STRATHFIELD

BIODIVERSITY CONSERVATION STRATEGY AND ACTION PLAN 2020-2030

DECEMBER 2019

STRATHFIELD COUNCIL

eco logical AUSTRALIA
A TETRA TECH COMPANY

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ABBREVIATIONS

BC Act	NSW Biodiversity Conservation Act 2016
BOS	Biodiversity Offset Scheme
BCSAP	Biodiversity Conservation Strategy and Action Plan
CEEC	Critically Endangered Ecological Community
CRCIF	Cooks River / Castlereagh Ironbark Forest
CSP	Community Strategic Plan
DPIE	NSW Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
GGBF	Green and Golden Bell Frog
LGA	Local Government Area
PCT	Plant Community Type
TEC	Threatened Ecological Community
VEEC	Vulnerable Endangered Ecological Community
WoNs	Weeds of National Significance

EXECUTIVE SUMMARY

Strathfield Council has developed the *Strathfield Biodiversity Conservation Strategy and Action Plan 2020-2030* to meet legislative requirements (local, state, federal and international law) as well as provide opportunities for the community to engage with biodiversity during a period of rapid growth in the Strathfield Local Government Area (LGA). The Strategy recognises that biodiversity supports our community through the provision of clean air, reducing urban heat, and improving health and wellbeing. This document outlines Strathfield LGA's natural assets (flora and fauna) and outlines the strategic approach to managing biodiversity across the LGA over the next decade.

Strathfield's community wellbeing is directly linked to biodiversity. For thousands of years the Cooks River provided camping, fishing and hunting grounds, as well as the provision of edible plants for the Aboriginal Wangal clan of the Darug tribe. After European settlement the land provided for the establishment of the first farms in the 1700's. In recent studies 94 species of animal have been recorded and over 300 species of plants are known to occur in the LGA. Strathfield's plants and animals live across four different remnant native vegetation communities as well as in planted reserves and streetscapes. Although a predominately green municipality, today less than 1% of native vegetation remains in Strathfield. Bushland has been cleared for the construction of housing and industry, and many riverbanks and waterways have been channelised with concrete. Many of the plants and animals in Strathfield are currently threatened with extinction and listed under the NSW Biodiversity Conservation Act 2016 including all four native vegetation communities, Green and Golden Bell Frog, Grey-headed Flying Fox and the plants Downy Wattle and Narrow-leaved Wilsonia. Many of Strathfield's reserves and parks have high conservation value because they provide habitat for internationally important migratory shorebirds and threatened plants and animals.

Managing biodiversity presents a challenge, particularly in a landscape as highly urbanised as Strathfield. Areas of remnant vegetation are at risk of further decline primarily due to high levels of weed invasion, with commensurate declines in Woodland birds such as wrens, thornbills, and fantails. Additionally, Strathfield's channelised waterways have little or no in-stream habitat for aquatic fauna.

This Strategy will ensure Council prioritises its biodiversity management approach whilst remaining considerate of the environmental, social and economic outcomes for the community. The vision for biodiversity in Strathfield is:

'Strathfield Council's community value and protect our native plants and animals, and the environment in which they live. We support thriving and resilient natural areas and greenspaces which contribute to our health and wellbeing.'

To achieve this vision Strathfield has engaged the local community and completed field studies to determine a strategic approach to managing natural resources to protect and enhance biodiversity. The key strategic priorities Strathfield is working towards include:

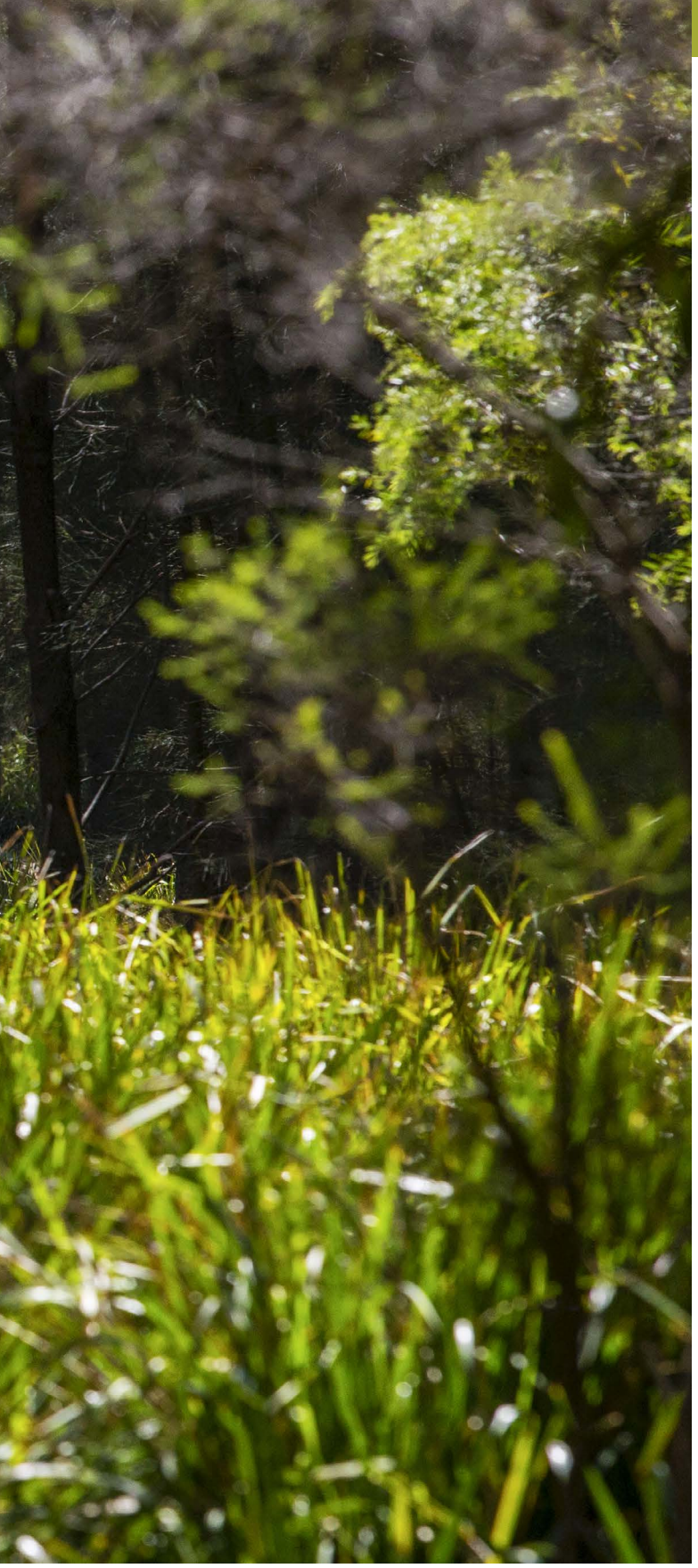
A range of actions have been developed to implement these strategic priorities over the next ten years including ecological restoration, waterways enhancement, community partnerships and education. Actions will be monitored and reviewed to ensure that the actions and outcomes are linked to the *Community Strategic Plan 2030* and *Local Strategic Planning Statement - Strathfield 2040*.

Ensuring native vegetation and habitat is conserved, restored and enhanced.

Improving the health and resilience of Mason Park Wetlands, Cooks River and Coxs Creek.

Connecting reserves, green spaces and streetscapes to support biodiversity.

Actively engaging Community and Council in biodiversity conservation.



CHAPTER 1: BACKGROUND

Strathfield Council LGA in Sydney's Inner West is a highly urbanised environment that features gardens, parks, streetscapes, bushland, wetlands and waterways that support biological diversity. The biodiversity of Strathfield has been substantially reduced since European settlement and continues to be affected by vegetation clearing and habitat degradation. In recent years Strathfield Council, the community and others have acted to protect and rehabilitate green spaces and waterways in the LGA. A strategic and coordinated approach is needed for Council to attract and effectively manage funding for biodiversity protection and enhancement to benefit ecosystem services and community health and wellbeing.

This Strategy and Action Plan has been developed via desktop and field investigations in consultation with the Strathfield community and Council. The Strategy applies to all environments within the Strathfield LGA and aims to:

- Satisfy legislative obligations and be consistent with higher level strategies, plans and policies.
- Support the consolidated *Strathfield Local Environmental Plan*, which is scheduled for release in 2021.
- Link to the *Community Strategic Plan 2030* and *Local Strategic Planning Statement Strathfield 2040*.
- Consolidate or extend previous studies and management actions, completed by Council and their contractors.
- Provide Council and the community with guidance on the use, conservation and enhancement of natural resources in the LGA, and how decisions should be prioritised.
- Inform Council and the community about existing biodiversity values, their threats and challenges.

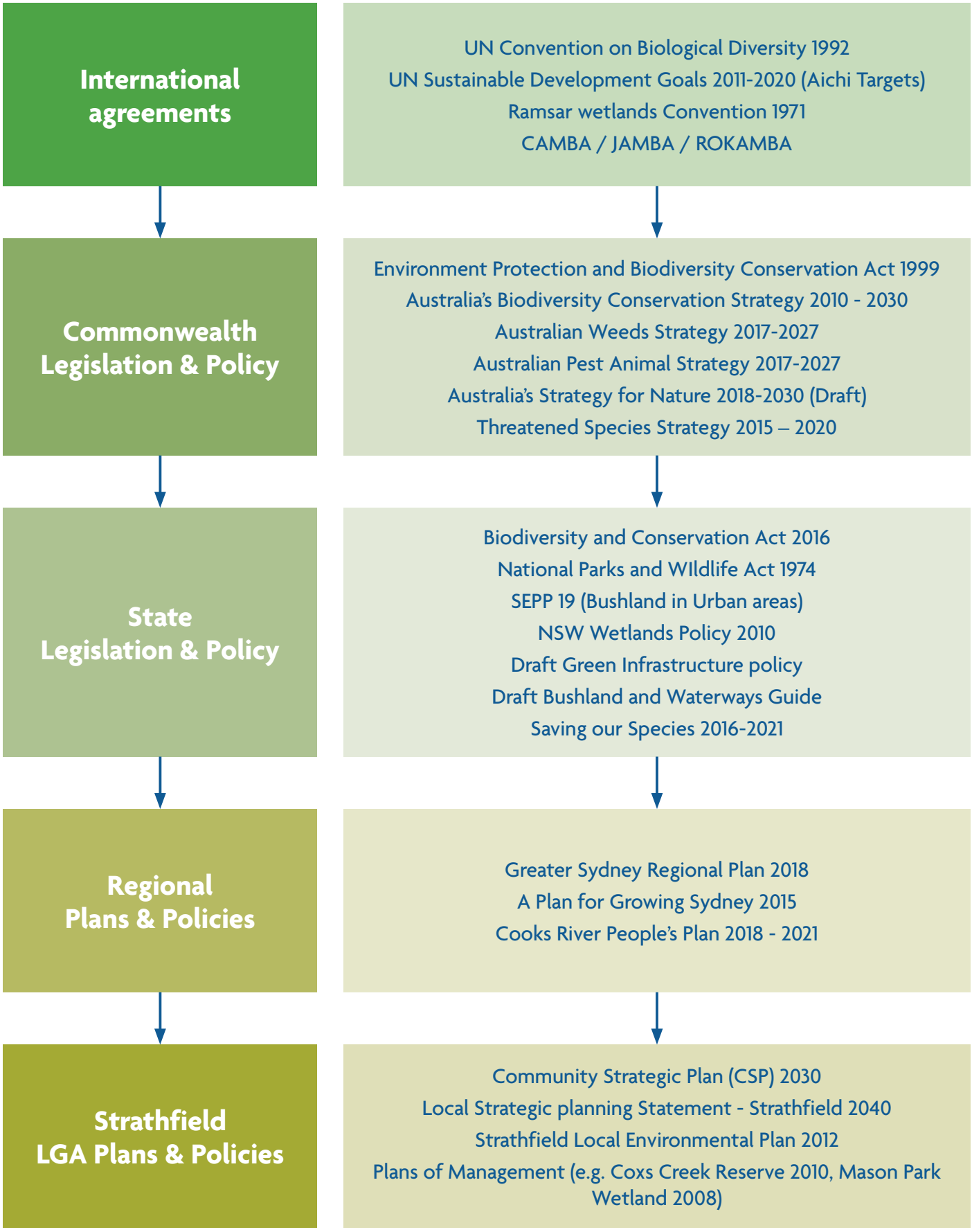


Figure 1: Strathfield Biodiversity Conservation Strategy and Action Plan Legislative and Planning Context

POLICY CONTEXT

The *Strathfield Biodiversity Conservation Strategy and Action Plan 2020-2030* has been developed within the context of a broad range of International, National and State legislation and policy as well as local strategies and planning instruments. For a summary of key legislation see Figure 1. A more comprehensive overview of legislation and policy governing biodiversity management is provided in Appendix A.

KEY MESSAGES FROM THE COMMUNITY

An important component in the preparation of the *Biodiversity Conservation Strategy and Action Plan 2020-2030* was to gain an understanding of community views. This was informed by engagement undertaken with the community from July to November 2019, including the distribution of an online survey, interviews at National Tree Day and a community workshop with members of Council's Community Panel. This was coupled with an analysis of previous fauna studies and vegetation surveys completed in June 2019, to develop the Strategy's vision, priorities and actions.

Regarding Biodiversity in Strathfield, the community has indicated:

- *They are interested in biodiversity in their local area and would like to learn more.*
- *They enjoy community activities to improve biodiversity such as planting and clean-up days and would like to participate further.*
- *They enjoy visiting biodiversity areas, particularly parks.*
- *That council should promote community participation in protecting biodiversity.*
- *That Council could better inform and educate the community about biodiversity, its importance and what could be done in the broader community as well as in households to improve biodiversity.*
- *They wanted Council to clean up local waterways and improve their biodiversity as a priority.*
- *They want to promote and protect Strathfield's green image.*
- *They want further increases in the urban tree canopy.*
- *People preferred a mix of natives and exotics on their property, on local streets and in open space parks.*
- *That native species should be the dominant tree type in bushland reserves.*
- *That localised planting of nature strips could bring the community together (e.g. bring people out of their apartments).*
- *That communication from Council was important and that a communications strategy on biodiversity was required that was inclusive of the different cultures in Strathfield.*

Full details of the community engagement process and results are provided on following pages.

Community tree planting at Bressington Park on 28 July 2019

Community planting event

Community planting activities on National Tree Day (Sunday 28 July 2019) at Bressington Park, Homebush provided an opportunity for face-to-face consultation to inform this Strategy. The event was attended by individuals, families and groups from diverse backgrounds. Participants were asked for their views about biodiversity in the LGA and two main themes emerged:

- People are interested in biodiversity in their local area and would like to learn more.
- People enjoy community activities to improve biodiversity such as planting and clean-up days and would like to participate more.

Community questionnaire

The Strathfield Biodiversity Conservation Strategy and Action Plan Factsheet (Appendix B) and Community Questionnaire was released online through Council's website. Participants were asked to respond between 15 August and 2 September 2019. A total of 157 responses were received.

The questionnaire results are summarised below according to common themes. Vision statements provided by respondents were used to develop the overarching vision for this strategy. Additional comments as well as the survey results were used to develop key targets for the Action Plan.

There were 152 different definitions of biodiversity provided. These ranged from 'Environmental issues' to 'all the various forms of living organisms that make up the environment.' Although definitions of biodiversity provided by respondents varied, they frequently included words like 'life,' 'nature,' 'species,' 'fauna,' and 'variety' (Figure 2).

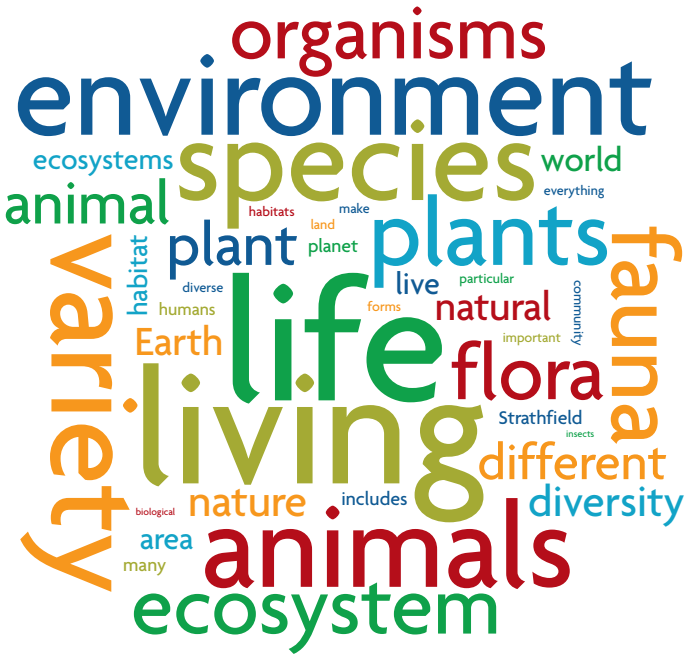


Figure 2: What is biodiversity? Wordcloud of most commonly cited words in respondent answers

Most respondents strongly agreed that biodiversity has a direct relationship with human health and daily life, and that the loss of animals and plants in the Strathfield LGA is a very serious problem. Bushland reserves, wetlands and waterways were rarely visited by respondents, with 30% of people never visiting these areas. The most visited biodiversity areas were parks, with 57% of respondents visiting a park every few weeks (Figure 3).

When asked to describe the extent to which Council could improve biodiversity management in the LGA (Figure 4):

- Most (>70%) strongly agreed that council should promote community participation in protecting biodiversity.
- The majority agreed that the community could be better informed about biodiversity and its importance.
- 80% strongly agreed that Council should prioritise cleaning up local waterways.
- A bit over half (52%) strongly agreed that Strathfield's tree canopy should be increased.

Around 55% of respondents indicated that there were too few trees in open space parks. When queried as to the types of trees they would like to see in the Strathfield LGA all respondents preferred a mix of natives and exotics on their property, on local streets and in open space parks. Approximately 76% of respondents indicated that native species should be the dominant trees in bushland reserves.

Some respondents were actively engaged in biodiversity conservation, with 9% indicating they were a member of a Bushcare group, 28% taking part in community planting days and 45% planting native vegetation in their garden.

Figure 3: Survey results showing how often biodiversity habitats are visited

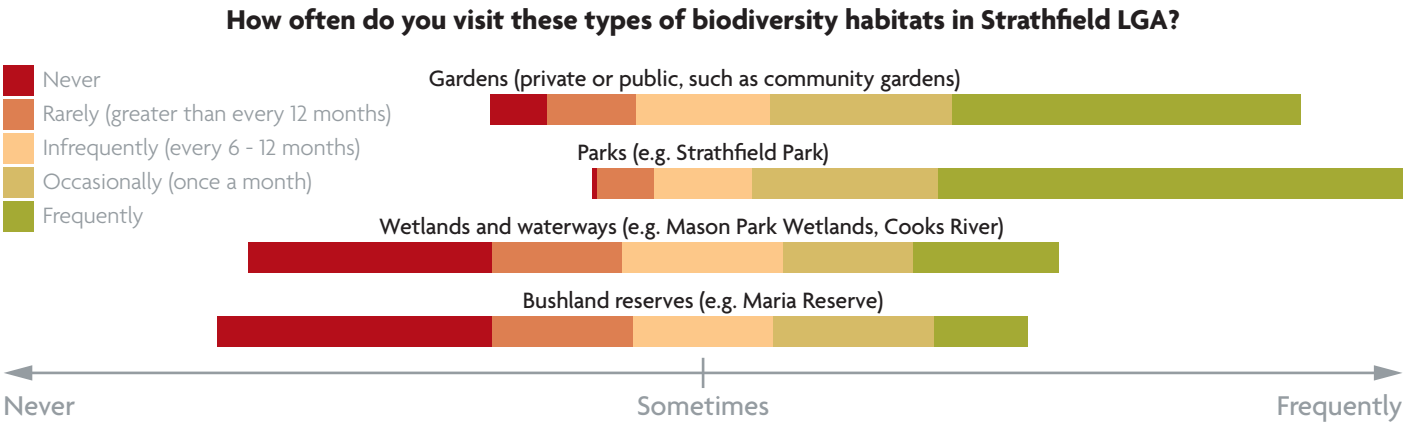
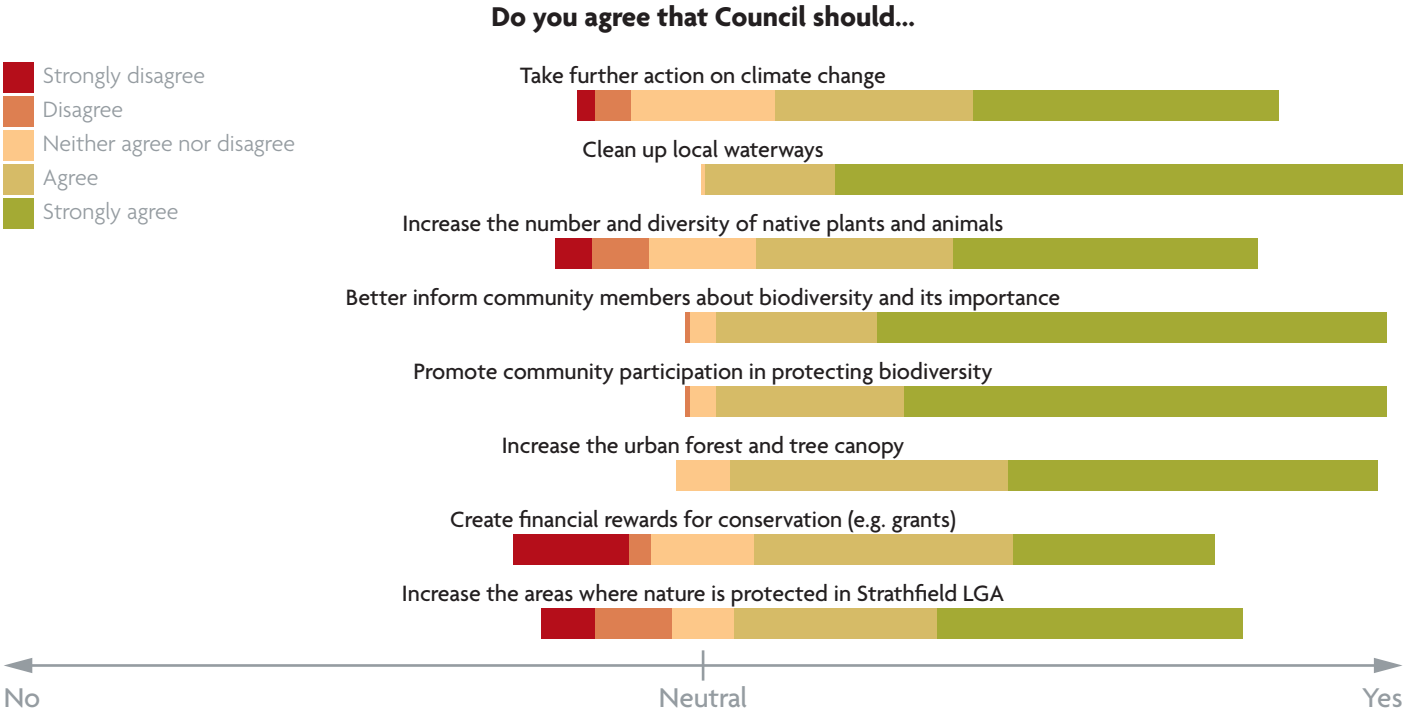


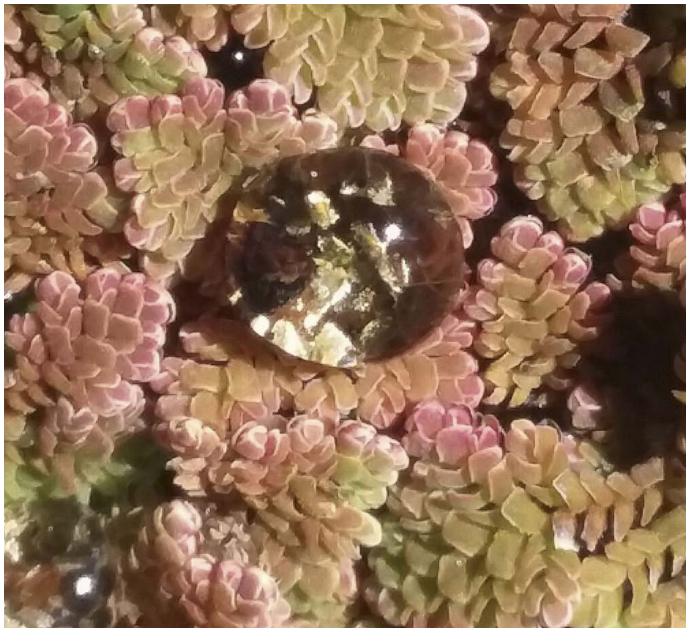
Figure 4: Survey results showing how respondents feel about actions Council could take to improve biodiversity management



Community workshop

A community workshop was held on the 16 October 2019. Fourteen community members attended and discussed priority areas, objectives and vision for biodiversity in Strathfield LGA. Results from the community questionnaire were used to guide the discussion. Information from this workshop was consolidated and incorporated into the vision and Action Plan. Key outputs of the workshop included:

- Cleaning up waterways, providing education on biodiversity and increasing community participation were priority actions for the strategy.
- Priority areas for biodiversity enhancement included Maria Reserve, Mason Park, and the Cooks River corridor and its confluence with Coxs Creek.
- More education about the impact pollutants and rubbish have on waterway health, including from households (e.g. chemical, fertiliser use) was needed.
- A water quality monitoring program could be a good way to engage with schools and community.
- Education on the value of trees and plants for homes and residents was required, including what indigenous plants should be planted in backyards and on apartment balconies.
- More biodiversity events in the community was preferred. For example, national tree day, Mason Park birdwatching and Bushcare. Preferred areas included locations where the community could focus on a local patch.
- Localised planting of nature strips could bring the community together (e.g. bring people out of their apartments).
- A communications strategy was required to communicate the biodiversity strategy and associated activities. Communication should be inclusive and in multiple languages to account for the changing demographics of Strathfield LGA.
- An expression of interest process to be run by Council where people could sign up to protect local areas for their biodiversity value.



WHAT IS BIODIVERSITY?

Biological diversity, or biodiversity, is the variety of life forms in all terrestrial (land) and aquatic (water) environments on Earth. There are three levels of biodiversity:

- Genetic diversity – the variety of genetic information contained in individual plants, animals and micro-organisms.
- Species diversity – the variety of species e.g. *Eucalyptus fibrosa* (Broad-leaved Ironbark) and *Wilsonia backhousei* (Narrow-leafed Wilsonia).
- Ecosystem diversity – the variety of habitats, ecological communities and ecological processes. An ecosystem is a dynamic combination of plant, animal and micro-organism communities and their non-living environment (e.g. soil, water and the climatic regime) interacting as a functional unit, e.g. Coastal Saltmarsh.

Biodiversity is interconnected, interdependent and constantly changing. It can be increased by genetic change and evolutionary processes or reduced by threats such as habitat clearing or disease which lead to population decline and extinction.

WHY IS BIODIVERSITY IMPORTANT?

Human wellbeing

Australians are increasingly recognising the benefits provided by the natural environment. In cities, ecosystems play a crucial role in maintaining people's health and wellbeing through providing meaningful places where they can live, work and play, as well as healthy environments where their basic needs of clean air, water and food are provided. Biodiversity is crucial to the functioning of these ecosystems and therefore underpins the delivery of many of these benefits (Figure 5).

Biodiversity is important for the physical and mental health of urban dwellers. For many people, green spaces are the main avenue for direct contact with the natural environment. Interaction with the natural environment contributes to a range of measurable positive benefits at individual and societal levels including:

- General health
- Degree of social interaction
- Respite from mental fatigue
- Opportunities for reflection

The psychological benefits of green spaces increase with biodiversity (Fuller et al 2007), as green space users can perceive and appreciate species richness, particularly plants and birds. Conserving and enhancing urban biodiversity is therefore not only important for the provision of ecosystem processes but also creates opportunities for increasingly urbanised communities to have contact with nature, thus enhancing societal and community wellbeing.

Nature and natural infrastructure are critical assets in strengthening cities' resilience to a broad range of shocks and stresses (Earth Economics 2018). For example, the ability of vegetation to reduce urban heat is well understood and will be increasingly important in protecting communities from extreme heat as the climate changes. A diverse vegetation structure and composition that is suited to its landscape setting will be more resilient to disease and other potential impacts.

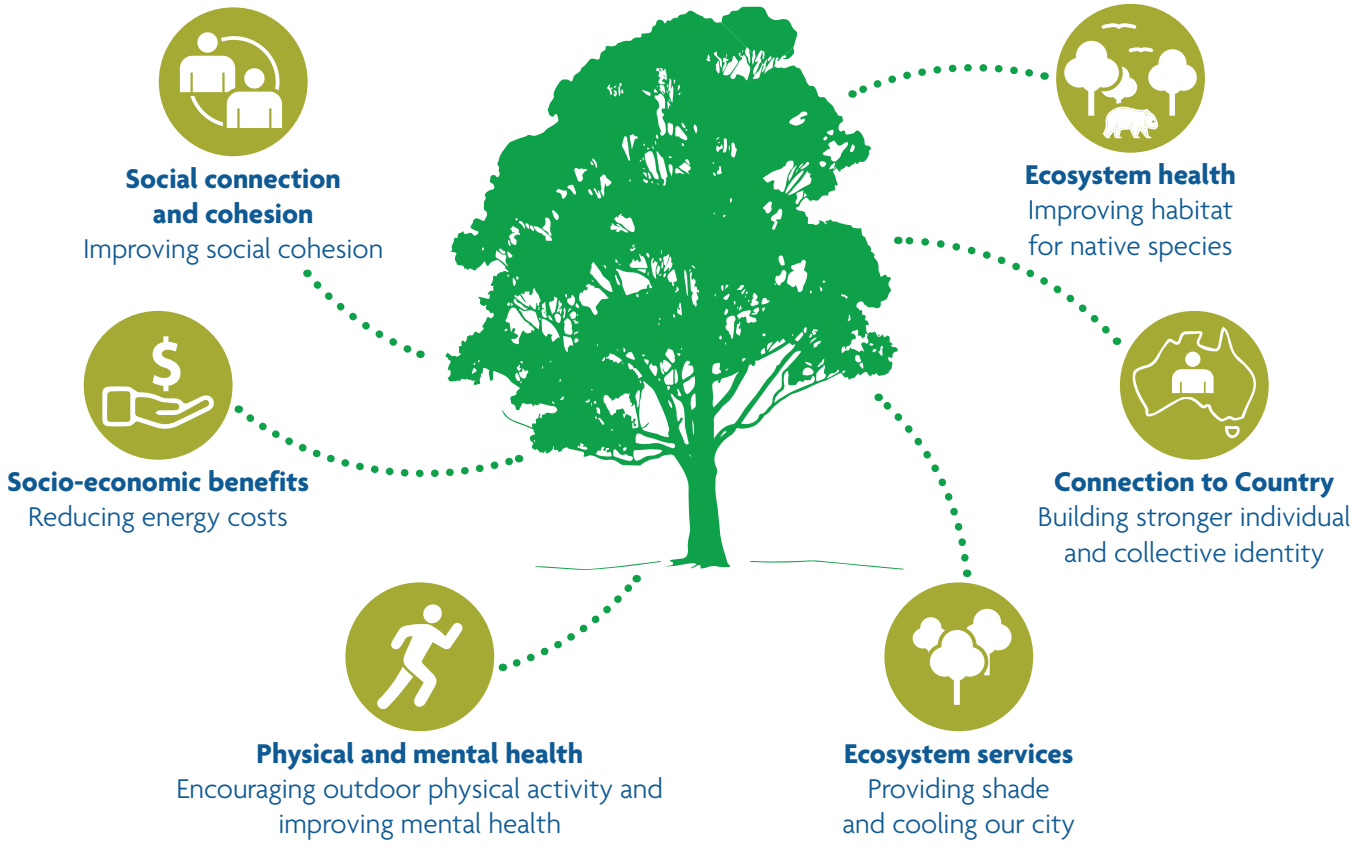


Figure 5: Potential benefits that nature can provide in Strathfield LGA (Source: natureaustralia.org)

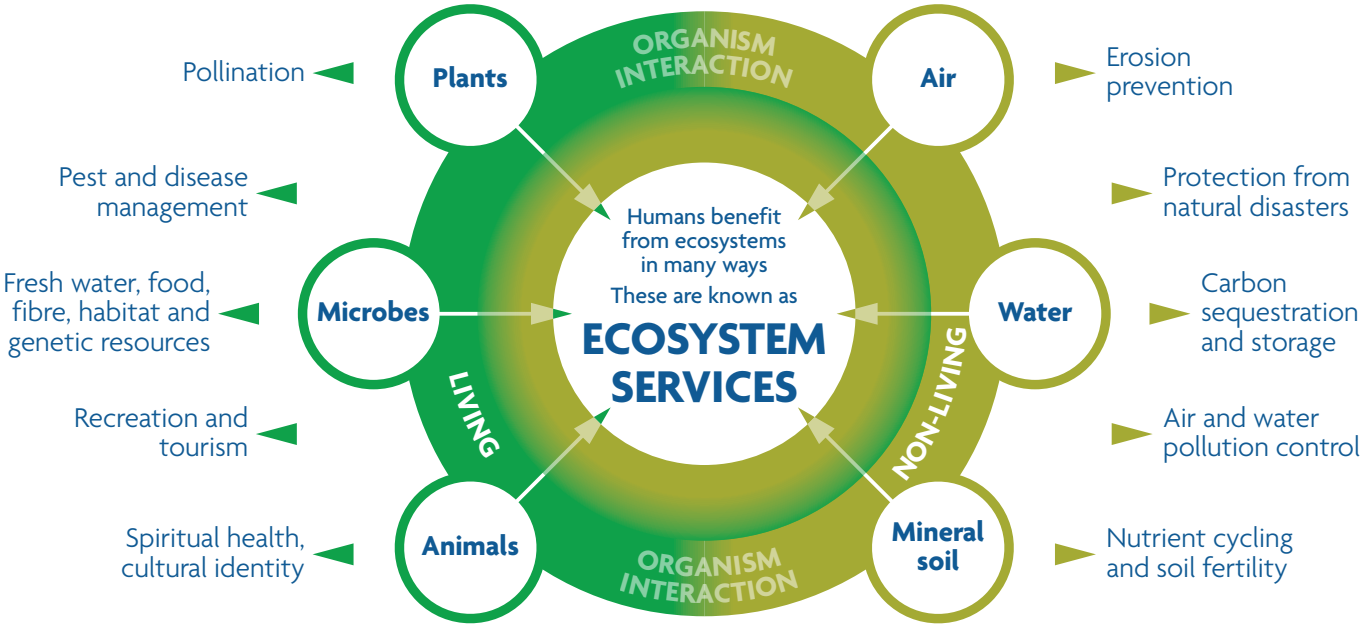


Figure 6: Ecosystem services (Source: www.cgiar.org)

Ecosystem services

Biodiversity supports ecosystem products and services which are essential for human survival. Types of ecosystem services are illustrated in Figure 6. The loss of biodiversity directly influences the capacity of an ecosystem to produce and supply essential services, and can affect the ability of ecological, economic and social systems to adapt and respond to pressures.

Economic value

A strong and sustainable economy relies on having healthy ecosystems. However, biodiversity and associated ecosystem services are often regarded as 'free' natural capital and are often taken for granted. The economic value of ecosystems may not be realised or appreciated until they are damaged, by contamination or clearing for example, and then require substantial costs for repair or restoration.

Biodiversity has a direct impact on property value and resulting tax revenue. The presence of trees increases the selling price of residential units by two to nine percent, and the proximity of open green space increases property sales prices (Symon 2015). An increase of 10% in the leaf canopy of street trees can increase the value of Sydney properties by an average of $50,000 per unit (based on three suburbs) (AECOM 2017).

Indigenous culture

Indigenous people have a strong affinity with native species and environments through their connection to traditional lands and waters. For thousands of years, areas like the Cooks River provided camping, fishing and hunting grounds, as well as the provision of edible plants for the Aboriginal Wangal clan of the Darug tribe. The Indigenous population now represents 0.3% of the Strathfield population or 115 people (2016 ABS Census). Little now remains of the former Aboriginal history of the area with visible relics of indigenous occupation such as open campsites, axe grinding grooves and scarred trees no longer present in the LGA due to extensive urbanisation.

WHAT DETERMINES BIODIVERSITY SIGNIFICANCE OF AN AREA?

Biodiversity significance is a ranking of an area according to specified values such as rarity, diversity, fragmentation, habitat condition, resilience, threats, and ecosystem processes. The more critical role an area or system plays for ecosystems, the more value it has in positively influencing biodiversity.

The value of an area is assessed on a set of attributes such as adequate habitat, relative size and condition, landscape connectivity and the presence of threatened species and/or communities.

Habitat

Habitat is the natural home or environment where an organism lives. Examples of habitat available in the Strathfield LGA include:

- Hollow bearing trees and dead standing trees
- Waterways, river banks and wetlands
- Dense vegetation
- Leaf litter and logs
- Built structures such as stormwater culverts and bridges

Animals may use different habitats for breeding, roosting or feeding. For example, many parrots forage in trees that have seeds and fruit but need hollows to nest and breed.

Figure 7: Benefits of green infrastructure in urban areas such as Strathfield LGA (GANSW 2017)

Green infrastructure

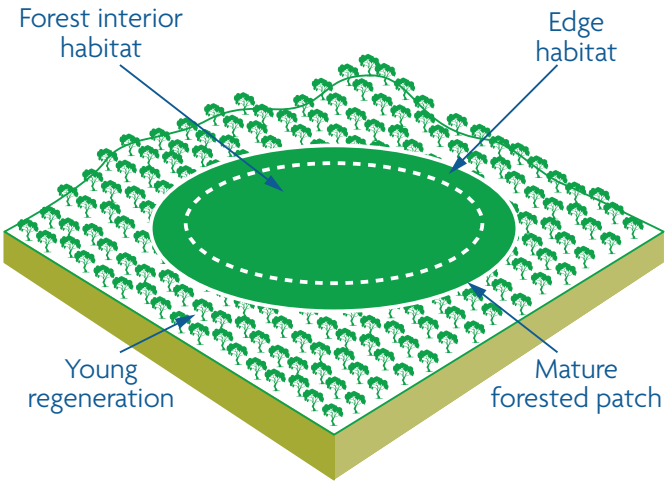
Green infrastructure is the network of green spaces, natural systems and semi-natural systems that are strategically planned, designed and managed to support a good quality of life in an urban environment (GANSW 2017). Elements of green infrastructure including roof gardens, residential gardens, local parks, streetscapes, service corridors, waterways, water sensitive urban design features and regional recreation areas provide important habitat for plants and animals (Figure 7).

Green infrastructure can be of high biodiversity value if it comprises a fully-functioning ecological community. For example a park planted with indigenous canopy, shrub and groundcover species from the critically endangered Cooks River/Castlereagh Ironbark Forest community has a higher biodiversity value than a streetscape planted with a mixture of exotic and native trees. .

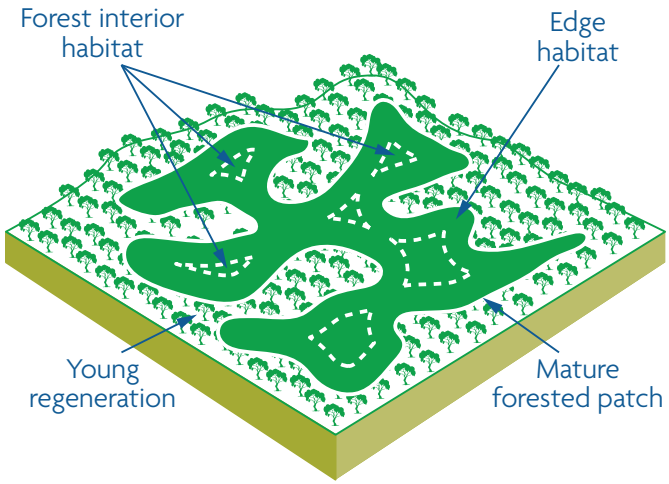
Carbon capture or sequestration is another benefit of green infrastructure. Plants naturally capture carbon from the atmosphere through photosynthesis. Photosynthesis works by combining carbon dioxide together with sunlight in a chemical reaction to produce oxygen and glucose. The carbon is held in the vegetation until the vegetation is burnt or dies and decomposes, thus releasing carbon back to the atmosphere and soil. Vegetation planting and regrowth can help to sequester carbon and thus offset the impacts of emissions that contribute to climate change.

Patch size and condition

Increased size of habitat areas enhances available resources and allows more ecosystem niches, therefore supporting more species and larger, more sustainable populations. Larger patches of habitat have a relatively low edge to size ratio, which means the habitat has a higher biodiversity value. Edge effects include weed invasion, spill of artificial lighting, rubbish dumping and vandalism. There is a greater adverse edge effect if the habitat patch has a long linear shape or is fragmented (Figure 8).



Large, circular patch sizes can support a large area of 'quality' habitat.



Irregular patch sizes can have more edge and less interior 'quality' habitat.

Figure 8: Patch size and shape affects the amount of quality habitat available. (Adapted from Ministry of Forests and B.C. Ministry of Environment, Lands and Parks 1996)

Corridors

Biodiversity corridors (also known as wildlife corridors or ecological corridors) (Map 1) are areas of connected habitat across the landscape that:

- Allow the movement of animals and the dispersal of plants.
- Ensure genetic exchange of flora and fauna populations that may otherwise become extinct in the long-term.
- Allow recolonisation of habitat areas by fauna and flora that have become locally extinct from events such as land clearing, fire, disease, fluctuating food supply and extreme weather.
- Provide a relatively safe route for the movement of animals across the landscape.

If an event causes local extinction or reduction of the population, complete or partial connectivity of patches allows replenishment and re-establishment of the species. Smaller patches of habitat can link large patches as 'stepping stones' to facilitate movement of more mobile species. Patches of habitat can be terrestrial, aquatic or a combination of both.

Corridor habitat can be categorised into core areas and transition areas.

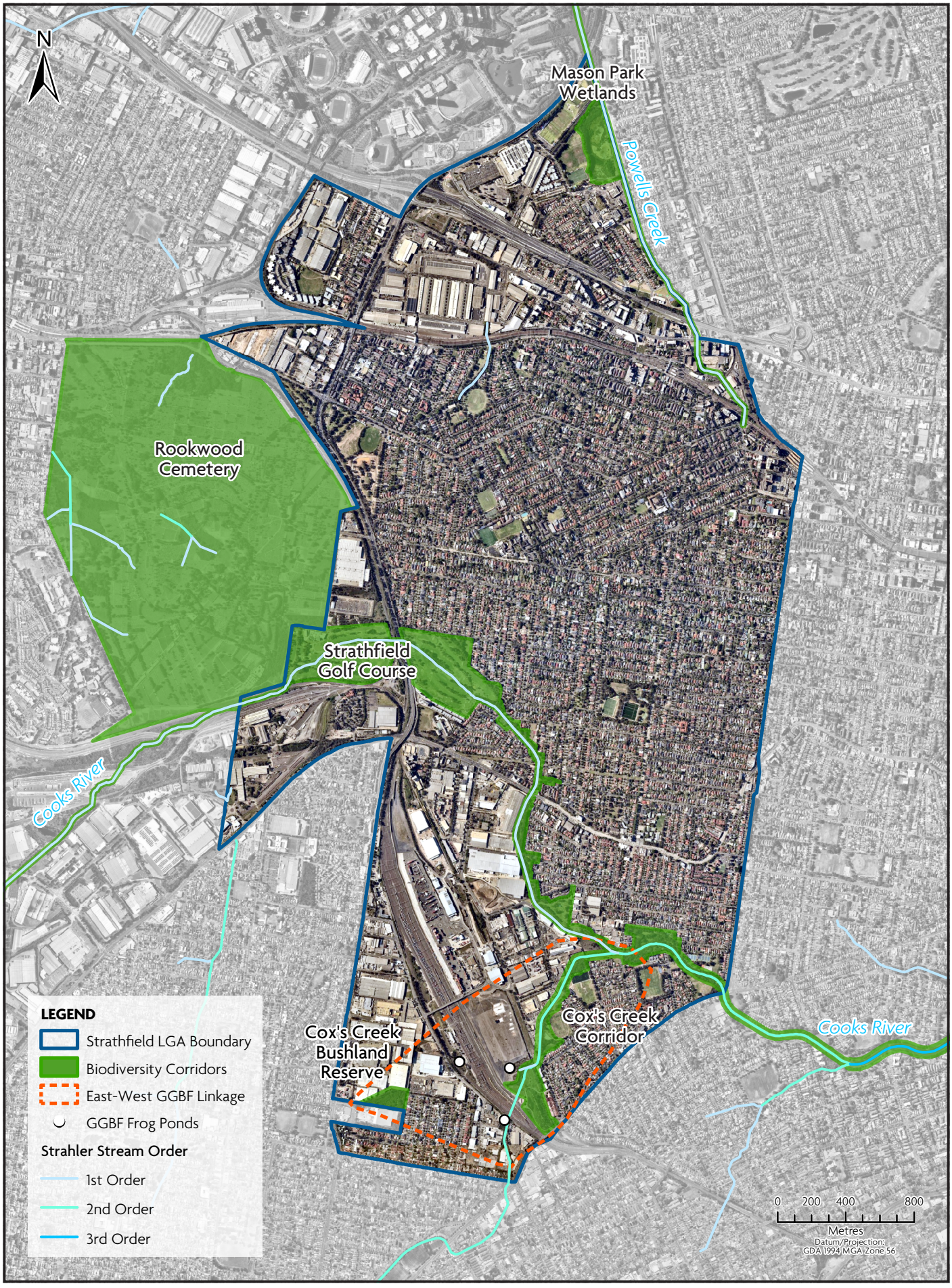
Transition areas

Transition or buffer areas are located at the interface between a natural area and adjoining urban environment and represent the change from one ecosystem to another. These areas buffer core zones, protecting them and reducing exposure to threats (e.g. weeds). Transition areas vary in size and structure. They can provide wildlife habitat and are often more suited to recreation uses such as cycleways, walkways, and picnic areas.

Core areas

Core areas of bushland and waterways are the least disturbed and the most biodiverse, representative of the structure, function, and composition known to exist before European settlement. Protection and management of these areas is important to protect biodiversity and ensure long-term stability of ecosystems.

Government Architect NSW (GANSW 2018a)

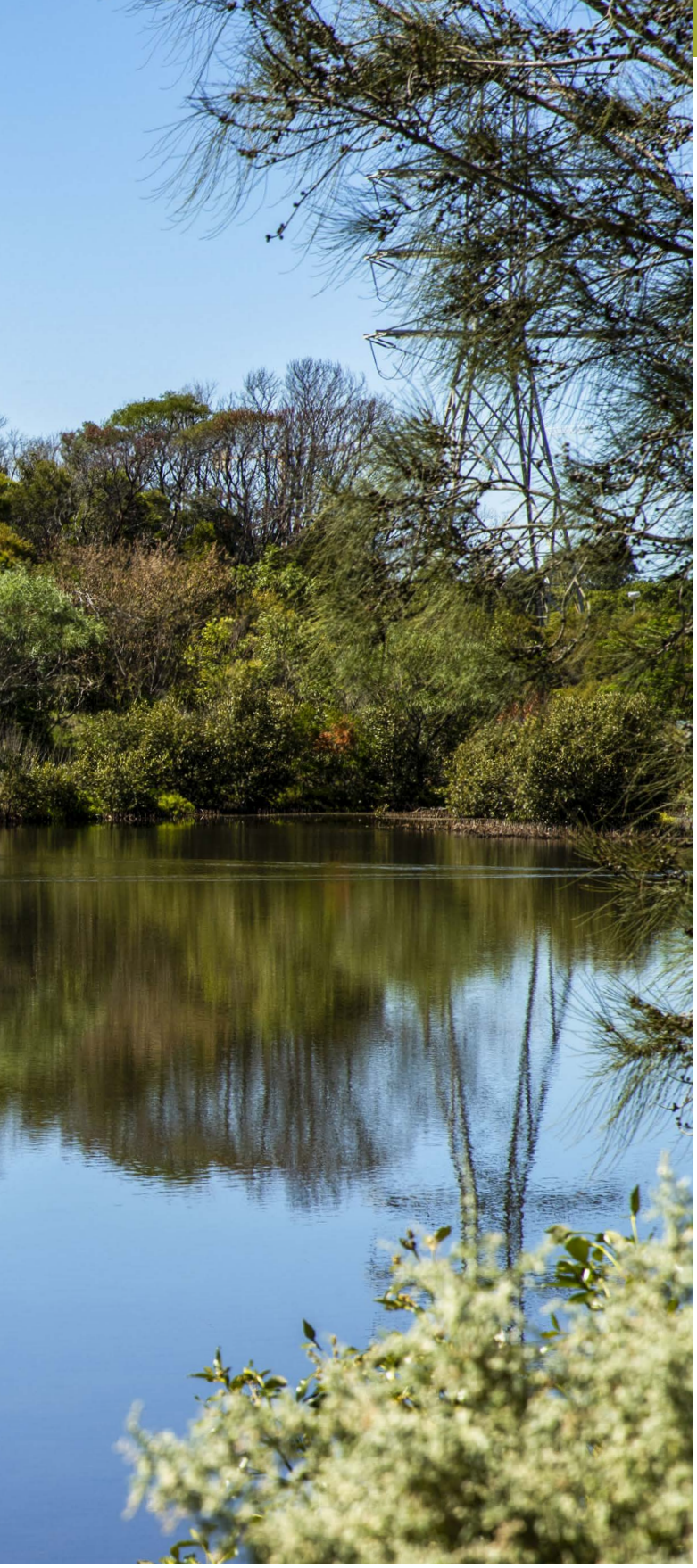


Map 1: Biodiversity corridors and major habitat patches

Threatened species and ecological communities

The biodiversity value of an area is also affected by the proportions of native and introduced species. Areas of higher biodiversity value are associated with the presence of threatened species and communities. Biodiversity values decrease if weeds and pest animal species are present.

The conservation status of species, populations and communities is determined by scientific committees that advise the NSW Department of Planning, Industry and Environment (DPIE) and Commonwealth Department of Environment. Council and the community have no direct role in the process.



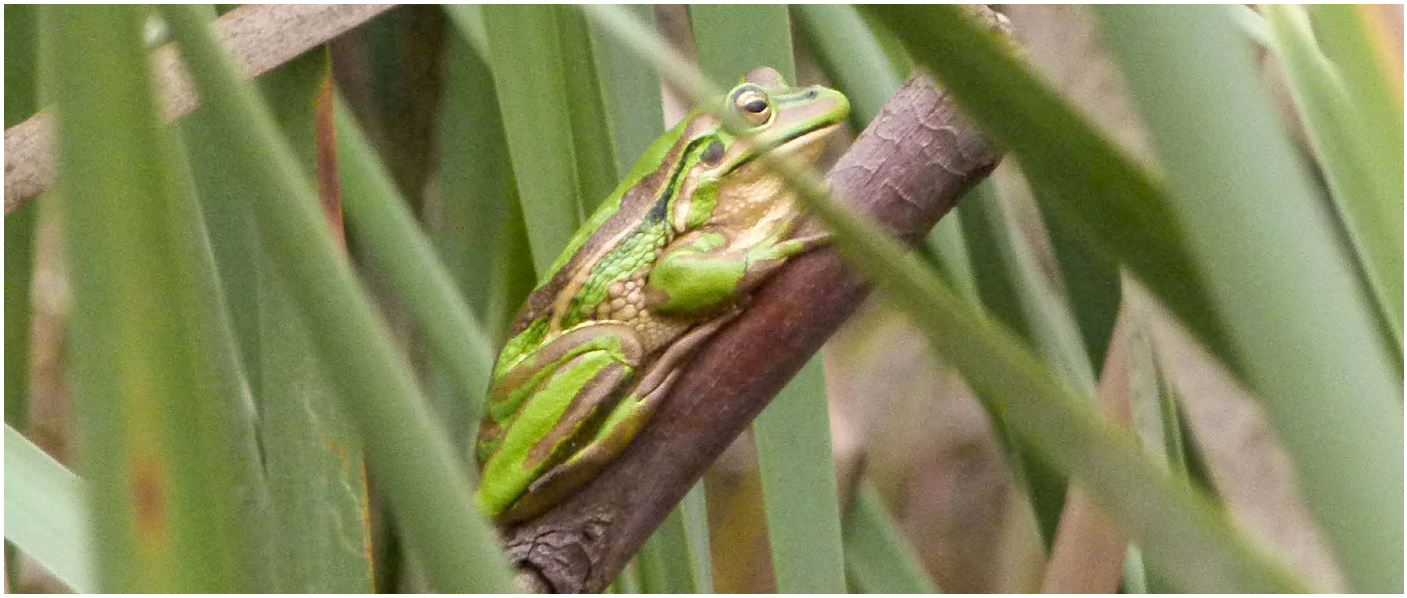
CHAPTER 2: BIODIVERSITY IN STRATHFIELD

WETLANDS AND WATERWAYS

Powells Creek and Mason Park Wetlands drain to the Parramatta River to the north. The main riparian corridor to the south of the Strathfield LGA is Cooks River – Coxs Creek.

The morphology of waterways in the LGA has changed since European settlement, either by natural processes, accelerated sedimentation and erosion, or reconfiguration and concrete lining. Channels and catchments have increased the peak runoff velocity and volumes and decreased low flow volumes. Waterways in the LGA experience poor water quality, invasion of aquatic weeds and pest species (e.g. Mosquito fish - *Gambusia holbrooki*), rubbish dumping and loss of riparian vegetation. This impacts aquatic species (e.g. through fish kills) and reduces the amenity and value of surrounding properties and public spaces. Poor waterway health can also affect downstream waterways such as the Parramatta River.

Mason Park contains Strathfield LGA's most significant wetland at over twelve hectares in size. The wetland consists of a saltmarsh, mangrove forest and small freshwater pond. The park lies in an irregular triangle formed by the arms of two canalised creeks, Saleyards and Powells Creeks, which drain north into Homebush Bay. Directly to the north is Bicentennial Park and Olympic Park. Long established residential and industrial land occupies most of the surrounding land in North Strathfield, Concord and Homebush. The wetland is listed on the Register of the National Estate as one of eight significant remnant wetlands which were once part of an extensive wetland system bordering the Parramatta River. Mangroves of the Parramatta River area represent a significant proportion of the mangroves remaining in the Sydney region.



Historic modifications (e.g. reclamation and landfilling, conversion of creeklines) to Mason Park wetland basin have reduced tidal inundation and water quality parameters, particularly pH and salinity. In addition, development in the catchment has led to an increase in pollutants including elevated nutrient levels. The natural purification processes of Powell's and Saleyards Creeks have been eliminated through canalising and concrete lining.

Constructed ponds, drainage depressions provide important habitat for the Green and Golden Bell Frog, especially in the suburb of Greenacre. Permanent water bodies include the 'Frog Habitat Area' ponds on the former brick pit site, Juno frog ponds, Chain of Ponds Reserve and the former 'FreightCorp' pond. The frogs utilise these features at different times of the year for breeding, foraging, shelter, moving or for protection over winter.

TERRESTRIAL BIODIVERSITY

This section outlines threatened species, terrestrial and aquatic biodiversity present within the Strathfield LGA.

The majority of biodiversity within Strathfield LGA is located in terrestrial environments. Terrestrial biodiversity includes plants and animals that occur on land across the LGA. Vegetation mapping and vegetation surveys are the primary tools to inform this Strategy as vegetation cover and quality are reflective of species richness for flora as well as fauna.

There is currently 9.06 hectares of remnant bushland across the Strathfield LGA which is less than 1% of the LGA's total area. Most of this bushland is in four small isolated remnants, surrounded by housing, parks, sporting fields, shops and industrial estates. The diversity of natural areas and biodiversity in Strathfield LGA can be demonstrated in recent studies such as InSight Ecology (2007, 2008, 2016) and Ambrose Ecological Services (2008). The most recent study in 2016 recorded 94 different animal species, mostly woodland birds which are disappearing from the inner and mid-western suburbs of Sydney.

Further vegetation surveys conducted by Eco Logical Australia in 2019 confirmed the presence of four different remnant vegetation communities (see right and Map 2), native creek plantings and native/exotic plantings in streetscapes and public reserves. The following parks and reserves were surveyed:

- Mason Park
- Mason Park Wetland
- Bressington Park
- Wentworth Reserve
- Bill Boyce Reserve
- Strathfield Golf Course
- Weerona Road Remnant
- Airey Park
- Davidson Street Remnant
- St Anne's Reserve
- Dean Reserve
- Maria Reserve
- Elliott Reserve
- Coxs Creek Remnant

A comprehensive terrestrial species list including a summary of previous fauna studies and ELA's survey results is provided in Appendix C.

Coxs Creek remnant, Davidson Street remnant and private property at Australia Post supports vegetation of the Cooks River/Castlereagh Ironbark Forest.

On the fringes of Mason Park Wetland Estuarine Mangroves with their aerial roots occupy salty water.

Mason Park Wetland hosts a rich Coastal Saltmarsh community.

At the edge of Mason Park Swamp Oak Floodplain Forest provides a buffer to the wetland.

LEGEND

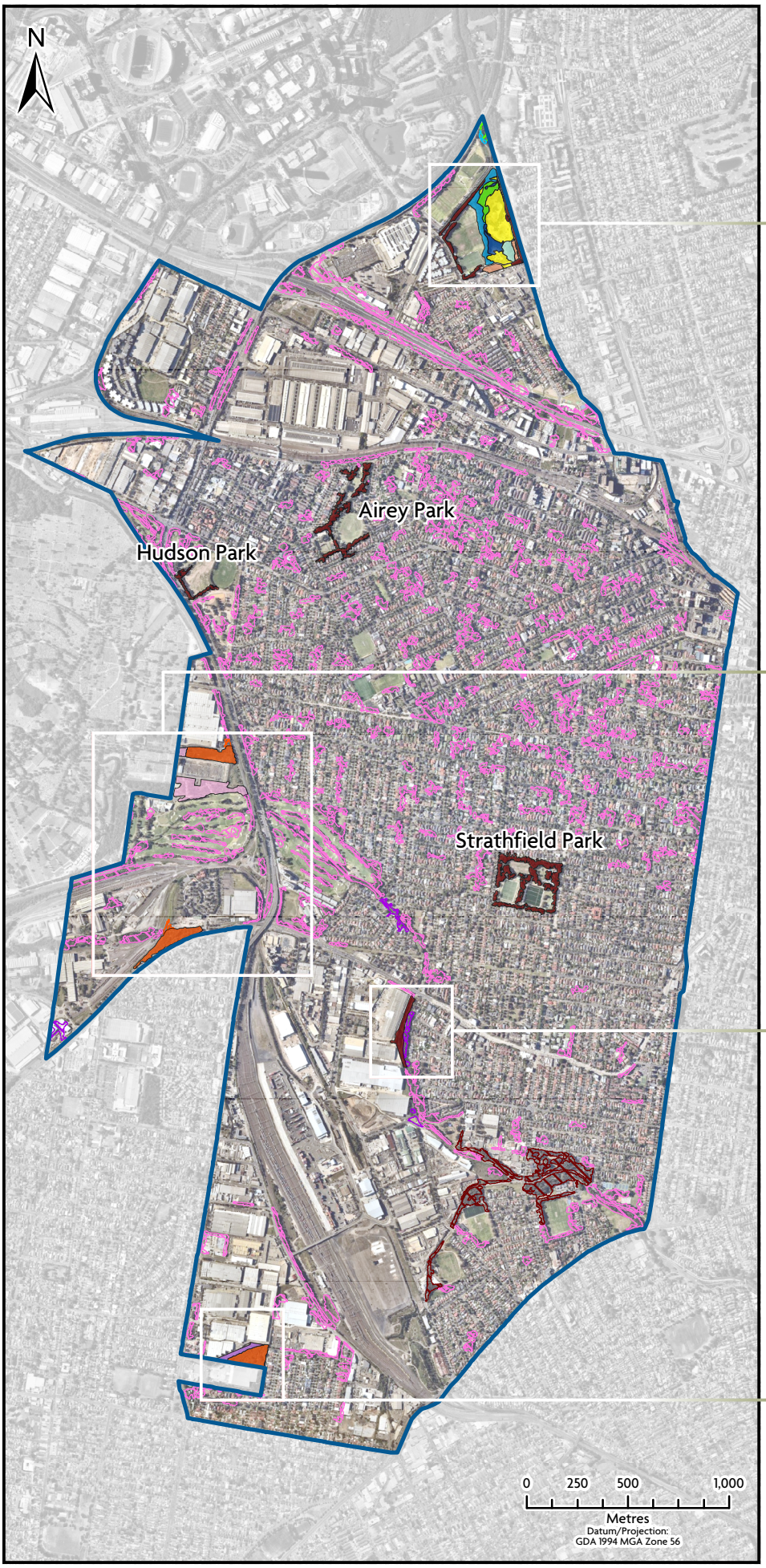
Strathfield LGA Boundary

Validated Vegetation Communities (ELA 2019)

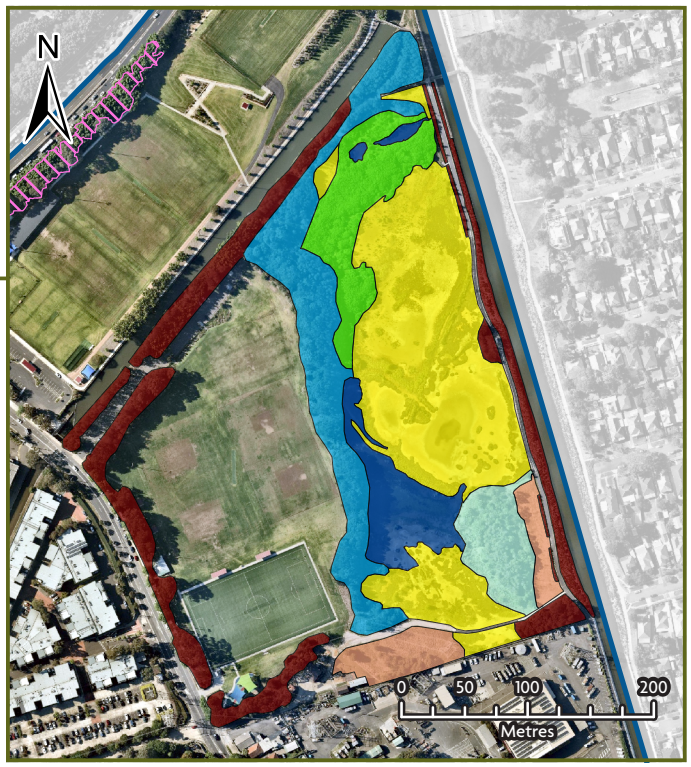
- PCT 725: Broad-leaved Ironbark - Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion (Cooks River/Castlereagh Ironbark Forest)
- PCT 920: Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion (Estuarine Mangrove Forest)
- PCT 1126: Saltmarsh in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion (Coastal Saltmarsh)
- PCT 1234: Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion (Swamp Oak Floodplain Forest)
- Planted Natives
- Native/Exotic Mix
- Urban Exotic/ Native
- Weeds and Exotics
- Exotic grassland
- Water

Vegetation Communities (OEH 2016)

- PCT 725: Broad-leaved Ironbark - Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion
- PCT 920: Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion
- PCT 1234: Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion
- Urban Exotic/Native
- Weeds and Exotics
- Plantation (native and/or exotic)



Map 2: Validated vegetation communities in the Strathfield LGA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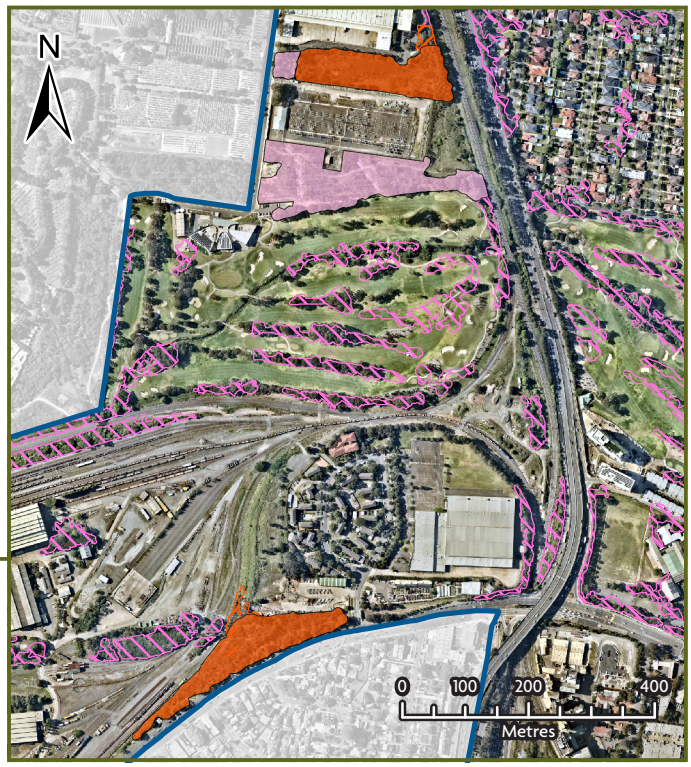
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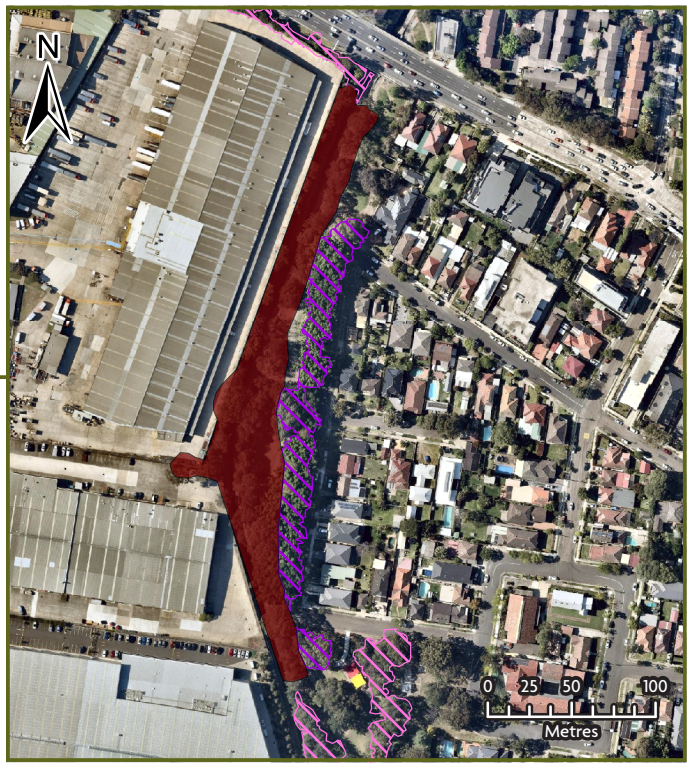
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Threatened and endangered species, populations and ecological communities

Many of Strathfield's plants and animals are currently threatened with extinction and are listed under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 and/or the NSW Biodiversity Conservation Act 2016. Threatened native plants include (Map 3):

- *Pomaderris prunifolia,*
- *Wahlenbergia multicaulis* (Tadgell's Bluebell),
- *Acacia pubescens* (Downy Wattle), and
- *Wilsonia backhousei* (Narrow -leafed Wilsonia).

Threatened native fauna include (Map 4):

- Grey-headed Flying-fox,
- Large Bent-wing bat, and
- Green and Golden Bell frog.

These species are all site managed species targeted under the NSW State Government 'Saving our Species' program.

Several recorded species are intercontinental migrants, which travel from the northern hemisphere to Australia between August and November (Map 5). Some species, such as the Curlew Sandpiper travel all the way from Northern Siberia to Australia. These migratory birds are listed under the UN Convention on the Conservation of Migratory Species and migratory bird protection agreements between the governments of Australia, China (CAMBA), Japan (JAMBA), and Republic of South Korea (ROKAMBA).

All four remnant vegetation communities present in Strathfield are listed as Threatened Ecological Communities (Table 1).

A comprehensive overview of threatened species, their ecology and habitat is provided in Appendix D.

Acacia pubescens

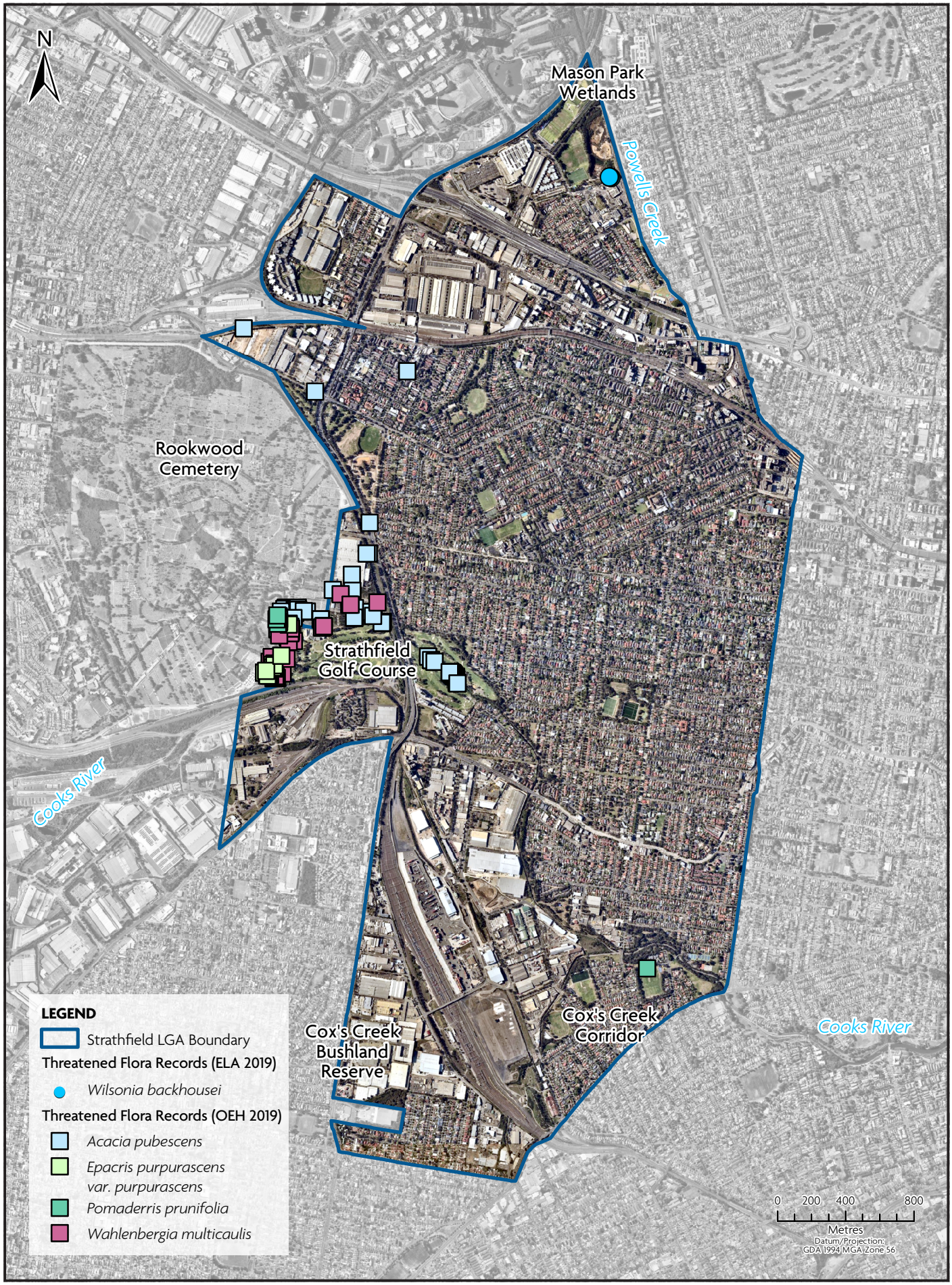
Wilsonia backhousei

Table 1: Vegetation communities in the Strathfield LGA

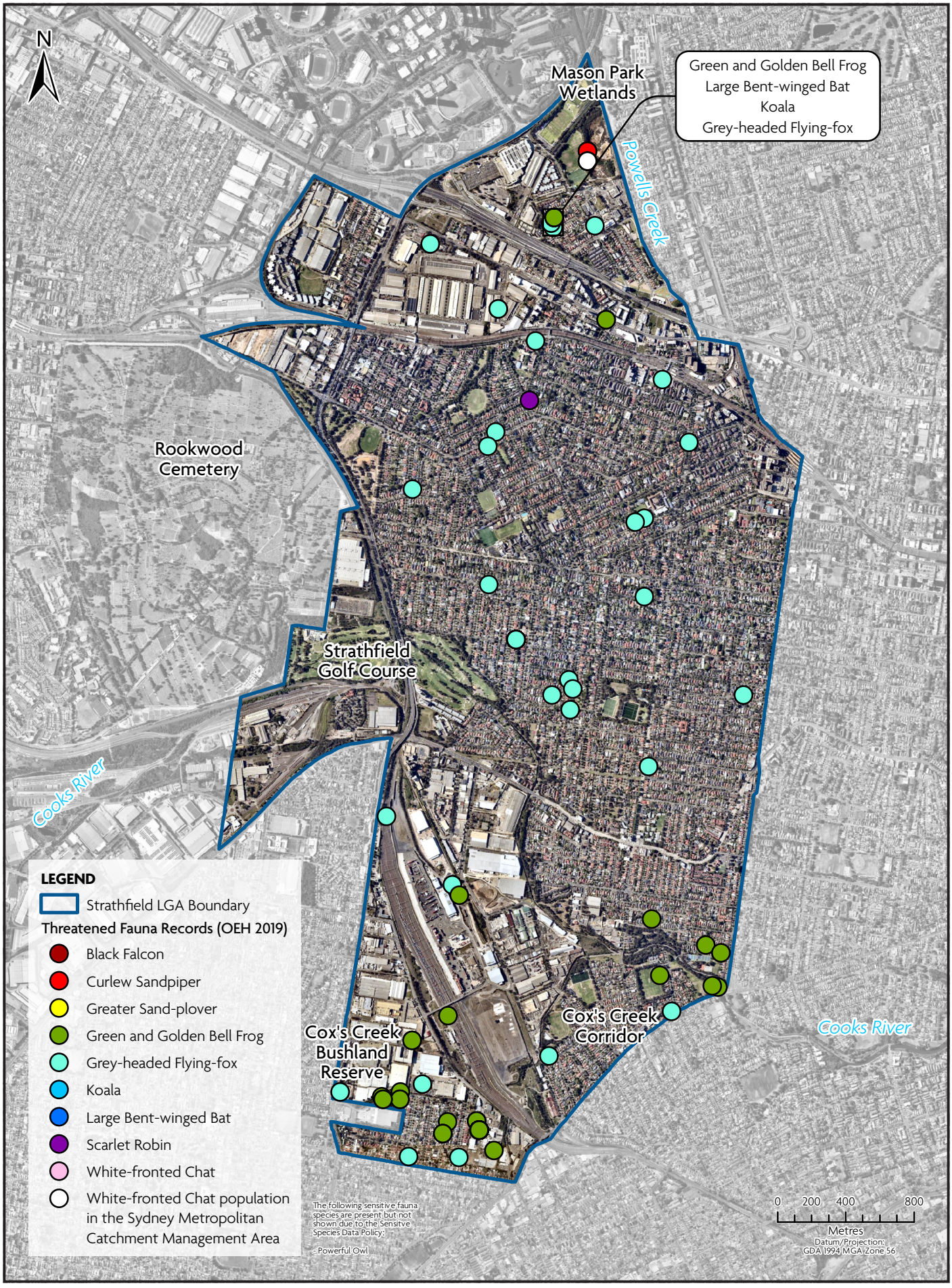
Vegetation community	BC Act status	EPBC Act status	Approximate area (ha)	Area as percentage of LGA (1386 ha)
Castlereagh Ironbark Forest	EEC	CEEC	4.4	0.3
Estuarine Mangrove Forest	-	-	0.76	0.05
Coastal Saltmarsh	EEC	VEC	2.5	0.18
Swamp Oak Floodplain Forest	EEC	EEC	1.4	0.10
Total			**9.06 ha**	**<1%**
Endangered ecological community (EEC) – facing a very high risk of extinction in Australia in the near future Critically endangered ecological community (CEEC) – facing an extremely high risk of extinction in Australia in the immediate future.				

Green and Golden Bell frog

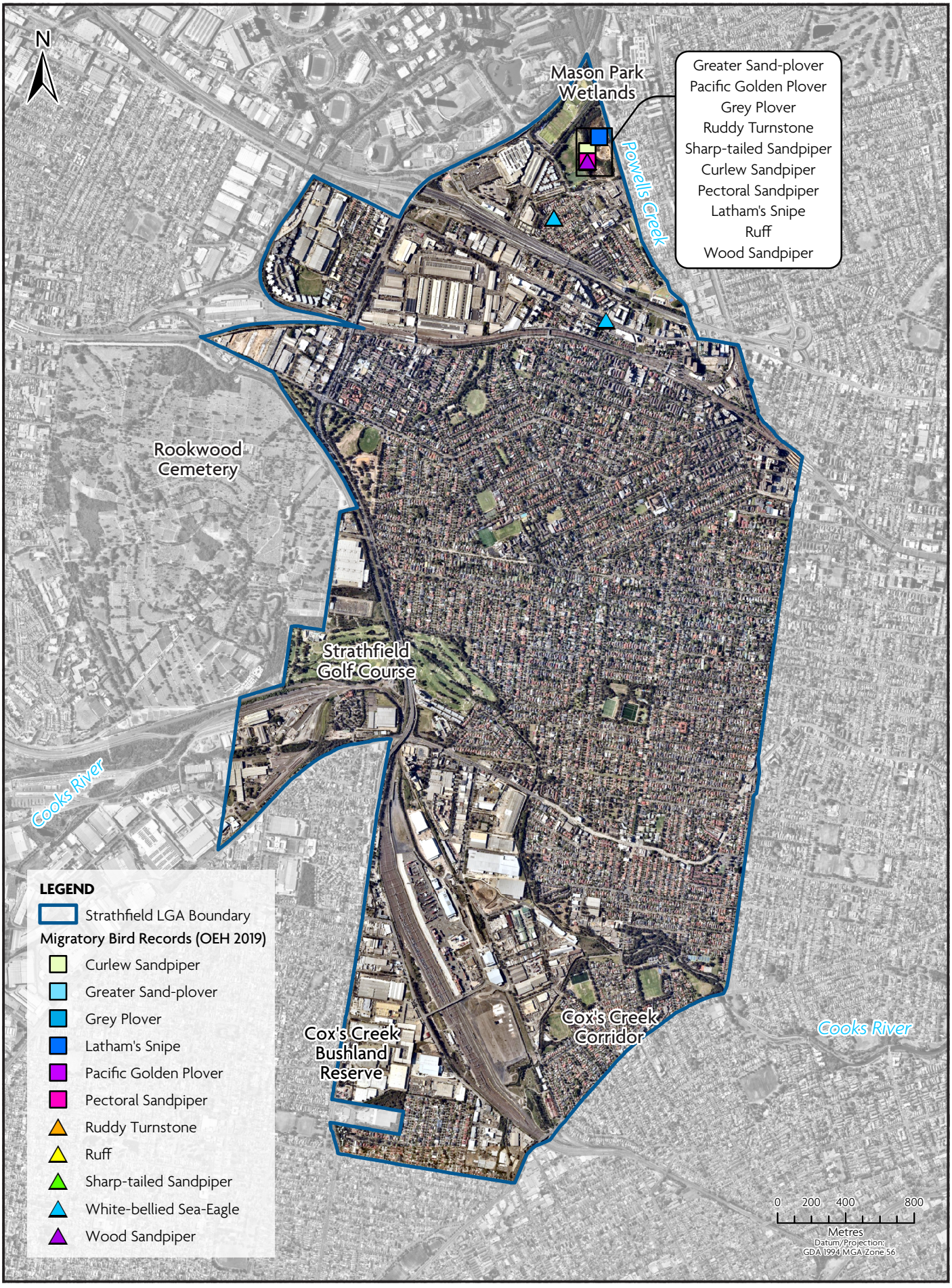
Grey-headed Flying-fox



Map 3: Threatened flora records within and adjacent to Strathfield LGA



Map 4: Threatened fauna records in the Strathfield LGA



Map 5: Listed migratory species records in the Strathfield LGA

THREATS TO STRATHFIELD'S BIODIVERSITY

Ongoing threats to biodiversity in the Strathfield LGA are typical of urban areas and include habitat loss, degradation and fragmentation associated with vegetation clearing, introduction and spread of weed species, fauna predation (hunting) by pest animals, and diseases.

Effective biodiversity management requires Council and the wider community to understand the key threatening processes. Examples of key threatening processes relevant to the Strathfield LGA are presented in Table 2.

Table 2: Key threatening processes

Category	Key threats	Description
Habitat	Native vegetation clearance. Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands. Human-caused climate change. Loss of hollow-bearing trees. Removal of dead wood and dead trees.	Habitat destruction or further fragmentation of vegetation that comprises threatened species, populations or ecological communities is perhaps the greatest threat to biodiversity, especially in existing or potential ecological corridors. Most of the native vegetation within Strathfield exists as small patches and along linear reserves with a high edge to size ratio. This makes it easier for weeds, rubbish, artificial lighting and other disturbances to penetrate through the entire habitat area. Rubbish can include garden clippings, dumped building materials and litter in stormwater runoff. Informal recreation tracks can further degrade sensitive areas. Revegetation and bush regeneration to consolidate and expand patches of vegetation can reduce adverse edge effects. Waterways provide habitat for many species, reduce the impacts of floods, absorb pollutants and improve water quality. Biodiversity in aquatic ecosystems is threatened by human activities which affect natural patterns of wetting and drying, the frequency and magnitude of floods, water quality, and the condition of habitats fringing rivers and streams. Impacts include pollution, including from sewage inflows, excessive applications of fertilisers and pesticides, vegetation clearance, gully and stream-bank erosion, and alteration of flows by urban development. Aquatic habitats are also challenged by changes in the climate, such as extreme drought or floods. Impermeable (hard) surfaces associated with developed areas increases the peak volume and velocity of stormwater runoff entering creeks and drainage lines, as water cannot infiltrate into the ground. Stormwater runoff also contains relatively high nutrient concentrations that favour the growth of weed species. The presence of a drainage line therefore provides another source of nutrients and weeds, in addition to weed invasion from the edges of bushland.

Category	Key threats	Description
Pest animals	Predation by European Red Fox (*Vulpes vulpes*). Predation by feral Cats (*Felis catus*). Predation by the plague minnow (*Gambusia holbrooki*).	Pest and nuisance animal species such as foxes, Indian Myna and feral cats are prevalent throughout Sydney. Pest species will predate, intimidate or outcompete native species for habitat. The lack of vegetative cover and habitat in the form of fallen timber and rocks, and the small size of bushland patches in Strathfield LGA makes native species more vulnerable to predation. It is not possible to eradicate pest species, but their numbers can be controlled to reduce adverse impacts. Feeding animals directly or indirectly (e.g. by leaving human or pet food available) is a major contributing factor in supporting the populations of pest animal species within the Strathfield LGA.
Weeds	Exotic vines and scramblers. Invasion of native plant communities by exotic perennial grasses.	The NSW Invasive Species Strategy and NSW *Biosecurity Act 2015* emphasise prevention of invasive species and early intervention in the incursion process as the most cost-effective controls. Unfortunately, weeds and pest animal species are already widespread across the Strathfield LGA and will continue to threaten biodiversity. The Australian Government nominates 32 Weeds of National Significance (WoNS) based on their invasiveness, potential for spread, and environmental, social and economic impacts. Consideration was also given to their ability to be successfully managed. The WoNS require coordination among all levels of government, organisations and individuals with weed management responsibilities. There have been six WoNS recorded in the LGA.
Disease	Infection of amphibians with chytrid fungus resulting in chytridiomycosis.	Plant and animal diseases are more prevalent in areas that are already subject to stress through habitat fragmentation and degradation.

BIODIVERSITY MANAGEMENT IN STRATHFIELD

The landscape of what is now referred to as the Strathfield LGA was traditionally and sustainably managed by the Wangal clan of the Darug people for thousands of years. This included burning patches of the landscape to favour certain types of plants and animals, and seasonal harvesting of food and other resources.

Europeans commenced farming and development in the area in 1793. This progressively resulted in widespread loss and degradation of natural resources across the Strathfield LGA. DPIE 2016 vegetation mapping indicates that less than 1% of native vegetation (any condition) remains in the LGA compared to what would have existed prior to settlement. Many species, populations and ecological communities that would once have been in the area are no longer present, and many of those that remain are recognised as threatened.

In recent decades, efforts have been made to protect and enhance some areas of the natural environment in Strathfield LGA. These actions have mainly been resourced by local council and/or community volunteers and may have been done within the framework of various plans.

Examples include actions taken in accordance with the:

- Neighbourhood Parks Plan of Management (2014)
- Strathfield Park Plan of Management (2008)
- Airey Park Plan of Management (2008)
- Mason Park Plan of Management (2008)
- Coxs Creek Wetlands and Reserve Plan of Management (2010)
- The Cooks River People's Plan (2018-2021)
- Green and Golden Bell Frog Key Population at Greenacre Management Plan (2007)

Past and ongoing biodiversity management activities are summarised in Table 3. The valuable contribution of community volunteers is acknowledged, but not fully documented.

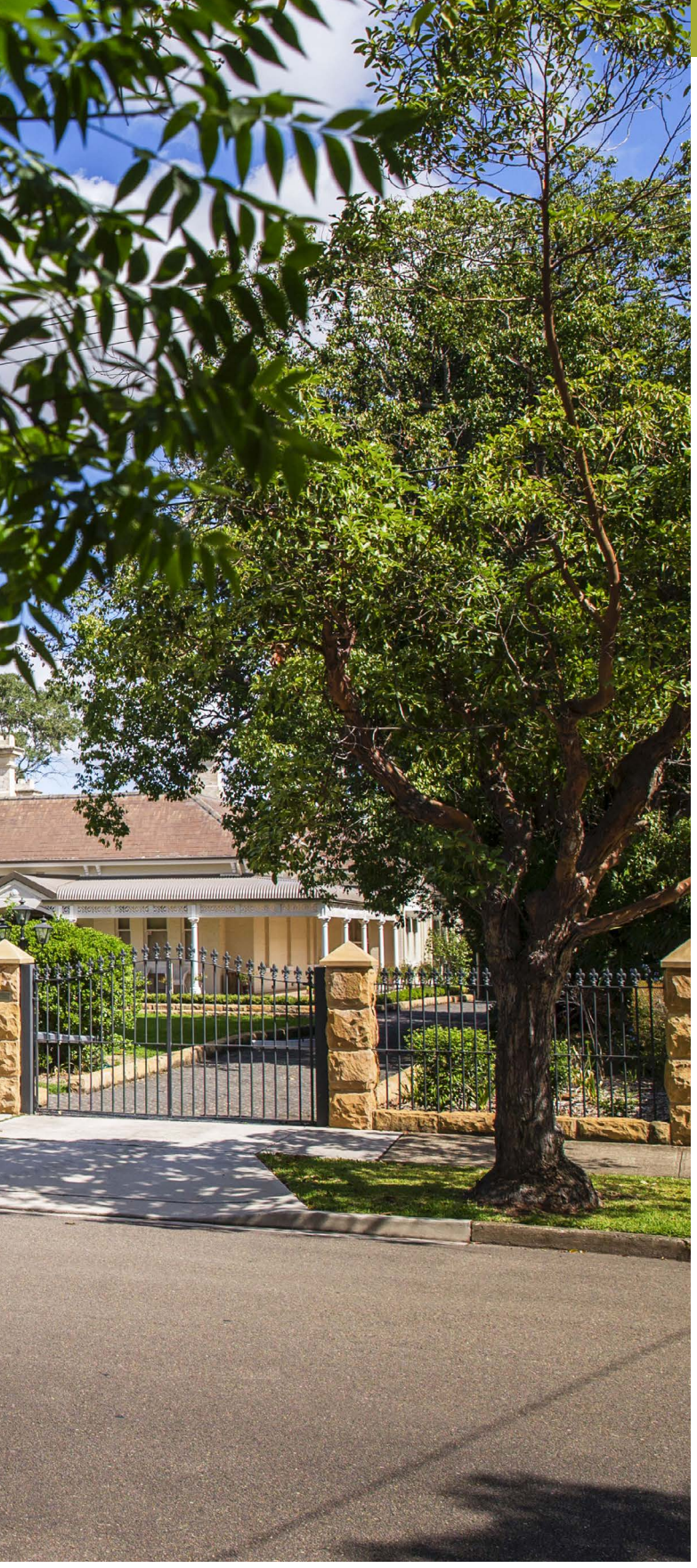
Overall, there has been a lack of adequate monitoring and follow-up to determine the effectiveness of these actions.

Table 3: Past and ongoing biodiversity management activities by Council within the Strathfield LGA

Program/Project	Description of biodiversity related management actions	Duration	Monitoring/ follow up
Freshwater Park	Major bank rehabilitation project to restore a 200m section of the Cooks River, just upstream from Hedges Avenue, which runs adjacent to numerous homes and through the Strathfield Private Golf Course. The creek is the only naturalised section of the Cooks River within the Strathfield Council area. Since 2002, Council has undertaken a further two projects to stabilise the riverbanks between Hedges Avenue and Centenary Drive, Strathfield.	2001 – 2002	N/A
Yarrowee Wetlands (Freshwater Park)	The wetland was restored to provide feeding habitat and breeding habitat for a variety of native wildlife including frogs, skinks and small birds. The project included the construction of a wetland to treat stormwater flowing from several local streets and the planting of over 2000 locally native shrubs, grasses and groundcovers to serve as a seed orchard for the Strathfield Council Native Nursery.	2010	N/A

Program/Project	Description of biodiversity related management actions	Duration	Monitoring/ follow up
Mason Park Wetlands	2004-05 Council removed weeds by spraying and eradicating *Juncus acutus*. Council and Sydney Olympic Park Authority completed nocturnal bird surveys in 2007 to record species diversity and behaviour within the wetlands. Studies of some of the rare and restricted saltmarsh species, such as *Wilsonia backhousei* are being undertaken by the University of NSW, Sydney University, and UTS. Weed control is an ongoing task undertaken by bush regeneration contractors. Mangrove removal is an ongoing task to limit encroachment into saltmarsh habitat. Naturalisation of Powells Creek. In 2017, Sydney Water replaced the old concrete banks of Powells Creek between Pomeroy Street and Conway Avenue with sandstone and native plants.	2004-2005, 2007, 2017, ongoing	Ongoing.
Treading Lightly - Mason Park Wetland Walk and Talk	Guided tour of the Mason Park Wetland, a recognised important feeding site for international migratory birds. Tour covered information about wetlands, wetland birds, mangroves and Powell's creek naturalisation.	September 2017	N/A
Coxs Creek Reserve	Ongoing weed control by council staff and bush regeneration contractors. Installation of an artificial wetland in the eastern section of the site. Developed a Coxs Creek Reserve Plan of Management (PoM), funded and gained external funding to undertake some habitat creation and enhancement initiatives on the reserve, funded occasional survey/monitoring of frogs within the reserve, and continue to undertake/support revegetation initiatives along the Cooks River and its tributaries. Council continues to be supportive of initiatives for the endangered GGBF in the LGA.	Ongoing	Ongoing.
Native tree planting and weed control Maria Reserve	Rolling program of weed control and native tree planting in reserves and parks. Approximately 1000 trees planted per annum. In 2019, 1000 plants were planted across Airey Park, Laker Reserve, Inveresk Park, Eliott Reserve, Fitzgerald Reserve, Mason Reserve, Bressington Park and Cooks River Corridor.	Ongoing	Council monitors and waters the plantings in the proceeding weeks.

Program/Project	Description of biodiversity related management actions	Duration	Monitoring/ follow up
National Tree Day	Council promotes a tree planting event at a chosen location in the LGA and encourages participation from residents, schools, community groups.	Ongoing – Annually	Council monitors and waters the plantings in the proceeding weeks.
Bushcare groups – Mason Park Wetland/ Maria Reserve	Council supports volunteer bushcare groups, these groups participate in weeding, planting, and litter collection at Mason Park, Bressington Park and Maria Reserve. Occasionally hold environmental education days.	Ongoing	Bushcare groups monitor sites they do work on.



CHAPTER 3: STRATEGIC CONTEXT

This section of the Strathfield Biodiversity Conservation Strategy and Action Plan outlines the vision for biodiversity management in the LGA, the key biodiversity principles, priorities and actions that will form the focus of Council's biodiversity management.

OUR VISION

'Strathfield Council's community value and protect our native plants and animals, and the environment in which they live. We support thriving and resilient natural areas and greenspaces which contribute to our health and wellbeing.'

GUIDING PRINCIPLES

The Strategy is underpinned by a set of principles that guide the objectives and actions to achieve the Vision. They have been developed in collaboration with Council and the Strathfield community.

1. Biodiversity contributes to the quality of life of Strathfield residents by improving visual, cultural and recreational opportunities and providing a connection to the natural world.
2. The Strathfield community, in partnership with Council, are key stewards of Strathfield's biodiversity.
3. Community participation in biodiversity management provides a sense of ownership and ensures long-term protection of biodiversity.
4. Strathfield's natural areas and greenspaces are irreplaceable assets that are important to resident's lifestyle and to the character of the LGA. They should be valued, managed and enhanced in an equivalent way.
5. Prevention of loss and degradation of biodiversity is the highest priority and is more cost-effective and less risky than recovery and restoration actions.
6. Fragmentation of natural areas should be avoided and corridors along waterways should be enhanced in extent and condition.
7. Individual species have different habitat requirements and a range of habitats on Council land and on private property is required to promote increased biodiversity.

BIODIVERSITY PRIORITIES

B1

Ensuring native vegetation and habitat is conserved, restored and enhanced.

B2

Improving the health and resilience of Mason Park Wetlands, Cooks River and Coxs Creek.

B3

Connecting reserves, green spaces and streetscapes to support biodiversity.

B4

Actively engaging Community and Council in biodiversity conservation.

Priority areas

Priority areas to protect and enhance biodiversity are mapped in Map 6. Priority areas were determined based on the following criteria:

Areas for biodiversity conservation:

1. Contain threatened ecological communities with all structural layers (i.e. canopy, shrubs and groundcovers) that forms key habitat for a range of species.
2. Contain state or nationally threatened species and populations.

Connectivity priority areas:

1. Contain core native habitat that supports locally important fauna and flora.
2. Act as 'stepping stones' and corridors that provide dispersal pathways for fauna to move through the landscape.

Community engagement priority areas:

1. Are easily accessible by community members for activities including planting days.
2. Contribute to Strathfield reserves and parklands that have biodiversity and connectivity potential.

Priority species for planting

Different plant species and forms will contribute to ecosystems through the habitat they provide. For example, small native birds need dense shrubs to protect from larger, more aggressive species. Where possible, the planting regime should aim to be diverse and replicate the composition of the ecological community that would naturally occur in an area (refer to vegetation mapping in Map 2). Appendix E lists species associated with each of the ecological communities that occur in the LGA and should be used to select species for revegetation projects in all priority areas. The recommended planting list can also be referred to by residents wanting to select species that would naturally occur in this area prior to settlement.

Priority habitats

Breeding, roosting and foraging habitat that can be introduced to the landscape to supplement plantings can include logs, nest boxes (different configurations for different target species) and water features with fringing vegetation. Highly sensitive areas should be fenced with signage outlining the purpose of fencing.

Priority weeds

As outlined previously, weeds are prevalent across the LGA and include at least six Weeds of National Significance (see Appendix C). Landowners, including Council, have legal obligations to control certain weeds. This can include preventing new weeds establishing in an area, treating them so they do not spread to other areas, or removing them. The Greater Sydney Regional Strategic Weed Management Plan 2017-2022 prioritises weeds for management purposes and provides details that should be considered in any weed control program. Best practice weed control techniques are described in Appendix F.

Map 6: Priority biodiversity areas in Strathfield LGA

ACHIEVING NO NET LOSS

The mitigation hierarchy is crucial for all development projects aiming to achieve no overall negative impact on biodiversity (also referred to a No Net Loss). It is based on a series of essential, sequential steps that must be taken throughout the project's life cycle in order to limit any negative impacts on biodiversity (Figure 9).

Expert advice should be sought regarding the type of offset scheme, if any, that is applicable. For example, the Biodiversity Offset Scheme Entry Tool can determine if a development will trigger the threshold for offsetting under the BC Act.

Council's roles and responsibilities regarding biodiversity impacts and offsets include:

- As the proponent causing the impact e.g. during asset construction or maintenance.
- As the regulator providing advice and approval to developers in the area.
- As the owner or manager of public land that:
  - Could provide an offset site
  - Maintains an offset site

Key features of biodiversity offsets and replacement planting schemes are summarised below.

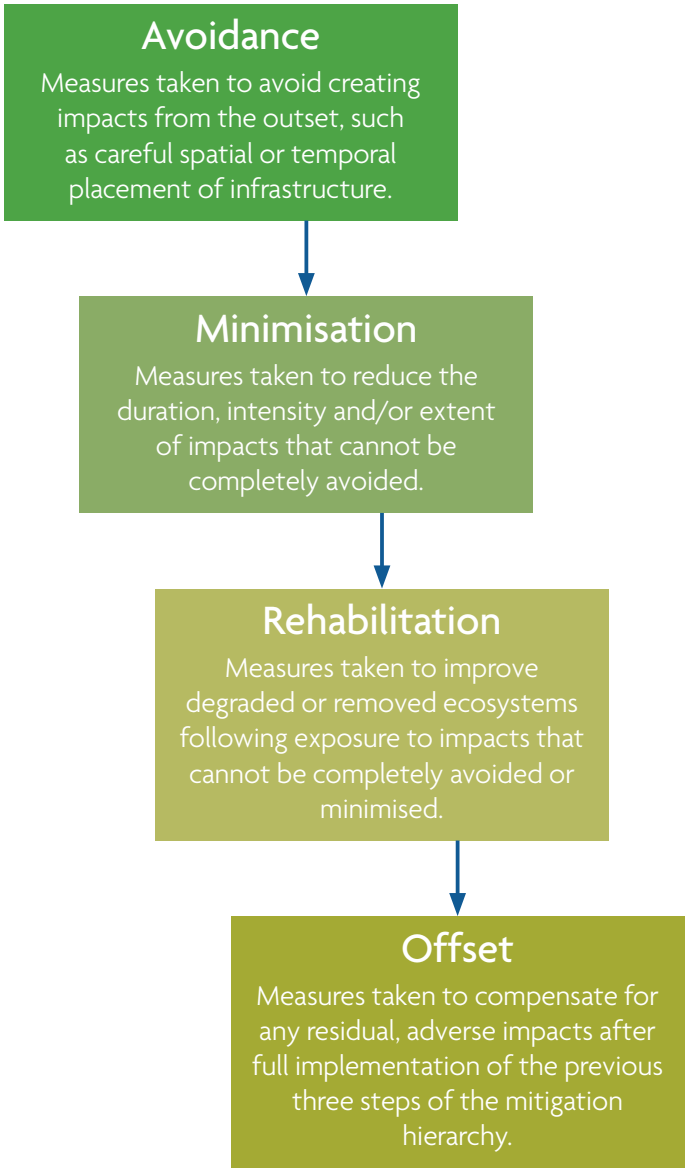


Figure 9: Mitigation hierarchy

Biodiversity offsets scheme

The Biodiversity Offsets Scheme (BOS) is a voluntary market-based scheme established in 2017. The BOS is administered in accordance with the *Biodiversity Conservation Act 2016* by the Biodiversity Conservation Trust, which is a statutory not-for-profit agency within the portfolio of the NSW Minister for the Environment.

The BOS enables 'biodiversity credits' to be generated by landowners and developers (including Council) who commit to enhancing and protecting biodiversity values on their land through a Biodiversity Stewardship Agreement. The biodiversity credits can then be sold, generating funds for the management of the site. Credits can be used to offset the impacts on biodiversity values that occur from development.

Ecosystem and species credits may only be created where management actions are proposed to be carried out on a biodiversity stewardship site. Where land has an existing conservation obligation, biodiversity credits may only be created where the management actions are additional to any biodiversity conservation measures already being undertaken (see section 13.11.11 of the 2017 Biodiversity Assessment Method). For example, if a conservation obligation under a Council Plan of Management for a reserve expires without having been implemented, then Council could revise the Plan of Management so that it includes a Biodiversity Stewardship Agreement for the site. However, an offset cannot be created on land that has previously been used as an offset site or has been deemed not eligible.

Some impacts cannot be offset because they are likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct. Under Clause 6.7 of the Biodiversity Conservation Regulation 2017 an impact is considered 'serious and irreversible' if:

- It will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
- It will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.
- It is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
- The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

Importantly, an offset area would need to be managed for conservation in perpetuity. An example could be where part of a public reserve is dedicated in perpetuity for conservation purposes as an offset site, and other parts of the reserve which are not covered by the Stewardship Agreement are to be used for recreation (e.g. cycleway, sports fields) or other purposes.

To identify and establish an offset site, Council and proponents should refer to the High Priority Areas in Section 8.2.1 of this study. Further analysis of the suitability of priority areas to establish an offset would involve a feasibility assessment by a Biodiversity Assessment Methodology (BAM) Accredited Assessor including review of the land tenure and biodiversity characteristics, as well as consideration of the need to match the species and/or ecosystem being impacted. Once the preferred offset site is identified, the BAM Accredited Assessor would:

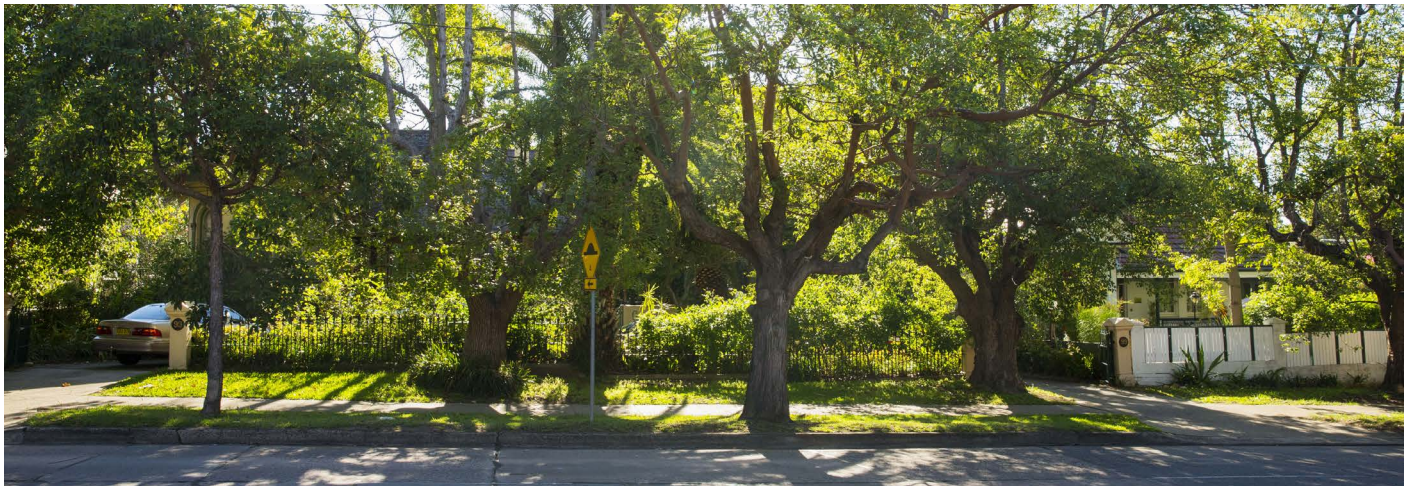
1. Undertake a detailed biodiversity assessment to establish the number and types of potential biodiversity credits that could be created.
2. Prepare an application for a formal Biodiversity Stewardship Agreement to be submitted to the Biodiversity Conservation Trust.

Once the Biodiversity Stewardship Agreement is approved by the Trust and Agreement implemented, the landholder of a stewardship site would receive annual payments from the Trust and be responsible for ongoing management of the site in accordance with the Agreement.

Canopy tree replacement

Replacement of individual trees on private or public land may be needed in circumstances where a biodiversity offset under the BC Act is not required. Potential removal and replacement of individual trees should be consistent with the Urban Tree Canopy Guide and Manual (GANSW 2018) and be subject to impact assessment. Examples of when this could apply include:

- A single tree may need to be removed by Council to enable a stormwater pipe to be repaired. Tree replacement would need to become part of Council's scope of works and budget.
- A private landowner may seek removal of a diseased tree from a backyard. Replacement planting should be on the same property where possible but may be implemented in priority areas if there is not adequate or suitable space.



Council's Development Control Plan (DCP) should be updated to include requirements for replacement tree planting. The DCP should set out:

- The minimum ratio of trees to be replaced in different circumstances (e.g. single dwelling development, higher density development, no proposed development).
- Requirements for species to be planted.
- Requirements for establishment of the planting, including the minimum size to be achieved during the compliance period.
- Controls for protection of trees during construction.
- When a financial contribution could be made to Council to support public tree planting in lieu of the applicant undertaking replacement planting.

Council officers have authority to audit compliance of replacement planting on private and public property and issue penalties if required.

The location and species selection for the replacement planting should consider:

- Where is the closest suitable position for the planting (consider proximity to built infrastructure such as pavements, buildings, underground pipes and overhead wires).
- What native species would be best suited to the preferred location (see Appendix E).

Decisions related to the removal or major pruning of individual trees should be made in consultation with a Consulting Arborist and in accordance with the Australian Standard AS4970 for Protection of Trees on Construction Sites.

FUNDING AND IN-KIND CONTRIBUTIONS

Sources of funding to implement the actions could include:

- Council's capital and recurrent expenditure
- Government and non-government grants
- Special environmental levy
- Section 94 contributions from developers
- Sponsorship

Council is encouraged to form partnerships with other government and non-government organisations and individuals to implement actions. As well as reducing costs, this can create greater engagement and 'ownership' of the actions. Opportunities for sourcing volunteer labour or other in-kind contributions could include:

- Project partners
- Planting events
- Rubbish removal e.g. Clean Up Australia Day
- Bush regeneration e.g. Bushcare, Conservation Volunteers Australia
- Water quality monitoring e.g. Streamwatch
- Species survey e.g. citizen science activities
- Research projects with local institutions such as Western Sydney University

Council will continue its commitment to supporting community volunteers through a variety of means including on-ground support, insurance and administrative support.

In addition to Council's budget from development contribution plans and rates, monetary grants and funding from various sources such as the NSW Environmental Trust and Catchment Management Authorities may be sought to carry out actions identified in this Plan. This includes actions which have a more regional biodiversity benefit such as connectivity and corridor enhancement or enhancement of vegetation or species habitat listed as threatened at either a State or Federal level (either through on ground action or knowledge advancement).

MONITORING AND REVIEW

It is essential that actions are monitored and reviewed to determine if they are meeting the strategic and specific objectives outlined in this Strategy. Monitoring and performance reporting is a standard requirement for grant funds and an important way to demonstrate effective use of public funds. The monitoring and reporting requirements for each action will align with the objectives and measures in the Action Plan.

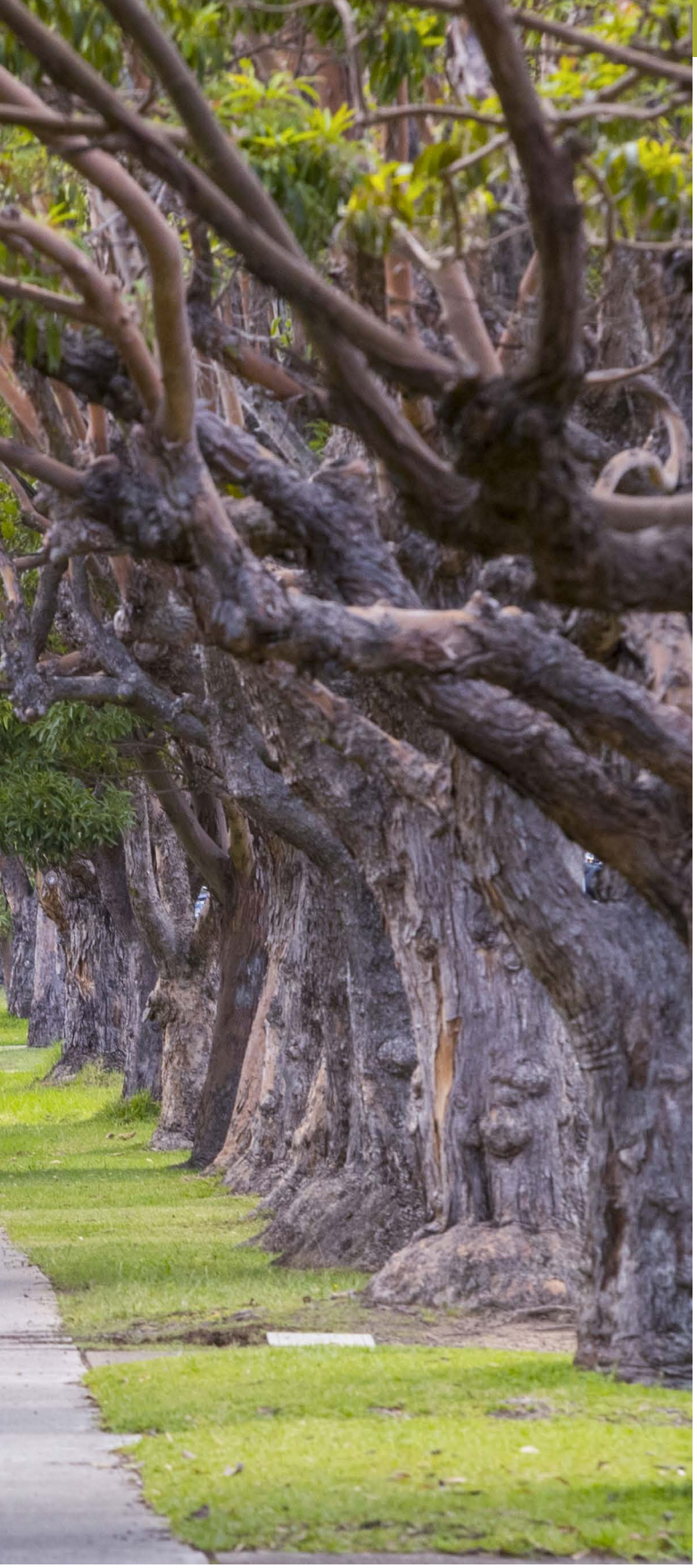
The status of each action will be communicated and regularly updated as:

- New
- Commenced
- Ongoing
- Completed

The Action Plan will be reviewed and updated by Council in five years, and both the Action Plan and Strategy will be reviewed and updated in ten years. Results of performance monitoring should be considered in the reviews.

Council's annual report to the community should identify (using diagrams and photos where possible):

- The type and location of actions taken.
- Lessons learnt for future action.
- Measurable changes for the year against the strategic objectives.
- Cumulative changes against the strategic objectives since implementation of the Biodiversity Conservation Strategy commenced.



CHAPTER 4: BIODIVERSITY ACTION PLAN

The Action Plan details activities Council can complete over the next five years to improve biodiversity management in the Strathfield LGA. Actions aim to maintain and improve biodiversity values across the LGA for each strategic objective.

The implementation timeframe for this Action Plan is five years. After five years, the Plan should be subject to a comprehensive review.

The following actions are based on the existing body of biodiversity knowledge from relevant plans, strategies and studies and community engagement that conducted for Strathfield Council. These actions are closely aligned with the Liveable Neighbourhoods theme as identified in the Strathfield 2030 Community Strategic Plan.

Each group of actions relating to targets are assigned a priority for completion. Priorities have been separated into:

- **H – High:** Actions investigated to commence within first year of the plan for completion within 5 years.
- **M – Medium:** Actions investigated to commence within first three years of the plan for completion within 5 years.
- **L – Low:** Actions investigated to commence within five years of the plan.

B1

Ensuring native vegetation and habitat is conserved, restored and enhanced.

Actions		Priority	Indicators
A1	Remove 30% of weeds at Coxs Creek Reserve and replace exotic species with a diverse and complex canopy, midstorey and understorey of indigenous plant species reflecting CRCIF community (see Appendix E).	H	30% less weeds at Coxs Creek Reserve.
A2	Ensure that TECs are being actively restored through bush regeneration and where required, that revegetation in reserves, parks and streetscapes is undertaken using locally sourced stock from agreed planting list (see Appendix E).	H	Increase in the number of plants planted and surviving in reserves, parks and streetscapes that are indigenous to the local area.
A3	Conduct a targeted field survey of mapped CRCIF TECs to determine whether they meet the criteria for listing under the EPBC Act (1999). Determine the presence/absence, abundance and condition of threatened species (e.g. *Acacia pubescens*)	L	1 vegetation survey completed in mapped CRCIF TECs.
A4	Retain dead timber in reserves as habitat for fauna and to create a more complex understory structure and shelter sites from predators. Establish 10 nest boxes at Coxs Creek reserve and monitor their efficacy as a habitat replacement for tree hollows.	M	10 nest boxes installed in Coxs Creek Reserve. Results of nest box efficacy.
A5	Liaise with Australia Post to investigate opportunities to protect the remnant patch of CRCIF to the south of the Australia Post depot.	M	Agreement in place with Australia Post to manage and protect CRCIF.
A6	Develop and maintain a standardised environmental data collection process (templates) and information repository (biodiversity database) for use by Council staff, consultants and volunteers. See PRISM (https://conservationevaluation.org/step-by-step-guide/) as best practice example.	H	Biodiversity database created. Number of templates developed.

B2

Improving the health and resilience of Mason Park Wetlands, Cooks River and Coxs Creek.

Actions		Priority	Indicators
A7	Mason Park Wetland Measure *W. backhousei* species cover, abundance and condition. Monitor annually during December along transects, at low tide • Manually remove mangroves that are encroaching into saltmarsh habitat • Establish 5 photopoints to keep track of mangrove incursions and extent of coastal saltmarsh. At each photopoint take 4 photos at each compass point annually.	**H**	Annual monitoring of *W. backhousei*. Increase in species cover, abundance and condition of *W. backhousei*. Positive response of saltmarsh to annual mangrove control. Annual photographic record.
A8	Conduct an annual bird survey (from December to February) to track change in migratory shorebird species utilising Mason Park wetland. Coordinate with Birdlife Australia Shorebirds 2020 project, which aims to facilitate shorebird monitoring across the country. Engage with local schools, universities and community. Aligned with the Strathfield Community Strategic Plan goal to ***develop environmental programs to educate and inform the community.***	**H**	One community shorebird survey completed annually. Before/after interviews and surveys of community participants. Increase in the number of school and community members participating in bird counts over 5 years.

continued...

Actions		Priority	Indicators
A9	Waterways Develop a Waterwatch[1] program targeting Cooks River to get a snapshot of the health of Strathfield's waterways. Engage community and school groups to establish up to 5 monitoring points along the river and undertake quarterly water quality monitoring and biannual (March and October) water bug surveys. Events used to educate community on aquatic environments, pollution and biodiversity. Aligned with the Strathfield Community Strategic Plan goal to ***develop environmental programs to educate and inform the community.*** 1 (https://www.nswwaterwatch.org.au/)	**M**	Up to 5 monitoring points established along Cooks River. 4 water quality monitoring activities completed per annum. 2 waterbug surveys completed per annum. Increase in the number of participants in water quality/ waterbug program over 5 years. Before/after interviews and surveys of participants. Database of water quality and waterbug statistics.
A10	Education of community "sweep instead of hose". Reinforce that everything on the streets enters our waterways. Aligned with the Strathfield Community Strategic Plan goal ***encourage sustainability and resource efficiency.***	**L**	Education materials created. Education materials distributed via council channels (e.g. website and social media). Number of hits on the webpage.
A11	Frog ponds Revitalise existing frog ponds and frog habitat at Coxs Creek by: • Removing stagnant water and relining the ponds to increase the chance of water pooling. • Complete annual frog surveys with community to determine the status of GGBF and monitor the population. Implement maintenance plan for Chain of Ponds Reserve and Juno Frog ponds to remove algae, replant aquatic plants and replace logs and rocks for GGBF.	**M**	Number and type of management actions completed to revitalise frog ponds. Annual surveys completed. Number of community members attending surveys.

B 3

Connecting reserves, green spaces and streetscapes to support biodiversity.

Actions		Priority	Indicators
A12	Identify opportunities for the establishment of roadside and habitat corridors. Areas of continuous habitat will be prioritised based on conservation significance.	**M**	Number and type of bushland management actions Alignment with regional strategic plans
A13	Update the Significant Trees Register and develop an Urban Forest Plan. Urban Forest Plan to include: • Summary of the benefits of native trees for public health and wellbeing. • Retain senescent trees as habitat where safe to do so. • Give due recognition to remnant trees in private yards. • Provide an overarching comprehensive plan for the long-term management and establishment of trees in the LGA. • Plan for tree removal and replanting through staged succession planting. • Plant along habitat corridors identified from this Plan (Map 6). • Increase the number of trees, midstorey and understorey species on nature strips along quiet roads using species well-adapted to soil conditions, which are low maintenance and have high fauna habitat values.	**L**	Significant Trees Register updated Urban forest plan completed

continued...

Actions		Priority	Indicators
A14	Develop Backyard Habitat Program and Creating Backyard Habitat guide for residents. Program is designed to support residents who would like to create native habitat gardens on their own property. Proposed contents of a Habitat Guide include: • Information on the environment where residents live, its flora, fauna, biodiversity and conservation • Local native plant lists (see Appendix E) for a bush friendly backyard and planting guide for apartment owners. • Impacts of feeding native and feral animals, • Attracting wildlife to residential gardens (e.g. bee hotels), • Impacts of and alternatives to dumping garden waste, • Importance of responsible pet ownership, • Importance of retaining native vegetation.	**M**	Increase in number of residents taking part in Backyard Habitat Program Community satisfaction surveys Number of information sessions held, number of participants, survey of perspectives before and after Number of brochures/ factsheets distributed to residents as part of the biodiversity education strategy. Number of attendees at educational programs and completion of before and after surveys

B4

Actively engaging Community and Council in biodiversity conservation.

Actions		Priority	Indicators
A15	Improve knowledge and awareness of best practice biodiversity management for council's staff (e.g. environmental, planning, infrastructure teams) through three internal biodiversity workshops: i. What is biodiversity and what are your responsibilities under the BC Act? ii. Incorporating biodiversity into planning (e.g. DA) iii. Best practice procedures for Council staff to ensure the protection and enhancement of biodiversity • Identify potential suitable funding sources to provide training in wildlife habitat requirements for parks / reserve staff and volunteers e.g. Controlling the spread of weed seed, retention of dead wood and stags.	**H**	Number of council staff attending workshops. Before/after surveys of biodiversity and its applicability to council staff operations. Increased number of council staff incorporating biodiversity into their decision making.
A16	Complete a communications review and develop a communications strategy for biodiversity. Strategy to include at a minimum: • Communication objectives • Target audiences • Key messages • Promotion of biodiversity achievements • Implementation	**H**	Communications review complete. Communications strategy completed.

continued...

Actions		Priority	Indicators
A17	Complete a review of internal Council planning processes. Including: • Duties under the BC Act. • Processes for providing and retaining habitat (e.g. tree hollows). • Pre-clearance assessments of trees. • Review of standard conditions of consent in development applications. Develop conditions to ensure biodiversity is included, enforced and linked with Development Control Plan (DCP). • Review council assessment practices in relation to threatened species. • Consideration of biodiversity in development assessment procedures.	**H**	Standard conditions of consent reviewed & updated. Development assessment procedures contain appropriate biodiversity conservation provisions.
A18	Increase the number of community planting days to 4 per annum. Identify and prioritise sites suitable for community planting events / activities (see Map 6).	**H**	4 community planting days completed per annum. Increase in the number of attendees at planting days over the 5-year period. Surveys of attendees before and after each event.
A19	Promote and encourage local business to participate / sponsor planting events and activities. As a starting point engage Australia Post in the protection of CRCIF at the Weerona Road depot.	**L**	$ Generated from sponsorship of community events. Number of corporate employees participating in community events. Surveys of attendees before and after each event.
A20	Identify new sites of high conservation value / priority that would benefit from establishment of a new bushcare group or volunteering where interest has been identified by the community through an EOI process. • Advertise bushcare groups and host information sessions, particularly in areas identified as very high and high priority that do not currently have a bushcare group.	**M**	Number of priority sites identified by community. Number of new Bushcare or similar groups established. Increase in community participation in Bushcare over 5 years.

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APPENDIX A

LEGISLATIVE CONTEXT

INTERNATIONAL AGREEMENTS AND LEGISLATION

Australia is signatory to a range of international agreements relevant to biodiversity. These include:

- Convention on Biological Diversity which requires countries to prepare a national biodiversity strategy and ensure that the strategy is incorporated in the planning and activities of all sectors whose activities can have an impact (positive and negative) on biodiversity.
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).
- Bilateral migratory bird agreements with Japan (JAMBA), China (CAMBA) and the Republic of Korea (ROKAMBA).
- United Nations Framework Convention on Climate Change.
- United Nations Sustainable Development Goals (SDG), including:
  - Goal 11: Make cities inclusive, safe, resilient and sustainable.
  - Goal 15: Life on land. Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.

Our international obligations influence Commonwealth and State legislation, which in turn are supported by policies, plans and strategies.

Act	Summary
Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) (EPBC Act)	Provides a national scheme for environmental protection and biodiversity conservation. Incorporates referral mechanisms and environmental impact assessment processes for projects of national significance. Triggers for referral to the Commonwealth include significant impacts to listed communities, species, Endangered Ecological Communities (EECs), and Critically Endangered Ecological Communities (CEECs).
Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act).	The principal planning legislation for the State providing a framework for the overall environmental planning and assessment of development proposals. Drives the planning and development processes in the LGA. The Act provides for the preparation of environmental planning instruments (including the Local Environmental Plan or LEP).
Biodiversity Conservation Act 2016 (NSW) (BC Act).	This requires that councils consider the impact on threatened species, populations and communities in fulfilling their statutory responsibilities under the EP&A Act for development approvals. It also covers management of threatened species and communities on Council owned lands.
Companion Animal Act 1998 (NSW).	Requires the identification and registration of companion animals (e.g. cats and dogs). It sets out the duties and responsibilities of their owners. Wildlife Protection Areas are public places set apart for the protection of native animals and their habitats under this Act. Cats are prohibited from entering these areas and dogs must be on a leash and remain on established tracks. Motor vehicles are not permitted.

Act	Summary
Protection of the Environment Operations Act 1997 (NSW) (POEO Act).	The POEO Act enables the Government to set out explicit protection of the environment policies (PEPs) and adopt more innovative approaches to reducing pollution through licences and approvals relating to air pollution, water pollution, noise pollution and waste management. Integration of licensing with the development approval procedures under the EP&A Act in environmental assessment of activities.
Local Government Act 1993 (NSW).	Incorporates Ecologically Sustainable Development (ESD) considerations (including biodiversity conservation) as a key aspect of Council operations. Requires the preparation of Plans of Management (POMs) for Council owned land, and provides for the classification of land into, amongst other things, natural areas.
Local Land Services Act 2013 (NSW).	The Act Provides a framework to ensure the proper management of natural resources in the social, economic and environmental interests of the State. Strathfield is part of the Greater Sydney Local Land Services (GSLLS) which provides guidance on matters such as community engagement, biosecurity and weeds.
National Parks and Wildlife Act 1974 (NSW):	Provides for the protection of flora and fauna species. There are no reserves in the LGA under this Act.
Crown Lands Management Act 2016 (NSW).	Governs the planning, management and use of Crown land, including provisions to reserve or dedicate lands for a prescribed public purpose and for leasing and licensing. Local councils manage Crown land under the public land provisions of the *Local Government Act 1993* and in accordance with plans of management for Crown reserves
Biosecurity Act 2015 (NSW):	Provides a framework for the management of pests, disease and weeds across all lands.
Fisheries Management Act 1994 (NSW).	This Act aims to preserve fish habitats and species. It allows for listing of threatened species, habitat, communities, and processes similar to the BC Act.
Water Management Act 2000 (NSW).	This Act controls the extraction of water, how water can be used, the construction of works such as dams and weirs, and the carrying out of activities on or near water sources in NSW. Any works within 40 m from the top of bank of a waterway is a controlled activity that requires integrated development approval. Council are exempt from requiring integrated approval.
Rural Fires Act 1997 (NSW).	Controls fire management practices (e.g. prescribed burning) and development controls in relation to bush fire protection.
State Environmental Planning Policy 19 – Bushland in Urban Areas.	Provides a statutory framework for protecting urban bushland and biodiversity within the LGA. Council can prepare a plan of management consistent with the objectives of the SEPP.

NATIONAL

- Australia's Biodiversity Conservation Strategy 2010-2020 (Consultation Draft) has a vision that 'Australia's biodiversity is healthy, resilient to climate change and valued for its essential contribution to our existence'. The principles are that:
  - We share the Earth with many other life forms that have intrinsic value and warrant our respect, whether or not they are of benefit to us.
  - Biodiversity is best conserved by protecting existing natural habitats.
  - Effective conservation of biodiversity operates at the landscape scale across public and private tenures.
  - Natural ecosystems are dynamic but have a finite capacity to recover from external threats, impacts and pressures.
  - Building resilience recognises the critical links between ecological and social systems.
  - All people benefit from biodiversity; all people can and should contribute to its well-being.
  - Our efforts to conserve biodiversity must acknowledge and respect the culture, values, innovations, practices and knowledge of Indigenous peoples.
  - Knowing that our knowledge is limited, we should apply the precautionary principle while employing adaptive management approaches using new science and practical experience. The precautionary principle is that lack of scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.
- Australia's Strategy for Nature 2018-2030 (Draft) has a vision that 'Australia's nature, now and into the future, is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our health, wellbeing, prosperity and quality of life'.
- Australian Weeds Strategy 2017-2027 sets out the principles of effective weed management as well as strategic goals and objectives.
- Australian Pest Animal Strategy 2017-2027 sets out the principles of effective pest animal management as well as strategic goals and objectives.
- Threatened Species Strategy 2015 – 2020
  - Strategy sets out a road map and highlights government's approach of utilising science, action and partnership to achieve the long-term goal of reversing species declines.
  - Action Plan 2015-16 identifies 10 threatened mammals and 10 threatened birds for action that will grow their populations by 2020.
- Threat abatements plans for:
  - Infection of amphibians with chytrid fungus resulting in chytridiomycosis.
  - Predation by European red fox.
  - Predation by feral cats.
- 202020 Vision Plan. The vision of this initiative is to form a 'mass collaboration of organisations working together to create 20% more and better urban green space by 2020.
- Intergovernmental Agreement on a National Water Initiative aims to achieve a nationally compatible regulatory and planning-based system to manage surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes. It is supported by the 2012 Aquatic Ecosystems Toolkit.

STATE

- The NSW Department of Planning and Environment has a goal to increase urban tree canopy across the Greater Sydney region to 40% by 2030. The Draft Green Infrastructure policy, Greener Places: Establishing an urban Green Infrastructure policy for New South Wales. It aims to guide the design, planning and delivery of Green Infrastructure in urban areas across NSW to create a healthier, more liveable, more resilient and sustainable urban environment by improving community access to recreation and exercise, walking and cycling connections.
- The Draft Bushland and Waterways Guide. The guide outlines the importance and benefits of urban habitat and requires councils to prepare a strategic urban biodiversity framework to implement the urban habitat and biodiversity components of the NSW green infrastructure policy.
- Saving our Species 2016-2021 is NSW's leading threatened species conservation program.
- Recovery plans for:
  - Cumberland Plain
  - Acacia pubescens
  - Green and Golden Bell Frog
- Best practice guidelines for:
  - Coastal Saltmarsh
  - Cooks River Castlereagh Ironbark Forest
  - Sydney Turpentine Ironbark Forest
  - Cumberland Plain

REGIONAL

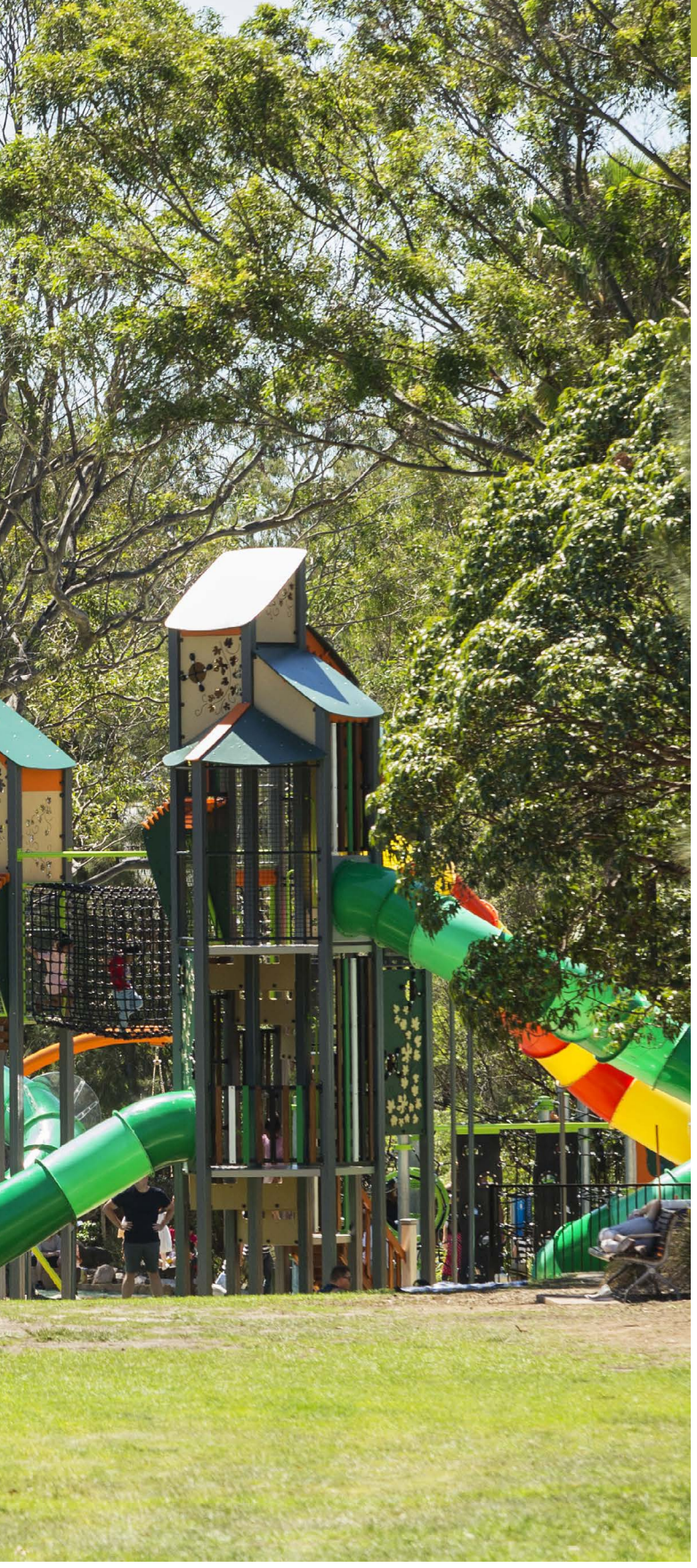
- The Greater Sydney Region Plan Sustainability Directions states, 'Greater Sydney has evolved within outstanding natural and scenic landscapes. As it grows, strategic planning will manage the effects of urban development to protect, restore and enhance these landscapes, waterways, natural areas and open spaces. A healthy natural environment will be important to improve liveability, create healthy places, and mitigate the effects of climate change'.
- The Greater Sydney Commission has developed three District Plans with planning priorities for the metropolitan region to 2056. The 2018 Eastern City District Plan includes the following priorities for sustainability relevant to the Strathfield LGA:
  - E14: Protecting and improving the health and enjoyment of Sydney Harbour and the District's waterways.
  - E15: Protecting and enhancing bushland and biodiversity.
  - E16: Protecting and enhancing scenic and cultural landscapes.
  - E17: Increasing urban tree canopy cover and delivering Green Grid connections.
  - E18: Delivering high quality open space.
  - E19: Reducing carbon emissions and managing energy, water and waste efficiently.
  - E20: Adapting to the impacts of urban and natural hazards and climate change.
- The Greater Sydney Central District Green Grid nominates a network of high-quality green spaces to connect communities to the natural landscape. The grid aims to link waterway and bushland corridors, parks, open spaces, tree cover on private land and tree-lined streets with walking and cycling paths, public transport and town centres. Enhancing Powells Creek and Mason Park and providing a secondary Green Link along Cooks River from Strathfield to Belmore are green grid priorities within the Strathfield LGA.
- Councils are required to deliver the green grid through land use planning and infrastructure investment mechanisms such as development and land use controls, and funding through local development contributions and voluntary planning agreements. The NSW Government supports delivery of the green grid through the Metropolitan Greenspace Program and Special Infrastructure Contributions.

LOCAL

- The Cooks River People's Plan 2018 - 2021
  - Three-year plan that commits the Cooks River Alliance to united action for a healthy Cooks River and catchment that improves the liveability of places and communities.
  - Eight goals across three strategic focus areas:
    - Cooks River Alliance partnership of land and water managers in community is ongoing.
    - Alliance has supported ongoing research into river catchment and health.
    - Advocacy for sufficient resources to improve river and catchment health has been successful.
    - Planning policies and practices are supporting improvements in river and catchment health.
    - Catchment and river health is better understood, measured and communicated.
    - There is an agreed approach to the management of the river and catchment.
    - Meaningful, mutually beneficial and sustainable relationships are established with Aboriginal people and organisations in the catchment.
    - The Alliance is achieving the catchment communities' aspirations for the river.
- State of the Environment (SoE) reporting is a statutory requirement under the Local Government Act 1993. Since 2009, the SoE report has been integrated into Council's Annual Report.

STRATHFIELD COUNCIL PLANS

- Strathfield Local Environmental Plan (LEP) 2012.
- Strathfield Development Control Plan 2005
  - Specific objectives and controls for ensuring development proposals are:
    - Designed to retain existing street trees, site trees and natural features that are unique to the site.
    - Able to provide a suite of native (indigenous) flora within the site to contribute to the network of natural areas and biodiversity corridors that have been displaced and disconnected within the LGA.
    - Able to protect natural areas and minimise pollution and contamintation of waterways during construction works.
- Coxs Creek Wetland and Reserve Plan of Management 2010
  - Provides best management practices and strategies to assist Council in better managing the reserve's assets, to increase biodiversity values and assist in the management of threatened species and vegetation communities on site.
- Mason Park Plan of Management 2008
  - Provide best management practices and strategies to assist Council in better managing the park's assets, to increase biodiversity values and assist in the management of threatened species and vegetation communities on site.
- Community Strategic Plan (CSP) 2030
  - Describes what the Strathfield community has identified as important priorities and community aspirations for the Council to achieve over the next 10 years.
  - Community identified that the Strathfield Council area should be maintained as a 'Garden City'. There were concerns about loss of green areas in the Strathfield Council area and erosion of established street and landscapes and condition of parks in the local area.
  - Council Operational Plan 2018-2019 is derived from the Delivery Program 2018-2022 which outlines what Council intends to achieve over the life of the plan, to work towards realising the community's long-term vision as set out in the Strathfield 2030 Community Strategic Plan.



APPENDIX B

COMMUNITY ENGAGEMENT FACTSHEET

Strathfield Biodiversity Strategy

The Basics of Biodiversity

What is biodiversity?

From the hot, dry of Western Sydney, through the lush green woodlands of Sydney's national parks, to the ocean depths of Sydney harbour, our natural world is a marvel of different landscapes, materials, colours and textures.

The land, air and seas of our planet are home to the tiniest insects and the largest animals, which make up a rich tapestry of life, all *connected and dependent on each other.*

This is **biodiversity.**

Biodiversity found on Earth today consists of an estimated **8 million distinct species,** the product of four billion years of evolution.

> **Biodiversity** is the variety of life on Earth, it includes all organisms, species, and populations, their genes, and the places they call home (habitats & ecosystems). It also refers to the complex and varied connections between genes, species and ecosystems.

Biodiversity in Strathfield LGA

Did you know that the Strathfield area contains important biodiversity areas and a diverse array of native plants and animals?

Have you ever visited any of the areas in the map?

STRATHFIELD NATURAL AREAS

STRATHFIELD COUNCIL

LEGEND

- Main road
- Council
- Library
- Public park/Reserve
- Waterway
- Wetland

EEC Endangered Ecological Community

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2

Important biodiversity areas in Strathfield LGA

Strathfield LGA contains key wetlands, reserves and green corridors that support biodiversity.

Mason Park Wetlands, in Homebush, attracts migratory wader birds from the Northern Hemisphere in Spring and Summer each year. The wetland provides an important rest area for these birds and provides food and habitat for 20 threatened species listed under international agreements. Two species which occur in the area – the Little Tern and the Black Tailed Godwit are Endangered in NSW.

Image 1. Mason Park Wetlands

Image 3. Narrow-leaved Wilsonia

Mason Park Wetlands is also the only place in the Strathfield LGA which contains mangroves and coastal saltmarsh, important habitat for many animals and home to the endangered Narrow-leaved Wilsonia.

Image 4. Mason Park

Image 2. Mason Park

Image 5. Green and Golden Bell Frog

The suburb of **Greenacre** supports one of the key populations of Green and Golden Bell Frog in Sydney. This charismatic frog lives in streams and ponds and is Endangered in NSW.

Cox's Creek Bushland Reserve in Greenacre is one of the few remaining sites in the Strathfield LGA which contains the threatened plant community - Cooks River/Castlereagh Ironbark Forest. The reserve hosts large, old Eucalyptus and Paperbark trees which provide an important refuge for local wildlife.

Cooks River Biodiversity Corridor runs along the Cooks River from Elliot Reserve in the east to Strathfield Golf course in the west. This corridor consists of riparian habitat in Strathfield Golf course as well as vegetated habitat in parks, reserves and gardens adjacent to the river.

Other biodiversity areas in Strathfield LGA

Strathfield LGA also contains numerous parks (some of which have undergone recent revegetation through National Tree Day and Bushcare programs) and two significant regional waterways, Cooks River and Powells Creek.

Image 6. Ford Park

Plants and animals of Strathfield LGA

Image 7. Grey-headed Flying Foxes

Strathfield LGA contains several native species including around 81 species of birds, 6 species of mammals, 3 species of reptiles, 2 frog species and 2 species of fish. Most of these (46) animal species are of local, NSW, national or international importance. Iconic threatened species that frequent Strathfield LGA include the Grey-headed Flying Fox.

Plants

Strathfield LGA contains important plants that are rare in NSW. This includes the Downy Wattle which has brilliant yellow flowers.

There are a few small pockets of important plant communities in the Strathfield LGA and many of these are Endangered. These include the Cooks River/Castlereagh Ironbark Forest, Sydney Turpentine Ironbark Forest, Mangroves and Coastal Saltmarsh.

Image 8. Cooks River/Castlereagh Ironbark forest

Trees

Strathfield is one of the greenest suburbs in inner Sydney, thanks to the myriad of street and backyard trees. The dense canopy that the trees provide plays a key role in cooling the Strathfield LGA, reducing power bills, increasing property prices and improving physical and mental health.

Image 9. Rainbow Lorikeet

Status and key threats to biodiversity

What's happening?

Fast isn't always good. Species are dying out at the fastest rate ever recorded, and most of these extinctions are tied to us – humans.

The rapid loss of species is estimated to be **tens to hundreds of times higher** than the natural rate, and it is accelerating.

There are an estimated **1 million species threatened** with extinction across the globe, many within the coming decades.

Greater than 85% of wetlands have been lost since 1700.

More than 40% of amphibians (frogs & toads) are threatened with extinction.

At least 680 vertebrates (species with a backbone) have been driven to extinction by human actions since the 16th century.

Wildlife are losing their homes. Globally there has been a 30% reduction in habitat on land.

Why is this happening?

There are many threats to our natural world, some include:

Habitat Loss

Habitat loss is one of the greatest threats to biodiversity. Removing habitat (e.g. trees, shrubs, grass, wetlands) leaves wildlife without a home and without food to eat.

Invasive species

Invasive species are plants and animals that have been moved by humans to places outside their natural environment. They replace, and often result in, the extinction of native animals and plants.

Pollution

Pollution from rubbish, plastics, toxic chemicals etc. can cause serious damage to the environment and poison animals and plants.

Climate Change

The climate is changing rapidly, and species are struggling to manage. If species cannot adjust to changing conditions, they will be lost forever.

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Importance of biodiversity and how Strathfield residents can conserve local biodiversity

Why does it matter?

Biodiversity **provides substantial benefits to humans,** such as clean water, clean air, food, protection from floods and a stable climate.

The loss of biodiversity **is dangerous**, and its consequences are immediate:

- Fewer opportunities for better health, education, and a better life
- A lack of clean water in our creeks, wetlands and rivers.
- A lack of clean air
- Less trees means suburbs are hotter and energy costs for cooling are higher.
- Reduced space for recreational activities
- Decreased attractiveness of local streets
- Reduced spiritual, artistic and religious connections to nature.

How can you help?

1. **Have your say!** What does nature mean to you? Why is biodiversity important in Strathfield? **Take the survey** and let us know!
2. **Make wildlife welcome.** Support the birds, reptiles, mammals and plants that live in your neighbourhood. You can attract more wild species by providing water and planting natives in your garden to provide shelter and privacy. Retain trees on your property.
3. **Protect habitats.** Explore habitats in your area. **Help clean up and protect** parks, reserves and fields where wild plants and animals live.
4. **Plant trees.** Trees have many ecosystem benefits including: providing critical habitat for birds and other animals, cooling and cleaning our atmosphere and reducing stormwater pollution. Plant in your garden, or speak to Council about where you can plant trees.
5. **Harness your house pets.** Consider keeping your pets indoors. Cats and dogs are major threats to Australian wildlife.
6. **Reduce, reuse, recycle.** Use reusable bags and avoid packaging where possible.
7. **Be a role model.** Show your friends and family how to take care of the environment.

STRATHFIELD COUNCIL | eco logical AUSTRALIA A TETRA TECH COMPANY

APPENDIX C

LIST OF FAUNA AND FLORA IN THE STRATHFIELD LGA

NSW BIONET ATLAS RECORDS 1980-2019

Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Amphibia	*Crinia signifera*		Common Eastern Froglet	P		17
Amphibia	*Limnodynastes dumerilii*		Eastern Banjo Frog	P		1
Amphibia	*Limnodynastes peronii*		Brown-striped Frog	P		32
Amphibia	*Limnodynastes tasmaniensis*		Spotted Grass Frog	P		2
Amphibia	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	60
Amphibia	*Litoria caerulea*		Green Tree Frog	P		1
Amphibia	*Litoria dentata*		Bleating Tree Frog	P		1
Amphibia	*Litoria peronii*		Peron's Tree Frog	P		3
Amphibia	*Litoria verreauxii*		Verreaux's Frog	P		1
Reptilia	*Chelodina longicollis*		Eastern Snake-necked Turtle	P		23
Reptilia	*Emydura macquarii macquarii*		Macquarie River Turtle	P		1
Reptilia	*Eulamprus quoyii*		Eastern Water-skink	P		2
Reptilia	*Lampropholis delicata*		Dark-flecked Garden Sunskink	P		6
Reptilia	*Lampropholis guichenoti*		Pale-flecked Garden Sunskink	P		1
Reptilia	*Saproscincus mustelinus*		Weasel Skink	P		1
Reptilia	*Tiliqua rugosa*		Shingle-back	P		2
Reptilia	*Tiliqua scincoides*		Eastern Blue-tongue	P		65
Reptilia	*Intellagama lesueurii*		Eastern Water Dragon	P		2
Reptilia	*Varanus varius*		Lace Monitor	P		1
Reptilia	*Morelia spilota*		Carpet & Diamond Pythons	P		2
Reptilia	*Morelia spilota spilota*		Diamond Python	P		1
Reptilia	*Pseudechis porphyriacus*		Red-bellied Black Snake	P		4
Reptilia	*Pseudonaja textilis*		Eastern Brown Snake	P		1
Aves	*Alectura lathami*		Australian Brush-turkey	P		5
Aves	*Coturnix ypsilophora*		Brown Quail	P		1
Aves	*Anas castanea*		Chestnut Teal	P		3
Aves	*Anas superciliosa*		Pacific Black Duck	P		51
Aves	*Aythya australis*		Hardhead	P		1
Aves	*Chenonetta jubata*		Australian Wood Duck	P		21
Aves	*Cygnus atratus*		Black Swan	P		9
Aves	*Tachybaptus novaehollandiae*		Australasian Grebe	P		1
Aves	*Columba livia*	✓	Rock Dove			20
Aves	*Macropygia amboinensis*		Brown Cuckoo-Dove	P		1
Aves	*Ocyphaps lophotes*		Crested Pigeon	P		33
Aves	*Streptopelia chinensis*	✓	Spotted Turtle-Dove			20

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Aves	*Podargus strigoides*		Tawny Frogmouth	P		35
Aves	*Eurostopodus mystacalis*		White-throated Nightjar	P		1
Aves	*Anhinga novaehollandiae*		Australasian Darter	P		2
Aves	*Phalacrocorax sulcirostris*		Little Black Cormorant	P		1
Aves	*Pelecanus conspicillatus*		Australian Pelican	P		5
Aves	*Ardea modesta*		Eastern Great Egret	P		1
Aves	*Egretta novaehollandiae*		White-faced Heron	P		3
Aves	*Platalea regia*		Royal Spoonbill	P		4
Aves	*Threskiornis molucca*		Australian White Ibis	P		96
Aves	*Accipiter cirrocephalus*		Collared Sparrowhawk	P		1
Aves	*Elanus axillaris*		Black-shouldered Kite	P		5
Aves	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P	C	3
Aves	*Falco cenchroides*		Nankeen Kestrel	P		4
Aves	*Falco longipennis*		Australian Hobby	P		3
Aves	*Falco peregrinus*		Peregrine Falcon	P		2
Aves	*Falco subniger*		Black Falcon	V,P		1
Aves	*Fulica atra*		Eurasian Coot	P		3
Aves	*Gallinula tenebrosa*		Dusky Moorhen	P		1
Aves	*Gallirallus philippensis*		Buff-banded Rail	P		1
Aves	*Porphyrio porphyrio*		Purple Swamphen	P		6
Aves	*Porzana fluminea*		Australian Spotted Crake	P		1
Aves	*Porzana pusilla*		Baillon's Crake	P		2
Aves	*Himantopus himantopus*		Black-winged Stilt	P		6
Aves	*Recurvirostra novaehollandiae*		Red-necked Avocet	P		1
Aves	*Charadrius leschenaultii*		Greater Sand-plover	V,P	V,C,J,K	1
Aves	*Elseyornis melanops*		Black-fronted Dotterel	P		6
Aves	*Erythrogonys cinctus*		Red-kneed Dotterel	P		7
Aves	*Pluvialis fulva*		Pacific Golden Plover	P	C,J,K	9
Aves	*Pluvialis squatarola*		Grey Plover	P	C,J,K	1
Aves	*Vanellus miles*		Masked Lapwing	P		28
Aves	*Arenaria interpres*		Ruddy Turnstone	P	C,J,K	1
Aves	*Calidris acuminata*		Sharp-tailed Sandpiper	P	C,J,K	6
Aves	*Calidris ferruginea*		Curlew Sandpiper	E1,P	CE,C,J,K	4
Aves	*Calidris melanotos*		Pectoral Sandpiper	P	J,K	7
Aves	*Gallinago hardwickii*		Latham's Snipe	P	C,J,K	1
Aves	*Philomachus pugnax*		Ruff	P	C,J,K	3
Aves	*Tringa glareola*		Wood Sandpiper	P	C,J,K	1

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Aves	*Chroicocephalus novaehollandiae*		Silver Gull	P		10
Aves	*Cacatua galerita*		Sulphur-crested Cockatoo	P		37
Aves	*Cacatua sanguinea*		Little Corella	P		9
Aves	*Cacatua tenuirostris*		Long-billed Corella	P		1
Aves	*Calyptorhynchus funereus*		Yellow-tailed Black-Cockatoo	P		1
Aves	*Eolophus roseicapillus*		Galah	P		22
Aves	*Nymphicus hollandicus*		Cockatiel	P		2
Aves	*Alisterus scapularis*		Australian King-Parrot	P		6
Aves	*Glossopsitta concinna*		Musk Lorikeet	P		5
Aves	*Melopsittacus undulatus*		Budgerigar	P		1
Aves	*Platycercus elegans*		Crimson Rosella	P		1
Aves	*Platycercus eximius*		Eastern Rosella	P		5
Aves	*Trichoglossus chlorolepidotus*		Scaly-breasted Lorikeet	P		1
Aves	*Trichoglossus haematodus*		Rainbow Lorikeet	P		297
Aves	*Cacomantis flabelliformis*		Fan-tailed Cuckoo	P		1
Aves	*Chalcites lucidus*		Shining Bronze-Cuckoo	P		2
Aves	*Eudynamys orientalis*		Eastern Koel	P		12
Aves	*Scythrops novaehollandiae*		Channel-billed Cuckoo	P		5
Aves	*Ninox strenua*		Powerful Owl	V,P		1
Aves	*Tyto javanica*		Eastern Barn Owl	P		2
Aves	*Dacelo novaeguineae*		Laughing Kookaburra	P		34
Aves	*Todiramphus sanctus*		Sacred Kingfisher	P		7
Aves	*Malurus cyaneus*		Superb Fairy-wren	P		10
Aves	*Acanthiza chrysorrhoa*		Yellow-rumped Thornbill	P		1
Aves	*Acanthiza nana*		Yellow Thornbill	P		1
Aves	*Pardalotus punctatus*		Spotted Pardalote	P		3
Aves	*Acanthorhynchus tenuirostris*		Eastern Spinebill	P		1
Aves	*Anthochaera carunculata*		Red Wattlebird	P		8
Aves	*Anthochaera chrysoptera*		Little Wattlebird	P		2
Aves	*Epthianura albifrons*		White-fronted Chat	V,P		1
Aves	*Manorina melanocephala*		Noisy Miner	P		99
Aves	*Manorina melanophrys*		Bell Miner	P		1
Aves	*Philemon corniculatus*		Noisy Friarbird	P		1
Aves	*Phylidonyris novaehollandiae*		New Holland Honeyeater	P		4
Aves	*Ptilotula penicillatus*		White-plumed Honeyeater	P		3
Aves	*Coracina novaehollandiae*		Black-faced Cuckoo-shrike	P		4

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Aves	*Pachycephala pectoralis*		Golden Whistler	P		1
Aves	*Oriolus sagittatus*		Olive-backed Oriole	P		3
Aves	*Sphecotheres vieilloti*		Australasian Figbird	P		7
Aves	*Cracticus nigrogularis*		Pied Butcherbird	P		1
Aves	*Cracticus tibicen*		Australian Magpie	P		110
Aves	*Cracticus torquatus*		Grey Butcherbird	P		4
Aves	*Strepera graculina*		Pied Currawong	P		25
Aves	*Rhipidura leucophrys*		Willie Wagtail	P		10
Aves	*Rhipidura rufifrons*		Rufous Fantail	P		2
Aves	*Corvus coronoides*		Australian Raven	P		34
Aves	*Corvus mellori*		Little Raven	P		1
Aves	*Grallina cyanoleuca*		Magpie-lark	P		15
Aves	*Monarcha melanopsis*		Black-faced Monarch	P		1
Aves	*Petroica boodang*		Scarlet Robin	V,P		1
Aves	*Acrocephalus australis*		Australian Reed-Warbler	P		1
Aves	*Cincloramphus mathewsi*		Rufous Songlark	P		1
Aves	*Zosterops lateralis*		Silvereye	P		8
Aves	*Hirundo neoxena*		Welcome Swallow	P		11
Aves	*Petrochelidon ariel*		Fairy Martin	P		3
Aves	*Pycnonotus jocosus*	✓	Red-whiskered Bulbul			6
Aves	*Turdus merula*	✓	Eurasian Blackbird			3
Aves	*Sturnus tristis*	✓	Common Myna			21
Aves	*Sturnus vulgaris*	✓	Common Starling			11
Aves	*Lonchura punctulata*	✓	Nutmeg Mannikin			2
Aves	*Neochmia temporalis*		Red-browed Finch	P		2
Aves	*Taeniopygia bichenovii*		Double-barred Finch	P		1
Aves	*Passer domesticus*	✓	House Sparrow			7
Aves	*Carduelis carduelis*	✓	European Goldfinch			5
Mammalia	*Tachyglossus aculeatus*		Short-beaked Echidna	P		5
Mammalia	*Phascolarctos cinereus*		Koala	V,P	V	1
Mammalia	*Pseudocheirus peregrinus*		Common Ringtail Possum	P		95
Mammalia	*Trichosurus vulpecula*		Common Brushtail Possum	P		250
Mammalia	*Macropus giganteus*		Eastern Grey Kangaroo	P		1
Mammalia	*Macropus robustus*		Common Wallaroo	P		1
Mammalia	*Miniopterus orianae oceanensis*		Large Bent-winged Bat	V		1
Mammalia	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	51
Mammalia	*Chalinolobus gouldii*		Gould's Wattled Bat	P		1

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Mammalia	*Rattus rattus*	✓	Black Rat			2
Mammalia	*Canis lupus familiaris*	✓	Dog			2
Mammalia	*Vulpes vulpes*	✓	Fox			1
Mammalia	*Felis catus*	✓	Cat			9
Mammalia	*Lepus capensis*	✓	Brown Hare			1
Mammalia	*Oryctolagus cuniculus*	✓	Rabbit			3
Flora	*Viburnum tinus*	✓				1
Flora	*Yucca spp.*					1
Flora	*Agapanthus spp.*	✓				1
Flora	*Allium spp.*	✓				1
Flora	*Nothoscordum borbonicum*	✓	Onion Weed			3
Flora	*Amaranthus retroflexus*	✓	Redroot Amaranth			1
Flora	*Amaranthus spp.*		Amaranth			1
Flora	*Clivia spp.*	✓				1
Flora	*Prunus armeniaca*	✓	Apricot			1
Flora	*Prunus spp.*	✓				2
Flora	*Harpephyllum caffrum*	✓				1
Flora	*Schinus areira*	✓	Pepper Tree			1
Flora	*Toxicodendron succedaneum*	✓	Rhus Tree			1
Flora	*Chlorophytum comosum*	✓	Spider Plant			1
Flora	*Centella asiatica*		Indian Pennywort			3
Flora	*Cyclospermum leptophyllum*	✓	Slender Celery			2
Flora	*Foeniculum vulgare*	✓	Fennel			7
Flora	*Hydrocotyle bonariensis*	✓				1
Flora	*Araujia sericifera*	✓	Moth Vine			7
Flora	*Gomphocarpus fruticosus*	✓	Narrow-leaved Cotton Bush			5
Flora	*Marsdenia rostrata*		Milk Vine			1
Flora	*Marsdenia suaveolens*		Scented Marsdenia			1
Flora	*Nerium oleander*	✓	Oleander			3
Flora	*Plumeria obtusa*	✓	Singapore Graveyard Flower			1
Flora	*Trachelospermum jasminoides*	✓				1
Flora	*Vinca major*	✓	Periwinkle			1
Flora	*Astrotricha longifolia*					1
Flora	*Schefflera actinophylla*	✓	Umbrella Tree			1
Flora	*Araucaria heterophylla*	✓	Norfolk Island Pine			1
Flora	*Archontophoenix alexandrae*	✓	Alexandra Palm			2

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Flora	*Archontophoenix cunninghamiana*		Bangalow Palm	P		2
Flora	*Caryota urens*	✓	Jaggery Palm			1
Flora	*Dypsis lutescens*	✓	Yellow Butterfly Palm			1
Flora	*Livistona australis*		Cabbage Palm	P		1
Flora	*Phoenix canariensis*	✓	Canary Island Date Palm			1
Flora	*Asparagus aethiopicus*	✓	Asparagus Fern			10
Flora	*Asparagus asparagoides*	✓	Bridal Creeper			3
Flora	*Asparagus officinalis*	✓	Asparagus			1
Flora	*Aloe spp.*	✓				1
Flora	*Ageratina adenophora*	✓	Crofton Weed			7
Flora	*Ambrosia artemisiifolia*	✓	Annual Ragweed			1
Flora	*Aster subulatus*	✓	Wild Aster			1
Flora	*Bidens pilosa*	✓	Cobbler's Pegs			13
Flora	*Cassinia aculeata*		Dolly Bush			1
Flora	*Cassinia sifton*					4
Flora	*Chrysanthemoides monilifera subsp. monilifera*	✓	Boneseed			2
Flora	*Cichorium intybus*	✓	Chicory			1
Flora	*Cirsium vulgare*	✓	Spear Thistle			6
Flora	*Conyza bonariensis*	✓	Flaxleaf Fleabane			3
Flora	*Conyza sumatrensis*	✓	Tall fleabane			4
Flora	*Coreopsis lanceolata*	✓	Coreopsis			3
Flora	*Gamochaeta calviceps*	✓	Cudweed			2
Flora	*Hypochaeris radicata*	✓	Catsear			7
Flora	*Lactuca serriola*	✓	Prickly Lettuce			4
Flora	*Olearia microphylla*					1
Flora	*Onopordum acanthium subsp. acanthium*	✓	Scotch Thistle			2
Flora	*Osteospermum fruticosum*	✓				1
Flora	*Ozothamnus diosmifolius*		White Dogwood			3
Flora	*Senecio madagascariensis*	✓	Fireweed			5
Flora	*Senecio pterophorus*	✓				1
Flora	*Soliva sessilis*	✓	Bindyi			2
Flora	*Sonchus oleraceus*	✓	Common Sowthistle			5
Flora	*Sonchus spp.*		Sowthistle			1
Flora	*Taraxacum officinale*	✓	Dandelion			5
Flora	*Anredera cordifolia*	✓	Madeira Vine			5

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Flora	*Jacaranda mimosifolia*	✓	Jacaranda			2
Flora	*Pandorea pandorana*		Wonga Wonga Vine			1
Flora	*Capsella bursa-pastoris*	✓	Shepherd's Purse			3
Flora	*Cardamine hirsuta*	✓	Common Bittercress			1
Flora	*Lobularia maritima*	✓	Sweet Alyssum			1
Flora	*Sisymbrium officinale*	✓	Hedge Mustard			2
Flora	*Buddleja spp.*	✓				1
Flora	*Wahlenbergia communis*		Tufted Bluebell			1
Flora	*Wahlenbergia gracilis*		Sprawling Bluebell			2
Flora	*Wahlenbergia multicaulis*		Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		8
Flora	*Canna x generalis*	✓				1
Flora	*Lonicera japonica*	✓	Japanese Honeysuckle			2
Flora	*Cerastium glomeratum*	✓	Mouse-ear Chickweed			2
Flora	*Paronychia brasiliana*	✓	Chilean Whitlow Wort, Brazilian Whitlow			1
Flora	*Polycarpon tetraphyllum*	✓	Four-leaved Allseed			1
Flora	*Stellaria media*	✓	Common Chickweed			1
Flora	*Allocasuarina littoralis*		Black She-Oak			1
Flora	*Allocasuarina torulosa*		Forest Oak			1
Flora	*Casuarina cunninghamiana subsp. cunninghamiana*		River Oak			1
Flora	*Casuarina glauca*		Swamp Oak			7
Flora	*Chenopodium album*	✓	Fat Hen			2
Flora	*Einadia hastata*		Berry Saltbush			2
Flora	*Einadia nutans subsp. nutans*		Climbing Saltbush			1
Flora	*Einadia trigonos*		Fishweed			1
Flora	*Commelina cyanea*		Native Wandering Jew			6
Flora	*Tradescantia fluminensis*	✓	Wandering Jew			1
Flora	*Dichondra repens*		Kidney Weed			2
Flora	*Ipomoea indica*	✓	Morning Glory			1
Flora	*Polymeria calycina*					1
Flora	*Bryophyllum delagoense*	✓	Mother of millions			1
Flora	*Crassula ovata*	✓	Jade Plant			1
Flora	*Sedum praealtum*	✓				1

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Flora	*Cupressus arizonica var. glabra*	✓				1
Flora	*Cupressus spp.*	✓				1
Flora	*Cyperus brevifolius*	✓				2
Flora	*Cyperus congestus*	✓				1
Flora	*Cyperus eragrostis*	✓	Umbrella Sedge			4
Flora	*Cyperus gracilis*		Slender Flat-sedge			1
Flora	*Fimbristylis dichotoma*		Common Fringe-sedge			1
Flora	*Gahnia sieberiana*		Red-fruit Saw-sedge	P		1
Flora	*Nephrolepis cordifolia*		Fishbone Fern			1
Flora	*Hibbertia aspera subsp. aspera*					1
Flora	*Hibbertia scandens*		Climbing Guinea Flower			1
Flora	*Hibbertia spp.*					1
Flora	*Doryanthes excelsa*		Gymea Lily	P		1
Flora	*Elaeocarpus reticulatus*		Blueberry Ash			1
Flora	*Astroloma humifusum*		Native Cranberry			1
Flora	*Leucopogon juniperinus*		Prickly Beard-heath			1
Flora	*Lissanthe strigosa*		Peach Heath			1
Flora	*Euphorbia peplus*	✓	Petty Spurge			1
Flora	*Ricinus communis*	✓	Castor Oil Plant			5
Flora	*Triadica sebifera*	✓	Chinese Tallowood			2
Flora	*Bauhinia spp.*	✓				1
Flora	*Bauhinia variegata*	✓	Pink Orchid Tree			1
Flora	*Senna pendula var. glabrata*	✓				2
Flora	*Dillwynia sieberi*					4
Flora	*Erythrina x sykesii*	✓	Coral tree			1
Flora	*Genista linifolia*	✓	Flaxleaf Broom			2
Flora	*Genista monspessulana*	✓	Montpellier Broom			2
Flora	*Glycine clandestina*		Twining glycine			3
Flora	*Glycine tabacina*		Variable Glycine			1
Flora	*Hardenbergia violacea*		False Sarsaparilla			2
Flora	*Indigofera australis*		Australian Indigo			2
Flora	*Kennedia rubicunda*		Dusky Coral Pea			1
Flora	*Lotus australis*		Australian Trefoil			1
Flora	*Lotus subbiflorus*	✓	Hairy Birds-foot Trefoil			1
Flora	*Medicago polymorpha*	✓	Burr Medic			6
Flora	*Medicago sativa*	✓	Lucerne			1
Flora	*Melilotus officinalis*	✓	Common Melilot			1

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Flora	*Pultenaea villosa*		Hairy Bush-pea			2
Flora	*Trifolium repens*	✓	White Clover			5
Flora	*Trifolium subterraneum*	✓	Subterranean Clover			1
Flora	*Trifolium tomentosum*	✓	Woolly Clover			1
Flora	*Vicia sativa*	✓	Common vetch			2
Flora	*Vicia sativa subsp. sativa*	✓	Common Vetch			1
Flora	*Wisteria sinensis*	✓	Chinese wisteria			2
Flora	*Acacia binervata*		Two-veined Hickory			1
Flora	*Acacia binervia*		Coast Myall			1
Flora	*Acacia decurrens*		Black Wattle			5
Flora	*Acacia elata*		Mountain Cedar Wattle			1
Flora	*Acacia falcata*					5
Flora	*Acacia fimbriata*		Fringed Wattle			2
Flora	*Acacia floribunda*		White Sally			1
Flora	*Acacia longifolia*					1
Flora	*Acacia longifolia subsp. longifolia*		Sydney Golden Wattle			3
Flora	*Acacia longissima*		Long-leaf Wattle			3
Flora	*Acacia maidenii*		Maiden's Wattle			1
Flora	*Acacia mearnsii*		Black Wattle			1
Flora	*Acacia parramattensis*		Parramatta Wattle			3
Flora	*Acacia pubescens*		Downy Wattle	V	V	58
Flora	*Acacia saligna*	✓	Golden Wreath Wattle			3
Flora	*Acacia ulicifolia*		Prickly Moses			2
Flora	*Paraserianthes lophantha subsp. lophantha*	✓	Crested Wattle			1
Flora	*Vachellia farnesiana*	✓	Mimosa Bush			1
Flora	*Fumaria capreolata subsp. capreolata*	✓	Climbing Fumitory			1
Flora	*Centaurium erythraea*	✓	Common Centaury			3
Flora	*Centaurium tenuiflorum*	✓	Branched Centaury, Slender centaury			2
Flora	*Geranium spp.*					1
Flora	*Pelargonium spp.*					1
Flora	*Goodenia paniculata*					1
Flora	*Gonocarpus teucrioides*		Germander Raspwort			2
Flora	*Liquidambar styraciflua*	✓	Sweetgum			1
Flora	*Romulea rosea var. australis*	✓	Onion Grass			1

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Flora	*Watsonia meriana*	✓				1
Flora	*Juncus acuminatus*	✓				1
Flora	*Juncus capensis*	✓				1
Flora	*Juncus kraussii subsp. australiensis*		Sea Rush			1
Flora	*Juncus usitatus*					4
Flora	*Lamium amplexicaule*	✓	Dead Nettle			1
Flora	*Prunella vulgaris*	✓	Self-heal			1
Flora	*Cassytha pubescens*		Downy Dodder-laurel			1
Flora	*Cinnamomum camphora*	✓	Camphor Laurel			9
Flora	*Persea americana*	✓	Avocado			1
Flora	*Lomandra longifolia*		Spiny-headed Mat-rush			5
Flora	*Lomandra multiflora subsp. multiflora*		Many-flowered Mat-rush			2
Flora	*Amyema gaudichaudii*					1
Flora	*Amyema spp.*		Mistletoe			1
Flora	*Dendrophthoe vitellina*					1
Flora	*Eustrephus latifolius*		Wombat Berry			1
Flora	*Cotoneaster glaucophyllus*	✓				2
Flora	*Cotoneaster pannosus*	✓				1
Flora	*Photinia serratifolia*	✓	Chinese Photinia			1
Flora	*Rhaphiolepis indica*	✓	Indian Hawthorn			2
Flora	*Hibiscus rosa-sinensis*	✓	Chinese Hibiscus			1
Flora	*Hibiscus spp.*					1
Flora	*Malva neglecta*	✓	Dwarf Mallow			1
Flora	*Malva parviflora*	✓	Small-flowered Mallow			1
Flora	*Modiola caroliniana*	✓	Red-flowered Mallow			5
Flora	*Sida acuta*	✓	Spinyhead Sida			1
Flora	*Sida rhombifolia*	✓	Paddy's Lucerne			8
Flora	*Tibouchina urvilleana*	✓	Lasiandra			1
Flora	*Melia azedarach*		White Cedar			4
Flora	*Ficus coronata*		Creek Sandpaper Fig			1
Flora	*Ficus microcarpa*	✓				1
Flora	*Morus alba*	✓	White Mulberry			1
Flora	*Acmena smithii*		Lilly Pilly			1
Flora	*Angophora costata*		Sydney Red Gum			2
Flora	*Angophora floribunda*		Rough-barked Apple			2

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Flora	*Callistemon citrinus*		Crimson Bottlebrush			3
Flora	*Callistemon linearis*		Narrow-leaved Bottlebrush			1
Flora	*Callistemon rigidus*		Stiff Bottlebrush			1
Flora	*Callistemon salignus*		Willow Bottlebrush			1
Flora	*Callistemon viminalis*		Weeping Bottlebrush			2
Flora	*Corymbia citriodora*	✓	Lemon-scented Gum			1
Flora	*Corymbia maculata*		Spotted Gum			5
Flora	*Corymbia torelliana*	✓	Cadaghi			1
Flora	*Eucalyptus amplifolia*		Cabbage Gum			1
Flora	*Eucalyptus bosistoana*		Coast Grey Box			1
Flora	*Eucalyptus botryoides*		Bangalay			2
Flora	*Eucalyptus crebra*		Narrow-leaved Ironbark			2
Flora	*Eucalyptus fibrosa*		Red Ironbark			2
Flora	*Eucalyptus microcorys*		Tallowwood			3
Flora	*Eucalyptus moluccana*		Grey Box			1
Flora	*Eucalyptus paniculata*		Grey Ironbark			1
Flora	*Eucalyptus pilularis*		Blackbutt			1
Flora	*Eucalyptus punctata*		Grey Gum			3
Flora	*Eucalyptus robusta*		Swamp Mahogany			2
Flora	*Eucalyptus sideroxylon*		Mugga Ironbark			1
Flora	*Eucalyptus tereticornis*		Forest Red Gum			1
Flora	*Kunzea ambigua*		Tick Bush	P		4
Flora	*Leptospermum petersonii*		Lemon-scented Teatree			1
Flora	*Leptospermum polygalifolium*		Tantoon			2
Flora	*Lophostemon confertus*		Brush Box			10
Flora	*Melaleuca armillaris subsp. armillaris*		Bracelet Honey-myrtle			3
Flora	*Melaleuca decora*					3
Flora	*Melaleuca hypericifolia*		Hillock bush			2
Flora	*Melaleuca linariifolia*		Flax-leaved Paperbark			1
Flora	*Melaleuca nodosa*					3
Flora	*Melaleuca quinquenervia*		Broad-leaved Paperbark			1
Flora	*Melaleuca sieberi*					1
Flora	*Melaleuca styphelioides*		Prickly-leaved Tea Tree			3
Flora	*Micromyrtus ciliata*		Fringed Heath-myrtle			1
Flora	*Syncarpia glomulifera*		Turpentine			1
Flora	*Tristaniopsis laurina*		Kanooka			3

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Flora	*Nandina domestica*	✓	Japanese Sacred Bamboo			2
Flora	*Bougainvillea spp.*	✓				1
Flora	*Ochna serrulata*	✓	Mickey Mouse Plant			2
Flora	*Jasminum polyanthum*	✓	White Jasmine			2
Flora	*Ligustrum lucidum*	✓	Large-leaved Privet			6
Flora	*Ligustrum sinense*	✓	Small-leaved Privet			4
Flora	*Olea europaea subsp. cuspidata*	✓	African Olive			1
Flora	*Oenothera drummondii*	✓				1
Flora	*Microtis parviflora*		Slender Onion Orchid	P		1
Flora	*Oxalis corniculata*	✓	Creeping Oxalis			2
Flora	*Oxalis perennans*					1
Flora	*Oxalis pes-caprae*	✓	Soursob			1
Flora	*Oxalis spp.*					1
Flora	*Passiflora caerulea*	✓	Blue Passionflower			1
Flora	*Dianella caerulea*		Blue Flax-lily			1
Flora	*Dianella revoluta*		Blueberry Lily			3
Flora	*Breynia oblongifolia*		Coffee Bush			1
Flora	*Glochidion ferdinandi*		Cheese Tree			1
Flora	*Glochidion ferdinandi var. ferdinandi*		Cheese Tree			1
Flora	*Pinus radiata*	✓	Radiata Pine			1
Flora	*Pinus spp.*	✓				1
Flora	*Billardiera scandens*		Hairy Apple Berry			1
Flora	*Bursaria spinosa*		Native Blackthorn			3
Flora	*Bursaria spinosa subsp. spinosa*		Native Blackthorn			1
Flora	*Pittosporum revolutum*		Rough Fruit Pittosporum			1
Flora	*Pittosporum undulatum*		Sweet Pittosporum			6
Flora	*Plantago lanceolata*	✓	Lamb's Tongues			10
Flora	*Veronica persica*	✓	Creeping Speedwell			1
Flora	*Platanus hispanica 'Acerifolia'*	✓	Hybrid Plane			1
Flora	*Aira cupaniana*	✓	Silvery Hairgrass			1
Flora	*Andropogon virginicus*	✓	Whisky Grass			4
Flora	*Aristida ramosa*		Purple Wiregrass			1
Flora	*Austrostipa spp.*		A Speargrass			1
Flora	*Austrostipa verticillata*		Slender Bamboo Grass			1
Flora	*Avena barbata*	✓	Bearded Oats			3
Flora	*Avena fatua*	✓	Wild Oats			1

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Flora	*Axonopus fissifolius*	✓	Narrow-leafed Carpet Grass			3
Flora	*Bothriochloa macra*		Red Grass			1
Flora	*Bouteloua dactyloides*	✓	Buffalo Grass			1
Flora	*Briza minor*	✓	Shivery Grass			2
Flora	*Briza subaristata*	✓				2
Flora	*Bromus catharticus*	✓	Praire Grass			3
Flora	*Capillipedium spicigerum*		Scented-top Grass			2
Flora	*Cenchrus clandestinus*	✓	Kikuyu Grass			7
Flora	*Chloris gayana*	✓	Rhodes Grass			3
Flora	*Chloris truncata*		Windmill Grass			2
Flora	*Chloris virgata*	✓	Feathertop Rhodes Grass			1
Flora	*Cortaderia selloana*	✓	Pampas Grass			3
Flora	*Cynodon dactylon*		Common Couch			10
Flora	*Dichelachne micrantha*		Shorthair Plumegrass			2
Flora	*Digitaria ciliaris*	✓	Summer Grass			2
Flora	*Ehrharta erecta*	✓	Panic Veldtgrass			8
Flora	*Elymus repens*	✓	English Couch			1
Flora	*Entolasia stricta*		Wiry Panic			2
Flora	*Eragrostis brownii*		Brown's Lovegrass			2
Flora	*Eragrostis curvula*	✓	African Lovegrass			4
Flora	*Holcus lanatus*	✓	Yorkshire Fog			1
Flora	*Hyparrhenia hirta*	✓	Coolatai Grass			1
Flora	*Imperata cylindrica*		Blady Grass			2
Flora	*Lachnagrostis filiformis*					2
Flora	*Lolium perenne*	✓	Perennial Ryegrass			2
Flora	*Melinis repens*	✓	Red Natal Grass			2
Flora	*Microlaena stipoides*		Weeping Grass			2
Flora	*Microlaena stipoides var. stipoides*		Weeping Grass			1
Flora	*Paspalum dilatatum*	✓	Paspalum			6
Flora	*Paspalum urvillei*	✓	Vasey Grass			1
Flora	*Phyllostachys spp.*	✓				2
Flora	*Poa annua*	✓	Winter Grass			4
Flora	*Polypogon monspeliensis*	✓	Annual Beardgrass			1
Flora	*Rytidosperma caespitosum*		Ringed Wallaby Grass			1
Flora	*Rytidosperma fulvum*		Wallaby Grass			1

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Flora	*Rytidosperma pallidum*		Redanther Wallaby Grass; Silvertop Wallaby Grass			1
Flora	*Rytidosperma tenuius*		A Wallaby Grass			2
Flora	*Setaria parviflora*	✓				5
Flora	*Setaria pumila*	✓	Pale Pigeon Grass			2
Flora	*Setaria viridis*	✓	Green Pigeon Grass			1
Flora	*Sorghum halepense*	✓	Johnson Grass			1
Flora	*Sporobolus africanus*	✓	Parramatta Grass			3
Flora	*Sporobolus elongatus*		Slender Rat's Tail Grass			1
Flora	*Sporobolus fertilis*	✓	Giant Parramatta Grass			2
Flora	*Stenotaphrum secundatum*	✓	Buffalo Grass			3
Flora	*Themeda triandra*					7
Flora	*Vulpia myuros*	✓	Rat's Tail Fescue			1
Flora	*Polygala myrtifolia*	✓				2
Flora	*Polygala virgata*	✓				1
Flora	*Acetosa sagittata*	✓	Rambling Dock			1
Flora	*Persicaria decipiens*		Slender Knotweed			1
Flora	*Persicaria lapathifolia*		Pale Knotweed			1
Flora	*Polygonum aviculare*	✓	Wireweed			1
Flora	*Rumex conglomeratus*	✓	Clustered Dock			1
Flora	*Rumex crispus*	✓	Curled Dock			3
Flora	*Portulaca oleracea*		Pigweed			1
Flora	*Portulacaria afra*	✓				1
Flora	*Lysimachia arvensis*	✓	Scarlet Pimpernel			3
Flora	*Hakea dactyloides*		Finger Hakea			2
Flora	*Hakea sericea*		Needlebush			3
Flora	*Cheilanthes sieberi subsp. sieberi*		Rock Fern			1
Flora	*Pomaderris discolor*					1
Flora	*Pomaderris elliptica subsp. elliptica*					1
Flora	*Pomaderris ferruginea*					1
Flora	*Pomaderris prunifolia*		Plum-leaf Pomaderris			1
Flora	*Pomaderris prunifolia*		P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		1
Flora	*Rosa spp.*	✓				2
Flora	*Rubus fruticosus sp. agg.*	✓	Blackberry complex			1

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Class	Scientific Name	Exotic	Common Name	NSW BC Act Status	EPBC Act Status	Number of Records
Flora	*Rubus parvifolius*		Native Raspberry			1
Flora	*Galium aparine*	✓	Goosegrass			1
Flora	*Gardenia spp.*	✓				1
Flora	*Pomax umbellata*		Pomax			1
Flora	*Citrus x taitensis*	✓	Rough Lemon			2
Flora	*Murraya paniculata*	✓				2
Flora	*Populus alba*	✓	White Poplar			1
Flora	*Salix babylonica*	✓	Weeping Willow			1
Flora	*Acer spp.*	✓				1
Flora	*Cardiospermum grandiflorum*	✓	Balloon Vine			1
Flora	*Cardiospermum halicacabum var. halicacabum*	✓	Small Balloon Vine			1
Flora	*Dodonaea triquetra*		Large-leaf Hop-bush			2
Flora	*Verbascum thapsus subsp. thapsus*	✓	Great Mullein			1
Flora	*Cestrum parqui*	✓	Green Cestrum			7
Flora	*Solanum nigrum*	✓	Black-berry Nightshade			8
Flora	*Tropaeolum majus*	✓	Nasturtium			1
Flora	*Celtis sinensis*	✓	Japanese Hackberry			1
Flora	*Parietaria judaica*	✓	Pellitory			1
Flora	*Lantana camara*	✓	Lantana			4
Flora	*Verbena bonariensis*	✓	Purpletop			5
Flora	*Verbena incompta*	✓				1
Flora	*Verbena litoralis*	✓				1
Flora	*Verbena quadrangularis*	✓				1
Flora	*Verbena rigida var. rigida*	✓	Veined Verbena			1
Flora	*Verbena spp.*					1
Flora	*Viola arvensis*	✓	Field Pansy			1
Flora	*Viola odorata*	✓	Sweet Violet			1
Flora	*Cayratia clematidea*		Native Grape			1

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SUMMARY OF PREVIOUS FAUNA STUDIES

Systematic studies of faunal populations and communities present in Strathfield LGA have been undertaken in bushland remnants, wetland remnant (Mason Park Wetland), revegetated parkland and open parkland habitats. Urban neighbourhood sites were surveyed only in 2007-2008.

Spring 2007 and autumn 2008

InSight Ecology surveyed avifauna across 25 sites in the LGA in late spring 2007 and the same 25 sites plus one additional site (Davidson Street remnant) in early autumn 2008. A total of 2,659 individual birds from 48 species were recorded in the 2007-2008 study (InSight Ecology 2008). Approximately 20% more birds were recorded in autumn than in early summer. Bushland remnants were similar in the number of birds and bird species recorded in both seasons.

Across all sites, the most abundant bird species recorded were Noisy Miner, Rainbow Lorikeet and the introduced Spotted Dove and Common Myna. A small group of woodland birds that have been declining or have disappeared from inner-western Sydney bushland remnants were the least abundant birds surveyed. They included very small numbers of White-browed Scrubwren, Yellow Thornbill and Superb Fairy-wren. These were detected mainly in remnants at Weeroona Road, Mason Park and in older revegetation along some upper Cooks River reserves.

Autumn and summer 2009

In Autumn and early summer 2008, Ambrose Ecological Services Pty Ltd surveyed 30 sites across the LGA for all vertebrate fauna taxa present. This study provided separate totals of the relative abundance and diversity of vertebrate fauna species recorded in each different type of greenspace and specific park and reserve across the LGA. In Mason Park Wetland and surrounding plantings 67 species were recorded in summer and 32 in autumn. The Mason Park playing fields and surrounding revegetation supported 22 species in summer and 16 species in autumn.

Bushland remnants provided important habitat for a range of different fauna taxa. Coxs Creek Bushland Reserve recorded 27 species including three individual threatened Green and Golden Bell Frog (GGBF) in December 2008.

Autumn and Summer 2016

In 2016, InSight Ecology completed another fauna study which provided data on the occurrence, relative abundance, species richness and habitat use of fauna in 39 parks, reserves and urban neighbourhoods across the LGA. This study surveyed diurnal and nocturnal birds, mammals, frogs and reptiles present in two consecutive seasons – autumn (May) and early summer (late November-early December) 2016.

A total of 4,985 individuals from 94 species of fauna were recorded during the study. Most of these were birds (81 species) – 67 terrestrial species and 14 aquatic taxa. Other fauna recorded were mammals (six species, including 3 introduced species), reptiles (3 species), amphibians (two species) and fish (two species). Over half (45 species, including two threatened species) of bird species recorded were of conservation significance while nine bird species detected have been introduced. Iconic threatened species include the Grey-headed Flying-fox, Green and Golden Bell Frog and Large Bent-wing bat. Most threatened species belong to a cohort of woodland birds which are declining in the inner and mid-western suburbs of Sydney.

FLORA SPECIES RECORDED IN RESERVES JUNE 2019 (ELA 2019)

Site #	Site Name	Scientific Name	Common Name	WoNs
1	Mason Park			
		Acacia saligna	Golden wreath wattle	
		Anredera cordifolia *	Madeira Vine	✓
		Araujia sericifera *	Moth Vine	
		Callistemon pinifolius	Pine-leaved Bottlebrush	
		Casuarina glauca	Swamp Sheaok	
		Cestrum parqui *	Green Cestrum	
		Commelina cyanea	Scurvy Weed	
		Cupaniopsis anacardioides	Tuckeroo	
		Cynodon dactylon	Couch Grass	
		Dianella caerula	Blue Flax Lily	
		Ehrharta erecta *	Panic veldt grass	
		Einadia hastata	Berry Saltbush	
		Einadia nutans	Nodding Saltbush	
		Ficus sp.	Fig	
		Hardenbergia violacea	Purple Coral Pea	
		Lomandra longifolia	Spiny headed mat rush	
		Phoenix canariensis *	Phoenix palm	
		Pittosporum revolutum	Rough-fruited pittosporum	
2	Mason Park Wetland			
		Avicennia marina	Grey Mangrove	
		Ficinia nodosa	Knobby Club-rush	
		Sarcocornia quinqueflora	Samphire	
		Selliera radicans	Swamp Weed	
		Suaeda australis	Austral Seablite	
		Tetragonia tetragonioides	Warrigal greens	
		Wilsonia backhousei	Narrow-leaved Wilsonia	
		Zoysia macrantha	Prickly Couch	
4	Bressington Park			
		Acer sp. *	Maple	
		Angophora floribunda	Rough-barked apple	
		Araujia sericifera *	Moth Vine	
		Atriplex nummularia	Saltbush	
		Cupaniopsis anacardioides	Tuckeroo	

* = Exotic species, WoNs = Weeds of National Significance

Site #	Site Name	Scientific Name	Common Name	WoNs
		Cynodon dactylon	Couch Grass	
		Dianella caerula	Blue Flax Lily	
		Dodonea triquetra	Hop bush	
		Ehrharta erecta *	Panic veldt grass	
		Einadia hastata	Berry Saltbush	
		Glochidion ferdinandi	Cheese tree	
		Lomandra longifolia	Spiny headed Mat Rush	
		Pittosporum revolutum	Rough-fruited pittsoporum	
		Pomaderris prunifolia	Prunus Pomaderris	
5	Wentworth Reserve			
		Corymbia maculata	Spotted Gum	
		Smillax ornata *	Sarsparilla	
6	Bill Boyce Reserve			
		Brachychiton acerifolius *	Illawarra Flame Tree	
		Cinnamomum camphora *	Camphor laurel	
		Ficus sp.	Fig	
9	Strathfield Golf Course (adjacent power station)			
		Acacia saligna	Golden Wreath Wattle	
		Andropogon virginicus *	Whiskey grass	
		Araujia sericifera *	Moth Vine	
		Asparagus aeethiopicus *	Asparagus fern	✓
		Bidens Pilosa *	Cobbler's Pegs	
		Casuarina glauca	Swamp Sheoak	
		Cortaderia sp.	Pampas grass	
		Crocosmia x crocosmiiflora *	Montbretia	
		Epilobium sp. *	Willowherb	
		Hydrocotyle bonariensis *	Pennywort	
		Ligustrum lucidum *	Broad-leaved privet	
		Melinis repens *	Red natal grass	
		Ochna serrulate *	Ochna	
		Olea europaea subsp. Cuspidate *	African olive	
		Paspalum dilatatum *	Paspalum	
		Ricinus communis *	Castor oil	
		Setaria viridis *	Pigeon grass	
		Sida rhombifolia	Paddy's Lucerne	
		Sisymbrium officinale *	Hedge Mustard	
		Verbena bonariensis	Purpletop	

* = *Exotic species, WoNs = Weeds of National Significance*

Site #	Site Name	Scientific Name	Common Name	WoNs
11	Weerona Road Remnant			
		Acacia saligna	Golden Wreath Wattle	
		Acetose sagittate *	Turkey Rhubarb	
		Ageratina adenophora *	Crofton weed	
		Andropogon virginicus *	Whiskey grass	
		Asparagus aspargoides *	Bridal creeper	✓
		Asparagus aethiopicus *	Asparagus fern	✓
		Bidens Pilosa *	Cobbler's Pegs	
		Bryophyllum delagoense *	Mother of millions	
		Bursaria spinosa	Sweet Bursaria	
		Cassytha sp.		
		Cestrum parqui	Green Cestrum	
		Cinnamomum camphora *	Camphor laurel	
		Conyza bonariensis *	Flax Leaf Fleabane	
		Cotoneaster glaucophyllus *	Cotoneaster	
		Crocosmia x crocosmiiflora	Montbretia	
		Cynodon dactylon	Couch Grass	
		Foeniculum vulgare *	Fennel	
		Genista linifolia *	Flax-leaf Broom	✓
		Gomphocarpus fruticosus *	Narrow-leaved Cotton bush	
		Hakea sericea	Silky Hakea	
		Hydrocotyle bonariensis *	Pennywort	
		Leptospermum lanigerum	Woolly tea tree	
		Ligustrum sinense *	Small leaf privet	
		Lonicera japonica *	Japanese Honey suckle	
		Phoenix canariensis *	Phoenix palm	
		Plantago lanceolate *	Plaintain	
		Ricinus communis *	Castor oil	
		Rubus fruticosus species aggregate *	Blackberry	✓
		Senna pendula	Cassia	
		Setaria viridis *	Pigeon grass	
		Solanum mauritianum *	Wild tobacco	
		Typha orientalis	Cumbungi	
		Verbena bonariensis *	Purpletop	
		Vinca major *	Blue Periwinkle	
		Westringia fruticosa	Coastal Rosemary	

* = *Exotic species, WoNs = Weeds of National Significance*

Site #	Site Name	Scientific Name	Common Name	WoNs
12	Airey Park			
		Acacia longifolia	Sydney Golden Wattle	
		Acacia parramatensis	Paramatta wattle	
		Bursaria spinosa	Sweet bursaria	
		Callistemon pinifolius	Pine-leaved Bottlebrush	
		Casuarina cunninghamiana	River Sheoak	
		Casuarina glauca	River oak	
		Cissus antarctica	Kangaroo Vine	
		Commelina cyanea	Scurvy Weed	
		Dianella caerula	Blue Flax Lily	
		Einadia hastata	Berry saltbush	
		Eucalyptus resinifera	Red Mahogany	
		Ficus sp.	Fig	
		Homolanthus populifolious	Bleeding Heart Tree	
		Lomandra longifolia	Spiny-headed Mat rush	
		Pittosporum undulatum	Sweet pittosporum	
16	Davidson Street Remnant			
		Acacia binervia	Coast Myall	
		Acacia linearifolia	Narrow-leaved wattle	
		Aloe vera *	Aloe	
		Araujia sericifera *	Moth vine	
		Asparagus aethiopicus *	Asparagus fern	✓
		Bidens pilosa *	Cobbler's Pegs	
		Bursaria spinosa	Sweet Bursaria	
		Cestrum parqui *	Green Cestrum	
		Cotoneaster glaucophyllus *	Cotoneaster	
		Cymbopogon refractus	Barbed wire grass	
		Cynodon dactylon	Couch grass	
		Dianella revoluta	Blueberry Lily	
		Ehrharta erecta *	Panic Veldt grass	
		Einadia hastata	Berry Saltbush	
		Eucalyptus fibrosa	Red Ironbark	
		Eucalyptus longifolia	Woollybutt	
		Eucalyptus resinifera	Red Mahogany	
		Glycine clandestina	Twining glycine	
		Hakea sericea	Silky Hakea	
		Lantana camara *	Lantana	✓
		Ligustrum sinense *	Small leaf privet	

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Site #	Site Name	Scientific Name	Common Name	WoNs
		Microlaena stipoides	Weeping grass	
		Ozothamnus diosmifolius	Rice flower	
		Paspalum dilatatum *	Paspalum	
		Pittosporum undulatum	Sweet pittosporum	
		Plantago lanceolata *	Plaintain	
		Rubus fruticosus species aggregate *	Blackberry	✓
		Setaria viridis *	Pigeon grass	
		Sida rhombifolia	Paddy's Lucerne	
		Solanum nigrum *	Blackberry nightshade	
		Themeda triandra	Kangaroo grass	
17	St Anne's Reserve			
		Anredera cordifolia *	Madeira vine	✓
		Cardiospermum grandiflorum *	Balloon vine	
		Casuarina glauca	Swamp Sheoak	
		Cayratia clematidea	Native Grape	
		Cestrum parqui *	Green Cestrum	
		Cotoneaster glaucophyllus *	Cotoneaster	
		Dianella caerula	Blue-flax Lily	
		Hakea sericea	Silky Hakea	
		Imperata cylindrica	Bladey grass	
		Ligustrum lucidum *	Broad-leaved privet	
		Ligustrum sinense *	Small-leaved privet	
		Lomandra longifolia	Spiny-headed Mat Rush	
		Ludwigia peruviana *	Water Primrose	
		Melaleuca stypheloides	Prickly paperbark	
		Phoenix canariensis *	Phoenix palm	
		Senna pendula *	Cassia	
		Tradescantia fluminensis *	Wnadering Trad	
		Vinca major *	Blue Periwinkle	
23	Dean Reserve			
		Bidens pilosa	Cobbler's pegs	
		Cestrum parqui *	Green Cestrum	
		Glochidion ferdinandi	Cheese tree	
		Imperata cylindrica	Blady grass	
		Lomandra longifolia	Spiny-headed mat rush	
		Phoenix canariensis *	Phoenix palm	

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Site #	Site Name	Scientific Name	Common Name	WoNs
26	Maria Reserve			
		Breynia oblongfolia	Coffee Bush	
		Bursaria spinosa	Sweet Bursaria	
		Cayratia clematidea	Native Grape	
		Cinnamomum camphora *	Camphor laurel	
		Clematis microphylla	Small – leaved clematis	
		Dodonaea triquetra	Hop Bush	
		Ehrharta erecta *	Panic Veldt Grass	
		Einadia hastata	Berry Saltbush	
		Einadia nutans	Nodding Saltbush	
		Eragrostis brownii	Brown's Lovegrass	
		Gahnia aspera	Rough saw Sedge	
		Glycine clandestina	Glycine	
		Hakea sericea	Silky Hakea	
		Imperata cylindrica	Bladey grass	
		Kennedia rubicunda	Dusky coral pea	
		Lomandra longifolia	Spiny-headed Mat Rush	
		Ochna serrulata *	Ochna	
		Phyllanthus sp.	Phyllanthus	
		Pittosporum undulatum	Sweet Pittosporum	
		Plectranthus verticillatus *	plectranthus	
		Pomaderris lanigera	Woolly Pomaderries	
		Sida rhombifolia *	Paddy's Lucerne	
		Smilax australis	Wait-a-while	
		Solanum nigrum *	Blackberry nightshade	
		Sonchus oleraceus *	Common Sow Thistle	
		Syncarpia glomulifera	Turpentine	
		Trema tometosa	Native Peach	
27	Elliott Reserve			
		Anredera cordifolia *	Madeira vine	✓
		Araujia sericifera *	Moth vine	
		Asparagus aethiopicus *	Asparagus fern	✓
		Bidens pilosa *	Cobbler's Pegs	
		Casuarina glauca	Swamp Sheoak	
		Cayratia clematidea	Native Grape	
		Commelina cyanea	Scurvy Weed	
		Cyperus eragrostis *	Tall flatsedge	
		Dianella revoluta	Blueberry Lily	

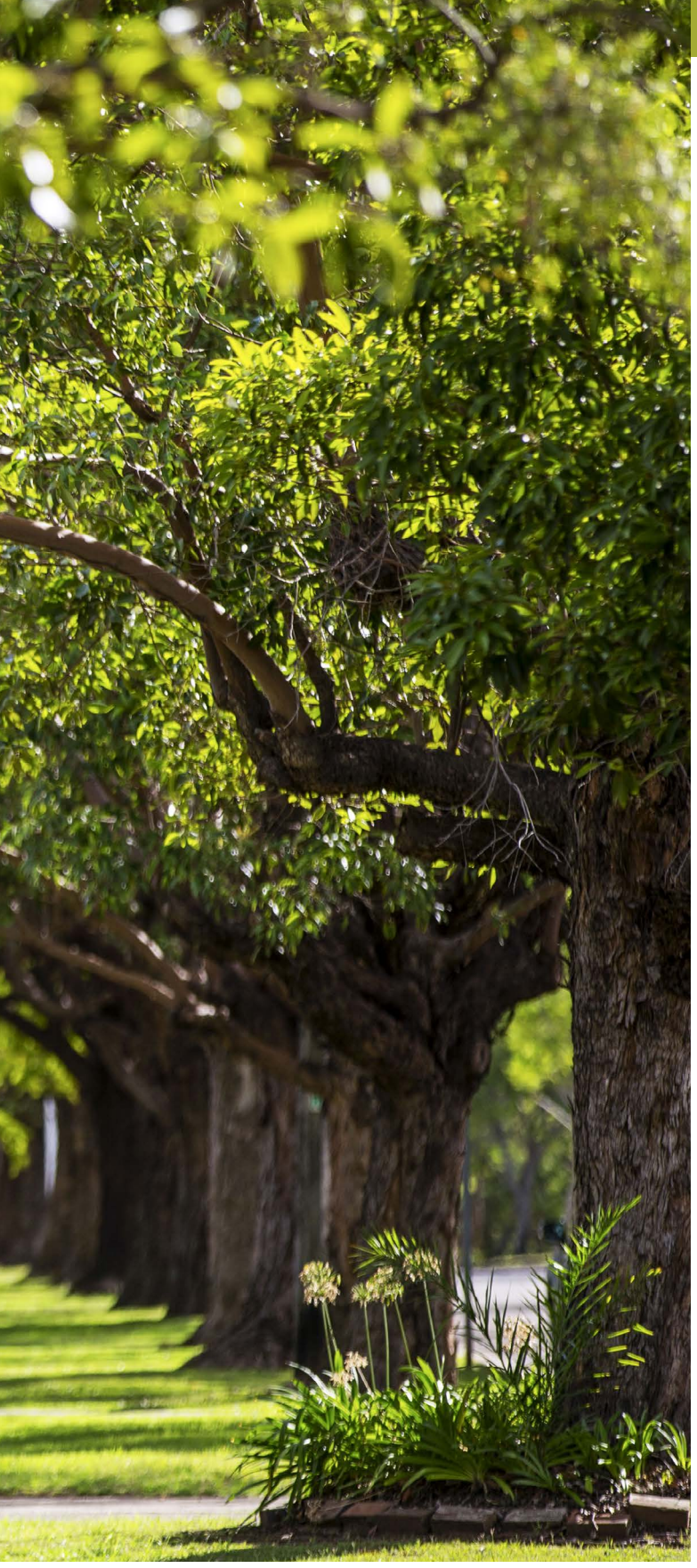
* = *Exotic species, WoNs = Weeds of National Significance*

Site #	Site Name	Scientific Name	Common Name	WoNs
		Ehrharta erecta *	Panic Veldt Grass	
		Eucalyptus longifolia	Woollybutt	
		Ipomoea purpurea *	Morning glory	
		Juncus usitatus	Club sedge	
		Ligustrum sinense *	Broad-leaved privet	
		Lomandra longifolia	Spiny-headed Mat Rush	
		Pittosporum revolutum	Yellow Pittosporum	
		Pittosporum undulatum	Sweet Pittosporum	
		Ricinus communis *	Castor oil	
		Sida rhombifolia *	Paddy's Lucerne	
		Smilax australis	Wait-a-while	
		Verbena bonariensis *	Purpletops	
32	Coxs Creek Remnant			
		Acacia longifolia	Sydney Golden Wattle	
		Acetose sagittate *	Turkey Rhubarb	
		Ageratina adenophora *	Crofton weed	
		Araujia sericifera *	Moth vine	
		Asparagus aspargoides *	Bridal creeper	✓
		Asparagus plumosus *	Climbing asparagus fern	✓
		Bidens Pilosa *	Cobbler's Pegs	
		Bryophyllum delagoense *	Mother of millions	
		Bursaria spinosa	Sweet Bursaria	
		Cardiospermum grandiflorum *	Balloon vine	
		Cestrum parqui *	Green Cestrum	
		Clematis microphylla	Small-leaved clematis	
		Commelina cyanea *	Scurvy weed	
		Cuscuta sp. *	Dodder	
		Cymbopogon refractus	Barbed wire grass	
		Dianella caerula	Blue flax lily	
		Dichondra repens	Kidney Weed	
		Dodonea triquetra	Hop Bush	
		Ehrharta erecta *	Panic Veldt Grass	
		Einadia hastata	Berry Saltbush	
		Erythrina x sykesii *	Coral tree	
		Glochidion ferdinandi	Cheese tree	
		Glycine clandestina	Twining glycine	
		Hardenbergia violacea	Purple Coral Pea	
		Ligustrum lucidum *	Broad-leaved privet	

* = *Exotic species, WoNs = Weeds of National Significance*

Site #	Site Name	Scientific Name	Common Name	WoNs
		Lobelia purpurascens	White Root	
		Microlaena stipoides	Weeping Grass	
		Melaleuca decora	Paperbark	
		Nasturtium officinale *	Watercress	
		Ochna serrulate *	Ochna	
		Olea europaea subsp. Cuspidate	African olive	
		Oplismenus aemulus	Basket grass	
		Parietaria Judaica *	Asthma weed	
		Pennisetum clandestinum *	Kikuyu grass	
		Persicaria decipiens	Slender Knot weed	
		Phyllanthus virgatus *	Creeping Phyllanthus	
		Pittosporum undulatum	Sweet Pittosporum	
		Plectranthus verticillatus *	Plectranthus	
		Pomaderris lanigera	Woolly Pomaderris	
		Rubus fruticosus species aggregate *	Blackberry	✓
		Schoenoplectus validus	River Club Rush	
		Sida rhombifolia *	Paddy's Lucerne	
		Solanum mauritianum *	Wild tobacco	
		Solanum nigrum *	Blackberry nightshade	
		Syncarpia glomulifera	Turpentine	
		Tradescantia fluminensis *	Wandering Trad	
		Typha orientalis	Cumbungi	
		Vicia sativa ssp. Sativa *	Common Vetch	

** = Exotic species, WoNs = Weeds of National Significance*



APPENDIX D

THREATENED SPECIES IN THE STRATHFIELD LGA

THREATENED FAUNA

Scientific Name	Common Name	NSW BC Act Status	EPBC Act Status	Habitat	Ecology
Litoria aurea	Green and Golden Bell Frog	E1	V	Marshes, dams and stream-sides, particularly those containing *Typha* spp. (bullrushes) or *Eleocharis* spp. (spikerushes). Some populations occur in highly disturbed areas.	The species is active by day and usually breeds in summer when conditions are warm and wet. Males call while floating in water and females produce a raft of eggs that initially float before settling to the bottom, often amongst vegetation. Tadpoles feed on algae and other plant-matter; adults eat mainly insects, but also other frogs.
Miniopterus orianae oceanensis	Large Bentwing-bat	V		Rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland.	It forages above and below the tree canopy on small insects, especially moths. The bats congregate at the same maternity roosts each year to give birth and rear young. In the southern part of the species' range this occurs during spring. Maternity roosts may be in caves, abandoned mines, concrete bunkers and lava tubes. Over-wintering roosts used outside the breeding period include cooler caves, old mines, and stormwater channels, under bridges and occasionally buildings.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Annual mating commences in January and single young is born in October or November. Can travel up to 50 km from the camp to forage. Feed on the nectar and pollen of *Eucalyptus, Melaleuca* and *Banksia* species, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.
Haliaeetus leucogaster	White-Bellied Sea Eagle	V		Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or near freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.	Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Hunts its prey from a perch or whilst in flight. Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground.

P = Protected, V = Vulnerable, E/E1/E2 = Endangered, CE = Critically Endangered

Scientific Name	Common Name	NSW BC Act Status	EPBC Act Status	Habitat	Ecology
Falco subniger	Black Falcon	V		Along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. It roosts in trees at night and often on power poles by day.	Forage from roosts on birds, small mammals, insects and reptiles and sometimes carrion.
Epthianura albifrons	White Fronted Chat	V		Usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. Predominantly found associated with the edges of wetlands, coastal saltmarsh and mangroves.	Breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves.
Listed Migratory Species					
Calidris ferrugine	Curlew Sandpiper	E		Occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts.	Forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores.
Charadrius leschenaultii	Greater Sand-plover	V	V	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks.	Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. Diet includes insects, crustaceans, polychaete worms and molluscs.
Pluvialis squatarola	Grey Plover			Occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes.	Usually forage on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons.

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Scientific Name	Common Name	NSW BC Act Status	EPBC Act Status	Habitat	Ecology
Gallinago hardwickii	Latham's Snipe			Occurs in permanent and ephemeral wetlands up to 2000m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity.	Omnivorous species that feeds on seeds and other plant material, and on invertebrates including insects (mainly flies and beetles), earthworms and spiders and occasionally molluscs, isopods and centipede.
Pluvialis fulva	Pacific Golden Plover			Usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as *Sarcocornia*, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, also in evaporation ponds in saltworks.	Forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. In addition, Pacific Golden Plovers occasionally forage among vegetation, such as saltmarsh, mangroves.
Arenaria interpres	Ruddy Turnstone			Mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats.	Often forage among banks of stranded seaweed or other tide-wrack. They are also known to forage on exposed rocky platforms, coral reefs and mudflats.

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Scientific Name	Common Name	NSW BC Act Status	EPBC Act Status	Habitat	Ecology
Philomachus pugnax	Ruff			Found on generally fresh, brackish or saline wetlands with exposed mudflats at the edges. Also found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and flood land.	Insectivorous throughout the breeding grounds, however, it is omnivorous elsewhere. It is diurnal and nocturnal. The species uses its bill to probe and peck in water, dry land and among dead vegetation at the edge of the water.
Calidris acuminata	Sharp-tailed Sandpiper			Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast.	Forage at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. They also forage among inundated vegetation of saltmarsh, grass or sedges. Forages on seeds, worms, molluscs, crustaceans and insects.
Tringa glareola	Wood Sandpiper			Uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds. They are rarely found using brackish wetlands, or dry stunted saltmarsh.	Forages on moist or dry mud at the edges of wetlands, either along shores, among open scattered aquatic vegetation, or in clear shallow water.
Hirundapus caudacutus	White-throated Needletail		V	Almost exclusively aerial. Occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest.	Roosts in forests and woodlands, amongst dense foliage and in the canopy. Breeds in wooded lowlands and sparsely vegetated hills.

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THREATENED FLORA

Scientific Name	Common Name	NSW BC Act status	EPBC Act status	Habitat	Ecology
Acacia pubescens	Downy Wattle	V	V	Open woodland and forest, including Cooks River/ Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones.	Flowers from August to October. The pods mature in October to December... Recruitment is more commonly from vegetative reproduction than from seedlings. The percentage of pod production and seed fall for this species appears to be low.
Pomaderris prunifolia		E2		At Rookwood Cemetery it occurs in a small gully of degraded Cooks River / Castlereagh Ironbark Forest on shale soils.	Does not appear to spread vegetatively. The longevity is thought to be 10-25 years. Buds are present for many months before flowers open. Probably killed by fire.
Wahlenbergia multicaulis	Tadgell's Bluebell	E2		In Western Sydney it is found in remnants of Cooks River/ Castlereagh Ironbark Forest. Typically occurs in damp, disturbed sites.	Usually flowers throughout the year, although a late spring/early summer peak has been observed at some locations. Usually a perennial, particularly in protected situations which provide greater protection during the summer months. However, in more exposed situations, the species may be more annual in its life cycle due to exposure and/or lack of soil moisture. Responds favourably to disturbance of soil in some situations with high exposure to sunlight.
Wilsonia backhousei	Narrow-leaved Wilsonia	V		At Mason park Wetland occurring as pure stand less thatn 10 m2 in extent. Typically occurs on the margins of salt marsh.	Perennial, sprawling, matted shrub less than 15 cm tall. The narrow, pointed, dark green, stalkless leaves are succulent and less than 20 mm long. The single white flowers are also stalkless.

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APPENDIX E

RECOMMENDED SPECIES LIST FOR PLANTING

COOKS RIVER CASTLEREAGH IRONBARK FOREST

Type	Scientific name	Common name
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Astroloma humifusum*	Native Cranberry
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Billardiera scandens*	Hairy Apple Berry
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Boronia polygalifolia*	Dwarf Boronia
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Calotis cuneifolia*	Purple Burr-daisy
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Cassytha glabella form glabella*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Cheilanthes sieberi subsp. sieberi*	Poison Rock Fern
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Dianella revoluta*	Blueberry Lily
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Dillwynia parvifolia*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Dillwynia tenuifolia+*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Einadia nutans*	Cimbing Saltbush
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Einadia trigonos*	Fishweed
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Glycine clandestina*	Twining Glycine
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Gonocarpus tetragynus*	A Raspwort
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Goodenia bellidifolia*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Goodenia hederacea subsp. hederacea*	Forest Goodenia
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Goodenia paniculata*	Branched Goodenia
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Hibbertia empetrifolia*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Hibbertia serpyllifolia*	Hairy Guinea Flower
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Laxmannia gracilis*	Slender Wire Lily
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Leucopogon juniperinus*	Prickly Beard-heath
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Lissanthe strigosa+*	Peach Heath
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Microtis parviflora*	Slender Onion Orchid
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Opercularia diphylla*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Orthoceras strictum*	Bird's-mouth Orchid
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Pomax umbellata*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Poranthera microphylla*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Pratia purpurascens*	Whiteroot
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Pultenaea villosa*	Hairy Bush-pea
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Rhytidosporum procumbens*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Stackhousia viminea*	Slender Stackhousia
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Thelymitra pauciflora*	Slender Sun Orchid
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Vernonia cinerea var. cinerea*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Wahlenbergia gracilis*	Sprawling Bluebell
Sedges, Rushes, Reeds & Grasses	*Aristida ramosa*	Purple Wiregrass
Sedges, Rushes, Reeds & Grasses	*Aristida vagans*	Threeawn Speargrass
Sedges, Rushes, Reeds & Grasses	*Austrostipa pubescens*	-

Type	Scientific name	Common name
Sedges, Rushes, Reeds & Grasses	*Austrostipa rudis*	-
Sedges, Rushes, Reeds & Grasses	*Dichelachne micrantha*	Shorthair Plumegrass
Sedges, Rushes, Reeds & Grasses	*Entolasia stricta*	Wiry Panic
Sedges, Rushes, Reeds & Grasses	*Eragrostis brownii*	Brown's Lovegrass
Sedges, Rushes, Reeds & Grasses	*Lepidosperma laterale*	-
Sedges, Rushes, Reeds & Grasses	*Lomandra longifolia*	Spiny-head Mat-rush
Sedges, Rushes, Reeds & Grasses	*Lomandra multiflora subsp. multiflora*	-
Sedges, Rushes, Reeds & Grasses	*Microlaena stipoides var. stipoides*	Weeping Meadow Grass
Sedges, Rushes, Reeds & Grasses	*Panicum simile*	Two-colour Panic
Sedges, Rushes, Reeds & Grasses	*Paspalidium distans*	-
Sedges, Rushes, Reeds & Grasses	*Rytidosperma tenuior*	Wallaby Grass
Sedges, Rushes, Reeds & Grasses	*Rytidosperma setacea*	Wallaby Grass
Sedges, Rushes, Reeds & Grasses	*Themeda australis*	Kangaroo Grass
Small Trees / Shrub Species (1.5-6m)	*Acacia falcata*	-
Small Trees / Shrub Species (1.5-6m)	*Acacia pubescens*	Downy Wattle
Small Trees / Shrub Species (1.5-6m)	*Bursaria spinosa*	Blackthorn
Small Trees / Shrub Species (1.5-6m)	*Cassinia arcuata*	Sifton
Small Trees / Shrub Species (1.5-6m)	*Daviesia ulicifolia+*	Gorse Bitter Pea
Small Trees / Shrub Species (1.5-6m)	*Dillwynia sieberi*	-
Small Trees / Shrub Species (1.5-6m)	*Exocarpos cupressiformis*	Native Cherry
Small Trees / Shrub Species (1.5-6m)	*Grevillea juniperina*	-
Small Trees / Shrub Species (1.5-6m)	*Hakea sericea*	Needlebush
Small Trees / Shrub Species (1.5-6m)	*Kunzea ambigua*	Tick Bush
Small Trees / Shrub Species (1.5-6m)	*Leptospermum trinervium*	Flaky-barked Tea-tree
Small Trees / Shrub Species (1.5-6m)	*Melaleuca decora+*	-
Small Trees / Shrub Species (1.5-6m)	*Melaleuca nodosa+*	Prickly-leaved Paperbark
Small Trees / Shrub Species (1.5-6m)	*Notelaea longifolia*	Large Mock-olive
Small Trees / Shrub Species (1.5-6m)	*Ozothamnus diosmifolius*	Rice Flower
Small Trees / Shrub Species (1.5-6m)	*Podolobium ilicifolium*	Prickly Shaggy Pea
Small Trees / Shrub Species (1.5-6m)	*Xanthorrhoea media*	Grass Tree
Tree Canopy Species (>6m)	*Angophora bakeri*	Narrow-leaved Apple
Tree Canopy Species (>6m)	*Angophora floribunda*	Rough-barked Apple
Tree Canopy Species (>6m)	*Eucalyptus capitellata*	Brown Stringybark
Tree Canopy Species (>6m)	*Eucalyptus fibrosa*	Red Ironbark+
Tree Canopy Species (>6m)	*Eucalyptus longifolia+*	Woollybutt
Tree Canopy Species (>6m)	*Eucalyptus moluccana*	Grey Box
Tree Canopy Species (>6m)	*Eucalyptus resinifera*	Red Mahogany
Tree Canopy Species (>6m)	*Syncarpia glomulifera*	Turpentine

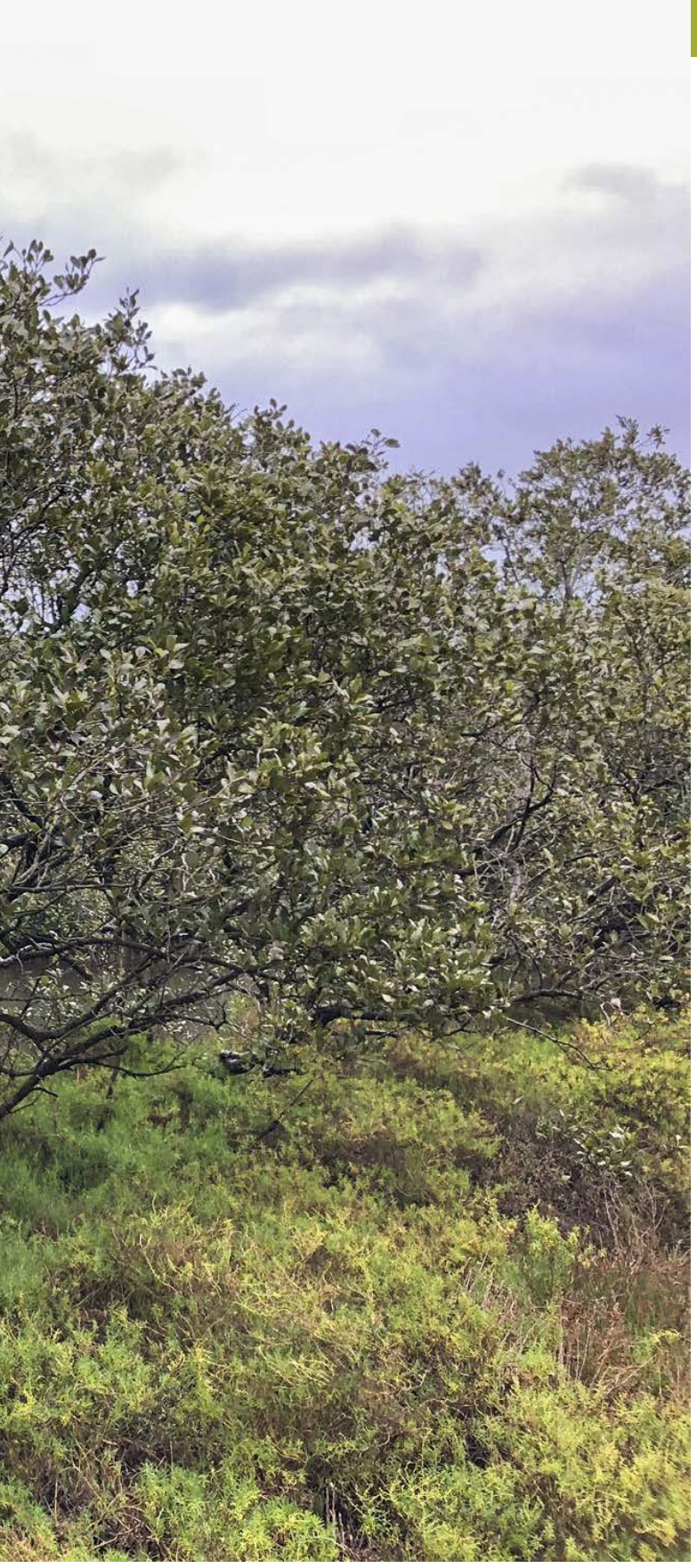
SALTMARSH

Type	Scientific name	Common name
Herbs / Aquatic Herbs	*Limonium australe*	Native Sea Lavender
Herbs / Aquatic Herbs	*Samolus repens*	Creeping Brookweed
Herbs / Aquatic Herbs	*Sarcocornia quinqueflora*	Samphire
Herbs / Aquatic Herbs	*Selliera radicans*	Swamp Weed
Herbs / Aquatic Herbs	*Suaeda australis*	Seablite
Herbs / Aquatic Herbs	*Triglochin striata*	Streaked Arrowgrass
Sedges, Rushes, Reeds & Grasses	*Austrostipa stipoides*	-
Sedges, Rushes, Reeds & Grasses	*Baumea juncea*	Bare Twig Rush
Sedges, Rushes, Reeds & Grasses	*Gahnia filum*	-
Sedges, Rushes, Reeds & Grasses	*Isolepis inundata*	Swamp Club-sedge
Sedges, Rushes, Reeds & Grasses	*Isolepis nodosa*	-
Sedges, Rushes, Reeds & Grasses	*Juncus kraussii subsp. australiensis*	Sea Rush
Sedges, Rushes, Reeds & Grasses	*Sporobolus virginicus*	Sand Couch
Sedges, Rushes, Reeds & Grasses	*Zoysia macrantha*	Prickly Couch
Small Trees / Shrub Species (1.5-6m)	*Tecticornia arbuscula*	-

SWAMP OAK FLOODPLAIN FOREST

Type	Scientific name	Common name
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Alternanthera denticulata*	Lesser Joyweed
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Blechnum indicum*	Swamp Water-fern
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Calochlaena dubia*	Rainbow Fern
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Centella asiatica*	Indian Pennywort +
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Commelina cyanea*	Commelina +
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Flagellaria indica*	Whip Vine
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Geitnoplesium cymosum*	Scrambling Lily
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Hydrocotyle peduncularis*	A Pennywort
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Hypolepis muelleri*	Harsh Ground Fern
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Lobelia anceps*	Angled Lobelia
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Maundia triglochinoides*	-
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Parsonsia straminea*	Common Silkpod +
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Selliera radicans*	Swamp Weed
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Smilax australis*	Lawyer Vine
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Stephania japonica var. discolor*	Snake Vine
Groundcover Species (~0-1.5m) & Vines/Scramblers	*Viola banksii*	A Violet
Herbs / Aquatic Herbs	*Persicaria decipiens*	Slender Knotweed

Type	Scientific name	Common name
Herbs / Aquatic Herbs	*Persicaria strigosa*	Prickly Smartweed
Sedges, Rushes, Reeds & Grasses	*Baumea juncea*	Bare Twig Rush
Sedges, Rushes, Reeds & Grasses	*Carex appressa*	Tall Sedge
Sedges, Rushes, Reeds & Grasses	*Crinum pedunculatum*	Swamp Lily
Sedges, Rushes, Reeds & Grasses	*Dianella caerulea*	Blue Flax Lily
Sedges, Rushes, Reeds & Grasses	*Entolasia marginata*	Bordered Panic
Sedges, Rushes, Reeds & Grasses	*Gahnia clarkei*	Tall Saw-sedge
Sedges, Rushes, Reeds & Grasses	*Imperata cylindrica var. major*	Blady Grass
Sedges, Rushes, Reeds & Grasses	*Isolepis inundata*	Swamp Club-sedge
Sedges, Rushes, Reeds & Grasses	*Juncus kraussii subsp. australiensis*	Sea Rush
Sedges, Rushes, Reeds & Grasses	*Juncus planifolius*	A Rush
Sedges, Rushes, Reeds & Grasses	*Juncus usitatus*	Common Rush
Sedges, Rushes, Reeds & Grasses	*Lomandra longifolia*	Spiny-head Mat-rush
Sedges, Rushes, Reeds & Grasses	*Microlaena stipoides var. stipoides*	Weeping Meadow Grass
Sedges, Rushes, Reeds & Grasses	*Oplismenus imbecillis*	Basket Grass
Small Trees / Shrub Species (1.5-6m)	*Callistemon salignus*	Sweet Willow Bottlebrush
Small Trees / Shrub Species (1.5-6m)	*Glochidion ferdinandi*	Cheese Tree +
Small Trees / Shrub Species (1.5-6m)	*Homalanthus populifolius*	Bleeding Heart
Small Trees / Shrub Species (1.5-6m)	*Melaleuca alternifolia*	Tea tree
Small Trees / Shrub Species (1.5-6m)	*Myoporum acuminatum*	Boobialla
Tree Canopy Species (>6m)	*Acmena smithii*	Lilly Pilly
Tree Canopy Species (>6m)	*Alphitonia excelsa*	Red Ash
Tree Canopy Species (>6m)	*Casuarina glauca*	Swamp Oak +
Tree Canopy Species (>6m)	*Cupaniopsis anacardioides*	Tuckeroo
Tree Canopy Species (>6m)	*Eucalyptus robusta*	Swamp Mahogany
Tree Canopy Species (>6m)	*Glochidion sumatranum*	Umbrella Cheese Tree
Tree Canopy Species (>6m)	*Melaleuca ericifolia*	Swamp Paperbark +
Tree Canopy Species (>6m)	*Melaleuca styphelioides*	Prickly-leaved Tea Tree



APPENDIX F

BEST PRACTICE WEED CONTROL TECHNIQUES

Various weed control techniques are required to control weed infestations in natural areas. Weed infestations usually consist of a number of different weed species, densities and weed forms.

Weed control techniques are summarised below. These techniques are guidelines only. An adaptive weed management program should include a combination of different weed control techniques and involves consideration of monitoring and reporting outcomes and potential changes to the weed management program based on those results.

Depending on the area, density and priority, objectives of weed control may change. For example, it may be more cost-effective to contain zones with a high weed infestation but with a low risk of spreading into adjacent habitats or impacting on threatened species or communities, rather than attempting to eradicate all weeds. Alternatively, it is cost effective in the long-term to eradicate weeds in small infestations before they become larger and more widespread.

To effectively manage the issue of weed invasion an understanding of the types of vectors responsible is important. The movement of wind and water is often considered the greatest mode of weed dispersal into new habitats. Water is commonly responsible for the transport of weed propagules along the riparian corridors and contributes to weeds establishing downstream watercourses. However, there are many options for weed dispersal by vectors other than wind or water. A list of some of the potential weed vectors and examples of weeds species is shown the table below.

HYGIENE PROTOCOLS

A strict hygiene protocol must be implemented to control the spread of weed propagules between habitats and the accidental introduction of invasive species into sensitive areas. Best management practices recommend work should target areas of high biodiversity value first and treat areas in poorer condition. Weed propagules may be spread on the clothes or boots of humans or in the soil on vehicles. It is important that all vehicles, especially earth movement, are thoroughly washed down before moving to a new site. This also applies to humans. Clothes must be free of weed propagules before entering a new site.

Weed vectors

Vector	Weed Examples	Description	Ecological Implications
Watercourse	Trad	Fleshy stems can be transported along watercourse.	Widely dispersed into native and disturbed environments.
Drain	Moth Vine	Light feathery capsules float on water.	Widely distributed along creek lines and into downstream habitats.
Wind	Pampas Grass	Very light seeds are windborne over long distances.	Readily invades disturbed open habitats, particularly along road verges.
Track	Cobblers Pegs	Burrs stick to animals and humans.	Invades disturbed bushland along tracks and is carried into adjacent habitats.
Birds	Blackberry, Lantana	Edible fruits are dispersed over large areas.	Birds increase weed dispersal into new habitats.
Mammals	Blackberry,	Eat fruit or transport burrs on fur.	Mammals spread seeds or burrs into new habitats.
Humans	African Lovegrass	Transport propagules on clothes and shoes.	Humans spread seeds or burrs into new habitats.

PRINCIPLES OF WEED CONTROL WITHIN NATURAL AREAS

Weed control programmes within natural areas follow the principles of bush regeneration including the Bradley Method and other techniques to promote natural regeneration as described in Buchanan (2000). These are summarised below:

- Where available, refer to best practice guidelines for individual weed species which may need to be adapted to a natural setting and ecological outcome.
- Ensure correct plant identification – many weed species are difficult to identify because they resemble native species or typically occur in a vegetative (i.e. non-flowering) form.
- Limit the creation of bare patches of soil and soil disturbance in general, since this will encourage weeds to establish and grow.As a first option for weed control, consider methods that do not use herbicide (e.g. hand pulling and crowning) and which create very little soil disturbance.
- When using herbicides, use the least toxic chemical whenever possible and always follow the instructions.
- When working on or near drainage lines, use an approved herbicide for this environment.
- Refer to the Australian Pesticides and Veterinary Medicines Authority (APVMA) website (www.apvma.gov.au) for information on off-label permits.
- Apply herbicides when the plants are actively growing and prior to seed set to achieve the best results.
- Regularly monitor for new infestations; and where woody weeds are providing habitat for native birds and animals, use the drill and fill technique to enable the same structure to remain in situ while the tree or shrub dies – this will enable the plant to provide shelter for a period of time, while giving the birds and animals a chance to move on of their own accord. Where this is not practical considering the size of an infestation consider a mosaic approach to control.

INTEGRATED WEED MANAGEMENT

Integrated weed management may use a combination of any of the following techniques; mechanical, chemical, manual handling and biological methods. According to the Department of Primary Industries (DPI) *Noxious and environmental weed control handbook* the best management practices consider a long-term perspective and do not rely solely on herbicide application (DPI 2010).

Weed control can be broken down into three main categories:

- **Primary Treatment:** the first weeding of the site.
- **Secondary Treatment**: the second weeding of the site which may be very intensive as all regrowing/ germinating weeds should be removed before they seed and out-compete native plants.
- **Maintenance/Follow-up Treatment:** every re-weeding of the site after the secondary phase.

The first time an area is weeded (primary treatment) can be labour intensive and time consuming depending on the target species and site conditions. It may take over several months to complete for one species (Buchanan 2009). In areas of high weed infestation and with no native resilience and/or native plants present, primary weeding may be accelerated as preparatory works for revegetation.

However, in areas where native plants may occur, primary weeding should be undertaken at a pace that assists with the natural regeneration of the site.

Secondary treatment of areas can take longer than primary treatment as new species can be present that are more difficult to treat than the original weed (Buchanan 2009). Secondary treatment needs to be carefully timed to:

- Prevent weeds from setting seed,
- Suppress vegetative regrowth while plants are still small, and
- Allow native plants to recruit without being smothered or out-competed by weeds.

However, secondary treatment should allow enough time for the soil profile to recover following primary treatment and the establishment of weed growth from the soil seed bank.

Maintenance treatment refers to weed control that is carried out after the secondary treatment (Buchanan 2009). The goal of follow-up treatments is to remove weedy recruits so that native species can re-colonise the area; frequent visits are likely to be needed at first, although the amount of time and resources used should gradually decrease over time.

CHEMICAL WEED CONTROL – HERBICIDE APPLICATION

Herbicide Selection

Any herbicide used in weed management activities must be registered for use in the appropriate situation for the species being treated. It is the responsibility of the weed control operator to check that the herbicide intended for use is registered at the time of control. Where herbicide application is used, many hardy species may require re-treatment between six and twelve months after the initial treatment to ensure mortality of individual plants.

Spot Spray Application

Hand operated spray gun connected to a knap-sack or vehicle (e.g. truck, ATV, etc.) mounted herbicide storage tank is used to direct diluted herbicide spray to defined areas. When applied under correct conditions, individual plants or parts of plants may be treated using this method with minimal risk of overspray and non-target damage. Spot spraying is an effective and targeted way of treating weeds on a landscape level, though non-target damage is possible on an individual plant level. This can be mitigated in some situations through the use of selective herbicides.

This method is most suitable for low growing or juvenile grasses, herbs, and woody weeds that have copious, but compact, foliage. In most cases, spot spraying should be undertaken after new growth is produced but before flowering. Because the plant is left in situ after spraying, there is potential of seed to mature on the plant if spraying is left to late. In some cases the target plant may also take weeks or months to die off.

Boom Spray Application

A nozzle spray apparatus is connected to the rear of a vehicle-mounted herbicide storage tank to apply a diluted herbicide application. Where terrain is suitable for vehicle access, large areas are typically treated using this technique (e.g. open paddock situation). Boom spraying is a fast and economical way of treating large areas of weeds on a landscape scale. However, boom spraying does not allow the operator to avoid individual plants and so has a high potential for non-target damage. This can be mitigated in some situations through the use of selective herbicides. This method is most suitable for large areas of weed infestation without any native regeneration potential.

Splatter Gun Application

Individually operated splatter or gas guns are connected to a 5L backpack which may be equipped with a canister of LPG. The hand gun applicator is charged with a dose of herbicide and a splatter of low volume-high concentration herbicide solution is applied. The LPG forces the herbicide out of the pack up to several meters distance; however, instead of a fine spray mist, as in the case of spot spray application, the herbicide is applied in a large droplet form leaving a line of herbicide on the plant.

"Stripes" of herbicide are applied across large plants instead of coating all parts of the plant in a fine mist.

Splatter guns are very effective as the application of the herbicide is more directed and produces limited off target damage. This treatment provides a good alternative to spot-spraying where access is difficult or materials have to be carried in, as they use much less water. Splatter guns can also provide an alternative to mechanical removal or herbicide treatments requiring access to the stem of the plant (e.g. cut and paint, drill and frill, etc.) amongst dense, low growing woody weeds such as Bitou and Lantana. This treatment is not effective on vegetation with sparse foliage cover.

Cut and Paint

In the cut and paint treatment, the stem of the plant is cut all the way through and herbicide applied to the stump. The plant should be cut as close to the base as possible, below any branches and the cut should be horizontal. The remaining stump should not exceed 10mm in height. The tools required to make the cut may be a handsaw, secateurs or chainsaw. Any dirt on the stump needs to be removed and the herbicide needs to be directly applied within 30seconds to the stump using a dabber bottle. Some plant species re-sprout after this treatment and follow up work may be required to kill the plant effectively. A non-specific herbicide should be used for the cut and paint method.

The cut and paint method is suitable for the control of woody weeds, large herbaceous weeds and vines/climbers. This treatment is commonly used when the biomass is to be removed from the site following the primary weed control. It is most suitable for plants with a small diameter at the base and a single stem or trunk. Given that to be effective the herbicide has to be applied as soon as possible after cutting, this method is not effective where extensive cutting is required.

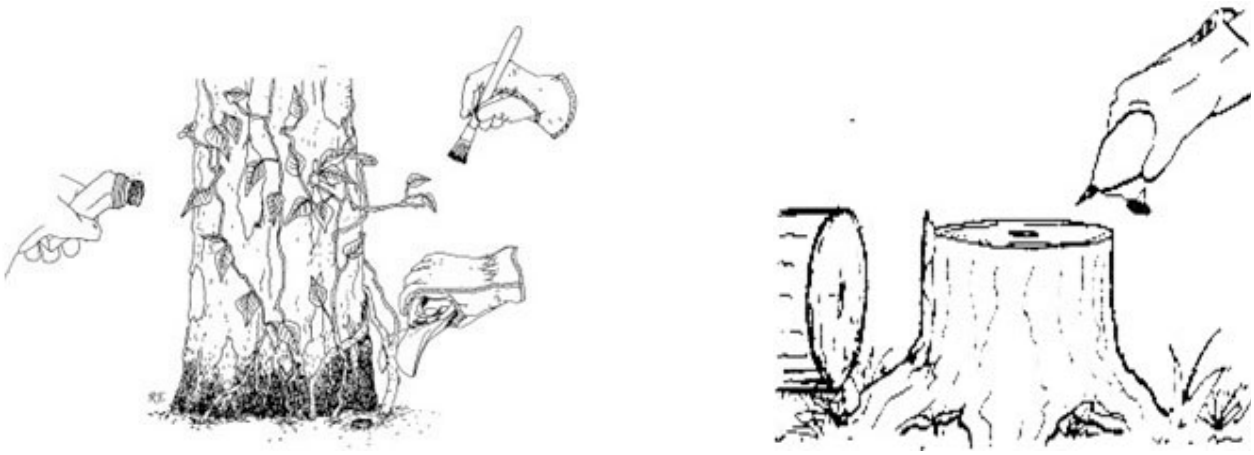


Figure 10: The cut and paint method (Muyt 2001, Sydney Weeds Committee 2013)

Drill and Fill

The drill and fill method involves drilling a hole into the base of a tree below any branches with a hand drill using a 9 or 10mm drill bit at an angle of 40-600. The hole should only penetrate through the sap wood and not through to the heart wood. The hole should then be filled immediately with the appropriate herbicide. An eye dropper or a squeeze bottle with a narrow nozzle can be used to fill the hole. If the plant re-sprouts follow up work will be required to kill the plant. A non-specific herbicide should be used for this treatment method.

The drill and fill method is suitable for woody weeds with a large diameter at ground height or for plants with multiple stems at the base. This control method is useful where dead trees are intended to be left standing as habitat trees and would be a suitable method for the eradication of large Camphor Laurels or Broad-leaved Privet trees, providing the dead trees do not present a hazard to the public at a later stage.

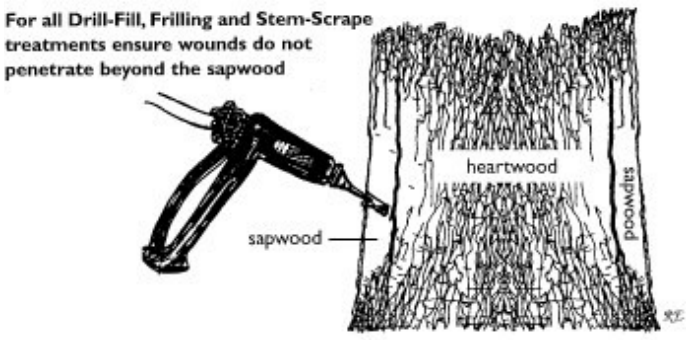


Figure 11: Drill and fill method for large woody trees (Muyt 2001)

Stem Scrape

The stem scrape method involves using a sharp knife to scrape back the top layer of bark from the vine 20-30cm long. An appropriately mixed herbicide needs to be applied immediately (within 30 seconds) using a dabber bottle. The root system of the plant should not be disturbed until the plant has died as this may reduce the effectiveness of the herbicide. Skirting method may be used in conjunction with stem scrape. This method is especially important to remove large infestations of vines within the canopy layer. Skirting involves cutting the vines within the canopy at chest height. This will allow an increase in the amount of light and resources to the canopy trees through the reduction of vine biomass.

The stem scrape method is most useful when used to treat species that need greater herbicide coverage than can be provided by the cut and paint method (e.g. Green Cestrum, Ochna), or a species that has reproductive material (e.g. tubers) that must be poisoned as well (e.g. Madeira Vine). For the latter, this is especially important if it is not possible to collect the reproductive material. However, for most woody weeds and vines, this method is not necessary.

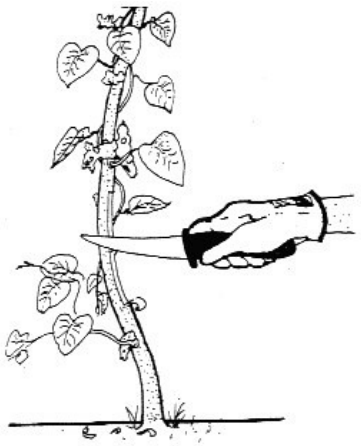


Figure 12: Stem scrape (Sydney Weeds Committee 2013)

MANUAL AND MECHANICAL WEED CONTROL

This technique physically removes plants from the soil and depending on the weed species may require special conditions for disposal (e.g. some noxious weeds must not be transported off-site and must be disposed of by deep burial). Manual treatment effectively removes the entire plant using hand tools such as shovels or the use of heavy machinery. This technique is most productive when treating small area infestations and successfully removes the entire plant effectively preventing future seed set.

Certain parts of plants may also be targeted for removal to prevent flowering or seed set (i.e. post flowering but prior to mature seed being released from the fruit or seed head). Re-treatment may be required if mature plants have previously released viable seed into the soil which may germinate post soil disturbance.

To reduce the risk of localised increased fuel load no debris should stockpiled on site.

Hand Removal / manual methods

Hand removal of weeds involves pulling the plant as close to the base as possible and ensuring the entire tap root is pulled out of the soil. This usually results in soil disturbance and the soil should be replaced and compressed to prevent further weed invasion.

The successful hand removal of some other weeds may require the removal of the plant's roots, bulbs or tubers. This method includes digging and crowning with the use of a hand mattock, knife or trowel. Crowning involves using a knife to cut the roots around the crown of the plant.

The hand removal or pulling of weeds is suitable for many species of weeds as long as they have a shallow root system. This includes woody weeds, grasses and herbaceous species. It is useful to follow up work on woody weeds to control seedlings

Mechanical Removal

This technique physically removes or destroys individual plants via a process utilising large machinery or chainsaws. The use of large-scale machinery can be extremely successful for the localised eradication of dense infestations of woody weed species such as African Olive and Blackberry.

Weeds may be grubbed or raked out, and then removed from site or mulched in situ. Species such as African Olive will resprout and will require follow up treatment with herbicide.

Mechanical removal is most effective with areas of high weed density, especially with woody weeds where herbicide spray is not practical. Where machinery access is possible, this is preferred as it has the added benefit of being able to mulch the woody weeds in situ. However, in creek lines or other steep sites chainsaws can be used to cut down woody weeds. When using chainsaws in this way it is recommended that only the outer layer of woody weeds and the smaller woody weeds in the interior be completely cut down. This will provide access into the interior. The larger woody weeds in the interior of the area should be treated by drill and frill and left standing. This allows for access through the creek line for follow up treatments. It is recommended to leave woody debris in situ or spread out loosely. The creation of large piles of woody debris is not recommended as it can impede follow up.

Generally, work sites where this technique is used require a maintenance component to monitor and control the potential reshooting root material, the germination of residual seed of the weed species and the colonisation of the site by other weed species. In some circumstances the control program requires follow up erosion, weed control, and revegetation programs to mitigate the risk of the aforementioned issues.

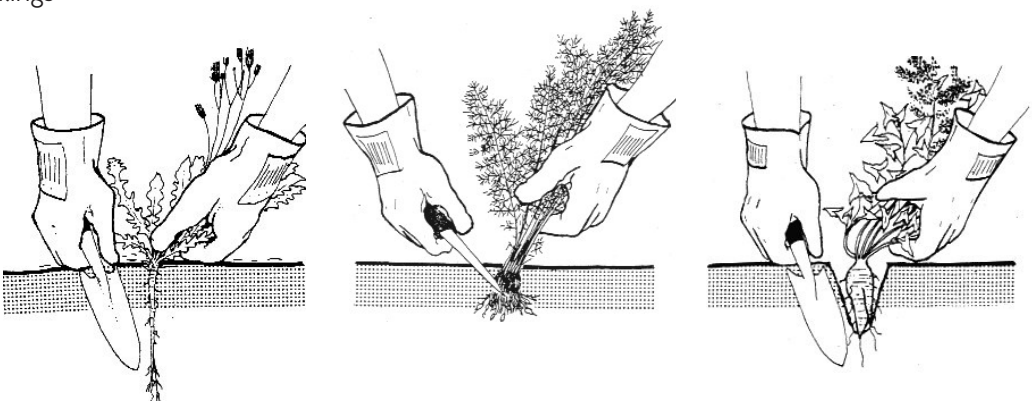


Figure 13:
Hand pull (left), Crown cut (middle) and Rhizome / tuber trace (right) (Sydney Weeds Committee 2013)

Slashing

Slashing involves removing some or all of the vegetative portion of a plant using mechanical blades. The use of machine drawn slashers or on a smaller scale individually operated brush cutters can prove extremely successful in reducing the seed load of key species.

The success of this technique is dependent on the timing of the slashing coinciding with the early flowering of the key species, in turn removing the flower heads prior to seed set. The timely use of slashing when combined with the use of herbicide application can provide an extremely cost effective and environmentally favourable program of weed control. Slashing reduces the vegetative material of a plant, encourages new growth and removes dead thatch. All these factors make herbicide spraying after slashing more efficient, effective and economical. It should be noted that as slashing is indiscriminate it can result in non-target damage. However, unlike herbicide which kills the entire plant slashing only removes the top portion and so can be used around native grasses especially with less risk. This can be further mitigated through setting of the slashing height and timing of the slashing to avoid native seed set.

BIOLOGICAL CONTROL

Biological control agents may be used for the management of some weed species. These control agents may have limited effectiveness due to their sensitivity to environmental conditions, and so the efficacy of this control technique depends on the ability of the control agent to establish self-perpetuating populations.

Biological control agents are generally best applied to high density weed infestations and the control agents (eg, Blackberry Rust) may need to be actively bred and reapplied regularly to counter natural mortality and periods of dormancy in target species.

Release of biological controls is particularly effective in treating weed populations in areas of high environmental sensitivity or to assist in the management of the identified weeds as part of a larger scale control program. These agents need to demonstrate high host specificity and pose little or no threat to other desirable plant species. If so, this is an ideal option for use in areas of threatened species or within sensitive habitats such as along water courses. The use of biological controls is strongly regulated to prevent the introduction of pests or diseases which impact on non-target species.

HERBICIDE INFORMATION

Herbicides

Herbicide application often forms an important component of an integrated weed management approach and can be the most appropriate method to control some weed species. Many herbicides are harmful not only to plants, but also fauna, particularly fish and amphibians.

Any herbicide used in weed management activities must be registered for use in the appropriate situation for the species being treated. These registration requirements are provided on the product label or an Off-label Permit. Some species which are known to be difficult to control may be treated using combinations of herbicides registered for use in Off-label Permits which are issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA). It is the responsibility of the weed control operator to check that the herbicide intended for use is registered at the time of control.

The situation of control should be carefully considered to ensure correct herbicide usage. In all cases the application technique must be aligned to the registration requirements of the individual herbicides selected for the weed control program. Where a sensitive environment coincides with weed infestation only herbicides suitable for use in sensitive areas (as dictated by the product registration) should be used. For example, to target a weed infestation in close proximity to water courses such as a creek line, a product such as Roundup® Biactive® could be used as it is registered for use in this type of situation.

Residual herbicides can be present in the soil profile for several months post application to reduce the incidence of regrowth of the target weed species. A residual selective herbicide would not, however, be appropriate if plans for the area involved revegetation, particularly with species intolerant to the herbicide. This would pose a serious threat to rehabilitation maintenance works where the area was to be revegetated with species which are susceptible to herbicide impact. Application of a residual herbicide may reduce recruitment of these species, further compounding the maintenance issues. In this situation a non-residual herbicide would be recommended to reduce the impact on establishing vegetation.

Herbicides fall into two main categories with regard to their impact on particular plants

- Non-selective herbicides which will, at appropriate rates, kill all plants. Glyphosate is a non-selective herbicide.
- Selective herbicides which will target either grass (monocot) species or broad-leaf (dicot) species.

Herbicide use should occur during the active growing season for plants to encourage the chemical uptake into the plant. Where herbicide application is used, many hardy species may require retreatment between six and twelve months after the initial treatment to ensure mortality of individual plants. Off target damage is common with herbicide use and consideration should be given to the following factors to avoid this damage.

- Correct identification of target species
- Spray drift in high winds
- Environmental conditions at time of application

A number of selective herbicides have been approved for grasses and for broad-leaf species in the NSW Department of Primary Industries (DPI) Noxious and environmental weed control handbook.

These selective herbicides represent a range of environmental toxicities and the Material Safety Data Sheets (MSDS) should be referred to in each instance. For instance, Metsulfuron-methyl poses a low risk to the environment, while Triclopyr is considered to be relatively toxic and has the potential to pose a moderate risk to the environment. Dimethylamine salt is in the same category as triclopyr, but is moderated by mixing it with metsulfuron-methyl.

Registration and records of any herbicide use must be kept in accordance with the NSW Pesticide Regulation 2009.

HERBICIDES IMPACT ON ECOSYSTEM

The correct training and appropriate application of herbicides must be followed at all times. There is a high risk of ecological impacts associated with use of herbicides. These risks include accidental death of plants due to spray-drift or due to incorrect handling technique or sensitive plants. There is also evidence that there are indirect impacts on microbats due to herbicide poisoning and reduced numbers of prey items for microbat species. Where possible consider alternative methods to herbicide use.

STAFF TRAINING

All weed control operators must be properly trained and hold required certification e.g. ChemCERT® and comply with requirements of the Pesticides Regulation 2009 (NSW) and Pesticides Act 1999 (NSW).

REVEGETATION WORKS

Revegetation has the dual aim of both re-establishing the original native vegetation community at the site and reducing erosion along the length of the riparian corridor, which will carry greatly increased peak flows due the increased run-off from the hard surfaces created by the associated residential development. Any plantings should consist of local provenance stock.

Planting of Hiko for trees and shrub species and Hiko or Viro cells for grasses and other groundcover species is the preferred method. Planting should be done via a low impact method such as hand digging or hand auger. The holes dug for each plant should be at least 1.5x the width and 2x the depth of the root ball. Fertiliser should be added to each hole dug as per the label specifications. Initial irrigation of the plantings is essential to ensure that the soil forms around the root ball and air pockets are removed. This will be required unless sufficient rainfall (approx. 10mm) occurs on the day of planting.

Tree guards will need to be installed on each tree or shrub to protect seedlings from extreme weather (frosts and heat), herbivorous grazing and herbicide drift during maintenance works. Bio-degradable tree guards are recommended to protect the seedlings. Following the revegetation works, irrigation needs to be undertaken for at least 8 weeks following planting to ensure the establishment of the plants. The level of irrigation will be determined by rainfall and temperature experienced at the planting site.

A temporary irrigation system should be installed to assist in the establishment of vegetation. Timing of the planting of these areas will need to take into consideration surrounding civil works and erosion/sediment control requirements, these areas will not be planted until earthworks have been completed. A maximum rate of attrition of 15% is to be tolerated, with any plant loss above this rate to be replaced at the contractor's expense.

Mulch can be derived from vegetation removed from the development area, if available. Alternately, mulch should be comprised of un-composted wood (preferably wood waste), with a particle size of 15 mm to 40 mm, with no fines, and good air-filled porosity. Mulch should not contain any weed seeds, nor be derived from diseased trees or from any part of the tree lower than 1 m above the ground. Mulch, where required, should be installed to a depth of 100 mm.

Jute matting, where required, must be comprised of 100% biodegradable jute fibres with a minimum weight of 680g/m2 (~6 mm thickness). Jute must be pegged with at least 3 x 150 mm pins per m2 and each roll overlapped by 100 mm.

SEED COLLECTION

For the growth of the plants used in the revegetation works, seed must be collected from local provenance species. Groundcovers, shrubs and trees should be collected as within close proximity (i.e. <20km) to the site. However, soil type, climate and aspect of the collection site(s) should also be considered. Native grasses typically have much larger dispersal mechanisms and are to be collected from within the Cumberland Plain of Sydney. Wetland species are to be collected from within the Cumberland Plain component of the Hawkesbury Nepean Catchment.

Record keeping of seed collection and planting locations are to follow the Florabank guidelines (Mortlock, 2000). A Section 132C licence under the NSW National Parks and Wildlife Act 1974 will be required to undertake seed collection works. The bush regeneration contractor is responsible for recording this information.

BUSH REGENERATION CONTRACTORS

All vegetation management works in the establishment phase will be undertaken by suitably qualified and experienced bush regeneration contractors who are members of the Australian Association of Bush Regenerators (AABR) or fulfil the membership criteria. Additionally, team leaders should have, as a minimum, a Certificate III in Conservation & Land Management or equivalent. The contractor will need to carry out best practice bush regeneration techniques as described by Buchanan (2009). A flexible approach is recommended since techniques may need to be changed or modified to suit site conditions. This approach is consistent with adaptive management and allows the contractor to develop and build on site knowledge.

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