Bird Sensitive City

HANDBOOK

CITY OF ADELAIDE

Acknowledgement to Country

City of Adelaide tampinthi, ngadlu Kaurna yartangka panpapanpalyarninthi (inparrinthi). Kaurna miyurna yaitya mathanya Wama Tarntanyaku. Parnaku yailtya, parnaku tapa purruna, parnaku yarta ngadlu tampinthi. Yalaka Kaurna miyurna itu yailtya, tapa purruna, yarta kuma puru martinthi, puru warri-apinthi, puru tangka martulayinthi.

City of Adelaide acknowledges the traditional country of the Kaurna people of the Adelaide Plains and pays respect to Elders past and present. We recognise and respect their cultural heritage, beliefs and relationship with the land. We acknowledge that they are of continuing importance to the Kaurna people living today.

Thank you to

Green Adelaide, Birds SA, City of Port Adelaide Enfield, Nature Conservation Society of South Australia & Bush For Life for your support and contribution to this document.

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For more information, visit

www.cityofadelaide.com.au/biodiversity

Overview

INTRODUCTION

The number of woodland birds in the Adelaide and Mount Lofty Ranges region has dropped by 45% since 2001, with 38 of 65 monitored species in decline, according to recent studies*. This is due to a number of factors, including habitat loss or fragmentation, smaller population sizes and isolation and competition from larger, more aggressive birds.

Declining species include raptors, parrots, owls, kingfishers, treecreepers, fairywrens, thornbills, robins and honeyeaters. Some species are stable in areas where extensive sections of woodland remain but are now uncommon or have vanished in areas where woodlands have been reduced. It is crucial to invest in the restoration of key ecosystems at a landscape level to counter the current decline of species relying on woodland habitat. Reaching a target of 30% of native vegetation should help to re-establish viable populations in the broader Adelaide and Mount Lofty Ranges region.

Cities can play a supporting role. Urban landscapes with well-designed green areas may significantly support local biodiversity. In addition, bringing nature into the city has many benefits for its residents. For example, people are healthier and happier, and the city is more resilient to climate change. A ‘wilder’ urban habitat has added value as an education tool, inspiring residents to connect with nature.

Our city and Park Lands support small native bird species by providing refuge, feeding and breeding habitats. Recreational and economic activities can coexist with bird habitat requirements with careful planning and appropriate habitat management and restoration.

This Bird Sensitive City Handbook provides information about what can be done to protect and enhance habitats for small native birds, as well as minimise and manage potential threats.

Superb Fairy-wren

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* Prowse, T. et al. (2021). Optimising monitoring for trend detection after 16 years of woodland-bird surveys. Journal of Applied Ecology Issue 5, Vol. 58.

* Whatmough, J. van Weenen, J. & J. Tan (2013). Bird Counts for the City of Adelaide Park Lands (DRAFT)

OUR APPROACH

Biodiversity Sensitive Urban Design (BSUD) approach was recently adopted by the City of Adelaide to reduce the impacts of urbanisation on native flora and fauna. It aims to expand and improve habitat resources in the urban area to contribute to the conservation of South Australian biodiversity and to enhance environmental connections and community wellbeing. This approach shows that the coordination of good design, conservation science, appropriate planting and site management can create the optimal conditions for the growth of biodiversity in an urban environment.

Birds in the city

Birds are identified as one of the most readily recognised wildlife connections that most urban residents experience regularly. Birds are useful to raise public awareness of important conservation issues. They are mostly diurnal (active in the day), are seen throughout most habitats and their absence is often noticed. In addition, urban birds are useful indicators of ecosystem health, as they are intimately linked with their habitats. **That's why we have used urban birds as a flagship for this handbook**; they show us where our efforts to improve our urban landscapes have been effective. It follows that by developing bird-specific management practices, we can effectively inform urban planning and design to support these improvements and engage the community in our sustainable approach.

To achieve this approach at the City of Adelaide, we coordinated three workshops and several discussion sessions across a Working Group. This Working Group consisted of experts from the City of Adelaide, Green Adelaide, Birds SA, City of Port Adelaide Enfield, Nature Conservation Society of South Australia & Bush For Life. Our main objective was to investigate the potential to maintain or increase the number of small native bird species using the city and Park Lands, especially species that are in decline or extinct in the Adelaide Park Lands. The workshops identified a list of rare or declining species based on an assessment of current and former status. The habitats and threats facing these species were then analysed to provide a list of target species that are most likely to benefit from management actions.

Some of the listed actions can be achieved in the short term, whereas others will take longer (e.g. waiting for planted trees to mature). Some of these actions will benefit multiple species – these are described as 'general management' actions. Other actions will be specific to individual species. These actions need to be assessed against other management objectives for the Park Lands so that any potential conflicts can be identified and resolved.

The final aim was to practically translate conservation science into an 'easy-to-use' tool by incorporating contemporary ecological knowledge into a handbook.

Audience

This handbook can be used by planners, designers and policy makers to guide their decisions by marrying goals of design aesthetics with ecosystem functionality and biodiversity conservation.

In addition, the Bird Sensitive City Handbook will facilitate local stewardship of biodiversity by providing 'cues to care', creating opportunities for positive interactions with nature, and addressing conflicts between biodiversity and urban development. Residents (i.e. garden owners) can use these guidelines to understand and implement the principles underlying BSUD to improve the ecological value of their backyard.

HABITATS IN THE CITY OF ADELAIDE

The Adelaide region at the time of the first European settlement was one of the most biodiverse areas in South Australia.

Adelaide's Park Lands pre-date many of the world's old parks such as Central Park in New York, Birkenhead in Merseyside and Derby Arboretum. The Adelaide Park Lands were a planned system of encircling public Park Lands and, uniquely, have essentially survived.

Set aside to serve the recreational needs of the citizens of Adelaide, and largely cleared of original vegetation, the Adelaide Park Lands also served as a refuge for those species of plants and animals that managed to survive and adapt.

The Adelaide Park Lands are today a multipurpose green landscape, with a diversity of native and exotic vegetation. The City of Adelaide's Integrated Biodiversity Management Plan sets aims, strategies and actions to manage Key Biodiversity Areas (KBA). It achieves this by protecting and enhancing native vegetation and improving connectivity throughout the landscape.

The City of Adelaide Management Plans for Key Biodiversity Areas protect four different ecological communities:

1. Grey Box / SA Blue Gum Woodland
2. SA Blue Gum / River Red Gum Woodland
3. River Red Gum Woodland
4. Mallee Box Woodland.

Vegetation remnants with many native plant species are still present in the Adelaide Park Lands. However, their condition varies from good (with reasonable diversity and cover of native species) to poor (with low diversity and cover of native species).

Over the many years of landscape modification, the Park Lands have seen significant changes in the populations of most bird species. Some species have become locally extinct, while many others have declined and continue to decline. However, parks and formal gardens still can provide suitable habitat for a range of native bird species. Further details can be found in the 'Biodiversity Survey of The Adelaide Park Lands' by M. Long, 2003.

The Adelaide Park Lands

Bird management

WHAT WE CAN DO

To improve biodiversity conservation, it is important to provide habitat for native birds that were once common in the Park Lands but are now in decline or extinct.

In Adelaide and many other cities across Australia, urban bird communities are often dominated by medium to large-sized omnivores and nectarivores. Species such as Noisy Miners are particularly aggressive and often chase away other birds from their territory.

Providing structural and plant diversity (using local native species) is fundamental to supplying appropriate habitat for small native bird species. However, to avoid the occupation by species such as Noisy Miners, it is important to clearly state what species are targeted by the proposed management.

Targeted bird species are explored under 'Species-specific management' on page 21.

A landscape that is attractive to small native birds should fulfill all of their basic needs, including food, shelter, water and nesting sites. To birds flying over an area, a highly textured landscape signals abundance and availability of food resources and cover for safe foraging. In a fragmented environment, the size of these habitat patches and, for some bird species, their connectivity to one another, is also important. Understorey vegetation is a key contributor to a healthy ecosystem and provides particularly important habitat for small birds and their prey.

Incorporating biodiversity habitat quality into urban planning and urban green design can substantially increase urban bird abundance and diversity. For example, there are opportunities to protect habitat through legislative and strategic instruments such as Adelaide Park Lands Community Land Management Plans and the Integrated Biodiversity Management Plan, which set out key biodiversity areas to be protected. These documents enable protection and enhancement of habitat for birds (and other animals).

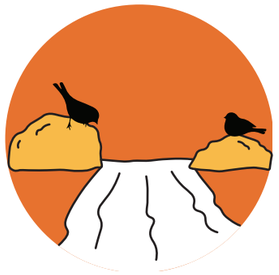
New Holland Honeyeater

The specifics of these habitat requirements are dependent upon the target bird species. For some declining species, there is a lack of ecological knowledge to provide effective recommendations. The general management principles in this handbook present a comprehensive approach in how to remediate urban habitats to create a friendlier environment for small native birds.

GENERAL MANAGEMENT

Our general management includes seven themes.

1. Protect and enhance dense planted areas



2. Improve waterways and water accessibility for small native birds

3. Create ecological corridors and improve connectivity

4. Protect hollows and provide, monitor and maintain nesting boxes

5. Improve habitats in the cityscape and gardens

6. Manage threats and 'Noisy Miner effect'

7. Build community leadership and collaborations

GENERAL MANAGEMENT

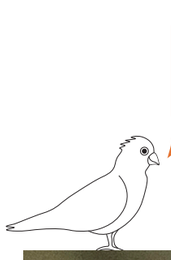
1. Protect and enhance dense planted areas

A diversity of habitats with multiple layers benefits more bird species than a less complex area. The structure and complexity of diverse plant species provides habitat suitable for foraging, moving, nesting and predator avoidance.

Remnant vegetation and bird habitat (trees with hollows, bare ground, grassy patches, dead vegetation) need to be protected and better understood for their value for target bird species. The City of Adelaide retains some patches of remnant vegetation, original to the site. A range of methods are used to encourage regeneration of plant species, such as fire, smoke and hand weeding.

ACTIONS

- **Create habitat with a high degree of structural complexity.** Revegetate with native trees, low-maintenance shrubs (of various heights), annual herbs, ground covers and grasses. This will increase the number of different bird species that can be supported by the site or provide habitat for their prey (e.g. insects).
- **Revegetate with native plant species that traditionally occur in the area.** Native vegetation is usually best suited to the soil and climate conditions at the site and therefore is more likely to establish and survive. The City of Adelaide nursery grows native plants from local provenance sources and the horticulture team can provide valuable information about the particular species that are best suited to the habitat. In particular, shrubs and ground covers are a crucial layer that is often missing in our urban landscape. The enhancement of this ecological community has the potential to attract a greater variety of bird species.
- **Retain or add ground elements.** Elements such as leaf litter, twigs, fallen branches, logs and rocks provide habitat for birds where they can forage or find shelter.
- **Inform the public that 'messy' densely vegetated areas effectively support bird life.** This counters the misconception that 'clean is best'.




Yellow Thornbill

ATTRACTS


Drooping she-oak
Allocasuarina verticillata
Image courtesy POI Australia


Murray Cypress Pine
Callitris gracilis


Weeping Pittosporum
Pittosporum angustifolium
Image courtesy Fagg/M.ANBG


Yellow Thornbill


Silvereye


Sweet Bursaria
Bursaria spinosa
Image courtesy Gardening with Angus


Austral trefoil
Lotus australis
Image courtesy Lucid Key Server


Native Lilac
Hardenbergia violacea
Image courtesy OzBreed


Dwarf Rice Flower
Pimelea humilis
Image courtesy Gardening with Angus


Golden Whistler


Running Postman
Kennedia prostrata
Image courtesy iNaturalist


White Carpet
Scaevola albida
Image courtesy Gardening with Angus


Grey Shrike Thrush


Tussock Mat-rush
Lomandra densiflora
Image courtesy iNaturalist


Grass Tree
Xanthorrhoea semiplana
Image courtesy ResearchGate


Lomandra
Lomandra multiflora ssp. dura
Image courtesy Burnside Biodiversity

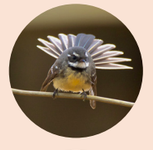

Silver Cassia
Senna artemisioides
Image courtesy Adelaide Botanic Garden


Chocolate Lily
Arthropodium fimbriatum
Image courtesy ANBG


Ruby Salt Bush
Enchylaena tomentosa
Image courtesy Australian Seed

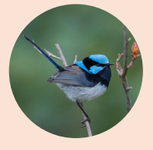

Atriplex spp.
A. semibaccata, A. suberecta
Image courtesy Butterfly Conservation SA

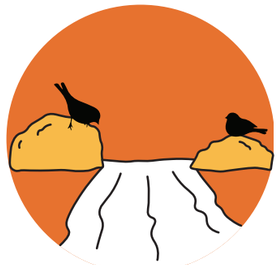

Common Wallaby Grass
Rytidosperma caespitosum
Image courtesy ApaceWA


Grey Fantail


Austrostipa spp.
A. elegantissima, A. eremophila, A. flavescens, A. nodosa
Image courtesy Cottesloe Coatscare Assn


Kangaroo Grass
Themeda triandra
Image courtesy Gardening with Angus


Superb Fairy-wren



2. Improve waterways and water accessibility for small native birds

The River Torrens / Karrawirra Pari is the most important waterway in the city of Adelaide. This river is a vital ecological corridor meandering for 85 kilometers from the Adelaide Hills near Mount Pleasant to the Gulf St Vincent. With minor creeks and channels, the river helps to shape the biodiversity present in our city. The habitats along its banks are valued as centres of high bird diversity. These areas are particularly important for aquatic plants and animals, as well as providing habitat for a range of unique land-based species. These water systems can act as wildlife corridors, both as linear strips and steppingstones, and are actively used as a navigation landmark for bats and other flying animals.

ACTIONS

- **Connect our waterbodies with ecological corridors.** Plant dense foliage vegetation to connect waterways or create new bodies of water that act as steppingstones between creeks, wetlands and the river.
- **Build small artificial ponds designed for small native birds.** Different types of birds have diverse requirements to access water for drinking and bathing. Ponds with gradual banks and a variety of water edge access (see Bird Sensitive Urban Design example page 26) will attract small native birds.
- **Provide ad-hoc water sources in KBAs.** It is important to provide water for small native birds to use; additional water may also improve habitat productivity (e.g. insects) and plant health. Bird baths or small artificial ponds are a good way to provide access to water if they are appropriately managed. This also applies to areas of low water availability (especially during summer).
- **Factor in the potential effects of climate change to revegetation and water management approaches.** Heat and water stress will affect the survival rate of newly planted vegetation and thought needs to be given in plant selection. Generally, local native plants are best suited to the climate conditions of the area but water-wise plants, or native species from hotter drier areas and/or non-native equivalents may be considered if they are suited to the surrounding ecological community.

Grey Fantail

ATTRACTS

Wooly Tea-tree
Leptospermum lanigerum
Image courtesy Australian Native Plants Society

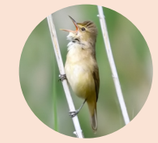
Heath Tea-tree
Leptospermum myrsinoides
Image courtesy Castlemaine Flora

Bottlebrush
Callistemon sieberi
Image courtesy ANBG

Swamp Club-rush
Isolepis inundata
Image courtesy Yarra Ranges Council

Loose Flower Rush
Juncus pauciflorus
Image courtesy Bungalook Nursery

Black Fruit Saw-sedge
Gahnia melanocarpa
Image courtesy Flora of the Great Lakes



Reed Warbler

And other rarer species

Tangled Lignum
Duma florulenta
Image courtesy Lucid Central

Plains Sedge
Carex bichenoviana
Image courtesy VictorianFlora

Billy Buttons
Craspedia variabilis
Image courtesy Castlemaine Flora

Tall Scurf-pea
Cullen australasicum
Image courtesy Butterfly Conservation SA

Spiny flat-sedge
Cyperus gymnocaulos
Image courtesy Burnside Biodiversity

Stiff-leaf Sedge
Cyperus vaginatus
Image courtesy Butterfly Conservation SA

Common Tussock
Poa labillardierei
Image courtesy Australian Native Plants Society

Coast Tussock
Poa poiformis
Image courtesy Gardening with Angus

Superb Fairy-wren

And other small native birds

Gold Dust Wattle
Acacia acinacea
Image courtesy Gardening with Angus

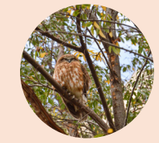
Blackwood
Acacia melanoxylon
Image courtesy Garden Manage

Kangaroo Wattle
Acacia paradoxa
Image courtesy Electronic Flora of SA

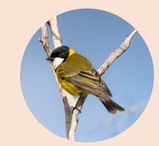
Swamp Wattle
Acacia provincialis
Image courtesy Castlemaine Flora

Golden Wattle
Acacia pycnantha
Image courtesy Australian Native Plants Society

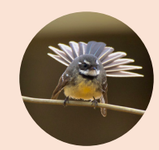
Southern Cypress Pine
Callitris preissii
Image courtesy iNaturalist



Australian Boobook & Kookaburra



Golden Whistler & Rufous Whistler



Grey Fantail & Grey Shrike Thrush

GENERAL MANAGEMENT

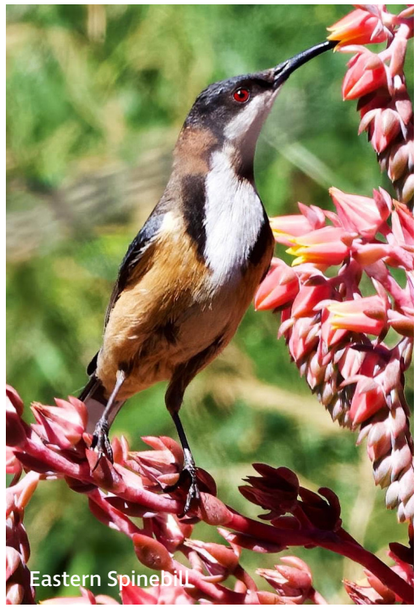
3. Create ecological corridors and improve connectivity

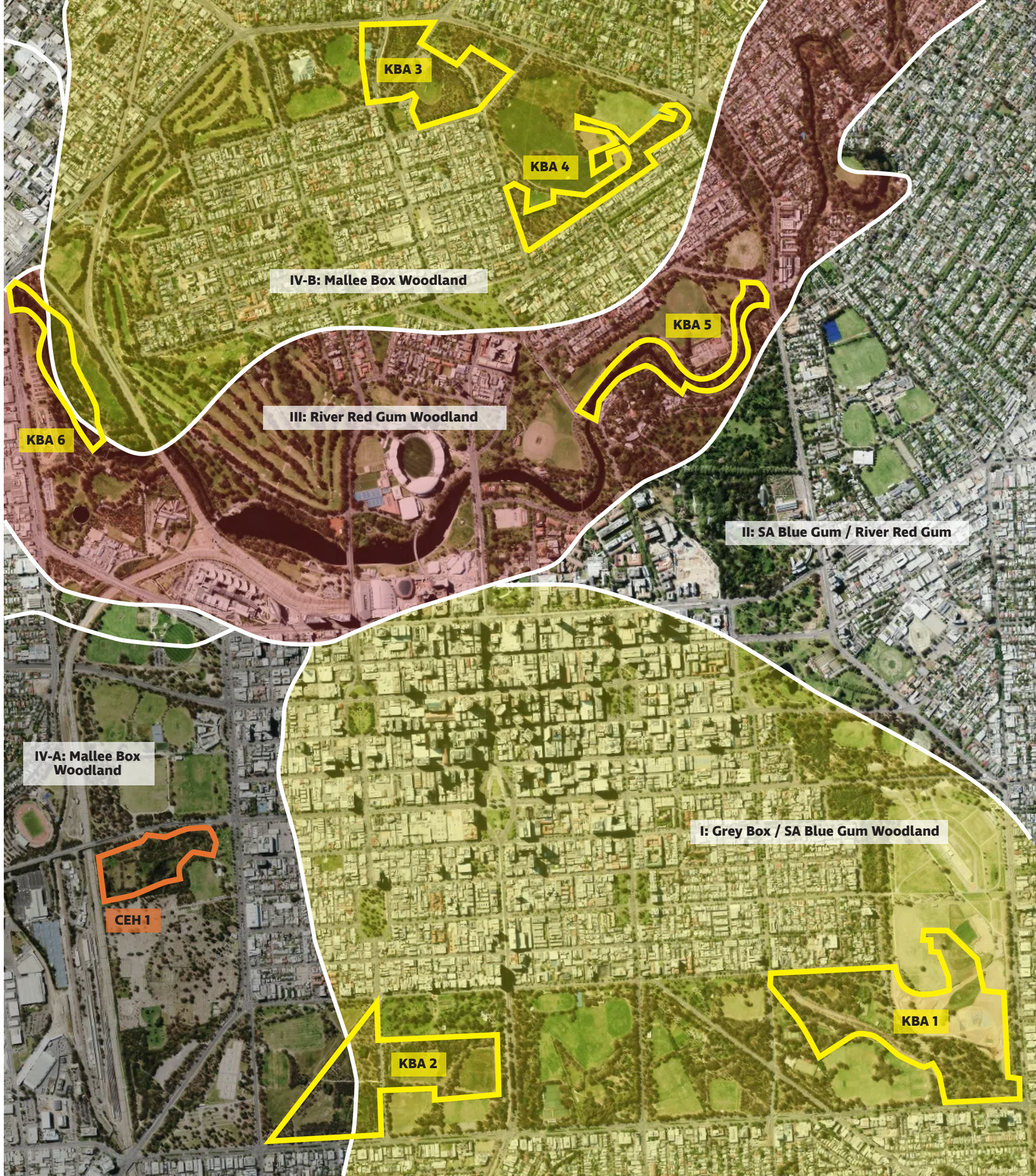
Preserving and enhancing the remnant vegetation and riparian habitats in urban areas is very important but they are often too small and isolated for many native bird species. Protecting and enhancing these corridors will ensure native fauna can move between the patches in search of food, shelter or nesting sites throughout the urban matrix. To establish a viable population of birds species that are now extinct in the Adelaide Park Lands (i.e. Golden Whistler) it is crucial to improve habitat connectivity between the hills and the city. The establishment of ecological corridors and stepping stones across the urban landscape will allow those species to find their way back through the built environment.

KBAs of the Adelaide Park Lands are areas with specific biodiversity values and management. However, these areas are not connected in the Park Lands matrix.

ACTIONS

- **Find opportunities to improve ecological connections.** Creating ecological corridors connecting KBAs will improve ecological processes allowing for the movement of animals and the continuation of viable populations within the Park Lands.
- **Create transition spaces between different land use areas with a high degree of structural complexity.** For example, revegetating sports field perimeters with a variety of native shrubs, ground covers and grasses and avoiding abrupt edges may reduce the presence of invasive species such as Noisy Miners.


Eastern Spinebill



Pictured on the right:
KBAs (yellow) and Community Education Hub (orange) in the Adelaide Park Lands

GENERAL MANAGEMENT

4. Protect hollows and provide, monitor and maintain nesting boxes

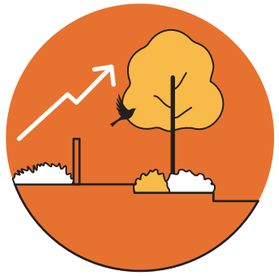
Some of our parks have large old trees that support animal species in the city. As trees age, they develop cavities and dead wood that form vital habitat for animals, such as microbats and many bird species. Decayed trees are often removed by the council for safety reasons and, as a consequence, hollows are in short supply in urban habitats. Trees where dead branches are retained are used by Tree Martins, Dusky Woodswallows and Tawny Frogmouth (particularly horizontal dead branches).

ACTIONS

- **Maintain and manage tree hollows where possible.** However, nesting boxes can be an effective substitute where natural hollows are uncommon.
- **Manage and regularly monitor nesting box use by native species.** Nesting boxes are generally purpose built for specific native mammals (primarily possums and bats) and birds such as pardalotes, kookaburras and owls.
- Remove undesirable species occupying **nesting boxes.** A range of introduced species like the Common Starling (*Sturnus vulgaris*) and feral/honey bees can also occupy nest boxes and must be appropriately managed.
- **Tailor the shape, size and orientation of nesting boxes to the target species.** For example, Laughing Kookaburras (*Dacelo novaeguineae*) need the floor of the nest chamber to be the same height as the entrance, with the box attached horizontally, while most parrots require deep boxes attached vertically. Nesting boxes technical information can be found here.

In the Park Lands there are a number of nesting boxes. It is key to map all nesting boxes present and implement a monitoring program, in collaboration with bird-related NGOs, to better understand what species are using the nesting boxes over the long term. This can further provide an opportunity for the community to connect with the birds that use the Park Lands.

Rainbow Lorikeet



GENERAL MANAGEMENT

5. Improve habitats in the cityscape and gardens

In urban habitats, streetscapes, formal gardens and parks as well as waterways can provide connectivity within the city and provide habitat for birds. Ornamental garden beds, planted with exotic species like fuchsias and salvias, are attractive to small honeyeaters.

ACTIONS

- **Encourage structural and floristic diversity in formal gardens and streetscapes.** A high degree of structural complexity in these areas will encourage visits from small birds, which are more likely to use trees if there is a safe place to retreat. Habitat enhancement for birds is ineffective when there are very few species or isolated exotic tree species. A mix of eucalyptus species with different flowering times will provide year-round nectar for a variety of bird species.
- **Use dedicated trees in formal gardens for educational purposes.** Select trees that illustrate their importance for urban birds.
- **Plant dense, spiny and prickly shrubs in low public visitation areas.** These areas are important to some native birds and may be created in line with Crime Prevention Through Environmental Design (CPTED) guidelines. Dense vegetation in an urban environment can contrast with CPTED, where the emphasis is on clear sight lines and safety issues. Implementation of CPTED often results in elimination of mid and understorey planting, which is detrimental for small native birds that use that area.

SA Blue Gum
Eucalyptus leucoxylon
Image courtesy Gardens Online

Grey Box
Eucalyptus microcarpa
Image courtesy DEW

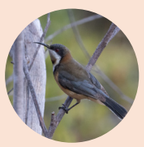
Mixed with flowering shrubs all year round

ATTRACTS

Musk Lorikeet & Purple-crowned Lorikeet

Banksia, Callistemon, Grevillea, Hakea, Melaleuca, Correa ssp.
Image courtesy Australian Plants Online

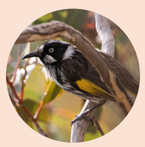
Providing nectar



Eastern Spinebill

Callistemon, Salvia, Grevillea, Eremophila ssp.
Image courtesy Australian Plants Online

Providing nectar



Honey-eaters

Kangaroo Thorn
Acacia paradoxa
Image courtesy Electronic Flora of SA

Sweet Bursaria
Bursaria spinosa
Image courtesy Gardening with Angus

Provide shelter/food

Willie Wagtail

GENERAL MANAGEMENT

6. Manage threats and 'Noisy Miner effect'

The Park Lands share a border with the Central Business District, a high density urban environment where bird sensitive areas can be subject to a range of issues (e.g. extensive noise and light pollution). Mapping of sensitive areas with sensitive bird species can help localise those issues and minimise threats (e.g. improve by-laws for the management of pets in the Park Lands).

Urban habitats are dominated by medium to large birds that are often very aggressive. Noisy Miners are very successful colonisers of urban habitats and exclude smaller birds. The Noisy Miners prefer sites of irrigated grassed areas with scattered larger eucalypts.

ACTIONS

- **Reduce the area of irrigated grass.** Substitute it with vegetation of dense shrub understorey that requires less fertiliser and water.
- **Increase feeding and breeding habitat for Red and Little Wattlebirds.** These species are capable of excluding Noisy Miners.
- **Increase plantings of non-eucalypts near irrigated grassed areas.** This includes species such as *Allocasuarina stricta, Callitris gracilis* and a range of large acacias.

It is key to investigate Noisy Miners breeding ecology and assess control solutions for this problematic species. Regular monitoring helps provide trends and management for decision making. One way to monitor this is create various habitat treatment plots adjacent unchanged control plots and observe bird species visitation. Over time, hopefully some treatment plots will show a reduction in Noisy Miner numbers.

Noisy Miner

A successful bird habitat in Mistletoe Park / Tainmuntilla (Park 11)

GENERAL MANAGEMENT

7. Build community leadership and collaborations

Many of the target bird species in this handbook are highly valued by the general public and there is a collective sense of responsibility to ensure their survival. Community understanding of landscaping improvements and actions implemented for the conservation of these birds is very important.

ACTIONS

- **Involve the community as a key stakeholder.** Engaging with the community for urban habitat projects can be highly beneficial and is often critical to the success of many projects.
- **Utilise volunteer programs and Citizen Science projects.** These can be valuable tools for community engagement, to gather key information and educate the broader community that a 'messy' area and dense vegetation is good for biodiversity.
- **Encourage community involvement with bird surveys.** Community participation in bird surveys is useful to assess the efficacy of bird sensitive management. Birding groups can be involved in the coordination of bird surveys for long-term monitoring to assess the success of the project. Bird surveys are quick and easy to complete and even a one-off survey can be valuable (e.g. Aussie Backyard Bird Count).
- **Raise the profile of bird conservation in the urban environment.** This may influence the political agenda by providing opportunities for community ownership and capacity building.
- **Review integrated biodiversity management policies and strategies.** This should be done using adaptive management techniques and at different governance levels.
- **Explore opportunities to collaborate and communicate within City of Adelaide.** For example, hold discussions with horticulture, irrigation, bio teams on a regular basis to share knowledge and learn. Practical discussions (e.g. toolbox meetings) are very useful to understand relevant on-ground issues and share local knowledge and views.
- **Align goals and create partnerships with other adjoining councils and community groups.** This is essential to protect and enhance vegetation structure and habitat connectivity across the wider landscape (e.g. Linear Park, River Torrens, channels, creeks etc).

Tree planting in the Park Lands in collaboration with the North Adelaide Primary School

SPECIES–SPECIFIC MANAGEMENT

One habitat cannot support all target bird species.

Adaptive management is needed to create or improve bird habitat according to species requirements (e.g. some species require at least 4 ha for survival and/or breeding). Habitat improvement practices can help address limiting factors to attract a specific species to a habitat and discourage invasive species such as Noisy Miners. This could be done by:

- The creation of pockets of dense vegetation for a specific group of birds and appropriate maintenance (e.g. no mowing, just weeding and rubbish collection).
- Ensure key features are not inadvertently lost (e.g. landscape diversity, dense shrubbery etc.).
- Identify ongoing practices that can be detrimental before making any change (e.g. replacing exotic species with natives may eliminate existing habitat – better to have a gradual re-vegetation approach).
- Implement non-native vegetation and artificial structures as valuable assets outside of KBAs when relevant for some species of targeted bird species (e.g. Pyrus on Leigh Street for Tree Martins; salvias and fuchsias provide nectar supplies).
- Species-specific management is successful if the targeted bird species benefits and invasive species, like the Noisy Miners, do not benefit or are discouraged.
- Regularly monitor outcomes of the adaptive management to identify improvements.

Examples of detrimental practices:

- Removing hollows or removing dead trees (these can be habitats)
- Extensive pruning of mistletoes
- Extensive removal of leaf litter in natural settings
- Free roaming of domestic cats
- Park users that trample on vegetation in natural settings
- Over use of pesticides
- Over lit areas / light spill in the Park Lands caused by inappropriate light fixtures

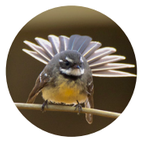
Mistletoebird

THESE ARE NATIVE BIRDS THAT WE WANT TO SEE IN THE ADELAIDE PARK LANDS!

Table 1. List of target bird species, status and proposed management

Species	Former status	Current status	Objective	Current habitat & proposed management
 **Fan-tailed Cuckoo** *Cacomantis flabelliformis*	Uncommon winter visitor	Vagrant	Former status	Woodland with diverse native understorey. General management actions to increase area of habitat. Improve linking habitat to the Adelaide Hills, particularly along the River Torrens
 **Southern Boobook** *Ninox novaeseelandiae*	Common resident	Uncommon resident	Former status	Woodland with diverse native understorey, large hollows for breeding, trees with dense foliage for roosting. General management actions to increase area of habitat. Install and manage more nesting boxes. Manage existing trees to maintain / enhance hollows. Plant trees that have dense foliage (e.g. Callitris). In the urban environment, prey such as rats and mice affected by ingesting pesticides can kill the predators that eat them. It is therefore important to share information on issues related to the potential effect of the poison and avoid its use.
 **Yellow-tailed Black Cockatoo** *Zanda funerea*	Rare vagrant	Summer feeding visitor	Maintain status	Aging pines (*Pinus radiata, Pinus halepensis & Pinus pinea*). Since about 2000, Yellow-tailed Black Cockatoos have visited the Adelaide Plains to feed on the seeds of pine trees and this is likely to continue as their native and non-native food sources in the Mount Lofty Ranges decline. It is important to protect existing pines used by this species. Plant new feed trees (propose P. pinea which is non-invasive) in areas where falling cones is not an issue (i.e. not carparks, etc); consider control of other species that feed on pine seeds, especially Sulphur-crested Cockatoos and corellas.
 **Purple-crowned Lorikeet** *Parvipsitta porphyrocephala*	Common breeding resident	Rare visitor	Breeding resident	Eucalypt woodland, particularly with *E. leucoxylon* and *E. microcarpa*. General management actions to increase area of habitat and monitor colonisation of Rainbow Lorikeets. Install and manage more nesting boxes. Manage existing trees to maintain / enhance hollows. Plant more eucalypts that produce copious nectar such as *E. leucoxylon* and *E. microcarpa*. Plant other eucalypt species that flower at other times to encourage year-round residency.

	Species	Former status	Current status	Objec-tive	Current habitat & proposed management
	**Red-rumped Parrot** *Psephotus haematonotus*	Common breeding resident	Rare resident	Former status	Eucalypt woodland, open areas with short native grasses (not irrigated). General management actions to increase area of habitat. Install and manage more nesting boxes. Manage existing trees to maintain / enhance hollows. Manage grassed areas to encourage native grasses.
	**Superb Fairy-wren** *Malurus cyaneus*	Common breeding resident	Extinct, but small population in western suburbs	Former status	Dense vegetation near water. General management actions to increase area of habitat and reduce Noisy Miners. Plant shrubs that have dense foliage to provide protection (e.g. Lignum, Kangaroo Thorn). Improve linking habitat to existing populations in western suburbs and in the Adelaide Hills (in particular along the River Torrens).
	**Eastern spinebill** *Acanthorhynchus tenuirostris*	Autumn visitor	Autumn visitor	Maintain status	Gardens and parks with shrubs with tubular flowers. General management actions to increase area of habitat and reduce Noisy Miners. Plant shrubs that have dense foliage to provide protection and that have tubular flowers that bear nectar in autumn (e.g. correas, salvias). Improve linking habitat to the Adelaide Hills (in particular along the River Torrens).
	**Red Wattlebird** *Anthochaera carunculata*	Common breeding resident	Uncommon resident	Former status	Eucalypt woodland providing rich nectar sources, with taller shrubs in understorey. General management actions to increase area of habitat and reduce Noisy Miners. Plant tall shrubs/low trees as understorey to eucalypts to provide suitable nesting sites, especially *Acacia pycnantha, Bursaria spinosa*.
	**White-plumed Honeyeater** *Lichenostomus penicillatus*	Common breeding resident	Uncommon resident	Former status	Eucalypt woodland, particularly *Eucalyptus camaldulensis*. General management actions to increase area of habitat and reduce Noisy Miners. Ensure ongoing recruitment of new eucalypts, especially River Red Gums.
	**Striated Pardalote** *Pardalotus striatus*	Common resident	Rare resident	Former status	Eucalypt woodland, particularly *Eucalyptus camaldulensis*. General management actions to increase area of habitat (particularly eucalypts) and in particular to reduce Noisy Miners. Install and manage more nesting boxes. Manage existing trees to maintain / enhance hollows.
	**Weebill** *Smicrornis brevirostris*	Uncommon resident	Vagrant	Former status	Eucalypt woodlands and mallee. General management actions to increase area of habitat (particularly eucalypts) and in particular to reduce Noisy Miners. Ensure ongoing recruitment of new eucalypts.

	Species	Former status	Current status	Objec-tive	Current habitat & proposed management
	**Yellow-rumped Thornbill** *Acanthiza chrysorrhoa*	Common breeding resident	Extinct, but small population in western suburbs	Former status	Open woodlands (especially Drooping Sheoak) with areas of short native grasses (not irrigated). General management actions to increase area of habitat and in particular to reduce Noisy Miners. Manage grassed areas to encourage native grasses. Plant additional open areas with scattered sheoaks.
	**Yellow Thornbill** *Acanthiza nana*	Uncommon resident	Extinct, but small population in western suburbs	Former status	Stands of *Allocasuarina, Callitris and Melaleuca* spp. Planting of a minimum stand of 1 ha of *Allocasuarina verticillata* (with or without *Callitris gracilis*), preferably in an area away from eucalypts and not dominated by Noisy Miners.
	**Black-faced Cuckooshrike** *Coracina novaehollandiae*	Uncommon resident	Rare visitor	Former status	Open eucalypt woodlands. General management actions to increase area of habitat and to reduce Noisy Miners.
	**Golden Whistler** *Pachycephala pectoralis*	Autumn to winter visitor	Vagrant	Former status	Native woodlands and mallee. General management actions to increase area of habitat and to reduce Noisy Miners. Plant taller shrubs and low trees that have dense foliage to provide protection. Improve linking habitat to the Adelaide Hills (in particular along the River Torrens).
	**Willie Wagtail** *Rhipidura leucophrys*	Common breeding resident	Rare resident	Former status	Open woodlands with areas of short grasses. General management actions to increase area of habitat and in particular to reduce Noisy Miners. Manage grassed areas to encourage native grasses.
	**Grey Fantail** *Rhipidura albiscapa*	Common autumn to winter visitor	Uncommon winter visitor	Former status	Native woodlands and mallee. General management actions to increase area of habitat and to reduce Noisy Miners. Plant taller shrubs and low trees that have dense foliage to provide protection. Improve linking habitat to the Adelaide Hills (in particular along the River Torrens).


Yellow-rumped Thornbill

	Species	Former status	Current status	Objec-tive	Current habitat & proposed management
	**Tree Martin** *Petrochelidon nigricans*	Common breeding resident with much of population migrating north in winter	Rare breeding resident with much of population migrating north in winter	Former status	Breeding: horizontal hollow metal cross-arms on power poles, vent holes and damaged cladding in old buildings. Non-breeding: Large roost of national significance in planted Manchurian Pears in Leigh Street, plus some Plane Trees near railway station on North Terrace. Liaise with SA Power Networks to investigate means of insulating cross-arms currently used for nest sites (Adelaide & Mount Lofty NRM has a database of these sites - high summer temperatures lead to a large nestling mortality); investigate if nesting boxes will be used by this species – if so, look at locating nesting boxes in suitable areas; protect existing roost trees and provide adjacent businesses with information on the birds and support with dealing with issues (e.g. daily cleaning of streets from Jan-May, assistance with cleaning of awnings and outside furniture); seek information on important feeding areas used by Tree Martins near Adelaide.
	**Mistletoebird** *Dicaeum hirundinaceum*	Common autumn visitor	Uncommon winter visitor	Former status	Relies largely on mistletoe fruits but will also eat fruits of other plants (mainly only if mistletoe fruits are available nearby). The mistletoe *Lysiana exocarpi* was probably the main mistletoe in the Adelaide area (hosted mainly on *Allocasuarina verticillata*) but possibly there was also *Amyema miquellii* on eucalypts. Increase the number of Lysiana plants (*Lysiana linearifolia*). This relies on having suitable host trees and some initial manual inoculation of new mistletoe plants. There are also several exotic street trees that provide good hosts, especially Golden Rain Tree and some varieties of Crepe Myrtle (refer to various Council's arborists). These could be planted as hosts preferably in an area away from eucalypts and not dominated by Noisy Miners. There has also been some experimentation in Melbourne planting Plane Trees with *Amyema* species which could be investigated here; investigate control of Noisy Miners (see above) as Mistletoebirds are much impacted by miners.
	**Rufous Songlark** *Cincloramphus mathewsi*	Sprint to summer breeding visitor	Vagrant	Former status	Native woodlands and mallee with open areas of native grasses (not irrigated). General management actions to increase area of habitat and to reduce Noisy Miners. Manage grassed areas to encourage native grasses.

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* Long, M. (2003). A Biodiversity Survey of the Adelaide Park Lands, South Australia in 2003. Department for Environment and Heritage
* Whatmough, J. van Weenen, J. & J. Tan (2013). Bird Counts for the City of Adelaide Park Lands (DRAFT)

White-plumed Honeyeater

BIRD SENSITIVE URBAN DESIGN EXAMPLE

This design aims to provide sheltered watering spots that are safe for small native birds and provide opportunities to escape Noisy Miners.

Some design considerations include:

- **A few rocks** over which water cascades providing different depths of water for different sized birds and spots that are suitable for drinking and bathing
- **Fencing or hedging of the area** to assist plant regeneration and attract small native birds, as well as prevent the entry of humans, cats and foxes
- Within the area **a central water feature** that is surrounded by dense bushes and shrubs is needed to provide shelter and nest sites for smaller birds and a refuge from Noisy Miners
- Where there is no water supply, **a water tank** or a self-filling mains water receptacle can be used
- In some sites a **small hide or bird observation wall** could be incorporated with an access path that does not disturb the birds. This would give the public a chance to see the area in action and inside the hide or on the wall there could be posters that identify the birds likely to be seen
- The roof of the hide could be a **catchment for water** to the water tank or support the installation of solar panels where applicable
- This set-up would also be appropriate **near the river** as the uniform banks and dense reeds provide little opportunity for drinking or bathing for most small birds and there is a ready source of water for the central water feature.

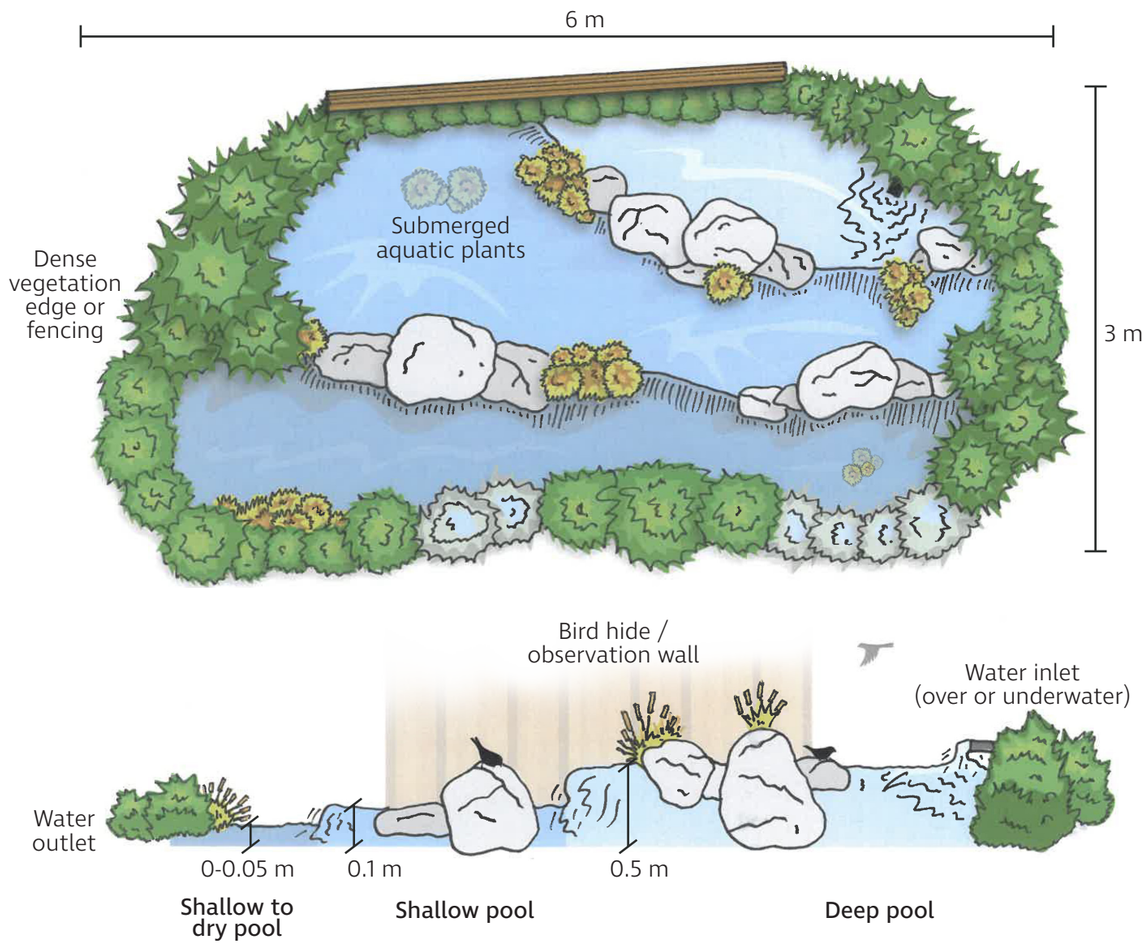
This implements the following principles:

1. **Improvement of waterways and provisioning of water**: providing water when it is most needed and thereby increasing the suitability of the Park Lands as a bird habitat (increased biodiversity).
2. **Conserve and increase dense planted areas**: providing habitat for some of the smaller birds (Superb Fairywrens etc.) as well as nest sites, food and shelter from the aggression of Noisy Miners.
3. **Community leadership**: an opportunity to educate visitors to the Park Lands about the Bird Sensitive City project and conservation of biodiversity.
4. **Community involvement**: coordination of bird surveys to assess efficacy of this asset.

Modelled example of a bird sensitive watering spot

Red-rumped Parrots perched on a rock in a pond

Example of a bird observation wall



Plan view (top) and sectional view (bottom) examples of a bird sensitive watering spot

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