium strictum	Common Vanilla-lily							x											x							x				
Arundo sp.*	Bamboo	Eastern Asia																											x	
*Asparagus declinatus**	Bridal Veil	South Africa																								x				
Atriplex paludosa	Marsh Saltbush																										x			
Atriplex semibaccata	Berry Saltbush							x	x			x	x						x					x		x	x			
Atriplex suberecta	Lagoon Saltbush							x																		x				
Austostipa puberula	Small Rusty Spear-grass							x																						

Species	Common Name	Endemic	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21W	22	23	24	25	26	27
Austrostipa curticoma	Short-crest Spear-grass																		x							x				
Austrostipa drummondii	Cottony Spear-grass																									x				
Austrostipa eremophila	Rusty Spear-grass							x	x																	x				
Austrostipa flavescens	Coast Spear-grass							x	x																	x				
Austrostipa nitida	Balcarra Spear-grass																									x				
Austrostipa nodosa	Tall Spear-grass							x	x										x							x				
Austrostipa puberula	Small Rusty Spear-grass								x																					
Austrostipa scabra* ssp. *scabra	Rough Spear-grass																									x				
***Austrostipa* sp.**	Spear-grass			x		x	x	x	x									x	x		x	x	x	x	x					
Banksia marginata	Silver Banksia																										x			
Bauhinia sp.*		China																												x
Boerhavia dominii	Tar-vine							x				x	x													x				
*Brachychiton acerifolius**	Illawarra Flame Tree	NSW			x											x					x									x
*Brachychiton discolor**		NSW & QLD																			x									
*Brachychiton populneus**	Kurrajong	NSW & QLD	x	x	x	x			x	x	x	x			x			x	x	x	x	x	x			x				x
Brachychiton sp.*																													x	
*Buddleja davidii**	Butterfly Bush																									x				
Bursaria spinosa ssp. *spinosa*	Sweet Bursaria																									x	x			
*Callistemon phoenicius**	Bottlebrush	WA	x		x																									
Callistemon rugulosus var. *rugulosus*	Scarlet Bottlebrush						x																							
Callistemon sp.	Bottlebrush																x			x	x		x						x	x
Callitris gracilis	Southern Cypress Pine				x	x	x											x	x	x	x	x	x	x		x	x		x	x
Calostemma purpureum	Pink-garland Lily																		x							x				
Calothamnus sp.*		WA																												x
Calystegia sepium	Large Bindweed		x																										x	x
Calytrix tetragona	Common Fringe-myrtle																	x												
*Casuarina glauca**		NSW	x	x	x	x		x							x							x	x	x	x	x	x	x	x	x
Casuarina sp.							x																							
*Ceratonia siliqua**	Carob	Middle-East				x		x				x					x		x	x	x						x	x		x
Chenopodium pumilio	Clammy Goosefoot							x										x	x				x	x						
Chloris truncata	Windmill Grass			x			x	x	x				x					x	x		x	x	x	x	x					
Convolvulus erubescens	Australian Bindweed																									x				
Convolvulus remotus	Grassy Bindweed																									x				
Correa pulchella	Salmon Correa																												x	
Correa reflexa	Common Correa																													x
Cotoneaster sp.*			x																				x							
Cotula australis	Common Cotula								x										x											
Cymbopogon ambiguus	Lemon-grass																									x				
***Cyperus* sp.**	Sedge																x					x								x
Danthonia caespitosa	Common Wallaby-grass							x	x										x											
Danthonia carphoides* var. *carphoides	Short Wallaby-grass																		x											

Species	Common Name	Endemic	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21W	22	23	24	25	26	27
Danthonia racemosa* var. *racemosa	Slender Wallaby-grass								x										x											
Danthonia setacea* var. *setacea	Small Flower Wallaby-grass							x																						
***Danthonia* sp.**	Wallaby-grass							x	x				x					x	x			x	x	x						
Delonix sp.*	Poinciana	Madagascar																					x		x					
Dianella revoluta* var. *revoluta	Black-anther Flax-lily																	x	x			x				x				
Dichondra repens	Kidney Weed							x	x	x									x					x						
Dodonaea viscosa ssp. *angustifolia*	Narrow-leaf Hop-bush																	x	x							x				
Dodoneae viscosa	Sticky Hop-bush						x																							
Einadia nutans ssp. *nutans*	Climbing Saltbush												x						x											
Elymus scaber* var. *scaber	Native Wheat-grass							x	x									x	x			x								
Enchylaena tomentosa* var. *tomentosa	Ruby Saltbush							x	x				x						x							x				
Enteropogon ramosus																								x	x					
Epilobium hirtigerum	Hairy Willow-herb																	x												
Eremophila maculata ssp.*		Inland Australia								x																			x	x
Erythrina sp.*		Northern Australia																			x		x							
Eucalyptus camaldulensis var. *camaldulenis*	River Red Gum			x				x	x	x	x				x	x	x	x	x		x	x	x		x	x	x	x	x	x
*Eucalyptus citriodora**	Lemon-scented Gum	NSW & QLD	x					x			x	x			x		x		x		x	x	x		x		x	x	x	x
*Eucalyptus cladocalyx**	Sugar Gum	SA	x	x			x	x		x	x	x			x		x	x	x	x	x	x	x	x	x	x		x		x
*Eucalyptus cornuta**	Yate	WA	x																											
Eucalyptus erythrocorys	Red Cap Mallee	WA														x	x				x	x								
*Eucalyptus ficifolia**	Red-flowering Gum	WA	x																x											
*Eucalyptus forrestiana**	Fuchsia Gum	WA						x									x									x	x			
Eucalyptus landsdowneana ssp.*	Red-flowered Mallee Box	WA																				x								
*Eucalyptus leucoxylon rosea**	Red-flowering Blue Gum	WA	x	x	x	x						x						x	x		x			x						x
Eucalyptus leucoxylon ssp. *leucoxylon*	South Australian Blue Gum						x				x							x		x	x		x	x	x	x	x	x		x
*Eucalyptus maculata**	Eyebane	WA															x		x						x					x
*Eucalyptus megacornuta**	Warted Yale	WA						x																						
Eucalyptus microcarpa	Grey Box						x																x				x			
Eucalyptus odorata	Peppermint Box					x															x									
*Eucalyptus platypus**	Moort	WA		x	x																x									
Eucalyptus porosa	Mallee Box																									x	x			
*Eucalyptus preissiana**	Bell-fruited Mallee	WA	x			x		x				x									x			x			x			
*Eucalyptus salmonophloia**	Salmon Gum	WA	x	x																						x				
*Eucalyptus salubris**	Gimlet	WA																												x
Eucalyptus sideroxylon ssp. *sideroxylon**	Red-flowering Ironbark	NSW	x									x						x	x		x	x	x	x			x		x	x
Eucalyptus socialis	Beaked Red Mallee																										x			
Eucalyptus sp.						x													x							x				x
*Eucalyptus spathulata**	Swamp Mallet	WA										x														x				
*Eucalyptus stoatei**	Stoat Gum	WA						x																		x	x			

Species	Common Name	Endemic	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21W	22	23	24	25	26	27
*Eucalyptus torquata**	Coral Gum	WA	x		x	x		x											x		x						x			
Euphorbia drummondii	Caustic Weed							x					x													x				
Eutaxia microphylla	Common Eutaxia																	x												
Felicia sp.*	Rose	UK														x													x	
*Ficus macrophylla**	Moreton Bay Fig	NSW	x	x						x	x	x			x							x	x			x	x	x	x	
*Fraxinus excelsior**	English Ash	UK																	x		x		x							x
*Fraxinus raywoodii**	Claret Ash																		x											
Fraxinus sp.*	Ash		x									x			x				x	x		x					x	x	x	
Goodenia amplexans	Clasping Goodenia																		x											
Grevillea banksii var. *forsteri**		QLD																											x	x
*Grevillea robusta**		QLD						x							x	x					x								x	x
*Grevillea rosmarinifolia**	Rosemary Grevillea	VIC																											x	
*Hakea laurina**	Pincushion Hakea	WA					x																x							
Hakea leucoptera ssp. *leucoptera*	Silver Needlewood				x																									
Hakea sp.		WA	x		x		x																							
Hardenbergia violaceae	Native Lilac																									x	x			
Hedera helix ssp. *helix**	Ivy	UK																								x				
Hibiscus sp.*																							x							
*Jacaranda mimosifolia**	Jacaranda	Brazil																				x								
***Juncus* sp.**	Rush														x		x					x								x
Kniphofia sp.	Red-Hot Poker																												x	
*Lagunaria patersonii**	Norfolk Island Lagunaria	Norfolk Island																		x	x	x	x	x		x	x	x	x	x
Lagunaria sp.*	Pyramid Tree		x	x		x		x			x	x			x		x								x				
Lantana camara var. *camara**	Common Lantana	Brazil																					x						x	
*Lavandula dentata**	Lavender	Europe																												x
*Leptospermum laevigatum**	Coast Tea-tree	VIC	x																											
Leptospermum lanigerum	Silky Tea-tree																												x	
Leptospermum sp.	Tea-tree																													x
Livistona sp.*	Palm																			x			x						x	x
Maireana brevifolia	Short-leaf Bluebush							x					x						x							x	x			
Maireana enchylaenoides	Wingless Fissure-plant							x	x										x				x	x	x	x				
Malus sp.	Kaffir Apple											x							x	x						x	x		x	
Melaleuca decussata	Totem-Poles						x																							
Melaleuca lanceolata	Dryland Tea-tree				x		x																x			x	x	x		
Melaleuca nesophila																													x	
Melaleuca sp.		WA			x																		x	x						
Melalueca lanceolata ssp. *lanceolata*	Dryland Tea-tree		x																											
Melia azedarach var. *australasica**	White Cedar	NSW	x					x				x			x	x			x				x						x	
Mesembryanthemum sp.*	Iceplant	South Africa														x														
Myoporum insulare	Common Boobialla																						x				x			
Myoporum platycarpum ssp. *platycarpum*	False Sandalwood																										x			
*Myoporum viscosum**	Sticky Boobialla	VIC &															x	x												

Species	Common Name	Endemic	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21W	22	23	24	25	26	27
		SA																												
Myriophyllum sp.	Milfoil																									x				
*Nerium oleander**	Oleander		x																							x			x	x
Olea europaea ssp. *europaea**	Olive	Europe	x					x	x	x					x		x	x			x	x	x	x		x			x	x
Olearia axillaris	Coast Daisy-bush																	x												
Olearia ramulosa	Twiggy Daisy-bush																									x	x			
Oxalis perennans	Native Sorrel							x	x									x	x			x		x	x	x				
Panicum effusum* var. *effusum	Hairy Panic																									x				
*Pennisetum clandestinum**	Kikuyu	East Africa	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Persicaria decipiens	Slender Knotweed																												x	x
Phragmites australis	Common Reed		x																							x			x	
*Pinus halepensis**	Aleppo Pine	Middle East	x	x		x		x		x	x				x	x	x		x		x	x	x	x	x		x	x		
*Pinus radiata**	Radiata Pine	North America	x					x		x		x					x		x		x		x	x	x	x	x	x	x	x
Pinus sp.*					x																		x							
Pittosporum angustifolium	Native Apricot						x														x					x				x
Pittosporum sp.																														x
*Pittosporum undulatum**	Sweet Pittosporum	VIC	x													x							x						x	x
Poinsettia sp.*																													x	
*Populus alba**	White Poplar	Europe														x		x	x	x										x
*Populus nigra**	Black Poplar	Europe																x	x				x							x
*Populus nigra italica**	Lombardy Poplar	Europe	x													x			x	x			x							x
Populus sp.*	Poplar	Europe	x					x							x		x				x	x					x	x		
*Prunus cerasifera**	Ornamental Cherry																												x	x
Prunus sp.*	Cherry Tree																			x			x							
*Pseudognaphalium luteoalbum**	Jersey Cudweed																		x											
*Quercus robur**	English Oak	UK														x									x					
Quercus sp.*	Oak	UK	x																x				x							x
*Rosa rubiginosa**	Briar Rose																									x				
*Salix babylonica**	Weeping Willow	Europe														x							x							x
Salsola kali	Buckbush							x																		x				
Santalum acuminatum	Quandong																									x				
*Schinus areira**	Pepper-tree	Chile	x		x	x		x				x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Senecio pterophorus var. *pterophorus**	African Daisy	South Africa														x														
Senecio quadridentatus	Cotton Groundsel																									x				
Senecio sp.																														x
Senna artemisioides ssp.	Desert Senna																										x			
Senna artemisioides ssp. *filifolia*	Fine-leaf Desert Senna				x																					x	x			
Solanum nigrum*	Black Nightshade																									x				
*Tamarix aphylla**	Athel Pine	North Africa	x					x			x	x			x								x			x			x	
Teucrium racemosum	Grey Germander																		x											

Species	Common Name	Endemic	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21W	22	23	24	25	26	27
Tristania sp.*																							x							
Typha domingensis	Narrow-leaf Bulrush		x												x		x					x	x			x			x	x
*Ulmus procera**	English Elm	UK	x												x	x													x	
Veronica sp.*	Speedwell																						x						x	
Vittadinia blackii	Narrow-leaf New Holland Daisy			x																										
Vittadinia dissecta	Dissected New Holland Daisy							x																						
Vittadinia gracilis	Woolly New Holland Daisy							x																			x			
Vittadinia sp.	New Holland Daisy							x											x											
*Westringia dampieri**		WA								x													x							x
Xanthorrhoea semiplana ssp. *semiplana*	Yacca																	x	x											
*Zantedeschia aethiopica**	White Arum Lily	South Africa														x													x	

FAUNA

MAMMALS

INTRODUCTION
The following Chapter details the fauna species compiled during this project, including Mammals, Birds, Reptiles, Amphibians, Insects and Arachnids. Opportune records were collected for some of these groups (Figure 56 and Appendix V).

This section describes the mammal fauna that once occupied the Adelaide Park Land area and details the species that exist today. Appraisals of species with either National or State conservation ratings will be provided, along with discussions on selected species that still occur in the area. Information on introduced mammals will also be discussed.

The Adelaide region with its once diverse variety of habitats supported many different fauna species. The mammal fauna was quite abundant in the Adelaide City area on settlement, with Bilby (*Macrotis lagotis*) described as 'quite common at Pinkie Flat along the Torrens, and on the Adelaide Plains' (Tyler *et al*. 1976). Mammal fauna has been the group most adversely effected by European colonisation, and especially in the Adelaide area. Twenty-six species of native mammals have disappeared from South Australia since European settlement (Robinson *et al*. 2000).

A total of 33 mammal species have been recorded for the Park Lands (Appendix V). Of this figure, nine species are considered Extinct in the area (Table 8), 11 are bat species and five species are introduced. Species listed in Table 8 are no longer found in the Adelaide Park Land area, and a more detailed description of each of these species is provided. However, there is a paucity of specific information on species occurrence in the immediate Adelaide area.

Table 8.
Locally extinct mammal fauna of the Adelaide Park Land area
AUS and SA Refer to Table X and Appendix V

Species	Common Name	AUS	SA	Comments
Bettongia lesueur	Burrowing Bettong	EN	E	Original populations Extinct. Introduced to Yookamurra Sanctuary & Roxby Downs Arid Recovery Project (Robinson *et al.* 2000)
Bettongia penicillata	Brush-tailed Bettong	EX	E	Original populations Extinct. Introduced to St Peter Island, Wedge Island, Venus Bay Conservation Park and Yookamurra Sanctuary (Robinson *et al*. 2000)
Dasyurus viverrinus	Eastern Quoll		E	1 SA Museum record from 1924, collected 'near' Adelaide
Isoodon obesulus	Southern Brown Bandicoot	EN	V	Surviving well in areas in the Mount Lofty Ranges
Macropus eugenii	Tammar Wallaby		E	Mainland subspecies Extinct. Kangaroo Island sub-species still common (Robinson *et al.* 2000)
Macrotis lagotis	Bilby	VU	V	Original populations Extinct. Introduced to Thistle Island, Yookamurra Sanctuary & Roxby Downs Arid Recovery Project (Robinson *et al.* 2000)

Ornithorhynchus anatinus	Platypus		E	Thought to be Extinct in region, has not been recorded for many years
Phascogale tapoatafa	Brush-tailed Phascogale		E	Thought to be Extinct in region, have been no confirmed sightings for many years
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat		R	1 SAM record collected 1935 somewhere within 18 km radius of Adelaide
Tachyglossus aculeatus	Short-beaked Echidna			1 SA Museum record collected 1928 from somewhere within a 18 km radius of Adelaide

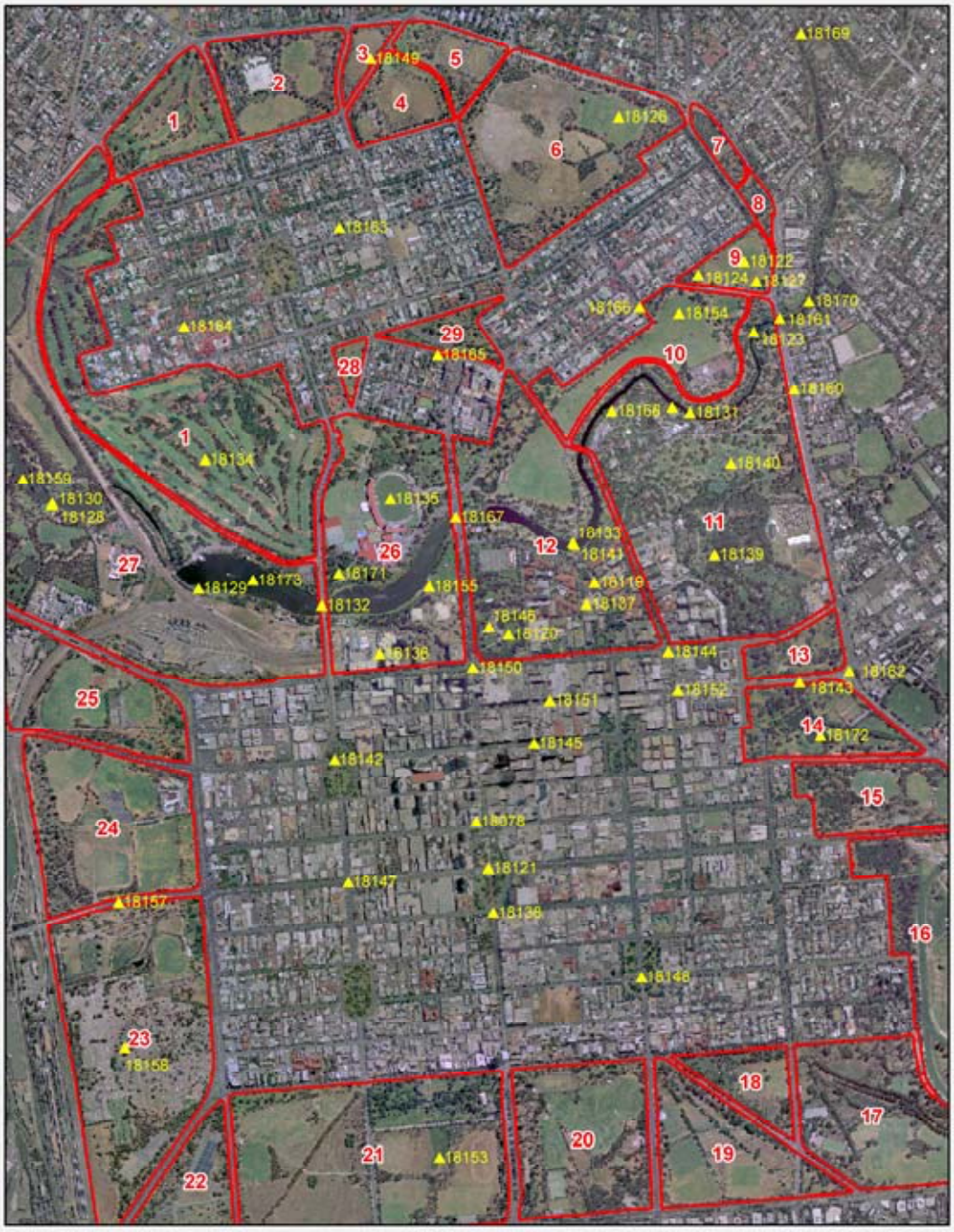

Figure 56.
Opportunistic Fauna Sites in the Adelaide Park Lands

Management Units

Opportune Fauna Sites

DESCRIPTIONS OF LOCALLY EXTINCT MAMMAL SPECIES

Burrowing Bettong (*Bettongia lesueur*)
The Burrowing Bettong is the only macropod that inhabits burrows on a regular basis (Strahan 1995). It had one of the largest geographic ranges of any Australian mammal, recorded in all State's and Territories except Queensland and Tasmania. It is now Extinct throughout mainland Australia but still found on some islands in WA (Strahan 1995). Tyler *et al*. (1976) and Watts (1977) report on its occurrence on the Adelaide Plains early in European settlement. Strahan (1995) reports that early naturalists in various areas of Australia noted that the Burrowing Bettong was one of the most abundant mammals in many areas. Its decline began in the 19th Century, with rabbits taking over disused warrens and in some areas they coexisted for many decades. The disappearance of the Burrowing Bettong from areas in Central and Western Australia coincided with the arrival of *Vulpes vules* Red Fox and *Felis catus* Cat has also been implicated in its extinction (Strahan 1995). *Oryctolagus cuniculus* Rabbit is implicated in its extinction from the Adelaide Plains (Tyler *et al*. 1976). It is a medium sized macropod weighing up to 1.5kg, and is one example of a medium sized macropod that has disappeared from the Adelaide Plains.

Brush-tailed Bettong (*Bettongia penicillata*) (Figure 57)
Bettongia penicillata was widespread at the time of European colonisation in Australia, and now it is an Endangered species (Strahan 1995). It had a habitat preference of open forests and woodlands, with clumped low understorey of tussock grasses or low woody scrub.

Tyler *et al*. (1976) and Watts (1977) record its occurrence on the Adelaide Plains at the time of European settlement. They were so common that Wood Jones (1923-1925) wrote "Twenty years ago the dealers in Adelaide did a great trade in selling them by the dozen at about ninepence a head for coursing on Sunday afternoons").

This species mainly feeds on underground fungi, which it supplements with bulbs, tubers, seeds, insects and resin (Strahan 1995). The Brush-tailed Bettong is also a small to medium sized macropod weighing on average 1.3kg and has a head and body length of 330mm (Strahan 1995). It nests in a dome made of grass or shredded bark, built over a shallow depression scraped in the ground or under a bush. This mammal has become endangered through habitat clearance in agricultural areas and the introduction of the fox (Strahan 1995).

Eastern Quoll (*Dasyurus viverrinus*) (Figure 58)
The Eastern Quoll was regarded as 'quite common' on the Adelaide Plains on settlement and its demise from this area is largely attributed to the destruction of its habitat (Tyler *et al.* 1976). The Eastern Quoll or Native Cat is extinct in South Australia and possibly extinct on mainland Australia but is common in Tasmania (Strahan 1995). It once ranged over most of south-eastern Australia and is thought to have disappeared as the result of an epidemic (Strahan 1995). It is an attractive animal with a white-spotted black or fawn fur, with an absence of spots on its tail. It is an opportunistic carnivore with insects comprising a large proportion of its diet along with ground-nesting birds, small mammals and carcasses of larger animals such as wallabies, possums and sheep (Strahan 1995). The average weight of males is 1300g and females 880g. It is found in a variety of habitats including dry sclerophyll forest, scrub, heathland and cultivated land, and remaining populations in Tasmania are most frequently found in areas where eucalypt forest and pastures are interspersed (Strahan 1995).

Southern Brown Bandicoot (*Isoodon obesulus*)
The Southern Brown Bandicoot is no longer found on the Adelaide Plains and populations have become fragmented across its range, including in the Mount Lofty Ranges (Haby 2003). There is limited information on the Southern Brown Bandicoot occurring on the Adelaide Plains, with Watts (1977) reporting its occurrence. It prefers a mosaic of habitats that are burnt sporadically, which in the regeneration stages support abundant insects (Strahan 1995). The Southern Brown Bandicoot is dark greyish or yellowish brown in colour above, creamy white below and has coarse short hair. The average weight of males is 850g and females 700g (Strahan 1995). Its diet consists mainly of earthworms and other insects, and it also eats fungi and other subterranean plant material (Strahan 1995). Due to the reliance of the Southern Brown Bandicoot on dense understorey and a mosaic of habitats its occurrence has now been reduced to a patchy distribution. Land clearance, the loss of dense vegetation,fpx predation, spread of sheep and cattle and the reduction in the frequency of small-scale fires, which were used by Aborigines before European settlement, have all contributed to the reduced range of this species (Strahan 1995).

Tammar Wallaby (*Macropus eugenii*)
The Tammar Wallaby is today best known for its populations on Kangaroo Island, however it was formerly one of the most numerous and widespread of the mammals in the southern parts of South Australia (Tyler *et al*. 1976). It is uncertain if it is still surviving on mainland South Australia.

The Tammar Wallaby is a dark, grizzled grey-brown colour above, becoming rufous on the sides of the body and on the limbs. Males weigh an average of 7.5kg and females 5.5kg (Strahan 1995). It requires dense low vegetation for daytime shelter and open grassy areas for feeding. The demise of this species on mainland South Australia has been attributed to the loss of habitat and predation by the feral cat (Strahan 1995).

Bilby (*Macrotis lagotis*) (Figure 59)
The Bilby once inhabited the arid and semi-arid regions throughout most of the Australian mainland, it is now confined to deserts of central Australia (Strahan 1995). On European settlement the Bilby was reported as being 'quite common' in Adelaide (Tyler *et al*. 1976). An area along the River Torrens, between Montefiore Bridge and King William Street was named 'Pinkie Flat' after the Bilby. The Bilby is identified by its long, blue-grey silky fur, long rabbit-like ears, a long tail which changes abruptly from black to white half-way along to the tip and it has a long and pointed muzzle. Males weigh an average of 2500g and females 1100g (Strahan 1995). The Bilby is a strong burrower, and can construct a burrow system up to 3 metres long and up to 1.8 metres deep, which contains no nest material (Strahan 1995). The Bilby is nocturnal, staying in its burrow throughout the day, when it emerges at night to search for insects and their larvae, seeds, bulbs, fruit and fungi. The Bilby saw a widespread contraction in its range in the early 1900's, and its distribution is still contracting. Populations were effected by the grazing pressures of introduced livestock and rabbits, changes in the fire regime and heavy predation from the introduced fox and feral cat. Populations have been introduced onto Thistle Island off the coast of South Australia and to Yookamurra Sanctuary in the Murray Mallee.

Platypus (*Ornithorhynchus anatinus*)
The Platypus was once found in the River Torrens and Onkaparinga River, but has not been reported for many years (Tyler *et al*. 1976). It is now considered possibly Extinct in South Australia (Strahan 1995) or Endangered (Robinson *et al*. 2000), except for an introduced population on Kangaroo Island. It is however still common in the remainder of its range, along the East Coast of Australia and Tasmania, but it could be under increasing pressure and should be regarded as vulnerable (Strahan 1995). The Platypus is unmistakable with its dense underfur, pliable bill, webbed feet and absence of visible ears. It feeds on a variety of adult and larval aquatic invertebrates by sifting the substrate with its bill and it also feeds on individual larger prey items (Strahan 1995). It constructs its burrows in the riverbank, just above the water level, where it shelters and incubates its eggs. The Platypus has been affected by water pollution, inappropriate fishing practises and stream and river bank disturbance for agriculture. Dam constructions have been responsible for many local extinctions and this is probably the main cause of its demise in South Australia (Strahan 1995).

Brush-tailed Phascogale (*Phascogale tapoatafa*)
Records of this elusive, largely arboreal mammal are scarce in South Australia. It has however been indicated as having occurred on the Adelaide Plains (Watts 1977). It is uncertain if it is still occurring in the Adelaide Hills, with many 'unconfirmed' sightings. It prefers open forest habitat with sparse ground cover (Strahan 1995). It is an attractive animal with a uniform, grizzled grey colour above, cream to white below, large hairless ears and a distinctive long black 'bottle-brush' tail up to 55mm in length. Its head and body length is 199mm for males and 181mm for females. Males weigh on average 231g and females 156g (Strahan 1995). It forages in large trees, peeling back bark looking for cockroaches, beetles, centipedes, spiders and bull ants. It has also been known to feed on small vertebrates and penned poultry (Strahan 1995). It nests in hollow tree limbs and large tree cavities, rotted stumps and some bird nests. Populations have been largely reduced and fragmented due to clearance for agriculture. All of the male Brush-tail Phascogale's die after the breeding season, lower densities could make populations very vulnerable to localised extinctions (Strahan 1995).

Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*)
The Yellow-bellied Sheathtail Bat is a medium-sized species and is readily recognised by its distinctive black fur on its head and back and contrasting white to creamy-yellow fur below (Reardon and Flavel 1987). Four specimens of this species have been collected from the Adelaide region (Reardon and Butler 2001). This species is a forest-dweller preferring large hollow trees for roosting (Reardon and Flavel 1987). It forages for insects high above the tree canopy - possibly up to 1000 metres high (Reardon and Butler 2001). It is considered Rare in South Australia, with a total of only 17 records from widespread localities in the State (Reardon and Butler 2001). It was not detected by this current survey in the Adelaide Park Lands.

Short-beaked Echidna (*Tachyglossus aculeatus*)
Although still widespread across Australia, the Echidna is not commonly found on the Adelaide Plains, and is no longer found around the Adelaide area. The Echidna is easily recognised by its thick covering of long spines with fur present in

between. It is a specialised feeder, feeding on ants and termites with its long sticky tongue, and powerful front claws for digging into nests and breaking apart rotting logs. It is found in a wide variety of habitats across Australia, from areas with winter snow to deserts. Their average weight can vary between 2-7kg (Strahan 1995). The Echidna has no significant predator, its demise in the Adelaide area is most likely attributed to the loss of suitable habitat and shelter.

CURRENT MAMMAL FAUNA

Of the total 33 native mammals recorded for the Adelaide area, 10 species remain. Including a possible six or seven bat species Wattled Bats (*Chalinolobus* sp.), the Southern Freetail Bat (*Mormopterus* sp.), the Lesser Long-eared Bat (*Nyctophilus geoffroyi*), the White-striped Freetail Bat (*Tadarida australis*) and Forest Bats (*Vespadelus* sp.), two possum species (the Common Brushtail Possum (*Trichosurus vulpecula*) and the Common Ringtail Possum (*Pseudocheirus peregrinus*)) and one rodent the Water-rat (*Hydromys chrysogaster*).

The most conspicuous of the native mammal fauna in the Adelaide Park Lands is *the* Commopn Brushtail Possum (Figure 60). Although considered Common and Very Common in some areas in South Australia, its status is not uniform with arid zone populations in South Australia being very rare, and believed extinct (Kemper and Foulkes 1996). Populations have remained common in the wetter areas of the State, including the Mount Lofty Ranges and Kangaroo Island, however they may be declining in some areas (Kemper and Foulkes 1996). The Common Brushtail Possum is however, one of the few mammal species that has adapted well to urban areas. A survey conducted by Adelaide University in the eastern suburbs of Adelaide, from the Central Business District to the Adelaide Hills Zone, reported that 35% of households surveyed reported the presence of the Common Brushtail Possum (Hill 1996). It was found that the relationship with the Common Brushtail Possum and property owners was not always a harmonious one.

Common Brushtail Possums are nocturnal, therefore their foraging, mating and male territorial activities all occur throughout the night, in urban populations this often means in and on roof spaces. The Common Brushtail Possum eats a wide variety of plant foods, including leaves, buds, flowers and fruit (Bird 1996). The leaves of *Eucalyptus camaldulensis* var. *camaldulensis* River Red Gum, has been found to account for 95% of the diet (reported in Bird 1996). As the Common Brushtail Possum is such a generalist herbivore it has adapted well to the abundant food sources available in urban gardens. It will eat a wide range of ornamental plants including the leaves and buds of roses, geraniums, stone fruit, grapes and olives to name a few (Bird 1996).

The Common Brushtail Possum in urban environments are subject to high mortality rates. Collisions with vehicles are common (Figure 61) and foxes, dogs and cats prey on them in urban areas (Bird 1996). Foxes have been observed taking possums in the West Terrace Cemetery (West Terrace Cemetery Gardening Staff pers. comm. 2003) The Common Brushtail Possum is considered a pest in some areas, which has created many management issues for Local Council's. Issues of translocation and re-colonisation, success of nesting boxes, destruction, education and attitudes toward this species are all considerations for Local Council's.

The Common Ringtail Possum (Figure 62) and the Water-rat (Figure 63) are less conspicuous than the Common Brushtail Possum, but they also have adapted well to close habitation with humans. However, electrocution and cat, fox and dog predation occurs within urban populations (Brunner *et al*. 1991). The Common Ringtail Possum makes use of the wide variety of flowers available in suburban gardens and the Water-rat is surviving well in the River Torrens in the inner city area. There is limited information available on inner city populations of both of these species. The SA Museum has numerous records of the Water-rat along the Park Lands section of the River Torrens, with some records of the Common Ringtail Possum in various areas of the Park Lands. The Water-rat can be most readily observed along the section of the River Torrens from the Adelaide Zoo to the Hackney Road Bridge in the early evening. They are easily recognisable, being much larger than the introduced Black Rat with a long thick tail with a white tip.

Bats are the most diverse group of mammals still existing in the Park Land area. They have been relatively successful in urban environments, by adapting to using human-structures for day roosts. They use roof spaces, wall cavities, sheds, water pipes and in some instances car exhaust pipes and cylinders on old tractors (Reardon and Butler 2001). Natural roosts include tree hollows, trunks and limbs, caves, rock crevices or overhangs or loose bark. The Park Lands do have a significant number of large trees with hollows available of both exotic and native Australian species (Lucas n.d.), which in combination with the many human-structures is supporting bat populations in the local area.

Four bat species were detected using ANABAT during this survey and these include the White-striped Freetail bat (*Tadarida australis*), Gould's Wattled Bat (*Chalinolobus gouldii*), the Southern Freetail bat (*Mormopterus* sp.) and possibly the Chocolate Wattled Bat (*Chalinolobus morio*). Other bat species that are likely use the Park Lands but were not detected during this survey include the Lesser Long-eared Bat (*Nyctophilus geoffroyi*), the Southern Forest Bat (*Vespadelus regulus*) and the Little Forest Bat (*Vespadelus vulturnus*).

No patterns were observed between bat species and location within the Park Lands. Each of the 5 recording nights did not produce a high abundance of calls, with an average of 11 recorded each night. Four species was the most recorded in one night, which was from the West Terrace Cemetery (Table 9). No recordings were made in the North Park Lands during this survey, an appropriate, lockable recording site was not available.

Table 9.
Bat Species Recorded using ANABAT in the Adelaide Park Lands

Species	Common Name	East	West	South	River	Valley
Chalinolobus gouldii	Gould's Wattled Bat		4	4	4	4
Chalinolobus morio	Chocolate Wattled Bat		4			
Mormopterus sp. (undescribed)	Southern Freetail bat	4	4	4	4	4
Tadarida australis	White-striped Freetail bat		4	4	4	

Mormopterus sp. (long penis form) (Figure 64) was the most frequently (71%) recorded species during this survey (Appendix V). This species is currently confused within a complex of other very similar species that are yet to be formally described (Churchill 1998). It is a small species, weighing between 7-15g, it is greyish in colour with a free tail (Reardon and Butler 2001). This species generally flies above the tree canopy feeding on bugs, beetles, moths and flying ants and roosts in tree hollows but is also commonly found in buildings (Reardon and Butler 2001).

Chalinolobus gouldii (Figure 65) was the next most frequently recorded species (50%) (Appendix V). This species is regarded as widespread and abundant in South Australia (Reardon and Flavel 1991). It is distinctive with black fur on its head and shoulders, which contrasts with lighter brown fur on the rest of its body. It weighs between 10-20g (Reardon and Butler 2001). *Chalinolobus gouldii* forages for insects in tree canopies, but also forages in open and modified vegetation. It roosts in tree hollows, often in River Red Gum's in colonies up to 200, and can be found occasionally roosting in the roof cavities of buildings (Reardon and Butler 2001).

Tadarida australis (Figure 66) was only recorded twice during the survey, but this species is regarded as common in the area. It is the largest of the species found in the Adelaide area, weighing between 30-44g (Reardon and Flavel 1987). It is a distinctive species, covered with black fur except for a white-stripe along the underside where the wing meets the body. This species flies high above the tree canopy, and is one of the only species audible to humans. It roosts in tree hollows.

Chalinolobus morio was possibly recorded once during this survey. I is also possible that this call could be from a *Vespadelus* sp., it lacked a distinctive characteristic common in *C. morio* calls (T. Reardon pers. comm. 2003).

INTRODUCED MAMMALS

Introduced mammals represent a significant proportion of the remaining mammal species found in the Adelaide Park Land area. There are five introduced species recorded for the Park Lands, including three rodents and two carnivores (Appendix V). Of the introduced rodent species the House Mouse (*Mus musculus*) is the most widely spread species, found in all habitats across South Australia (Strahan 1995). The Black Rat (*Rattus rattus*) is restricted to the wetter areas of South Australia, and is common over the Adelaide Plains. The Brown Rat (*Rattus norvegicus*) has a far more restricted range than the other two species, but there are numerous SA Museum records for this species for around the City of Adelaide. Although not surveyed during this project, there is numerous anecdotal evidence of these species being in abundance in and around Adelaide.

The Rabbit (*Oryctolagus cuniculus*) was introduced into south-eastern Australia in 1858, where it rapidly spread across Australia (Strahan 1995). The Rabbit probably had a greater effect in the Adelaide area in the colonial period when it competed directly with the small to medium sized macropods such as *Bettongia penicillata* and *Macrotis lagotis,* for food and burrow sites.

It is not known what the population sizes of Rabbits are today in the Adelaide Park Land area, there is minimal data available for this species.

The two carnivores introduced into the Adelaide area, the Red Fox (*Vulpes vulpes*) and the Cat (*Felis catus*), have probably had the most direct influence on the small to medium sized mammals and bird species. The Red Fox has contributed to the extinction of many small to medium sized mammals in Australia. It is often observed in the Adelaide Park Lands, and is regularly seen in West Terrace Cemetery (West Terrace Cemetery ground staff pers. comm. 2003) where it has been seen preying on Common Brushtail Possums. The Adelaide City Council has conducted a pilot survey on the Red Fox in the Park Lands. Spotlighting was conducted every night for a two-week period, at least one Red Fox was seen each night (P. Baldacchino, pers. comm. 2003). A trial trapping effort was attempted but no animals were caught. There have been no population studies of the Red Fox in the Park Lands or any stomach content or scat analysis done. Therefore it is not known what the Red Foxes are feeding on in the Park Lands besides possums and if they pose any immediate threats to the remaining native fauna, especially birds and nestlings.

The diet of the Red Fox has been analysed using scats in an urban park in Melbourne (Brunner *et al*. 1991). This study found that smaller prey items such as the House Mouse and Black Rat were important dietary items of the fox, but birds, possums and reptiles also formed a substantial component of their diet.

The Cat is most likely posing the largest threat to native species in the Park Lands today. It is widespread with domestic and some feral populations reported around the Festival Theatre, Aquatic Centre, along the River Torrens near Morphett Street Bridge and there is an occasional family reported from the South Park Lands (P. Baldacchino pers. comm. 2003). Two feral cats were trapped by the Adelaide City Council in 2002 and one of these was sent to the Adelaide Zoological Gardens for stomach content analysis, the results were not available at the time of this report (P. Baldacchino pers. comm. 2003).

The impact that cats have on native wildlife around Australia has been well documented (Potter 1991). Paton (1991) conducted a questionnaire of cat owners on the prey items that their cats collect in suburban Adelaide. This survey found that of the respondents, 59.4% kept cats. 50 – 60% of the domestic cats took birds and mammals, and 30% collected reptiles, with frogs and insects also recorded. The cats collected on average eight birds, 16 mammals and eight reptiles per year. It was found that a wide range of native bird species were collected including, parrots, honeyeaters, wrens, robins, thornbills, pardalotes, finches, whistlers, magpie larks, magpies and woodswallows. Introduced species were also taken including turtle doves, blackbirds, starlings and house sparrows. Mammal species taken included brushtail and ringtail possums, dunnarts, antechinus, bandicoots and many snake, skink and gecko species were also taken. It was also reported that in suburban Adelaide, bird densities are around 10-30 birds per hectare, and that domestic cats in suburbs take between 10-30 birds per hectare per year. Therefore it is possible that domestic cats are taking 50% of the standing crop of birds each year. The report concluded that domestic cats take a diverse array of vertebrate prey, despite being cared for and fed by their owners and that they are a substantial threat to Australian wildlife.

There is limited information on the impacts that the Domestic Dog (*Canis lupus familiaris*) may have on native fauna species in the Adelaide area. A comparison of the diets of foxes, dogs and cats was conducted in an urban park in Melbourne (Brunner *et al.* 1991). This study found that dogs commonly preyed upon native mammal species and small numbers of birds. The Common Ringtail Possum and Common Brushtail Possum were the most commonly recorded prey items in the dogs scats. Over half of the dogs scats collected from the urban park contained mammalian remains (Brunner *et al*. 1991). The combined influences of dogs, foxes and cats on the remaining Park Land fauna could therefore be very significant.

Figure 57.
Brush-tailed Bettong (*Bettongia penicillata*) once widespread in South Australia. Original populations are now Extinct, it has been introduced to some offshore islands and Yookamurra Sanctuary.
Photo: P. Canty.

Figure 58.
Eastern Quoll (*Dasyrurus viverrinus*) was regarded as 'quite common' near Adelaide on European settlement and is now considered Extinct in South Australia.
Photo: A. Robinson.

Figure 59.
The Bilby (*Macrotis lagotis*) was Common on the Adelaide Plains on European Settlement, an area between Morphett Street and King William Street Bridges was named 'Pinkie Flat' after the Bilby.
Photo: A. Robinson.

Figure 60.
The Common Brushtail Possum (*Trichosurus vulpecula*) is one of the most conspicuous native mammals remaining in the Adelaide Park Lands.
Photo: A. Robinson.

Figure 61.
Roadkills are common in the suburban area.
Photo: M. Long.

Figure 62.
The Common Ringtail Possum (*Pseudocheirus peregrinus*) is a resident in the Park Lands.
Photo: A. Robinson.

Figure 63.
Water Rat (*Hydromys chrysogaster*) is the only native rodent remaining in the Adelaide Park Lands. Populations are surviving well in areas along the River Torrens.
Photo: S. Doyle.

Figure 64.
Southern Freetail Bat (*Mormopterus* sp.) was the most frequently recorded bat species during the survey.
Photo: P. Bird.

Figure 65.
Gould's Wattled Bat (*Chalinolobus gouldii*) was recorded during the survey and has adapted to roosting in roof cavities in urban areas.
Photo: P. Bird.

Figure 66.
White-striped Freetail Bat (*Tadarida australis*) was recorded during the survey. This is the largest of the bat species found in the Adelaide Park Lands.
Photo: A. Robinson.

BIRDS

INTRODUCTION

This following section summarises bird species in the Adelaide Park Lands and discusses species changes since European settlement. Aspects of their ecology and their National and State Conservation significance will be described, along with a discussion of common and introduced species species, and those which are of local significance.

Bird fauna is the most conspicuous and well documented fauna group in the Adelaide Park Lands. There are a wide variety of colourful parrots, honeyeaters and waterbirds that frequent the inner suburban area of Adelaide. The South Australian Ornithologists Association (SAOA) is a very active naturalist group in South Australia and members have provided valuable information for this survey. The group produces a biannual journal, which has dedicated volumes to bird species sightings across South Australia and includes local Adelaide records (SAOA 1977; Reid 1980; Bransbury 1984; Paton *et al*. 1994 Parts 1 and 2). Many other reports and papers have published bird species lists for various localities around Adelaide, spanning many years (Morgan 1914; Paton 1976 and 1977; Whatmough 1978; Pedler and Paton 1992; Thompson 1997). Other papers have published occurrences of individual species in the Adelaide area, including changes in distributions (Zeitz 1914; Bowie 1978 and 1980; Whatmough 1981 and 1997; Reid 1983; Parker 1988).

This survey compiled bird records from the South Australian Museum, literature and from the many active ornithologists in the Adelaide area. A very important dataset, compiled by Mr B. Whatmough was available for use in this report.

Appendix VI shows the 153 bird species recorded for the Adelaide Park Lands during this project. This figure includes species that are no longer found in the Adelaide Park Lands, species that are occasional visitors, migratory species and introduced species. This figure represents a significant proportion of the State's total of 355 species (43%) (Kahrimanis 1999). It includes a number of species of National, State and Regionally conservation significance (Table 10), which will each be discussed in more detail.

Table 10.
Bird Species with Conservation Significance recorded for the Adelaide area.

Australian (AUS), South Australian (SA) and Regional (REG) conservation significance. (For further detail refer to Appendix VI and Table 3).

Species	Common Name	AUS	SA	REG	Comments
Xanthomyza phrygia	Regent Honeyeater	EN	E	E	Recorded by Glover (1953) in Botanic Park and Gardens. Possibly a regular visitor to the Park Lands until the 1940's (Paton 1976)
Lathamus discolor	Swift Parrot	EN	E	V	One SA Museum record from 1927, collected from somewhere within a 55km radius from Adelaide
Pedionomus torquatus	Plains-wanderer	VU	E	E	One SA Museum record from 1914 collected near North Adelaide
Alcedo azurea	Azure Kingfisher		E	X	One SA Museum record from 1906 collected from somewhere within a 55km radius from Adelaide. Recorded by Glover (1953) in Botanic Park and Gardens
Haliaeetus leucogaster	White-bellied Sea-Eagle		E	V	Two records from the SAOA newsletter. Recorded in 1968 in West Park Lands and in 1982 from River Torrens near Adelaide
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo		V	V	A more recent arrival to the Adelaide City Park Lands
Ninox connivens	Barking Owl		R	X	One SA Museum record from 1895 from 'near' Adelaide
Struthidea cinerea	Apostlebird			X	Recorded in the South Park Lands 1979 (SAOA 1979)
Neophema elegans	Elegant Parrot		R	K	Recorded in the 1984-1985 Bird

					Atlas (Paton *et al*. 1994), exact locality of records uncertain
Corcorax melanorhamphos	White-winged Chough		R	V	Recorded in Botanic Park and Gardens (Paton 1976) and in Botanic Park in 1969 (SAOA 1969)
Falcunculus frontatus	Crested Shrike-tit		R	V	One SA Museum record from 1939 from the 'Torrens Lake' also recorded by Glover (1953) and SAOA (1977)
Myiagra inquieta	Restless Flycatcher		R	V	Recorded by Glover (1953) in Botanic Park and Gardens and by the 1974-1975 and 1984-1985 Bird Atlas, exact localities uncertain
Barnardius zonarius	Australian Ringneck			V	Records are of aviary escapees (Pers. comm. P. Horton 2003)
Geopelia placida	Peaceful Dove			V	Recorded in the SAOA Newsletter in 1981 from South Park Lands and 1991 from the River Torrens Gilberton (just outside of study area)
Melithreptus gularis	Black-chinned Honeyeater			V	One SA Museum record from 1927 from 'near' Adelaide. Also recorded by Glover (1953)

DESCRIPTIONS OF BIRD SPECIES OF CONSERVATION SIGNIFICANCE

Regent Honeyeater (*Xanthomyza phrygia*)
The Regent Honeyeater is an attractive bird, mostly black in colour with a bold netted scaly pattern of cream and yellow over the chest, the wings and tail feathers have conspicuous broad golden-yellow edges (Pizzey 1980). It feeds on nectar from ironbark eucalypts, banksias and mistletoe, and can also take insects and lerps.

In South Australia, the Regent Honeyeater is most commonly observed near Adelaide, with some records from the Mount Lofty Ranges. Its range extends into the southern Flinders Ranges. Breeding records and reports of more than two birds are from Adelaide or in immediately adjacent areas of the Mount Lofty Ranges. The distribution of the Regent Honeyeater within the Adelaide area is strongly concentrated along the western slopes of the southern Mount Lofty Ranges with a further cluster in the Adelaide Park Lands (Franklin and Menkhorst 1988).

This species was once quite abundant around Adelaide, with substantial numbers reported in 1919 near Lockleys (Franklin and Menkhorst 1988). The Regent Honeyeater is now thought to be declining in number as well as range (Blakers *et al.* 1984), with this decline being the most prevalent in South Australia, where now it is considered a vagrant. (Franklin and Menkhorst 1988).

The Regent Honeyeater is a seasonal and nomadic inhabitant of eucalypt forest and woodlands. The clearing of habitat for urbanization is thought to be a cause for the decline of this species. Other factors may also be important as this bird has at times thrived in some well-treed urban habitats (Franklin and Menkhorst 1988). The Adelaide Zoo is successfully breeding this species. Research staff have identified a critical class of chemicals(carotenoids) in their diet, which could also be important for wild populations of this species (G. Johnston, pers. comm. 2003).

Swift Parrot (*Lathamus discolor*)
The Swift Parrot is a predominantly green parrot with a dusky red spike-shaped tail, forehead and throat and has a blue crown and cheeks (Pizzey 1980).

Early reports of the Swift Parrot suggest that it was once a regular visitor to the Adelaide area, regularly seen in 1863 at the Reed Beds, west of Adelaide (Zeitz 1914). A report from 1862 states they were numerous around the Burnside area (Clark 1914).

It is found in well-timbered areas where there are flowering trees. It breeds in Tasmania and migrates to the mainland for autumn and winter. It overwinters in the Mount Lofty Ranges and southern Flinders Ranges and also follows the East Coast to the Fitzroy River area in Queensland (Schodde and Tidemann 1986). It is considered a vagrant species on mainland Australia.

Plains-wanderer (*Pedionomus torquatus*)
The Plains Wanderer is a quail-like bird associated with native grasslands. It is a solitary species and seldom flies, with females being much larger than

the males (male 150mm; female 175mm) and they have much brighter plumage (Pizzey 1980). Little is known of the former distribution of this species. There is one record from the South Australian Museum from 1914 that was collected from the North Adelaide area. Other records are from Fulham (1902), Yatala, Gilles Plains and the northern Adelaide Plains including Virginia, Dublin, Wildhorse Plain and Windsor (Condon 1969). It has disappeared from most areas where there is intensive agriculture, and it is unlikely to still be found on the northern Adelaide Plains.

Azure Kingfisher (*Alcedo azurea*)
The Azure Kingfisher is a small Kingfisher (170-190mm) and is a rich glossy dark-blue above with a white spot on the side of its neck, with a paler underside (Pizzey 1980). It is generally found in tree-lined creeks, rivers, lakes and swamps with suitable banks for nesting, it could still be found along the River Murray near Renmark and Chowilla (Pizzey 1980).

The Azure Kingfisher is Extinct in the Mount Lofty Ranges and Adelaide area (Carpenter and Reid 1998). Glover (1953) recorded the Azure Kingfisher in Botanic Park and the Botanic Gardens. Paton (1976) who repeated Glover's (1953) survey recorded no sightings but suggested that it was not frequently seen in the Park Lands even at the time of the original survey.

White-bellied Sea-Eagle (*Haliaeetus leucogaster*)
The White-bellied Sea-Eagle is found throughout coastal Australia, but is considered Endangered in South Australia. It is a large bird (710-890mm) with a wing span up to two metres (Pizzey 1980). Its nests are large and built of sticks usually on offshore islands and remote coastal cliffs.

There are two records of the White-bellied Sea-Eagle for the Adelaide Park Lands. One sighting was in the West Park Lands in 1968 and the other in 1982 from along the River Torrens (SAOA Newsletter 1968 and 1982). It is not a resident of the Adelaide area but these suggest they could occasionally seek refuge in open inland areas.

Yellow-tailed Black-Cockatoo (*Calyptorhynchus funereus*) (Figure 75)
The Yellow-tailed Black-Cockatoo It is a large (630-690mm) glossy black cockatoo with a round yellow mark on its ear-coverts and pale-yellow panels on upper surface of tail (Pizzey 1980). It is considered Vulnerable in South Australia, and it is a recent arrival in the Adelaide area. Whatmough (Unpublished Data 2003) first recorded this species in 2001 in the North and East Park Lands and along the River Torrens. The Bird Atlas of the Adelaide Region (Paton *et al*. 1994) which compared standard bird counts across the region in 1974-75 with comparable data collected in 1984-85 reported the species more widely in the southern Mount Lofty Ranges in the later survey.

Conlon (1969) reports its occurrence in the southern parts of South Australia from the South-East to lower Eyre Peninsula. It is generally associated with pine plantations and eucalypt forests, feeding on seeds from introduced pines, hakeas and banksias and wood-boring grubs. (Pizzey 1980). It has probably moved into the southern Mount Lofty Ranges and Adelaide area in search of extra food sources due to increased clearance of its natural habitat in agricultural areas (DEH 2003).

Barking Owl (*Ninox connivens*)
The Barking Owl inhabits open forests, woodlands, dense scrubs, foothills and woodland along watercourses (Pizzey 1980). It is Extinct in the Mount Lofty Ranges and Adelaide area (Carpenter and Reid 1998). Although there are few South Australian records of this species, it was recorded at the Reedbeds west of Adelaide until 1906 (Blakers *et al*. 1984), and from around Wilmington in 1944-1950. More recent records are from northern parts of the Flinders Ranges (Blakers *et al.* 1984). There is also one SA Museum record for this species from 1895 from 'near' Adelaide.

Apostlebird (*Struthidea cinerea*)
The Apostlebird inhabits drier open forests, usually near water, woodlands, scrubs and *Eucalyptus camaldulensis* River Red Gum Woodland along watercourses (Pizzey 1980). It is considered Extinct in the Mount Lofty Ranges region (Carpenter and Reid 1998). There is a record in the SAOA Newsletter in 1979 from the South Park Lands. There are other sightings made by Whatmough (Unpublished Data 2003) in the South Park Lands from 1974-1978 but he has not seen them since. Conlon (1969) reports of a flock of six birds from Glen Osmond last seen in 1961. A small colony was also recorded during 1974-1975 near the Waite Arboretum in the south-eastern suburbs, but they were not seen after this (Paton *et al*. 1994).

Elegant Parrot (*Neophema elegans*)
The Elegant Parrot inhabits grasslands, both native and introduced, eucalypt woodland, mallee, acacia scrub and tussock grassland (Blakers *et al*. 1984). Paton *et al*. (1994) reported an increase in Elegant Parrot abundance in the southern Mount Lofty Ranges and the Adelaide Plains. Whatmough (Unpublished Data 2003) has not recorded this species in the Park Lands. Its current status is still uncertain in the Adelaide and Mount Lofty Ranges (Carpenter and Reid 1998). In South Australia the

species is found in the South-East, and from the Fleurieu Peninsula to the Flinders Ranges (Pizzey 1980).

White-winged Chough (*Corcorax melanorhamphos*)
The White-winged Chough is a large black bird (425-470mm) with a longish tail and white patches on the flight feathers (Pizzey 1980). It inhabits drier forests, woodlands, mallee and introduced pine plantations. Considered Vulnerable in South Australia, the White-winged Chough was recorded as being widespread only in the drier mallee and woodland areas of the Murray Mallee and the northern Mount Lofty Ranges in the 1984-1985 Atlas (Paton *et al*. 1994). In the 1950's, it was also reported from the southern Mount Lofty Ranges in woodlands and adjacent pine plantations. Condon (1968) reports that the species was widespread but declined due to the loss of eucalypt woodland. The last record in the Park Lands was in in the Botanic Park and Gardens in 1969 (Paton 1976).

Crested Shrike-tit (*Falcunculus frontatus*)
Considered Vulnerable in the Mount Lofty Ranges and Adelaide region, the 1984-1985 Atlas found the Crested Shrike-tit to be largely restricted to the woodland and forested areas of the southern and northern Mount Lofty Ranges and Fleurieu Peninsula with little change from the 1974-1975 Atlas (Paton *et al*. 1994). Whatmough has not recorded the Crested Shrike-tit in the Adelaide Park Lands (Unpublished data 2003). There is one SA Museum record for this species collected in 1939 from the 'Torrens Lake' and Glover (1953) recorded it in the Botanic Park and Gardens. SAOA (1977) recorded it for the Adelaide region but the exact locality of this record is not known.

Restless Flycatcher (*Myiagra inquieta*)
The Restless Flycatcher is listed as Vulnerable for the Mount Lofty Ranges and Adelaide region. Paton *et al*. (1994) found the species to have contracted its distribution from the 1974-1975 Atlas in all areas. Records of this species are limited in the Adelaide Park Land area. Glover (1953) recorded it in the Botanic Park and Gardens, but Whatmough has no records (Unpublished data 2003). Reasons for this decline are unclear.The accumulating effects of extensive vegetation clearance may offer an explanation (Paton *et al*. 1994). In addition, as the Restless Flycatcher forages on or near the ground on beetles, spiders, ants, wasps, flies, moths, caterpillars, and worms. This species could therefore be more prone to predation by introduced predators and its food sources could be more sensitive to grazing (Paton *et al*. 1994). Detailed ecological studies are needed for this species and other declining ground frequenting birds.

Australian Ringneck (*Barnardius zonarius*)
The Australian Ringneck has been recorded in the Adelaide region by Paton *et al.* (1994) and Whatmough has scatterred recordings for the Park Lands (Unpublished Data 2003). As there are no established wild populations of this species in the area, these records are likely to be aviary escapees (P. Horton pers. comm. 2003),.

Peaceful Dove (*Geopelia placida*)
The Peaceful Dove was considered common and widespread throughout the State (Condon 1969). Condon (1969) reports that it became rare around Adelaide and in the Mount Lofty Ranges following the introduction of the Spotted Turtle-dove (*Streptopelia chinensis*) in the 1930's. However, Paton *et al*. (1994) noted a dramatic increase and expansion of this species into the southern and northern Mount Lofty Ranges during the 1984-1985 Atlas representing a reclamation of their former territory (Paton *et al*. 1994). Reasons for this influx are unknown but could have been related to dry inland conditions. Paton *et al*. (1994) reports that the Peaceful Dove has expanded into areas also occupied by the Spotted Turtle-dove, with no reciprocal reduction in the Spotted Turtle-dove populations, which may suggest that direct competition between these species may not have been the only cause of the earlier population declines. The Peaceful Dove has been recorded in the South Park Lands (SAOA 1981), along the River Torrens at Gilberton (SAOA 1991), in Botanic Park (SAOA 1919 and 1935) and in the West Park Lands (Whatmough Unpublished Data 2003).

Black-chinned Honeyeater (*Melithreptus gularis*)
Although there are few records for the Black-chinned Honeyeater from the Adelaide area this species was more widespread and had disappeared from many locations prior to the first systematic bird surveys for the 1974-1975 Atlas (Paton *et al*. 1994). There is one SA Museum record in 1927 from 'near' Adelaide, no other information is available for this specimen. Glover (1953) recorded it in Botanic Park and Gardens. Paton *et al.* (1994) record it as being mainly restricted to the southern Mount Lofty Ranges and Fleurieu Peninsula and the distributions remained similar for the two atlas periods (1974-1975 and 1984-1985). However, Its preferred habitat is taller, drier eucalypt forests, woodlands and timber along watercourses often without understorey (Pizzey 1980). Populations could therefore have been disrupted by very mearly early agricultural clearance in the Mount Lofty Ranges.

CHANGES IN BIRD FAUNA IN THE ADELAIDE REGION

There have been notable changes in the structure of the bird fauna in the Adelaide region since European settlement. Along with the Regional Extinctions listed in Table 10, Tyler *et al.* (1976) recorded additional extinctions that occurred in the greater Adelaide region since 1836. They include the Southern Stone-curlew (*Burhinus grallarius*) and the Ground Parrot (*Pezoporus wallicus*). These disappearances were attributed to predation by the fox. The Orange-bellied Parrot (*Neophema chrysogaster*) also disappeared very early following settlement.

Whatmough (Unpublished Data 2003) has made systematic observations of the bird fauna in the Park Lands since 1974. A compilation of this data was provided for this project, from 1974-2001. Patterns of change in the abundance of species were analysed and are presented in Table 11 and Figures 67-74..

Table 11.
Changes in Bird Species in the Adelaide Park Lands since 1974.

(Source: Whatmough Unpublished Data 2003).
*** = Introduced Species**
**** = Not recorded at European Settlement in the area**

Species	Common Name	Decline	Stable	Increase	Vagrant
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	x			
Smicrornis brevirostris	Weebill				x
Accipiter cirrhocephalus	Collared Sparrowhawk				x
Accipiter fasciatus	Brown Goshawk				x
Aquila audax	Wedge-tailed Eagle				x
Elanus axillaris	Black-shouldered Kite				x
Haliastur sphenurus	Whistling Kite				x
Hieraaetus morphnoides	Little Eagle				x
*Alauda arvensis**	Eurasian Skylark				x
Dacelo novaeguineae	Laughing Kookaburra			x	
Todiramphus sanctus	Sacred Kingfisher	x			
Anas castanea	Chestnut Teal	x			
Anas gracilis	Grey Teal		x		
Anas platyrhynchos	Mallard		x		
Anas superciliosa	Pacific Black Duck	x			
Anas superciliosa X Anas platyrhynchos	Hybrid Mallard & Pacific Black Duck		x		
Aythya australis	Hardhead	x			
Biziura lobata	Musk Duck	x			
Cereopsis novaehollandiae	Cape Barren Goose				x
Chenonetta jubata	Australian Wood Duck			x	
Cygnus atratus	Black Swan	x			
Tadorna tadornoides	Australian Shelduck				x
Anhinga melanogaster	Darter				x
Apus pacificus	Fork-tailed Swift				x
Ardea alba	Great Egret		x		
Ardea pacifica	White-necked Heron	x			
Egretta garzetta	Little Egret				x
Egretta novaehollandiae	White-faced Heron		x		
Nycticorax caledonicus	Nankeen Night Heron				x
Artamus cyanopterus	Dusky Woodswallow	x			
Gymnorhina tibicen	Australian Magpie			x	
Cacatua galerita	Sulphur-crested Cockatoo			x	
*Cacatua roseicapilla***	Galah			x	
*Cacatua sanguinea***	Little Corella			x	

Species	Common Name	Decline	Stable	Increase	Vagrant
*Cacatua tenuirostris***	Long-billed Corella			x	
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo			x	
Nymphicus hollandicus	Cockatiel				x
Coracina novaehollandiae	Black-faced Cuckoo-shrike		x		
Lalage tricolor	White-winged Triller	x			
Elseyornis melanops	Black-fronted Dotterel				x
Vanellus miles	Masked Lapwing			x	
*Columba livia**	Feral Pigeon			x	
Geopelia placida	Peaceful Dove				x
*Ocyphaps lophotes***	Crested Pigeon			x	
*Streptopelia chinensis**	Spotted Turtle-dove		x		
Corvus mellori	Little Raven		x		
Cacomantis flabelliformis	Fan-tailed Cuckoo				x
Chrysococcyx basalis	Horsfield's Bronze-Cuckoo				x
Cuculus pallidus	Pallid Cuckoo				x
Dicaeum hirundinaceum	Mistletoebird				x
Grallina cyanoleuca	Magpie-lark			x	
Rhipidura albiscapa	Grey Fantail				x
Rhipidura leucophrys	Willie Wagtail	x			
Falco berigora	Brown Falcon				x
Falco cenchroides	Nankeen Kestrel		x		
Falco longipennis	Australian Hobby		x		
Falco peregrinus	Peregrine Falcon				x
Falco subniger	Black Falcon				x
*Cardeulis carduelis**	European Goldfinch	x			
*Cardeulis chloris**	European Greenfinch	x			
Hirundo neoxena	Welcome Swallow		x		
Petrochelidon ariel	Fairy Martin	x			
Petrochelidon nigricans	Tree Martin	x			
*Larus novaehollandiae***	Silver Gull			x	
Sterna bergii	Crested Tern				x
Sterna caspia	Caspian Tern				x
Acanthorhynchus tenuirostris	Eastern Spinebill	x			
Anthochaera carunculata	Red Wattlebird	x			
Anthochaera chrysoptera	Little Wattlebird	x			
Lichenostomus penicillatus	White-plumed Honeyeater	x			
Manorina melanocephala	Noisy Miner		x		
Phylidonyris novaehollandiae	New Holland Honeyeater	x			
Anthus novaeseelandiae	Richard's Pipit	x			
*Turdus merula**	Common Blackbird	x			
Colluricincla harmonica	Grey Shrike-thrush	x			
Pachycephala rufiventris	Rufous Whistler				x
Pardalotus punctatus	Spotted Pardalote	x			
Pardalotus striatus	Striated Pardalote		x		
*Passer domesticus**	House Sparrow	x			
Pelecanus conspicillatus	Australian Pelican			x	
Petroica goodenovii	Red-capped Robin	x			
Phalacrocorax carbo	Great Cormorant		x		
Phalacrocorax melanoleucos	Little Pied Cormorant		x		
Phalacrocorax sulcirostris	Little Black Cormorant		x		
Phalacrocorax varius	Pied Cormorant	x			
Coturnix pectoralis	Stubble Quail	x			

Species	Common Name	Decline	Stable	Increase	Vagrant
Podiceps cristatus	Great Crested Grebe				x
Poliocephalus poliocephalus	Hoary-headed Grebe				x
Tachybaptus novaehollandiae	Australasian Grebe		x		
Barnardius zonarius	Australian Ringneck				x
Glossopsitta concinna	Musk Lorikeet		x		
Glossopsitta porphyrocephala	Purple-crowned Lorikeet		x		
Melopsittacus undulatus	Budgerigar				x
Platycercus elegans	Adelaide Rosella			x	
Platycercus eximius	Eastern Rosella			x	
Psephotus haematonotus	Red-rumped Parrot	x			
Trichoglossus haematodus	Rainbow Lorikeet			x	
Fulica atra	Eurasian Coot		x		
Gallinula tenebrosa	Dusky Moorhen	x			
Gallinula ventralis	Black-tailed Native Hen		x		
Gallirallus philippensis	Buff-banded Rail				x
Porphyrio porphyrio	Purple Swamphen		x		
Porzana fluminea	Australian Spotted Crake				x
Porzana tabuensis	Spotless Crake				x
Ninox novaeseelandiae	Southern Boobook	x			
*Sturnus vulgaris**	Common Starling			x	
Acrocephalus australis	Australian Reed-warbler		x		
Cincloramphus cruralis	Brown Songlark				x
Cincloramphus mathewsi	Rufous Songlark				x
Megalurus gramineus	Little Grassbird	x			
Platalea regia	Royal Spoonbill				x
Threskiornis molucca	Australian White Ibis			x	
Turnix velox	Little Button-quail	x			
Tyto alba	Barn Owl				x
Zosterops lateralis	Silvereye	x			

Declines in the Adelaide Park Lands bird fauna
The bird fauna of the Adelaide region has changed significantly since European settlement. Tyler *et al*. (1976) report enormous flocks of Black Swan (*Cygnus atratus*), Australian Shelduck (*Tadorna tadornoides*), Pacific Black Duck (*Anas superciliosa*), Grey Teal (*A. gracilis*), Chestnut Teal (*A. castanea*), Australasian Shoveler (*A. rhynchotis*), Pink-eared Duck (*Malacorhynchus membranaceus*) and Hardhead (*Aythya australis*) in the Reed Beds west of Adelaide in the 1920's. When these large flocks took to the air they extended from horizon to horizon. This highlights how significant the changes in bird fauna have been in the Adelaide region.

Although population estimates are not available for those species as listed above for the Adelaide region, observations of species occurrences since 1974 are available (Whatmough Unpublished Data 2003). The Black Swan (Figure 67) has been declining significantly in the Adelaide area is flagged as a species of particular concern (Whatmough 1989). Although theBlack Swan has been observed fairly consistently along the River Torrens, sightings have declined dramatically in the East Park Lands. In addition,, the Chestnut Teal was not observed in the Adelaide Park Lands by Whatmough from 1979-1991 with a few more consistent recordings from 1991-1999, when sightings dropped again (Figure 68). The Pink-eared Duck has been observed on only one occasion in 1991, the Australasian Shelduck on two occasions in 1974 and 1988 while the Hardhead has been observed as scattered records. The Grey Teal has been recorded each year but not in high numbers and the Pacific Black Duck (Figure 77) has been recorded consistently in the Park Lands, but appears to be declining in number in recent years. It can be seen from these observations that these waterbird populations, that were once so abundant in the area, have changed significantly.

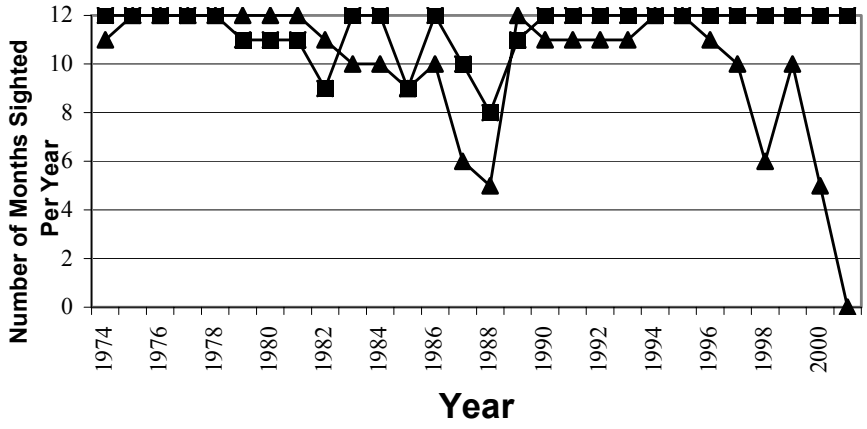

Figure 67.
Sightings of the Black Swan in the Adelaide Park Lands.
■ = River Division ▲ = East Division
(Source: Whatmough Unpublished Data 2003)

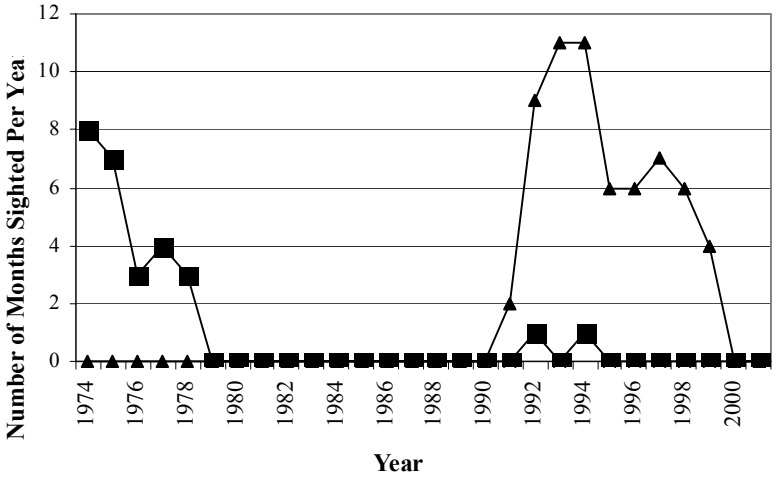

Figure 68.
Sightings of Chestnut Teal in the Adelaide Park Lands
(Source: Whatmough Unpublished Data 2003)
■ = River Division ▲ = East Division

Small woodland birds have also declined substantially in the Adelaide Park Land area and in some instances have disappeared completely. Declines of species such as the Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*) (Figure 71, 78) have happened in recent years. Other small woodland birds disappeared much earlier in settlement, for example, the Superb Fairy-wren (*Malurus cyaneus*) (Figure 79) and the Dusky Woodswallow (*Artamus cyanopterus*) (Whatmough 1989). Other species such as the Red-capped Robin (*Petroica goodenovii*) (Figure 80) were probably also reduced in number earlier in settlement, with infrequent sightings since 1974 and no records since 1994 (Whatmough Unpublished Data 2003). The Fairy Martin (*Petrochelidon ariel*) was observed in the West Park Lands, where it was recorded breeding until 1985, it has only been observed on two occasions since, once in 1992 and in 1996 (Whatmough

Unpublished Data 2003) (Figure 69). Cats have been implicated in its demise in this area (Whatmough 1989). The Little Grassbird (*Megalurus gramineus*) has also declined (Figure 70) as has the Silvereye (*Zosterops lateralis*), which was last recorded in 1993 and infrequently in the years before that. Other species that are considered more common on a regional basis are also declining in some areas of the Park Lands, for example, the Willie Wagtail (*Rhipidura leucophrys*) has declined in the East and North Park Lands, the White-plumed Honeyeater (*Lichenostomus penicillatus*) in the East and South Park Lands, Little Wattlebird (*Anthochaera chrysoptera*) mainly in the East Park Lands and along the River and the Red Wattlebird (*A. carunculata*) is also declining in the East Park Lands, along the River and Valley Divisions (Whatmough Unpublished Data 2003).

Woodland species have also shown the greatest decline in the Mount Lofty Ranges. Paton *et al.* (1994) suggests that woodland habitats have been the worst affected areas by land clearance for agriculture, and that ground and shrub layers are either cleared or easily modified by fires, weeds and grazing. This clearance increases the risk of predation by introduced predators such as the fox and cat. The Adelaide Park Land area has virtually no protective mid-storey plants, which could have contributed to the demise of some of the above mentioned species.

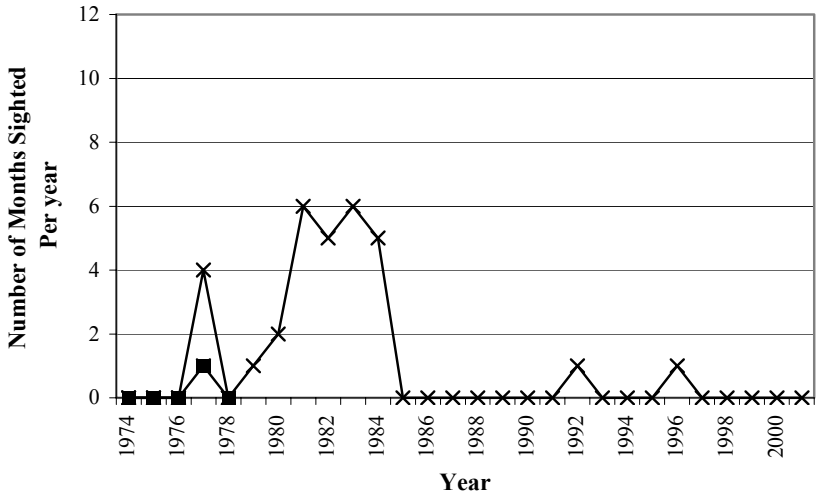

Figure 69.
Sightings of the Fairy Martin in the Adelaide Park Lands.
(Source: Whatmough Unpublished Data 2003)
■ = River Division X = West Division

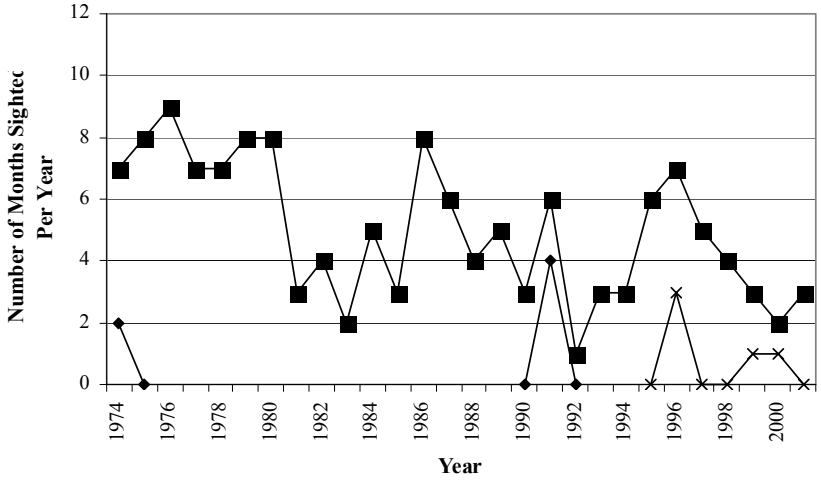

Figure 70.
Sightings of the Little Grassbird in the Adelaide Park Lands
(Source: Whatmough Unpublished Data 2003)
■ = River Division X = West Division ♦ = East Division

The decline of the Yellow-rumped Thornbill in the Adelaide Park Lands is considered in more detail. Considered common in South Australia and other areas of the Adelaide region, Whatmough (1997) discusses the decline of the Yellow-rumped Thornbill in the Park Lands and its final disappearence from the area only five years ago (Whatmough Unpublished Data 2003), with the last record in the South Park Lands in 1998 (Figure 71). It can be seen that the Yellow-rumped Thornbill was present in all areas of the Park Lands, where it disappeared from the River, East, Valley and North Divisions by 1980, persisted in the West Division until 1992 and continued in very small numbers in the South Division until 1998. It is not clear why this species persisted for as long as it did in some areas of the Park Lands. Whatmough (1997) observed many changes in the divisions of the Park Lands that may have affected the birds. Shrubs and hedges, were removed in some areas; while extensive plantings of trees reduced the number of formerly open areas. Horse grazing was removed from some areas; and horticultural maintainance was reduced in West Terrace Cemetery encouraging the growth of weed species. Although some of these changes removed vegetation cover for the species, the planting of trees can also be unfavourable as the Yellow-rumped Thornbill naturally occurs in open woodland habitat and feeds in the more open grassed areas. It basically frequents the edge habitats using the fringing shrubbery for shelter and nesting (Schodde and Tidemann 1986).

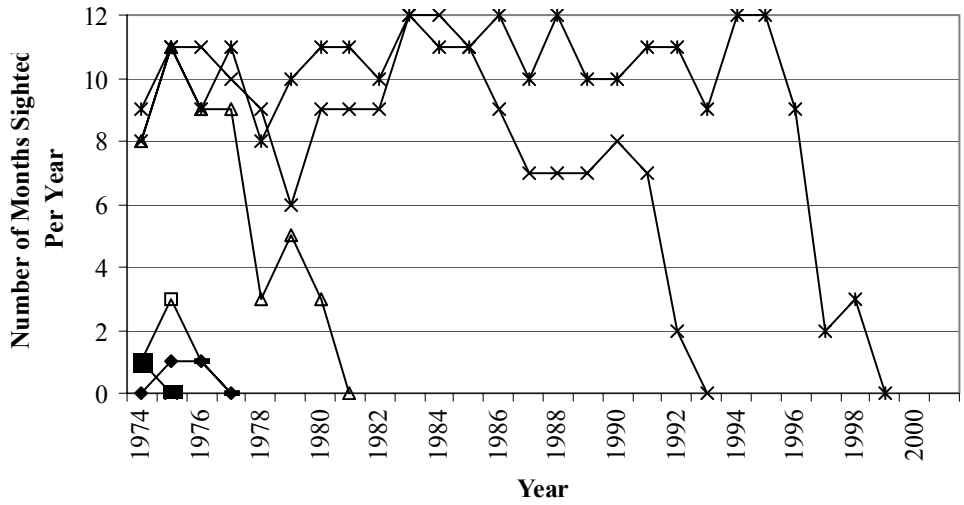

Figure 71.
The Decline of the Yellow-rumped Thornbill in the Adelaide City Park Lands
(Source: Whatmough Unpublished Data 2003)

■ = River Division **X = West Division** **♦ = East Division**

□ = Valley Division **✳ = South Division** **Δ = North Division**

Increases in the Adelaide Park Lands bird fauna
A suite of bird species able to benefit from the changed environment of the Adelaide Park Lands. The Park Lands now have large open turfed areas of introduced grasses that provide an abundant seed source, many planted interstate eucalypt and acacia species with high nectar production and an increased provision of water sources. These changes have attracted granivorous and nectivorous species, that before European settlement were not found in the Adelaide region. Crested Pigeon (*Ocyphaps lophotes*) (Figure 81) and the Galah (*Cacatua roseicapilla*) (Figure 82) are now the most common and widespread species in the Park Lands today (Whatmough Unpublished Data 2003). . They were not recorded at all around Adelaide in the first decade of this century.

Other large granivorous species have moved into the Park Lands in more recent years, and are increasing. The Long-billed Corella (*Cacatua tenuirostris*) (Figure 72) and the Sulphur-crested Cockatoo (*C. galerita*) (Figure 73) have moved into the Park Land area. The Little Corella (*C. sanguinea*) is also being seen more frequently in the Park Lands.

This influx of bird species is from surrounding agricultural areas and could be due to a number of factors. Dry inland conditions may be forcing bird species to move south. In addition, population sizes in agricultural areas may be at maximum carrying capacity pushing birds into surrounding areas.

The Yellow-tailed Black-Cockatoo (*Calyptorhynchus funereus*) (Figure 75) is the most recent granivorous bird to arrive in the Park Lands. It was first recorded in 2001 in three locations around the Park Lands (North, River and East Divisions) (Whatmough Unpublished Data 2003), and has been observed regularly since. It is also been reported to have increased its distribution in the southern Mount Lofty Ranges (Paton *et al*. 1994). This increasing distribution however does not necessarily indicate an increase in abundance of the species. The Yellow-tailed Black Cockatoo is listed as Vulnerable in South Australia with an estimated population of only 1000 birds remaining in the Greater Mount Lofty Region (DEH 2003). A few large flocks contain the whole population. The Yellow-tailed Black Cockatoo feeds on seeds from woody cones and is under threat from clearance of natural vegetation which once provided this food resource and the contined loss of scattered trees that provide nesting sites (DEH 2003). As a result the cockatoos are now highly dependent on exotic tree species, especially pines (e.g. *Pinus radiata*). The Park Lands with their a relatively high abundance of mature pines may be beginning to provide important food resources for the Mt Lofty Ranges population.

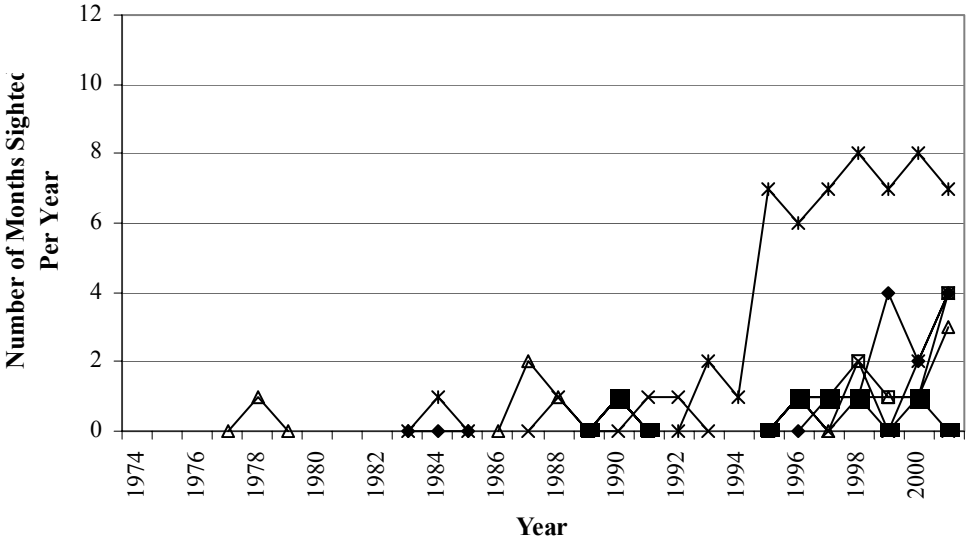

Figure 72.
Sightings of the Long-billed Corella in the Adelaide Park Lands
(Source: Whatmough Unpublished Data 2003)
■ = River Division **X = West Division** **♦ = East Division**
□ = Valley Division **✳ = South Division** **Δ = North Division**

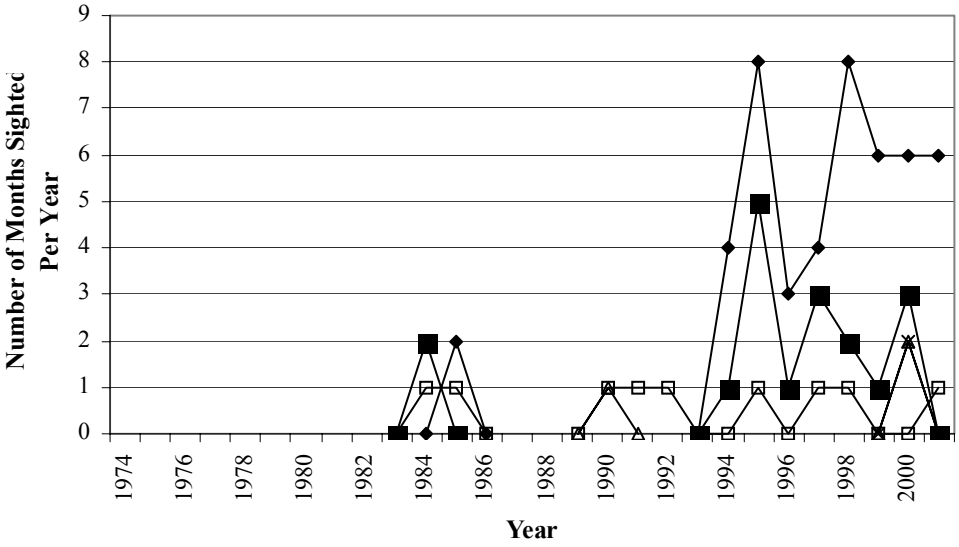

Figure 73.
Sightings of the Sulphur-crested Cockatoo in the Adelaide Park Lands
(Source: Whatmough Unpublished Data 2003)
■ = River Division **X = West Division** **♦ = East Division**
□ = Valley Division **Δ = North Division**

Many nectivorous species have also moved into the Park Lands, attracted to the abundance and variety of nectar producing plantsprovided by the wide variety of exotic and interstate plant species growing in the area. This combination of plant species now provides a more abundant and reliable source of nectar throughout the year than what would be available in a natural situation.

The Rainbow Lorikeet (*Trichoglossus haematodus*) has demonstrated the strongest increase in the Adelaide Park Lands (Figure 74) Other species such as the Musk Lorikeet (*Glossopsitta concinna*), the Adelaide Rosella (*Platycercus elegans*) and the Eastern Rosella (*P. eximius*) have been observed more consistently in the Park Lands over Whatmough's survey period (Whatmough Unpublished Data 2003). The New Holland Honeyeater (*Phylidonyris novaehollandiae*) although commonly found in suburban areas is sighted rarely in the Park Lands (Whatmough Unpublished Data 2003).

Common and introduced Park Land bird species

Other native species which are abundant in the Park Lands include the Noisy Miner (*Manorina melanocephala*), the Magpie-lark,(*Grallina cyanoleuca*), the Australian Magpie (*Gymnorhina tibicen*), the Silver Gull (*Larus novaehollandiae*) and the Welcome Swallow (*Hirundo neoxena*).

The Noisy Miner is an extremely territorial and aggressive species and may be responsible for keeping some less aggressive bird species from the Park Lands. Groups of of Noisy Miners have even been observed attacking individual New Holland Honeyeaters (themselves a relatively aggressive species (R. Storr pers. comm. 2003). Magpies, particularly around nesting time, are territorial and can also be very aggressive towards other birds.

The Silver Gull is one species that has benefited greatly from urbanisation making use of rubbish disposal and the picnicking habits of the general public.

Common introduced species include the Feral Pigeon (*Columba livia*), the Spotted Turtle-dove (*Streptopelia chinensis*), the Common Starling (*Sturnus vulgaris*), the Common Blackbird (*Turdus merula* and the House Sparrow (*Passer domesticus*).

There is limited information on the impacts of the introduced bird species in the Park Lands. There are potential impacts of the more aggressive introduced species colonising areas where native species have declined. It is not known if these species are more of a threat to local bird populations than the aggressive native species in the Park Lands.

CONCLUSIONS

The Adelaide Park Lands owe much of their appeal to the abundant bird species that they support. The variety of native bird species so close to human habitation offers an excellent opportunity for tourism and education. Adelaide City Council is in a unique position to protect and enhance these species. Many species have been lost or are declining in the area, yet the Park Lands also provides food sources for species being pushed out of their natural habitats. The landscape of the Park Lands is currently favourable to species that can utilise abundant seed and nectar sources. It however lacks variety of vegetation structure that provides essential shelter and nesting habitat and provides protection for species vulnerable to predation from introduced mammal species and competition from other aggressive bird species. The Park Lands are isolated from other pockets of natural vegetation, with the linking of habitats in suburban areas. Important future considerations for encouraging bird species should include the provision of much more diverse native shrub and ground vegetation layers and the linking of the Park Lands to adjacent suburban habitat.

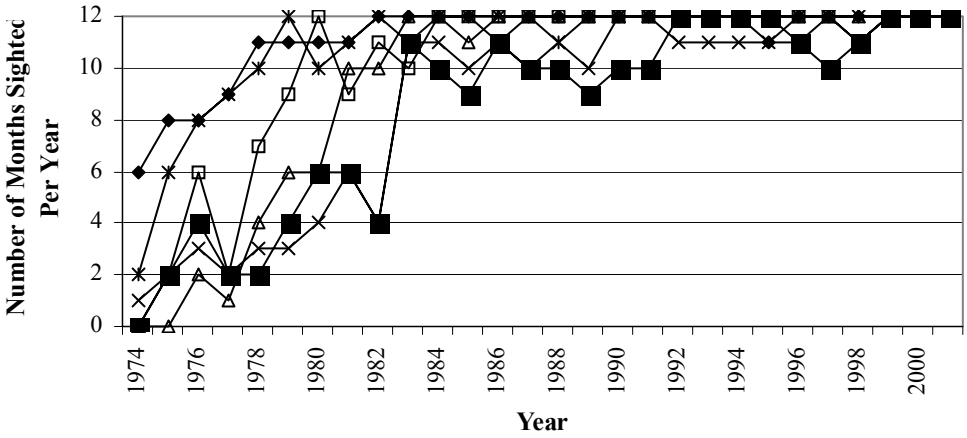

Figure 74.
Increase of the Rainbow Lorikeet in all areas of the Adelaide Park Lands
(Source: Whatmough Unpublished Data 2003)

■ = River Division	X = West Division	♦ = East Division
□ = Valley Division	✳ = South Division	Δ = North Division

Figure 75.
The Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus*) is a recent arrival to the Adelaide Park Lands. It is listed as a Vulnerable species in South Australia.
Photo: P. Canty.

Figure 76.
Populations of the Black Swan (*Cygnus atratus*) are declining in the Adelaide Park Lands.
Photo: A. Robinson.

Figure 77.
The Pacific Black Duck (*Anas superciliosa*) is commonly observed in the Adelaide Park Lands, but populations may be decreasing.
Photo: M. Harper.

Figure 78.
The Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*) has recently disappeared from the Adelaide Park Lands.
Photo: SAOA.

Figure 79.
The Superb Fairy-wren (*Malurus cyaneus*) is one of the small woodland birds that disappeared from the Adelaide area early in settlement.
Photo: SAOA.

Figure 80.
The Red-capped Robin (*Petroica goodenovii*) has not been recorded in the Park Lands for several years.
Photo: SAOA.

Figure 81.
The Crested Pigeon (*Ocyphaps lophotes*) is a successful coloniser species in suburban areas as it did not occur in the Adelaide area before European settlement.
Photo: A. Robinson.

Figure 82.
The Galah (*Cacatua roseicapilla*) is able to utilise the abundant seed source in the Adelaide Park Lands.
Photo: A. Robinson.

REPTILES AND AMPHIBIANS

INTRODUCTION
The following section describes the reptile and amphibian fauna of the Adelaide Park Lands.

There is a paucity of information available for reptile species in the Park Land area, both historical and current. Amphibians have been surveyed regularly, throughout Metropolitan Adelaide and the Park Lands, by the Environment Protection Authority Frog Census. Tyler *et al.* (1976) gives a brief account of the reptile and amphibian fauna that once existed in the Park Land area. The SA Museum has records of reptiles and amphibians from the Park Lands.

Reptiles
A total of 20 reptile species recorded at some time from the Adelaide Park Lands(Appendix VII and Table 12) were compiled, including records from the SA Museum, Tyler *et al*. (1976) and some opportune sightings during the survey. These species comprise of five families: Dragon Lizards (Agamidae), Tortoises (Chelidae), Snakes (Elapidae), Geckos and Legless Lizards (Gekkonidae) and Skinks (Scincidae). Only one species, which occurs in the area has a conservation rating, the Macquarie Tortoise (*Emydura macquarii*) is listed as Vulnerable in South Australia (NPSWA Act, Updated Schedule 1999). Skinks.

Skinks
The Skink family contains the most reptile taxa in the Park Lands, the most conspicuous species being the Sleepy Lizard (*Tiliqua rugosa*) and the Eastern Bluetongue (*T. scincoides*). The Sleepy Lizard is the more stout of the two species, with a heavily scaled, or shingled back, and a stumpy tail. It is widely distributed over southern Australia but there is only one record of this speciesfrom the Park Lands in the SA Museum collected in 1915, 'near Adelaide'. The Sleepy Lizard is found in a wide range of habitats from coastal heaths, woodlands, mallee and sandy deserts (Cogger 2000).

The Eastern Bluetongue (Figure 83) is a regular inhabitant of gardens and is more frequently encountered than the Sleepy Lizard around suburban Adelaide. It is a relatively large lizard, smooth and shiny in appearance with a series of bands crossing its back.

Table 12.
Reptile species recorded for the Park Lands

Species	Common Name	*Family*
Ctenophorus decresii	Tawny Dragon	AGAMIDAE
Pogona barbata	Eastern Bearded Dragon	AGAMIDAE
Tympanocryptis lineata	Five-lined Earless Dragon	AGAMIDAE
Chelodina longicollis	Common Long-necked Tortoise	CHELIDAE
Emydura macquarii	Macquarie Tortoise	CHELIDAE
Pseudechis porphyriacus	Red-bellied Black Snake	ELAPIDAE
Pseudonaja modesta	Five-ringed Snake	ELAPIDAE
Pseudonaja textilis	Eastern Brown Snake	ELAPIDAE
Aprasia striolata	Lined Worm-lizard	GEKKONIDAE
Christinus marmoratus	Marbled Gecko	GEKKONIDAE
Nephrurus milii	Barking Gecko	GEKKONIDAE
Egernia striolata	Eastern Tree Skink	SCINCIDAE
Eulamprus quoyii	Eastern Water Skink	SCINCIDAE
Hemiergis decresiensis	Three-toed Earless Slider	SCINCIDAE
Hemiergis peronii	Four-toed Earless Slider	SCINCIDAE
Lampropholis guichenoti	Garden Skink	SCINCIDAE
Lerista dorsalis	Southern Four-toed Slider	SCINCIDAE
Menetia greyii	Dwarf Skink	SCINCIDAE
Tiliqua rugosa	Sleepy Lizard	SCINCIDAE
Tiliqua scincoides	Eastern Bluetongue	SCINCIDAE

Its tail is long, narrow and tapers to a point unlike that of the Sleepy Lizard. A study in Sydney examined why the Eastern Bluetongue has persisted in suburban areas, when many other reptile species have declined or disappeared. Koenig *et al*. (2001) They found that the lizards have very restricted home ranges, strong site fidelity, which allowed familiarity with their refuges and they spent over 70% of their time in 'safe' locations. Gravid females in particular were highly sedentary. They showed a strong avoidance of roads and moved between core areas along fence lines and corridors of vegetation. Importantly they are also able to exploit artificial habitats, have a varied diet and are able to exploit the various food sources available in gardens, (especially the introduced snail *Helix aspersa*), which is commonly found in many gardens. This adaptability has allowed the Eastern Bluetongue to persist in suburban areas unlike the Sleepy Lizard which seems less adaptable and more prone to roadkills and predation from domestic dogs, cats and foxes.

Other skinks found around the Adelaide area are smaller and observed less frequently. One such species, the Eastern Water Skink (*Eulamprus quoyii*) (Figure 84), which was observed during this survey in rock piles along the River Torrens.

There are four records of the Eastern Tree Skink (*Egernia striolata*) from the SA Museum, three of the records are from 1912 from North Adelaide and one of the records is from 1964 from around the Payneham area. This species is typically arboreal, found in hollow limbs and cracks or under bark, it can also be found in fallen timber or in rock outcrops (Cogger 2000).

Two species of *Hemiergis* have been recorded for the Adelaide area, the exact locality of these records is not known. The Four-toed Earless Slider (*Hemiergis peronii*) is the most likely of the two species to have existed in the Park Lands (H. Owens pers. comm. 2003). The Southern Four-toed Slider (*Lerista dorsalis*) and the Dwarf Skink (*Menetia greyii*) are historical records, both are unlikely to still remain in the Park Land area as they require a dense leaf litter.

The Garden Skink (*Lampropholis guichenoti*) is more commonly seen in suburban gardens in the Adelaide Hills. This is a small species (40mm snout-vent) and is fairly inconspicuous in its markings, being mainly brown above with a lighter brown vertebral stripe running from the neck to the base of the tail. The status of this species in the Park Lands is not known.

Dragon Lizards

Three species have been recorded for the Park Land area. The species most likely to still be found in the Park Lands is the Eastern Bearded Dragon (*Pogona barbata*), which is quite a large lizard (25cm snout-vent, with a longer tail). Tyler *et al*. (1976) record this species as being present in the Adelaide area, but no other records were found for this species during this survey. It is usually observed perched during the day on fallen timber, stumps or fence posts.

The Tawny Dragon (*Ctenophorus decresii*) is generally found in the Mount Lofty Ranges and is closely associated with rocky habitats (Cogger 2000). There is one SA Museum record collected from North Adelaide in 1970. It is unlikely that this species is surviving in the Park Lands.

There is one record of the Five-lined Earless Dragon (*Tympanocryptis lineata*) in the SA Museum collected in 1946 from Adelaide. The exact locality is not known. Historically this species could have existed in the Park Land area, associated with grasslands, living in cracking soils or in ground litter (Cogger 2000).

Snakes

Three snakes are recorded for the Park Lands. The Eastern Brown Snake (*Pseudonaja textiles*) is the most commonly caught snake in the Park Lands, with approximately 15-20 calls logged each year with snake removal services (Snake Away pers. comm. 2003). The Eastern Brown Snake is a venomous snake which feeds on small mammals and reptiles. Introduced mice and rats provide a food source in the Park Lands.

The Red-bellied Black Snake (*Pseudechis porphyriacus*) is also reported for the Park Lands, approximately 5% of the calls to snake removalists being for this species (Snake Away pers. comm. 2000). The Red-bellied Black Snake is found in association with wetter areas, around streams, swamps and lagoons. It is most frequently encountered along the River Torrens in the Park Lands. It is a distinctive iridescent black snake with red lateral and belly scales (Cogger 2000).

There is a single record of the Five-ringed Snake (*Pseudonaja modesta*) for the Park Land area, collected from the Zoological Gardens in 1933. It is generally found in drier climates and is unlikely to be resident around the Park Lands (D. Armstrong pers. comm. 2003).

Legless Lizards

Tyler *et al.* (1976) reports a number of legless lizards in the Adelaide region. There is a SA Museum record from 1990 with the locality

recorded as 'Adelaide' of the Lined Worm-lizard (*Aprasia striolata*). This is a cryptic burrowing species usually associated with sandy or loamy soils (Cogger 2000) and may still occur in suitable areas of the Park Lands.

Geckos

The Marbled Gecko (*Christinus marmoratus*) (Figure 85) is the commonest gecko in the area. It is predominantly an arboreal species, living under bark and can bee seen at night chasing insects under outside lighting. The Barking Gecko (*Nephrurus milii*) (Figure 86) was quite common in the undisturbed areas of the Adelaide Plains, where it could be found beneath large rocks or fallen timber (Tyler *et al*. 1976). It is unlikely to still be surviving in the Park Lands, which are largely devoid of ground litter or suitable rock piles to provide suitable habitat.

Tortoises

There are two species of tortoise found in the River Torrens section of the Park Lands. The Common Long-necked Tortoise (*Chelodina longicollis*) is typically an inhabitant of swamps, billabongs or slow moving rivers (Cogger 2000). There is one specimen of the Common Long-necked Tortoise in the SA Museum, which was collected in 1981 from the River Torrens near Adelaide. The status of this species is uncertain in the area. The Macquarie Tortoise (*Emydura macquarii*) was observed in the River Torrens during this survey (Appendix VII). This species is listed as Vulnerable in South Australia. It is quite distinctive with a pale yellowish stripe along the lower jaw and a yellow patch behind the eye. It is found in the Murray/Darling River system and those individuals now in the River Torrens probably originated from pet escapes (D. Armstrong, pers. comm. 2003).

Amphibians

Five frog species are known from 111 calls recorded during the 1994-2001 Frog Censuses at sites in the Park Lands (Table 13). Other sources of data include the SA Museum and Tyler *et al*. (1976). Tyler *et al*. (1976) report a total of eight species occurring over the Adelaide Plains, but this survey records seven species for the Park Land area. One species, the Brown Toadlet (*Pseudophryne bibroni*) is listed as Rare in South Australia. There are two SA Museum records for this species, one was collected in the 'Torrens Lake' in 1933 and the other in 1957 from near Adelaide. This species is recorded as declining in recent years (EPA 1999) and the historical status of this species on the Adelaide Plains is uncertain (S. Walker, pers. comm. 2003), but their abundance may have reduced significantly.

The only record for the Striped Marsh Frog (*Limnodynastes peroni*) is that listed in Table 13. This record is from inside the Bicentennial Conservatory in the Botanic Gardens and it is likely that it was introduced by a member of the general public (S. Walker pers. comm. 2003). This species is typically found in swamps and billabongs along the River Murray (EPA 1999).

The Spotted Grass Frog (*Limnodynastes tasmaniensis*) has the most records in the Park Lands and has been recorded in high abundance in some areas (Table 13). It is the most common frog in Australia (EPA 1999) and can be found in wetlands, creek edges and marshy country. The Common Froglet (*Crinia signifera*) (Figure 87) is also commonly recorded in the Park Lands (Table 13). This species is also widespread in creeks and streams in the Mount Lofty Ranges (EPA 1999). It is a variable species with many differences in skin colour and texture, even within the same population (EPA 1999). It can be found beneath rocks, vegetation and debris, at the edge of creeks, ponds, wetlands and areas of seepage (EPA 1999).

The Bull Frog (*Limnodynastes dumerili*) (Figure 88) has been recorded in many areas of the Park Lands (Table 13). It is a medium to large sized frog compared with the other species in the area and is a common inhabitant of wetlands and rivers. In dry periods it spends its time in a burrow (EPA 1999). This species has a very distinctive call, it is a single musical 'bonk'. The Brown Tree Frog (*Litoria ewingi*) (Figure 89) is also recorded in the Park Lands (Table 13) and is considered common throughout Adelaide and the Mount Lofty Ranges (EPA 1999). This species can be found in a wide range of habitats, in vegetation, under rocks near permanent water and it is commonly found in gardens (EPA 1999).

There are no records of the Painted Frog (*Neobatrachus pictus*) from the Park Land area, however it is possible that this species existed in the area (S. Walker pers. comm. 2003). There have been recent records of this species at the Adelaide Airport around 1995 (S. Walker pers. comm. 2003).

It therefore appears that six species of frogs may have been found in the Park Lands, but only four of these remain common. Clearly there has been a significant decline in numbers since settlement, and maintainence of existing and provision of additional suitable habitat, particularly along the River Torrens and the other creek lines, will be important into the future.

Table 13.
Frog Species Recorded by the EPA Frog Census in the Adelaide Park Land area

Species	Year	Location	Habitat	Number Recorded
Limnodynastes peroni Striped Marsh Frog	2001	Botanic Gardens	Pond	1
Limnodynastes tasmaniensis Spotted Grass Frog	2001	Botanic Gardens	Pond	1
	1999-2001	Adelaide Zoo	Several Ponds	2-9 to 10-50
	2001	Botanic Gardens, Lily Pond	Pond	2-9
	1998-1999	First Creek Bridge	Stream/Creek	10-50
	2000	Victoria Park Racecourse	Stream/Creek	2-9
	1996-2001	South Park Lands Greenhill Road	Drain	2-9 to 10-50
	2001	Park 23 Stormwater Pond	Pond Stream/Creek	10-50
	1998	River Torrens Channel 7	River	10-50
	1996-2001	South Park Lands	Stream/Creek	2-9 to 10-50
	1995	South Terrace	Pond	2-9
	1995-1996	West Terrace	Pond	2-9 to 10-50
Litoria ewingi Brown Tree Frog	1999-2001	Adelaide Zoo	Several Ponds	2-9
	2001	Botanic Gardens	Pond	2-9
	1996-1998	River Torrens	River	2-9 to 10-50
Limnodynastes dumerili Bull Frog	2000	Adelaide Zoo	Pond	1 to 2-9
	1994	Bonython Park	River	2-9
	2001	Botanic Gardens	Pond	2-9
	1998-1999	First Creek Bridge	Stream/Creek	10-50 and >50
	2001	Park 23	Pond	2-9
	1996-1999	River Torrens	River	2-9 and 10-50
Crinia signifera Common Froglet	1999-2001	Adelaide Zoo	Pond	2-9 and 10-50
	1994-1996	Bonython Park	River	10-50
	2001	Botanic Gardens	Pond	2-9
	1998	First Creek Bridge	Stream/Creek	10-50
	2001	South Park Lands Greenhill Road	Drain	2-9
	2001	Park 23	Pond and Stream/Creek	10-50
	1994-2001	River Torrens	River	1-9, 10-50 and >50
	1995-1996	Torrens Lake	River	1-9 to 10-50
	1996	West Park Lands	Siltation Pond	2-9

Figure 83.
The Eastern Bluetongue (*Tiliqua scincoides*) is one of the reptiles most likely to be encountered in the Park Lands.
Photo: P. Canty.

Figure 84.
The Eastern Water Skink (*Eulamprus quoyii*) was recorded during this survey along the River Torrens.
Photo: S. Doyle.

Figure 85.
The Marbled Gecko (*Christinus marmoratus*) is an arboreal species found in the Park Lands.
Photo: A. Robinson.

Figure 86.
The Barking Gecko (*Nephrurus milii*) is unlikely to still be found in the Park Lands.
Photo: A. Robinson.

Figure 87.
The Common Froglet (*Crinia signifera*) is commonly recorded in the Park Lands.
Photo: A. Robinson.

Figure 88.
The Bull Frog (*Limnodynastes dumerili*) is one of the largest frog species found in the Park Lands.
Photo: A. Robinson

Figure 89.
The Brown Tree Frog (*Litoria ewingi*) is recorded in the Park Lands and is commonly found in suburban gardens.
Photo: A. Robinson.

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INSECTS AND SPIDERS

INTRODUCTION

There is very limited information available on insects and spiders in the Park Lands. They were not directly surveyed during this project, but some data was collected on ants, butterflies and arachnids, which will be discussed in this section. Ant information was compiled from literature, butterfly data was provided by Mr R. Grund and spider information was supplied by the SA Museum.

Ants

Some research has been conducted into ant species in the Park Land area. A Flinders University student project compared the habitat use of two species of ant in the South Park Lands, the Common Meat Ant (*Iridomyrmex purpurius*) and *Camponotus consobrinus*. This study found up to 20 other species at the project site, however names were not listed. Many Common Meat Ant nests were also observed in the Park Lands during this survey. An ant species list has been prepared for the Adelaide Zoo (McArthur 2002) (Table 14). Thirteen taxa were identified in the zoo area, a surprisingly high number considering that the total ant genera for South Australia is approximately 56 (McArthur 2002).

Table 14. Species of Ant recorded in the Adelaide Zoo (Source: McArthur 2002).

Species	Common Name
Anonychomyrma sp.	
Camponotus claripes	Honey Ant
Camponotus consobrinus	
Crematogaster sp.	
Iridomyrmex sp.	
Linipithema sp.	Argentine Ant
Monomorium sp.	
Octetellus sp.	
Paratrechina sp.	
Pheidole sp.	Big Head Ant
Tapinoma sp.	
Technomyrmex sp.	White Footed Ant
Tetramrium sp.	

Butterflies

There have been no surveys of butterflies in the Park Lands, however Mr R. Grund provided a list of species likely to occur in the area based on the presence of caterpillar food plants.

Only common urban butterflies are likely to be resident in the Park Lands, complimented at certain times of the year by migrant species. The following species are those species most likely to be found in the Park Lands with descriptions below. Twenty-one native and three introduced species are recorded for the Park Lands (Table 15). Descriptions of these species is provided in the following text.

Table 15. Butterfly species in the Adelaide Park Lands

*** = Introduced Species**

Species	Common Name
*Cephrenes augiades**	Orange Palm-dart
Ocybadistes walkeri	Southern Grass-dart
Taractrocera papyria	White-banded Grass-dart
Papilio anactus	Dingy Swallowtail
Eremocitrus glauca	Wild citrus
Papilio demoleus	Chequered Swallowtail
Eurema smilax	Small Grass-yellow
Belenois java	Caper White
Delias aganippe	Wood White
*Pieris rapae**	Cabbage White
Heteronympha merope	Common Brown
Geitoneura klugii	Common Xenica
Polyura sempronius	Tailed Emperor
Vanessa itea	Australian Admiral
Vanessa kershawi	Australian Painted Lady
Danaus chrysippus	Lesser Wanderer
*Danaus plexippus**	Wanderer
Lucia limbaria	Small Copper
Ogyris amaryllis	Amaryllis Azure
Lampides boeticus	Long-tailed Pea-blue
Nacaduba biocellata	Two-spotted Line-blue
Theclinesthes miskini	Wattle Blue
Theclinesthes serpentata	Saltbush Blue
Zizina labradus	Common Grass-blue

Skipper Butterflies.

The Orange Palm-dart (*Cephrenes augiades*) is a recent introduction into the region from the tropics, it utilises palm trees as a caterpillar food plant. This species has been found in the Botanic Gardens. The Southern Grass-dart (*Ocybadistes walkeri*) and the White-banded Grass-dart (*Taractrocera papyria*) are two small yellow butterflies which use grasses as food plants. They require grasses to be in a permanently soft green condition and are most likely to be found along the River Torrens and in highly irrigated areas.

Swallowtail Butterflies
The Dingy Swallowtail (*Papilio anactus*) (Figure 90) is a large butterfly that uses citrus trees as food plants and commonly occurs in urban gardens. It is likely to move across the Park Lands and could be encouraged to the area if irregular thickets of Wild Citrus (*Eremocitrus glauca*) were planted. The Chequered Swallowtail (*Papilio demoleus*) is a large swallowtail that was once a regular summer visitor from northern areas to Adelaide, but now it is rarely seen. It uses native legumes as food plants (e.g. *Psoralea* sp.), which could planted if this species was to encourage this species into the area.

Yellow Butterflies
The Small Grass-yellow (*Eurema smilax*) is a small butterfly that periodically flies into Adelaide from northern areas. Its main food plant is *Senna artemisioides*, which is found in the Park Lands.

White Butterflies
The Caper White (*Belenois java*) is an occasional migrant to Adelaide from the north and may become more regular if its food plants were present over summer. Its major food plant, (Tree Caper, *Capparis mitchellii*) is not native to the Adelaide area, it occurs in northern regions of the State. The Wood White (*Delias aganippe*) (Figure 91) is a large and attractive butterfly once reasonably common in Adelaide, but now rarely seen. Its main food plants are Quondong (*Santalum acuminatum*) and Melaleuca Mistletoe (*Amyema melaleucae*). This species could be encouraged back into the area, by incorporating Quondongs into future revegetation plans. The Cabbage White (*Pieris rapae*) is an introduced butterfly treated as an agricultural pest. This species is found in the Park Lands with its caterpillars thriving on Nasturtiums (*Tropaeolum majus*).

Satyr Butterflies
It is not known if the Common Brown (*Heteronympha merope*) and the Common Xenica (*Geitoneura klugii*) still exist in the Park Lands. These species require woodland habitats with grassy understoreys. The food plants for the caterpillars are the native grasses *Danthonia* sp. and *Austrostipa* sp., which do not die off in summer. A consideration for the recovery of these species is that the grasses not be regularly mowed as this kills the caterpillars (R. Grund pers. comm. 2003).

Emperor Butterflies
The Tailed Emperor (*Polyura sempronius*) (Figure 92) is another large species that has recently been observed in Adelaide. It prefers exotic urban trees as food plants, but regularly switches the species it feeds upon.

Nymph Butterflies
The Australian Admiral (*Vanessa itea*) (Figure 93) is likely to be a semi-permanent resident of the Park Lands that breeds in urban gardens. The Australian Painted Lady (*Vanessa kershawi*) feeds on various daisy species and may also be found in the Park Lands.

Milkweed Butterflies
The Lesser Wanderer (*Danaus chrysippus*) is a large butterfly that may periodically fly into the Park Lands to use one of its food plants, the Broad-leaved Cotton-bush (*Gomphocarpus cancellatus*) which is found in the Park Lands. The Wanderer (*Danaus plexippus*)is an introduced butterfly now well established across southern and eastern Australia, which also uses the Broad-leaved Cotton-bush as a food plant, and could also be found in the Park Land area.

Copper Butterflies
The Small Copper (*Lucia limbaria*) (Figure 94) is a rare, small metallic-orange butterfly that is now unlikely to occur in the Park Lands. Its food plant Native Sorrel (*Oxalis perennans*) is however, found in quite a few areas of the Park Lands. This butterfly could possibly be encouraged back into the area by infrequently mowing areas of Native Sorrel.

Blue Butterflies
The Amaryllis Azure (*Ogyris amaryllis*) is a spectacular butterfly with metallic-blue wings. It has long been extinct from the Park Lands (R. Grund pers. comm. 2003), but could possibly be re-introduced with the provision of its principal food plant Melaleuca Mistletoe (*Amyema melaleucae*). In addition, its larvae have a complex relationship with particular ant species so re-introduction would not be simple. The Long-tailed Pea-blue (*Lampides boeticus*) is a small, purple coloured butterfly that utilises many small native and introduced legumes as food plants. It could be a semi-resident of the Park Lands, moving between urban areas. Another likely resident is Two-spotted Line-blue (*Nacaduba biocellata*), a very small butterfly that uses *Acacia* spp. buds as larval food plants. The Wattle Blue (*Theclinesthes miskini*) is another species likely to be found in the Park Lands, its caterpillars feed on the young growing tips of

various *Acacia* sp. Saltbush Blue (*Theclinesthes serpentata*) uses Chenopod species as its food plants. It could be encouraged into the Park Lands if a variety of *Atriplex* spp. occurred in sufficient densities. The most likely small blue butterfly to inhabit the Park Lands is the Common Grass-blue *(Zizina labradus*). The caterpillars of this species utilise many small flowered native and introduced legumes as food plants. It also utilises clover and lucerne, provided they remain in green condition.

Spiders

Records of spiders from the Adelaide area were compiled by Mr D. Hirst from the SA Museum, and are listed in Table 16 with habitat comments provided. The two main groupings of spiders found in the Park Lands are Mygalomorphae and Araneomorphae. Mygalomorphae are spiders that must raise the front part of the body prior to striking in order to allow the fangs to drop down readily into the prey. They are primitive spiders, and possess two pairs of book-lungs. All live in burrows, some make trapdoors (D. Hirst pers. comm. 2003). The second group is Araneomorphae, which is the modern group of spiders. They have one pair of book-lungs and the spider bites pincer-like without having to lift their body. Some live in burrows, for example, the Wolf Spiders (*Venetrix* sp.) (Figure 95) or spin webs, to snare prey. Others have evolved as active hunters searching for prey on the ground or on vegetation (D. Hirst pers. comm. 2003).

Table 16.
Spider species recorded in the Adelaide area
(Source: SA Museum, D. Hirst)

Species	Common Name	Family	Habitat
		MYGALOMORPHAE	
Hadronyche adelaidensis	Adelaide Funnelweb	HEXATHELIDAE	burrows in undisturbed areas
Blakistonia aurea	Adelaide Trapdoor	IDIOPIDAE	burrows in undisturbed areas
?Misgolas sp.		IDIOPIDAE	burrows in undisturbed areas
Aname sp.		NEMESIIDAE	burrows in undisturbed areas
Stanwellia sp.		NEMESIIDAE	burrows in undisturbed areas
		ARANEOMORPHAE	
Wandella murrayensis		FILISTATIDAE	under bark/ stones
Oecobius navis		OECOBIIDAE	walls of buildings
Dysdera crocota	Slater Eater	DYSDERIDAE	under rocks
Pholcus phalangioides	Daddy-Long-Legs	PHOLCIDAE	buildings
Badumna insignis	Black House Spider	DESIDAE	trees, rockeries, buildings
Clubiona robusta	Sac Spider	CLUBIONIDAE	under bark of trees
Clubiona sp. *2*	Sac Spider	CLUBIONIDAE	under bark of trees
Clubiona sp. *3*	Sac Spider	CLUBIONIDAE	under bark of trees
Pentasteron intermedium	Spotted Ant Spider	ZODARIIDAE	garden situations
?Asteron sp.	Spotted Ant Spider	ZODARIIDAE	garden situations
Lycosa leuckartii	Wolf Spider	LYCOSIDAE	less disturbed grassy areas
Artoria sp. *2*	Wolf Spider	LYCOSIDAE	gardens, lawns
Venatrix pseudospeciosa	Wolf Spider	LYCOSIDAE	gardens, lawns
Hemicloea sp.	Flat Rock Spider	GNAPHOSIDAE	under bark of trees
?genus sp. *2*	Ground Spider	GNAPHOSIDAE	often under bark of trees
?genus sp. *3*	Ground Spider	GNAPHOSIDAE	often under bark of trees, rocks
Lampona cylindrata	White-Tailed Spider	LAMPONIDAE	trees, rockeries, buildings
Supunna picta	Fast Spotted Ground Spider	CORINNIDAE	on ground, walls
Breda jovialis	Jumping Spider	SALTICIDAE	trees, buildings
Clynotis severus	Jumping Spider	SALTICIDAE	trees, buildings
Lycidas sp. *1*	Jumping Spider	SALTICIDAE	garden situations
Lycidas sp. *2*	Jumping Spider	SALTICIDAE	garden situations
Myrmarachne bicolor?	Jumping Spider	SALTICIDAE	trees
Servaea vestita	Jumping Spider	SALTICIDAE	trees

Sondra sp.	Jumping Spider	SALTICIDAE	garden situations
Isopedella leai	Common Grey Huntsman	SPARASSIDAE	trees, buildings
Sidymella trapezia	Flower Spider	THOMISIDAE	garden situations
Achaearanea veruculata	Tangle-Web Weaver	THERIDIIDAE	garden situations, bushes or trees
Achaearanea sp.	Grey House Spider		usually only in buildings, man made structures
Dipoena sp.	Tangle-Web Weaver	THERIDIIDAE	garden situations
Latrodectus hasselti	Redback	THERIDIIDAE	any crevices close to ground, pots, rocks
Steatoda capensis	Cupboard Spider	THERIDIIDAE	any crevices close to ground, pots, rocks
Theridion sp	Tangle-Web Weaver	THERIDIIDAE	vegetation
Eriophora biapicata	Common Garden Orb-Weaver	ARANEIDAE	webs between buildings, bushes or trees
Phonognatha graeffei	Leaf-Curling Spider	TETRAGNATHIDAE	low vegetation
Tetragnatha sp.	Long-Jawed Spiders	TETRAGNATHIDAE	moist garden situations, often near or over water
Erigone prominens	Midget Spiders	LINYPHIIDAE	moist garden situations, under rocks
Ostearius melanopygius	Midget Spiders	LINYPHIIDAE	moist garden situations, under rocks

Figure 90.
The Dingy Swallowtail (*Papilio anactus*) is likely to be found in the Park Lands and suburban gardens.
Photo: R. Grund.

Figure 91.
The Wood White (*Delias aganippe*) was once common in Adelaide, but now is very rarely seen.
Photo: R. Grund.

Figure 92.
The Tailed Emperor (*Polyura sempronius*) is a recent arrival to the Adelaide area.
Photo: L. Hunt.

Figure 93.
The Australian Admiral (*Vanessa itea*) is found at a number of locations in the Park Lands.
Photo: P. Lang.

Figure 94.
The Small Copper (*Lucia limbaria*) is unlikely to now occur in the Park Lands.
Photo: L. Hunt.

Figure 95.
A Wolf Spider (*Venetrix* sp.) is one of the more common spiders found in the Adelaide area.
Photo: A. Robinson.

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

The Adelaide Park Lands form a contiguous belt of 'open space', surrounded by Metropolitan Adelaide and encircling the Adelaide CBD. The Adelaide Park Lands, covering an area of 720 hectares (45% of the City Council area) are the focal point of open space for people living in the metropolitan area. They characterise Adelaide and are highly valued by the Adelaide community as a place for recreation and cultural significance. The Adelaide City Council prepared a Park Lands Management Strategy (1999), which identified the directions for the Park Lands from 2000-2036. The identification, protection and enhancement of existing biodiversity values in the Park Lands was an important management direction identified. As a result, the current biodiversity survey was commissioned by the Adelaide City Council to identify any existing biodiversity values and make recommendations for future directions for the protection and enhancement of these values. This Chapter summarises the findings of the biodiversity survey in the Park Lands, identifies gaps in current knowledge and makes recommendations to assist council with future planning directions for the environment. These recommendations are intended for a 'whole' of Park Land approach, and will not offer specific land management prescriptions, or address site specific issues.

In common with the rest of the Adelaide Plains, the Adelaide Park Lands are a highly modified environment. Little remains of the original flora and fauna that was, before European settlement, a highly biodiverse landscape. The Park Land area was adorned with large majestic River Red Gum's lining the banks of the River Torrens: open grassy woodlands stood where the City streets and buildings stand today and mallee woodland dominated the North Adelaide area. The destruction of these environments occurred very early following European settlement. Clearance of native vegetation was a priority, to make way for housing, agriculture and stock grazing. As with all new colonies many plant and animal species were introduced, some of which became pests. These combined influences have seen significant declines and changes in the indigenous flora and fauna.

SUMMARY OF RESULTS

Flora

This field survey recorded 514 plant taxa (Australian and overseas) for the Park Lands, 60% (309 species) of which are introduced. This survey documented 183 indigenous taxa still present, (Some grasses could not be fully identified due to no flowering in the dry seasonal conditions).

The Park Lands are dominated by a mixture of planted exotic and native Australian species. The plantings of native Australian trees largely consist of Western Australian eucalypt species, many River Red Gums (*Eucalyptus camaldulensis* var. *camaldulensis*), along with Sugar Gums (*E. cladocalyx*) and Lemon-scented Gums (*E. citriodora*). Other Australian tree species commonly planted include, Kurrajongs (*Brachychiton populneus*) and Moreton Bay Figs (*Ficus macrophylla*). Scattered patches of native Australian shrub species are also planted in the Park Lands and these largely include *Acacia*, *Melaleuca*, *Grevillea*, *Callitris*, *Hakea* and *Callistemon* species.

There are many exotic tree species in the Park Lands with the Pepper-tree (*Schinus areira*), the Aleppo Pine (*Pinus halepensis*), the Radiata Pine (*P. radiata*), the Athel Pine (*Tamarix aphylla*) and the Olive (*Olea europaea* ssp. *europaea*) being the most conspicuous and abundant. The ground stratum over most of the area is dominated with exotic grasses such as Kikuyu (*Pennisetum clandestinum*), Buffalo Grass (*Stenotaphrum secundatum*) and Couch (*Cynodon dactylon* var. *dactylon*).

Two hundred and five indigenous plant taxa are now recorded, using all available data sources, for the Park Lands. Grasses (Gramineae) has the highest species richness with 41 taxa identified, representing 20% of the remnant flora. The Pea family (Leguminosae) is the next species rich family with 22 taxa, then Daisies (Compositae) with 20 taxa and Lily Lily (Liliaceae), Sedges (Cyperaceae) and Saltbushes (Chenopodiaceae) each with 13 taxa. The most commonly recorded remnant grass species include, Spear-grass. (*Austrostipa* spp), Wallaby-grass (*Danthonia* spp.) and Windmill

Grass (*Chloris truncata*). Other herbaceous species include Vanilla-lillies (*Arthropodium* sp.), Bindweeds (*Convolvulus* sp.), the Black-anther Flax-lilly (*Dianella revoluta* var. *revoluta*), Kidney Weed (*Dichondra repens*), Native Lilac (*Hardenbergia violacea*), Native Sorrel (*Oxalis perennans*), Buckbush (*Salsola kali*), Grey Germander (*Teucrium racemosum*) and New Holland Daisies (*Vittadinia* spp.). The more commonly recorded chenopods include Saltbushes (*Atriplex* spp.), Goosefoots (*Chenopodium* spp.), Ruby Saltbush (*Enchylaena tomentosa* var. *tomentosa*) and Bluebushes (*Maireana* spp.). The majority of these naturally regenerating species are found in the West Terrace Cemetery, the south Park Lands and Nanto Womma Park (Park 6) in the North Park Lands.

There are no flora species recorded for the Park Lands with a National conservation rating. Short Wallaby-grass (*Danthonia carphoides* var. *carphoides*), which has been recorded in recent years in the south Park Lands, has a State conservation rating of Rare. There are several species with Regional significance still found in the Park Lands and these include, Heath Spear-grass (*Austrostipa exilis*) which is regionally Threatened and is recorded for the south Park Lands. Grey germander (*Teucrium racemosum*) is also regionally Threatened and can be found in the South Park Lands in Tuttangga Park (Park 17), Pityarrilla Park (Park 19) and Minno Wirra Park (Park 21 West). Willow Wattle (*Acacia salicina*) is regionally Vulnerable and is found in West Terrace Cemetery as is the Quondong (*Santalum acuminatum*).

Park Land Site Summary

The majority of the Park Land sites are dedicated to recreation, with large open turfed areas surrounded with plantings of mixed exotic and native Australian species. There are also many sites that retain a mixture of recreation and sporting uses with areas of a more 'natural' character. Nanto Womma Park (Park 6) is an example of an area with a mixed use. It has areas with naturally re-generating locally indigenous plant species (Figure 23), it has areas of horse grazing, fenced off areas of planted exotic and native Australian tree species and it has an area of playing fields and tennis courts. The majority of Bakkabakkandi Park (Park 16) is dedicated to the Victoria Park Racecourse, however an area south of the racecourse has diverse communities of native grasses, herbs and chenopods.

Other sites in the south Park Lands also contain many areas of naturally re-generating flora species. Tuttanga Park (Park 17) has stands of native grasses, and a Trees For Life Bush Care Site that contains many examples of locally indigenous taxa. Pityarrilla Park (Park 19) also contains patches of native grasses as does Kurrangga Park (Park 20) which also has some communities of Native Sorrel (*Oxalis perennans*) and Black-anther Flax-lilly (*Dianella revoluta* var. *revoluta*) which were probably introduced into the site. Minno Wirra Park (Park 21 West) has many communities of naturally re-generating grass and non-grassy understorey species. Many of these areas have been roped off to protect the plants from mowing, and individual plants have been staked. Minno Wirra Park (Park 21 West) has also been targetted as part of the One Million Trees Program and planting has begun in this area.

West Terrace Cemetery in Wirranendi Park (Park 23) remains one of the most important sites for locally indigenous taxa in the Adelaide area. It has many examples of remnant flora and provides an excellent seed source for re-vegetation programs in the Park Lands and Metropolitan Adelaide. It has an important grove of Quondong (*Santalum acuminatum*), along with Native Apricot (*Pittosporum angustifolium*), Umbrella Bush (*Acacia ligulata*), Black-anther Flax-lily (*Dianella revoluta* var. *revoluta*) and many *Austrostipa* spp. This site remains one of the most historically significant areas in Metropolitan Adelaide for remnant plant species.

Although these communities of remnant flora are only small they remain significant at a local scale. Understorey woodland species are now very rare across the Adelaide Metropolitan area and the Park Lands provide one of the few remaining open areas for the survival of these plants in the suburban environment.

Mammals

In common with many other areas across Australia, a significant proportion of the mammal fauna in the Adelaide area has become extinct since European settlement. The Adelaide area, as the original site of colonisation, was first hit by the wave of extinctions that were to occur throughout the rest of the State. Of the 33 mammal species recorded for the Adelaide environs, nine are extinct and six are introduced. Ten species of native mammals remain in the Park Lands, of

which 6 or 7 are bats (Wattled Bat *Chalinolobus* sp., Southern Freetail Bat *Mormopterus* sp., Lesser Long-eared Bat *Nyctophilus geoffroyi*, White-Striped Freetail Bat *Tadarida australis* and Forest Bat *Vespadelus* sp.), two are possum species the Common Brushtail Possum (*Trichosurus vulpecula*) and the Common Ringtail Possum (*Pseudocheirus peregrinus*) and one rodent, the Water Rat (*Hydromys chrysogaster*).

The remaining 5 species of mammal are introduced including three rodents (House Mouse *Mus musculus*, Black Rat *Rattus rattus* and Brown Rat *R. norvegicus*), two carnivores (Red Fox *Vulpes vulpes* and Cat *Felis catus*) and the Rabbit (*Oryctolagus cuniculus*). The Red Fox and Cat have been implicated in many of the extinctions of mammal fauna in the Adelaide area, including the disappearance of Eastern Quoll (*Dasyurus viverrinus)*, Brush-tailed bettong (*Bettongia penicillata*) and Bilby (*Macrotis lagotis*).

Birds

The bird fauna has seen less extinctions than the mammal fauna, but the population structure has changed significantly over the Adelaide area since settlement. One hundred and fifty three bird species have been recorded for the Park Lands, representing 43% of the State's total. Many species have disappeared or become extinct in the region (Regent Honeyeater *Xanthomyza phrygia*, Swift Parrot *Lathamus discolor*, Plains-wanderer *Pedionomus torquatus*, Azure Kingfisher *Alcedo azurea,* Barking Owl *Ninox* connivens and Apostlebird *Struthidea cinerea*). Whereas other species that were common at settlement have re-distributed or are showing declines (Black Swan *Cygnus atratus* and Chestnut Teal *Anas castanea*). Many of the earlier declines in the area were of woodland species (Superb Fairly-wren *Malurus cyaneus*, Red-capped Robin *Petroica goodenovii, Fairy Martin Petrochelidon ariel*, Little Grassbird *Megalurus gramineus* and Silvereye *Zosterops lateralis*). Some declines have been in recent years (Yellow-rumped Thornbill *Acanthiza chrysorrhoa*).

Conversely, many species have profited from the changed environment in the Park Lands. Species able to utilise an abundant seed source such as the Galah (*Cacatua roseicapilla*), Crested Pigeon (*Ocyphaps lophotes*), Long-billed Corella (*Cacatua tenuirostris*) and Sulphur-crested Cockatoo (*Cacatua galerita*) have moved into the area since settlement and prospered. The Yellow-tailed Black-Cockatoo (*Calyptorhynchus funereus*) is a recent arrival, using the introduced *Pinus* spp. of the Park Lands as an additional food source. Many nectivorous species have also moved into the area, making use of the abundant nectar supply from many of the planted interstate eucalypt species (Rainbow Lorikeet *Trichoglossus haematodus*, Musk Lorikeet *Glossopsitta concinna*, Adelaide Rosella *Platycercus elegans* and *P. eximius* Eastern Rosella).

Other native species that are abundant in the Park Lands include the Noisy Miner (*Manorina melanocephala*), Magpie-lark (*Grallina cyanoleuca*), Australian Magpie (*Gymnorhina tibicen*) and Silver Gull (*Larus novaehollandiae*).

Introduced species that are commonly recorded in the area include, the Feral Pigeon (*Columba livia*), Spotted Turtle-dove (*Streptopelia chinensis*), Common Starling (*Sturnus vulgaris*), Common Blackbird (*Turdus merula*) and House Sparrow (*Passer domesticus*).

Reptiles and Amphibians

Eighteen species of reptile have been recorded for the Park Land area, with the scink family having the most taxa. The most conspicuous of the reptile fauna are the Eastern Bluetongue (*Tiliqua scincoides*) and Sleepy Lizard (*T. rugosa*). The status of other small skinks in the Park Lands is not known (*Hemiergis* sp., *Lerista* sp. and *Menetia* sp.). Two snake species are regularly recorded, the Eastern Brown Snake (*Psedonaja textilis*) being the most common and the Red-bellied Black Snake (*Pseudechis porphyriacus*) recorded less frequently. The Marbled Gecko (*Christinus marmoratus*) is the most commonly recorded gecko species for the Park Land area. Two species of tortoise are found in the Park Lands, the Common Long-necked Tortoise (*Chelodina longicollis*) and the Macquarie Tortoise (*Emydura macquarii*).

Six species of amphibians are recorded for the Park Lands, with one species having disappeared from the area (Brown Toadlet *Pseudophryne bibroni*). Frog species richness is believed to have not changed significantly since European settlement, but their abundance may have reduced significantly.

CONSERVATION AND LAND MANAGEMENT

Database Development and Management

There is no centralised database or record keeping system for historic or current

biological information in the Park Lands. At present there is no systematic process of recording data for remnant plant species or fauna, or a database to manage such records. To date, dedicated volunteers have been essential in the identification and recording of remnant plants in the Park Lands

This Biodiversity Survey has recorded biological data, including remnant plant species lists, fauna species lists and opportunistic point-based records for individual flora and fauna sightings. This data is stored on the Biological Database of South Australia, which is administered and managed by DEH. This database can be added to with future records of remnant plant species and fauna records from the Adelaide Park Lands. However, it is recommended that the Adelaide City Council develop their own databasing system to manage data collection and retrieval. This database should be developed in collaboration with DEH and other City Council's (e.g. Burnside City Council) for a coordinated and long-standing approach to land management.

Recommended Actions

- to develop a systematic datasheet for recording remnant plant and fauna species information.
- Develop a database, within the Adelaide City Council, to manage future records of remnant flora and fauna species.
- That this database should be compatible with the Biological Databases of SA, DEH.
- Train staff in the standard data collection required for species records.
- Supply volunteers with the datasheets and training in data collection.

Data-set Capture

An important data-set from a local naturalist was identified during this project. As discussed in Chapter 3, a member of the SAOA, Mr B. Whatmough has routinely collected bird data in the Park Lands since 1974. Records have been collected each month from a transect encompassing the whole Park Land area. A compilation of this data was provided for this project and it proved extremely valuable for determining changes in bird fauna in the area for nearly the past 30 years. It was not possible to capture all of this data during this project. However, discussions have occurred with Mr B. Whatmough for this data to be entered into the Biological Databases of SA, where it can stand with other biological datasets collected in South Australia.

Recommended Actions

- That this data set be captured and stored appropriately

Further Survey and Research

Plants

The identification and recognition of the remnant plant species in the Park Lands is required.

- Map areas of remnant vegetation for each Park Land Management Block.
- Estimate densities of remnant flora species.
- Preparation of re-vegetation plans for each Park Land site. Detailed management prescriptions should be identified in each of these plans, on a site by site basis. Issues to address include weed control, site preparation involving the identification and marking of remnant plants existing at the sites, identification of appropriate seasons for plantings, revising mulching practises, mowing regimes, encouragement of natural regeneration, structural plantings and correct sourcing of seed provenance.
- Prepare monitoring guidelines for re-vegetation success for each site.

Mammals

As the majority of the small to medium sized mammals have already been lost from the Park Lands, the following could be implemented to benefit those species surviving.

- A detailed study into the bat species surviving in Metropolitan Adelaide. Identification of high-use areas for bats. The use and monitoring of bat boxes in the Park Lands.
- Conduct spotlighting surveys and establish monitoring programs to accurately estimate the distribution and density of populations of the Common Brushtail Possum and Common Ringtail Possum in the Park Lands.
- Conduct population estimates of the Water Rat in the River Torrens section of the Park Lands, identifying critical habitat usage in the area.
- Control and monitoring of introduced predators.

Birds

The structure of bird species in the Park Lands has changed dramatically since settlement. The future of the bird species in the Park Lands is reliant upon decisions of habitat

re-construction in the Park Lands, with the following considerations;

- To encourage or support the smaller woodland species that have been lost, multi-layered understorey plant species with varying densities are required.
- Investigation of flora species best suited for encouraging a diversity of birds, or to continue to support the species that are utilising the Park Lands.
- Education programs within the general community.
- Linkage of habitat areas, within the Park Lands and with other open areas.
- Control of introduced predators.
- Linkage with other programs in the area, for example, the Mount Lofty Ranges 'Birds for Biodiversity' Program.

Reptiles

There is a paucity of information available on reptile species presence and abundance.

- Conduct further surveys to identify distribution of species.
- Involvement of community groups with local knowledge is recommended, for example, SA Herpetology Group.
- Incorporation of important structural components of reptile habitat into re-vegetation plans. Including ground litter, logs and rock piles.

Re-vegetation Planning

Structural Diversity

A major limitation identified in the Park Lands is the lack of structural components of the vegetation. In the past, areas that have been planted generally consist of large trees with an exotic grassy understorey. The trees are planted either in rows or too densely to represent original habitat structure. The area has very few understorey shrubs, which would offer natural protection for many native fauna species.

Recommended Actions

- Future plantings should contain a natural mix of grasses, low to mid stratum understorey shrubs and tree species.
- Plantings should maintain a more 'natural' structure, with dense patches of plantings mixed with open areas.
- Species selected should be of locally indigenous taxa, as identified by this project.
- Local seed provenance should be sourced whenever possible.

Seed Provenance

Seed Provenance has been a major limitation in the Park Lands in previous years. Plantings have largely consisted of species with unknown provenance. Moves have been made toward sourcing species of correct provenance for current and future planting programs. It is important from a biological perspective to plant species with local provenance when possible as these plants are the most suited to local conditions and will have a much higher survival success than non-local species. It is also in keeping with the natural landscape values of the area.

Recommended Actions

- Establish a network of local seed collection and propagation.
- Incorporate seed provenance details into the Adelaide City Council's database system (to be developed).
- Keep detailed records of seed collection, propagation and planting sites throughout the Park Lands.

Habitat Isolation and Linkage

The Park Lands are essentially an isolated patch of open space, surrounded by suburbia. To maximise the habitat value of the Park Lands it is essential to develop 'habitat' linkages. As the surrounding areas are already 'built-up', alternative solutions to linking areas are required. Australia is known for its 'quarter of an acre blocks', which are still commonly found throughout the Adelaide suburbs. These spaces are ideal for supplying extra food sources and habitat for fauna, especially bird species. Expanding this, is the concept of 'bush-top' gardens on inner city buildings. Adelaide University, in partnership with the Adelaide City Council, is currently experimenting with the concept and have developed a concept plan for a bush-top garden on an inner-city car park roof.

Recommended Actions

- Identify natural linkage areas available in the Park Lands, namely the River Torrens Linear Park and other oppropriate creek lines, to maximise habitat area.
- Develop smaller-scale linkages within the Park Lands area for small fauna species, which should be incorporated into re-vegetation programs.
- Investigate other intact habitat areas in suburban Adelaide and investigate potential linkages to these areas.

Introduced Predators
The Red Fox and Cat have been implicated in many of the extinctions of native fauna in the Adelaide area, with small to medium sized mammals being the worst affected. The Red Fox is known to prey upon the Common Brushtail Possum in the Park Lands as well as many bird species. Studies conducted on the prey composition of domestic Cats in suburban environments, show that they kill substantial numbers and varieties of native birds, mammals and reptiles, including introduced mammals such as mice and rats, which can, in some areas, represent 64% of their prey items (Barratt 1997). It is important to understand much more about the real impact of the Red Fox and Cat in the Park Lands before implementing control programs.

Investigations into the impacts that feral bee populations may be having on the available nesting sites for birds and roosts for bat species is also recommended.

Recommended Actions
- Population estimates and further dietary studies are required to determine the ecological impact of the Red Fox and the Cat in the Park Lands.
- Should a siginificant impact be found, suitable culling programs in an urban environment would need very careful development.
- Education programs promoting responsible pet ownership
- Investigating success of introducing cat curfews into suburban areas.

Environmental Weeds
Although the Park Lands are dominated by exotic species and, in many instances, they contribute to the cultural integrity of the Park Lands, some of these species have the potential to become environmental weeds. It is recommended that individual site investigations be conducted for each re-vegetation program. Existing and potential environmental weeds should be identified and managed at each re-vegetation site.

Public Safety Concerns
The re-establishment of vegetation in an urban context has a number of considerations. Public safety in areas planted, at least in patches, more densely than at present is a potential concern, along with increased fire hazard, vandalism and rubbish dumping.

Reintroduction of Fauna
There is virtually no possibility of succesfully reintroducing extinct fauna species back into the Park Lands under current conditions. The Park Lands in their current state can not support viable populations of small to medium sized mammals or birds that have become extinct in the area. Many issues would have to be addressed, a re-creation of large areas of intact habitat and areas may require fencing to protect against road kills. An achievable aim however would be to encourage the natural reintroduction of species through the re-creation of habitat to encourage bird species back into the area.

Education and Training
Significant training opportunities would present themselves from the above mentioned management actions. These could include;
- Staff training in the identification of remnant flora and fauna species
- Encourage and provide training in data collection and identification of remnant flora and fauna species to volunteers
- Provide information sessions for the general community on flora and fauna species present in the Park Lands
- Encourage community involvement in re-vegetation programs and data collection.

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APPENDIX I

PLANT SPECIES LIST FOR THE ADELAIDE PARK LANDS

* = Introduced Species. Includes all non-endemic species to the Southern Lofty Herbarium Region.
Plant Status and Taxonomy = Refer to Table 3 and Table 5.
Source = Herb (South Australian Plant Biodiversity Centre).
WTC = West Terrace Cemetery.

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
Acacia acinacea	Wreath Wattle	LEGUMINOSAE			N		y	WTC (Bagust 2002); Park 3, 5, 16, 17, 23, 24, 25
*Acacia baileyana**	Cootamundra Wattle	LEGUMINOSAE				y	y	Park 16 (Crompton 1997); Park 16
Acacia brachybotrya	Grey Mulga-bush	LEGUMINOSAE					y	Park 1, 27
Acacia cyclops	Western Coastal Wattle	LEGUMINOSAE					y	Park 5
*Acacia dealbata**	Silver Wattle	LEGUMINOSAE				y		1 collection 1895 from 'Adelaide'
Acacia hakeoides	Hakea Wattle	LEGUMINOSAE					y	Park 5
*Acacia iteaphylla**	Flinders Ranges Wattle	LEGUMINOSAE					y	Park 4, 8, 15, 17, 18, 19, 20, 21, 22, 23, 27
Acacia ligulata	Umbrella Bush	LEGUMINOSAE			K	y	y	WTC (Bagust 2002); Park 3, 4, 5, 16, 20, 23, 24, 27
Acacia longifolia var. *sophorae*	Coastal Wattle	LEGUMINOSAE			N	y		1 collection 1946 from 'West Torrens'
*Acacia melanoxylon**	Blackwood	LEGUMINOSAE					y	Park 23, 24
Acacia myrtifolia var. *myrtifolia*	Myrtle Wattle	LEGUMINOSAE				y		1 collection 1979 from 'Adelaide'
Acacia notabilis	Notable Wattle	LEGUMINOSAE					y	Park 5
Acacia paradoxa	Kangaroo Thorn	LEGUMINOSAE				y	y	Park 3, 5, 16, 23, 24
*Acacia pendula**		LEGUMINOSAE					y	Park 5, 15, 18, 21, 22, 23, 27
Acacia pycnantha	Golden Wattle	LEGUMINOSAE				y	y	Park 16 (Crompton 1997 & 1998); WTC (Bagust 2002); South Parklands (Sando 2001); Park 2, 3, 4, 5, 9, 16, 17, 19, 20, 21, 21W, 23, 27
Acacia retinodes var. *retinodes*	Swamp Wattle	LEGUMINOSAE				y	y	Park 26, 27
Acacia salicina	Willow Wattle	LEGUMINOSAE			V			WTC & Mile End rail yard (Bagust 2002)
*Acacia saligna**	Golden Wreath Wattle	LEGUMINOSAE					y	Park 1, 2, 3, 16, 18, 20, 21, 21W, 27
Acacia sp.		LEGUMINOSAE					y	Park 10, 13
Acacia victoriae ssp. *victoriae*	Elegant Wattle	LEGUMINOSAE			V		y	Extinct WTC 2002 (Bagust 2002); Park 22, 23, 24
*Acer pseudoplatanus**	Sycamore	ACERACEAE					y	Park 1, 13, 14
*Acmena smithii**	Lillypilly	MYRTACEAE					y	Park 14, 21
Agapanthus sp.*	Agapanthus	AMARYLLIDACEAE					y	Park 14, 21, 26
*Agonis flexuosa**		MYRTACEAE					y	Park 1, 2, 21
Agrostis aemula var. *aemula*	Blown-grass	GRAMINEAE				y		2 collections 1970 from 'Adelaide - along banks of River

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
								Torrens'
Agrostis avenacea	Common Blown-grass	GRAMINEAE				y		1 collection 1879 from 'banks of River Torrens'
*Ailanthus altissima**	Tree Of Heaven	SIMAROUBACEAE				y		1 collection 1989 from 'along Torrens by Zoo'
*Allium roseum**		LILIACEAE				y		3 collections 1945-1972 from 'University Grounds and Botanic Park'
*Allium triquetrum**	Three-cornered Garlic	LILIACEAE				y		2 collections 1946 & 1990 from Botanic Park
Allocasuarina verticillata	Drooping Sheoak	CASUARINACEAE					y	WTC, planted non-local only (Bagust 2002); Park 4, 5, 16, 17, 19, 20, 21, 21W, 23, 24, 27
*Alopecurus pratensis**	Meadow Fox-tail	GRAMINEAE				y		1 collection 1950 from 'Adelaide'
Alternanthera denticulata	Lesser Joyweed	AMARANTHACEAE			U	y		1 collection 1993 from 'opposite Adelaide Zoo'
Anigozanthus sp.*	Kangaroo Paw	HAEMODORACEAE					y	Park 26
*Araucaria bidwillii**	Bunya Pine	ARAUCARIACEAE					y	Park 5, 10
*Araucaria excelsa**	Norfolk Island Pine	ARAUCARIACEAE					y	Park 21, 27
Araucaria sp.*		ARAUCARIACEAE					y	Park 17, 19, 20, 27
*Arctotheca calendula**	Cape Weed	COMPOSITAE				y		6 collections 1861-1970 from 'North Adelaide Parklands'
Argentipallium blandowskianum	Woolly Everlasting	COMPOSITAE			R	y		1 collection 1898 from 'near Adelaide'
Aristida behriana	Brush Wire-grass	GRAMINEAE			U			Park 16 (Crompton 1997 & 1998); Extinct WTC 2002 (Bagust 2002); South Parklands (Sando 2001)
Artemisia sp.*	Wormwood	ASTERACEAE					y	Park 27
Arthropodium fimbriatum	Nodding Vanilla-lilly	LILIACEAE				y		Park 19 & 21W (Crompton 1998); WTC (Bagust 2002); South Parklands (Sando 2001)
Arthropodium strictum	Common Vanilla-lilly	LILIACEAE				y		Park 16 & 17 (Crompton 1997 & 1998); Park 6 & 6 Bush For Life Site (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001)
*Arundo donax**	Giant Reed	GRAMINEAE				y		5 collections 1989 from 'banks of River Torrens'
Arundo sp.*	Bamboo	GRAMINEAE					y	Park 26
*Asparagus declinatus**	Bridal Veil	LILIACEAE					y	Park 23
Asperula conferta	Common Woodruff	RUBIACEAE						Extinct WTC 2002 (Bagust 2002)
*Asphodelus fistulosus**	Onion Weed	LILIACEAE				y		3 collections 1913 & 1925 from 'Montefiore Hill'
*Aster subulatus**	Aster-weed	COMPOSITAE				y		11 collections early 1920'2 from 'Torrens Lake'
Atriplex australasica	Green Saltbush	CHENOPODIACEAE		R	R	y		1 collection 1916 from 'North Adelaide'
Atriplex paludosa ssp. *paludosa*	Marsh Saltbush	CHENOPODIACEAE			K		y	Extinct WTC 2002 (Bagust 2002); Park 24
*Atriplex prostrata**	Creeping Saltbush	CHENOPODIACEAE				y		4 collections 1948-1989 from 'Torrens Lake'
Atriplex semibaccata	Berry Saltbush	CHENOPODIACEAE				y	y	Park 16 & 21W (Crompton 1997 &1998); Park 7 & 8, Botanic Park, Park 6 & 6 Bush for Life Site (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 10, 17, 21W, 23, 24
Atriplex suberecta	Lagoon Saltbush	CHENOPODIACEAE				y	y	Park 22 (Crompton 1998); Park 6 (Paton 2003); WTC (Bagust

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
								2002); South Parklands (Sando 2001); Park 23
Austrostipa blackii	Crested Spear-grass	GRAMINEAE						WTC (Bagust 2002)
Austrostipa curticoma	Short-Crest Spear-grass	GRAMINEAE			U			Park 16, 17 & 21 (Crompton 1997 & 1998); Extinct? WTC (Bagust 2002); South Parklands (Sando 2001)
Austrostipa drummondii	Cottony Spear-grass	GRAMINEAE						WTC (Botanic Gardens 2002)
Austrostipa elegantissima	Feather Spear-grass	GRAMINEAE			U			Extinct WTC 2002 (Bagust 2002)
Austrostipa eremophila	Rusty Spear-grass	GRAMINEAE			U			Park 6, 7 & 8 (Paton 2003); WTC (Bagust 2002)
Austrostipa exilis	Heath Spear-grass	GRAMINEAE			T			Park 16 (Crompton 1998); South Parklands (Sando 2001)
Austrostipa flavescens	Coast Spear-grass	GRAMINEAE						Park 22 (Crompton 1998); Park 6, 7 & 8 (Paton 2003); South Parklands (Sando 2001)
Austrostipa gibbosa	Fat Spear-grass	GRAMINEAE		R	R			Park 17 (Crompton 1998); South Parklands (Sando 2001)
Austrostipa nitida	Balcarra Spear-grass	GRAMINEAE						Park 16, 17 & 19 (Crompton 1997 & 1998); South Parklands (Sando 2001)
Austrostipa nodosa	Tall Spear-grass	GRAMINEAE						Park 16, 17 & 21W (Crompton 1997 & 1998); Park 6, 7, 8 & 6 Bush for Life Site (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001)
Austrostipa puberula	Small Rusty Spear-grass	GRAMINEAE						Park 6, 7 & 8 (Paton 2003)
Austrostipa scabra ssp. *scabra*	Rough Spear-grass	GRAMINEAE					y	Park 16, 17, 18, 19, 21 & 21W (Crompton 1997 & 1998); WTC (Bagust 2002); South Parklands (Sando 2001); Park 23
Austrostipa sp.	Spear-grass	GRAMINEAE				y	y	Park 6 (Paton 2003); Park 2, 4, 5, 6, 7, 16, 17, 19, 20, 21, 21W, 22, 23
*Avena barbata**	Bearded Oat	GRAMINEAE				y		9 collections 1911-1981 from 'North and East Parklands'
*Avena fatua**	Wild Oat	GRAMINEAE						Park 16 (Crompton 1997)
Azolla filiculoides	Pacific Azolla	AZOLLACEAE				y		1 collection 1909 from Botanic Gardens
Banksia marginata	Silver Banksia	PROTEACEAE					y	Park 24
Bauhinia sp.*		LEGUMINOSAE					y	Park 27
Beta vulgaris ssp. *maritima**	Sea Beet	CHENOPODIACEAE				y		1 collection 1946 from Botanic Gardens
*Bidens pilosa**	Cobbler's Pegs	COMPOSITAE				y		4 collections 1981 & 1983 from 'Rundle Street car park'
Billardiera versicolor	Yellow-flower Apple-berry	PITTOSPORACEAE			R	y		1 collection 1970 from 'bank of River Torrens'
Boerhavia dominii	Tar-vine	NYCTAGINACEAE				y	y	Park 6 & Botanic Park (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 6, 10
Bolboschoenus caldwellii	Salt Club-rush	CYPERACEAE				y		5 collections 1910-1970 from 'near River Torrens and near the wier'
*Brachychiton acerifolius**	Illawarra Flame Tree	STERCULIACEAE					y	Park 3, 14, 19, 27
*Brachychiton discolor**		STERCULIACEAE					y	Park 19
*Brachychiton populneus**	Kurrajong	STERCULIACEAE					y	Park 1, 2, 3, 4, 7, 8, 9, 10, 13, 16, 17, 18, 19, 20, 21, 23, 27

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
Brachychiton sp.*		STERCULIACEAE					y	Park 26
*Brachypodium distachyon**	False Brome	GRAMINEAE				y		1 collection 1908 from 'North Parklands'
*Briza maxima**	Large Quaking-grass	GRAMINEAE				y		3 collections 1903 & 1955 from 'Adelaide Plains'
*Briza minor**	Lesser Quaking-grass	GRAMINEAE				y		5 collections 1903-55 from 'North Parklands, Kintore Avenue'
*Bromus catharticus**	Prairie Grass	GRAMINEAE				y		4 collections 1933-70 from 'Adelaide University, North Parklands and banks of the River Torrens'
*Bromus diandrus**	Great Brome	GRAMINEAE				y		Park 16 (Crompton 1997)
Bromus hordeaceus ssp. *hordeaceus**	Soft Brome	GRAMINEAE				y		Park 16 (Crompton 1997)
*Bromus lanceolatus**	Mediterranean Brome	GRAMINEAE				y		1 collection 1933 from 'Brougham Place North Adelaide'
*Bromus madritensis**	Compact Brome	GRAMINEAE				y		7 collections 1905-83 from ' North Adelaide, Pennington Terrace and Botanic Gardens'
*Bromus rubens**	Red Brome	GRAMINEAE				y		2 collections 1916 & 1920 from 'North Parklands'
*Buddleja davidii**	Butterfly Bush	LOGANIACEAE					y	Park 23
Bulbine bulbosa	Bulbine-lily	LILIACEAE				y		Extinct WTC 2002 (Bagust 2002); 3 collections 1861, 1941 & 42 from 'North Adelaide Parklands, Golfhouse'
*Bupleurum lancifolium**		UMBELLIFERAE				y		1 collection 1919 from 'Adelaide'
*Bupleurum semicompositum**	Hare's Ear	UMBELLIFERAE				y		1 collection 1881 from 'marshes by North Arm & North Adelaide Parklands'
Burchardia umbellata	Milkmaids	LILIACEAE				y		2 collections 1861 & 1961 from 'North Adelaide'
Bursaria spinosa ssp. *spinosa*	Sweet Bursaria	PITTOSPORACEAE					y	Botanic Gardens; Park 23, 24
Caesia calliantha	Blue Grass-lily	LILIACEAE				y		2 collections 1921 & 1961 from 'near Adelaide'
*Calendula arvensis**	Field Marigold	COMPOSITAE				y		8 collections 1902-1936 from 'University Grounds, rear of Police Barracks & North Parklands'
*Calendula officinalis**	Garden Marigold	COMPOSITAE				y		1 collection 1909 from 'North Adelaide'
*Callistemon phoenicius**	Bottlebrush	MYRTACEAE					y	Park 1, 3
Callistemon rugulosus var. *rugulosus*	Scarlet Bottlebrush	MYRTACEAE				y	y	Park 5
Callistemon sp.	Bottlebrush	MYRTACEAE					y	Park 15, 18, 19, 21, 26, 27
*Callitris glaucophylla**	White Cypress-pine	CUPRESSACEAE				y		1 collection 1914 from 'Botanic Gardens'
Callitris gracilis	Southern Cypress Pine	CUPRESSACEAE			U		y	WTC - planted non-local only (Bagust 2002): Park 3, 4, 5, 16, 17, 18, 19, 20, 21, 21W, 23, 24, 26, 27
Calostemma purpureum	Pink Garland-lily	AMARYLLIDACEAE				y	y	WTC (Bagust 2002); South Parklands (Sando 2001); Park 17 Trees for Life Site and (Subagio 2003); Park 22
Calothamnus sp.*		MYRTACEAE					y	Park 27
Calystegia sepium	Large Bindweed	CONVOLVULACEAE			R		y	Park 1, 26, 27
Calytrix tetragona	Common Fringe-myrtle	MYRTACEAE					y	Park 16

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
*Carduus pycnocephalus**	Shore Thistle	COMPOSITAE				y		1 collection 1943 from 'North Parklands'
*Carduus tenuiflorus**	Slender Thistle	COMPOSITAE				y		2 collections 1907 & 1936 from 'South side Torrens Weir & North Parklands'
Carex bichenoviana	Notched Sedge	CYPERACEAE			U	y		6 collections 1879-1970 from 'River Torrens at dam, Botanic Park & North Parklands'
*Carex divisa**	Divided Sedge	CYPERACEAE				y		4 collections 1963-89 from 'Torrens Lake and banks River Torrens'
Carex fascicularis	Tassel Sedge	CYPERACEAE			U	y		1 collection 1907 from 'Torrens Lake'
Carex inversa var. *inversa*	Knob Sedge	CYPERACEAE			R	y		1 collection 1993 from 'Adelaide near Swan Pond'
*Casuarina glauca**		CASUARINACEAE					y	Park 1, 2, 3, 4, 6, 13, 20, 21, 21W, 22, 23, 25, 26, 27
Casuarina sp.		CASUARINACEAE					y	Park 5
*Catapodium rigidum**	Rigid Fescue	GRAMINEAE				y		Park 16 (Crompton 1997)
*Centaurea calcitrapa**	Star Thistle	COMPOSITAE				y		4 collections 1906-1977 from 'Adelaide Torrens River and East Parklands'
*Centaurea solstitialis**	St Barnaby's Thistle	COMPOSITAE				y		1 collection 1997 from 'by the Torrens at Adelaide'
*Centaurium tenuiflorum**	Branched Centaury	GENTIANACEAE				y		1 collection 1967 from 'West Terrace Cemetery'
Centipeda cunninghamii	Common Sneezeweed	COMPOSITAE				y		1 collection 1993 from 'River Torrens North bank opposite Adelaide Zoo'
*Cerastium glomeratum**	Common Mouse-ear Chickweed	CARYOPHYLLACEAE				y		4 collections 1916-1961 from 'Brougham Place North Adelaide'
*Cerastium pumilum**	Chickweed	CARYOPHYLLACEAE				y		1 collection 1879 from 'Adelaide'
*Ceratonia siliqua**	Carob	LEGUMINOSAE					y	Park 16 (Crompton 1997); Park 4, 6, 10, 15, 17, 18, 19, 25, 27
Cheiranthera alternifolia	Hand-flower	PITTOSPORACEAE				y		1 collection no date from 'Adelaide'
*Chenopodium album**	Fat Hen	CHENOPODIACEAE				y		16 collections 1911-2000 from 'North Adelaide, South Terrace'
Chenopodium ambrosioides var. *ambrosioides**	Mexican Tea	CHENOPODIACEAE				y		1 collection 1994 from 'along Torrens by Zoo'
Chenopodium cristatum	Crested Goosefoot	CHENOPODIACEAE				y		WTC (Bagust 2002)
*Chenopodium multifidum**	Scented Goosefoot	CHENOPODIACEAE				y		1 collection 1981 from 'North Adelaide'
*Chenopodium murale**	Nettle-leaf Goosefoot	CHENOPODIACEAE				y		7 collections 1906-1982 from 'Brougham Place North Adelaide & banks of River Torrens'
Chenopodium nitrariaceum	Nitre Goosefoot	CHENOPODIACEAE				y		1 collection 1910 from 'Adelaide High School garden'
Chenopodium pumilio	Clammy Goosefoot	CHENOPODIACEAE				y	y	Park 6 (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 17 Trees for Life Site (Subagio 2003); Park 6, 16, 21, 21W
Chloris sp.		GRAMINEAE				y		1 collection 1955 from 'Adelaide'
Chloris truncata	Windmill Grass	GRAMINEAE				y	y	Park 16, 17, 18, 19 & 21W (Crompton 1997 & 1998); Park 6, 7 & 8, Botanic Park and Park 6 Bush for Life Site (Paton 2003); South Parklands (Sando 2001); Park 2, 5, 6, 7, 16, 17, 19, 21,

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
								21W, 22
Chrysocephalum apiculatum	Common Everlasting	COMPOSITAE				y		1 collection 1906 from 'Adelaide'
Chrysocephalum baxteri	White Everlasting	COMPOSITAE				y		1 collection 1953 from 'Adelaide'
*Cichorium intybus**	Chicory	COMPOSITAE				y		3 collections 1880 & 1970 from 'Tynte Street North Adelaide and banks of River Torrens'
Convolvulus angustissimus ssp. *angustissimus**		CONVOLVULACEAE				y		1 collection 1879 from 'Adelaide'
*Convolvulus arvensis**	Field Bindweed	CONVOLVULACEAE				y		1 collection 1998 from 'West Terrace Cemetery'
Convolvulus erubescens	Australian Bindweed	CONVOLVULACEAE					y	WTC (Bagust 2002); South Parklands (Sando 2001); Park 23
Convolvulus remotus	Grassy Bindweed	CONVOLVULACEAE				y		WTC (Bagust 2002); South Parklands (Sando 2001)
*Conyza albida**	Tall Fleabane	COMPOSITAE				y		5 collections 1940-1945 from 'University of Adelaide and North Adelaide'
*Conyza bonariensis**	Flaxleaf Fleabane	COMPOSITAE				y		13 collections 1880-1968 from 'University of Adelaide, North Adelaide, behind Government House'
*Coronopus squamatus**		CRUCIFERAE				y		not in SL region, collected near fire station in Wakefield Street, 1974
Correa pulchella	Salmon Correa	RUTACEAE					y	Park 26
Correa reflexa	Common Correa	RUTACEAE					y	Park 27
Cotoneaster sp.*	Cotoneaster	ROSACEAE					y	Park 1, 21
Cotula australis	Common Cotula	COMPOSITAE				y		Park 7 & 8 (Paton 2003); South Parklands (Sando 2001)
*Cotula coronopifolia**	Water Buttons	COMPOSITAE				y		2 collections 1928 & 1970 from 'Torrens Lake and River Torrens'
Craspedia variabilis	Billy-Buttons	COMPOSITAE				y		1 collection 1975 from 'Adelaide'
*Crataegus monogyna**	Hawthorn	ROSACEAE				y		1 collection 1907 from 'Adelaide'
*Crepis capillaris**	Smooth Hawksbeard	COMPOSITAE				y		2 collections 1918 & 1967 from 'Botanic Park and North Adelaide - Montefiore Hill'
Crepis foetida ssp. *foetida**	Stinking Hawksbeard	COMPOSITAE				y		4 collections 1955-1957 from 'old Exhibition Building, North Terrace'
Critesion murinum ssp. *glaucum**	Blue Barley-grass	GRAMINEAE				y		3 collections 1903, 1942 & 1950 from 'Brougham Place North Adelaide and Adelaide'
Critesion murinum ssp. *leporinum**	Wall Barley-grass	GRAMINEAE				y		5 collections 1861 & 1956-1981 from 'North Adelaide, East Parklands, North bank River Torrens near Hackney Bridge'
Critesion murinum ssp.* *(glaucum or leporium)*	Barley-Grass	GRAMINEAE						Park 16 (Crompton 1997)
*Cucumis myriocarpus**	Paddy Melon	CUCURBITACEAE				y		1 collection 1907 from 'East Adelaide on banks River Torrens'
Cymbopogon ambiguus	Lemon-Grass	GRAMINEAE			V	y	y	Park 23
Cymbopogon obtectus	Silky-head Lemon-grass	GRAMINEAE			R	y		1 collection 1903 from 'mill above Torrens Weir'
Cynodon dactylon var. *dactylon**	Couch	GRAMINEAE				y		Park 16 (Crompton 1997)

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
*Cyperus congestus**	Dense Flat-sedge	CYPERACEAE				y		Park 16 (Crompton 1997)
*Cyperus eragrostis**	Drain Flat-sedge	CYPERACEAE				y		1 collection 1975 'found on piles of soil Botanic Park'
Cyperus gymnocaulos	Spiny Flat-sedge	CYPERACEAE				y		Park 17 & 19 (Crompton 1998); WTC (Bagust 2002); South Parklands (Sando 2001)
*Cyperus involucratus**		CYPERACEAE				y		2 collections 1969 & 1987 from 'Torrens Lake and West Parklands'
Cyperus rotundus ssp. *rotundus**	Nut-grass	CYPERACEAE				y		10 collections 1912-1991 from 'University of Adelaide, Adelaide Railyard, banks of Lake, Torrens River'
Cyperus sp.	Sedge	CYPERACEAE					y	Park 15, 20, 27
Cyperus vaginatus	Stiff Flat-sedge	CYPERACEAE				y		4 collections 1922, 1947, 1970 & 1993 from 'Torrens Lake and Torrens River'
*Dactylis glomerata**	Cocksfoot	GRAMINEAE				y		1 collection 1967 from South Parklands
Danthonia auriculata	Lobed Wallaby-grass	GRAMINEAE			N			Park 16 & 17 (Crompton 1997 & 1998); South Parklands (Sando 2001)
Danthonia caespitosa	Common Wallaby-grass	GRAMINEAE				y		Park 16, 17, 18, 21 & 21W (Crompton 1997 & 1998); Park 7 & 8 and Park 6 Bush for Life Site (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001)
Danthonia carphoides var. *carphoides*	Short Wallaby-grass	GRAMINEAE		R	V			Park 17 (Crompton 1998); South Parklands (2001)
Danthonia eriantha	Hill Wallaby-grass	GRAMINEAE			K			South Parklands (Sando 2001)
Danthonia linkii var. *fulva*	Leaf Wallaby-grass	GRAMINEAE			R			Park 17 (Crompton 1998); South Parklands (Sando 2001)
Danthonia pilosa var. *pilosa*	Velvet Wallaby-grass	GRAMINEAE				y		1 collection 1902 from 'Adelaide'
Danthonia racemosa var. *racemosa*	Slender Wallaby-grass	GRAMINEAE						Park 16, 17, 20, 21 & 21W (Crompton 1997 & 1998); Park 7 & 8 (Paton 2003); South Parklands (Sando 2001)
Danthonia setacea var. *setacea*	Small-flower Wallaby-grass	GRAMINEAE				y		Park 16 (Crompton 1997 & 1998); Park 6 (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001)
Danthonia sp.		GRAMINEAE					y	Botanic Park & Park 6 (Paton 2003); Park 6, 7, 16, 17, 20, 21, 21W
Daviesia ulicifolia ssp. *incarnata*		LEGUMINOSAE				y		1 collection 1975 from 'Adelaide'
Delonix sp.*	Poinciana	LEGUMINOSAE					y	Park 21, 22
Dianella revoluta var. *revoluta*	Black-anther Flax-lily	LILIACEAE				y	y	WTC (Bagust 2002); Park 16, 17, 20, 23
Dichelachne micrantha	Short-hair Plume-grass	GRAMINEAE			Q	y		1 collection 1883 from 'Adelaide Plains'
Dichondra repens	Kidney Weed	CONVOLVULACEAE					y	Park 16, 19 & 21 (Crompton 1997 & 1998); Park 6, 7 & 8 (Paton 2003); South Parklands (Sando 2001): Park 7, 17, 21W, 22
Digitaria sanguinalis	Crab Grass	GRAMINEAE				y		1 collection 1950 from 'Adelaide'
*Digitaria violascens**		GRAMINEAE				y		1 collection 1969 from 'Adelaide'
*Dillwynia uncinata**	Silky Parrot-Pea	LEGUMINOSAE				y		not in SL region, collected from bank of River Torrens, 1970

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
Diplotaxis muralis var. *muralis**		CRUCIFERAE				y		6 collections 1876 & 1880, 1946-1959 from 'University Adelaide grounds'
*Dipogon lignosus**	Lavatory Creeper	LEGUMINOSAE				y		1 collection 1861 from 'North Adelaide'
*Dittrichia graveolens**	Stinkweed	COMPOSITAE				y		2 collections 1880 & 1924 from 'North Adelaide'
Dodoneae viscosa ssp.	Sticky Hop-bush	SAPINDACEAE					y	Park 5, 16, 17, 24
*Echinochloa crus-galli**	Common Barnyard Grass	GRAMINEAE				y		1 collection 1939 from 'Broougham Place North Adelaide'
*Echinochloa esculenta**	Japanese Millet	GRAMINEAE				y		1 collection 1982 from 'River Torrens in Parklands'
*Echium plantagineum**	Salvation Jane	BORAGINACEAE				y		Park 16 (Crompton 1997)
*Ehrharta calycina**	Perennial Veldt Grass	GRAMINEAE				y		2 collections 1955 & 1995 from 'Adelaide and garden at Adelaide'
*Ehrharta longiflora**	Annual Veldt Grass	GRAMINEAE				y		Park 16 (Crompton 1997)
Ehrharta villosa var. *maxima**	Pyp Grass	GRAMINEAE				y		1 collection 1913 from 'North Adelaide'
Einadia nutans ssp. *nutans*	Climbing Saltbush	CHENOPODIACEAE				y	y	Botanic Park (Paton 2003); Park 17
Elymus scaber var. *scaber*	Native Wheat-grass	GRAMINEAE					y	Park 16 (Crompton 1997 & 1998); Park 6 Bush for Life Site (Paton 2003); South Parklands (Sando 2001); Park 7, 16, 20
*Elytrigia repens**		GRAMINEAE				y		2 collections 1933 & 1967 from 'Adelaide'
Enchylaena tomentosa var. *tomentosa*	Ruby Saltbush	CHENOPODIACEAE					y	Park 21W (Crompton 1998); Park 6 (1 plant), 7 & 8, Botanic Park (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 6, 17, 23
Enneapogon nigricans	Black-head Grass	GRAMINEAE						South Parklands (Sando 2001)
Enteropogon acicularis	Umbrella Grass	GRAMINEAE				y		Extinct WTC 2002 (Bagust 2002); 1 collection 1967 from 'South Parklands'
Enteropogon ramosus		GRAMINEAE						Park 21W & 22 many plants (Subagio & Jury 2003)
Epilobium billardierianum ssp. *billardierianum*	Robust Willow-herb	ONAGRACEAE						Park 20 (Crompton 1998); South Parklands (Sando 2001)
*Epilobium ciliatum**	Glandular Willow-herb	ONAGRACEAE				y		1 collection 1993 from 'River Torrens South bank'
Epilobium hirtigerum	Hairy Willow-herb	ONAGRACEAE						South Parklands (Sando 2001); Park 16 (Subagio & Jury 2003)
*Eragrostis tef**		GRAMINEAE				y		collected by Department of Agriculture, no date
Eremophila maculata ssp.*		MYOPORACEAE					y	Park 8, 26, 27
*Erigeron karvinskianus**	Bony-tip Fleabone	COMPOSITAE				y		1 collection 1967 from 'North Adelaide on side Monefiore Hill during re-construction work'
Erythrina sp.*		LEGUMINOSAE					y	Park 19, 21
Eucalyptus camaldulensis var. *camaldulensis*	River Red Gum	MYRTACEAE				y	y	Park 16, 17, 20 & 22 (Crompton 1997 & 1998); WTC (Bagust 2002); South Parklands (Sando 2001); Park 6, 7, 8, 9, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25, 26, 27
*Eucalyptus citriodora**	Lemon-scented Gum	MYRTACEAE					y	Park 1, 6, 9, 10, 13, 15, 17, 19, 20, 21, 22, 25, 26, 27
*Eucalyptus cladocalyx**	Sugar Gum	MYRTACEAE					y	Park 16, planted (Crompton 1997); Park 1, 2, 5, 6, 8, 9, 10, 13,

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Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
								15, 16, 17, 18, 19, 20, 21, 21W, 22, 23, 25, 27
*Eucalyptus cornuta**	Yate	MYRTACEAE					y	Park 1
*Eucalyptus coronata**	Crowned Mallee	MYRTACEAE					y	Park 1
*Eucalyptus erythrocorys**	Red Cap Mallee	MYRTACEAE					y	Park 14, 15, 19, 20
*Eucalyptus ficifolia**	Red-flowering Gum	MYRTACEAE					y	Park 1, 17
*Eucalyptus forrestiana**	Fuchsia Gum	MYRTACEAE					y	Park 6, 15, 23, 25
Eucalyptus incrassata	Ridge-fruited Mallee	MYRTACEAE			U	y		1 collection 1958 from 'Botanic Gardens'
Eucalyptus landsdowneana ssp.*	Red-flowered Mallee Box	MYRTACEAE					y	Park 20
*Eucalyptus leucoxylon rosea**	Red-flowering Blue Gum	MYRTACEAE					y	Park 1, 2, 3, 4, 10, 16, 17, 19, 21W, 27
Eucalyptus leucoxylon ssp.		MYRTACEAE					y	Park 4, 5, 9, 16, 18, 19, 21, 21W, 22, 23, 24, 25, 27
Eucalyptus leucoxylon ssp. *pruinosa*	Inland South Australian Blue Gum	MYRTACEAE				y		1 collection 1982 from 'Golf Club North Adelaide'
Eucalyptus leucoxylon ssp. *leucoxylon*	South Australian Blue Gum	MYRTACEAE						Park 16, 17 & 21 (Crompton 1997 & 1998); South Parklands (Sando 2001)
*Eucalyptus maculata**	Eyebane	MYRTACEAE					y	Park 15, 17, 22, 27
*Eucalyptus megacornuta**	Warted Yale	MYRTACEAE					y	Park 6
Eucalyptus microcarpa	Grey Box	MYRTACEAE			U	y	y	Park 5, 21, 24
Eucalyptus odorata	Peppermint Box	MYRTACEAE					y	Park 4, 19
*Eucalyptus platypus**	Moort	MYRTACEAE					y	Park 2, 3, 19
Eucalyptus porosa	Mallee Box	MYRTACEAE			U		y	WTC (Bagust 2002); Park 23, 24
*Eucalyptus preissiana**	Bell-Fruited Mallee	MYRTACEAE					y	Park 1, 4, 6, 10, 19, 21W, 25
*Eucalyptus salmonophloia**	Salmon Gum	MYRTACEAE					y	Park 1, 2, 23
*Eucalyptus salubris**	Gimlet	MYRTACEAE					y	Park 27
Eucalyptus sideroxylon ssp.*sideroxylon**	Red-flowering Ironbark	MYRTACEAE					y	Park 1, 10, 16, 17, 19, 20, 21, 21W, 25, 26, 27
Eucalyptus socialis	Beaked Red Mallee	MYRTACEAE			U		y	Park 24
Eucalyptus sp.		MYRTACEAE					y	Park 4, 17, 23, 27
*Eucalyptus spathulata**	Swamp Mallett	MYRTACEAE					y	Park 10, 23
*Eucalyptus stoatei**	Stoat Gum	MYRTACEAE					y	Park 6, 23, 25
*Eucalyptus torquata**	Coral Gum	MYRTACEAE					y	Park 1, 3, 4, 6, 17, 19, 25
Eucalyptus viminalis ssp. *viminalis*	Manna Gum	MYRTACEAE		R		y		1 collection 1912 from 'Adelaide'
Euchiton sphaericus	Annual Cudweed	COMPOSITAE				y		1 collection 1928 from 'Torrens Lake'
Euphorbia drummondii	Caustic Weed	EUPHORBIACEAE				y	y	Park 16 (Crompton 1997 & 1998); Botanic Park & Park 6 & 6 Bush for Life Site (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 23

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*Euphorbia helioscopia**	Sun Spurge	EUPHORBIACEAE				y		2 collections 1968 & 1985 from ' Botanic Park and banks River Torrens opposite Botanic Park'
*Euphorbia peplus**	Petty Spurge	EUPHORBIACEAE				y		10 collections 1929-1981 from 'North Adelaide, East Parklands, Botanic Garden, ACC Nursery'
*Euphorbia terracina**	False Caper	EUPHORBIACEAE				y		4 collections 1944-1954 from ' Adelaide University and North Adelaide Golf Course'
Eutaxia microphylla	Common Eutaxia	LEGUMINOSAE				y	y	Park 16
Exocarpos sparteus	Slender Cherry	SANTALACEAE			R	y		1 collection 1970 from 'bank River Torrens'
Felicia sp.*	Red Rose	ROSACEAE					y	Park 14, 26
*Ficus carica**	Edible Fig	MORACEAE				y		1 collection no date from 'Adelaide'
*Ficus macrophylla**	Moreton Bay Fig	MORACEAE					y	Park 1, 2, 8, 9, 10, 13, 20, 21, 23, 25, 26
*Fraxinus excelsior**	English Ash	OLEACEAE					y	Park 17, 19, 21, 27
*Fraxinus raywoodii**	Claret Ash	OLEACEAE					y	Park 17
Fraxinus rotundifolia ssp. *rotundifolia**	Desert Ash	OLEACEAE				y		1 collection 1931 from 'Tynte Street North Adelaide'
Fraxinus sp.*	Ash Tree	OLEACEAE					y	Park 16 (Crompton 1997); Park 1, 10, 13, 17, 18, 20, 24, 25, 26
Galenia pubescens var. *pubescens**	Coastal Galenia	AIZOACEAE						Park 16 (Crompton 1997)
*Galinsoga parviflora**	Yellow Weed	COMPOSITAE				y		1 collection 1968 from 'Rundle Street'
*Gamochaeta americana**	Spiked Cudweed	COMPOSITAE				y		1 collection 1965 from 'East Parklands'
*Gamochaeta purpurea**		COMPOSITAE				y		1 collection no date from 'Light Square Adelaide'
*Genista monspessulana**	Montpellier Broom	LEGUMINOSAE				y		3 collections 1861, 1961 & 1982 from 'North Adelaide and Botanic Gardens'
Geranium molle var. *molle**		GERANIACEAE				y		1 collection 1956 from ' Parklands between Botanic Gardens and Rundle Street'
*Gomphocarpus cancellatus**	Broad-leaved Cotton-bush	ASCLEPIADACEAE				y		1 collection 1917 from 'Adelaide'
Goodenia amplexans	Clasping Goodenia	GOODENIACEAE			U		y	Park 17
Goodenia pinnatifida	Cut-Leaf Goodenia	GOODENIACEAE			U			Extinct WTC 2002 (Bagust 2002)
Grevillea banksii var. *forsteri**		PROTEACEAE					y	Park 26, 27
*Grevillea robusta**		PROTEACEAE					y	Park 6, 13, 14, 19, 26, 27
*Grevillea rosmarinifolia**	Rosemary Grevillea	PROTEACEAE					y	Park 26
*Gynandriris setifolia**	Thread Iris	IRIDACEAE				y		5 collections 1925-1942 from ' Montefiore Hill North Parklands'
*Hakea laurina**	Pincushion Hakea	PROTEACEAE					y	Park 5, 21
Hakea leucoptera ssp. *leucoptera**	Silver Needlewood	PROTEACEAE					y	Park 3
Hakea sp.		PROTEACEAE					y	Park 1, 3, 5
Halgania cyanea	Rough Blue-flower	BORAGINACEAE				y		1 collection 1953 from 'near Adelaide'
Hardenbergia violacea	Native Lilac	LEGUMINOSAE				y	y	WTC (Bagust 2002); Park 23, 24

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Hedera helix ssp. *helix**	Ivy	ARALIACEAE					y	Park 23
*Hedypnois rhagadioloides**	Cretan Weed	COMPOSITAE				y		2 collections 1960 from 'South East corner Parklands'
*Heliotropium supinum**	Creeping Heliotrope	BORAGINACEAE				y		1 collection 1942 from 'Railway Station Yards Adelaide'
*Helminthotheca echioides**	Ox-tongue	COMPOSITAE				y		10 collections 1917-1962 from ' University Grounds, Exhibition Building'
*Hibbertia "glabriuscula"**		DILLENIACEAE				y		1 collection 1970 from 'bank River Torrens'
Hibbertia crinita		DILLENIACEAE			N	y		1 collection 1966 from 'Botanic Gardens'
Hibbertia pallidiflora	Guinea-flower	DILLENIACEAE				y		
Hibiscus sp.*		MALVACEAE					y	Park 21
Hibiscus trionum var. *trionum*	Bladder Ketmia	MALVACEAE				y		1 collection 1994 from 'bank of River Torrens'
*Holcus lanatus**	Yorkshire Fog	GRAMINEAE				y		2 collections 1907 & 1948 from ' bank of Torrens Lake'
*Homeria flaccida**	One-leaf Cape Tulip	IRIDACEAE				y		2 collections 1946 & 1948 from 'Adelaide'
*Homeria miniata**	Two-leaf Cape Tulip	IRIDACEAE				y		6 collections 1943, 1950, 1967-88 from 'North Adelaide, Botanic Park, East Parklands, South Parklands'
Hymenanthera dentata	Tree Violet	VIOLACEAE			R	y		1 collection 1897 from 'Adelaide district'
*Hyparrhenia hirta**	Tambookie Grass	GRAMINEAE				y		1 collection 1955 from 'Adelaide'
*Hypochaeris glabra**	Smooth Cat's Ear	COMPOSITAE				y		3 collections 1939 & 1943 from 'North Adelaide'
*Hypochaeris radicata**	Rough Cat's Ear	COMPOSITAE				y		8 collections 1924-1962 from 'East Parklands, North Parklands, North Adelaide and Botanic Park'
Hypoxis glabella var. *glabella*	Tiny Star	HYPOXIDACEAE				y		Park 17 & 19 (Crompton 1998); WTC (Bagust 2002); South Parklands (Sando 2001)
Hypoxis vaginata var. *vaginata*	Yellow Star	HYPOXIDACEAE			N			Extinct WTC 2002 (Bagust 2002)
Isolepis inundata	Swamp Club-rush	CYPERACEAE				y		1 collection 1924 from 'Torrens Lake'
Isolepis platycarpa	Flat-Fruit Club-rush	CYPERACEAE				y		1 collection 1989 from 'River Torrens'
Ixodia achillaeoides ssp. *alata*	Hills Daisy	COMPOSITAE				y		1 collection 1967 from 'Montefiore Hill'
*Jacaranda mimosifolia**	Jacaranda	BIGNONIACEAE					y	Park 20
*Juncus articulatus**	Jointed Rush	JUNCACEAE				y		4 collections 1924 from 'Torrens Lake'
Juncus bufonius	Toad Rush	JUNCACEAE				y		Extinct WTC 2002 (Bagust 2002); 8 collections 1924-1966 from ' Torrens Lake and Montefiore Hill'
Juncus caespiticius	Grassy Rush	JUNCACEAE				y		5 collections 1924 & 1989 from 'Torrens Lake'
Juncus kraussii	Sea Rush	JUNCACEAE				y		Park 19 (Crompton 1998); South Parklands (Sando 2001)
Juncus pallidus	Pale Rush	JUNCACEAE				y		6 collections 1918-1920 from 'Torrens Lake'
Juncus pauciflorus	Loose-flower Rush	JUNCACEAE				y		Park 20 (Crompton 1998); South Parklands (Sando 2001)
Juncus sarophorus		JUNCACEAE			N	y		2 collections 1919 & 1920 from 'Torrens Lake'
Juncus sp.	Rush	JUNCACEAE					y	Park 13, 15, 20, 27
Juncus subsecundus	Finger Rush	JUNCACEAE				y		2 collections 1918 & 1919 from 'Torrens Lake'

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*Juncus usitatus**	Common Rush	JUNCACEAE				y		3 collections 1919, 1988 & 1994 from ' River Torrens opposite Zoo'
Kniphofia sp.*	Red-Hot Poker	ASPHODELACEAE					y	Park 26
*Lactuca saligna**	Willow-leaf Lettuce	COMPOSITAE				y		4 collections 1944 & 1946 from 'Adelaide University grounds'
*Lactuca serriola**	Prickly Lettuce	COMPOSITAE				y		5 collections 1945, 1962, 1963 & 1971 from 'North Adelaide, East Parklands, Royal Adelaide Hospital, Botanic Gardens'
*Lagunaria patersonii**	Norfolk Island Lagunaria	MALVACEAE					y	Park 18, 19 20, 21, 21W, 23, 25, 26, 27
Lagunaria sp.*	Pyramid Tree	MALVACEAE					y	Park 1, 2, 4, 6, 9, 10, 13, 15, 22
Lantana camara var. *camara**	Common Lantana	VERBENACEAE					y	Park 21, 26
*Lavandula dentata**	Lavender	LABIATAE					y	Park 27
*Lavatera cretica**	Cretan Hollyhock	MALVACEAE				y		1 collection 1997 from 'bank River Torrens alongside Hackney Bridge'
Lavatera plebeia	Australian Hollyhock	MALVACEAE						Extinct WTC 2002 (Bagust 2002)
Laxmannia orientalis	Dwarf Wire-lily	LILIACEAE				y		1 collection 1928 from 'Adelaide'
Lemna disperma	Common Duckweed	LEMNACEAE				y		1 collection 1910 from 'Adelaide High School'
*Lepidium africanum**	Common Peppercress	CRUCIFERAE				y		3 collections 1922, 1923 & 1943 from 'Botanic Park and North Parklands'
*Lepidium latifolium**	Perennial Peppercress	CRUCIFERAE				y		1 collection 1993 from ' below Torrens Weir'
Lepidium pseudotasmanicum	Shade Peppercress	CRUCIFERAE		V		y		collected along River Torrens near Zoological Gardens, 1997
*Leptospermum laevigatum**	Coast Tea-tree	MYRTACEAE					y	Park 1
Leptospermum lanigerum	Silky Tea-tree	MYRTACEAE			U		y	Park 26
Leptospermum sp.	Tea-tree	MYRTACEAE					y	Park 27
*Leucanthemum vulgare**	Ox-eye Daisy	COMPOSITAE				y		1 collection 1994 from 'River Torrens by Channel 7'
Livistona sp.*	Palm	ARECACEAE					y	Park 18, 21, 26, 27
*Lolium multiflorum **		GRAMINEAE				y		1 collection 1940 from 'North Parklands'
*Lolium perenne**	Perrenial Ryegrass	GRAMINEAE				y		1 collection 1981 from 'East Adelaide'
*Lolium rigidum**	Wimmera Ryegrass	GRAMINEAE				y		7 collections 1903, 1907, 1942, 1952 & 1954 from 'North Parklands, River Torrens, Adelaide'
Lomandra densiflora	Soft Tussock Mat-rush	LILIACEAE				y		1 collection 1967 from 'West Terrace Cemetery'
Lomandra micrantha ssp. *tuberculata*	Small-Flower Mat-rush	LILIACEAE				y		1 collection 1935 from 'near Adelaide'
Lomandra multiflora ssp. *dura*	Hard Mat-rush	LILIACEAE				y		1 collection 1910 from ' Adelaide Plains'
Lotus australis	Austral Trefoil	LEGUMINOSAE			U	y		Extinct WTC 2002 (Bagust 2002); South Parklands (Sando 2001)
*Lupinus cosentinii**	Blue Lupin	LEGUMINOSAE				y		1 collection 1951 from 'surroundings of Adelaide'
Lythrum hyssopifolia	Lesser Loosestrife	LYTHRACEAE				y		Park 19 & 21 (Crompton 1998); South Parklands (Sando 2001)

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Maireana brevifolia	Short-leaf Bluebush	CHENOPODIACEAE				y	y	Park 22 (Crompton 1998); Park 6 & Botanic Park (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 17, 23, 24
Maireana enchylaenoides	Wingless Fissure-plant	CHENOPODIACEAE			U	y	y	Park 16, 21 & 22 (Crompton 1997 & 1998); Park 6, 7, 8 & 6 Bush for Life Site (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 21, 21W, 22, 23
Malus sp.*	Kaffir Apple	ROSACEAE					y	Park 10
*Malva nicaeensis**	Mallow Of Nice	MALVACEAE				y		1 collection 1960 from 'South East corner Parklands'
*Medicago littoralis**	Strand Medic	LEGUMINOSAE				y		1 collection 1947 from 'Adelaide University'
*Medicago lupulina**	Black Medic	LEGUMINOSAE				y		2 collections 1941 & 1947 from 'Adelaide University'
*Medicago orbicularis**	Button Medic	LEGUMINOSAE				y		1 collection 1921 from 'North Parklands'
Medicago polymorpha var. *polymorpha**	Burr Medic	LEGUMINOSAE				y		18 collections 1861, 1946-1970 from 'North Adelaide, near Adelaide, East Adelaide, South East corner Parklands'
Medicago sativa ssp. *sativa**	Lucerne	LEGUMINOSAE				y		1 collection 1903 from 'Botanic Park'
*Medicago truncatula**	Barrel Medic	LEGUMINOSAE				y		14 collections 1912, 1921-1951 from 'North Parklands, Torrens Lake, Botanic Park'
*Melaleuca armillaris**	Bracelet Honey-myrtle	MYRTACEAE					y	Park 17, 18, 23, 24, 26
Melaleuca brevifolia	Short-leaf Honey-myrtle	MYRTACEAE			R	y		1 collection 1909 from 'River Torrens'
Melaleuca decussata	Totem-poles	MYRTACEAE					y	Park 5
Melaleuca lanceolata ssp. *lanceolata*	Dryland Tea-tree	MYRTACEAE			U	y	y	Park 1, 3, 5, 21, 23, 24, 25
*Melaleuca nesophila**		MYRTACEAE					y	Park 26
Melaleuca sp.		MYRTACEAE					y	Park 3, 21, 21W
Melia azedarach var. *australasica**	White Cedar	MELIACEAE					y	Park 1, 6, 10, 13, 14, 17, 21, 26
*Melilotus alba**	Bokhara Clover	LEGUMINOSAE				y		4 collections 1903-1920 from ' Torrens Lake and Torrens Weir'
*Melilotus indica**	King Island Melilot	LEGUMINOSAE				y		6 collections 1861, 1942-1982 from 'North Adelaide & Botanic Gardens'
Mesembryanthemum sp.*	Iceplant	AIZOACEAE					y	Park 14
*Modiola caroliniana**	Red-Flowered Mallow	MALVACEAE				y		2 collections 1939 & 1943 from 'Adelaide Hospital'
Muehlenbeckia gunnii	Coastal Climbing Lignum	POLYGONACEAE				y		1 collection 1949 from 'North Adelaide'
Myoporum insulare	Common Boobialla	MYOPORACEAE					y	Park 21, 24
Myoporum platycarpum ssp. *platycarpum*	False Sandalwood	MYOPORACEAE					y	Park 24
*Myoporum viscosum**	Sticky Boobialla	MYOPORACEAE					y	Park 15, 16
Myriophyllum sp.	Milfoil	HALORAGACEAE					y	Park 23
*Nerium oleander**	Oleander	APOCYNACEAE					y	Park 1, 23, 26, 27

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Neurachne alopecuroidea	Fox-Tail Mulga-grass	GRAMINEAE				y		2 collections 1903 & 1920 from 'Adelaide'
*Nothoscordum borbonicum**	Fragrant Onion	LILIACEAE						Park 16 (Crompton 1997)
Olea europaea ssp. *europaea**	Olive	OLEACEAE				y	y	Park 1, 6, 7, 8, 13, 15, 16, 19, 20, 21, 21W, 23 26, 27
Olearia axillaris	Coast Daisy-bush	COMPOSITAE					y	Park 16
Olearia ramulosa	Twiggy Daisy-bush	COMPOSITAE					y	Park 23, 24
*Onopordum acaulon**	Horse Thistle	COMPOSITAE				y		1 collection 1909 from 'North Adelaide'
Opercularia varia	Variable Stinkweed	RUBIACEAE				y		1 collection 1908 from 'near Adelaide'
*Oxalis articulata**	Bent Wood-sorrel	OXALIDACEAE				y		1 collection 1975 from 'South East Adelaide'
*Oxalis compressa**		OXALIDACEAE				y		1 collection 1975 from 'Botanic Gardens'
Oxalis perennans	Native Sorrel	OXALIDACEAE				y	y	Park 16 & 21 (Crompton 1997 & 1998); Park 6, 7, 8 & Park 6 Bush for Life Site (Paton 2003); WTC (Bagust 2002); South Parklands (Sando 2001); Park 6, 16, 20, 21W, 22, 23
*Oxalis pes-caprae**	Soursob	OXALIDACEAE						Park 16 (Crompton 1997)
Ozothamnus ferrugineus	Tree Everlasting	COMPOSITAE				y		1 collection no date from 'Adelaide'
Panicum capillare var. *brevifolium**	Witch-grass	GRAMINEAE				y		1 collection 1982 from 'River Torrens in Parklands'
Panicum effusum var. *effusum*	Hairy Panic	GRAMINEAE			K		y	WTC (Bagust 2002); Park 23
*Parietaria judaica**	Wall Pellitory	URTICACEAE				y		1 collection 1990 from 'Roper St Adelaide'
*Paspalum dilatatum**	Paspalum	GRAMINEAE				y		Park 16 (Crompton 1997)
*Paspalum distichum**	Water Couch	GRAMINEAE				y		3 collections 1908, 1929 & 1948 from 'North Adelaide'
*Paspalum vaginatum**	Salt-Water Couch	GRAMINEAE				y		1 collection 1968 from 'Adelaide'
*Pennisetum clandestinum**	Kikuyu	GRAMINEAE					y	Park 16 (Crompton 1997); Park 8
*Pennisetum villosum**	Feather-top	GRAMINEAE				y		5 collections 1906, 1934, 1941 & 1948 from 'Adelaide, East and West Parklands'
*Pentaschistis airoides**	False Hair-grass	GRAMINEAE				y		1 collection 1948 from 'Tavistock St Adelaide'
*Pentaschistis pallida**	Pussy Tail	GRAMINEAE				y		2 collections 1944 from 'Adelaide High School'
Persicaria decipiens	Slender Knotweed	POLYGONACEAE					y	Park 26, 27
Persicaria lapathifolia	Pale Knotweed	POLYGONACEAE			T	y		1 collection 1993 from 'River Torrens opposite Zoo'
*Phalaris aquatica**	Phalaris	GRAMINEAE				y		1 collection 1954 from 'Adelaide Plains'
*Phalaris canariensis**	Canary-grass	GRAMINEAE				y		1 collection 1909 from 'Torrens Lake'
*Phalaris minor**	Lesser Canary-grass	GRAMINEAE				y		10 collections 1966-1970 from 'University of Adelaide & North Parklands'
Phragmites australis	Common Reed	GRAMINEAE				y	y	Park 16 (Crompton 1997 & 1998); South Parklands (Sando 2001); Park 1, 23, 26
*Phyla canescens**	Lippia	VERBENACEAE				y		4 collections 1927, 1960, 1964 & 1968 from 'Torrens Lake, East Parklands, South East corner Parklands near watercourse'
*Pinus canariensis**	Canary Island Pine	PINACEAE						Park 16 (Crompton 1997)

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
*Pinus halepensis**	Aleppo Pine	PINACEAE					y	Park 16 (Crompton 1997); Park 1, 2, 4, 6, 8, 9, 13, 14, 15, 17, 19, 20, 21, 21W, 22, 25
*Pinus radiata**	Radiata Pine	PINACEAE					y	Park 1, 6, 8, 10, 15, 17, 19, 21, 21W, 22, 23, 25, 26, 27
Pinus sp.*		PINACEAE					y	Park 3, 21
*Piptatherum miliaceum**	Rice Millet	GRAMINEAE				y		Park 16 (Crompton 1997)
Pittosporum angustifolium	Native Apricot	PITTOSPORACEAE			R		y	WTC (Bagust 2002); Park 5, 19, 23, 27
Pittosporum sp.		PITTOSPORACEAE					y	Park 27
*Pittosporum undulatum**	Sweet Pittosporum	PITTOSPORACEAE				y	y	Park 1, 14, 22, 26, 27
Plantago lanceolata var. *lanceolata**	Ribwort	PLANTAGINACEAE						Park 16 (Crompton 1997)
*Poa annua**	Winter Grass	GRAMINEAE				y		Park 16 (Crompton 1997)
*Poa bulbosa**	Bulbous Meadow-grass	GRAMINEAE				y		7 collections 1909-1937 from 'East, West, South Parklands and River Torrens'
*Poa pratensis**	Kentucky Blue-grass	GRAMINEAE				y		4 collections 1921-1941 from 'North Adelaide'
Poinsettia sp.*		EUPHORBIACEAE					y	Park 26
*Polycarpon tetraphyllum**	Four-leaf Allseed	CARYOPHYLLACEAE				y		3 collections 1939-1950 from 'Brougham Place North Adelaide'
*Polypogon monspeliensis**	Annual Beard-grass	GRAMINEAE				y		4 collections 1907-1932 from 'River Torrens below Weir'
*Polypogon viridis**	Water Bent	GRAMINEAE				y		3 collections 1924, 1948 & 1967 fron 'Montefiore Hill during re-construction work, bank of River Torrens'
Populus alba var.*	White Poplar	SALICACEAE					y	Park 27
*Populus alba**	White Poplar	SALICACEAE					y	Park 14, 16, 17, 18
*Populus nigra italica**	Lombardy Poplar	SALICACEAE					y	Park 1, 14, 17, 18, 21, 27
*Populus nigra**	Black Poplar	SALICACEAE					y	Park 16, 17, 21, 27
Populus sp.*	Poplar	SALICACEAE					y	Park 1, 6, 13, 15, 19, 20, 25
Potamogeton crispus	Curly Pondweed	POTAMOGETONACEAE				y		3 collections 1931, 1961 & 1971 from 'River Torrens near Adelaide'
Potamogeton ochreatus	Blunt Pondweed	POTAMOGETONACEAE		R	T	y		1 collection 1921 from 'River Torrens below Weir'
*Potamogeton pectinatus**	Fennel Pondweed	POTAMOGETONACEAE				y		2 collections 1961 from 'River Torrens near City Bridge'
*Prunus cerasifera**	Ornamental Cherry	ROSACEAE					y	Park 26, 27
Prunus sp.*	Cherry Tree	ROSACEAE					y	Park 18, 21
*Pseudognaphalium luteoalbum**	Jersey Cudweed	COMPOSITAE				y		3 collections 1922, 1924 & 1931 from 'Adelaide University, North Parklands and Torrens Lake'; Park 17 by creek (Jury 2003)
Pteris tremula	Tender Brake	PTERIDACEAE		R	V	y		1 collection 1970 from 'bank of River Torrens'
Ptilotus spathulatus form spathulatus	Pussy-tails	AMARANTHACEAE			R			Extinct WTC (Bagust 2002)
Puccinellia stricta var. *stricta*	Australian Saltmarsh-	GRAMINEAE						Extinct WTC (Bagust 2002)

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
	grass							
Pultenaea largiflorens	Twiggy Bush-pea	LEGUMINOSAE				y		1 collection 1975 from 'Adelaide'
*Quercus robur**	English Oak	FAGACEAE					y	Park 14, 22
Quercus sp.*	Oak	FAGACEAE					y	Park 1, 17, 21, 27
*Ranunculus muricatus**	Picklefruit Buttercup	RANUNCULACEAE				y		2 collections 1892 & 1956 from 'SA Museum, Parklands between Botanic Gardens and Rundle Street'
*Reichardia tingitana**	False Sowthistle	COMPOSITAE				y		1 collection 1962 from 'North Terrace Park opposite Botanic Gardens'
*Ricinus communis**	Castor Oil-plant	EUPHORBIACEAE				y		2 collections 1908 & 1939 from 'North Terrace and near River Torrens'
*Romulea minutiflora**	Small-Flower Onion-grass	IRIDACEAE				y		6 collections 1912, 1945-1942 from 'North Parklands'
Romulea rosea var. *australis**	Common Onion-grass	IRIDACEAE				y		Park 16 (Crompton 1997)
*Rorippa palustris**	Yellow Marsh-cress	CRUCIFERAE				y		1 collection 1993 from 'South bank of River Torrens below Zoo'
*Rosa rubiginosa**	Sweet Briar	ROSACEAE				y	y	Park 23
*Rostraria cristata**	Annual Cat's-tail	GRAMINEAE				y		5 collections 1905, 1916, 1918 & 1948 from 'East and North Parklands'
*Rubus anglocandicans**		ROSACEAE				y		3 collections 1907, 1935 & 1946 from Torrens Weir and banks River Torrens'
*Rumex conglomeratus**	Clustered Dock	POLYGONACEAE				y		2 collections 1932 & 1970 from '1 km North Adelaide and banks River Torrens'
*Rumex crispus**	Curled Dock	POLYGONACEAE				y		1 collection 1972 from East Parklands
*Rumex obtusifolius**	Broad-leaf Dock	POLYGONACEAE				y		2 collections 1972 from Rymill Park
Rumex pulcher ssp. *pulcher**	Fiddle Dock	POLYGONACEAE				y		1 collection 1972 from East Parklands
Sagina apetala ssp. *apetala**	Annual Pearlwort	CARYOPHYLLACEAE				y		3 collections 1879, 1926 & 1949 from 'Adelaide'
*Sagina procumbens**	Spreading Pearlwort	CARYOPHYLLACEAE				y		1 collection 1935 from 'Adelaide Bowling Green'
*Salix babylonica**	Weeping Willow	SALICACEAE					y	Park 14, 21, 27
Salsola kali	Buckbush	CHENOPODIACEAE				y	y	Park 6 (Paton 2003); Park 6, 23
Salvia verbenaca var.*verbenaca**	Wild Sage	LABIATAE				y		Park 16 (Crompton 1997)
Santalum acuminatum	Quandong	SANTALACEAE			V		y	WTC (Bagust 2002); Park 23
*Scabiosa atropurpurea**	Pincushion	DIPSACACEAE						Park 16 (Crompton 1997)
*Schinus areira**	Pepper-tree	ANACARDIACEAE				y	y	Park 16 (Crompton 1997); Park 1, 3, 4, 6, 10, 13, 14, 15, 16, 17, 18, 19, 20, 21, 21W, 22, 23, 25, 26
Schoenoplectus litoralis	Shore Club-rush	CYPERACEAE			U	y		1 collection 1884 from 'River Torrens at Adelaide'
Schoenoplectus pungens	Spiky Club-rush	CYPERACEAE			N	y		7 collections 1897, 1907-1989 from 'Torrens Lake, Torrens Weir and River Torrens Adelaide'
Schoenoplectus validus	River Club-rush	CYPERACEAE			N	y		2 collections 1932 & 1982 from '0.5 km upstream from Southwark Brewery and River Torrens below Weir'

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
Schoenus apogon	Common Bog-rush	CYPERACEAE				y		2 collections 1961 & 1964 from 'Botanic Gardens'
Sclerolaena diacantha	Grey Bindyi	CHENOPODIACEAE			R	y		1 collection 1968 from 'bank River Torrens Botanic Park'
*Selaginella kraussiana**	Garden Selaginella	SELAGINELLACEAE				y		1 collection 1953 from 'Adelaide'
Senecio lautus	Variable Groundsel	COMPOSITAE				y		1 collection 1914 from 'Adelaide'
Senecio pterophorus var. *pterophorus**	African Daisy	COMPOSITAE				y	y	Park 14
Senecio quadridentatus	Cotton Groundsel	COMPOSITAE				y		WTC (Bagust 2002); South Parklands (Sando 2001)
Senecio sp.		COMPOSITAE					y	Park 27
*Senecio vulgaris**	Common Groundsel	COMPOSITAE				y		2 collections 1923 & 1950 from 'North Adelaide'
Senna artemisioides ssp. *filifolia*	Fine-leaf Desert Senna	LEGUMINOSAE					y	Park 3, 23, 24
Senna artemisioides ssp. *petiolaris*	Flat-Stalk Senna	LEGUMINOSAE				y		2 collections 1948 & 1953 from 'Adelaide'
Setaria pumila ssp. *pumila**	Pale Pigeon-grass	GRAMINEAE				y		1 collection 1917 'near Adelaide'
*Setaria verticillata**	Whorled Pigeon-grass	GRAMINEAE				y		7 collections 1904, 1921-1982 from 'Adelaide Railway Station, Botanic Gardens and Adelaide'
Silene gallica var. *gallica**	French Catchfly	CARYOPHYLLACEAE				y		1 collection 1861 from 'North Adelaide'
*Silene nocturna**	Mediterranean Catchfly	CARYOPHYLLACEAE				y		1 collection 1915 from 'Botanic Park'
*Silene vulgaris**	Bladder Campion	CARYOPHYLLACEAE				y		2 collections 1923 & 1924 from 'North Parklands
*Sisymbrium officinale**	Hedge Mustard	CRUCIFERAE				y		1 collection 1967 from 'South Parklands'
*Solanum aviculare**		SOLANACEAE				y		1 collection 1991 from 'Botanic Gardens'
*Solanum nigrum**	Black Nightshade	SOLANACEAE				y	y	Park 23
Solenogyne dominii	Smooth Solenogyne	COMPOSITAE			U	y		1 collection 1993 'Hundred of Adelaide'
*Solidago canadensis**	Golden Rod	COMPOSITAE				y		4 collections 1965 & 1988 from 'Port Road Bridge, bank River Torrens'
*Soliva pterosperma**	Jo-Jo	COMPOSITAE				y		1 collection 1981 from 'North Adelaide Golf Course'
*Sollya heterophylla**	Blue-bell Creeper	PITTOSPORACEAE				y		1 collection 1970 from 'bank of River Torrens'
Sonchus asper ssp. *asper**	Rough Sow-thistle	COMPOSITAE				y		1 collection 1968 from 'Botanic Park'
*Sonchus oleraceus**	Common Sow-thistle	COMPOSITAE				y		10 collections 1944-1968 from 'Botanic Gardens, Adelaide and East Parklands'
*Sorghum halepense**	Johnson Grass	GRAMINEAE				y		1 collection 1959 from 'North Adelaide Golf Links'
Spinifex sericeus	Rolling Spinifex	GRAMINEAE				y		2 collections 1898 & 1970 from 'near Adelaide and bank of River Torrens'
*Sporobolus africanus**	Rat-Tail Grass	GRAMINEAE						Park 16 (Crompton 1997)
Sporobolus virginicus	Salt Couch	GRAMINEAE				y		1 collection 1925 from 'River Torrens below Weir'
*Stenotaphrum secundatum**	Buffalo Grass	GRAMINEAE				y		4 collections 1935-1969 from 'North Parklands'
Swainsona behriana	Behr's Swainson-pea	LEGUMINOSAE		V	E	y		1 collection 1861 from 'North Adelaide'
*Tamarix aphylla**	Athel Pine	PINACEAE					y	Park 1, 6, 9, 10, 13, 21, 23, 26

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
*Taraxacum officinale**	Dandelion	COMPOSITAE				y		5 collections 1928-1949 from 'North Parklands, North Adelaide and Adelaide University'
Teucrium racemosum	Grey Germander	LABIATAE			T		y	Park 19 & 21W (Crompton 1998); South Parklands (Sando 2001); Park 17
Themeda triandra	Kangaroo Grass	GRAMINEAE				y		3 collections 1955 & 1965 from 'Adelaide and Adelaide Plains'
Thysanotus patersonii	Twining Fringe-lily	LILIACEAE				y		1 collection 1961 from 'Adelaide'
*Trifolium angustifolium**	Narrow-leaf Clover	LEGUMINOSAE				y		1 collection 1913 from 'Adelaide'
Trifolium arvense var. *arvense**	Hare's-foot Clover	LEGUMINOSAE				y		Park 16 (Crompton 1997)
*Trifolium campestre**	Hop Clover	LEGUMINOSAE				y		3 collections 1916, 1948 & 1956 from 'East Parklands and Adelaide'
*Trifolium dubium**	Suckling Clover	LEGUMINOSAE				y		2 collections 1922 & 1943 from 'North Adelaide'
Trifolium fragiferum var. *fragiferum**	Strawberry Clover	LEGUMINOSAE				y		3 collections 1925, 1929 & 1947 from 'River Torrens below Weir, North Parklands and River Torrens'
*Trifolium glomeratum**	Cluster Clover	LEGUMINOSAE				y		1 collection 1916 from 'Adelaide'
*Trifolium repens**	White Clover	LEGUMINOSAE				y		2 collections 1916 & 1953 from 'Adelaide and North Adelaide'
Trifolium resupinatum var. *resupinatum**	Shaftal Clover	LEGUMINOSAE				y		6 collections 1931-1949 from 'North Terrace, Adelaide University, near Zoo'
*Trifolium scabrum**	Rough Clover	LEGUMINOSAE				y		10 collections 1910-1946 from 'North Adelaide'
*Trifolium striatum**	Knotted Clover	LEGUMINOSAE				y		2 collections 1949 from 'near Zoo'
*Trifolium subterraneum**	Subterranean Clover	LEGUMINOSAE				y		2 collections 1960 & 1961 from 'Botanic Gardens'
*Trifolium tomentosum**	Woolly Clover	LEGUMINOSAE				y		9 collections 1916-1988 from 'North Terrace, Botanic Gardens and near Zoo'
Tristania sp.*		MYRTACEAE					y	Park 21
Typha domingensis	Narrow-leaf Bulrush	TYPHACEAE				y	y	Park 1, 13, 15, 20, 21, 23, 26, 27
Typha sp.		TYPHACEAE						Park 20 (Crompton 1998)
*Ulex europaeus**	Gorse	LEGUMINOSAE				y		2 collections 1906 from 'Adelaide and Adelaide Golf Links'
*Ulmus procera**	Common Elm	ULMACEAE					y	Park 16 (Crompton 1997); 1, 13, 14, 26
*Urospermum picroides**	False Hawkbit	COMPOSITAE				y		1 collection no date from 'Torrens Lake'
*Veronica arvensis**	Wall Speedwell	SCROPHULARIACEAE				y		4 collections 1921, 1923, 1948 from 'Botanic Gardens, Hindmarsh Square and North Adelaide'
Veronica sp.*	Speedwell	SCROPHULARIACEAE					y	Park 21, 26
Vicia sativa ssp. *cordata**		LEGUMINOSAE				y		2 collections 1934 & 1945 from 'Brougham Place North Adelaide, and Adelaide'
Vicia sativa ssp. *nigra**	Narrow-leaf Vetch	LEGUMINOSAE				y		3 collections 1946 from 'Adelaide'
Vicia sativa ssp. *sativa**	Common Vetch	LEGUMINOSAE				y		5 collections 1950-1960 from 'Adelaide, East Parklands and Parklands between Botanic Gardens and Rundle Street'
*Vinca major**	Blue Periwinkle	APOCYNACEAE				y		1 collection 1906 from 'Adelaide'

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**Herb**	**Survey**	**Additional References / Comments**
*Viola odorata**	Common Violet	VIOLACEAE				y		1 collection 1861 from 'North Adelaide'
Vittadinia australasica var. *australasica*	Sticky New Holland Daisy	COMPOSITAE			R			Extinct WTC 2002 (Bagust 2002)
Vittadinia blackii	Narrow-leaf New Holland Daisy	COMPOSITAE			R	y		1 collection 1917 from 'near Adelaide'
Vittadinia dissecta	Dissected New Holland Daisy	COMPOSITAE						Park 6 - 6 plants (Paton 2003)
Vittadinia gracilis	Woolly New Holland Daisy	COMPOSITAE				y	y	Park 22 (Crompton 1998); Park 6 (Paton 2003): WTC (Bagust 2002); South Parklands (Sando 2001); Park 24
Vittadinia sp.	New Holland Daisy	COMPOSITAE					y	Park 6, 24
*Vulpia muralis**	Wall Fescue	GRAMINEAE				y		1 collection 1910 from 'Alfred Street'
*Vulpia myuros f. megalura**	Fox-tail Fescue	GRAMINEAE				y		1 collection 1932 from 'North Parklands'
*Vulpia myuros f. myuros**	Rat's-tail Fescue	GRAMINEAE				y		2 collections 1916 & 1942 from 'North Parklands'
*Westringia dampieri**		LABIATAE					y	Park 8, 21, 27
Wurmbea dioica ssp. *dioica*	Early Star-lily	LILIACEAE				y		South Parklands (Sando 2001)
*Xanthium spinosum**	Bathurst Burr	COMPOSITAE				y		3 collections 1914, 1947 & 1981 from 'North Adelaide'
Xanthorrhoea semiplana ssp. *semiplana*	Yacca	LILIACEAE					y	Park 16, 17
*Zantedeschia aethiopica**	White Arum Lily	ARACEAE					y	Park 14, 26

APPENDIX II

OPPORTUNISTIC VEGETATION SITES IN THE ADELAIDE PARK LANDS

Refer to Figures 24, 39 and 45 for locality.

Opportune Site	Date	Species	Common Name
8066	20/11/1991	*Danthonia caespitosa*	Common Wallaby-grass
8066	20/11/1991	*Danthonia racemosa* var. *racemosa*	Slender Wallaby-grass
8066	20/11/1991	*Stipa scabra* ssp. *falcata*	Slender Spear-grass
8066	20/11/1991	*Chloris truncata*	Windmill Grass
8067	31/03/1992	*Atriplex semibaccata*	Berry Saltbush
8067	31/03/1992	*Stipa curticoma*	Short-crest Spear-grass
8067	31/03/1992	*Stipa exilis*	Heath Spear-grass
18174	01/02/2003	*Atriplex suberecta*	Lagoon Saltbush
18175	01/02/2003	*Stipa eremophila*	Rusty Spear-grass
18176	01/02/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
18176	01/02/2003	*Atriplex semibaccata*	Berry Saltbush
18177	01/02/2003	*Stipa nodosa*	Tall Spear-grass
18177	01/02/2003	*Danthonia* sp.	Wallaby-grass
18177	01/02/2003	*Danthonia setacea* var. *setacea*	Small-flower Wallaby-grass
18177	01/02/2003	*Vittadinia gracilis*	Woolly New Holland Daisy
18177	01/02/2003	*Stipa puberula*	Fine-hairy Spear-grass
18177	01/02/2003	*Chloris truncata*	Windmill Grass
18177	01/02/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
18178	01/02/2003	*Dichondra repens*	Kidney Weed
18178	01/02/2003	*Chenopodium pumilio*	Clammy Goosefoot
18179	01/02/2003	*Arthropodium strictum*	Common Vanilla-lily
18179	01/02/2003	*Atriplex semibaccata*	Berry Saltbush
18179	01/02/2003	*Chloris truncata*	Windmill Grass
18179	01/02/2003	*Danthonia caespitosa*	Common Wallaby-grass
18179	01/02/2003	*Elymus scabrus* var. *scabrus*	Native Wheat-grass
18179	01/02/2003	*Euphorbia drummondii*	Caustic Weed
18179	01/02/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
18179	01/02/2003	*Oxalis perennans*	Native Sorrel
18179	01/02/2003	*Stipa nodosa*	Tall Spear-grass
18180	01/02/2003	*Arthropodium strictum*	Common Vanilla-lily
18180	01/02/2003	*Danthonia* sp.	Wallaby-grass
18180	01/02/2003	*Vittadinia dissecta* var. *hirta*	Dissected New Holland Daisy
18181	01/02/2003	*Arthropodium strictum*	Common Vanilla-lily
18181	01/02/2003	*Danthonia* sp.	Wallaby-grass
18181	01/02/2003	*Dichondra repens*	Kidney Weed
18181	01/02/2003	*Enchylaena tomentosa* var. *tomentosa*	Ruby Saltbush
18181	01/02/2003	*Stipa* sp.	Spear-grass
18182	01/02/2003	*Arthropodium strictum*	Common Vanilla-lily
18182	01/02/2003	*Euphorbia drummondii*	Caustic Weed
18182	01/02/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
18182	01/02/2003	*Oxalis perennans*	Native Sorrel
18182	01/02/2003	*Stipa* sp.	Spear-grass
18183	01/02/2003	*Danthonia* sp.	Wallaby-grass
18184	01/02/2003	*Atriplex semibaccata*	Berry Saltbush
18184	01/02/2003	*Chloris truncata*	Windmill Grass
18184	01/02/2003	*Danthonia* sp.	Wallaby-grass
18184	01/02/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
18184	01/02/2003	*Stipa nodosa*	Tall Spear-grass
18185	01/02/2003	*Salsola kali*	Buckbush
18186	01/02/2003	*Vittadinia gracilis*	Woolly New Holland Daisy
18187	01/02/2003	*Dichondra repens*	Kidney Weed
18187	01/02/2003	*Maireana brevifolia*	Short-leaf Bluebush
18187	01/02/2003	*Salsola kali*	Buckbush
18187	01/02/2003	*Stipa flavescens*	Coast Spear-grass
18188	01/02/2003	*Dichondra repens*	Kidney Weed
18189	01/02/2003	*Boerhavia dominii*	Tar-vine
18190	01/02/2003	*Arthropodium strictum*	Common Vanilla-lily

Opportune Site	Date	Species	Common Name
18191	01/02/2003	*Arthropodium strictum*	Common Vanilla-lily
18191	01/02/2003	*Arthropodium strictum*	Common Vanilla-lily
18192	12/02/2003	*Vittadinia blackii*	Narrow-leaf New Holland Daisy
18193	12/02/2003	*Boerhavia dominii*	Tar-vine
19450	01/05/2003	*Danthonia* sp.	Wallaby-grass
19451	01/05/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
19452	01/05/2003	*Chloris truncata*	Windmill Grass
19452	01/05/2003	*Danthonia* sp.	Wallaby-grass
19452	15/04/2003	*Enteropogon ramosus*	Umbrella Grass
19453	01/05/2003	*Atriplex suberecta*	Lagoon Saltbush
19454	01/05/2003	*Enteropogon ramosus*	Umbrella Grass
19454	01/05/2003	*Chloris truncata*	Windmill Grass
19454	01/05/2003	*Oxalis perennans*	Native Sorrel
19454	01/05/2003	*Stipa* sp.	Spear-grass
19454	01/05/2003	*Danthonia* sp.	Wallaby-grass
19455	01/05/2003	*Enteropogon ramosus*	Umbrella Grass
19455	01/05/2003	*Chloris truncata*	Windmill Grass
19455	01/05/2003	*Atriplex suberecta*	Lagoon Saltbush
19456	01/05/2003	*Maireana brevifolia*	Short-leaf Bluebush
19457	01/05/2003	*Atriplex suberecta*	Lagoon Saltbush
19458	01/05/2003	*Arthropodium* sp.	Vanilla-lily
19458	01/05/2003	*Oxalis perennans*	Native Sorrel
19458	01/05/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
19458	01/05/2003	*Danthonia setacea* var. *setacea*	Small-flower Wallaby-grass
19458	01/05/2003	*Dichondra repens*	Kidney Weed
19458	01/05/2003	*Stipa puberula*	Fine-hairy Spear-grass
19458	01/05/2003	*Atriplex semibaccata*	Berry Saltbush
19459	01/05/2003	*Arthropodium* sp.	Vanilla-lily
19460	01/05/2003	*Convolvulus* aff. *erubescens "linear lobes"*	Grassland Bindweed
19460	01/05/2003	*Oxalis perennans*	Native Sorrel
19461	01/05/2003	*Enchylaena tomentosa* var. *tomentosa*	Ruby Saltbush
19462	01/05/2003	*Chloris truncata*	Windmill Grass
19463	01/05/2003	*Atriplex semibaccata*	Berry Saltbush
19464	01/05/2003	*Enchylaena tomentosa* var. *tomentosa*	Ruby Saltbush
19464	01/05/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
19465	01/05/2003	*Convolvulus erubescens*	Australian Bindweed
19465	01/05/2003	*Oxalis perennans*	Native Sorrel
19465	01/05/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
19465	01/05/2003	*Danthonia* sp.	Wallaby-grass
19466	01/05/2003	*Convolvulus erubescens*	Australian Bindweed
19467	01/05/2003	*Enteropogon ramosus*	Umbrella Grass
19468	01/05/2003	*Chenopodium pumilio*	Clammy Goosefoot
19469	01/05/2003	*Salsola kali*	Buckbush
19470	01/05/2003	*Atriplex semibaccata*	Berry Saltbush
19470	01/05/2003	*Maireana enchylaenoides*	Wingless Fissure-plant
19470	01/05/2003	*Dichondra repens*	Kidney Weed
19470	01/05/2003	*Danthonia* sp.	Wallaby-grass
19471	01/05/2003	*Atriplex semibaccata*	Berry Saltbush
19472	01/05/2003	*Atriplex semibaccata*	Berry Saltbush
19473	01/05/2003	*Danthonia carphoides* var.	Short Wallaby-grass
19474	01/05/2003	*Calostemma purpureum*	Pink Garland-lily
19474	01/05/2003	*Danthonia carphoides* var.	Short Wallaby-grass
19475	01/05/2003	*Pseudognaphalium luteoalbum*	Jersey Cudweed
19476	01/05/2003	*Teucrium racemosum*	Grey Germander
19477	01/05/2003	*Arthropodium* sp.	Vanilla-lily
19478	01/05/2003	*Danthonia setacea* var. *setacea*	Small-flower Wallaby-grass
19479	01/05/2003	*Epilobium hirtigerum*	Hairy Willow-herb
19480	01/05/2003	*Boerhavia dominii*	Tar-vine
19481	01/05/2003	*Enchylaena tomentosa* var. *tomentosa*	Ruby Saltbush
19481	01/05/2003	*Atriplex semibaccata*	Berry Saltbush
19482	01/05/2003	*Euphorbia drummondii*	Caustic Weed
19483	01/05/2003	*Boerhavia dominii*	Tar-vine
19483	01/05/2003	*Euphorbia drummondii*	Caustic Weed

APPENDIX III

OPPORTUNISTIC FAUNA SITES IN THE ADELAIDE PARK LANDS

Refer to Figure 56 for locality.

Opportune Site	Date	Class	Species	Common Name
18078	20/01/1973	AVES	*Apus pacificus*	Fork-tailed Swift
18078	02/08/1980	AVES	*Dicaeum hirundinaceum*	Mistletoebird
18078	13/02/1986	AVES	*Falco subniger*	Black Falcon
18078	23/09/1985	AVES	*Lalage tricolor*	White-winged Triller
18078	23/10/1969	AVES	*Nymphicus hollandicus*	Cockatiel
18078	15/02/1969	AVES	*Pelecanus conspicillatus*	Australian Pelican
18119	23/05/2000	AVES	*Acanthorhynchus tenuirostris*	Eastern Spinebill
18120	23/06/2000	AVES	*Acanthorhynchus tenuirostris*	Eastern Spinebill
18121	24/07/2001	AVES	*Platycercus elegans*	Crimson Rosella
18121	24/07/2001	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18122	24/07/2001	AVES	*Falco cenchroides*	Nankeen Kestrel
18123	15/11/2001	AVES	*Gallirallus philippensis*	Buff-banded Rail
18123	02/02/2003	AVES	*Gallirallus philippensis*	Buff-banded Rail
18124	11/02/2002	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18124	20/06/2001	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18124	26/10/2002	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18124	15/01/2003	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18125	12/04/2001	AVES	*Gallirallus philippensis*	Buff-banded Rail
18126	11/11/2002	AVES	*Cacatua roseicapilla*	Galah
18126	11/11/2002	AVES	*Cacatua tenuirostris*	Long-billed Corella
18127	18/01/2003	AVES	*Calyptorhynchus funereus*	Yellow-tailed Black-Cockatoo
18128	10/02/2003	REPTILIA	*Eulamprus quoyii*	Eastern Water Skink
18129	01/12/2002	REPTILIA	*Emydura macquarii*	Macquarie Tortoise
18130	29/10/1991	AVES	*Acrocephalus australis*	Australian Reed Warbler
18130	04/02/1992	AVES	*Acrocephalus australis*	Australian Reed Warbler
18130	04/02/1992	AVES	*Anas castanea*	Chestnut Teal
18130	29/10/1991	AVES	*Anas gracilis*	Grey Teal
18130	23/03/1992	AVES	*Anas gracilis*	Grey Teal
18130	04/02/1992	AVES	*Anas gracilis*	Grey Teal
18130	29/10/1991	AVES	*Anas superciliosa*	Pacific Black Duck
18130	04/02/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18130	23/03/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18130	29/10/1991	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18130	04/02/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18130	23/03/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18130	29/10/1991	AVES	*Ardea alba*	Great Egret
18130	23/03/1992	AVES	*Ardea alba*	Great Egret
18130	04/02/1992	AVES	*Aythya australis*	Hardhead
18130	23/03/1992	AVES	*Cacatua roseicapilla*	Galah
18130	04/02/1992	AVES	*Cacatua roseicapilla*	Galah
18130	29/10/1991	AVES	*Cacatua roseicapilla*	Galah
18130	29/10/1991	AVES	*Chenonetta jubata*	Australian Wood Duck
18130	04/02/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18130	23/03/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18130	29/10/1991	AVES	*Columba livia*	Rock Dove
18130	23/03/1992	AVES	*Columba livia*	Rock Dove
18130	29/10/1991	AVES	*Corvus mellori*	Little Raven
18130	04/02/1992	AVES	*Corvus mellori*	Little Raven
18130	23/03/1992	AVES	*Corvus mellori*	Little Raven
18130	29/10/1991	AVES	*Cygnus atratus*	Black Swan
18130	23/03/1992	AVES	*Cygnus atratus*	Black Swan
18130	04/02/1992	AVES	*Cygnus atratus*	Black Swan
18130	29/10/1991	AVES	*Egretta novaehollandiae*	White-faced Heron
18130	23/03/1992	AVES	*Egretta novaehollandiae*	White-faced Heron
18130	04/02/1991	AVES	*Egretta novaehollandiae*	White-faced Heron

Opportune Site	Date	Class	Species	Common Name
18130	04/02/1992	AVES	*Falco cenchroides*	Nankeen Kestrel
18130	04/02/1992	AVES	*Fulica atra*	Eurasian Coot
18130	23/03/1992	AVES	*Fulica atra*	Eurasian Coot
18130	29/10/1991	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18130	04/02/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18130	23/03/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18130	29/10/1991	AVES	*Gallinula ventralis*	Black-tailed Native-hen
18130	04/02/1992	AVES	*Glossopsitta concinna*	Musk Lorikeet
18130	29/10/1991	AVES	*Grallina cyanoleuca*	Magpie-lark
18130	23/03/1992	AVES	*Grallina cyanoleuca*	Magpie-lark
18130	04/02/1992	AVES	*Grallina cyanoleuca*	Magpie-lark
18130	29/10/1991	AVES	*Gymnorhina tibicen*	Australian Magpie
18130	04/02/1992	AVES	*Gymnorhina tibicen*	Australian Magpie
18130	29/10/1991	AVES	*Hirundo neoxena*	Welcome Swallow
18130	23/03/1992	AVES	*Hirundo neoxena*	Welcome Swallow
18130	29/10/1991	AVES	*Larus novaehollandiae*	Silver Gull
18130	23/03/1992	AVES	*Larus novaehollandiae*	Silver Gull
18130	04/02/1992	AVES	*Larus novaehollandiae*	Silver Gull
18130	29/10/1991	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18130	29/10/1991	AVES	*Manorina melanocephala*	Noisy Miner
18130	04/02/1992	AVES	*Manorina melanocephala*	Noisy Miner
18130	23/03/1992	AVES	*Manorina melanocephala*	Noisy Miner
18130	29/10/1991	AVES	*Megalurus gramineus*	Little Grassbird
18130	29/10/1991	AVES	*Ocyphaps lophotes*	Crested Pigeon
18130	23/03/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18130	04/02/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18130	04/02/1992	AVES	*Pelecanus conspicillatus*	Australian Pelican
18130	04/02/1992	AVES	*Phalacrocorax carbo*	Great Cormorant
18130	23/03/1992	AVES	*Phalacrocorax carbo*	Great Cormorant
18130	29/10/1991	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18130	23/03/1992	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18130	04/02/1992	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18130	29/10/1991	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18130	23/03/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18130	04/02/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18130	29/10/1991	AVES	*Platycercus elegans*	Crimson Rosella
18130	04/02/1992	AVES	*Platycercus elegans*	Crimson Rosella
18130	04/02/1992	AVES	*Platycercus eximius*	Eastern Rosella
18130	04/02/1992	AVES	*Poliocephalus poliocephalus*	Hoary-headed Grebe
18130	23/03/1992	AVES	*Poliocephalus poliocephalus*	Hoary-headed Grebe
18130	29/10/1991	AVES	*Porphyrio porphyrio*	Purple Swamphen
18130	04/02/1992	AVES	*Porphyrio porphyrio*	Purple Swamphen
18130	23/03/1992	AVES	*Porphyrio porphyrio*	Purple Swamphen
18130	23/03/1992	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18130	04/02/1992	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18130	29/10/1991	AVES	*Rhipidura leucophrys*	Willie Wagtail
18130	04/02/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18130	23/03/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18130	29/10/1991	AVES	*Sturnus vulgaris*	Common Starling
18130	04/02/1992	AVES	*Sturnus vulgaris*	Common Starling
18130	23/03/1992	AVES	*Sturnus vulgaris*	Common Starling
18130	04/02/1992	AVES	*Tachybaptus novaehollandiae*	Australasian Grebe
18130	23/03/1992	AVES	*Tachybaptus novaehollandiae*	Australasian Grebe
18130	29/10/1991	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18130	04/02/1992	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18130	29/10/1991	AVES	*Turdus merula*	Eurasian Blackbird
18130	02/02/1992	AVES	*Turdus merula*	Eurasian Blackbird
18130	29/10/1991	AVES	*Vanellus miles*	Masked Lapwing
18130	04/02/1992	AVES	*Vanellus miles*	Masked Lapwing
18130	23/03/1992	AVES	*Vanellus miles*	Masked Lapwing
18131	04/02/1992	AVES	*Acrocephalus australis*	Australian Reed Warbler
18131	23/03/1992	AVES	*Acrocephalus australis*	Australian Reed Warbler

Opportune Site	Date	Class	Species	Common Name
18131	29/10/1991	AVES	*Acrocephalus australis*	Australian Reed Warbler
18131	23/03/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18131	04/02/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18131	29/10/1991	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18131	23/03/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18131	04/02/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18131	23/03/1992	AVES	*Ardea alba*	Great Egret
18131	04/02/1992	AVES	*Cacatua roseicapilla*	Galah
18131	23/03/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18131	29/10/1991	AVES	*Chenonetta jubata*	Australian Wood Duck
18131	04/02/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18131	04/02/1992	AVES	*Columba livia*	Rock Dove
18131	29/10/1991	AVES	*Columba livia*	Rock Dove
18131	29/10/1991	AVES	*Corvus mellori*	Little Raven
18131	04/02/1992	AVES	*Corvus mellori*	Little Raven
18131	23/03/1992	AVES	*Cygnus atratus*	Black Swan
18131	04/02/1992	AVES	*Cygnus atratus*	Black Swan
18131	29/10/1991	AVES	*Falco longipennis*	Australian Hobby
18131	23/03/1992	AVES	*Fulica atra*	Eurasian Coot
18131	04/02/1992	AVES	*Fulica atra*	Eurasian Coot
18131	29/10/1991	AVES	*Fulica atra*	Eurasian Coot
18131	23/03/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18131	04/02/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18131	29/10/1991	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18131	04/02/1992	AVES	*Glossopsitta concinna*	Musk Lorikeet
18131	29/10/1991	AVES	*Glossopsitta concinna*	Musk Lorikeet
18131	23/03/1992	AVES	*Glossopsitta concinna*	Musk Lorikeet
18131	23/03/1992	AVES	*Grallina cyanoleuca*	Magpie-lark
18131	04/02/1992	AVES	*Grallina cyanoleuca*	Magpie-lark
18131	29/10/1991	AVES	*Grallina cyanoleuca*	Magpie-lark
18131	23/03/1992	AVES	*Gymnorhina tibicen*	Australian Magpie
18131	29/10/1991	AVES	*Gymnorhina tibicen*	Australian Magpie
18131	23/03/1992	AVES	*Hirundo neoxena*	Welcome Swallow
18131	29/10/1991	AVES	*Hirundo neoxena*	Welcome Swallow
18131	04/02/1992	AVES	*Larus novaehollandiae*	Silver Gull
18131	29/10/1991	AVES	*Larus novaehollandiae*	Silver Gull
18131	04/02/1992	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18131	23/03/1992	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18131	29/10/1991	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18131	23/03/1992	AVES	*Manorina melanocephala*	Noisy Miner
18131	04/02/1992	AVES	*Manorina melanocephala*	Noisy Miner
18131	29/10/1991	AVES	*Manorina melanocephala*	Noisy Miner
18131	04/02/1992	AVES	*Megalurus gramineus*	Little Grassbird
18131	29/10/1991	AVES	*Nycticorax caledonicus*	Nankeen Night Heron
18131	23/03/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18131	29/10/1991	AVES	*Ocyphaps lophotes*	Crested Pigeon
18131	04/02/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18131	29/10/1991	AVES	*Passer domesticus*	House Sparrow
18131	04/02/1992	AVES	*Passer domesticus*	House Sparrow
18131	29/10/1991	AVES	*Phalacrocorax carbo*	Great Cormorant
18131	23/03/1992	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18131	04/02/1992	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18131	23/03/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18131	29/10/1991	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18131	04/02/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18131	29/10/1991	AVES	*Phalacrocorax varius*	Pied Cormorant
18131	23/03/1992	AVES	*Platycercus elegans*	Crimson Rosella
18131	23/03/1992	AVES	*Poliocephalus poliocephalus*	Hoary-headed Grebe
18131	23/03/1992	AVES	*Porphyrio porphyrio*	Purple Swamphen
18131	29/10/1991	AVES	*Porphyrio porphyrio*	Purple Swamphen
18131	04/02/1992	AVES	*Porphyrio porphyrio*	Purple Swamphen
18131	04/02/1992	AVES	*Psephotus haematonotus*	Red-rumped Parrot

Opportune Site	Date	Class	Species	Common Name
18131	04/02/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18131	23/03/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18131	29/10/1991	AVES	*Rhipidura leucophrys*	Willie Wagtail
18131	23/03/1992	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18131	04/02/1992	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18131	29/10/1991	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18131	04/02/1992	AVES	*Sturnus vulgaris*	Common Starling
18131	29/10/1991	AVES	*Sturnus vulgaris*	Common Starling
18131	23/03/1992	AVES	*Sturnus vulgaris*	Common Starling
18131	23/03/1992	AVES	*Tachybaptus novaehollandiae*	Australasian Grebe
18131	23/03/1992	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18131	04/02/1992	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18131	29/10/1991	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18131	29/10/1991	AVES	*Turdus merula*	Eurasian Blackbird
18132	04/02/1992	AVES	*Acrocephalus australis*	Australian Reed Warbler
18132	29/10/1991	AVES	*Acrocephalus australis*	Australian Reed Warbler
18132	23/03/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18132	04/02/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18132	23/03/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18132	04/02/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18132	29/10/1991	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18132	29/10/1991	AVES	*Ardea alba*	Great Egret
18132	23/03/1992	AVES	*Cereopsis novaehollandiae*	Cape Barren Goose
18132	29/10/1991	AVES	*Chenonetta jubata*	Australian Wood Duck
18132	04/02/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18132	23/03/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18132	29/10/1991	AVES	*Columba livia*	Rock Dove
18132	04/02/1992	AVES	*Columba livia*	Rock Dove
18132	23/03/1992	AVES	*Columba livia*	Rock Dove
18132	29/10/1991	AVES	*Corvus mellori*	Little Raven
18132	04/02/1992	AVES	*Corvus mellori*	Little Raven
18132	23/03/1992	AVES	*Cygnus atratus*	Black Swan
18132	02/02/1992	AVES	*Cygnus atratus*	Black Swan
18132	29/10/1991	AVES	*Cygnus atratus*	Black Swan
18132	04/02/1992	AVES	*Fulica atra*	Eurasian Coot
18132	23/03/1992	AVES	*Fulica atra*	Eurasian Coot
18132	29/10/1991	AVES	*Fulica atra*	Eurasian Coot
18132	23/03/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18132	29/10/1991	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18132	04/02/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18132	29/10/1991	AVES	*Gallinula ventralis*	Black-tailed Native-hen
18132	04/02/1992	AVES	*Glossopsitta concinna*	Musk Lorikeet
18132	04/02/1992	AVES	*Grallina cyanoleuca*	Magpie-lark
18132	23/03/1992	AVES	*Grallina cyanoleuca*	Magpie-lark
18132	29/10/1991	AVES	*Grallina cyanoleuca*	Magpie-lark
18132	29/10/1991	AVES	*Gymnorhina tibicen*	Australian Magpie
18132	04/02/1992	AVES	*Gymnorhina tibicen*	Australian Magpie
18132	04/02/1992	AVES	*Hirundo neoxena*	Welcome Swallow
18132	29/10/1991	AVES	*Hirundo neoxena*	Welcome Swallow
18132	23/03/1992	AVES	*Hirundo neoxena*	Welcome Swallow
18132	04/02/1992	AVES	*Larus novaehollandiae*	Silver Gull
18132	23/03/1992	AVES	*Larus novaehollandiae*	Silver Gull
18132	29/10/1991	AVES	*Larus novaehollandiae*	Silver Gull
18132	23/03/1992	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18132	04/02/1992	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18132	29/10/1991	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18132	23/03/1992	AVES	*Manorina melanocephala*	Noisy Miner
18132	29/10/1991	AVES	*Manorina melanocephala*	Noisy Miner
18132	04/02/1992	AVES	*Manorina melanocephala*	Noisy Miner
18132	29/10/1991	AVES	*Nycticorax caledonicus*	Nankeen Night Heron
18132	04/02/1992	AVES	*Nycticorax caledonicus*	Nankeen Night Heron
18132	29/10/1991	AVES	*Ocyphaps lophotes*	Crested Pigeon

Opportune Site	Date	Class	Species	Common Name
18132	23/03/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18132	04/02/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18132	29/10/1991	AVES	*Passer domesticus*	House Sparrow
18132	23/03/1992	AVES	*Passer domesticus*	House Sparrow
18132	04/02/1992	AVES	*Passer domesticus*	House Sparrow
18132	04/02/1992	AVES	*Pelecanus conspicillatus*	Australian Pelican
18132	29/10/1991	AVES	*Pelecanus conspicillatus*	Australian Pelican
18132	29/10/1991	AVES	*Petrochelidon ariel*	Fairy Martin
18132	23/03/1992	AVES	*Petrochelidon ariel*	Fairy Martin
18132	29/10/1991	AVES	*Phalacrocorax carbo*	Great Cormorant
18132	04/02/1992	AVES	*Phalacrocorax carbo*	Great Cormorant
18132	23/03/1992	AVES	*Phalacrocorax carbo*	Great Cormorant
18132	23/03/1992	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18132	04/02/1992	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18132	29/10/1991	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18132	23/03/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18132	04/02/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18132	29/10/1991	AVES	*Phylidonyris novaehollandiae*	New Holland Honeyeater
18132	23/03/1992	AVES	*Platycercus eximius*	Eastern Rosella
18132	04/02/1992	AVES	*Platycercus eximius*	Eastern Rosella
18132	04/02/1992	AVES	*Poliocephalus poliocephalus*	Hoary-headed Grebe
18132	29/10/1991	AVES	*Poliocephalus poliocephalus*	Hoary-headed Grebe
18132	29/10/1991	AVES	*Porphyrio porphyrio*	Purple Swamphen
18132	23/03/1992	AVES	*Porphyrio porphyrio*	Purple Swamphen
18132	04/02/1992	AVES	*Porphyrio porphyrio*	Purple Swamphen
18132	29/10/1991	AVES	*Rhipidura leucophrys*	Willie Wagtail
18132	23/03/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18132	04/02/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18132	04/02/1992	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18132	23/03/1992	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18132	23/03/1992	AVES	*Sturnus vulgaris*	Common Starling
18132	04/02/1992	AVES	*Sturnus vulgaris*	Common Starling
18132	29/10/1991	AVES	*Sturnus vulgaris*	Common Starling
18132	04/02/1992	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18132	29/10/1991	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18132	29/10/1991	AVES	*Turdus merula*	Eurasian Blackbird
18133	04/02/1992	AVES	*Anas gracilis*	Grey Teal
18133	23/03/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18133	04/02/1992	AVES	*Anas superciliosa*	Pacific Black Duck
18133	04/02/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18133	29/10/1991	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18133	23/03/1992	AVES	*Anas superciliosa x anas platyrhynchos*	Pacific Black Duck/Mallard Hybrid
18133	23/03/1992	AVES	*Ardea alba*	Great Egret
18133	04/02/1992	AVES	*Aythya australis*	Hardhead
18133	29/10/1991	AVES	*Cacatua roseicapilla*	Galah
18133	04/02/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18133	29/10/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18133	23/03/1992	AVES	*Chenonetta jubata*	Australian Wood Duck
18133	29/10/1991	AVES	*Columba livia*	Rock Dove
18133	23/03/1992	AVES	*Columba livia*	Rock Dove
18133	04/02/1992	AVES	*Columba livia*	Rock Dove
18133	29/10/1991	AVES	*Corvus mellori*	Little Raven
18133	04/02/1992	AVES	*Corvus mellori*	Little Raven
18133	23/03/1992	AVES	*Cygnus atratus*	Black Swan
18133	04/02/1992	AVES	*Cygnus atratus*	Black Swan
18133	23/03/1992	AVES	*Egretta novaehollandiae*	White-faced Heron
18133	23/03/1992	AVES	*Fulica atra*	Eurasian Coot
18133	04/02/1992	AVES	*Fulica atra*	Eurasian Coot
18133	04/02/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18133	29/10/1991	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18133	23/03/1992	AVES	*Gallinula tenebrosa*	Dusky Moorhen
18133	29/10/1991	AVES	*Glossopsitta concinna*	Musk Lorikeet

Opportune Site	Date	Class	Species	Common Name
18133	04/02/1992	AVES	*Glossopsitta concinna*	Musk Lorikeet
18133	29/10/1991	AVES	*Grallina cyanoleuca*	Magpie-lark
18133	04/02/1992	AVES	*Grallina cyanoleuca*	Magpie-lark
18133	29/10/1991	AVES	*Gymnorhina tibicen*	Australian Magpie
18133	04/02/1992	AVES	*Gymnorhina tibicen*	Australian Magpie
18133	29/10/1991	AVES	*Hirundo neoxena*	Welcome Swallow
18133	29/10/1991	AVES	*Larus novaehollandiae*	Silver Gull
18133	04/02/1992	AVES	*Larus novaehollandiae*	Silver Gull
18133	23/03/1992	AVES	*Larus novaehollandiae*	Silver Gull
18133	29/10/1991	AVES	*Lichenostomus penicillatus*	White-plumed Honeyeater
18133	23/03/1992	AVES	*Manorina melanocephala*	Noisy Miner
18133	04/02/1992	AVES	*Manorina melanocephala*	Noisy Miner
18133	29/10/1991	AVES	*Manorina melanocephala*	Noisy Miner
18133	04/02/1992	AVES	*Nycticorax caledonicus*	Nankeen Night Heron
18133	29/10/1991	AVES	*Ocyphaps lophotes*	Crested Pigeon
18133	04/02/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18133	23/03/1992	AVES	*Ocyphaps lophotes*	Crested Pigeon
18133	29/10/1991	AVES	*Passer domesticus*	House Sparrow
18133	23/03/1992	AVES	*Phalacrocorax carbo*	Great Cormorant
18133	04/02/1992	AVES	*Phalacrocorax carbo*	Great Cormorant
18133	29/10/1991	AVES	*Phalacrocorax carbo*	Great Cormorant
18133	04/02/1992	AVES	*Phalacrocorax melanoleucos*	Little Pied Cormorant
18133	23/03/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18133	29/10/1991	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18133	04/02/1992	AVES	*Phalacrocorax sulcirostris*	Little Black Cormorant
18133	29/10/1991	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18133	29/10/1991	AVES	*Rhipidura leucophrys*	Willie Wagtail
18133	04/02/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18133	23/02/1992	AVES	*Rhipidura leucophrys*	Willie Wagtail
18133	04/02/1992	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18133	29/10/1991	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18133	23/03/1992	AVES	*Streptopelia chinensis*	Spotted Turtle-dove
18133	23/03/1992	AVES	*Sturnus vulgaris*	Common Starling
18133	04/02/1992	AVES	*Sturnus vulgaris*	Common Starling
18133	29/10/1991	AVES	*Sturnus vulgaris*	Common Starling
18133	29/10/1991	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18133	29/10/1991	AVES	*Turdus merula*	Eurasian Blackbird
18134	26/06/1966	AVES	*Platycercus elegans*	Crimson Rosella
18135	26/01/1995	AVES	*Milvus migrans*	Black Kite
18135	07/12/1984	AVES	*Nymphicus hollandicus*	Cockatiel
18136	29/11/1983	AVES	*Petrochelidon nigricans*	Tree Martin
18137	21/08/1967	AVES	*Dacelo novaeguineae*	Laughing Kookaburra
18137	21/08/1967	AVES	*Dacelo novaeguineae*	Laughing Kookaburra
18137	02/11/1982	AVES	*Sturnus vulgaris*	Common Starling
18138	01/06/1978	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18139	20/02/1975	AVES	*Acanthorhynchus tenuirostris*	Eastern Spinebill
18139	28/06/1968	AVES	*Acanthorhynchus tenuirostris*	Eastern Spinebill
18139	01/01/1993	AVES	*Accipiter cirrhocephalus*	Collared Sparrowhawk
18139	12/02/1973	AVES	*Acridotheres tristis*	Common(Indian) Mynah
18139	28/01/1973	AVES	*Acridotheres tristis*	Common(Indian) Mynah
18139	06/09/1969	AVES	*Anthochaera chrysoptera*	Little Wattlebird
18139	24/05/1972	AVES	*Ardea alba*	Great Egret
18139	29/12/1979	AVES	*Aythya australis*	Hardhead
18139	07/10/1972	AVES	*Colluricincla harmonica*	Grey Shrike-thrush
18139	11/06/1967	AVES	*Coracina papuensis*	White-bellied Cuckoo-shrike
18139	16/10/1987	AVES	*Cygnus atratus*	Black Swan
18139	13/12/1982	AVES	*Gallirallus philippensis*	Buff-banded Rail
18139	17/11/1970	AVES	*Ninox novaeseelandiae*	Southern Boobook
18139	22/09/1965	AVES	*Platycercus elegans*	Crimson Rosella
18139	08/06/1980	AVES	*Porzana tabuensis*	Spotless Crake
18139	01/06/1978	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18139	08/08/1991	AVES	*Rhipidura albiscapa*	Grey Fantail

Opportune Site	Date	Class	Species	Common Name
18139	12/08/1970	AVES	*Sterna caspia*	Caspian Tern
18139	15/03/1975	AVES	*Todiramphus sanctus*	Sacred Kingfisher
18139	01/07/1968	AVES	*Trichoglossus haematodus*	Rainbow Lorikeet
18140	02/06/1974	AVES	*Cacomantis flabelliformis*	Fan-tailed Cuckoo
18140	01/09/1975	AVES	*Chrysococcyx osculans*	Black-eared Cuckoo
18140	01/09/1975	AVES	*Chrysococcyx osculans*	Black-eared Cuckoo
18140	29/07/1969	AVES	*Corcorax melanorhamphos*	White-winged Chough
18140	20/08/1974	AVES	*Cuculus pallidus*	Pallid Cuckoo
18140	27/03/1974	AVES	*Dacelo novaeguineae*	Laughing Kookaburra
18140	01/03/1976	AVES	*Falco peregrinus*	Peregrine Falcon
18140	01/02/1976	AVES	*Falco subniger*	Black Falcon
18140	22/05/1982	AVES	*Falco subniger*	Black Falcon
18141	19/10/1971	AVES	*Cereopsis novaehollandiae*	Cape Barren Goose
18141	01/07/1979	AVES	*Nycticorax caledonicus*	Nankeen Night Heron
18141	01/05/1996	AVES	*Porzana tabuensis*	Spotless Crake
18142	13/01/1972	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18143	19/02/1973	AVES	*Accipiter fasciatus*	Brown Goshawk
18143	13/04/1994	AVES	*Cacatua tenuirostris*	Long-billed Corella
18143	14/01/1984	AVES	*Falco longipennis*	Australian Hobby
18143	17/05/1972	AVES	*Falco longipennis*	Australian Hobby
18143	22/12/1976	AVES	*Falco longipennis*	Australian Hobby
18143	28/02/1977	AVES	*Falco subniger*	Black Falcon
18143	12/11/1978	AVES	*Lalage tricolor*	White-winged Triller
18144	26/11/1992	AVES	*Platycercus elegans*	Crimson Rosella
18145	06/01/1993	AVES	*Petrochelidon nigricans*	Tree Martin
18146	07/11/1967	AVES	*Lalage tricolor*	White-winged Triller
18146	05/08/1965	AVES	*Tyto alba*	Barn Owl
18147	07/01/1982	AVES	*Aegotheles cristatus*	Australian Owlet-nightjar
18148	28/07/1975	AVES	*Tyto alba*	Barn Owl
18149	16/03/1980	AVES	*Alauda arvensis*	Eurasian Skylark
18149	14/08/1983	AVES	*Alauda arvensis*	Eurasian Skylark
18149	15/03/1996	AVES	*Apus pacificus*	Fork-tailed Swift
18149	10/07/1981	AVES	*Cacatua roseicapilla*	Galah
18149	26/03/1973	AVES	*Cacatua roseicapilla*	Galah
18149	05/10/1974	AVES	*Cincloramphus cruralis*	Brown Songlark
18149	25/07/1983	AVES	*Falco subniger*	Black Falcon
18149	15/12/1974	AVES	*Lalage tricolor*	White-winged Triller
18149	11/06/1972	AVES	*Ocyphaps lophotes*	Crested Pigeon
18149	07/03/1971	AVES	*Platycercus eximius*	Eastern Rosella
18149	15/12/1974	AVES	*Turnix velox*	Little Button-quail
18150	28/09/1972	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18151	23/04/1983	AVES	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike
18151	19/01/1984	AVES	*Melopsittacus undulatus*	Budgerigar
18152	15/09/1993	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18153	20/10/1967	AVES	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill
18153	10/07/1982	AVES	*Cacomantis flabelliformis*	Fan-tailed Cuckoo
18153	02/12/1990	AVES	*Cincloramphus cruralis*	Brown Songlark
18153	10/04/1981	AVES	*Geopelia placida*	Peaceful Dove
18153	04/11/1978	AVES	*Lalage tricolor*	White-winged Triller
18153	01/11/1980	AVES	*Lalage tricolor*	White-winged Triller
18153	18/10/1968	AVES	*Lalage tricolor*	White-winged Triller
18153	27/10/1971	AVES	*Lalage tricolor*	White-winged Triller
18153	22/11/1983	AVES	*Lalage tricolor*	White-winged Triller
18153	02/01/1984	AVES	*Lalage tricolor*	White-winged Triller
18153	12/08/1977	AVES	*Nycticorax caledonicus*	Nankeen Night Heron
18153	02/11/1974	AVES	*Pardalotus punctatus*	Spotted Pardalote
18153	24/06/1994	AVES	*Petroica goodenovii*	Red-capped Robin
18153	24/07/1969	AVES	*Platycercus eximius*	Eastern Rosella
18153	14/01/1975	AVES	*Struthidea cinerea*	Apostlebird
18153	24/03/1998	MAMMALIA	*Chalinolobus gouldii*	Gould's Wattled Bat
18153	24/03/1998	MAMMALIA	*Mormopterus* sp.	
18153	24/03/1998	MAMMALIA	*Tadarida australis*	White-striped Freetail-bat

Opportune Site	Date	Class	Species	Common Name
18154	07/03/1968	AVES	*Cacatua galerita*	Sulphur-crested Cockatoo
18155	02/04/1989	AVES	*Egretta novaehollandiae*	White-faced Heron
18156	01/03/1991	AVES	*Aquila audax*	Wedge-tailed Eagle
18156	01/07/1988	AVES	*Falco peregrinus*	Peregrine Falcon
18157	05/10/1974	AVES	*Cincloramphus cruralis*	Brown Songlark
18157	22/02/1968	AVES	*Haliaeetus leucogaster*	White-bellied Sea-Eagle
18157	19/11/1983	AVES	*Melopsittacus undulatus*	Budgerigar
18157	13/02/1984	AVES	*Milvus migrans*	Black Kite
18157	13/04/1985	AVES	*Smicrornis brevirostris*	Weebill
18158	11/10/1984	AVES	*Cincloramphus mathewsi*	Rufous Songlark
18159	21/12/1974	AVES	*Chrysococcyx basalis*	Horsfield's Bronze-cuckoo
18159	04/11/1979	AVES	*Erythrogonys cinctus*	Red-kneed Dotterel
18159	01/03/1980	AVES	*Pardalotus punctatus*	Spotted Pardalote
18159	01/02/1982	AVES	*Platalea regia*	Royal Spoonbill
18159	04/01/1992	AVES	*Podiceps cristatus*	Great Crested Grebe
18159	06/11/1976	AVES	*Tachybaptus novaehollandiae*	Australasian Grebe
18160	19/06/1979	AVES	*Acridotheres tristis*	Common (Indian) Mynah
18161	09/04/1975	AVES	*Ardea alba*	Great Egret
18162	13/03/1985	AVES	*Apus pacificus*	Fork-tailed Swift
18162	13/03/1982	AVES	*Chrysococcyx basalis*	Horsfield's Bronze-cuckoo
18162	17/01/1976	AVES	*Dacelo novaeguineae*	Laughing Kookaburra
18162	21/11/1977	AVES	*Dacelo novaeguineae*	Laughing Kookaburra
18162	03/11/1978	AVES	*Falco berigora*	Brown Falcon
18162	16/12/1974	AVES	*Ninox novaeseelandiae*	Southern Boobook
18162	27/06/1982	AVES	*Oriolus sagittatus*	Olive-backed Oriole
18163	13/03/1977	AVES	*Falco peregrinus*	Peregrine Falcon
18163	22/06/1978	AVES	*Psephotus haematonotus*	Red-rumped Parrot
18164	01/11/1983	AVES	*Malurus cyaneus*	Superb Fairy-wren
18165	17/01/1972	AVES	*Platycercus elegans*	Crimson Rosella
18166	03/01/1975	AVES	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill
18166	07/03/1990	AVES	*Egretta garzetta*	Little Egret
18167	27/05/1982	AVES	*Anhinga melanogaster*	Darter
18167	09/03/1975	AVES	*Aythya australis*	Hardhead
18167	03/12/1989	AVES	*Biziura lobata*	Musk Duck
18167	28/08/1974	AVES	*Chenonetta jubata*	Australian Wood Duck
18167	08/11/1982	AVES	*Haliaeetus leucogaster*	White-bellied Sea-Eagle
18167	16/10/1981	AVES	*Merops ornatus*	Rainbow Bee-eater
18167	24/08/1985	AVES	*Porzana pusilla*	Baillon's Crake
18167	12/06/1982	AVES	*Sterna caspia*	Caspian Tern
18167	16/06/1982	AVES	*Sterna caspia*	Caspian Tern
18167	01/03/1984	AVES	*Sterna caspia*	Caspian Tern
18168	14/08/1965	AVES	*Gallinula ventralis*	Black-tailed Native-hen
18168	17/11/1988	AVES	*Gallirallus philippensis*	Buff-banded Rail
18168	22/07/1971	AVES	*Gallirallus philippensis*	Buff-banded Rail
18168	04/12/1978	AVES	*Porzana fluminea*	Australian Spotted Crake
18168	03/09/1978	AVES	*Porzana fluminea*	Australian Spotted Crake
18168	23/05/1984	AVES	*Porzana tabuensis*	Spotless Crake
18168	19/03/1968	AVES	*Vanellus miles*	Masked Lapwing
18169	02/05/1991	AVES	*Geopelia placida*	Peaceful Dove
18169	01/12/1988	AVES	*Porphyrio porphyrio*	Purple Swamphen
18170	15/03/1974	AVES	*Cacatua sanguinea*	Little Corella
18171	24/05/1985	AVES	*Gallinula ventralis*	Black-tailed Native-hen
18171	01/01/1995	AVES	*Tringa nebularia*	Common Greenshank
18172	21/11/1982	AVES	*Ninox novaeseelandiae*	Southern Boobook
18172	30/11/1974	AVES	*Todiramphus sanctus*	Sacred Kingfisher
18173	16/02/1975	AVES	*Ardea pacifica*	White-necked Heron
18173	11/06/1972	AVES	*Aythya australis*	Hardhead
18173	04/04/1991	AVES	*Egretta garzetta*	Little Egret
18173	04/04/1991	AVES	*Malacorhynchus membranaceus*	Pink-eared Duck
18173	07/05/1978	AVES	*Pelecanus conspicillatus*	Australian Pelican

APPENDIX IV

MAMMAL SPECIES LIST COMPILED FOR THE ADELAIDE PARK LANDS

***** = Introduced Species.
Status = Source refer to Table 3. **Codes** = AUS (Australia) and SA (South Australia): EX = Extinct, E = Endangered, V = Vulnerable, R = Rare.
Source = SAM (South Australian Museum); Survey (Observed during Survey)

			Status		Source			
Species	**Common Name**	**Family**	**AUS**	**SA**	**SAM**	**Survey**	**Additional References**	**Comments**
Bettongia lesueur	Burrowing Bettong	POTOROIDAE	EN	E			Tyler et al. 1976; Watts 1977	once existed on the 'Adelaide Plains'
Bettongia penicillata penicillata	Brush-tailed Bettong	POTOROIDAE	EX	E			Tyler *et al*. 1976; Watts 1977	once existed on the 'Adelaide Plains'; presumed extinct in SA (NPWSA Schedule 2002)
Cercartetus concinnus	Western Pygmy-possum	BURRAMYDAE					Watts 1977	locality 'Adelaide Plains'
Chalinolobus gouldii	Gould's Wattled Bat	VESPERTILIONIDAE			Y		Tyler et al. 1976; DTUPA 1998	
Chalinolobus morio	Chocolate Wattled Bat	VESPERTILIONIDAE					Tyler et al. 1976; DTUPA 1998	
Dasyurus viverrinus	Eastern Quoll	DASYURIDAE		E	Y		Tyler et al. 1976; Watts 1977	was once quite common on the Adelaide Plains, last SAM record 1924, specific collection data unknown but was collected in an 55km radius from 'near' Adelaide; presumed extinct in SA (NPWSA Schedule 2002)
*Felis catus**	Cat	FELIDAE			Y	Y		
Hydromys chrysogaster	Water-rat	MURIDAE			Y	Y	Tyler *et al*. 1976; Watts 1977	
Isoodon obesulus	Southern Brown Bandicoot	PERAMELIDAE	EN	V			Watts 1977	locality 'Adelaide Plains'
Macropus eugenii	Tammar Wallaby	MACROPODIDAE		E			Watts 1977	locality 'Adelaide Plains'; Presumed extinct in the wild (mainland)
Macropus fuliginosus	Western Grey Kangaroo	MACROPODIDAE					Watts 1977	locality 'Adelaide Plains'
Macrotis lagotis	Bilby	PERAMELIDAE	VU	V			Tyler et al. 1976; Watts 1977	quite common in early days of European settlement at Pinkie Flat along the River Torrens and on the Adelaide Plains (Tyler et al. 1976)
Miniopterus schreibersii	Large Bentwing-bat	VESPERTILIONIDAE					Tyler *et al*. 1976	found in 'Adelaide region'
Mormopterus spp.	Southern Freetail-bats	MOLOSSIDAE				Y	DTUPA 1998; Tyler *et*	

			Status		Source			
Species	**Common Name**	**Family**	**AUS**	**SA**	**SAM**	**Survey**	**Additional References**	**Comments**
							al. 1976	
*Mus musculus**	House Mouse	MURIDAE			Y	Y	Watts 1977	
Nyctophilus geoffroyi	Lesser Long-eared Bat	VESPERTILIONIDAE			Y	Y	Tyler et al. 1976; DTUPA 1998	
Ornithorhynchus anatinus	Platypus	ORNITHORHYNCHIDAE		E			Tyler *et al*. 1976	was once found in the River Torrens and Onkaparinga Rivers but has not been reported for many years' (Tyler et al. 1976)
*Oryctolagus cuniculus**	Rabbit	LEPORIDAE			Y			collected somewhere within 18 km radius of city centre
Phascogale tapoatafa	Brush-tailed Phascogale	DASYURIDAE		E			Watts 1977	locality 'Adelaide Plains'; presumed extinct in SA (NPWSA Schedule 2002)
Pseudocheirus peregrinus	Common Ringtail Possum	PSEUDOCHEIRIDAE			Y	Y	Tyler et al. 1976; Watts 1977	
Rattus lutreolus	Swamp Rat	MURIDAE		R			Watts 1977	locality 'Adelaide Plains'
*Rattus norvegicus**	Brown Rat	MURIDAE			Y		Watts 1977	
*Rattus rattus**	Black Rat	MURIDAE			Y	Y	Watts 1977	
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	EMBALLONURIDAE		R	Y		DTUPA 1998	1 SAM record collected 1935 somewhere within 18 km radius of Adelaide
Scotorepens balstoni	Inland Broad-nosed Bat	VESPERTILIONIDAE			Y			1 SAM record collected 1931 somewhere within 18 km radius of Adelaide
Sminthopsis crassicaudata	Fat-tailed Dunnart	DASYURIDAE					Watts 1977	locality 'Adelaide Plains'
Tachyglossus aculeatus	Short-beaked Echidna	TACHYGLOSSIDAE			Y		Watts 1977	1 SAM record collected 1928 somewhere within 18 km radius of Adelaide
Tadarida australis	White-striped Freetail-bat	MOLOSSIDAE			Y	Y	Tyler *et al*. 1976	found in 'Adelaide region'
Trichosurus vulpecula	Common Brushtail Possum	PHALANGERIDAE		R	Y	Y	Tyler *et al*. 1976; Watts 1977; DTUPA 1998	
Vespadelus darlingtoni	Large Forest Bat	VESPERTILIONIDAE			Y			2 SAM records, last collected in 1946
Vespadelus regulus	Southern Forest Bat	VESPERTILIONIDAE			Y		DTUPA 1998	1 SAM record collected 1932 somewhere within 18 km radius of Adelaide
Vespadelus vulturnus	Little Forest Bat	VESPERTILIONIDAE					Reardon and Flavel 1987	
*Vulpes vulpes**	Red Fox	CANIDAE				Y		

APPENDIX V

BIRD SPECIES LIST COMPILED FOR THE ADELAIDE PARK LANDS

***** = Introduced Species
****** = Native Species that on European Settlement were not present.
Status = Refer to Table 3. **Codes** = AUS (Australia), SA (South Australia), REG (Regional): X = Extint, E = Endangered, V = Vulnerable, R = Rare, U = Uncommon, K = Indeterminate (not enough information available to categorise), I = Introduced (native species introduced or re-introduced), O = Occassional.
Source = SAM (South Australian Museum)
1974-75 = SAOA (1977) *A Bird Atlas of the Adelaide Region*. South Australian Ornithologist Association, Adelaide.
1984-85 = Paton, D.C., Carpenter, G. and Sinclair, R. G. (1994) A Second Bird Atlas of the Adelaide Region. Part 1: Changes in the Distribution of Birds: 1974-75 vs 1984-85. *The South Australian Ornithologist*, (31)7:151-193.
RJW = R. J. Whatmough Unpublished Date 2003.

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	ACANTHIZIDAE					Y	Y	Y	Glover 1953; Paton 1976; Whatmough 1997 and 1989; SAOA Newsletter (1967: v44; 1975: v76)	observed for 21 years in Adelaide City Parklands by Whatmough (1997), and has not been seen for the past 2 years.
Acanthorhynchus tenuirostris	Eastern Spinebill	MELIPHAGIDAE					Y		Y	Glover 1953; Paton 1976; Whatmough 1989; SAOA Newsletter (1968: v47; 1975: v75)	not recorded since mid-1984
Accipiter cirrhocephalus	Collared Sparrowhawk	ACCIPITRIDAE			U	Y		Y	Y	Paton 1977; SAOA Newsletter (1993: v145)	1 SAM record collected 1901, locality not accurate collected from somewhere within 55 km radius from Adelaide. Records states 'near Adelaide'.
Accipiter fasciatus	Brown Goshawk	ACCIPITRIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976; SAOA Newsletter (1973: v65)	last SAM record 1952
Acrocephalus australis	Australian Reed-warbler	SYLVIIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	SAM record collected around River Torrens and Torrens Lake. A breeding migrant of reedbeds (Whatmough 1989)
*Alauda arvensis**	Eurasian Skylark	ALAUDIDAE							Y	Paton 1977; SAOA Newsletter (1980: v97; 1983: v110)	
Anas castanea	Chestnut Teal	ANATIDAE			U		Y		Y	Glover 1953; Paton 1976; Whatmough 1989	not seen since mid-1979 (Whatmough 1989)
Anas gracilis	Grey Teal	ANATIDAE					Y	Y	Y	Glover 1953	
Anas platyrhynchos	Mallard	ANATIDAE				Y	Y	Y	Y	Glover 1953; Paton 1977	
Anas superciliosa	Pacific Black Duck	ANATIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977	

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Anas superciliosa X Anas platyrhynchos	Hybrid Mallard & Pacific Black Duck	ANATIDAE				Y			Y	Paton 1976; Whatmough 1989	hybrids between Mallards and Pacific Black Ducks are found in the wild
Anhinga melanogaster	Darter	ANHINGIDAE		R	R	Y			Y	Glover 1953; SAOA Newsletter (1982: v103)	1 SAM record collected 1904 from Botanic Gardens
Anthochaera carunculata	Red Wattlebird	MELIPHAGIDAE					Y	Y	Y	Glover 1953; Tyler et al. 1976; Paton 1976 & 1977	numbers more numerous with establishment of gardens than when area was used for agriculture
Anthochaera chrysoptera	Little Wattlebird	MELIPHAGIDAE			U	Y	Y	Y	Y	Glover 1953; Tyler et al. 1976; Paton 1976 & 1977; SAOA Newsletter (1969: v51)	numbers more numerous with establishment of gardens than when area was used for agriculture
Anthus novaeseelandiae	Richard's Pipit	MOTACILLIDAE					Y	Y	Y	Whatmough 1989	1-2 birds seen with decreasing frequency, not seen in last 3 years (1986)
Apus pacificus	Fork-tailed Swift	APODIDAE					Y	Y	Y	Paton 1976; SAOA Newsletter (1973: v66; 1985: v114; 1996: v158)	
Aquila audax	Wedge-tailed Eagle	ACCIPITRIDAE					Y		Y	SAOA Newsletter (1991: v138)	
Ardea alba	Great Egret	ARDEIDAE				Y	Y	Y	Y	Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1972: v63; 1975: v77)	1 SAM record collected 1904 from Botanic Gardens
Ardea pacifica	White-necked Heron	ARDEIDAE			U				Y	SAOA Newsletter (1975: v73)	
Artamus cyanopterus	Dusky Woodswallow	ARTAMIDAE				Y	Y	Y	Y	Glover 1953	1 SAM record collected 1936 from North Parklands
Aythya australis	Hardhead	ANATIDAE			U			Y	Y	Whatmough 1989; SAOA Newsletter (1972: v63; 1975: v74; 1979: v 93)	
Barnardius zonarius	Australian Ringneck	PSITTACIDAE			V		Y	Y	Y		aviary escapees
Biziura lobata	Musk Duck	ANATIDAE		R	U		Y		Y	Whatmough 1989; SAOA Newsletter (1989: v133)	not seen since mid-1978 (Whatmough 1989)
Cacatua galerita	Sulphur-crested Cockatoo	CACATUIDAE			U			Y	Y	Paton 1976; SAOA Newsletter (1968: v46)	
*Cacatua roseicapilla***	Galah	CACATUIDAE				Y	Y	Y	Y	Glover 1953; Tyler et al. 1976; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1973: v66; 1981: v99)	was not recorded for area prior to first decade of this century
*Cacatua sanguinea***	Little Corella	CACATUIDAE					Y	Y	Y	Paton 1976 & 1977; SAOA Newsletter (1974: v70)	

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
*Cacatua tenuirostris***	Long-billed Corella	CACATUIDAE			I				Y	SAOA Newsletter (1994: v150)	
Cacomantis flabelliformis	Fan-tailed Cuckoo	CUCULIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976; SAOA Newsletter (1974: v71; 1982: v103)	3 SAM records from 'Adelaide District'
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	CACATUIDAE		V	V		Y		Y	Glover 1953	
*Cardeulis carduelis**	European Goldfinch	FRINGILLIDAE					Y	Y	Y	Glover 1953; Paton 1976 & 1977	
*Cardeulis chloris**	European Greenfinch	FRINGILLIDAE					Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
Cereopsis novaehollandiae	Cape Barren Goose	ANATIDAE		R	R				Y	Paton 1976; SAOA Newsletter (1971: v60)	
Chenonetta jubata	Australian Wood Duck	ANATIDAE				Y	Y	Y	Y	Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1974: v71)	1 SAM record 1987, locality not accurate collected from somewhere within 55 km radius from Adelaide. Whatmough 1989 observed numbers to greatly increase from 1986.
Chrysococcyx basalis	Horsfield's Bronze-Cuckoo	CUCULIDAE					Y	Y	Y	Glover 1953; Paton 1976; SAOA Newsletter (1974: v73; 1982: v102)	
Cincloramphus cruralis	Brown Songlark	SYLVIIDAE					Y	Y	Y	Paton 1977; SAOA Newsletter (1974: v76; 1990: v137)	
Cincloramphus mathewsi	Rufous Songlark	SYLVIIDAE							Y	SAOA Newsletter (1984: v113)	
Colluricincla harmonica	Grey Shrike-thrush	PACHYCEPHALIDAE					Y		Y	Glover 1953; Paton 1976; SAOA Newsletter (1972; Vol 65)	
*Columba livia**	Feral Pigeon	COLUMBIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
Coracina novaehollandiae	Black-faced Cuckoo-shrike	CAMPEPHAGIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1983: v106)	an erratic visitor to all Adelaide Parkland areas (Whatmough 1989)
Corvus mellori	Little Raven	CORVIDAE					Y	Y	Y	Paton 1976 & 1977; Whatmough 1989	
Coturnix pectoralis	Stubble Quail	PHASIANIDAE				Y	Y	Y	Y		2 SAM records collected 1985 and 1995
Cuculus pallidus	Pallid Cuckoo	CUCULIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; SAOA Newsletter (1974: v71)	1 SAM record collected 1927 'near Adelaide'

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Cygnus atratus	Black Swan	ANATIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1987; Vol 124)	1 SAM record collected 1935 from Torrens Lake
Dacelo novaeguineae	Laughing Kookaburra	ALCEDINIDAE					Y	Y	Y	Glover 1953; Paton 1976 & 1977; SAOA Newsletter (1967: v43 & 44; 1974: v70; 1976: v81; 1977: v84)	
Dicaeum hirundinaceum	Mistletoebird	DICAEIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976; SAOA Newsletter (1980; Vol 97)	
Egretta garzetta	Little Egret	ARDEIDAE		R					Y	SAOA Newsletter (1990: v134; 1991: v138)	
Egretta novaehollandiae	White-faced Heron	ARDEIDAE					Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1989: v131)	
Elanus axillaris	Black-shouldered Kite	ACCIPITRIDAE				Y	Y	Y	Y	Paton 1977	
Elseyornis melanops	Black-fronted Dotterel	CHARADRIIDAE							Y	Glover 1953	
Epthianura albifrons	White-fronted Chat	MELIPHAGIDAE						Y	Y		
Falco berigora	Brown Falcon	FALCONIDAE				Y	Y		Y	Paton 1976; SAOA Newsletter (1978: v88)	1 SAM record collected 1906 'near Adelaide'
Falco cenchroides	Nankeen Kestrel	FALCONIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977	
Falco longipennis	Australian Hobby	FALCONIDAE			U	Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; SAOA Newsletter (1972: v63; 1976: v82; 1984: v109)	
Falco peregrinus	Peregrine Falcon	FALCONIDAE		R	R		Y		Y	Paton 1976; SAOA Newsletter (1976: v78; 1977: v82; 1988: v127)	
Falco subniger	Black Falcon	FALCONIDAE			U		Y		Y	SAOA Newsletter (1976: v78; 1977: v82; 1982: v103; 1983: 107; 1986: v118)	
Fulica atra	Eurasian Coot	RALLIDAE					Y	Y	Y	Glover 1953; Paton 1976	
Gallinula tenebrosa	Dusky Moorhen	RALLIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977	
Gallinula ventralis	Black-tailed Native Hen	RALLIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1965: v35; 1985: v115)	1 SAM record collected 1927 'near Adelaide'
Gallirallus philippensis	Buff-banded Rail	RALLIDAE				Y	Y		Y	Glover 1953; Paton 1976; SAOA Newsletter (1971: v60; 1982: v105; 1988: v128)	
Geopelia placida	Peaceful Dove	COLUMBIDAE			V	Y			Y	SAOA Newsletter (1981: v98; 1991: v139)	1 SAM record collected 1987 from Museum grounds

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Glossopsitta concinna	Musk Lorikeet	PSITTACIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
Glossopsitta porphyrocephala	Purple-crowned Lorikeet	PSITTACIDAE					Y	Y	Y	Glover 1953; Paton 1976 & 1977	
Grallina cyanoleuca	Magpie-lark	DICRURIDAE				Y	Y		Y	Glover 1953; Tyler et al. 1976; Paton 1976 & 1977; Whatmough 1989	numbers more numerous with establishment of gardens than when area was used for agriculture
Gymnorhina tibicen	Australian Magpie	ARTAMIDAE				Y		Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
Haliastur sphenurus	Whistling Kite	ACCIPITRIDAE			U		Y	Y	Y	Glover 1953; Paton 1976	
Hieraaetus morphnoides	Little Eagle	ACCIPITRIDAE			U		Y	Y	Y		
Hirundo neoxena	Welcome Swallow	HIRUNDINIDAE				Y	Y	Y	Y	Whatmough 1989	
Lalage tricolor	White-winged Triller	CAMPEPHAGIDAE				Y		Y	Y	Glover 1953; SAOA Newsletter (1967: v45; 1968: v49; 1971: v60; 1974: v74; 1978: v89; 1980: v97; 1983: v109; 1984: v109; 1985: v116)	1 SAM record 1927, locality not accurate collected somewhere within 55 km radius from Adelaide
*Larus novaehollandiae***	Silver Gull	LARIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
Lichenostomus penicillatus	White-plumed Honeyeater	MELIPHAGIDAE				Y	Y	Y	Y	Glover 1953; Tyler et al. 1976; Paton 1976 & 1977; Whatmough 1989	numbers more numerous with establishment of gardens than when area was used for agriculture. Observed to be declining in East Parklands (Whatmough 1989)
Malacorhynchus membranaceus	Pink-eared Duck	ANATIDAE						Y	Y	SAOA Newsletter (1991: v138)	
Manorina melanocephala	Noisy Miner	MELIPHAGIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977	first SAM record 1939
Megalurus gramineus	Little Grassbird	SYLVIIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	2 SAM records collected 1918 and 1935 from 'Torrens Lake'. Found in reedbeds by Whatmough (1989).
Melopsittacus undulatus	Budgerigar	PSITTACIDAE					Y	Y	Y	SAOA Newsletter (1983: v109; 1984: v109)	
Ninox novaeseelandiae	Southern Boobook	STRIGIDAE				Y	Y	Y	Y	Glover 1953; SAOA Newsletter (1970: v56; 1974: v73; 1982: v105)	

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Nycticorax caledonicus	Nankeen Night Heron	ARDEIDAE			U	Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; SAOA Newsletter (1977: v83; 1979: v91)	
Nymphicus hollandicus	Cockatiel	CACATUIDAE					Y	Y	Y	Paton 1976; SAOA Newsletter (1984: v113)	
Ocyphaps lophotes	Crested Pigeon	COLUMBIDAE				Y	Y	Y	Y	Glover 1953; Tyler *et al*. 1976; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1972: v63)	was not recorded for area prior to first decade of this century: First SAM specimen collected 1982
Pachycephala rufiventris	Rufous Whistler	PACHYCEPHALIDAE				Y	Y	Y	Y		1 SAM record collected 2000
Pardalotus punctatus	Spotted Pardalote	PARDALOTIDAE			U	Y	Y	Y	Y	SAOA Newsletter (1974: v76; 1980: v97)	1 SAM record from 1895 'near Adelaide'
Pardalotus striatus	Striated Pardalote	PARDALOTIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
*Passer domesticus**	House Sparrow	PASSERIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	first SAM record 1937. Decreases observed mainly between 1980 -1985 (Whatmough 1989).
Pelecanus conspicillatus	Australian Pelican	PELECANIDAE						Y	Y	Whatmough 1989; SAOA Newsletter (1978: v87)	
Petrochelidon ariel	Fairy Martin	HIRUNDINIDAE					Y	Y	Y		
Petrochelidon nigricans	Tree Martin	HIRUNDINIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1983: v110; 1993: v145)	Recorded declines in Adelaide region (NPWSA Schedule 2002)
Petroica goodenovii	Red-capped Robin	PETROICIDAE			U			Y	Y	SAOA Newsletter (1994: v151)	
Phalacrocorax carbo	Great Cormorant	PHALACROCORACIDAE				Y		Y	Y	Paton 1976 & 1977	1 SAM record from 1935 collected from Botanic Gardens
Phalacrocorax melanoleucos	Little Pied Cormorant	PHALACROCORACIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977	7 SAM records from Botanic Gardens
Phalacrocorax sulcirostris	Little Black Cormorant	PHALACROCORACIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	2 SAM records from Botanic Gardens, 1923 and 1935
Phalacrocorax varius	Pied Cormorant	PHALACROCORACIDAE					Y	Y	Y	Glover 1953; Paton 1976	
Phylidonyris novaehollandiae	New Holland Honeyeater	MELIPHAGIDAE				Y		Y	Y	Glover 1953; Tyler et al. 1976; Paton 1976 & 1977; Whatmough 1989	numbers more numerous with establishment of gardens than when area was used for agriculture

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Platalea regia	Royal Spoonbill	THRESKIORNITHIDAE			U				Y	SAOA Newsletter (1982: v102)	
Platycercus elegans	Adelaide Rosella	PSITTACIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1966; Vol 39: 1965; Vol 36; 1972: v61)	
Platycercus eximius	Eastern Rosella	PSITTACIDAE					Y	Y	Y	Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1969: v51; 1971: v58)	
Podiceps cristatus	Great Crested Grebe	PODICIPEDIDAE		R	R	Y			Y	SAOA Newsletter (1992: v146)	1 SAM record 1966, locality not accurate collected somewhere within 18 km radius from Adelaide
Poliocephalus poliocephalus	Hoary-headed Grebe	PODICIPEDIDAE				Y	Y	Y	Y	Paton 1976 & 1977; Whatmough 1989	1 SAM record from 1975 collected from Botanic Gardens
Porphyrio porphyrio	Purple Swamphen	RALLIDAE						Y	Y	Paton 1977; SAOA Newsletter (1988: v131)	
Porzana fluminea	Australian Spotted Crake	RALLIDAE							Y	SAOA Newsletter (1978: v86 & 89)	
Porzana tabuensis	Spotless Crake	RALLIDAE		R	U			Y	Y	SAOA Newsletter (1980: v95; 1984: v111; 1996: v159)	
Psephotus haematonotus	Red-rumped Parrot	PSITTACIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1972: v61 & 65; 1978: v87; 1993: v148)	first SAM record 1982
Rhipidura albiscapa	Grey Fantail	DICRURIDAE					Y		Y	Glover 1953; SAOA Newsletter (1991: v141)	
Rhipidura leucophrys	Willie Wagtail	DICRURIDAE				Y	Y	Y	Y	Glover 1953; Tyler et al. 1976; Paton 1976 & 1977; Whatmough 1989	numbers more numerous with establishment of gardens than when area was used for agriculture. Decline in numbers observed since mid-1981 (Whatmough 1989)
Smicrornis brevirostris	Weebill	ACANTHIZIDAE					Y		Y	SAOA Newsletter (1985: v114)	
Sterna bergii	Crested Tern	LARIDAE							Y	SAOA Newsletter (1982: v103; 1984: v110)	
Sterna caspia	Caspian Tern	LARIDAE					Y	Y	Y	Paton 1976; SAOA Newsletter (1970: v 55; 1982: v103)	
*Streptopelia chinensis**	Spotted Turtle-dove	COLUMBIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
Struthidea cinerea	Apostlebird	CORCORACIDAE			X				Y	SA Ornithologist, 1979 (29): 165	Populations may be expanding (NPWSA Schedule 2002)
*Sturnus vulgaris**	Common Starling	STURNIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1982: v106)	

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Tachybaptus novaehollandiae	Australasian Grebe	PODICIPEDIDAE					Y	Y	Y	Glover 1953; Paton 1976; SAOA Newsletter (1976: v80)	
Tadorna tadornoides	Australian Shelduck	ANATIDAE					Y		Y	Paton 1976	
Threskiornis molucca	Australian White Ibis	THRESKIORNITHIDAE					Y	Y	Y		25 observed feeding on oval in the South Parklands (T. Croft 2003)
Todiramphus sanctus	Sacred Kingfisher	ALCEDINIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989; SAOA Newsletter (1974: v74; 1975: v74)	3 SAM records, first recorded 1953 then other 2 collected 1963 from Botanic Gardens. Whatmough (1989) has only had one record since mid-1981.
Trichoglossus haematodus	Rainbow Lorikeet	PSITTACIDAE			C	Y	Y	Y	Y	Paton 1976; Whatmough 1989; SAOA Newsletter (1968; Vol 47)	
*Turdus merula**	Common Blackbird	MUSCICAPIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	has steadily declined in some Parkland areas over 14 years (Whatmough 1989)
Turnix velox	Little Button-quail	TURNICIDAE				Y	Y		Y	Paton 1977; SAOA Newsletter (1974: v73)	1 SAM record collected 1975 from North Terrace
Tyto alba	Barn Owl	TYTONIDAE					Y		Y	SAOA Newsletter (1965: v35; 1975: 75)	
Vanellus miles	Masked Lapwing	CHARADRIIDAE					Y	Y	Y	Whatmough 1989; SAOA Newsletter (1968: v46)	
Zosterops lateralis	Silvereye	ZOSTEROPIDAE				Y	Y	Y	Y	Glover 1953; Paton 1976 & 1977; Whatmough 1989	
*Acridotheres tristis**	Common Mynah	STURNIDAE								Paton 1976; SAOA Newsletter (1973: v66; 1979: v91)	
Aegotheles cristatus	Australian Owlet-nightjar	AEGOTHELIDAE			U					SAOA Newsletter (1982: v101)	
Alcedo azurea	Azure Kingfisher	ALCEDINIDAE		E	X	Y				Glover 1953	1 SAM record 1906, locality not accurate collected from somewhere within 55 km radius from Adelaide
Chrysococcyx osculans	Black-eared Cuckoo	CUCULIDAE			O					SAOA Newsletter (1975: v75 & 78)	
Coracina papuensis	White-bellied Cuckoo-shrike	CAMPEPHAGIDAE		R	O					SAOA Newsletter (1967; Vol 43)	
Corcorax melanorhamphos	White-winged Chough	CORCORACIDAE		R	V					Paton 1976; SAOA Newsletter (1969: v51)	
Erythrogonys cinctus	Red-kneed	CHARADRIIDAE								SAOA Newsletter (1979: v93)	

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
	Dotterel										
Falcunculus frontatus	Crested Shrike-tit	PACHYCEPHALIDAE		R	V	Y	Y			Glover 1953	1 SAM record collected 1939 from Torrens Lake
Haliaeetus leucogaster	White-bellied Sea-Eagle	ACCIPITRIDAE		E	V					SAOA Newsletter (1968: v46; 1982: v105)	
Lathamus discolor	Swift Parrot	PSITTACIDAE	EN	E	V	Y					1 SAM record 1927, locality not accurate collected somewhere within 55 km radius from Adelaide
Lichenostomus chrysops	Yellow-faced Honeyeater	MELIPHAGIDAE				Y	Y				1 SAM record 1902, locality not accurate collected somewhere within 55 km radius from Adelaide
Malurus cyaneus	Superb Fairy-Wren	MALURIDAE				Y	Y			Glover 1953; Paton 1977; SAOA Newsletter (1983: v109)	3 SAM records, 2 from Botanic Park in early 1920's the other from 1985 but locality not accurate
Melithreptus brevirostris	Brown-headed Honeyeater	MELIPHAGIDAE					Y				
Melithreptus gularis	Black-chinned Honeyeater	MELIPHAGIDAE			V	Y				Glover 1953	1 SAM record from 1927 'near Adelaide'
Melithreptus lunatus	White-naped Honeyeater	MELIPHAGIDAE					Y			Glover 1953	
Merops ornatus	Rainbow Bee-eater	MEROPIDAE					Y	Y		SAOA Newsletter (1981: v101)	
Microeca fascinans	Jacky Winter	PETROICIDAE				Y	Y				2 SAM records 1927, locality not accurate collected somewhere within 55 km radius from Adelaide; Rates as Rare for the Mount Lofty Ranges (NPWSA Schedule 2002)
Milvus migrans	Black Kite	ACCIPITRIDAE			O					SAOA Newsletter (1984: v110; 1995: v153)	
Myiagra inquieta	Restless Flycatcher	DICRURIDAE		R	V		Y	Y		Glover 1953	
Neochmia temporalis	Red-browed Finch	ESTRILDIDAE					Y				
Neophema elegans	Elegant Parrot	PSITTACIDAE		R	K			Y			
Ninox connivens	Barking Owl	STRIGIDAE		R	X	Y					1 SAM record from 1895 'near Adelaide'
Oceanites oceanicus	Wilson's Storm-Petrel	HYDROBATIDAE				Y					1 SAM record collected 1974 from Adelaide University Oval

			Status			Source					
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**1974-75**	**1984-85**	**RJW**	**Additional References**	**Comments**
Oriolus sagittatus	Olive-backed Oriole	ORIOLIDAE		R	R					Glover 1953; SAOA Newsletter (1982: v103)	
Oxyura australis	Blue-billed Duck	ANATIDAE		R	U			Y			
Pachycephala pectoralis	Golden Whistler	PACHYCEPHALIDAE			C		Y	Y		Paton 1976	
Pedionomus torquatus	Plains-wanderer	PEDIONOMIDAE	VU	E	E	Y					1 SAM record from 1914 collected near North Adelaide
Petroica multicolor	Scarlet Robin	PETROICIDAE			U		Y			Glover 1953	
Phylidonyris pyrrhoptera	Crescent Honeyeater	MELIPHAGIDAE					Y				
Podargus strigoides	Tawny Frogmouth	PODARGIDAE					Y				
Pomatostomus superciliosus	White-browed Babbler	POMATOSTOMIDAE			U					Glover 1953	
Porzana pusilla	Baillon's Crake	RALLIDAE			R			Y*		Glover 1953; SAOA Newsletter (1985: v116)	
Puffinus tenuirostris	Short-tailed Shearwater	PROCELLARIIDAE				Y					2 SAM records 1 from Adelaide Zoological Gardens
Tringa nebularia	Common Greenshank	SCOLOPACIDAE								SAOA Newsletter (1995: v153)	
Xanthomyza phrygia	Regent Honeyeater	MELIPHAGIDAE	EN	E	E					Glover 1953	Presumed Extinct in SA (NPWSA Schedule 2002)

APPENDIX VI

REPTILE AND AMPHIBIAN SPECIES LISTS FOR THE ADELAIDE PARK LANDS

Status = Refer to Table 3. Codes: AUS (Australia), SA (South Australia), REG (Regional): V = Vulnerable.
Source = SAM (South Australian Museum), Survey – Observed during this Survey.

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**Survey**	**Additional References/Comments**
Aprasia striolata	Lined Worm-lizard	GEKKONIDAE				Y		
Chelodina longicollis	Common Long-necked Tortoise	CHELIDAE				Y		
Christinus marmoratus	Marbled Gecko	GEKKONIDAE				Y		
Ctenophorus decresii	Tawny Dragon	AGAMIDAE				Y		
Egernia striolata	Eastern Tree Skink	SCINCIDAE				Y		
Emydura macquarii	Macquarie Tortoise	CHELIDAE		V			Y	Status treats Murray and Cooper populations separately
Eulamprus quoyii	Eastern Water Skink	SCINCIDAE					Y	
Hemiergis decresiensis	Three-toed Earless Slider	SCINCIDAE						DTUPA 1998
Hemiergis peronii	Four-toed Earless Slider	SCINCIDAE						
Lampropholis guichenoti	Garden Skink	SCINCIDAE					Y	
Lerista dorsalis	Southern Four-toed Slider	SCINCIDAE						DTUPA 1998
Menetia greyii	Dwarf Skink	SCINCIDAE						DTUPA 1998
Nephrurus milii	Barking Gecko	GEKKONIDAE				Y		1 SAM record from 1917
Pogona barbata	Eastern Bearded Dragon	AGAMIDAE						(Armstrong pers. comm. 2003)
Pseudechis porphyriacus	Red-bellied Black Snake	ELAPIDAE						Adelaide Snake Catchers
Pseudonaja modesta	Five-ringed Snake	ELAPIDAE				Y		1 SAM record from 1933
Pseudonaja textilis	Eastern Brown Snake	ELAPIDAE				Y		Tyler *et al*. 1976; Adelaide Snake Catchers
Tiliqua rugosa	Sleepy Lizard	SCINCIDAE				Y		Tyler *et al*. 1976; DTUPA 1998; Only one record from SAM collected in 1915
Tiliqua scincoides	Eastern Bluetongue	SCINCIDAE				Y		Tyler *et al*. 1976; DTUPA 1998;
Tympanocryptis lineata	Five-lined Earless Dragon	AGAMIDAE				Y		1 SAM record from 1946

AMPHIBIAN SPECIES LIST COMPILED FOR THE ADELAIDE CITY PARK LANDS

Status = Refer to Table 3. Codes: AUS (Australia), SA (South Australia), REG (Regional): R = Rare.
Source = SAM (South Australian Museum), EPA (Environment Protection Authority, Frog Census)

			Status			Source		
Species	**Common Name**	**Family**	**AUS**	**SA**	**REG**	**SAM**	**EPA**	**Additional References/ Comments**
Crinia signifera	Common Froglet	MYOBATRACHIDAE				Y	Y	Tyler *et al*. 1976
Limnodynastes dumerili	Bull Frog	MYOBATRACHIDAE				Y	Y	Tyler *et al*. 1976
Limnodynastes peroni	Striped Marsh Frog	MYOBATRACHIDAE					Y	Probably introduced
Limnodynastes tasmaniensis	Spotted Grass Frog	MYOBATRACHIDAE					Y	Tyler et al. 1976
Litoria ewingi	Brown Tree Frog	HYLIDAE				Y	Y	Tyler *et al*. 1976
Neobatrachus pictus	Painted Frog	MYOBATRACHIDAE						Tyler *et al*. 1976; Adelaide is the type locality
Pseudophryne bibroni	Brown Toadlet	MYOBATRACHIDAE		R		Y		2 SAM records from 1933 and 1957