INTEGRATED BIODIVERSITY MANAGEMENT PLAN 2018–2023

24 July 2018

CITY OF ADELAIDE

DOCUMENT PROPERTIES

Contact for enquiries and proposed changes

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CONTENTS

INTRODUCTION

The Adelaide Park Lands are a unique part of the City of Adelaide's character and culture. They receive approximately ten million visits a year, for a wide variety of purposes, and their landscapes are highly variable and include sporting fields, event spaces, curated gardens, open woodlands, playgrounds, roads and paths. Embedded within these landscapes are areas of remnant native vegetation, mainly in the form of open grassy woodland and grassland, and associated wildlife.

These vegetation remnants are very significant, because most of the native vegetation on the Adelaide Plains has been cleared since European settlement. The City of Adelaide (CoA) has been protecting and enhancing biodiversity[1] in the Park Lands for many years, with the support of partners and the community. This document confirms our commitment to biodiversity conservation and sets new directions to ensure that our efforts are based on best practice, that the connection of the community with the City's biodiversity is improved, and that the knowledge of the Kaurna People is respected and incorporated into our management of biodiversity where possible. Integration of biodiversity with other planning and management in the Park Lands is a key theme of this Plan.

Another significant component of the ecology of the City is the River Torrens, which winds through the Park Lands on its route from the Mt Lofty Ranges to Gulf St Vincent. The Torrens Lake is of particular significance, because it is at the centre of our vibrant Riverbank precinct and receives extensive national and international exposure during the City's festivals, sporting fixtures and major events. The Lake also provides important recreational opportunities, such as exercising along the banks and adjacent parks, and boating on the Lake itself. This document sets the policy position for maximising the ecological health of the City's watercourses, particularly Torrens Lake.

OBJECTIVES: WHAT DO WE WANT TO ACHIEVE?

This Plan has three objectives:

1. To enhance the City's biodiversity
2. To connect people with nature
3. To incorporate Kaurna knowledge into the management of the City's biodiversity

SCOPE

This Plan addresses what the CoA will do to conserve and improve the remaining native biodiversity in the City: the native species present, the genetic diversity in these species, and the ecosystems that they form.

The geographic scope is the Adelaide Park Lands, because there is very little remnant native biodiversity in the built-up areas of the City. Some general policy positions will apply across the City, such as prescriptions on the genetic provenance of plants used in projects. Most actions will apply to the parts of the Park Lands under the care and control of the City of Adelaide, including the River Torrens.

[1] The formal definition and description of biodiversity from the SA Government's No Species Loss strategy will be used (pp 8-9); in brief, biodiversity is *'the variety of life in all its forms – the different plants, animals, fungi, bacteria and other micro-organisms, the genes they contain, and the ecosystems of which they form a part'*.

The focus is on remnant biodiversity. Areas of planted native species are included if they are well planned and delivering positive biodiversity outcomes that are consistent with the principles, objectives and strategies of this Plan.

This is a five-year Plan, from 2018 to 2023.

STRATEGIC CONTEXT

City of Adelaide

Strategic Plan

The City of Adelaide 2016–2020 Strategic Plan sets a vision for Adelaide as a welcoming and dynamic city full of rich and diverse experiences, and includes the aim for Adelaide to be an international leader in environmental change.

This Plan contributes to delivery of the following targets and actions from the Green theme of the Strategic Plan:

- Enhance biodiversity in the Park Lands and strengthen their role in achieving a carbon neutral city
- Improve the ecological value of watercourses and biodiversity in the Park Lands
- By 2020, aquatic native plants on the Torrens Lake floor will have increased from almost zero to 7,500 square metres
- Reduce stormwater run-off and pollution into the River Torrens through integrated catchment management and water sensitive urban design
- Continue to work with the State Government and other councils to reduce stormwater and other pollutants into the River Torrens catchment

Park Lands Management Strategy

The Adelaide Park Lands Management Strategy 2015–2025 (APLMS) provides a vision and a detailed strategic framework for management of the Park Lands. The APLMS was developed by the Adelaide Park Lands Authority and has been adopted by the City of Adelaide and the relevant Minister.

One of five outcomes for the Park Lands is:

- Sustainable + Enduring Places: places that thrive in the face of a changing climate

This outcome includes several strategies and actions that address biodiversity, watercourses, and ecological management.

The APLMS also provides a detailed blueprint for protection and improvement of the Park Lands, including identifying Park Lands precincts that show how the plan's spatial planning approach will result in a diverse and integrated park system. This Plan responds to the APLMS by identifying how biodiversity conservation will be integrated with other land uses and precinct planning in the Park Lands.

The APLMS was developed after an extensive community engagement program called *Shape the Park Lands*. Protection of biodiversity and natural areas in the Park Lands and along creeks were priorities that arose from this engagement. The detailed ideas and submissions generated by Shape the Park Lands have been used in developing this Plan.

Reconciliation Action Plan

The Stretch Reconciliation Action Plan 2015–2018 (RAP) consolidates Council's longstanding commitment to reconciliation with Aboriginal and Torres Strait Islander Peoples. The RAP is based on three core ingredients: respect, relationships and opportunities. One of six guiding principles of the RAP is that CoA will 'seek the advice and participation of Aboriginal and Torres Strait Islander Peoples on key issues of interest to the community, and will promote cooperative approaches on these issues between the City of Adelaide and Aboriginal and Torres Strait Islander Peoples'. This principle underpins the approach adopted in this Plan.

Asset Management Plan

The Park Lands and Open Space Asset Management Plan (April 2016) demonstrates responsive management of Park Lands and open space assets and the services they provide, and identifies the funding needed to meet the required levels of service; it also includes a plan for improvement of asset management practices. Biodiversity and natural asset management are areas that have been identified for improvement.

Resilient East

In 2016 the eastern metropolitan councils and CoA developed the Resilient East Climate Change Adaptation Plan. This included an assessment of the likely impacts of climate change on natural landscapes in the region, and several adaptation options for implementation immediately and in the future. These have guided the development of actions relating to climate change in this Plan.

External policy environment

Convention on Biological Diversity

Australia is party to the UN Convention on Biological Diversity (CBD), which provides a framework for integrating natural resources and biodiversity management policies. All parties must develop and implement national biodiversity strategies and action plans.

National Biodiversity Strategy

Australia's Biodiversity Conservation Strategy 2010–2030 meets the obligation under the CBD to prepare a strategy and action plan. Three national priorities are defined:

1. Engaging all Australians (including increasing Indigenous engagement)
2. Building ecosystem resilience in a changing climate
3. Getting measurable results (including knowledge sharing and monitoring)

These priorities are strong themes of this Plan.

No Species Loss

No Species Loss: A Biodiversity Strategy for South Australia 2006–2016 defines a vision for biodiversity conservation and management, and lists numerous goals, strategies and actions.

The Nature of SA project is re-thinking biodiversity conservation and building shared visions and strategic policy directions for nature conservation in South Australia. It will build on No Species Loss to develop a shared vision and a new approach to biodiversity conservation.

Regional NRM Plan

The Adelaide and Mount Lofty Ranges Natural Resources Management (NRM) Plan, developed by the Adelaide and Mount Lofty Ranges NRM Board, identifies what needs to be done by all

stakeholders to manage the region's natural resources, and includes long-term goals and aspirational targets for the future. The NRM planning framework is currently under review.

Legislative

The following acts are relevant to the management of biodiversity in the Adelaide Park Lands.

EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. Among other provisions, the EPBC Act lists nationally threatened native species and ecological communities.

One ecological community listed as endangered under the EPBC Act occurs within the CoA boundary: remnants of 'Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia' are present in the south-eastern Park Lands.

Only one species listed under the EPBC Act is present in the Park Lands: the Grey-headed Flying Fox (*Pteropus poliocephalus*) is listed as vulnerable (Table 2).

National Parks and Wildlife Act

The *National Parks and Wildlife Act 1972 (SA)* (NPW Act) lists endangered, vulnerable and rare species in South Australia. Two species listed under the NPW Act are present in the Park Lands (Table 2).

Adelaide Park Lands Act

The *Adelaide Park Lands Act 2005 (SA)* includes a number of statutory principles, including:

'The contribution the Park Lands make to the natural heritage of the Adelaide Plains should be recognised, and Park Lands initiatives which can improve the biodiversity and sustainability of the Adelaide Plains should be considered.'

NRM Act

The *Natural Resources Management Act 2004 (SA)* provides guiding principles for natural resources management in South Australia through an integrated and sustainable framework. The City of Adelaide lies within the Adelaide and Mount Lofty Ranges NRM region. The NRM Act is currently under review.

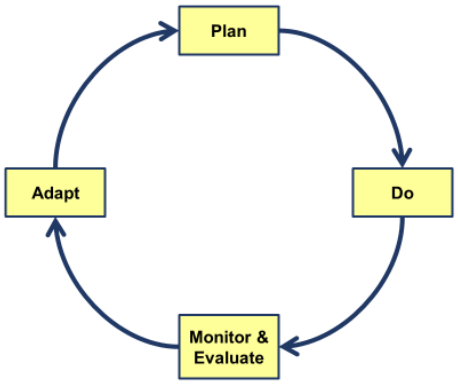
Native Vegetation Act

The *Native Vegetation Act 1991 (SA),* which is the key piece of legislation related to managing native vegetation in South Australia, does not apply in the City of Adelaide area.

OUR PLANNING APPROACH

Best practice

There are many models available for undertaking best-practice conservation planning. In particular, the Open Standards for the Practice of Conservation[2] provide a structured and repeatable process for planning, implementing, and monitoring conservation works. The Open Standards are based on adaptive management or 'learning by doing': learn what works, what does not work, and why, and continuously adapt what you are doing in response to those learnings.



Key components to this cycle that this Plan follows include:

- Define scope and vision/objectives
- Analyse conservation situation
- Identify key threats/risks
- Set conservation targets
- Develop strategies, actions and monitoring plan
- Cost actions and prepare budgets
- Implement actions
- Implement monitoring
- Evaluate results and practices
- Adapt practices and priorities.

This ensures that priorities and actions are clearly defined and derived through a logical planning process. Any significant additional actions should only be undertaken in the context of the ongoing review of priorities.

[2] Conservation Measures Partnership April 2013 (Version 3.0): http://cmp-openstandards.org/wp-content/uploads/2014/03/CMP-OS-V3-0-Final.pdf

Principles of biodiversity conservation

This Plan is based on the following principles:

1. Protecting and enhancing remnant vegetation and habitat is the highest priority

   Remnant vegetation will be managed using best-practice techniques to promote survival and recruitment of desirable native species. Revegetation does have a role, especially where it assists in enhancing viability and size of existing remnants, and for pre-European communities that have been fully cleared. However, this should be well planned and have clear ecological goals.

2. Connected populations have greater genetic diversity and are more resilient

   To maximise the likelihood of populations of species surviving, larger populations are preferable. This increases genetic diversity, reduces the risk of local extinction, and increases the capacity of the populations, species and ecosystems to cope with a changing climate.

   For these reasons, biodiversity should be managed at a landscape scale rather than at the scale of individual remnants. Managing the best-quality biodiversity areas with linkages to improve connectivity will facilitate larger, more genetically diverse and resilient populations.

3. Use both a coarse filter and fine filter approach

   Conserving representative samples of all the ecological communities in a region and managing at an ecosystem level can facilitate conservation of most species present. This is referred to as the coarse filter approach. Some species and other features 'fall through' this coarse filter and are not benefited by it (e.g. species that have particular habitat requirements). A fine filter approach addresses the specific needs of species and other components of ecological systems (such as providing hollows or specific food plants). By combining a coarse and fine filter approach, conservation outcomes are maximised.

SITUATION ANALYSIS

Ecological description

What was it like before European settlement?

Kraehenbuehl (1996)[3] mapped and described the pre-European vegetation of the Adelaide Plains, using historical records and other sources. His book provides a fascinating insight into the early days of natural history endeavours, European settlement and clearance of native vegetation on the Adelaide Plains.

Long (2003)[4] prepared a comprehensive catalogue of the knowledge of the historical and current biodiversity of the Adelaide Park Lands. This includes a map of the pre-European vegetation, relying

[3] Kraehenbuehl, DK 1996 *Pre-European Vegetation of Adelaide: A Survey from the Gawler River to Hallett Cove.* Nature Conservation Society of SA, Inc.
[4] Long, M 2003 *A Biodiversity Survey of the Adelaide Park Lands, South Australia.* Department for Environment and Heritage, SA.

heavily on the work of Kraehenbuehl, and detailed descriptions of vegetation communities, flora and fauna, and soil.

Prior to European settlement, the City of Adelaide area was covered with a rich diversity of eucalypt woodlands, with other ecosystems scattered throughout, including grassy plains, wetlands and waterholes, and shrubland.

There were five main vegetation communities in the City of Adelaide area at the time of European settlement; these were described by Long (2003, pp. 24–33), and their distribution is shown in Map 1[5]. These would not have been clear-cut zones of distinct vegetation types: they would have been variable in composition, merged and blended with each other, and been punctuated by other minor vegetation types. The main vegetation communities are:

I. *Eucalyptus microcarpa* (Grey Box) / *E. leucoxylon* (SA Blue Gum) Woodland, in the south-east of the city. An extension of the Black Forest that grew south of the city, this community was primarily open grassy woodland in the city area.
II. *E. leucoxylon* (SA Blue Gum) / *E. camaldulensis* (River Red Gum) Woodland, in the east and north-east of the city.
III. *E. camaldulensis* (River Red Gum) Woodland, along the creeks and river systems. The vegetation in these areas was particularly variable.
IV. *E. porosa* (Mallee Box) Woodland, occurring as two distinct associations:
IV-A in the west of the city and adjoining city area, and
IV-B in North Adelaide.

Prior to European settlement, greater Adelaide was one of the most biodiverse areas in South Australia. It contained 30% of South Australia's plant species, 43% of its birds, 32% of its land mammals, 20% of its reptiles and 20% of its frogs.

The River Torrens in the City of Adelaide location at the time of European settlement was a small river with numerous waterholes, lined with River Red Gum, SA Blue Gum and associated vegetation. Its flow was highly variable, with periods of no flow being common in summer.

What is it like now?

Clearance of the native vegetation on the Adelaide Plains was rapid and extensive after European settlement, and now approximately 3% of the original cover remains on the Plains. Most remnants of native vegetation are highly modified.

Vegetation remnants persist in the Adelaide Park Lands. They vary widely in condition, from good (having reasonable diversity and cover of native species) to poor (having low diversity and cover of native species). This remnant vegetation has been mapped and categorised as good, medium and poor, and this is shown in Map 1.

In the remnants of grassy woodland that persist in the Park Lands, the tree layer has been removed, leaving a modified grassy understorey that is sometimes referred to as 'derived native grassland'. This is particularly true of the remnants of vegetation community I: *Eucalyptus microcarpa* (Grey Box) / *E. leucoxylon* (SA Blue Gum) grassy woodland in the south-east Park Lands; the EPBC-listed Grey Box Woodland and Derived Native Grasslands fit into this category.

[5] The maps in this Plan use the pre-European boundaries from Kraehenbuehl (1996); those from Long (2003) differ only slightly.

There are still many native plant species present in the Park Lands. Long reported that 183 indigenous species were still present during the 2003 survey, and new records of previously unrecorded species are often made.

As occurred across South Australia, the mammal fauna suffered severe declines after settlement, and over 50% of greater Adelaide's original native mammal species are now locally extinct. There are now only ten species remaining in the Park Lands of the 33 that were present (plus a recent arrival, the Grey-headed Flying-fox).

The bird fauna has seen fewer extinctions than the mammal fauna, but there have been significant changes in populations of most species. Some species have become locally extinct, many have declined and continue to decline, and populations of some species are increasing.

Data on the abundance of reptiles and amphibians in the Park Lands are scarce. No local reptile extinctions have been reported, although one frog species is considered to have become locally extinct; all frog species and most reptiles are likely to have declined in abundance (Long 2003).

Freshwater fish form a significant component of the aquatic biodiversity of the Adelaide region. They have been severely affected by changes to aquatic systems, with the loss of many species and declines in range and abundance of others. Only eight of the 16 indigenous freshwater fish species that were historically present still occur.

There are numerous records of invertebrates from the Park Lands, primarily for butterflies, ants and spiders. Some of these species, especially butterflies, are known to have declined in abundance.

Recent fauna surveys have found that the Park Lands locations with the highest fauna diversity are sites near water: watercourses and stormwater management sites. Similarly, linear features such as watercourses provide opportunities for enhancing ecological connectivity in the landscape, both within the Park Lands and with neighbouring areas.

There have been many efforts to re-establish native vegetation in recent decades, and the most significant revegetation areas are mapped in Map 2.

The most significant change to the River Torrens in the City has been the construction of the Torrens Weir in 1880, which created Torrens Lake. Due to its location low in the catchment, the Torrens Lake receives a high input of debris, sediment, nutrients and other pollutants. When conditions of increased nutrients, high temperatures and low flow conditions coincide, cyanobacteria blooms sometimes occur and the Lake is closed for public use. Given the high profile of the Lake, these closures are undesirable.

Threats

Impacts on flora and fauna

The primary threats to the vegetation remnants in the Park Lands are clearance and weeds (which can include Australian native plant species that are not locally indigenous) competing with indigenous plants and changing the structure, composition and function of the vegetation. Remnant grasslands are highly susceptible to invasion by non-native grasses, including from surrounding land uses (e.g. turf grasses).

Declines of bird populations in the Park Lands are well documented, and likely causes include changes to the distribution and abundance of plant species; and changes to vegetation structure, especially the removal of understorey and mid-storey species, resulting in less shelter from

predators and competitors and changed foraging conditions. The native bird Noisy Miner (*Manorina melanocephala*) is particularly aggressive towards other birds and is known to cause reductions in populations of small birds, and is in high numbers in the Park Lands.

The River Torrens is a highly modified catchment, and the Torrens Lake is an artificial impoundment, therefore the threats to native flora and fauna in this system are numerous. The primary threats are poor water quality, barriers to movement (weirs), lack of habitat and food, over-predation, competition with introduced species, and altered hydrodynamics (changes to parameters such as water flows, flooding, and wetting and drying cycles). The Torrens Weir is the main impact on fish and turtle passage within the catchment.

Climate change

Climate change poses a significant threat to the City's ecological systems. Warmer and drier conditions are expected to have an impact on the survival and recruitment of many native species. The condition of remnant vegetation and habitats may decline, and the structure and composition of vegetation communities is expected to change. The selection of plants for planting programs will have to consider these changing conditions. Climate change is also expected to exacerbate some existing threats; for example, some plants and animals will benefit from the changed conditions and become invasive.

Multiple-use setting

The Park Lands is a highly diverse landscape, containing many areas of high cultural and social importance. The presence of patches of native vegetation within this dynamic landscape of sport, culture and recreation is very unusual and adds greatly to the richness of the Park Lands. Nevertheless, it is challenging to protect and enhance the ecological values of these remnants in such a matrix of urban land uses, and poorly managed human impacts can be a threat to Park Lands biodiversity.

The Adelaide Park Lands Management Strategy (APLMS) is the primary policy for integrating the multiple uses of the Park Lands, and the precinct plans are integral to achieving this balance (as described in section 4 Strategic Context). Other important documents are the Adelaide Park Lands Events Management Plan 2016–2020 and the Sports Infrastructure Master Plan - West and South Park Lands Regional Sports Areas (supported in principle by Council in 2014). This Plan will work with these documents to gain clarity, where needed, on the primary use of locations in the Park Lands and to ensure that planning for facilities and other infrastructure is integrated.

Community engagement

Volunteers

Members of the Adelaide community make important contributions to the protection of biodiversity in the Park Lands. There are more than 150 regular community volunteers who work in biodiversity sites in the Park Lands. These volunteers manage several priority remnant vegetation sites, and a substantial amount of revegetation has been undertaken by volunteers. The revegetation in G S Kingston Park / Wirrarninthi is of particular note and there is scope to establish a community education hub based around this site, to raise awareness and develop skills in revegetation and associated activities.

Biodiversity volunteering achieves multiple outcomes. Volunteers benefit from gaining knowledge and skills in a range of activities, such as bushcare techniques, revegetation, nursery activities, monitoring, and plant and bird identification. There are also many less tangible benefits for

biodiversity volunteers, such as the opportunity to work as part of a team and with people from across the community, and significant health and wellbeing benefits. The City of Adelaide benefits from the availability of a skilled and committed workforce to jointly deliver priority outcomes in the Park Lands.

There is a need to review the volunteer program to ensure that optimal outcomes are achieved for the community and for CoA. For volunteers, this will include ensuring that new opportunities are identified and effectively promoted, and that fulfilling training and other forms of knowledge transfer are provided. Partnerships and strategic alliances with many groups, including non-government organisations, corporations, schools and other educational institutions, will be vital to growing the volunteer opportunities in the Park Lands.

From CoA's perspective, it is important that the program retains its focus on providing meaningful work delivering priority outcomes. This will also entail providing a clear scope, in line with this document and any relevant management plans, and a process to ensure that volunteer projects stay within scope.

Park Lands Visitation

The Adelaide Park Lands receive approximately ten million visits a year, for a vast range of activities and events. An analysis of Park Lands visitation in 2013 found that 21% of these visits were for informal activities (i.e. not events, sport or a commercial destination).

Most visitors to the Park Lands would be unaware that remnants of our natural heritage surround them. These high levels of visitation provide a special opportunity for CoA to showcase its commitment to biodiversity conservation and connect South Australians and other visitors with the nature of the region.

Kaurna connection to country

The Kaurna People are the Traditional Owners of the Adelaide Plains, and have continuing cultural and spiritual obligations in their lands and seas. The culture of the Kaurna People is inextricably linked with the ecology of the region. The sustainable management of the land, including the use of fire, by the Kaurna People had a major impact on the evolution of the ecosystems of the Adelaide Plains. The absence of fire in these ecosystems exacerbates many management challenges in the contemporary landscape.

The Kaurna People's connection to country is ongoing. There are opportunities to seek the advice and participation of the Kaurna People in management of biodiversity in the Park Lands. This will improve management outcomes, and will enable acknowledgement and celebration of the Kaurna People's culture and ongoing connection to country.

Asset management and horticulture practices

Including biodiversity and the services it provides in CoA's Asset Management Plan will enable biodiversity to be considered as an asset group, which will be a significant step forward in planning service levels and resource allocation.

Horticultural Maintenance Guidelines outline the benchmarks to which the Park Lands are maintained, and locations are managed according to particular guidelines. Although guidelines are applicable to sites that are managed for biodiversity, it is timely to undertake a review of the relevant guidelines to ensure that there is full alignment between biodiversity goals, management practices and horticultural guidelines.

It is important that there is clarity around which sites in the Park Lands are being managed for biodiversity. This is to ensure that there is no ambiguity around management of locations, and that appropriate resources, personnel and maintenance guidelines can be applied with certainty to all locations.

It is also important that there is certainty around how biodiversity sites are being managed. Management plans linked to appropriate Horticultural Maintenance Guidelines will be central to achieving this.

This Plan provides certainty regarding the boundaries of areas managed for biodiversity and establishes planning processes that will provide certainty around how these are managed.

CONSERVATION TARGETS

To achieve our objectives, we will focus our efforts on conservation targets in the following categories:

1. Ecosystems – coarse filter
2. Species – fine filter
3. Threats – across the Park Lands.

Ecosystems

We will continue to protect and manage significant remnants of native vegetation. By improving the composition, structure and function of remnant vegetation, we will deliver positive outcomes for many of the constituent species and ecological processes.

For many years we have been focussing our biodiversity conservation efforts in six locations known as key biodiversity areas (KBAs). By ensuring that there is at least one such KBA in each pre-European vegetation community, we maximise the number of species, associations and ecological processes that are benefited.

We will continue to manage six KBAs, as mapped in Map 3 and described in Table 1. All were identified in CoA's previous Biodiversity and Water Quality Action Plan and have been modified slightly in this Plan to reflect new knowledge and changed priorities. Map 3 also shows the site of a new community education hub, based around the revegetation site in G S Kingston Park / Wirrarninthi.

The vegetation within each KBA is included in the relevant precinct plan in the Park Lands Strategy (APLMS), providing vital context for integrating biodiversity conservation with other Park Lands uses (Table 1).

Table 1: Vegetation community (see section 5), Park Lands precinct (from APLMS) and other observations for each key biodiversity area (KBA).

KBA	Vegetation community	Park Lands precinct	Comments
1	I: Grey Box / SA Blue Gum Woodland	Victoria Park	Includes Management Agreement area containing a remnant of EPBC-listed Grey Box Woodlands and Derived Native Grasslands.
2	IV-A: Mallee Box Woodland (south-west) I: Grey Box / SA Blue Gum Woodland	South-West	Boundary between vegetation types passes through this area.
3	IV-B: Mallee Box Woodland (North Adelaide)	North	
4	IV-B: Mallee Box Woodland (North Adelaide) II: SA Blue Gum / River Red Gum Woodland	North	Includes a zone in north-east Park Lands mapped as SA Blue Gum in Long (2003) but not shown in Map 1.
5	III: River Red Gum Woodland	Botanic & Adelaide Zoo, North-East	No remnant vegetation; re-establishment of riparian woodland along high banks of River Torrens in Mistletoe Park / Tainmuntilla.
6	III: River Red Gum Woodland	Bonython	No remnant vegetation; re-establishment of riparian woodland along low-lying reach of River Torrens in Bonython Park / Tulya Wardli.

Four of the KBAs contain remnant vegetation, and two are comprised of reconstructed vegetation with very few remnant plants present. The KBAs have been chosen to ensure that the best condition remnants are managed for biodiversity, and to ensure that each pre-European vegetation community is included.

The KBAs that contain remnant vegetation are patchy in composition and ecological condition. Importantly, they all contain substantial areas of vegetation that are mapped as being in good condition (Map 4). These areas are surrounded by native vegetation in poorer condition, and by other land uses including open non-native woodlands, plantings of Australian native flora, roads and paths.

We will manage the KBAs according to principles of landscape-scale conservation:

- The good condition remnants within the KBAs will be managed as the highest priority; management will be most intense in these cores and will use best-practice bush restoration techniques.
- Surrounding areas of poorer condition vegetation within the KBAs will be less intensively managed, as linking areas to facilitate connectivity and increase population sizes.
- The priority is to manage remnant vegetation to promote survival and recruitment of desirable native species. Some planting of species that are indigenous to the site may be

undertaken, where this contributes to improving the condition and viability of the remnants.
- Past revegetation areas will be modified to improve their contribution to ecological goals and to improve aesthetics where possible.

The two KBAs that contain little remnant vegetation (Tulya Wardli and Tainmuntilla) are located at two locations along the River Torrens (Map 4), in vegetation community III: River Red Gum Woodland. These projects have been underway for many years, and management will focus on maintenance to discourage weeds, other impacts from the River (e.g. flood damage and debris), and additional works to move the vegetation toward the target structure and composition.

Management plans will be prepared for all six KBAs, and will:

- Be based on data describing the current ecological condition.
- Set targets of composition and structure, based on:
  1. the vegetation type that is considered to have been present at European settlement; and
  2. consideration of the implications of a changing climate.
- Be based on landscape ecology principles.
- Use a zoning approach to spatially define the boundaries of different areas within the KBA, particularly the best condition areas, linking areas, revegetation that contributes to ecological goals, and plantings that have other roles in the landscape.
- Explicitly link with asset management and horticulture practices, and horticulture guidelines, to provide clarity around roles and responsibilities and resource allocation.
- Address experiential opportunities (e.g. interpretation, nature play, access) and facilities required.

We will seek opportunities to use watercourses and stormwater channels to enhance ecological connectivity within the Park Lands and with neighbouring areas.

We will also manage our catchments to improve the ecological health of our watercourses. We aim for a Torrens Lake that is ecologically healthy and diverse, with aquatic plants, native fish and other flora and fauna thriving, and that does not experience blue-green algae outbreaks.

Species

We will manage significant species that 'fall through' the coarse filter of ecosystem-level works and require attention. This will include any species listed as threatened at the State or national level (Table 2), and other species (or groups of species) that are of priority. These species or groups will be determined through a systematic review of available information on population status, threats and other considerations, and will be considered by a cross-program governance group that will be established under this Plan.

Detailed flora and fauna surveys, with accompanying management recommendations, were undertaken in 2017 and 2018, and will provide the basis for identifying species priorities. Regional conservation ratings and the Regional Recovery Plan[6] for threatened species in the Adelaide and Mt Lofty Ranges will also be a reference for identifying species priorities.

[6] Willson, A and Bignall, J 2009 Regional Recovery plan for Threatened Species and Ecological Communities of Adelaide and the Mount Lofty Ranges, South Australia. Department for Environment and Heritage, Adelaide.

Table 2: Species known to be present in the Park Lands that are considered threatened at the State or national level. V – vulnerable; R – rare; EPBC – *Environment Protection and Biodiversity Act 1991* (Commonwealth); NPW – *National Parks and Wildlife Act 1972* (State); no formal listing – invertebrates are not listed under NPW Act, but CoA has previously undertaken to manage for Chequered Copper conservation because it is considered rare.

Common name	Scientific name	Status	Comments
Fauna			
Grey-headed Flying-fox	*Pteropus poliocephalus*	V, EPBC; R, NPW	Manage nuisance impacts while also managing as a threatened species
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	V, NPW	Requires exotic trees especially pines
Chequered Copper (butterfly)	*Lucia limbaria*	R, no formal listing	Management statement has been prepared for species in Victoria Park; needs Native Sorrel *Oxalis perennans* and ant species *Iridomyrmex rufoniger*
Flora			
Swollen Spear-grass	*Austrostipa gibbosa*	R, NPW	Protect in Victoria Park / Pakapakanthi

Threats

Some threats will require a Park Lands-wide approach to manage their impact and will not be adequately addressed by ecosystem-level or species-level works.

Weeds

Many weeds, especially declared plants and alert weeds in South Australia and weeds of national significance, require a coordinated approach to identify them and implement appropriate and effective responses. Programs must be coordinated with other landholders, including other councils and State government agencies, to achieve success.

Climate change

Our response to the impacts of climate change on biodiversity will be largely informed by the Resilient East Climate Change Adaptation Plan. Resilient East provides valuable direction for managing threats from climate change, with immediate actions to enhance the ecological resilience of remnant biodiversity and improve our understanding of impacts and management approaches; and longer-term actions in a partnership across the region to prepare our ecological systems for the significant changes ahead.

STRATEGIES AND ACTIONS

Strategies

The following eight (8) strategies and thirty-six (36) actions are adopted:

Strategy 1: Manage ecosystems

Strategy 2: Conserve species

Strategy 3: Connect the community

Strategy 4: Incorporate Kaurna knowledge

Strategy 5: Prepare for climate change

Strategy 6: Integrate biodiversity

Strategy 7: Provide leadership

Strategy 8: Provide good governance

Actions

STRATEGY 1: MANAGE ECOSYSTEMS

Action 1.1: Continue to manage the native vegetation in the six biodiversity areas mapped in Map 3.

Action 1.2: Prepare a management plan for each key biodiversity area, based on principles of landscape scale conservation, that is consistent with the precinct plans in the Adelaide Park Lands Management Strategy.

Action 1.3: Manage areas planted with native species to ensure they make positive contributions to achieving ecological objectives.

Action 1.4: Monitor remnant vegetation and planted vegetation to assess progress towards management objectives.

Action 1.5: Investigate the use of fire as a management tool in grasslands.

Action 1.6: Seek opportunities to use watercourses and stormwater channels to enhance ecological connectivity within the Park Lands and with neighbouring areas.

Action 1.7: Develop an alert list for priority weeds, identify appropriate management responses, and raise awareness of these among operational staff.

Action 1.8: Complete the Tainmuntilla riparian restoration project.

Action 1.9: Implement an aquatic plant revegetation program in the Torrens Lake.

Action 1.10: Collaborate with State Government agencies, other councils and other stakeholders in managing catchments to improve the ecological health of watercourses.

STRATEGY 2: CONSERVE SPECIES

Action 2.1: Review information on distribution, abundance, status and threats for flora and fauna species, and determine priority species or groups of species and appropriate actions, through the established governance group.

Action 2.2: Implement identified actions to conserve priority species or groups of species.

Action 2.3: Compile and consolidate all records of flora and fauna from the Park Lands, and establish protocols for centralised storage of data that is linked to the asset system.

Action 2.4: Consider fauna habitat requirements when managing remnant vegetation.

Action 2.5: Protect the genetic integrity and genetic variability of remnant populations by only using local provenance forms/cultivars/genetic material when planting species that occurred naturally in the Park Lands, unless agreed otherwise as part of a provenancing strategy to manage the impacts of climate change.

STRATEGY 3: CONNECT THE COMMUNITY

Action 3.1: Develop a biodiversity interpretation plan to raise public awareness of, and attract people to experience, the biodiversity of the Park Lands and the region.

Action 3.2: Provide diverse opportunities for people to interact with nature in the Park Lands.

Action 3.3: Continue to support community volunteers to have meaningful and skilled input to priority biodiversity projects in the Park Lands.

Action 3.4: Review the biodiversity volunteer program, with a continuing focus on excellence in delivering defined outcomes while increasing opportunities and the number of volunteers, improving volunteers' experience, and creating partnerships and strategic alliances.

Action 3.5: Establish a community education hub at the revegetation site in G S Kingston Park / Wirrarninthi, to raise awareness of the project and its aims, and to develop skills in revegetation and associated activities.

Action 3.6: Improve our ecological understanding and management through partnerships with research institutions and non-government organisations.

STRATEGY 4: INCORPORATE KAURNA KNOWLEDGE

Action 4.1: Work with the Kaurna People to identify opportunities to incorporate traditional knowledge into biodiversity management in the Park Lands.

Action 4.2: Identify opportunities for the Kaurna People to regularly share their knowledge of biodiversity and ecological management.

Action 4.3: Incorporate appropriate Kaurna biodiversity management strategies into 'business as usual' management practices.

Action 4.4: Provide culturally appropriate interpretation of Kaurna knowledge and culture relating to biodiversity.

STRATEGY 5: PREPARE FOR CLIMATE CHANGE

Action 5.1: Manage ecosystems and species for resilience, connectivity and genetic diversity to assist remnant vegetation and populations of species to cope with changes in climate.

Action 5.2: Monitor ecosystems and species with specific attention to possible impacts of climate change on survivorship and recruitment, and modify management plans and practices where appropriate.

Action 5.3: Form a regional partnership to implement relevant actions from the Resilient East Regional Climate Change Adaptation Plan.

STRATEGY 6: INTEGRATE BIODIVERSITY CONSERVATION

Action 6.1: Ensure that there is clarity around the management of all biodiversity areas in the Park Lands, and that boundaries are defined, management objectives are clear, a horticulture guideline has been assigned, and responsibility is clear.

Action 6.2: Review relevant horticultural management guidelines to align with agreed biodiversity management approaches.

Action 6.3: Develop a methodology to value biodiversity assets and ecosystem services and treat them as an asset group, and incorporate this into the Asset Management Plan.

Action 6.4: Collaborate with South Australian Government agencies, other councils and other stakeholders to achieve integrated management of biodiversity and threats.

STRATEGY 7: PROVIDE LEADERSHIP

Action 7.1: Continue to pursue best-practice biodiversity management, and share our lessons learnt with other councils, through forums such as the Local Government Biodiversity Network and through active partnerships.

Action 7.2: Pursue interstate and international partnerships and programs through Local Governments for Sustainability (ICLEI), including investigating initiatives such as Local Action for Biodiversity and the Durban Commitment.

STRATEGY 8: PROVIDE GOOD GOVERNANCE

Action 8.1: Establish a group from across the City of Adelaide to take ownership of implementation, review, and evaluation for the life of this Plan.

Action 8.2: Publicly report on progress in implementation of this Plan.

Measures of Success

1. All key biodiversity areas have a management plan that clearly defines boundaries, roles and responsibilities, and is based on landscape ecology principles.

2. The requirements of all significant species have been assessed.

3. The relevant Asset Management Plan includes consideration of biodiversity and the services it provides.

4. A monitoring program is in place to assess progress towards this Plan's objectives and strategies.

5. Progress in implementation of this Plan is reviewed annually by a cross-program governance group and modifications made as appropriate.

6. Progress in implementation of this Plan is reported publicly.

7. The biodiversity volunteer program has been reviewed.

Monitoring

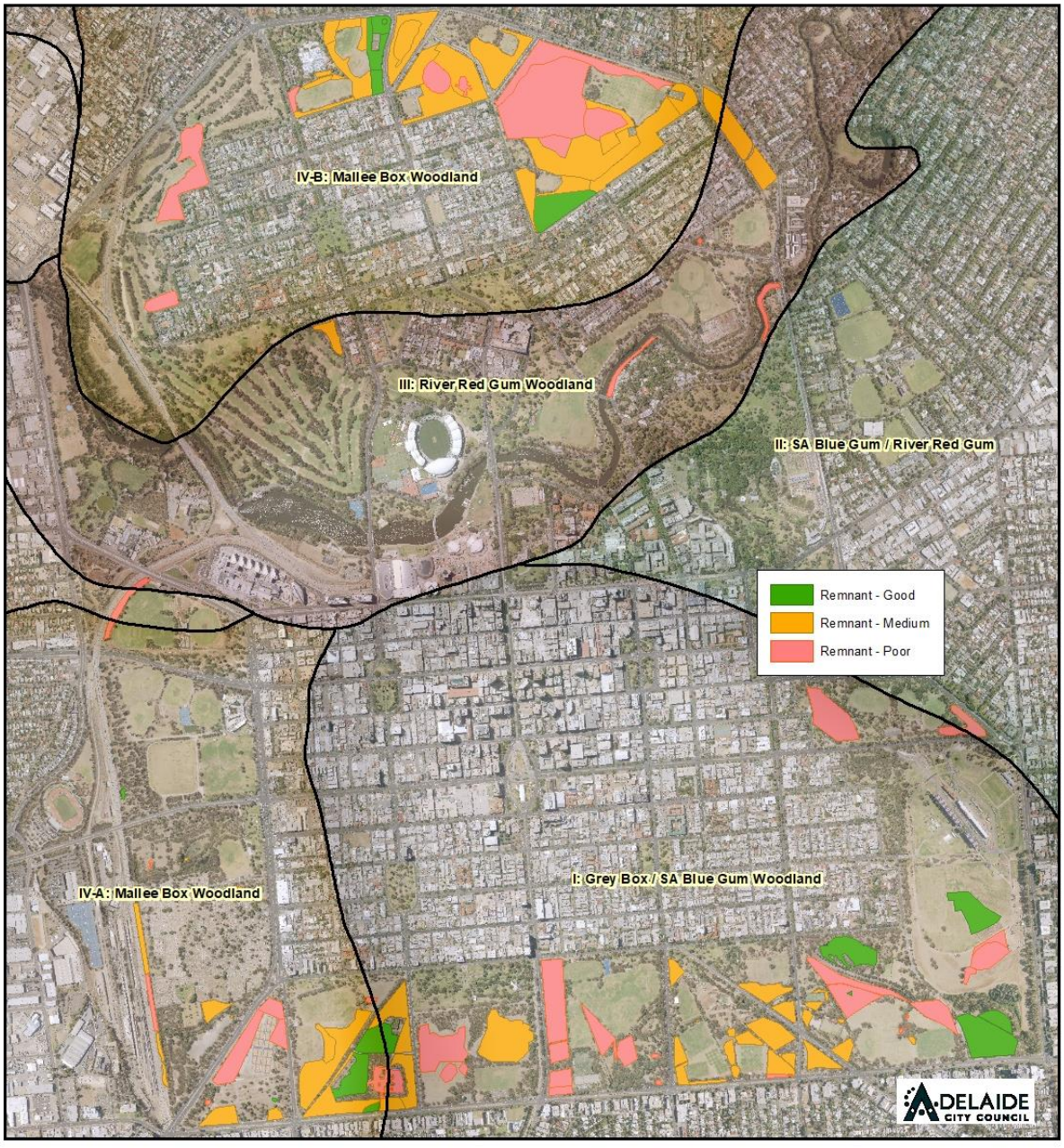
To enable completion of the adaptive management cycle, we will monitor and evaluate practices and results, learn from these findings, and adapt what we are doing if necessary.

A monitoring plan will be developed, which will include:

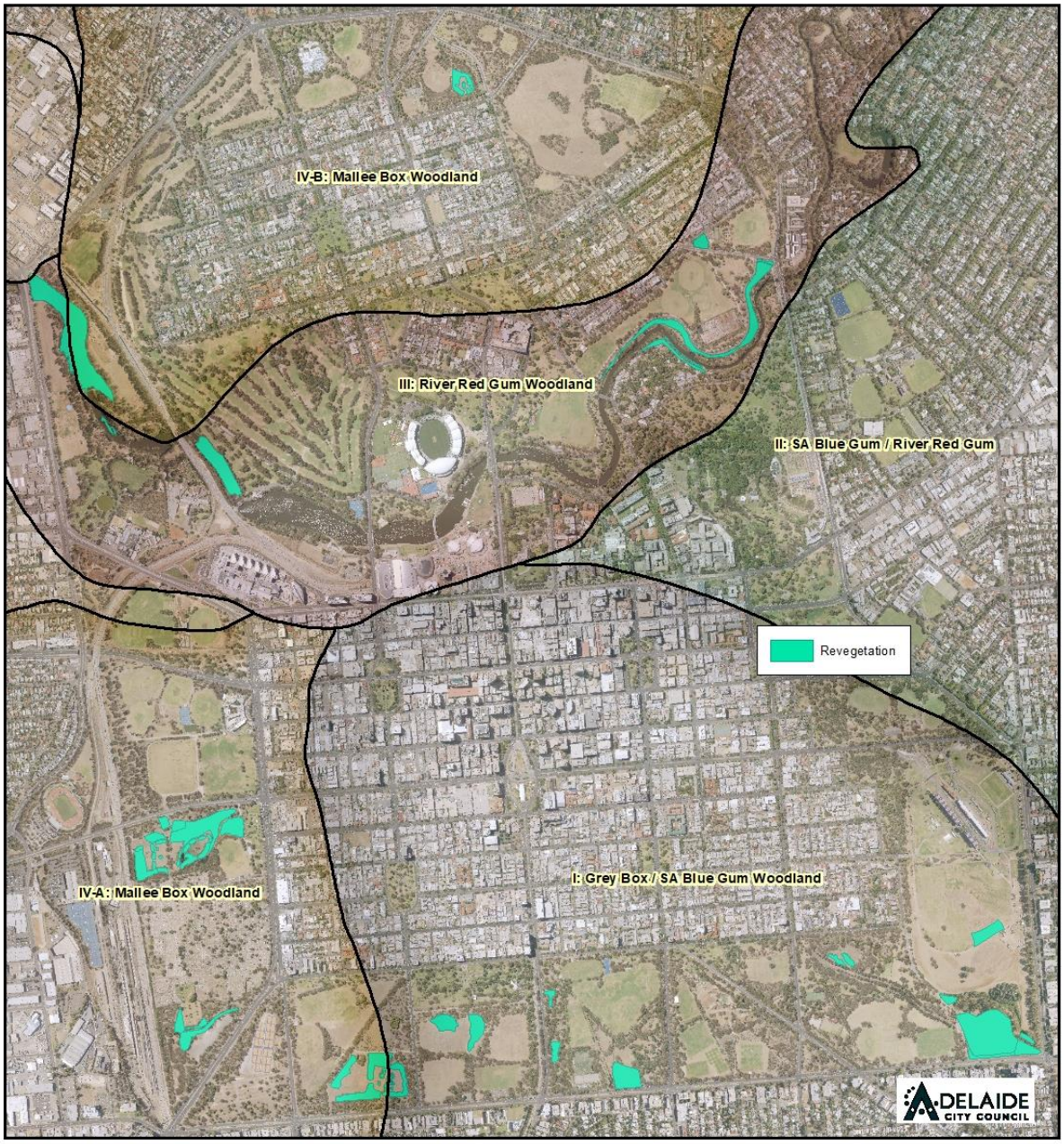
- Assessment against the objectives, actions and measures of success
- Monitoring of particular sites, including key biodiversity areas
- Monitoring of significant species
- Evaluation of effectiveness of on-ground practices
- Evaluation of priorities.

On-ground monitoring programs will be specifically designed to assess progress against explicit outcomes and will be reasonably simple and cost-effective.

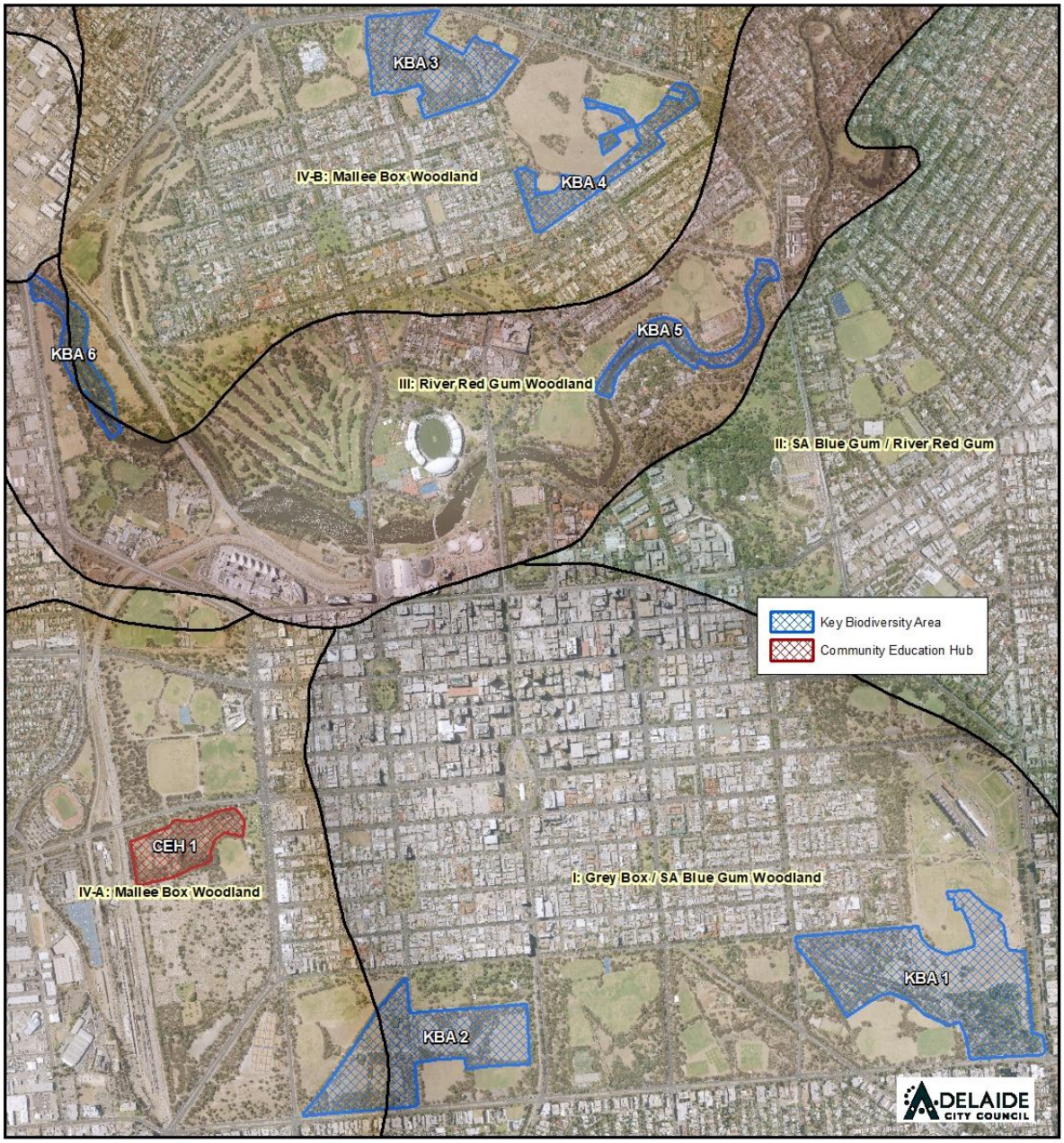
Maps



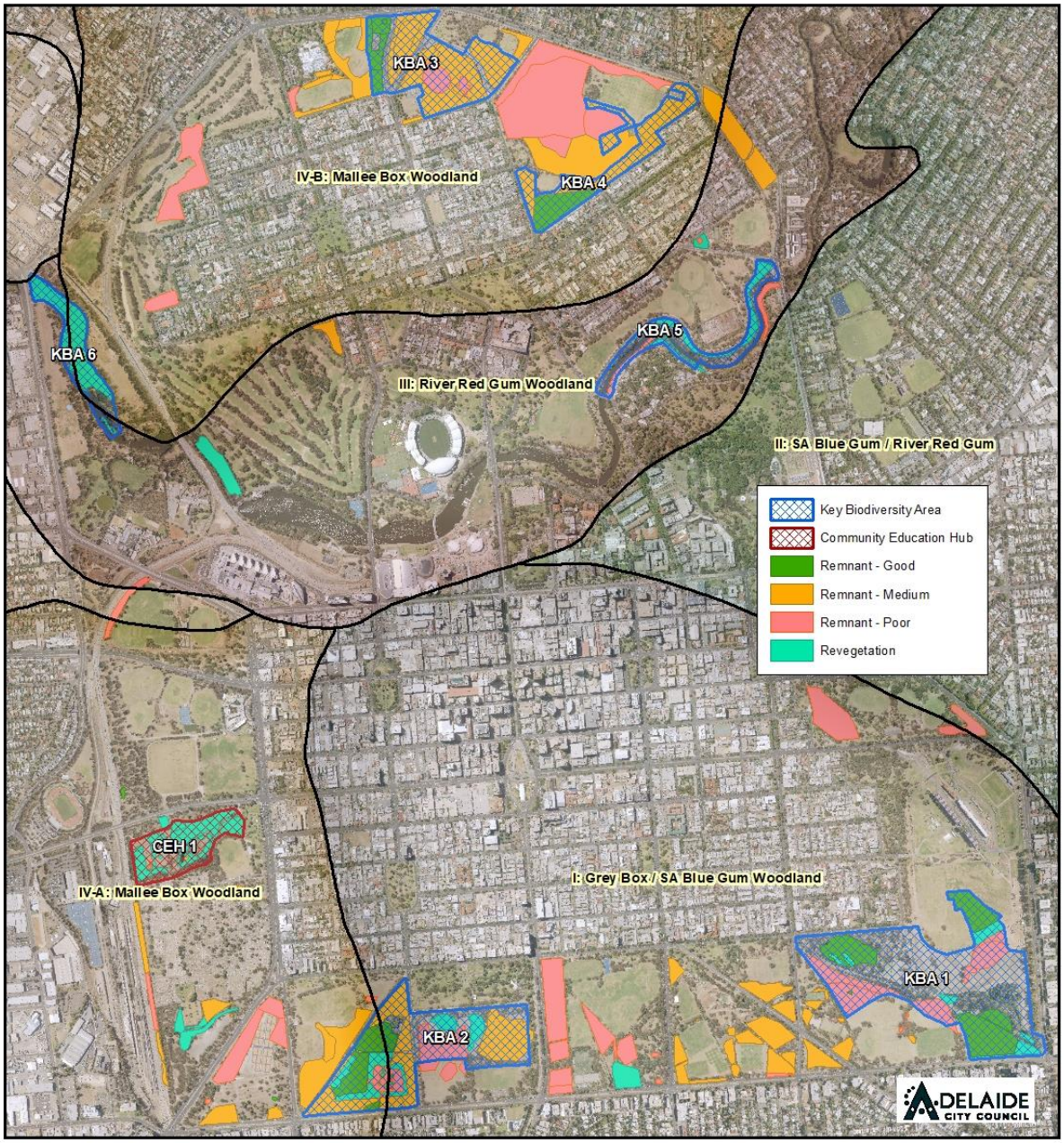
Map 1: Pre-European vegetation boundaries and mapped remnant vegetation in the Adelaide Park Lands (areas under the care and control of the City of Adelaide). See text for explanation of the pre-European vegetation communities and categories of vegetation condition.



Map 2: Significant areas in the Adelaide Park Lands that have been revegetated with plant species that are indigenous to the locality. Pre-European vegetation boundaries are also shown.



Map 3: Key Biodiversity Areas and Community Education Hub; see text and Table 1 for descriptions of the Key Biodiversity Areas. Pre-European vegetation boundaries are also shown.



Map 4: Map showing pre-European vegetation boundaries, mapped remnant vegetation, significant revegetation, Key Biodiversity Areas and the Community Education Hub.