



Western Sydney Parklands


WESTERN SYDNEY PARKLANDS



BIODIVERSITY STRATEGY

2012 – 2020





The Western Sydney Parklands Biodiversity Strategy 2012 - 2020

Prepared by the Western Sydney Parklands Trust.

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Cover image: Sulphur-crested Cockatoo

This image: School children involved in 500 School Planting Program

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Caring for Country

The Western Sydney Parklands Trust acknowledges the traditional custodians of the land on which the Parklands is situated.

The Trust will work in a respectful manner with the Indigenous Australians in Caring for Country and aim to treat Indigenous people, their cultural heritage, customs and beliefs with respect.



Black Shouldered Kite



In Summary



Moist Shale Woodland, Abbotsbury

The first Western Sydney Parklands Biodiversity Strategy (Strategy) was prepared in 2008 and provided the framework for the Western Sydney Parklands Trust's (Trust) development and management of environmental assets in the Western Sydney Parklands (Parklands).

The Parklands Plan of Management 2020 (Plan) determined the need to review the Strategy in line with this Plan.

In addition, the Strategy needed to be reviewed in light of the outcomes of environmental works carried out as a result of the 2008 Strategy.

A review of the 2008 Strategy concluded that the aims and objectives were still relevant and in keeping with the Plan. The review identified that there is:

- + a good diversity and cover of native grasses across the Parklands. However, there is a need to improve the native herbs, the shrub layer and preserve habitat values such as hollow bearing trees,
- + a need to adapt management techniques as the Trust monitors the response and recovery of the bushland,
- + an interest from the general community to learn about the natural environment as experienced through the participation in the '500 School Planting Program' and the volunteer bush care program in the Parklands,
- + limited data on fauna and water quality to scientifically assess the Parklands.

Key Outcomes

THIS STRATEGY IDENTIFIES 7 OUTCOMES:



Increase the bushland habitat by an average of 33 ha per annum to achieve the longer term goal.



Improve the bushland structure, diversity and habitat values.



Improve understanding of the Trust's actions in managing the environment.



Improve water quality and aquatic diversity in natural water systems.



Share knowledge and learning with others to support the successful management of biodiversity across the Cumberland Plain.



Improve appreciation of natural places and create connectedness.



Create community stewardship of the natural environment.

ACTIONS AND THEMES

To address the outcomes, the Strategy details actions under four important themes:



Biodiversity Corridor



Research and Education




Water Quality



Community Involvement

Each action has been prioritised and KPIs developed to monitor the progress over the life of this Strategy.

The Parklands is over 5,000 hectares of public land managed by the Western Sydney Parklands. It stretches 27 km from Quakers Hill in the north to Leppington in the south. The Parklands is characterised by a diversity of land uses from bushland to world class recreation, entertainment and tourism facilities.



The Plan of Management 2020 identifies that the Parklands now has over 1,056 ha (20% of Parklands) of bushland with the goal to achieve over 2,000 ha (37% of the Parklands) in the longer term.



Introduction

Hand weeding around new plantings, Horsley Park

This Strategy provides the management actions required to achieve the functions and aspirations created by relevant legislation and policies; and the outcomes identified in the Plan.

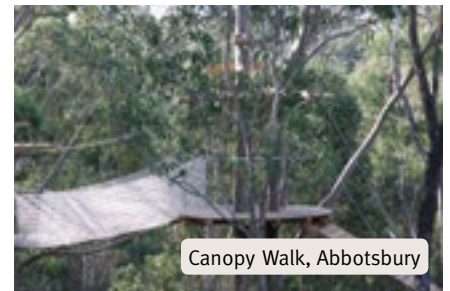
This Strategy addresses the key action in the Plan of Management to: *‘Continue implementing, reviewing and updating the Biodiversity Restoration Strategy’*. After four years of onground work, this Strategy is an update of the 2008 Strategy and provides a clear and practical approach to guide future management to 2020.

While the Strategy is for the management of the Parklands, it has been developed within wider frameworks including neighbouring local government areas of Blacktown, Fairfield and Liverpool, the broader catchment areas of the Hawkesbury Nepean, upper Parramatta, and Georges River, and as an affiliate with the Great Eastern Ranges Linking Landscapes program.

The Strategy will be reviewed concurrently with the review of the Plan.



Eastern Dwarf Tree Frog

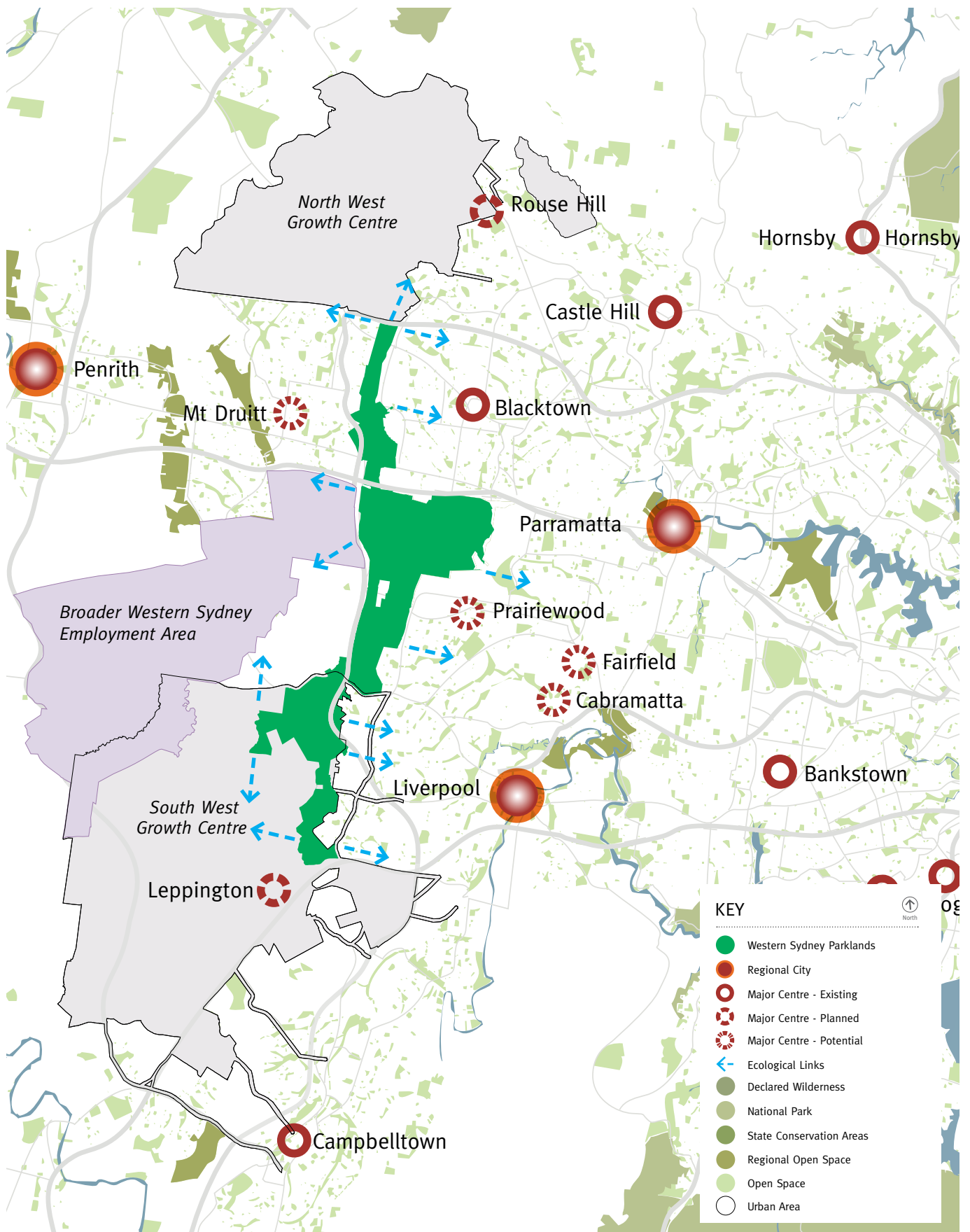


Canopy Walk, Abbotsbury



Yellow dragonfly

Western Sydney Parklands Wider Context





The Strategy Framework

500 Schools Planting Program, West Hoxton

The Biodiversity Strategy Framework

Long into the future, the Parklands will mature into a healthy and diverse bushland home for the native animals of western Sydney. The future Parklands will have:

- + 2000 ha of good condition bushland corridor and fragments of bushland providing links and stepping stone pathways for native animals,
- + healthy waterways supporting a diverse web of life,
- + a landscape scale refuge for native fauna in the centre of the Sydney Basin, and
- + a place for city dwellers to stay connected and appreciate the natural world.

Key Frameworks

- Australian Conservation Strategy*
- Cumberland Plain Recovery Plan*
- Great Eastern Ranges Initiative*
- Metropolitan Strategy for Sydney to 2031*

Plan of Management 2020 Outcomes

- + Expand the bushland corridor by an additional 6 percent of the Parklands (330 ha).
- + Develop a clear description, baseline data and understanding of the state of the Parklands natural assets within the Parklands.

Biodiversity Strategy 2020 Outcomes

1. Increase the bushland habitat by an average of 33 ha per annum to achieve the longer term goal.
2. Improve the bushland structure, diversity and habitat values.
3. Improve understanding of the Trust's actions in managing the environment.
4. Improve water quality and aquatic diversity in natural water systems.
5. Share knowledge and learning with others to support biodiversity across the Cumberland Plain.
6. Improve appreciation of natural places and create connectedness.
7. Create community stewardship of the natural environment.

Strategy Themes



Biodiversity Corridor



Water Quality



Research & Education

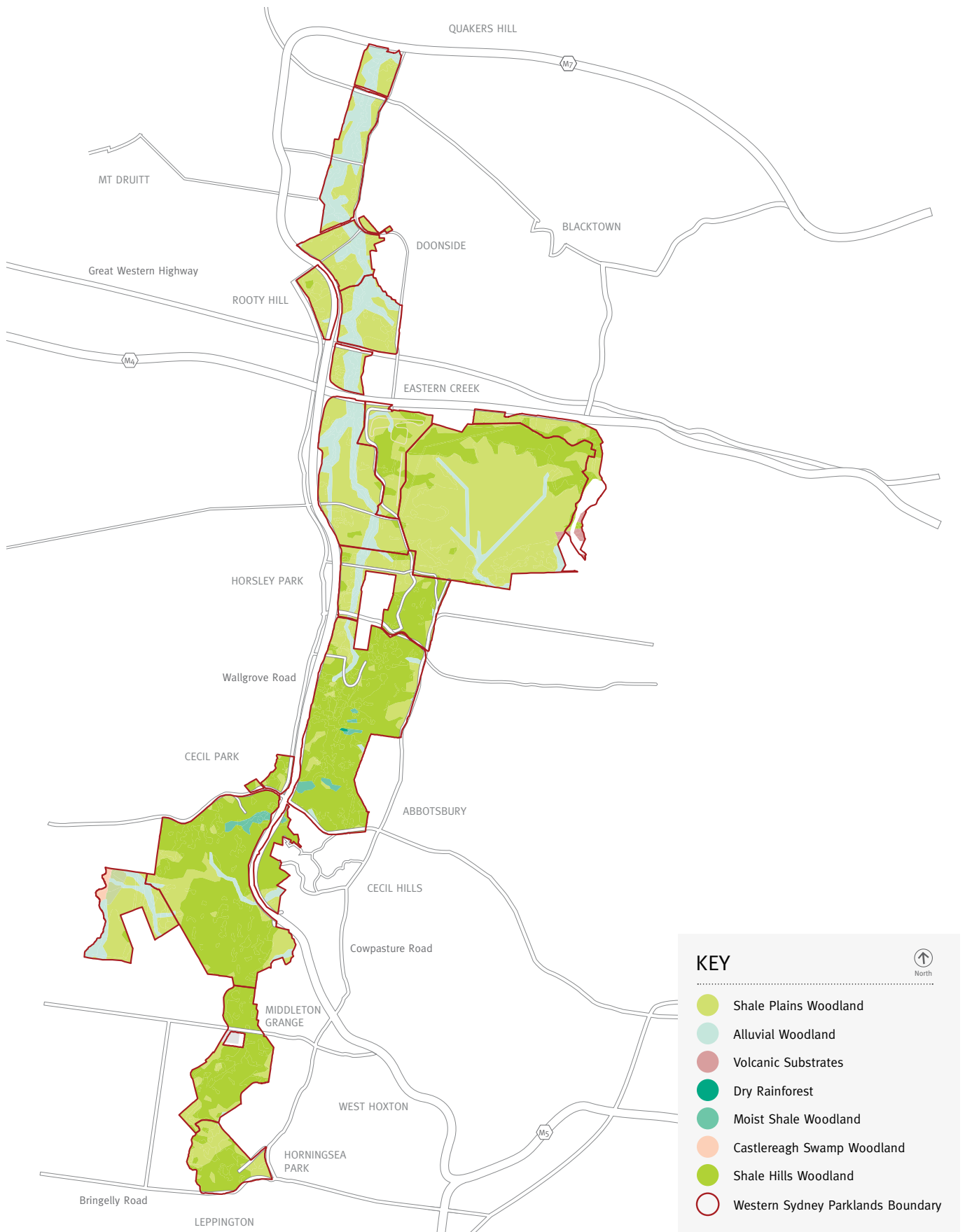


Community Involvement



Biodiversity Timeline

Assumed Vegetation prior to European Settlement



Parklands Biodiversity Timeline

1800s Early settlement

Clearing for agriculture, timber use for various industries, introduction of grasses for grazing, clearing of shrub layer, introduction of ornamental plants such as African Olive. Smaller streams are cleared to the stream bank.

1800s

1900s

Agricultural expansion across Western Sydney including market gardens, orchards, and grazing left small fragments of biodiversity. Urban sprawl post WWII continued to fragment bushland and introduce new weeds and pests from suburban gardens.

1900s

1968

Green corridor identified in Sydney Region Outline Plan.

1968

1970s

Increased public awareness of the importance of the natural environment and a growing environmental movement. Land management allows natural regrowth of vegetation.

1970s

1992

Commencement of the Greening Western Sydney Program. Revegetation of Abbotsbury and Doonside areas.

1992

1998

Greening Western Sydney Program of revegetation at Cecil Hills to Kemps Creek.

1998

2008

First Biodiversity Strategy for the Western Sydney Parklands.

2008

2009

The Trust's bush regeneration program commences to increase and enhance the bushland. Baseline vegetation monitoring undertaken.

2009

Now

Active revegetation and restoration of bushland across the Parklands.

Now

Themeda grassland, Bungarribee



Biodiversity- Here and Now

In 2012 vegetation monitoring was undertaken using the Biometric methodology. This follows the original baseline floristic monitoring in 2009. The BioMetric methodology provides an assessment of the biodiversity of the site set against a vegetation condition benchmark for sites where no impact or disturbance has occurred. The data collected enables bushland managers to set clear management actions to address areas where vegetation or biodiversity is deficient.

Few of the sites surveyed were within the benchmark range for most BioMetric site value variables.

More than 70 percent of the sites had native grass cover within or above maximum benchmark values; however, herbaceous (non-grass) native ground cover was low in over 70 percent of the sites. Native groundcover species, including less common and slower-growing native grasses and herbs, are a strong indicator of resilience. The consistently low scores for native 'other' (herbs) in most sites indicates that future restoration efforts need to focus on improving the condition and abundance of the herbaceous groundcover.

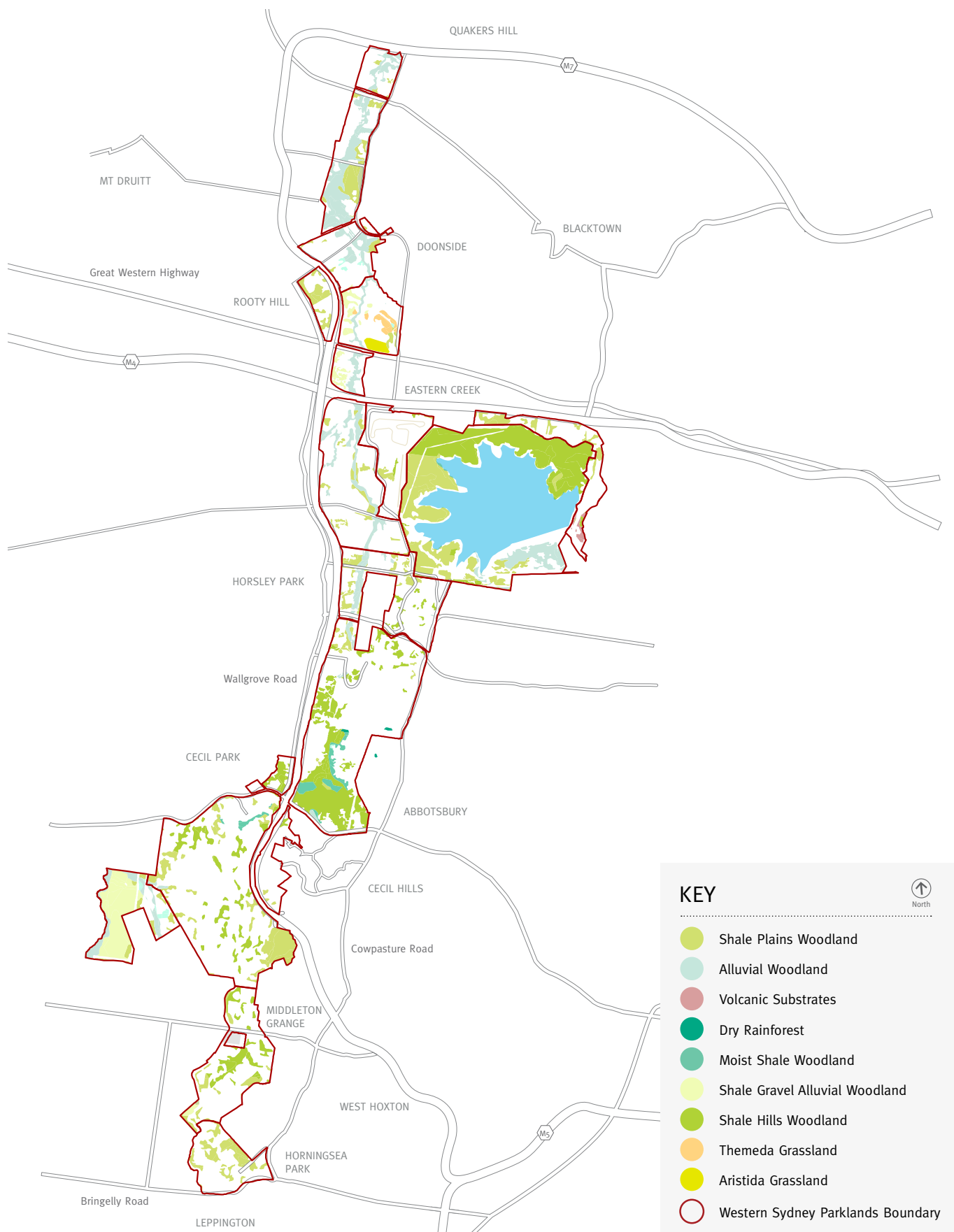
Approximately 40 percent of the sites scored low for mid stratum native cover. This stratum has historically been cleared for grazing. In more recent times the impact of invasive woody weeds, notably African Olive, has excluded this stratum from regeneration. Reducing the impact of weeds in this stratum and including a diversity of shrubs in planting programs will assist future diversity.

Over storey regeneration was low in all vegetation types and approximately 50 percent of the sites scored low for hollow-bearing trees, a critical habitat requirement for fauna in Western Sydney. This highlights the historic clearing of trees that has occurred within the Cumberland Plain and emphasises the long term regeneration program that is required.



Biobank site, Cecil Park

Current Vegetation



The majority of current Parklands overstorey regeneration is still very young and a long term approach that creates a diversity of age structures in tree species will improve this benchmark score. Also clearly evident was the impact on Grey Box trees showing signs of dieback or reduced foliage cover due to the Psyllid infestation. Grey Box is the dominant tree species in Western Sydney and the recent infestation has highlighted that heavily modified bushland systems can be dramatically altered. It has been recommended that the numbers of less dominant endemic species such as Forest Red Gum, Ironbark and Spotted Gum be increased to buffer against future impacts.

Updated mapping was conducted concurrently and identified an increase of bushland vegetation from 1,006 ha identified in the Plan to 1,117 ha. This expansion of 111 ha progresses to the target of 330 ha of new bushland by 2020. There are changes in areas of specific vegetation types in the current mapping, mainly resulting from reassignment of vegetation types rather than a loss or increase in the extent of particular types. Current totals of each vegetation community are shown in **Table 1**.

Until now, there has been no formal fauna monitoring program in the Parklands and records are from observations from bush regeneration teams and volunteer recordings from members of the Cumberland Bird Observers Club. Sightings have included positives and negatives for the Parklands wildlife with the sighting of a breeding mob of swamp wallabies being countered by a high number of foxes sighted in the southern area of the Parklands. Other wildlife includes Echidnas, Eastern Grey Kangaroos, Lace Monitors and a diversity of birdlife. A fauna monitoring program is a management approach in this Strategy.

The Parklands is the headwaters to three major catchment areas with Eastern Creek being the largest tributary. Water quality, freshwater wetland and creek health has not been routinely monitored so there is little data to scientifically assess the quality of the creek system. Mapping and classification of water bodies and creeks, and design and implementation of a formal water quality and riverine health monitoring program is a management approach in this Strategy.

The data and information collected from monitoring programs and on-ground works is stored in the Trust's corporate record system. The GIS Biodiversity Database is continually updated as new data is received. This provides the Trust with a clearer understanding of the biodiversity of the Parklands and success of management strategies. Ongoing data management is a key action in this Strategy.

Reducing the impact of weeds and including a diversity of shrubs in planting programs will assist future diversity.



Sacred Kingfisher

Table 1: Vegetation Communities in Western Sydney Parklands

VEGETATION TYPE	AREA (HA)	TSC ACT	EPBC ACT	DESCRIPTOR
<p>Shale Plains Woodland</p> 	363	Cumberland Plain Woodland (CEEC)*	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CEEC)*	Grey Box and Forest Red Gum, with Narrow-leaved Ironbark, Thin-leaved Stringybark and Spotted Gum occurring less commonly in the tree layer. Mainly occurring on soils derived from Wianamatta Shale.
<p>Shale Hills Woodland</p> 	327	Cumberland Plain Woodland (CEEC)*	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CEEC)*	Grey Box, Forest Red Gum, Narrow-leaved Ironbark Woodland with low densities of Spotted Gum located on the shale hills.
<p>Shale Gravel Transition Forest</p> 	115	Shale Gravel Transition Forest in the Sydney Basin Bioregion (EEC)**	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CEEC)*	On shallow deposits of Tertiary alluvium that overlie shale soils, may also be on localised concentrations of iron-indurated gravel. Broad-leaved Ironbark with Grey Box, Forest Red Gum; less frequently with small tree stratum of White Feather Honey Myrtle.
<p>Alluvial Woodland</p> 	263	River Flat Eucalypt Forest (EEC)**		Cabbage Gum and Forest Red Gum with abundant Swamp Oak associated with minor watercourses and soils with recent alluvial deposition.

VEGETATION TYPE*	AREA (HA)	TSC ACT	EPBC ACT	DESCRIPTOR
<p>Riparian Woodland</p> 	28	River Flat Eucalypt Forest (EEC)**		Highly restricted – creek lines and adjacent swampy areas draining Wianamatta Shale soils. Cabbage Gum and Swamp Oak. Shrubs not usually present, ground stratum may be dense.
<p>Moist Shale Woodland</p> 	20	Moist Shale Woodland (EEC)**		On Wianamatta Shale on the upper portion of very steep sheltered slopes. Grey Box, Forest Red Gum, Narrow-leaved Ironbark Woodland with low densities of Spotted Gum.
<p>Western Sydney Dry Rainforest</p> 	1	Western Sydney Dry Rainforest (EEC)**	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CEEC)*	Highly restricted on soils derived from Wianamatta Shale on sheltered lower slopes and gullies on steeply sloping, rugged topography. Prickly-leaved Paperbark, Hickory Wattle, Native Qunice and less frequently Whalebone Tree.
<p>Freshwater Wetlands</p> 	TBD***	Freshwater wetlands on the coastal floodplains (EEC)**		Variable in floristic composition of wetlands depending on water depth and period of inundation.

* Critically Endangered Ecological Community

** Endangered Ecological Community

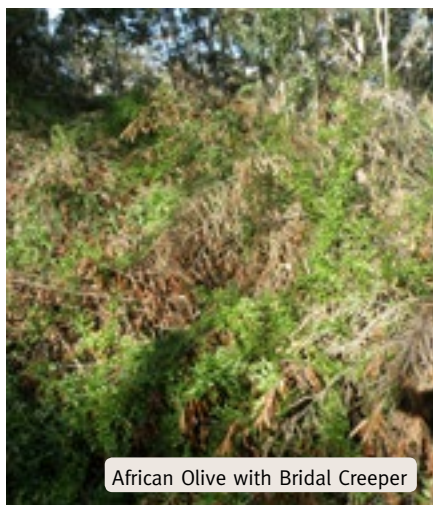
*** To Be Determined as a Management Approach in this Strategy



Biodiversity Challenges

Piled African Olive after cut and paint, Abbotsbury

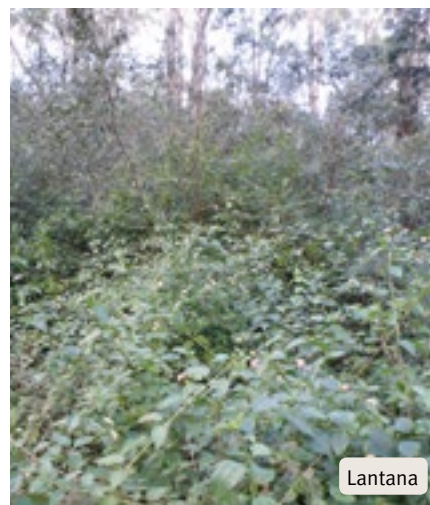
Managing the biodiversity of the Parklands is challenging. Its linear shape, coupled with the surrounding urbanisation and development will continue to isolate and fragment the Parklands from other natural areas. Coupled with climate change, the impacts will become more pronounced in the future.



African Olive with Bridal Creeper



Fox



Lantana

The increase in population in the immediate surrounds will help the Trust connect people with nature, but it will also create a management challenge to balance the permitted uses with ecosystem functions. It will also result in uncontrolled uses that is usually more damaging to natural settings.

Invasive weeds such as African Olive, African Lovegrass and Bridal Creeper are an ongoing management challenge. The immediate priority is to undertake primary work to gain control of heavily infested areas with the knowledge that ongoing maintenance will be required to achieve good quality bushland desired in the future.

Pest fauna provide further threats to vegetation with rabbits feeding on regenerating or revegetated bushland and destroying soil structure with warrens. The current Psyllid outbreak has heavily impacted on Eucalyptus mollucanna of all age structures and could be a precursor to the ongoing

insect outbreaks caused by climate change. Predatory pest fauna such as foxes, cats, and mosquito fish will inhibit efforts to return native fauna diversity.

Phytophthora is currently known to occur in Kemps Creek and Prospect Nature Reserves. As the Parklands develop and engage the community, the challenge will be to contain this disease and prevent the introduction of new diseases.

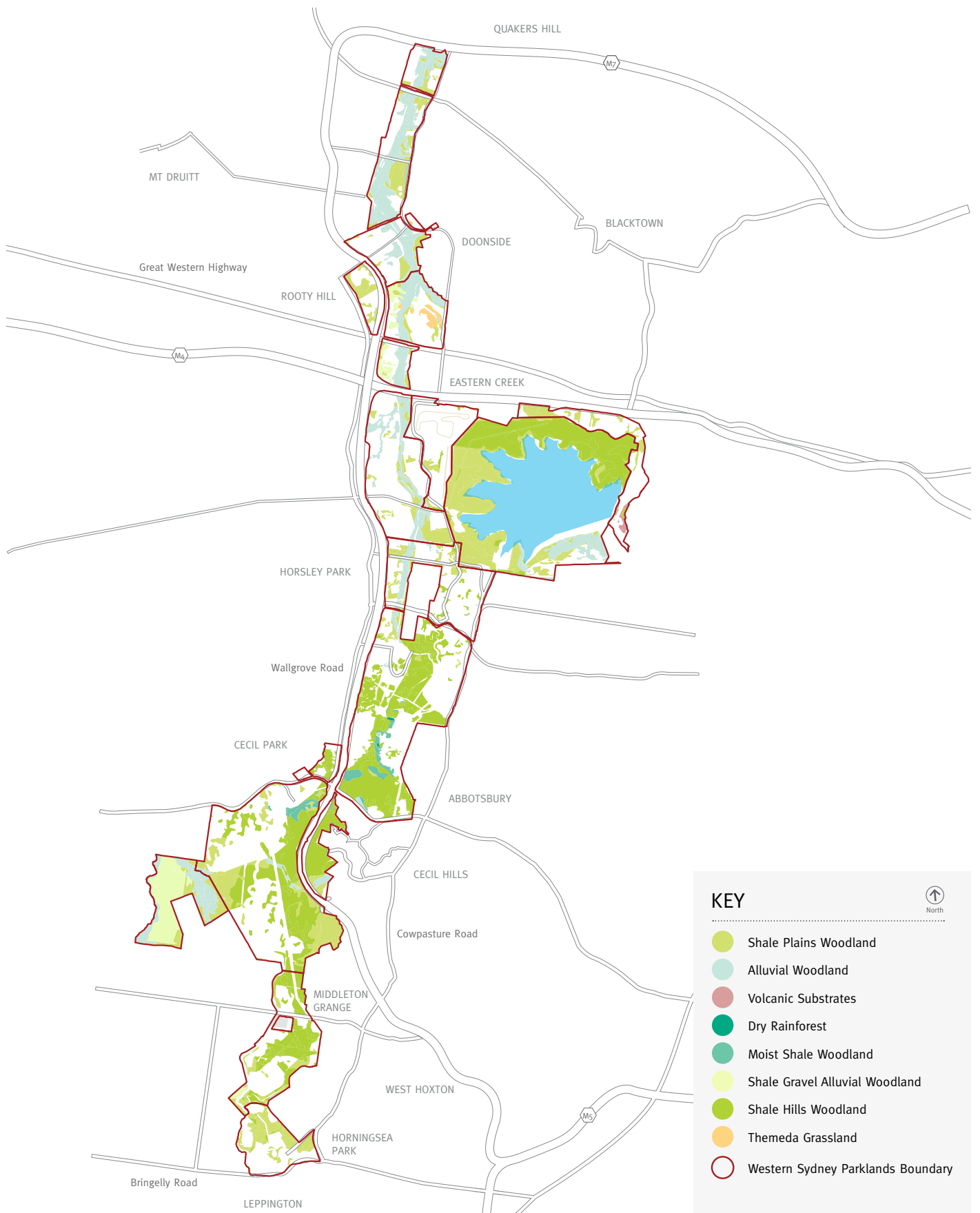
Dryland salinity has already been identified in one location in the Parklands. The revegetation program will help manage this issue but as surrounding areas are developed the challenge will increase.



Delivering the Strategy



Future Vegetation for Biodiversity



Theme 1 - Biodiversity Corridor



Action	Management Approach	Priority	KPI
Expand bushland habitat with high priority to increasing core habitat, linking fragments and sites with threatened species.	Contractors to protect regenerating bushland and undertake revegetation works.	High	Increase bushland at 10 year rolling average of 33 ha per annum.
Improve herbaceous vegetation diversity.	Contractors to include herbaceous species in revegetation.	High	50 percent of monitoring sites with Biometric benchmark 2 by 2020.
Remove threats to mid storey, particularly African Olive and target mid storey revegetation.	Contractors to prioritise African Olive reduction and promote native shrub regeneration or revegetation with native shrubs.	High	75 percent of monitoring sites with Biometric benchmark 2 by 2020.
Create a varied age structure of tree species to ensure future over storey regeneration and development of tree hollows.	Contractors to protect old growth trees and stagger timing of tree species plantings in revegetation programs.	Medium	Long term goal.
Increase the numbers of less dominant endemic tree species such as Forest Red Gum, Ironbark and Spotted Gum to ensure buffering against species specific impacts such as the Grey Box Psyllid infestation.	Contractors to increase the ratio of less dominant tree species in revegetation programs.	Medium	Revegetation tree species lists to have no greater than 35 percent Grey Box.
Utilise fire management to improve species diversity and control weed threats.	Contractors to coordinate with Rural Fire Services to undertake ecological burns or pile burns.	High	Three ecological burns every 5 years at various sites.
	Contractors to respond with appropriate bush regeneration following arson, natural bushfires or hazard reduction burns.	High	As identified.



500 School Planting Program



Bungaribee after fire

Action	Management Approach	Priority	KPI
Ensure programmed hazard reduction burns do not impact on species diversity.	Include guidance regarding the appropriate burn regimes for vegetation communities within the Trust's fire management plan.	High	Fire management plan updated.
	Ensure reference to updated GIS fire history database prior to hazard reduction burns.	High	Ongoing.
Control pest animal species in the Parklands that threaten biodiversity.	Contractors to assess and use rabbit control at revegetation sites.	Medium	Ongoing.
	Contractors to report locations of warrens and dens and prioritise destruction.	Medium	Ongoing.
Secure physical location and management funding for important bushland.	Assess and create BioBanking sites and sell the credits generated.	High	Five Biobanking sites approved by OEH by 2014.
	Investigate Carbon Farming Initiative for generating revenue through carbon offsets.	Medium	Undertake by end of 2013.
	Assess grant funding opportunities and apply where substantial benefit can be obtained.	Low	Ongoing.
	Assign bushland to the asset register to provide a financial value and accounting process to the natural assets.	High	Undertake within 5 years.

Plan of Management 2020 Key Actions

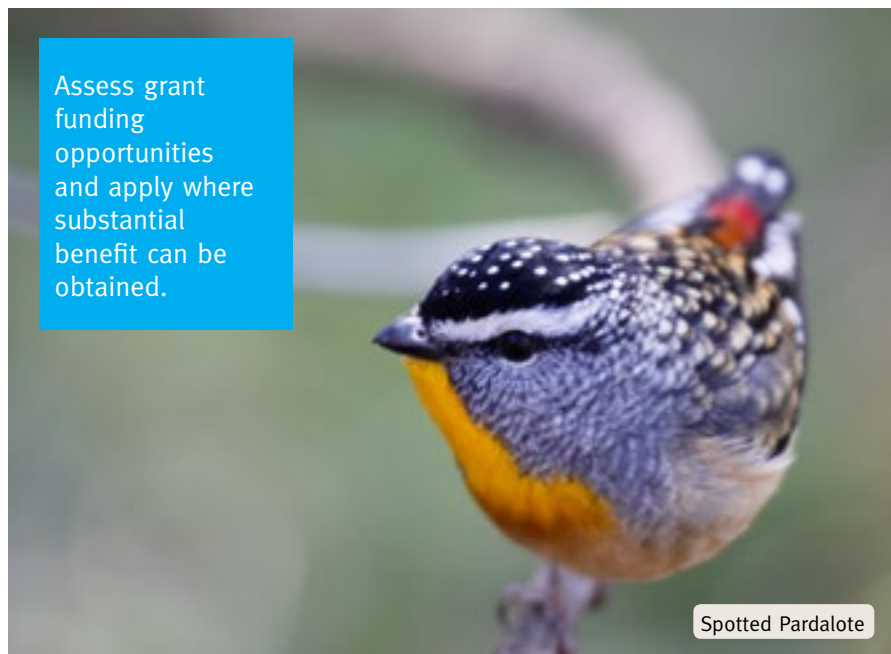
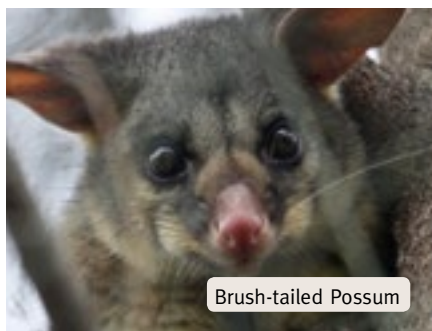
Work with external groups on restoration and recovery initiatives such as bio-banking.

Implement the Bush Fire Management Strategy for the Parklands for safety and biodiversity outcomes.

Maintain ongoing protection and enhancement of core habitats, including weed, feral animal control and fire management.

Deliver key projects, including the restoration of the Cumberland Plain Woodland and linking areas of existing core habitats.

Create a register of the Parklands' natural assets to be incorporated into the asset management strategy.



Theme 2 - Water Quality

Action	Management Approach	Priority	KPI
Reduce point sources of water pollution.	Map EPA licensed sources of pollution.	Medium	GIS database of point sources of pollution.
	Map other point sources of pollution when identified.	Medium	GIS database of point sources of pollution.
	Engage with neighbour Councils and OEHL to prioritise and action appropriate measures for controlling pollution.	Medium	High priority point sources actioned for reduction by 2020.
Reduce soil erosion.	Map areas of significant erosion.	Medium	GIS database of erosion.
	Engage with neighbour Councils and OEHL to prioritise and action appropriate measures for controlling erosion.	Medium	Erosion control measures implemented.

Plan of Management 2020 Key Actions

Work with a range of partners to improve water quality in Eastern Creek and other water bodies.



Theme 3 - Research and Education



Action	Management Approach	Priority	KPI
Understand the quality of the Parklands' natural systems and assets.	Continue Biometric vegetation survey every 3 years.	Medium	Monitoring and report completed every 3 years.
	Undertake mapping and assessment of freshwater wetlands and open water bodies.	High	Mapping completed by 2013.
	Design and commence long term fauna and water body monitoring program.	High	Monitoring completed by 2013 and ongoing as per design.
	Continue to update Biodiversity GIS database.	High	GIS database.
Exchange knowledge of bushland management experiences with other Western Sydney land managers.	Annually present outcomes of Parklands management from regeneration and revegetation programs to neighbouring Councils, OEH and key stakeholder groups.	High	Presentations by the Trust per annum.
Provide exchange of information and ideas on biodiversity management in Western Sydney.	Select key biodiversity stakeholder groups to regularly participate and contribute.	Medium	Key stakeholder groups selected and attendance per annum. Attendance at meetings, workshops, seminars per annum.
Increase the quantity of skilled workers in bushland management in Western Sydney.	Utilise Department of Education, Employment and Workplace Relations' Guide to contract bush regeneration work within an Employment Partnerships Program.	High	One program operating per annum as a minimum.

Plan of Management 2020 Key Actions

Research, map and understand the quality of the Parklands natural systems and assets.

Further develop an ongoing monitoring program.

Work with research agencies and educational organisations to promote the exchange of information across the Western Sydney community.

Work with partners on case study research projects.



Assessment of freshwater wetlands and open water bodies

Theme 4 - Community Involvement



Action	Management Approach	Priority	KPI
Involve the local and broader community in the bushland restoration program.	Continue a bushland volunteer program at Abbotsbury and expand to other Parklands locations.	High	New volunteer locations and activities.
	Align existing programs to promote special events such as Clean Up Australia Day, and National Tree Day.	High	Ongoing.
Involve local community organisations in understanding the quality of the Parklands natural systems and assets.	Incorporate community organisations (eg Cumberland Bird Observers Club) in data collection for long term monitoring programs and other activities.	Medium	Community organisations undertaking regular field surveys and other activities.
Increase the variety of activities that bring the community into the bushland to broaden their appreciation and experience.	Advocate and support the creation of recreational locations, businesses and activities that familiarise people with nature such as the adventure ropes courses, guided walking tours and mountain bike trails.	High	New bushland based operations.
Improve young people's understanding and appreciation of the Parklands' bushland and biodiversity.	Continue the school planting program.	High	500 school visits by 2016.
	Assess the feasibility of expanding trial school excursion programs to broader curriculum based excursions similar to the Environmental Education Centre offerings.	Low	Cost-Benefit analysis completed.

Plan of Management 2020 Key Actions

Establish a volunteer program to involve the local and broader community in the restoration process.

Work with partners to develop and implement an environmental education and training program.

Promote opportunities for children and young people to interact with nature.



Local community involvement in volunteer program, Abbotsbury



Funding the Actions



New plantings, Quakers Hill

The Trust is a self-funded NSW government agency. To continue to manage and improve the biodiversity of the Parklands, the Trust needs to secure and commit funding streams over the long term to enable strategic management across large areas.

The cost to manage bushland in urban areas is expensive. Primary weed control for dense infestations of African Olive can exceed \$40,000 per hectare per annum. The fragmented nature of the Parklands bushland and its linear shape creates a fragility that results in an ongoing funding challenge. The funding sources to implement this Strategy are discussed to the right.

Commercial Revenue Sources

Revenue from the Trust's commercial activities through leases and licenses provides the base funding for biodiversity actions across the Parklands. The Trust has committed over \$500,000 per annum from its current revenue to 2018 to biodiversity projects. The Trust will also explore partnerships and sponsorships to assist in funding these projects.

Biobanking and Biodiversity Offsets

Biobanking and other offsets place a protective covenant on bushland within the Parklands and are an important source of funds for management. The Trust has secured Biobanking sites under Biobanking Agreement ID70 and continues to seek opportunities to sell credits and generate new credits.

Government Grants

Grants from various government and non-government sources provide opportunistic additional funds to allow the Trust to accelerate its program of works or address issues that are outside of the ability of the base revenue funding to cover. The Trust has secured funding from the Commonwealth Biodiversity Fund to 2018 for major bush regeneration and revegetation works. It has also secured short term funding from the Catchment Management Authority to manage the bushland volunteer program. The Trust will continue to seek grants in order to achieve the outcomes indicated in this Strategy.

Reading Material

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Image Credits

Fauna

Mark Fuller, Avianation – Cover and pages 2, 3, 8, 18 & 26
WSPT – Page 22

Plantings

Simon Wood, Simon Wood Photography
– Pages 10, 23, 30

School Children and Volunteers

Josephine Ki, Josephine Ki Photography – Inside cover and pages 1 & 25
Conservation Volunteers Australia – Page 29

Oblique aeriels

Roger Sherack, Skycam Australia – Pages 25 & 32

Vegetation and Landscapes

WSPT – Pages 4, 6, 7, 8, 12, 14, 15, 16, 19, 20, 21, 22, 27, 28, 31

Map Data

Parklands Boundary – WSPT

Assumed Vegetation – Office of Environment and Heritage

Current and Future Vegetation – WSPT modified from NPWS 2002 and Assumed Vegetation





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