



ACT
Government

Environment and Planning

Offset Management Plan for the extension of the Pinnacle Nature Reserve

Final

October 2016

**Prepared by the Parks and Conservation Service on behalf of the
ACT Health Directorate**

Project Name

University of Canberra Public Hospital - Offset Management Plan for the extension of the Pinnacle Nature Reserve

EPBC Referral Number

EPBC Ref. 2013/6987

Location of the Action

Belconnen Rural Blocks 1616 and 1370, Canberra, Australian Capital Territory

Declaration of accuracy

While reasonable efforts have been made to ensure that the contents of this plan are factually correct, the ACT Government does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this plan.

Date of preparation

This version last edited on 20 October 2016

Report Preparation

Report prepared by the Parks and Conservation Service on behalf of the ACT Government

Report accepted by D. Iglesias, Director, ACT Parks and Conservation Service

Acknowledgments

The Parks and Conservation Service would like to acknowledge the contribution of all stakeholders who have commented on aspects of this plan, including the Friends of the Pinnacle ParkCare Group. We would also like to acknowledge the contribution of Grass Roots Environmental consulting, which assisted in developing the final stages of the plan.

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List of Abbreviations

ACT	Australian Capital Territory
COG	Canberra Ornithologist Group
CR	Conservation and Research unit - within the Environment and Planning Directorate
DA	Development Application
DoE	Department of the Environment (Commonwealth)
EIS	Environmental Impact Statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwth)
EPD	Environment and Planning Directorate
FMU	Fire Management Unit (part of PCS)
FVS	Floristic Vegetation Score
MNES	Matters of National Environmental Significance
NC Act	<i>Nature Conservation Act 1980</i> (ACT)
NSW	New South Wales
OMP	Offset Management Plan
PCS	ACT Parks and Conservation Service - within the Environment and Planning Directorate
UCPH	University of Canberra Public Hospital

1. Introduction

1.1 Background

An ecological assessment of the University of Canberra Public Hospital (UCPH) development concluded that the development would directly impact up to 7.6 hectares of low quality White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland (Box Gum Woodland) community (Umwelt 2014). This community is listed as a critically endangered ecological community under the Commonwealth’s *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

To offset the impact on the Box Gum Woodland, a 19.5 hectare Offset Area has been established, which extends on the Pinnacle Nature Reserve. This Offset Area includes 15.5 hectares of moderate quality Box Gum Woodland (Umwelt 2014).

The establishment of the Offset Area was approved by the Commonwealth Department of the Environment (DoE) on 17th October 2014 and forms part of the approval decision (EPBC 2013/6987) for the UCPH development under the EPBC Act.

1.2 Purpose and Scope

This Offset Management Plan (OMP) has been prepared to fulfil condition 4 in the approval decision (Table 2).

As part of the preliminary documentation and prior to the release of the approval decision for the development, an interim Offset Management Plan was prepared for the Offset Area. Once approved by the DoE, this OMP will supersede the interim Offset Management Plan.

This OMP will:

- guide the implementation of ecological management activities within the Offset Area to protect and enhance the quality of the Box Gum Woodland.
- contribute towards the planning associated with delivering other conditions in the approval decision. This includes conditions 3, 6, 7 and 9.
- guide the management of conservation values present in the Offset Area that are not part of the approval decision, but which are listed under the EPBC Act. This includes the Superb Parrot (*Polytelis swainsonii*) and Pink-tailed Worm-lizard (*Aprasia parapulchella*).
- guide the management of conservation values present in the Offset Area that are not listed under the EPBC Act. This includes species listed under the ACT Government *Nature Conservation Act 2014* and heritage values protected under the ACT Government *Heritage Act 2004*.

Importantly, this OMP also guides how the management of the conservation values within the Offset Area will complement or enhance other conservation programs within Canberra Nature Park.

Furthermore, section 1.3 outlines how this OMP will contribute towards delivering commitments within other plans and strategies that relate to managing threatened ecological communities and species and other reserves within Canberra Nature Park.



Figure 1. Location and Boundary of the Pinnacle Offset Area

1.3 Strategic Context

The primary objectives for establishing and managing the Offset Area are to:

- permanently protect the critically endangered White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland ecological community (Box Gum Woodland) within the Offset Area
- enhance the quality of Box Gum Woodland within the Offset Area
- improve connectivity between patches of Box Gum Woodland by providing a link between the Pinnacle and Kama Nature Reserves (Umwelt 2014).

The first of these objectives will be met upon gazettal of the area as part of the Pinnacle Nature Reserve (Umwelt 2014) (section 1.7). The remaining objectives will be achieved by implementing this OMP.

This OMP provides a framework for achieving these objectives in a measureable and assessable manner.

Implementing this OMP will also contribute to implementing the ACT Government’s commitments within other regional and national plans, strategies and policies relating to:

- the management and recovery of threatened species and ecological communities (including the ACT Government’s Action Plans for threatened species and communities, and the delivery of established long-term research and monitoring programs)
- the management of places or objects with cultural heritage value
- addressing priority land management issues (e.g. reducing the impact from invasive plants and animals and mitigating the impact from bushfire on the adjacent urban areas) and
- the management of Canberra Nature Park more broadly.

Table 1 provides examples of these plans and strategies.

Table 1. Links with Regional and National Strategies and Recovery Plans

Strategic Objective	Title
<p>The management and recovery of threatened species and ecological communities</p>	<p><u>ACT Nature Conservation Strategy 2013 – 2023</u> (ACT Government 2013a) Box Gum Woodland <u>The National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland</u> (Department of Environment, Climate Change and Water NSW 2010) <u>Action Plan No. 27 - ACT Lowland Woodland Conservation Strategy</u> (ACT Government 2004) Superb Parrot <u>National Recovery Plan for the Superb Parrot <i>Polytelis swainsonii</i></u> (Baker Gabb 2011) <u>Action Plan No. 27 -ACT Lowland Woodland Conservation Strategy</u> (ACT Government 2004) Pink-tailed Worm-lizard <u>Action Plan No. 29 - ACT Aquatic Species and Riparian Zone Conservation Strategy</u> (ACT Government 2007) <i>Recovery plan for the Pink-tailed Worm-lizard (<i>Aprasia parapulchella</i>)</i> (Osborne and Jones 1995) Woodland Birds <u>Action Plan No. 27 -ACT Lowland Woodland Conservation Strategy</u> (ACT Government 2004)</p>
<p>The assessment and management of places or objects with heritage value</p>	<p>ACT Heritage Council <u>Cultural Heritage Reporting Policy</u> (ACT Government 2015a)</p>
<p>Addressing land management issues</p>	<p>Invasive Plants <u>ACT Weeds Strategy 2009 – 2019</u> (ACT Government 2009a). <i>Noxious and Environment Weeds Operations Plan (eWOP) – ACT Parks and Conservation Service</i> (updated annually) <u>Draft Community Weed Management Plan for the Pinnacle Nature Reserve (2010-2020)</u> (Friends of the Pinnacle 2010) Invasive Animals <u>Canberra Indian Myna Action Group Strategy</u> (Canberra Indian Myna Action Group 2006) <u>ACT Pest Animal Management Strategy 2012-2022</u> (ACT Government 2012) <i>Vertebrate Pest Management Operations Plan – ACT Parks and Conservation Service</i> (updated annually) Over-abundant Animals <u>ACT Kangaroo Management Plan</u> (ACT Government 2010) Bushfire Management <u>The ACT Strategic Bushfire Management Plan 2014-2019</u> (ACT Government 2014a)</p>
<p>Management of adjoining reserves and Canberra Nature Park</p>	<p><i>Draft Canberra Nature Park Plan of Management 2015-2025.</i> ACT Government (2015b)</p>
<p>Regional management plans or strategies</p>	<p><i>Molonglo Catchment Strategy 2004-2024</i> (Molonglo Catchment Group 2005)</p>

1.4 Specific Commitments

Umwelt (2014) describes specific actions required to achieve management objectives. These actions include (but are not limited to):

- fencing of the Offset Area
- prevention of stock access (with the exception of grazing for bushfire fuel management)
- feral animal and noxious weed control
- management of erosion and sedimentation
- fire management
- relocation of woody debris
- encouragement of natural regeneration
- assisted rehabilitation with locally occurring indigenous species (if required) (Umwelt 2014).

Some of these also form part of the conditions in the approval decision for the University of Canberra Public Hospital development. Table 2 highlights the conditions in the approval decision that are addressed in this OMP.

Table 2. Reference to Conditions of Approval

Condition No.	Condition Requirement	Section No.
3	To compensate for residual impacts to Box Gum Woodland, the approval holder must formally incorporate the Offset Area into the Pinnacle Nature Reserve for conservation purposes (as further described at condition four (4)). Evidence of the formal transition must be provided to the Department within two (2) years of the date of this approval.	Section 1.7
4	For the enduring conservation, management and monitoring of the Offset Area, the approval holder must engage a suitably qualified person to develop an Offset Management Plan (OMP). The OMP must be submitted to the Minister for approval within twelve (12) months of the date of this approval. The OMP must include details on:	This OMP
4a	Location of the Offset Area including clear maps and accompanying shapefiles.	Figure 1
4b	Baseline surveys to confirm the extent and quality of Box Gum Woodland onsite.	Section 6
4c	Management of: <ul style="list-style-type: none"> i. soil erosion ii. pests, feral animals and grazing stock iii. weeds and pathogens (in particular, measures to avoid the seed setting and dispersal of key weed species) iv. fire (to maintain the ecological integrity of ecosystems) 	Section 4.1.4 Section 4.3.2, 4.1.1 and 4.2.1 Section 4.3.1 and 4.3.4 Section 4.1.1 and 5

Condition No.	Condition Requirement	Section No.
4c (cont'd)	<p>v. unwanted access (including the use of fencing and signage)</p> <p>vi. assisted regeneration and revegetation</p> <p>This must include details on timing and duration.</p> <p>Priority areas for rehabilitation (both short and long term) must also be clearly illustrated using maps.</p>	<p>Section 4.2.1 and 4.4.1</p> <p>Section 4.1.2 and 4.1.3</p> <p>Section 7 and in other sections relating to specific actions.</p> <p>Section 7 provides information on the rehabilitation of the eroded gully. This is a specific site illustrated in Figure 8 which will be rehabilitated in the short term.</p>
4d	<p>Objectives and performance indicators associated with all items listed at (c) making reference to claimed offset scores and corresponding contingency or remedial measures. These must be framed in the context of restoring structure and ecological function to Box Gum Woodland consistent with Departmental policy statements.</p>	<p>Section 6 and Appendix C</p>
4e	<p>Monitoring and reporting measures associated with all items listed at (c). Monitoring must be able to quantify a change in the quality of Box Gum Woodland onsite, in response to management actions.</p>	<p>Section 6</p>
4f	<p>Scheduling and costing estimates associated with all management actions.</p>	<p>Section 7</p>
4g	<p>Provisions for the transition of the Offset Area to the Pinnacle Nature Reserve, including a statement of commitment by the relevant Government agency to ongoing maintenance, enduring management, and associated annual resourcing.</p>	<p>Section 1.7</p>
	<p>The OMP must demonstrate how management of the Offset Area is complimentary (and additional) to restoration activities previously carried out on site.</p>	<p>Section 2.8</p>
6	<p>Maintenance of accurate records substantiating all activities associated with the implementation of the OMP.</p>	<p>Section 10</p>

Condition No.	Condition Requirement	Section No.
7	<p>A report addressing compliance with each of the conditions of this approval and the implementation of the OMP must be published on the ACT Government website within three months of every 12 month anniversary of the commencement of the action.</p> <p>Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published.</p>	Section 11
9	<p>If the approval holder wishes to carry out any activity otherwise than in accordance with OMP as specified in the condition four (4), the approval holder must submit to the Department for the Minister's written approval a revised version of that strategy. The varied activity shall not commence until the Minister has approved the varied OMP in writing. The Minister will not approve a varied OMP unless the revised OMP would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised OMP, that OMP must be implemented in place of the OMP, originally approved.</p>	Section 12

1.5 Roles and Responsibilities

Implementation of the OMP will be primarily the responsibility of the ACT Government's Parks and Conservation Service (PCS), who are responsible for managing public land in the ACT.

Roles and responsibilities associated with implementing this OMP are presented in Table 3 below.

Table 3. Roles and Responsibilities

Agency	Role within Government	Responsibilities
EPD - Parks and Conservation Service	<p>Custodian and manager of Offset Area and adjoining Pinnacle Nature Reserve and the adjacent unleased territory land.</p> <p>Develop and implement fire management plans to manage bushfire fuels and limit the spread of fire on and from land managed by the Parks and Conservation Service.</p>	<ul style="list-style-type: none"> • implement this OMP • use the results of the monitoring program to evaluate and refine management actions within this OMP • periodically review progress against performance measures • ensure all internal and external reporting requirements are met • ensure that all relevant records are effectively maintained • ensure that staff and contractors are appropriately qualified, licensed and experienced to undertake the tasks described in this OMP • provide support, guidance and manage volunteer Park Care (Friends of the Pinnacle) activities • advise and assist management of bushfire fuel in accordance with the Strategic Bushfire Management Plan (ACT Government 2014)
EPD - Conservation and Research	<p>Prepare scientific advice on ecological and natural resource management, conduct ecological surveys, biodiversity monitoring, and prepare and guide the implementation of threatened species recovery plans and the reintroduction of rare species into the ACT.</p>	<ul style="list-style-type: none"> • assist PCS staff to interpret results from MNES monitoring programs and provide recommendations on how to adjust land management strategies to deliver the objectives outlined in Umwelt (2014) and in this OMP, and in line with the adaptive management strategy (section 8) • provide advice, as required by PCS staff, on managing the conservation values within the Offset Area
Friends of the Pinnacle ParkCare Group	<p>Friends of the Pinnacle are a group of ParkCare volunteers with a common interest in protecting, enhancing and promoting the ecological values of the Pinnacle Reserve.</p>	<ul style="list-style-type: none"> • The Friends of the Pinnacle will continue to undertake activities within the Offset Area in line with the PCS Volunteer Policy (ACT Government 2009b) and this OMP.
ACT Health	<p>Agency responsible for the University of Canberra Public Hospital development.</p>	<ul style="list-style-type: none"> • Assist PCS to re-locate woody debris from development areas into the Offset Area, with advice from PCS and CR

1.6 Statutory bodies and Community Consultation

This OMP has been prepared in consultation with ACT Government representatives from the PCS (including region staff and the Fire Management Unit) and the Conservation and Research unit, as well as members of the Friends of the Pinnacle ParkCare group.

1.7 Process for Incorporating the Offset Area into Canberra Nature Park

The Offset Area is located within Belconnen Rural Blocks 1616 and 1370 (Figure 1). The process of applying a Pc- nature reserve overlay variation to the Territory Plan was completed on 19th August 2016. The Offset Area now extends the Pinnacle Nature Reserve and will be managed specifically for the conservation of the natural environment and to provide public use of the area for recreation, the education and research opportunities.

Block 1370 also contains an easement which enables access to the water reservoirs within the Pinnacle Nature Reserve. While the easement is the responsibility of the landholder (in this case PCS), the *Utilities Protection Act 2000* means that activities undertaken on that land are restricted to ensure the easement remains clear and accessible. For example, structures cannot be built on easement areas, and they must not be modified without permission.

2. Offset Site Description

The Offset Area (19.5 hectares) is located on part of Block 1616 and part of Block 1370, Belconnen, between the Pinnacle Nature Reserve and William Hovell Drive. Kama Nature Reserve is located directly to the south of William Hovell Drive. The Offset Area provides a link between the two (Figure 1).

2.1 Connectivity

The Offset Area extends the Pinnacle Nature Reserve, which is part of a group of nature reserves that form a connected network of remnant woodland vegetation, extending from Black Mountain and Bruce Ridge in the east, to the Kama Nature Reserve, Molonglo River and Murrumbidgee River in the west (Figure 2). This woodland has been shown to provide valuable habitat for wildlife, as it facilitates movement across the landscape for a variety of species (Barrett and Love 2012).

Minor drainage lines within the Offset Area eventually feed into the Molonglo River and the Murrumbidgee River approximately 9 kilometres downstream. This contributes towards increasing habitat connectivity for species, such as the Superb Parrot (*Polytelis swainsonii*) and other woodland birds.

2.2 Conservation Significance

The Offset Area is considered to be of high conservation value, supporting 15.5 hectares of a well-connected and vegetatively diverse remnant of the critically endangered White Box – Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland). This community is listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Box Gum Woodland community within the Offset Area supports three plant species considered rare in the ACT. These species are Pale Flax Lily (*Dianella Longifolia*), Narrow Plantain (*Plantago gaudichaudii*) and Bristle Rock Fern (*Cheilanthes distans*) (Table 6; Appendix A).

Rocky outcrops and the surrounding native grass understorey provide habitat for the Pink-tailed Worm-lizard (*Aprasia parapulchella*). This habitat extends into adjacent unleased territory land. One adult lizard and three skins were located as part of opportunistic sightings in March 2015 (R. Milner, 2015 pers. comm.).

In addition, one of only two breeding areas within the ACT for the Superb Parrot (*Polytelis swainsonii*) occurs in nearby woodland. The Offset Area provides important foraging habitat and contains potential future breeding trees.

Both the Pink-tailed Worm-lizard and Superb Parrot are listed as vulnerable under the EPBC Act.

A further 14 species of fauna listed as vulnerable, or considered rare in the ACT, have been recorded within the Offset Area or adjoining areas in the Pinnacle Nature Reserve and adjacent Kama Nature Reserve (Table 5; Appendix B).

In addition, a four hectare patch of *Eucalyptus macrorhyncha* Tableland Grass-Shrub Forest (ACT Vegetation Community 25) (Sharp *et al.* 2007) is located within the south-eastern corner of the Offset Area. The ground layer within this community has a higher complement of heaths and shrubby understorey than the grassy understorey within the rest of the Offset Area.

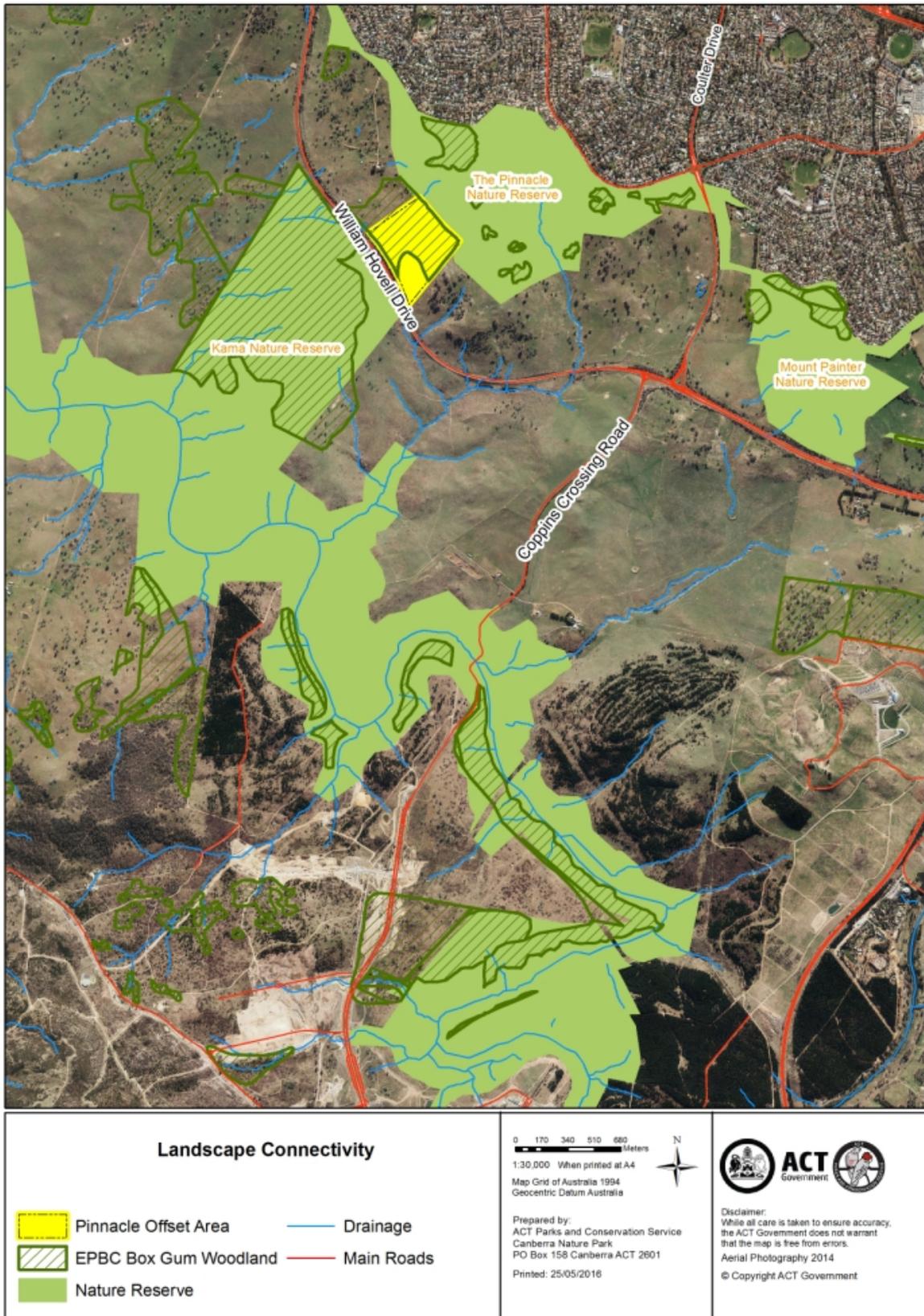


Figure 2. Landscape Connectivity

2.3 Land-use History

The Ngunnawal people are the original custodians of the land that is now the Pinnacle Nature Reserve and Offset Area. It was the land management practices of the indigenous people that created the open “parkland” environment that was attractive to European settlers.

A squatter map by Robert Dixon indicates that by 1837 the Offset Area was part of grazing land owned by a Mr Palmer. It has a long history of sheep and cattle grazing (M. Mulvaney, 2015. pers. comm.).

It is also considered unlikely that the Offset Area was ever subject to pasture improvement or mechanical clearing, with no or only low levels of chemical fertiliser application (M. Mulvaney, 2015. pers. comm.).

The Offset Area, the adjacent unleased territory land and the Pinnacle Nature Reserve were leased until the 1980’s, when the ACT Government withdrew the lease and took over land management responsibilities. The Pinnacle Nature Reserve was formally gazetted in 1993.

The unleased territory land either side of the Offset Area is periodically grazed with cattle for bushfire fuel management purposes.

2.4 Significant Communities

The dominant vegetation type in the Offset Area is the critically endangered White Box – Yellow Box - Blakely’s Red Gum Grassy Woodland and Derived Native Grassland (Table 4). This community is habitat critical for woodland fauna, including woodland birds.

Table 4. Significant Communities in the Offset Area

Community	Common-wealth*	ACT**	NSW***
White Box – Yellow Box - Blakely’s Red Gum Grassy Woodland and Derived Native Grassland	critically endangered	endangered	endangered

2.5 Significant Species

2.5.1 Fauna

Table 5. Significant Fauna Recorded in or adjacent to the Offset Area

Scientific Name	Common Name	Common-wealth*	ACT**	NSW***	Notes
<i>Aprasia parapulchella</i>	Pink-tailed worm-lizard	vulnerable	Vulnerable	vulnerable	Observed in March 2015
<i>Polytelis swainsonii</i>	Superb parrot	vulnerable	Vulnerable	vulnerable	
<i>Daphoenositta chrysoptera</i>	Varied Sittella	-	Vulnerable	vulnerable	
<i>Hieraaetus morphnoides</i>	Little Eagle	-	Vulnerable	vulnerable	
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	-	-	vulnerable	

* Australian Government Environment Protection and Biodiversity Conservation Act 1999

** Nature Conservation Act 2014 (ACT)

*** Threatened Species Conservation Act 1995 (NSW)

Scientific Name	Common Name	Common-wealth*	ACT**	NSW***	Notes
<i>Circus assimilis</i>	Spotted Harrier	-	-	vulnerable	Considered to be rare in the ACT
<i>Petroica boodang</i>	Scarlet Robin	-	Vulnerable	vulnerable	
<i>Pyrrholaemus sagittatus</i>	Speckled Warbler	-	-	vulnerable	
<i>Petroica phoenicea</i>	Flame Robin	-	-	vulnerable	
<i>Stagonopleura guttata</i>	Diamond Firetail	-	-	vulnerable	
<i>Lalage tricolor</i>	White-winged Triller	-	Vulnerable	-	
<i>Artamus personatus</i>	Masked Woodswallow	-	-	-	Considered to be rare in the ACT
<i>Cincloramphus cruralis</i>	Brown Songlark	-	-	-	Considered to be rare in the ACT
<i>Circus approximans</i>	Swamp Harrier	-	-	-	Considered to be rare in the ACT
<i>Climacteris picumnus</i>	Brown Treecreeper	-	Vulnerable	vulnerable	
<i>Myiagra inquieta</i>	Restless Flycatcher	-	-	-	Considered to be rare in the ACT

2.5.2 Flora

Table 6. Significant Flora recorded in the Offset Area

Scientific Name	Common Name	Common-wealth*	ACT**	NSW***	Notes
<i>Cheilanthes distans</i>	Shaggy Rock Fern	-	-	-	Recorded In the Offset Area. Considered to be rare in the ACT
<i>Dianella longifolia</i> var. <i>longifolia</i>	Pale flax lily	-	-	-	Recorded In the Offset Area. Considered to be rare in the ACT
<i>Plantago gaudichaudii</i>	Narrow plantain	-	-	-	Recorded In the Offset Area. Considered to be rare in the ACT

2.6 Heritage Values

There are currently no registered cultural heritage values identified within the Offset Area, however indigenous heritage artefacts that have not been identified, may be present on site.

2.7 Recreational Values

The Pinnacle Nature Reserve is used for walking, running and cycling. Bird watching is also very popular. Horse riding is permitted along designated trails. Dogs are only permitted on a leash.

Section 4.4.1 provides further information on the proposed recreation opportunities within the Offset Area.

* Australian Government Environment Protection and Biodiversity Conservation Act 1999

** Nature Conservation Act 2014 (ACT)

*** Threatened Species Conservation Act 1995 (NSW)

2.8 Environmental Management History within the Offset Area

This section outlines the pre-offset land management actions that were undertaken within the Offset Area. This information assists to demonstrate how planned management of the Offset is complimentary (and additional) to restoration activities previously carried out on site (pursuant to condition 4 in the approval decision).

The Parks and Conservation Service is the long-term manager of the land that now forms the Offset Area. As land that has been outside the reserve system, land management activities have been restricted to those associated with managing the bushfire fuel loads and addressing issues that could impact on the values within the adjacent nature reserve. This has included:

- Stock grazing (cattle) for fuel reduction
- weed control
- rabbit control
- minor erosion control
- management of over-abundant animals.

The Friends of the Pinnacle

The [Friends of the Pinnacle ParkCare Group](#) has also been actively involved in monitoring and improving local flora and fauna habitat within the Offset Area. Since 2010, the group has been involved in:

- weed infestation mapping and control
- mapping of rabbit warrens
- kangaroo counts

The Friends of the Pinnacle maintain an active interest in the ongoing management of the Offset Area. PCS supports the involvement of the group to assist in implementing aspects of this OMP.

Neither ecological burning nor active revegetation has occurred within the Offset Area.

All activities undertaken prior to the land being an approved offset, are described in more detail below.

Note: the Offset Area was formally approved on 17 October 2014. Some of the information below includes data relating to works undertaken post this date.

2.8.1 Grazing for fuel reduction

The northern paddock has been crash-grazed each year for short periods leading up to the bushfire season to comply with the bushfire fuel management requirements. Grazing has not been required within the southern paddock for fuel reduction purposes. This paddock has remained ungrazed by stock for at least the last five years.

2.8.2 Weed monitoring and control

The Friends of the Pinnacle have mapped and controlled weeds within the Offset Area since 2011. Table 7(a) highlights the time spent (in hours) by members of the group undertaking weed control activities within the Offset Area. PCS has also undertaken weed control activities within the Offset Area, primarily to control St John's Wort (Table 7(b)).

Table 7. Weed control effort undertaken in the Offset Area (a) by the Friends of the Pinnacle within the Offset Area (b) by PCS contractors

(a) time spent (hours)

Species	2011-12	2012-13	2013-14	2014-15	2015-16
African Love Grass	0.9	0.0	0.6	0.9	2.0
St. John's Wort	0.3	4.2	15.4	14.6	32.8
Blackberries	0.0	0.7	0.2	0.6	0.7
Sweet Briar	2.9	11.8	6.3	7.1	6.6
Bathurst Burr	0.0	7.6	4.4	2.8	7.0
Paterson's Curse	2.3	9.5	16.4	7.5	4.9
Saffron thistles	2.0	7.1	7.8	28.7	9.3
Thistles (not Saffron)	10.5	10.4	5.2	20.0	18.8
Horehound	16.5	23.8	3.3	14.0	0.2
Verbascum	6.0	10.8	5.6	11.6	20.6
Woody weeds (other)	0.0	3.4	0.1	0.0	0.2
Other exotic grasses	0.0	0.0	0.0	0.0	0.2
Other weeds	1.1	0.1	0.1	1.8	1.0
Total	42	89	65	110	104

Source: W. Bond, 2015 pers. comm

(b)

Year	Species	Density	Hectares treated (spot spray selective herbicide)
2010	Horehound	11-50%	1.6ha
2011	St John's Wort	11-50%	9.1ha
2012-13	St John's Wort	11-50%	1.5ha
2014	St John's Wort	1-10%	17ha

Source: PCS data collected on ArcGIS On-line/Collector app

Weed control maps (as produced by the Friends of the Pinnacle) are available on [the Friends of the Pinnacle website](#). These indicate the location of walked lines along which weed control is undertaken. The density of the lines reflects the time spent undertaking weed control activities along these lines. They do not reflect changes in weed density over time.

2.8.3 Rabbit Control

The Friends of the Pinnacle have mapped the rabbit warrens. Minor control (warren fumigation) has been required over the last five years. This has mainly involved fumigating warrens.

Rabbit populations have been surveyed within the Pinnacle Nature Reserve. Rabbits are counted along a transect at night using a spotlight. Transects are consistent each year. Figure 3 depicts the results of these spotlight counts since 2010. They depict a general decline in the rabbit population. The most recent surveys indicate the rabbit population is at low numbers (approximately 2 rabbits per kilometre).

2.8.4 Erosion control

Small scale rockwork was undertaken to stabilise minor erosion along the drainage line that runs parallel with the diagonal fence that separates the north and south paddocks within the Offset Area.

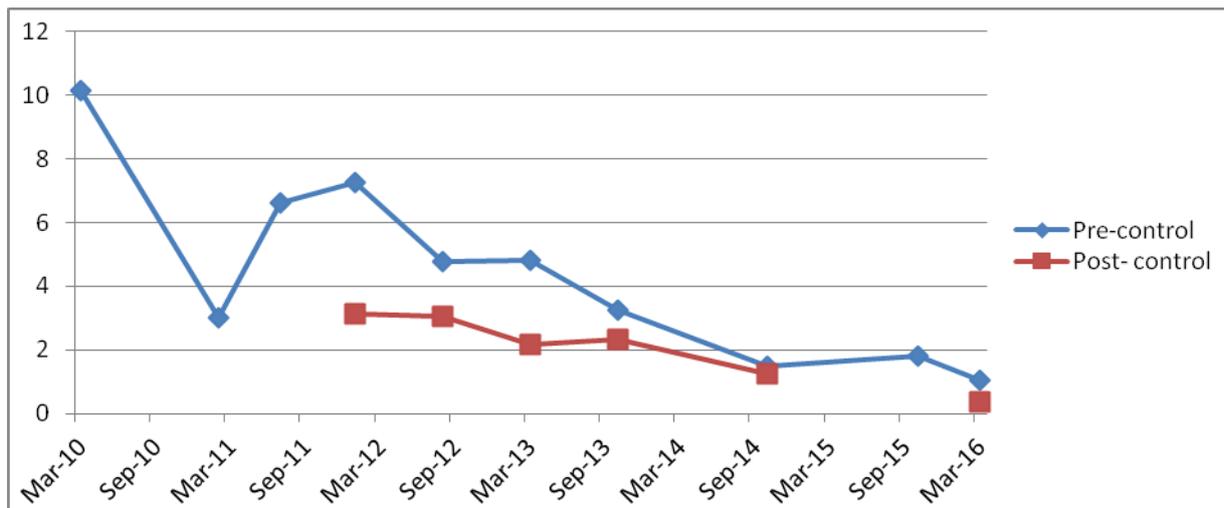


Figure 3. Results of Rabbit Spotlight Counts 2010 – 2015 (numbers counted per kilometre along fixed transects pre and post control)

2.8.5 Managing over-abundant animals

The Pinnacle Nature Reserve is one reserve that is included in the Kangaroo Management Program. This program will continue within the area as required and be delivered in accordance with policies outlined in the *ACT Kangaroo Management Plan* (ACT Government 2010).

3. Natural Conservation Values

3.1 White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

The Offset Area includes approximately 15.5 hectares of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Figure 4).

3.1.1 Description

White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological communities (Box Gum Woodland) can occur either as woodland or derived native grassland (i.e. grassy woodland when the overstorey has been removed). It is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs (where shrub cover comprises less than 30% cover), and a dominance or prior dominance of White Box (*Eucalyptus albens*) and/or Yellow Box (*E. melliodora*) and/or Blakely's Red Gum (*E. blakelyi*) trees. In the woodland state, tree cover is generally discontinuous and of medium height with canopies that are clearly separated (Australian Government 2006).

To be considered a listed ecological community, remnant areas must also:

- have a predominantly native understorey where at least 50 percent of the perennial vegetation cover in the ground layer is made up of native species and
- be 0.1 hectare or greater in size and contain an understorey with at least 12 native understorey species other than grasses, as well as at least one listed important species
or
- be 2 hectares or greater in size, with an average of 20 or more mature trees per hectare or displays evidence of natural regeneration of mature trees (Department of Environment, Climate Change and Water NSW 2011).

Mature trees are defined as those with a circumference of at least 125 centimetres at 130 centimetres above the ground. Regeneration must consist of naturally occurring juveniles of dominant overstorey species with a circumference of at least 15 centimetres at 130 centimetres above the ground (Department of Environment, Climate Change and Water NSW 2011).

The Box Gum Woodland within the Offset Area has a dominant canopy of Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*E. blakelyi*) and less frequently Apple Box (*Eucalyptus bridgesiana*), over a predominantly native understorey of Red Leg (*Bothriocloa macra*), Tall Spear Grass (*Austrostipa bigeniculata*) and Wallaby grasses (*Rytidosperma* spp.). At least 63 species of native forbs and grasses have been recorded within the Offset Area (Appendix A).

There are two distinct zones within the Box Gum Woodland, which are separated by a stock proof fence (Figure 9). The southern paddock has an understory dominated by native grasses and forbs on shallow rocky soils. Using the quality definition score as described in Umwelt (2014), the Box Gum Woodland community within this paddock scored 7 out of 10 (with 10 being of the highest quality). SMEC (2016) also assessed this paddock as high quality Box Gum Woodland (FVS 22).

The northern paddock has deeper soils and higher biomass. Although still dominated by native grasses, this paddock also has a greater cover of exotic grasses (compared with the southern paddock) and achieved a lower quality rating (5/10) (Umwelt 2014). It should be noted that quality varies across the site and these scores are based on a very quick survey (Umwelt 2014). SMEC (2016) assessed this paddock as low quality Box Gum Woodland (average FVS 7).

The northern paddock is currently grazed as required for bushfire fuel management purposes.

Although both paddocks are classified as Box Gum Woodland, the condition (which is a reflection of land class and past and present land management practices) varies slightly between the two areas. In this regard, the areas need to be considered as different management zones for the purposes of this OMP.

The main threat to the Box Gum Woodland community is competition from weeds. The key species for control are: Saffron thistle (*Carthamus lanatus*), Spear thistle (*Cirsium vulgare*), African Lovegrass (*Eragrostis curvula*), Paterson's Curse (*Echium plantagineum*), Horehound (*Marrubium vulgare*), St John's Wort (*Hypericum perforatum*), Bathurst Burr (*Xanthium spinosum*) and woody weeds including African Boxthorn (*Lycium ferocissimum*), Sweet Briar (*Rosa rubiginosa*) and Blackberry (*Rubus fruticosus* aggregate). The Friends of the Pinnacle Parkcare group are actively involved in the weed control activities. They have invested significant time to control the weeds.

A habitat quality assessment was recently completed by SMEC. This was undertaken following the Box Gum Woodland monitoring guidelines (ACT Government 2015c).

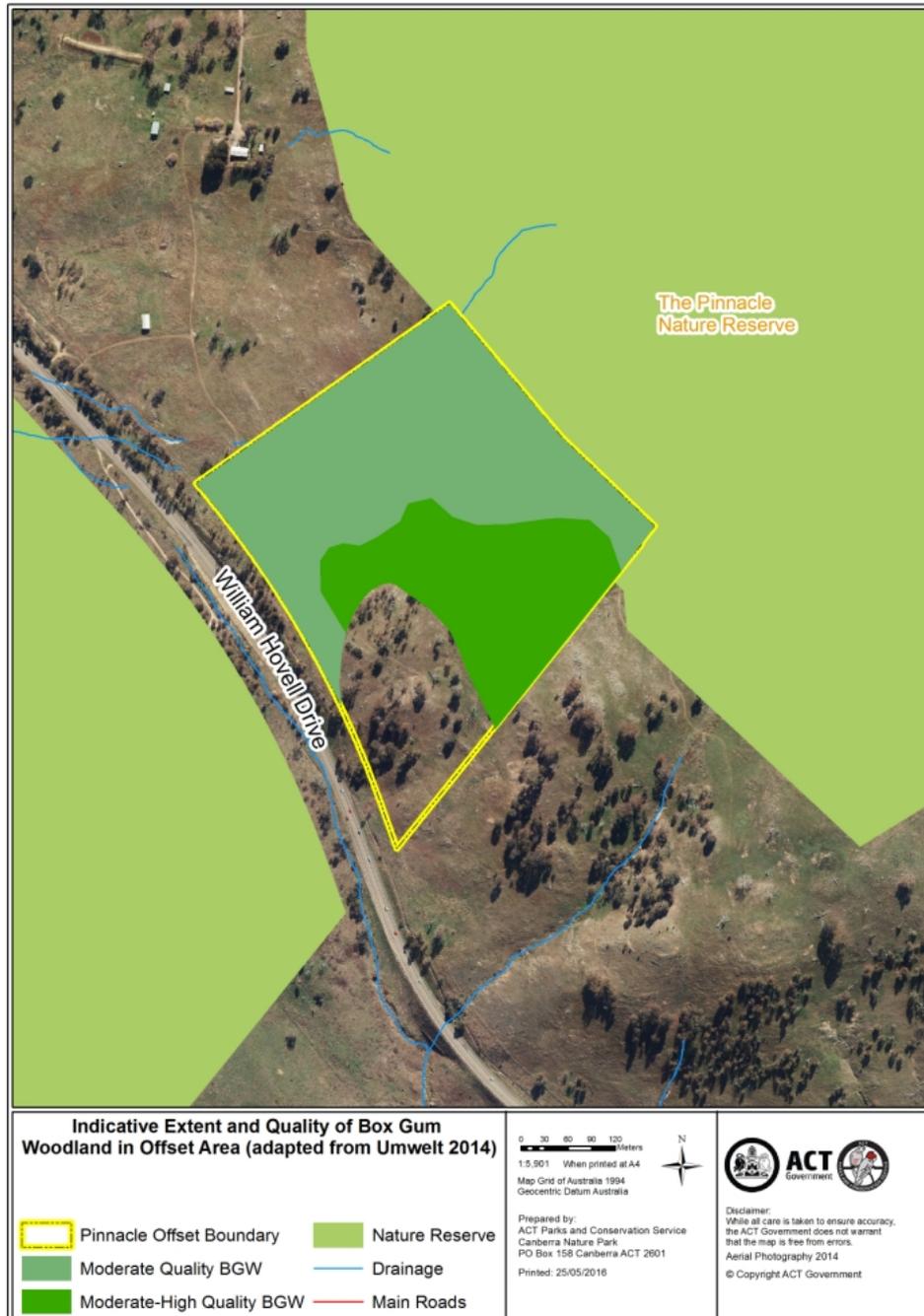


Figure 4. Extent and quality of the Box Gum Woodland ecological community within the Offset Area

3.2 Pink-tailed Worm-lizard (*Aprasia parapulchella*)

Approximately 5.48 hectares of potential Pink-tailed Worm-lizard habitat is present within the Offset Area. This is based on an assessment undertaken by Osborne and Wong (2015). This habitat extends into adjacent unleased territory land. One adult lizard and three skins were also located as part of opportunistic sightings in March 2015 (R. Milner, 2015 pers. comm.) (Figure 5).

3.2.1 Description and Life Cycle

The Pink-tailed Worm-lizard (*Aprasia parapulchella*) is a small legless lizard that grows to about 24 cm in length. It is grey or brown in dorsal colour, with a darker head and nape. The tail is a distinctive pinkish- or reddish-brown colour (Osborne and Jones 1995).

Dark dots or longitudinal bars on the centre of each dorsal scale give the appearance of faint longitudinal lines running down the body and tail. The body is slender and round, the head is blunt and the tail is relatively short and round-tipped. In the ACT region, the Pink-tailed Worm-lizard cannot readily be confused with any other species (Sharp *et al.* 2015).

This lizard is a burrowing species that spends most of its life underground, under rocks and in ant tunnels. It has a long slender body that is designed to move easily through the tunnels and galleries of ant nests and feeds almost entirely on the eggs, larvae and pupae of several genera of ants (Osborne and Jones 1995).

The Pink-tailed Worm-lizard is dependent on the temperature of its surroundings to regulate body temperature (Osborne and Jones 1995). During cold weather when soil temperatures are relatively low, the lizards move to the upper edges of the ant burrows to bask against the warm underside of the rocks that cover the ant nests (Osborne *et al.* 1991). During unfavourable weather (either too hot or too cold) the lizard retreats deeper into the ant tunnels for shelter (Osborne *et al.* 1991; Sharp *et al.* 2015).

Wong *et al.* (2011) provides further details on the life-history and ecology of the Pink-tailed Worm-lizard.

3.2.2 Habitat Requirements

The Pink-tailed Worm-lizard is found within primary and secondary native grassland or pasture where there are numerous scattered surface rocks that are well-weathered, and partially embedded in the soil and grass. These grasslands usually have no or very little tree cover and little or no leaf litter (Sharp *et al.* 2015).

Higher quality habitat is characterised by the presence of native grasses, particularly Kangaroo Grass (*Themeda australis*), Barbed-wire Grass (*Cymbopogon refractus*) as well as Wattle Matrush (*Lomandra filiformis*). In more disturbed sites, Red leg Grass (*Bothriochloa macra*) predominates (Sharp *et al.* 2015).

Maintaining surface rock in grasslands with few shrubs and no trees is important for the habitat requirements of the Pink-tailed Worm-lizard.

Other threats to the Pink-tailed Worm-lizard habitat include pasture improvement, nutrient pollution, soil erosion or other disturbance to the soil, pest plants and animals, excess grassy biomass and the removal of rocks or fallen timber (Sharp *et al.* 2015).

The ACT and Commonwealth Governments recommend that a 20 metre wide buffer is established around Pink-tail Worm-lizard habitat to minimise impact from these threats (Sharp *et al.* 2015).

The potential Pink-tailed Worm-lizard habitat was mapped by Osborne and Wong (2015). The mapping identified high, moderate and low quality habitat classes within the Offset Area and adjacent reserve, based on the classification criteria described in the report (Osborne and Wong 2015) and in Osborne and Wong (2010) (Figure 5). The low quality habitat is considered unlikely to still be occupied by the species (Osborne and Wong 2015).

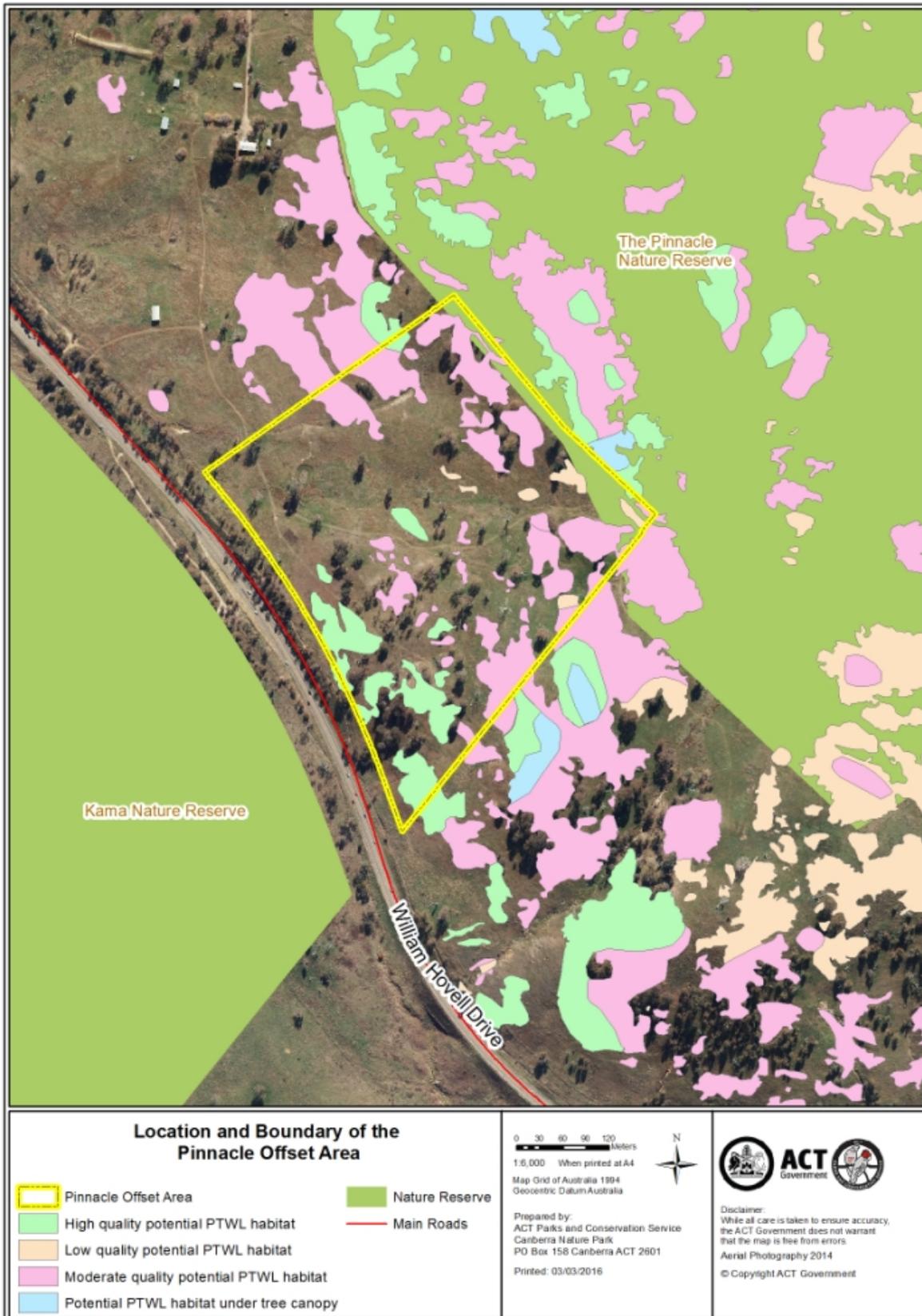


Figure 5. Extent and Quality of Potential Pink-tailed Worm-lizard Habitat in the Pinnacle Nature Reserve and Offset Area

3.3 Superb Parrot (*Polytelis swainsonii*)

The Pinnacle Nature Reserve and Offset Area provides transitory and foraging habitat for the Superb Parrot. The closest breeding habitat is in the Molonglo Valley (Figure 6).

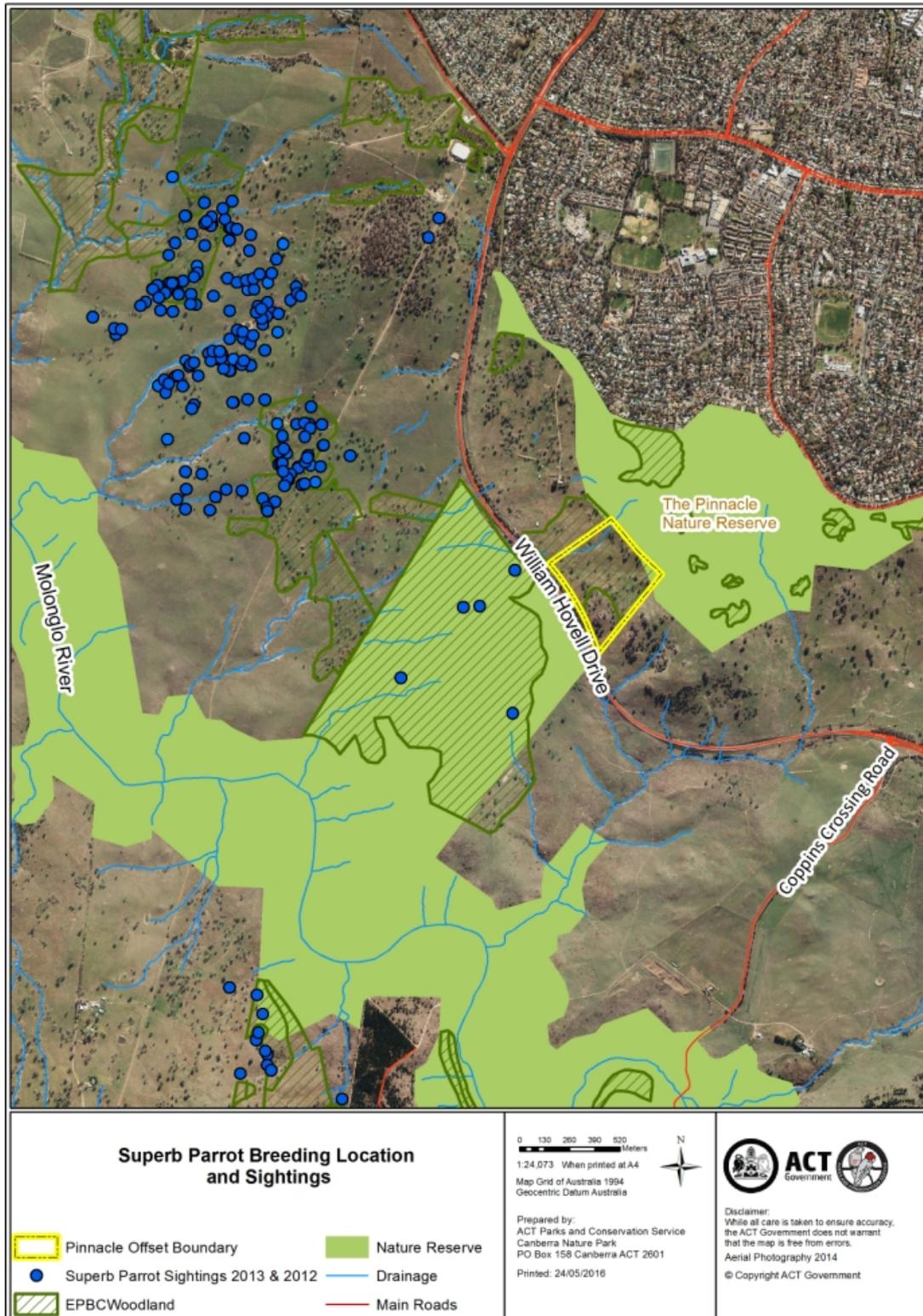


Figure 6. Superb Parrot Breeding Location and Sightings (Molonglo River)

3.3.1 Description and Life Cycle

The Superb Parrot (*Polytelis swainsonii*) is a slender grass-green parrot, about 400mm in length, with a distinctively long tail. The male has brilliant green plumage with yellow-green underparts. The forehead, throat and cheeks are yellow and there is a scarlet band across the neck. The female is green, with a dull bluish-green face (ACT Government 2004).

It is estimated that the Superb Parrot is sexually mature at two to three years (Low 1980). In the ACT region the Superb Parrot arrives during August to breed, departing the following January.

Females lay between four to six white eggs on a bed of decayed wood in a hollow branch or a hole in the trunk of a large eucalypt (Low 1980). Eggs are incubated for about 20 days, with chicks fledgling at about five weeks. The female remains at the nest throughout incubation and until the chicks are well developed (ACT Government 2014a).

During incubation males travel to and from foraging sites where they collect food for the sitting females. Males and females will both forage for chicks and frequently join small foraging flocks, which may also consist of non-breeding birds (Department of the Environment 2015).

In the ACT, the Superb Parrot appears to have distinctive and separate breeding and foraging areas. Breeding appears to be confined to the Central Molonglo Valley and Throsby Ridge (within the Offset Area extending the Gorooyarroo Nature Reserve). It is thought that between 10 - 20 pairs of Superb Parrot breed at each location, with little feeding activity at either breeding site (ACT Government 2014a).

The parrots can travel up to 10 km from breeding to foraging areas, following corridors of trees (J. Bounds 2015, pers. comm.). Foraging largely occurs within suburban Belconnen and the Gungahlin suburb of Harrison, where birds largely feed on the seeds or flowers of planted trees and shrubs including elms (*Ulmus* sp.), Red Ironbark (*Eucalyptus sideroxylon*), Wattles (*Acacia* spp.) or on grass seed on suburban sports grounds (ACT Government 2014a).

The species tends to return to traditional nest sites, though use within a particular year will depend on seasonal conditions. In the non-breeding season, birds are usually in small flocks of up to 30 with equal proportions of males and females (ACT Government 2014a). The exact relationship between breeding and non-breeding ranges is unclear (Department of the Environment 2015).

3.3.2 Habitat Requirements

Suitable nesting trees are a critical resource. Across its range the Superb Parrot usually nests in hollow limbs or holes deep in the trunk of large woodland or riparian eucalypts, usually near a permanent water source. Preferred nesting trees are Blakely's Red Gum (*Eucalyptus blakelyi*) or River Red Gum (*E. camaldulensis*), though in the ACT nesting is within Blakely's Red Gum, Yellow Box (*E. melliodora*) or Scribbly Gum (*E. rossii*) (ACT Government 2014a).

In the Molonglo Valley Blakely's Red Gum (*E. blakelyi*) is the main tree associated with breeding behaviour. The nesting trees in Molonglo are large and very old and probably contain deep hollows (ACT Government 2014a). The presence of these old trees with deep hollows may be an important reason for the location of the ACT nesting sites (ACT Government 2014a).

Superb Parrots preferentially seek out large (>60 cm dbh) trees in box-ironbark forests and Woodland because they provide reliable and fairly predictable nectar flows. The biggest challenge for effective conservation of the Superb Parrot is landscape-scale retention and regeneration of woodland habitat.

The Pinnacle Offset Area provides important foraging habitat within 10 km of critical nesting habitat in the Molonglo Valley, and also provides linkages across the landscape between habitat fragments to enable movement between foraging and breeding sites across the ACT.

3.4 Other Natural Conservation Assets

3.4.1 *Eucalyptus macrorhyncha* Tableland Grass-Shrub Forest

Red Stringybark (*Eucalyptus macrorhyncha*) Tableland Grass-Shrub Forest (Sharp *et. al.* 2007) also occurs within the Offset Area (Figure 4). This community occurs on poorly developed or skeletal soils on the exposed dry, steep and rocky hills and foot slopes around Canberra (Peden *et al.* 2011) in the southern-most corner of the Offset site.

The dominant canopy species within this zone of the Offset Area are Red Stringybark (*E. macrorhyncha*), Scribbly Gum (*E. rossii*), with scattered Blakely's Red Gum (*E. blakelyi*) saplings scattered throughout SMEC (2016).

Other species include Common Raspwort (*Gonocarpus tetragynus*), Blue Devil (*Eryngium ovinum*) and Honeypots (*Acrotriche serrulata*). A more comprehensive species list can be found at Appendix A. There is a higher concentration of shrubby understorey than other parts of the site. There are woody weeds such as Sweet Briar in this area, but these are low in number and being controlled by the Friends of the Pinnacle. Broadly, this community (albeit of a small size) is in good condition in terms of structure and diversity.

3.4.2 Woodland Birds

Appendix B lists the bird species that have been recorded in the Offset Area and adjacent reserves. This includes a number of woodland-dependent birds and several that prefer more open grassland habitat. A total of 15 birds of significance have been recorded including the Varied Sittella (*Daphoenositta chrysoptera*), Scarlet Robin (*Petroica boodang*) and the Diamond Firetail (*Stagonopleura guttata*) (Table 5).

Habitat Requirements

Habitat connectivity and diversity are critical for woodland birds. The Offset Area is an important component of a regionally important woodland link (Barrett and Love 2012). Priority must be given to maintaining or creating connectivity between remnant woodland patches, and providing a range of habitat values including:

- maintaining a diverse understorey of shrubs, herbs and forbs
- maintaining areas of grassland that support insects and other invertebrates
- providing fallen timber for additional foraging habitat and
- preserving large living and dead trees are for perching, roosting, nesting and foraging (ACT Government 2004).

Habitat diversity will also contribute towards reducing the competitive advantage of the native Noisy Miner (*Manorina melanocephala*), which can exclude other birds through aggressive behaviour.

3.4.3 Other species

Other animals recorded in the adjacent Pinnacle and Kama Nature Reserves which rely on woodland and grassy habitat include mammals such as the Short-beaked Echidna (*Tachyglossus aculeatus*), Red-necked Wallaby (*Macropus rufogriseus*) and Swamp Wallaby (*Wallabia bicolor*), 12 reptiles (in addition to the Pink-tailed Worm-lizard), and seven amphibians. Full lists can be found in Appendix B.

Further assessment is required to confirm presence of these species in the Offset Area, although there is a high likelihood that a number of these will be found due to the suitability of habitat, particularly for reptiles.

4. Habitat Improvement Plan

Section 2.8 describes the environmental management works that were undertaken within the Offset Area prior to the approval of the site as an offset. The following sections describe the management issues that remain applicable to the Offset Area, and outline how these issues will be addressed. These actions will both expand and be additional to the actions described in section 2.8.

Pursuant to condition 4(c) in the approval decision, this OMP must also include objectives, performance indicators, trigger values and contingency or remediation measures associated with the following management issues:

- Soil erosion
- Pests, feral animals and grazing stock
- Weeds and pathogens (in particular, measures to avoid the seed setting and dispersal of key weed species)
- Fire (to maintain the ecological integrity of ecosystems)
- Unwanted access (including the use of fencing and signage)
- Assisted regeneration and revegetation

While these issues are addressed individually within the OMP and contribute towards the overall management objective for the Offset Area (improving the quality of the Box Gum Woodland community), the information required to comply with condition 4 (c) is summarised in Appendix C.

4.1 Enhancement

4.1.1 Biomass Management

It is important to consider the biomass management history of a site when determining the most appropriate biomass management method to use within grassland and grassy woodland ecosystems. Morgan (2015) advises that changing long-term biomass management methods can in fact be detrimental to maintaining grassland values.

As such, grazing (by kangaroos and stock) will remain the main method for managing understorey biomass within the Offset Area.

Stock Grazing

The northern paddock has a history of being grazed by cattle for short periods in spring each year for bushfire fuel management purposes. Stock grazing will continue within the northern paddock to manage the bushfire fuel load and maintain habitat structure with the Box Gum Woodland community.

Stock grazing will however, be delayed if the fuel load leading up to the bushfire season is within acceptable levels (as defined by the bushfire fuel standards within the *Strategic Bushfire Management Plan* (ACT Government 2014a)). This will provide opportunities to graze the paddock to maintain habitat structure within late summer/ early autumn, which is a more optimal time for the box gum woodland community.

Stock grazing may also be excluded within any given season if biomass levels remain with an appropriate range (from both bushfire and ecological community perspective).

Stocking rates will be determined based on seasonal biomass levels, however, as a guide, the site will be crash grazed by about one head (cattle) per hectare for approximately 2 weeks at a time (R. Rehwinkle, 2016 pers. comm.).

Stock will continue to be excluded from the southern paddock, unless grazing is required to fulfil the bushfire fuel management requirements. It is however, unlikely that stock will be required to graze the southern paddock, as the nature of this area doesn't allow accumulation of high levels of biomass. This is due to the rocky and skeletal soils and native-grass and forb dominated understorey.

A stock proof fence separates the northern and southern paddocks. This enables stock to be excluded from the southern part of the site when the northern paddock is grazed (section 4.2.1).

Ecological burning

PCS does not commit to implement an ecological burning program within the Offset Area over the life of this OMP.

PCS does however, reserve the right to undertake an ecological burning trial, if at the advice of a suitably qualified ecologist, it is considered beneficial for the management of the community. This is in line with an adaptive management strategy.

The implementation of any ecological burning trial is dependent on the availability of staff and equipment resources.

4.1.2 Regeneration

- Tree and shrub regeneration is occurring under current regimes and a range of age classes is represented.
- Continued regeneration of indigenous trees and shrubs will be promoted within the Box Gum Woodland to improve connectivity and wildlife movement between the Offset Area, the adjacent reserves and the surrounding landscape. Regenerating canopy species may also eventually form hollows and provide nesting sites for the Superb Parrot and other woodland birds.
- The aim is for tree and shrub cover to reach the pre-disturbance, or [benchmark](#), condition of the Box Gum Woodland community (ACT Government 2015d). SMEC (2016) assessed current tree cover at 1.4% in the northern paddock and 30% in the southern paddock (benchmark 11 – 31%). Shrub (mid-storey) cover was assessed at 0% in both the northern and southern paddocks (benchmark 0-12.5%). The results for shrub cover reflect the assessment plot locations. Shrubs are present within the Offset Area (Appendix A), although the cover is low (particularly in the northern paddock). An increase in the shrub cover would benefit the habitat values of the Box Gum Woodland community.
- Regenerating trees and shrubs will be protected by tall tree guards and/or fenced to protect them from stock and/or kangaroos. Any guards or fencing around regenerated plants would need to remain for at least 3 years (maybe longer depending on climatic conditions) to protect them from grazing (G. Fifield, 2015 pers. comm.).
- Priority will be given to protecting regenerating trees and shrubs within the ‘least cost regional pathways’. Figure 7 depicts the most effective links, or ‘least cost pathways’, for wildlife movement across the Offset Area. This path was identified using the model that was developed following research by Doerr *et al.* (2010) and Doerr *et al.* (2014). Doerr *et al.* (2014) found that most birds will move through a landscape provided there are patches of habitat that are at least 10 hectares in size, which are not more than 1.1 kilometres apart and that are connected by trees or clumps of trees spaced no more than 150 metres apart.
- Regenerating trees and large shrubs must be managed in a way that does not compromise the viability of populations that rely on derived native grasslands. In particular, this will include managing the Offset Area to maintain open grassland areas within the Pink-tailed Worm-lizard habitat areas (Figure 5). Although this species has been found in open-forest and woodland communities, the highest densities have been recorded in areas without tree cover (Sharp *et al.* 2015).
- To maintain an environment suitable for the Pink-tailed Worm-lizard, regenerating trees and large shrubs (>2 metres) should be limited to 5% cover within the Pink-tailed Worm-lizard habitat (Sharp *et al.* 2015).

4.1.3 Revegetation

- A small number of shrubs and trees (less than 50) will be planted in the gully to address erosion (section 4.1.4).
- Other small scale plantings will also be undertaken within the least cost regional pathways (excluding the Pink-tailed Worm-lizard habitat) (Figure 7) to increase plant species diversity (particularly in the northern paddock) and provide additional habitat for woodland birds.
- These plantings will consist primarily of shrubs that will be configured in clumps, spaced at a minimum distance of 150 metres, to assist in the movement of woodland birds across the landscape.
- Emphasis will be given to planting locally occurring plant species that woodland birds, including the Superb Parrot, are known to use for nesting and as a food source.
- The objective will be for tree, shrub and understory species diversity and cover to reach the [benchmark](#) of the Box Gum Woodland community (ACT Government 2015d)).
- Trees and shrubs will not be planted within the Pink-tailed Worm-lizard habitat areas (Figures 5 & 7).
- All revegetated plants will be protected by tall tree guards and/or fenced to protect them from stock and/or kangaroos. Any fencing around regenerated plants would need to remain for at least 3 years to protect from grazing (G. Fifield, 2015 pers. comm.).
- All revegetation projects will be subject to a monitoring and maintenance program and infill planting undertaken if plant mortality is greater than 20%.
- Any revegetation works must be cognisant of a potential increased fire risk and the fuel management requirements as described in the *ACT Strategic Bushfire Management Plan* (ACT Government 2014).

4.1.4 Erosion

There is one small erosion gully in the Offset Area on which small scale erosion control works have taken place by PCS. The gully is largely stable, although there are some small areas of concern, namely a series of lateral (side wall) nick-points associated with a natural spring that has resulted in reduced cover of native grasses in the immediate catchment area (Figure 8). There is also one nick-point in the base of the gully which is active. For the majority of the gully, it is well grassed and stable.

A ‘nick point’ is a localised area of unstable soil which works its way uphill. Left untreated, this type of erosion can undermine the stability of a gully and/or create new erosion gullies depending on the level of water flow – in this case a saturated area of soil that can wash as a result of surface flow travelling over the saturated soil during rain events.

Management intervention is not urgent (L. Gould pers. Comm. 2015); however the following options may be applied if the nick-points are found to be progressing more than 0.1 metres per year:

- Planting of Box Gum overstorey species (*Eucalyptus melliodora* and *E. blakelyi*) at a minimum of 5 metres apart on the saturated area, 4 metres above the lateral nick-points. The purpose of this is to soak up some of the water in the spring so it is not constantly seeping. [Note that species that are usually suitable for planting in gullies close to riparian areas (e.g. Bottlebrush, Tea Tree and other water tolerant species), are not compatible with the Box Gum Woodland species composition and will be avoided]. Other understory plants such as *Acacia implexa* and *Bursaria* sp., which are indigenous to the area, will not tolerate the saturated conditions.
- Planted trees will need to be protected from grazing with fencing or individual stock proof guards.
- Placement of rocks in the nick-point in the gully floor would help to stop its upward

migration.

Gully erosion works and the speed of movement of the nick-points will be monitored using marker posts and photo points, to ensure that works remain effective over time, and that the nick-points stabilise rather than progress.

There are a number of small areas of localised soil disturbance (minor sheet erosion), particularly in areas with shallow rocky soils. These are predominantly in the southern paddock with minor occurrences in the northern paddock. These are very small patches which are being recolonised with lichen, grasses and forbs and are showing signs of natural recovery.

4.1.5 Placement of Woody Debris

- The Offset Area has a number of sites with high levels of naturally occurring woody debris (fallen timber), particularly in the southern paddock. There are also a number of standing dead trees that provide habitat for birds and other wildlife.
- To increase the amount of woody debris in the northern paddock, timber was sourced from the University of Canberra Public Hospital development site and placed within the Offset Area. The additional woody debris will provide unique micro-habitats that are beneficial to both fauna and flora species (ACT Government 2014b).
- Additional woody debris will also be placed around the dam (see below).

4.1.6 Improving Frog Habitat

- To improve frog habitat, woody debris has also been placed within and around the dam in the north paddock. Additional woody debris will be placed around the dam to prohibit or limit stock access to the dam.
- Frog habitat will be regulated through periodic water quality testing and water level monitoring. The regime will guide any future needs to fence off the dam from stock if water quality or water levels decline.
- Wetland species will also be planted around the dam to further improve water quality and frog habitat.
- The dam was included in the 2013 ACT Frogwatch frog census, which recorded low numbers (1 to 5 individuals) of both the Plains Froglet (*Crinia parinsignifera*) and the Smooth Toadlet (*Uperoleia laevisgata*) (ACT Frogwatch 2016). PCS will continue to monitor the frogs within the dam using the ACT Frogwatch frog census method ([Ginninderra Catchment Group 2008](#)). Frogs will be monitored concurrently with the annual Frogwatch census.

4.1.7 Eucalyptus Dieback

- Eucalyptus dieback is evident within the Offset Area, and is particularly affecting the Blakely's Red Gum (*Eucalyptus blakelyi*). Possible causes of dieback can include drought, isolation, localised compacted soils, *Phytophthora cinnamomi* infection or an increased population of insects (namely Psyllids, which are a common and diverse group of sap-sucking insects related to whiteflies, aphids and scale (Stone and Urquhart 1995)). The latter is generally a result of an imbalance in ecosystem function from a lack of woodland birds and other pressures. The specific cause of dieback in the Offset Area is unclear; however it is likely to be caused from a combination of factors.
- The protection of regenerating trees and shrubs (section 4.1.2) will provide additional habitat for woodland birds within the Offset Area. This may help to control insect attack. Planting appropriate habitat species may also assist (section 4.1.3).
- The potential risk from *Phytophthora cinnamomi* is discussed further in section 4.3.4. There is no evidence of *Phytophthora cinnamomi* within the Offset Area.

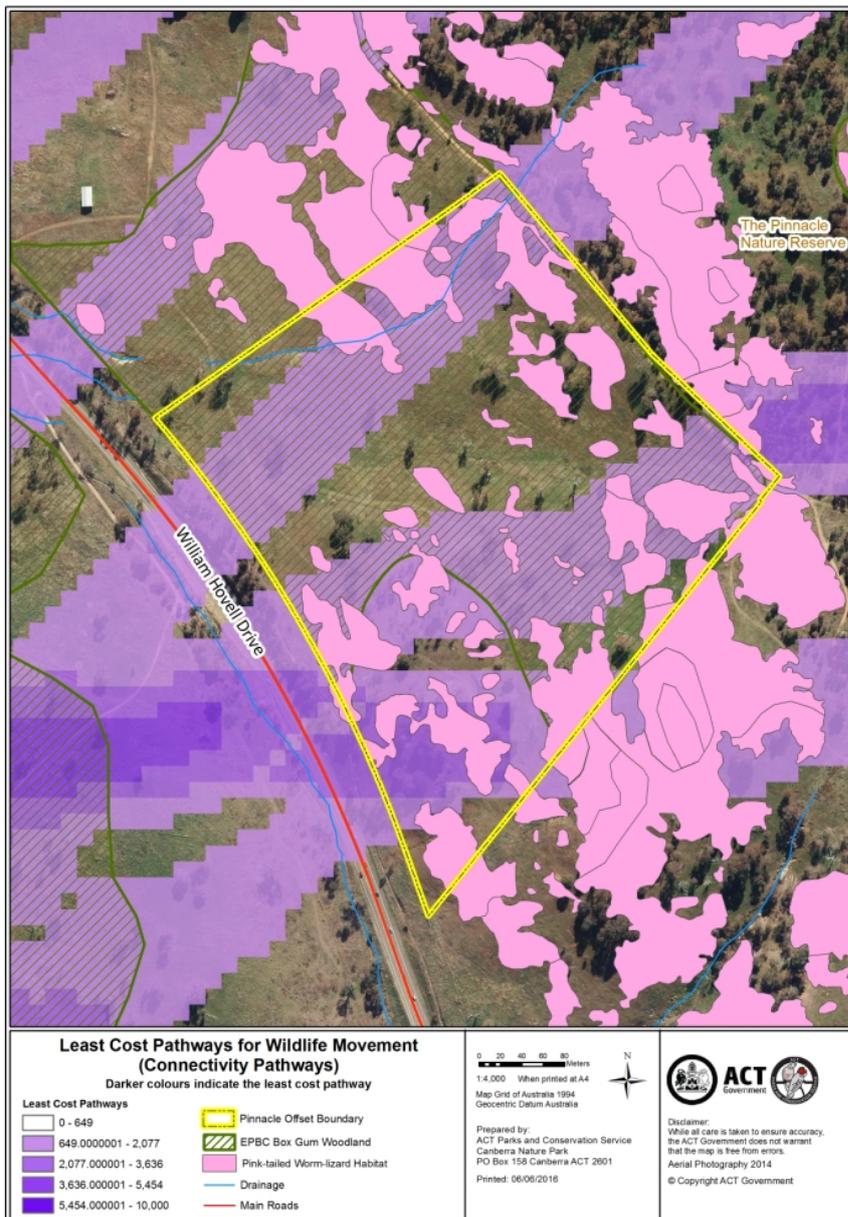


Figure 7. Least Cost Pathways for Wildlife Movement (Connectivity Pathways)



Figure 8. Location of Minor Gully and Sheet Erosion in the Offset Area

4.2 Assets and Infrastructure

4.2.1 Fencing

External fencing

- Existing external fencing will be maintained to a domestic stock proof standard and will be replaced or repaired as required.
- The north western boundary of the Offset Area has been fenced with wildlife friendly stock-proof fencing.
- There are currently three gates into the Offset Area (Figure 9). Additional gates and stiles have been installed to improve access for PCS staff and volunteers into the Offset Area.

Internal Fencing

- There is an internal stock proof fence that separates the two management zones – the northern paddock which will continue to be grazed by stock and the southern paddock which remains ungrazed by stock. This fence provides a useful tool to manage stock used for biomass management purposes. Careful consideration would be required to any possible future plans to remove it (despite the fact it dissects the site). The southern paddock is a more fragile land class than the northern paddock. If grazing is required to manage biomass within the northern paddock, the internal fence ensures that the southern paddock will be protected from unwanted grazing pressure.
- Additional fencing may also be installed to:
 - protect priority regeneration or revegetation areas
 - assist with erosion control
 - protect individual trees to reduce pressures contributing to dieback.
- Any repairs, replacement or removal of fences within the Pink-tailed Worm-lizard habitat will be guided by a scope of works developed by PCS to ensure minimal disturbance to the Pink-tailed Worm-lizard habitat. All fencing related works would be undertaken manually without the use of vehicles or machinery.
- Any new internal fences will be installed following wildlife friendly specifications.

4.2.2 Tracks and Trails - Access

- Only management vehicles are permitted within the Offset Area.
- A management vehicle track enters the site from the north-western boundary and another informal track (slash-line) enters from the east (Figure 9). Care must be taken when travelling along the tracks after rainy periods. Walk into the Offset Area if possible.
- Vehicles are not permitted off the tracks after rain periods.
- Vehicles are not permitted on rocky outcrops.

4.2.3 Stock Water

- Two troughs within the Offset Area provide adequate water for the short duration stock grazing that occurs to manage the bushfire fuel load.
- Stock also currently have access to the dam within the northern paddock. This dam also provides frog habitat with good fringing vegetation.
- Section 4.1.6 describes the works planned to improve the frog habitat within the dam. This includes monitoring the water quality and fencing the dam from stock if the water quality is not considered to be high enough to support frogs or falls below a level that is optimal as frog habitat.

- Due to the low frequency of stock grazing, it is not considered necessary to immediately fence the dam until the water quality is assessed and the stock grazing is determined to be impacting on the frog habitat.



Figure 9. Infrastructure

*Disclaimer: this map provides an overview of the infrastructure and utilities present within the Offset Areas at the time that this OMP was prepared. It does not factor in potential changes to the infrastructure as a result of implementing this OMP. In addition, the accuracy of the presence and location of the infrastructure and utilities is not guaranteed. The information on this map can assist, but must not be solely used to inform planning or land management decisions. Further investigations to confirm the location of infrastructure and utilities from the appropriate authorities (i.e. dial before you dig) is required.

4.3 Over-abundant or Invasive Plants, Animals and Pathogens

4.3.1 Invasive Plants

Appendix A includes the invasive plant species recorded in the Offset Area (as part of the overall flora species list and denoted by an *). The key invasive species include Saffron thistle (*Carthamus lanatus*), Spear thistle (*Cirsium vulgare*), African Lovegrass (*Eragrostis curvula*), Paterson's Curse (*Echium plantagineum*), Horehound (*Marrubium vulgare*), St John's Wort (*Hypericum perforatum*), Bathurst Burr (*Xanthium spinosum*), *Verbascum* spp. and woody weeds including African Boxthorn (*Lycium ferocissimum*), Sweet Briar (*Rosa rubiginosa*) and Blackberry (*Rubus fruticosus* aggregate). The latter tend to occur as isolated plants which are largely under control. African Boxthorn, Serrated Tussock and Blackberry are weeds of national significance.

As part of delivering this OMP, weed control activities will be undertaken within the Offset Area boundary as well as the adjacent roadside reserve. Weeds will be controlled using methods such as spot spraying, chipping and slashing. Funding has also been allocated to control weeds in adjacent paddocks to minimise weed spread into the Offset Area. In addition:

- Woody weed removal will be undertaken in the Offset Area. These mostly occur as isolated plants or very small patches, which are controlled by the Friends of the Pinnacle. Removal of these weeds will have little impact on native bird habitat as there are numerous patches of regenerating Eucalypts of comparable size.
- Weed management in Pink-tailed Worm-lizard habitat may include regenerating trees and shrubs, which may need to be removed in addition to control of exotic weeds. Guidelines will be developed to advise specifically on the most appropriate weed control methodology to ensure protection of the Pink-tail Worm-lizard.
- Measures will be implemented to avoid the key weed species setting seed in the Offset Area and adjacent land. This includes ensuring vehicles are washed down when moving from infestations of African Lovegrass to clean areas, slashing prior to seed set and undertaking a coordinated weed control program with the Friends of the Pinnacle, PCS staff and contractors.
- Weed control programs will be delivered by appropriately trained and licensed contractors, staff and volunteers, who are experienced in working in areas of high conservation value and are able to differentiate weeds from the native plants species (including the native grasses, herbs and forbs) that occur on the site.
- Prior to the conduct of weed control activities, PCS will ensure contractors and volunteers are briefed on the area's values, weeds to be targeted, areas to avoid and other matters to ensure avoidable secondary impacts do not occur (e.g. spray drift and impact on non-target species).
- PCS staff, contractors and the Friends of the Pinnacle will continue to map all weed control activities undertaken within the Offset Area. This provides a means to monitor the distribution and spread of weeds within the Offset Area, including the key weed species. A summary of the weed management activities carried out on site each year will be included in the annual report.

4.3.2 Invasive Animals

- The program to control rabbits within the Pinnacle Nature Reserve will be expanded to include the Offset Area.
- Figure 3 depicts the results of the rabbit surveys within the adjacent Pinnacle Nature Reserve. This data indicates a downward trend in rabbits within the reserve. Rabbit numbers are currently considered to be low and within the target range. The rabbit population is currently surveyed in spring and autumn prior to delivering the biannual rabbit control programs.
- The Friends of the Pinnacle will continue to monitor (and map) the location of warrens in the Offset Area.
- Other opportunistic sightings (i.e. droppings, visual confirmation) also aid to inform the rabbit

control program.

- Fox control is not undertaken due to the issues relating to the use of 1080 baits and the potential for effects on non-target animals such as domestic dogs and wildlife (C. Wainwright, 2015 pers. comm.).
- Any pest animal control program will be undertaken in accordance with the *ACT Pest Animal Management Strategy* and advice from PCS staff in line with best practice guidelines.

4.3.3 Over-abundant Animals

- There is potential for the population of Eastern Grey Kangaroos (*Macropus giganteus*) to become over-abundant within the Pinnacle Nature Reserve and the Offset Area (ACT Government 2010).
- Over-grazing can limit growth of native species and reproductive output through the grazing of flowers and fruit, reducing natural recruitment.
- Overgrazing can also impact grassy understorey habitat for reptiles such as the Pink-tail Worm-lizard, and macroinvertebrates which provide critical links in the food chain.
- Kangaroo populations within Canberra Nature Park are managed in accordance with policies outlined in the *ACT Kangaroo Management Plan* (ACT Government 2010).

4.3.4 Invasive Pathogens

There are no known pathogen infestations in the Offset Area.

The incidence of *Phytophthora cinnamomi* in the ACT is low and there are no records of *P. cinnamomi* within the Offset Area or surrounding landscape. Nonetheless, dieback caused by *P. cinnamomi* is a key threatening process under the EPBC Act. Once present it can dramatically modify the structure and composition of native plant communities, resulting in habitat degradation for dependant flora and fauna (Commonwealth of Australia 2014). The Box Gum Woodland is an ecological community that may be impacted by *P. cinnamomi*.

To reduce the risk of *P. cinnamomi* entering the Offset Area, staff, contractors and volunteers will be educated on the threat imposed by *P. cinnamomi* and procedures to follow in order to reduce the risk of infection. Following guidelines in the *Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi* (Commonwealth of Australia 2014), activities may include:

- cleaning vehicles and equipment before entering the Offset Area
- ensuring *P. cinnamomi* hygiene protocols are included in works contracts
- avoiding the importation of raw materials (e.g. gravel, sand, soil and water) where possible.

It is noted that if an infestation occurs, chemical control options are very limited and prevention is the best management strategy.

4.4 Community Engagement

4.4.1 Recreation

- The Offset Area will continue to be accessible to the Friends of the Pinnacle and other members of the community for activities such as guided walks (hosted by the Friends of the Pinnacle), bird watching and bush walking.
- There are however, currently no plans to establish specific recreation tracks from the Pinnacle Nature Reserve into the Offset Area. Any future plans to establish formal recreation tracks into the Offset Area will be assessed, in consultation with the Friends of the Pinnacle, on the basis of potential use, associated impacts on the natural environment and community interest.
- Horse riding is permitted along designated trails within the Pinnacle Nature Reserve. There are no plans to extend these trails to permit horse riding within the Offset Area.

- General park signage and signs identifying prohibited activities (as is required under the under the *Nature Conservation Act 2014*) will be installed.

4.4.2 Interpretation

- The Friends of the Pinnacle host guided walks (including bird watching and Aboriginal heritage walks) within the Pinnacle Nature Reserve. These hosted walks, at the discretion of the group, may extend into the Offset Area.
- Information on the conservation values within the Pinnacle Nature Reserve is also included on the Friends of the Pinnacle website www.fotpin.org.au.
- There are currently, no plans for interpretation signage within the Offset Area. Any future plans to install signage or other interpretation infrastructure will be developed in consultation with Friends of the Pinnacle, and will form part of an interpretation program for the wider Pinnacle Nature Reserve.

4.5 Managing Cultural Heritage Values

The ACT Government *Heritage Act 2004* includes specific provisions that require a person to report the discovery of an Aboriginal place or object to the Heritage Council within five working days. There are also provisions and penalties that apply if a person damages any Aboriginal place or object in the ACT (ACT Government 2015e).

The *Cultural Heritage Reporting Policy* (ACT Government 2015a) details the cultural assessment and reporting requirements for projects that may impact on places or objects with heritage value. This may include some operational and habitat restoration projects. A cultural heritage assessment and associated reporting will be undertaken in accordance with the guidelines described in this document. The ACT Heritage Unit can provide further advice on assessment requirements.

5. Bushfire Hazard Management

The Offset Area is currently classified as a Strategic Fire Fighting Advantage Zone (ACT Government 2015f) (Figure 10), which requires the bushfire fuel load (biomass) to be managed in accordance with the standards required in the *Strategic Bushfire Management Plan for the ACT* (ACT Government 2014a).

The area within the Pinnacle Nature Reserve (outside the Offset Area), is classified as Landscape Fire Management Zone. This is not subject to bushfire fuel hazard management requirements under the *Strategic Bushfire Management Plan for the ACT* (ACT Government 2014a).

The bushfire fuel loads within the Offset Area will be assessed by PCS staff and managed with stock (cattle) grazing as required. This is further discussed in section 4.1.1. Grazing for the purpose of managing fire fuel loads will be undertaken in a manner that complies with the *Ecological Guidelines for Fuel and Fire Management Operations* (Kitchin and Matthews 2012).

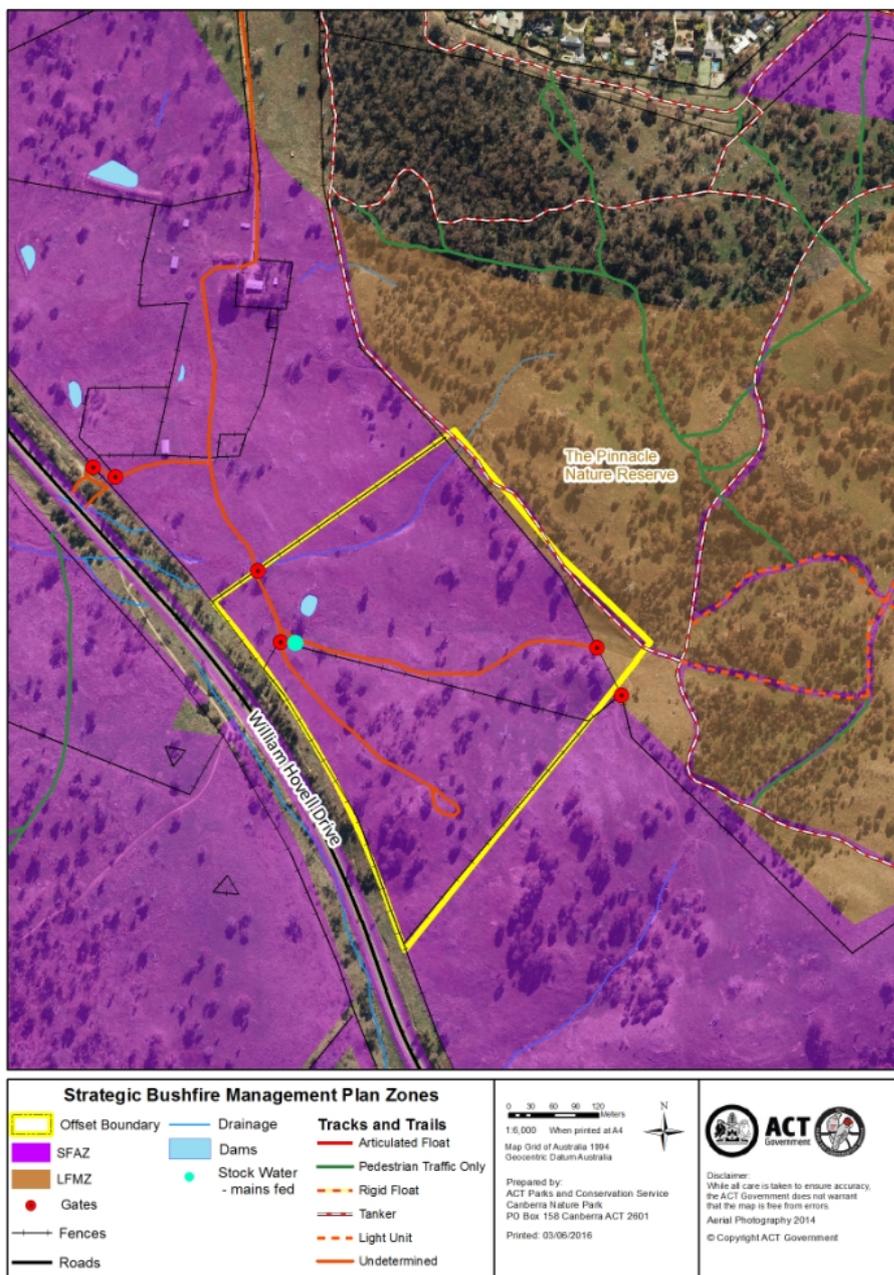


Figure 10. Strategic Bushfire Management Plan Zones

6. Monitoring Plan

6.1 Monitoring MNES

An assessment of the extent and condition of the Box Gum Woodland community in the Offset Area was undertaken in 2015. This assessment was undertaken following the methods described in ACT Government (2015c).

This assessment provides a baseline[^] from which PCS can demonstrate an improvement in the extent and quality of the Box Gum Woodland community within this Offset Area and compliance with the primary objective identified in section 1.3.

This method is consistent with the method used to monitor the Box Gum Woodland community within other reserves within Canberra Nature Park (including other Offset Areas) and will therefore enable site condition to be compared against other sites supporting the Box Gum Woodland community within the ACT reserve system.

Monitoring results will be assessed by PCS staff and ACT Government ecologists. The results will enable a direct comparison of the habitat quality against [benchmark condition](#) (ACT Government 2015d) as well as being able to monitor change compared to baseline over time.

Table 8 outlines the Box Gum Woodland monitoring schedule post 2015.

Although not part of the approval decision, the Pink-tail Worm-lizard habitat will also be monitored within the Offset Area. At this stage a survey of the Pink-tailed Worm-lizard population will not be included in the monitoring program. Recent opportunistic sightings (R. Milner 2015, pers. comm.) have confirmed the presence of Pink-tailed Worm-lizards within the Offset Area.

At present the only technique used to survey Pink-tailed Worm-lizard populations requires rock-turning. Used frequently, this technique could be deleterious to the habitat and the population itself.

The ACT Government is currently undertaking research with the aim of developing a low-impact Pink-tailed Worm-lizard survey method (R. Milner, 2015 pers. comm.). Until this method has been developed, only the Pink-tailed Worm-lizard habitat will be monitored to ensure that the quality of the habitat is maintained.

All monitoring will be undertaken by ACT Government staff or by suitably qualified consultants. Opportunities will also be provided to community groups and volunteers to participate in the monitoring program, where appropriate.

Table 8. MNES Monitoring Program Schedule

MNES	Years
Box Gum Woodland	2015 (complete), 2016, 2017, 2020, 2023 and 2024
Pink-tailed Worm-lizard habitat	2015 (complete), 2016, 2017, 2020, 2023 and 2024

The [2015 baseline assessment](#) was completed in summer (December 2015). It is acknowledged that the survey was not undertaken in the most ideal time however; of the ten variables that measure condition all except the diversity and cover of native understory species (which includes forbs that are only visible in spring) were measurable and assessed. Due to this and the fact that works to improve the value of the Offset Area have commenced, the baseline values are those collected in the summer 2015 assessment and in spring 2016 (for native diversity and cover only).

6.2 Performance Measures

A measured improvement in the quality of the Box Gum Woodland community will be demonstrated by an increase in the diversity and cover of native plant species from a range of vegetation structural elements (e.g. overstorey, midstorey, groundcover) and other habitat values (e.g. fallen timber), which are assessed as part of the Box Gum Woodland monitoring program. The performance measures will be assessed from the 2015 and 2016 baseline levels and compared to benchmark level (ACT Government 2015d).

The following performance measures have been developed to assist in assessing the success of the management activities in the Offset Area. Primary indicators include:

- an increase in native species richness (diversity)
- a decline in the cover of weed species
- improved diversity and cover of native plant species from a range of vegetation structural elements (e.g. overstorey, midstorey, groundcover) and habitat values (e.g. fallen timber) that are commensurate with the EPBC listed Box Gum Woodland community
- an increase in the natural regeneration of dominant overstorey species (*E. melliodora* and *E. blakelyi*) and midstorey species (cognisant of bushfire fuel management requirements and how that relates to the benchmark level)

Monitoring results will underpin continual improvement of restoration techniques under an adaptive framework, and will be documented as part of annual reporting (and published on the internet).

Accurate records will be kept for all activities to ensure reporting and monitoring requirements are met.

The results of the monitoring program will also be disseminated within the ACT Government to better inform the management of the conservation values within the ACT, and will feed into a process of review and adaptive management.

6.3 Other Monitoring Requirements

Pursuant to condition 4(e) in the approval decision, monitoring of the activities described in condition 4 (c) is also required. Table 9 identifies these activities and the associated monitoring program.

Table 9. Other Monitoring Requirements

Activity	Monitoring method
Soil Erosion	Photo-monitoring points (section 6.5) will be established at the location of the gully erosion as described in section 4.1.4
Pests, feral animals and grazing stock	Rabbits will be monitored as part of the established spotlighting program (section 4.3.2). Rabbit warrens are monitored (and mapped) by the Friends of the Pinnacle. Kangaroos will be monitored as part of the PCS kangaroo monitoring program (section 4.3.3) Biomass structure and bushfire fuel loads will be assessed annually prior to and during the bushfire season to ensure that bushfire fuel management requirements. Stock grazing will be introduced as a tool to fulfil this requirement.
Weeds and pathogens	Mapping of weed control activities described in section 4.3.1. No formal monitoring for pathogens will occur, however guidelines will be developed to reduce the risk of <i>Phytophthora cinnamomi</i> infection
Fire	Any burning for ecological purposes will be undertaken on a trial basis. A pre and post fire floristic assessment will be undertaken as part of this trial and will form part of an experimental design developed in consultation with ACT Government ecologists.
Unwanted access	The Offset Area is public land. No formal monitoring program will be implemented. Incidental monitoring of potentially illegal activities will occur as part of the duties of the Park Ranger, other PCS staff and the Friends of the Pinnacle.
Assisted regeneration and revegetation	Monitoring the contribution regeneration and revegetation make towards improving the quality of the Box Gum Woodland community will be captured in the Box Gum Woodland monitoring program (section 6.1).

6.4 Monitoring other rare or threatened species

Other conservation values, including species that are considered rare, vulnerable or in decline in the ACT or New South Wales (Tables 5 and 6) will be monitored as part of existing monitoring programs. This includes bird monitoring programs delivered by community groups such as the Canberra Ornithologists Group, and opportunistic surveys for fauna undertaken by PCS staff in conjunction with the Friends of the Pinnacle at appropriate times of the year.

Rare plant species may also be picked up as part of the monitoring programs outlined in section 6.1.

6.5 Photo Monitoring Points

Photo monitoring points will be established in the Offset Area, co-located with the vegetation monitoring plots.

These points will assist to assess change over time and will help to determine the effectiveness of active management interventions such as gully erosion control, weed control, regeneration and revegetation (if appropriate).

Photo monitoring plots will be undertaken following the methods described in (ACT Government 2014b).

7. Management Actions

7.1 Planning

Activity	Description	Responsibility	Estimated Timeframe for Completion	Estimated [#] Budget 2015 - 2018	Estimated [#] Ongoing Operational Costs (p.a.)
Consult with ACT Heritage Unit	Inform the ACT Heritage Unit of operational or habitat restoration works which could impact potential cultural heritage sites within the Offset Areas.	PCS	As required	-	-
Cultural Heritage Assessment Reporting and Management requirements	<p>Section 4.5</p> <ul style="list-style-type: none"> Follow the guidelines outlined in the Cultural Heritage Reporting Policy (ACT Government 2015a). This document details the cultural assessment and reporting requirements for projects that may impact on places or objects with indigenous or historic heritage value. Any discovery of an Aboriginal place or object will be reported to the Heritage Council within five working days. 	PCS	As required	-	-
Utility Notifications	<p>Section 1.7</p> <p>Adhere to the Code of Practice between PCS and ActewAGL (ERM 2009).</p>	PCS	As required	-	-
Offset Management Plan Review	<p>Section 12</p> <p>This OMP will be reviewed and updated within six (6) months of the finalisation of the 2018 Box Gum Woodland monitoring program report (section 6).</p>	PCS	2019	-	-

7.2 Capital Improvement and Maintenance

Activity	Description	Responsibility	Estimated Timing of Completion and Duration**	Estimated [#] Budget 2015-2018	Estimated [#] Ongoing Operational Costs (p.a.)
Fencing	<p>Section 4.2.1</p> <ul style="list-style-type: none"> Install fence along north-western boundary of Offset Area. Replace or repair other boundary and internal fences as is 	PCS	2016-2017	2015-16: 10,000 2016-17: \$20,000	\$2000

Activity	Description	Responsibility	Estimated Timing of Completion and Duration**	Estimated [#] Budget 2015-2018	Estimated [#] Ongoing Operational Costs (p.a.)
	<p>required, using wildlife friendly specifications.</p> <ul style="list-style-type: none"> Any fencing within the Pink-tailed Worm-lizard habitat will be guided by a scope of works developed by PCS to ensure minimal disturbance to the Pink-tailed Worm-lizard habitat. This includes undertaking all fencing related works manually without the use of vehicles or machinery. 				
Tracks and Trails	<p>Section 4.2.2 Undertake works to maintain existing track network as is required</p>	PCS	2016-2017	\$16,000	\$1000
General Information Signage	<p>Section 4.4.1 General park sign and prohibited activity signage (as is required under the under the <i>Nature Conservation Act 2014</i>) will be installed on the offset boundary.</p>	PCS	2016-2017	\$6000	\$700

7.3 Environmental Enhancement and Operational Works

Activity	Description	Responsibility	Estimated Timing of Completion and Duration**	Estimated [#] Budget 2015-2018	Estimated [#] Ongoing Operational Costs (p.a.)
Protection of Natural Regeneration	<p>Section 4.1.2</p> <ul style="list-style-type: none"> Natural regeneration of indigenous trees and shrubs will be promoted within the Box Gum Woodland Regeneration will be monitored within the Pink-tail Worm-lizard habitat to ensure it does not become too dense Trees guards or temporary fencing may be required to protect regenerating trees and shrubs. 	PCS	An on-going requirement as required.	\$5000	\$500
Revegetation	<p>Section 4.1.3 and 4.1.4</p> <ul style="list-style-type: none"> Undertaken revegetation works described in section 4.1.3 and 4.1.4 Trees and shrubs will not be planted in identified Pink-tail Worm-lizard habitat. All revegetation will be subject to a monitoring and maintenance program 	PCS	Planting in autumn- winter 2017 with a 2 year monitoring and maintenance program	\$15,000	\$1000
Gully Erosion	<p>Section 4.1.4</p> <ul style="list-style-type: none"> Very small scale revegetation (<50 plants) and minor rock placement will be undertaken to address erosion Monitoring the progress of gully nick points will be carried out using markers and photo-points to help determine if further works are required. 	PCS	2016-2017	\$5000	\$500
Woody debris relocation	<p>Section 4.1.5 and 4.1.6</p> <p>Woody debris has been relocated from the University of Canberra development site to the Offset Area. Additional woody debris will be sought to place around the dam to restrict stock access and improve frog habitat.</p>	PCS	2016-17	\$30,000	-
Weed control	<p>Section 4.3.1</p> <ul style="list-style-type: none"> Target key weeds that are of high priority for control Weeds will also be controlled on adjacent land (particularly the roadside reserve and adjacent unleased territory land) to minimise weed seed blowing into the Offset Area 	PCS and The Friends of the Pinnacle	Annually. Refer to Appendix D for the timing of weed control activities for	2015-16:\$10,000 2016-17: \$17,000 2017-18: \$17,000	\$10,000

Activity	Description	Responsibility	Estimated Timing of Completion and Duration**	Estimated [#] Budget 2015-2018	Estimated [#] Ongoing Operational Costs (p.a.)
			specific species.		
Invasive Animals (Rabbits)	Section 4.3.2 Rabbits will be monitored and controlled annually in autumn and spring in conjunction with the program operating within the Pinnacle Nature Reserve	PCS and The Friends of the Pinnacle	Annually in autumn and spring	2015-16: \$5000 2016-17: \$5100 2017-18: \$5250	\$5400
Manage overabundant animals	Section 4.3.3 Kangaroos will be managed in accordance with the Kangaroo Management Plan (ACT Government 2010). This includes annual kangaroo monitoring to inform the management program.	PCS	Annual program	2015-16: \$20,000 2016-17: \$22,800 2017-18: \$24,400	\$25,000
Invasive Pathogens	Section 4.3.4 Develop an information hand-out for key staff, contractors and volunteers on the risks from <i>Phytophthora cinnamomi</i> and associated management protocols for working within the Offset Area. Guidelines to be included in scope of works for all contractors working within the Offset Area. These management procedures will be revised immediately if a <i>P. cinnamomi</i> infestation is identified in the vicinity of, or within the Offset Area.	PCS	Guidelines developed by 2016-17 Distribution: on-going requirement.	-	-
Bushfire fuel reduction	Section 5 Bushfire fuel will be assessed in the northern paddock to ensure that it meets the standards applicable for the Strategic Bushfire Advantage Zone and appropriate action to reduce fuel load undertaken as required.	PCS	Annually prior to bushfire season	-	-

7.4 Monitoring Program and Review

Proposed Activity	Description of Proposed Works	Responsibility	Estimated Timing of Completion and Duration**	Estimated [#] Budget 2015-2018	Estimated [#] Ongoing Operational Costs (p.a.)
Box-Gum Grassy Woodlands Monitoring	Section 6 Engage a suitably qualified expert to deliver the monitoring program described in section 6.	PCS to engage a suitably qualified expert	Schedule outlined in section 6.	\$31,000	\$10,000
Mapping and Monitoring Pink-tailed Worm-Lizard Habitat	Section 6 Follow-up monitoring will occur in line with the program described in section 6.	PCS to engage a suitably qualified expert	Schedule outlined in section 6.	\$5000	\$3000
Other Monitoring Requirements	Table 9	PCS	On-going	-	-
Photo Monitoring	Section 6.5	PCS	On-going	-	-

7.5 Management Resources

Proposed Activity	Description of Proposed Works	Responsibility	Estimated Timing of Completion and Duration**	Estimated [#] Budget 2015-2018	Estimated [#] Ongoing Operational Costs (p.a.)
Staffing	To deliver the actions outlined in this, plan resources to support a part-time a Senior Ranger (Ranger Grade 3) position and vehicle are required.	PCS	On-going	\$185,000	\$70,000
Training	All personnel, including contractors, involved in managing the Offset Area must be trained in the requirements and appropriate management of Box-Gum Grassy Woodlands and pink-tailed worm-lizard habitat.	PCS and CR	As needed	-	-

**The approval decision requires that the duration of the management actions is included in the offset management plan. All management activities will be undertaken over the life of this offset management plan. This is with the exception of new infrastructure, which once installed, will be maintained or replaced as part of the on-going capital management program.

[#]The estimated costs and timeframes required to deliver on the proposed works are based on current information from experienced PCS staff and external service providers who manage reserves with similar land management issues and requirements. Some variation to these estimates may occur due to factors such as external environmental influences (e.g. climate, pest plant and animal population dynamics etc.), increased material costs, increased contractor costs, contractor availability etc.

Note: items without allocated funds will be delivered using PCS staff or funded as part of other actions identified in this plan.

8. Adaptive Management

Adaptive management is a systematic process for continually improving management practices through learning from the outcomes of previous management (Umwelt 2014). A strong feedback loop between monitoring and management will be established. Adaptive management of the Offset Area will comprise of adapting conservation and land management practices in response to:

- ecological data from the monitoring program
- legislative change
- any unforeseen or unplanned management threats
- issues that affect day-to-day operations
- advances in research and land management techniques.

This will enable a flexible approach to the management requirements of the Offset Area, allowing ongoing feedback and refinement of the management strategy.

Adaptive management will be the key mechanism used to:

- address the risks associated with implementing this OMP and complying with the conditions within the approval decision and
- vary standard operational tasks according to seasonal conditions and natural fluctuations (e.g. in weed or pest animal density).

This may involve an ongoing evaluation of the management practices undertaken to address issues such as weed infestation, pest animals, bushfire fuel reduction and revegetation.

Any changes to the management of the Offset Area that is outside the scope of what is considered as adaptive management will be presented to the Department of the Environment for approval prior to implementation.

Notwithstanding this, if the ACT Government wishes to undertake activities other than in accordance with the OMP as specified in condition 9 in the approval decision, a revised version of the OMP must be submitted to Department of Environment for approval.

9. Corrective Actions

Monitoring results will identify if the objectives and any of the performance measures are not being met. Examples of this would be:

- a decline in the quality of the Box Gum Woodland community below baseline condition
- a decline in the Pink-tail Worm-lizard habitat quality below baseline condition
- an increase in weed cover.

The results of monitoring will be assessed and used to inform future management actions as well as identify any corrective actions required to meet the objectives and performance measures (section 6).

There may be a number of reasons for possible decline in woodland diversity and/or condition within the Offset Area.

- Regeneration may be hampered by grazing pressure from pest animals such as rabbits, or over abundant native animals such as kangaroos. If improvement in woodland condition is not occurring, then the grazing intensity will be examined and if possible, changed. This change may involve increasing the level of rabbit control or kangaroo management. Additional protection of seedlings (i.e. grazing exclusion plots) would also be effective in protecting recruitment if decreasing grazing pressure is not possible.

- Another potential reason for a lack of recruitment or decline in biodiversity is the lack of natural disturbance to promote seed set such as fire. If this is considered likely, and other causes are ruled out, ecological burns may be trialled if resources are available.

Other factors affecting diversity may include:

- promotion of weed species through soil disturbance
- introduction of new weeds via seed on equipment
- failure of native plant recruitment following weed removal
- introduction of fungal pathogens with soil or other organic matter
- long-term decline in native species from overgrazing (preventing seed set)
- trampling of vegetation through increased visitor rates.

Options to address some of these pressures may include increasing the weed control and/or pest control programs and undertaking revegetation programs as outlined in more detail in section 4. There may also be scope to introduce ecological burns to stimulate regeneration. Grazing by domestic stock will also be assessed on an annual basis based on biomass and bushfire fuel levels.

Appendix C provides additional information on trigger values, contingency and remediation relating to the issues identified in condition 4(c) in the approval decision.

10. Record Management

PCS will maintain accurate records substantiating any activities associated with or relevant to the conditions of approval, including measures taken to implement this OMP. Any activities undertaken by the Friends of the Pinnacle will also be recorded and provided to PCS staff to assist with monitoring and reporting.

11. Reporting

11.1 Standard Reporting Schedule

Pursuant to condition 7 in the approval decision, within three months of every 12 month anniversary of the commencement of the action, a report will be published on the PCS website and/or on the ACT Government Environmental Offsets Register, addressing compliance with each of the conditions of this approval and on the implementation of this OMP.

Documentary evidence providing proof of the date of publication and any non-compliance of any of the conditions within the approval decision will be submitted to the Commonwealth at the same time as the report is published.

11.2 Reporting of unanticipated or unapproved incidents

Unanticipated impacts to MNES will be reported at time of incidence (or as early as practicable) along with any mitigation or rectification activities. Reporting will include a “lessons learned” summary and a schedule of costs, as well as an overview of any further action required.

12. Review Date

The management actions outlined in this plan will be reviewed and updated within six (6) months of the finalisation of reports prepared as part of the 2018 Box Gum Woodland monitoring program (section 6). Any updates will be in response to:

- the outcomes of the monitoring program (section 6)
- advances in our knowledge of the habitat requirements and life cycle of the MNES and
- any unforeseen or unplanned threats to the conservation values within the Offset Area.

The revised OMP will be developed in consultation with key stakeholders as described in sections 1.5 and 1.6.

The OMP may be updated before this time if a significant event (e.g. bushfire) occurs that requires changes to the OMP.

The approval decision has effect until 30 September 2030. Any revision to the offset management in will be submitted to the Commonwealth Department of the Environment pursuant to condition 9 in the approval decision.

A review will also be undertaken if directed by the Commonwealth Minister for the Department of the Environment pursuant to condition 10 in the approval decision.

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Appendix A. Flora species list in Offset Area.

Scientific Name	Common Name	Notes
Trees		
<i>Eucalyptus bridgesiana</i>	Apple Box	
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	
<i>Eucalyptus macrorhyncha</i>	Red Stringybark	
<i>Eucalyptus melliodora</i>	Yellow Box	
<i>Eucalyptus rossii</i>	Scribbly Gum	
Small Trees and Large Shrubs		
<i>Acacia dealbata</i>	Silver Wattle	
<i>Acacia decurrens</i>	Green Wattle	
<i>Acacia implexa</i>	Hickory Wattle	
<i>Callitris endlicheri</i>	Black Cypress Pine	
<i>Exocarpos cupressiformis</i>	Cherry Ballart	
Shrubs		
<i>Acrotriche serrulata</i>	Honeypots	
<i>Bossiaea buxifolia</i>	Matted Bossiaea	
<i>Brachyloma daphnoides</i>	Daphne Heath	
<i>Bursaria spinosa</i>	Sweet Bursaria	
<i>Cryptandra amara</i>	Bitter Cryptandra	
<i>Cassinia quinquefaria</i>	Sifton Bush	
<i>Dodonaea viscosa</i>	Hopbush	
<i>Hibbertia obtusifolia</i>	Hoary Guinea-flower	
<i>Hibbertia riparia</i>	Erect Guinea-flower	
<i>Hovea heterophylla</i>	Common Hovea	
<i>Melichrus urceolatus</i>	Urn Heath	
<i>Lycium ferrocissimum</i> *	African Boxthorn	Weed of National Significance
<i>Marrubium vulgare</i> *	Horehound	
<i>Rosa rubiginosa</i> *	Sweet Briar	
<i>Rubus fruticosus</i> *	Blackberry	Weed of National Significance
<i>Salvia verbenaca</i> var. <i>verbanaca</i> *	Wild Sage	
<i>Solanum nigrum</i> *	Blackberry Nightshade	
Herbs		
<i>Acaena echinata</i>	Sheep's Burr	
<i>Acaena ovina</i>	Sheep's Burr	
<i>Acetosella vulgaris</i> *	Sheep Sorrell	
<i>Alternanthera denticulata</i> var. <i>denticulata</i>	Joyweed	
<i>Amaranthus retroflexus</i> *	Redroot Amaranth	
<i>Asperula conferta</i>	Common Woodruff	
<i>Carex appressa</i>	Tall Sedge	
<i>Carex breviculmis</i>	Short-Stem Sedge	
<i>Carex inversa</i>	Knob Sedge	
<i>Carthamus lanatus</i> *	Saffron Thistle	
<i>Centaurium erythraea</i> *	Common Centaury	
<i>Chondrilla juncea</i> *	Skeleton Weed	
<i>Chrysocephalum apiculatum</i>	Common Everlasting	
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting	
<i>Cirsium vulgare</i> *	Spear Thistle	
<i>Conyza bonariensis</i> *	Flaxleaf Fleabane	
<i>Crepis capillaris</i> *	Smooth Hawksbeard	

Scientific Name	Common Name	Notes
<i>Cucumis myriocarpus*</i>	Prickly Paddy Melon	
<i>Cymbonotus lawsonianus</i>	Austral Bear's Ears	
<i>Dianella longifolia</i>	Pale Flax-Lily	Considered to be rare in the ACT
<i>Dianella revoluta</i>	Black-Anther Flax-Lily	
<i>Dichondra repens</i>	Kidney Weed	
<i>Dysphania pumilio</i>	Small Crumbweed	
<i>Echium plantagineum*</i>	Paterson's Curse	
<i>Einadia nutans</i>	Climbing Saltbush	
<i>Epilobium billardierianum</i>	Willowherb	
<i>Erodium botrys*</i>	Long Storksbill	
<i>Erodium crinitum</i>	Blue Storksbill	
<i>Eryngium ovinum</i>	Blue Devil	
<i>Euchiton sphaericus</i>	Cudweed	
<i>Geranium solandri</i>	Native Geranium	
<i>Glycine clandestina</i>	Twining Glycine	
<i>Gonocarpus tetragynus</i>	Common Raspwort	
<i>Goodenia hederacea</i>	Ivy Goodenia	
<i>Haloragis heterophylla</i>	Variable Raspwort	
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	
<i>Hypericum gramineum</i>	Small St John's Wort	
<i>Hypericum perforatum*</i>	St John's Wort	
<i>Hyperochaeris radicata*</i>	Common Catsear	
<i>Juncus filicaulis</i>	Pinrush	
<i>Lactuca serriola*</i>	Prickly Lettuce	
<i>Lysimachia arvense*</i>	Scarlet Pimpernell	
<i>Malva neglecta*</i>	Dwarf Mallow	
<i>Modiola caroliniana*</i>	Red-Flowered Mallow	
<i>Onopordum acanthinum*</i>	Scotch Thistle	
<i>Orobanche minor*</i>	Lesser Broomrape	
<i>Oxalis perennans</i>	Native Oxalis	
<i>Parentucellia latifolia*</i>	Red Bartsia	
<i>Paronychia brasiliiana*</i>	Chilean Whitlow	
<i>Persicaria prostrata*</i>	Creeping Knotweed	
<i>Petrorhagia nanteuilii*</i>	Proliferous Pink	
<i>Plantago gaudichaudii</i>	Narrow Plantain	Considered to be rare in the ACT
<i>Plantago lanceolata*</i>	Ribwort Plantain	
<i>Plantago varia</i>	Variable Plantain	
<i>Polygonum aviculare*</i>	Wireweed	
<i>Portulaca oleracea</i>	Pigweed	
<i>Rumex brownii</i>	Swamp Dock	
<i>Senecio quadridentatus</i>	Cotton Fireweed	
<i>Silene gallica*</i>	Catchfly	
<i>Solenogyne dominii</i>	Smooth Solenogyne	
<i>Sonchus asper*</i>	Rough Sowthistle	
<i>Sonchus oleraceus*</i>	Common Sowthistle	
<i>Tragopogon dubius*</i>	Goatsbeard	
<i>Tricoryne elatior</i>	Yellow Rush Lily	
<i>Trifolium spp.*</i>	Trefoil	
<i>Verbascum thapsus*</i>	Great Mullein	
<i>Verbascum virgatum*</i>	Twiggy Mullein	
<i>Vittadinia muelleri</i>	Narrow-Leaved New Holland Daisy	
<i>Wahlenbergia communis</i>	Native Bluebell	
<i>Wahlenbergia stricta</i>	Tall Bluebell	
<i>Xerochrysum viscosum</i>	Sticky Everlasting	

Scientific Name	Common Name	Notes
Grasses, Rushes and Sedges		
<i>Agrostis avenacea</i>	Blown Grass	
<i>Aira spp.*</i>	Aira	
<i>Aristida ramosa</i>	Purple Wiregrass	Dense patches in areas
<i>Austrostipa bigeniculata</i>	Kneed Speargrass	
<i>Austrostipa scabra</i>	Speargrass	
<i>Avena spp.*</i>	Wild Oats	
<i>Bothriochloa macra</i>	Redleg Grass	Dominant species
<i>Bromus diandrus*</i>	Great Grass	
<i>Bromus hordaceus*</i>	Soft Grass	
<i>Chloris truncata</i>	Windmill Grass	
<i>Cymbopogon refractus</i>	Barbed Wire Grass	
<i>Cynodon dactylon*</i>	Couch Grass	
<i>Digitaria brownii</i>	Cotton Panic Grass	
<i>Elymus scaber</i>	Common Wheat-Grass	
<i>Enneapogon nigricans</i>	Nine-Awned Grass	
<i>Eragrostis brownii</i>	Brown's Lovegrass	
<i>Holcus lanatus*</i>	Yorkshire Fog	
<i>Lepidosperma laterale</i>	Variable Sword-Sedge	
<i>Lomandra filiformis subsp. coriacea</i>	Wattle Mat-Rush	
<i>Lomandra multiflora</i>	Many Flowered Mat-Rush	
<i>Luzula densiflora</i>	Woodrush	
<i>Microlaena stipoides</i>	Weeping Grass	
<i>Panicum effusum</i>	Hairy Panic	
<i>Paspalum distichum*</i>	Couch	
<i>Phalaris aquatic*</i>	Phalaris	
<i>Poa sieberiana</i>	Snowgrass	
<i>Rytidosperma carphoides</i>	Wallaby-Grass	
<i>Sorghum leiocladum</i>	Wild Sorghum	
<i>Sporobolus pyramidalis</i>	Giant Ratstail Grass	
<i>Themeda australis</i>	Kangaroo Grass	
Climbers		
<i>Hardenbergia violacea</i>	False Sarsaparilla	
Ferns		
<i>Cheilanthes austrotenuifolia</i>	Rock Fern	
<i>Cheilanthes distans</i>	Bristle Rock Fern	Considered to be rare in the ACT

*exotic species

Appendix B. Fauna records for the Offset Area and/or adjacent Pinnacle and Kama Nature Reserves

Scientific Name	Common Name	Notes
Birds		All records from COG
<i>Acanthiza lineata</i>	Striated Thornbill	
<i>Acanthiza pusilla</i>	Brown Thornbill	
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	
<i>Accipiter fasciatus</i>	Brown Goshawk	
<i>Acrocephalus australis</i>	Australian Reed-warbler	
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	
<i>Alauda arvensis</i>	Eurasian Skylark*	
<i>Alisterus scapularis</i>	Australian King-parrot	
<i>Anas castanea</i>	Chestnut Teal	
<i>Anas gracilis</i>	Grey Teal	
<i>Anas superciliosa</i>	Pacific Black Duck	
<i>Anthochaera carunculata</i>	Red Wattlebird	
<i>Anthus novaeseelandiae</i>	Australasian Pipit	
<i>Aphelocephala leucopsis</i>	Southern Whiteface	
<i>Aquila audax</i>	Wedge-tailed Eagle	
<i>Artamus cyanopterus</i>	Dusky Woodswallow	
<i>Artamus personatus</i>	Masked Woodswallow	Considered to be rare in the ACT
<i>Aythya australis</i>	Hardhead	
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	
<i>Cacatua sanguinea</i>	Little Corella	
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	
<i>Cacomantis pallidus</i>	Pallid Cuckoo	
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable in NSW
<i>Carduelis carduelis</i>	European Goldfinch*	
<i>Chenonetta jubata</i>	Australian Wood Duck	
<i>Chrysococcyx basalis</i>	Horsfield's Bronze-cuckoo	
<i>Chrysococcyx lucidus</i>	Shining Bronze-cuckoo	
<i>Chthonicola sagittata</i>	Speckled Warbler	
<i>Cincloramphus cruralis</i>	Brown Songlark	Considered to be rare in the ACT
<i>Circus approximans</i>	Swamp Harrier	Considered to be rare in the ACT
<i>Circus assimilis</i>	Spotted Harrier	Vulnerable in NSW
<i>Cisticola exilis</i>	Golden-headed Cisticola	
<i>Climacteris picumnus</i>	Brown Treecreeper	Considered to be rare in the ACT
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	
<i>Corvus coronoides</i>	Australian Raven	
<i>Corvus mellori</i>	Little Raven	
<i>Coturnix pectoralis</i>	Stubble Quail	
<i>Coturnix ypsilophora</i>	Brown Quail	
<i>Cracticus tibicen</i>	Australian Magpie	

Scientific Name	Common Name	Notes
<i>Cracticus torquatus</i>	Grey Butcherbird	
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Vulnerable in NSW and ACT
<i>Dicaeum hirundinaceum</i>	Mistletoebird	
<i>Elanus axillaris</i>	Black-shouldered Kite	
<i>Euseyornis melanops</i>	Black-fronted Dotterel	
<i>Eolophus roseicapillus</i>	Galah	
<i>Eopsaltria australis</i>	Eastern Yellow Robin	
<i>Eudynamys orientalis</i>	Common Koel	
<i>Eurystomus orientalis</i>	Dollarbird	
<i>Falco berigora</i>	Brown Falcon	
<i>Falco cenchroides</i>	Nankeen Kestrel	
<i>Falco longipennis</i>	Australian Hobby	
<i>Falco peregrinus</i>	Peregrine Falcon	
<i>Fulica atra</i>	Eurasian Coot	
<i>Gallinula tenebrosa</i>	Dusky Moorhen	
<i>Grallina cyanoleuca</i>	Magpie-lark	
<i>Hieraaetus morphnoides</i>	Little Eagle	Vulnerable in NSW and ACT
<i>Hirundo neoxena</i>	Welcome Swallow	
<i>Lichenostomus fuscus</i>	Fuscous Honeyeater	
<i>Malurus cyaneus</i>	Superb Fairy-wren	
<i>Manorina melanocephala</i>	Noisy Miner	
<i>Megalurus mathewsi</i>	Rufous Songlark	
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	
<i>Microeca fascinans</i>	Jacky Winter	
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	
<i>Myiagra inquieta</i>	Restless Flycatcher	Considered to be rare in the ACT
<i>Myiagra rubecula</i>	Leaden Flycatcher	
<i>Neochmia temporalis</i>	Red-browed Finch	
<i>Ninox boobook</i>	Southern Boobook	
<i>Ocyphaps lophotes</i>	Crested Pigeon	
<i>Oriolus sagittatus</i>	Olive-backed Oriole	
<i>Pachycephala pectoralis</i>	Golden Whistler	
<i>Pachycephala rufiventris</i>	Rufous Whistler	
<i>Pardalotus punctatus</i>	Spotted Pardalote	
<i>Pardalotus striatus</i>	Striated Pardalote	
<i>Passer domesticus</i>	House Sparrow*	
<i>Petrochelidon ariel</i>	Fairy Martin	
<i>Petrochelidon nigricans</i>	Tree Martin	
<i>Petroica boodang</i>	Scarlet Robin	Vulnerable in NSW
<i>Petroica goodenovii</i>	Red-capped Robin	
<i>Petroica phoenicea</i>	Flame Robin	
<i>Petroica rosea</i>	Rose Robin	
<i>Phalacrocorax carbo</i>	Great Cormorant	

Scientific Name	Common Name	Notes
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	
<i>Phaps chalcoptera</i>	Common Bronzewing	
<i>Philemon corniculatus</i>	Noisy Friarbird	
<i>Platycercus elegans</i>	Crimson Rosella	
<i>Platycercus eximius</i>	Eastern Rosella	
<i>Podargus strigoides</i>	Tawny Frogmouth	
<i>Polytelis swainsonii</i>	Superb Parrot	MNES, NSW and ACT listed
<i>Psephotus haematonotus</i>	Red-rumped Parrot	
<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird	
<i>Rhipidura albiscapa</i>	Grey Fantail	
<i>Smicronis brevirostris</i>	Weebill	
<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable in NSW and ACT
<i>Strepera graculina</i>	Pied Currawong	
<i>Strepera versicolor</i>	Grey Currawong	
<i>Streptopelia chinensis</i>	Spotted Dove*	
<i>Sturnus tristis</i>	Common Myna*	
<i>Sturnus vulgaris</i>	Common Starling*	
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	
<i>Taeniopygia bichenovii</i>	Double-barred Finch	
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	
<i>Todiramphus sanctus</i>	Sacred Kingfisher	
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	
<i>Turdus merula</i>	Common Blackbird*	
<i>Vanellus miles</i>	Masked Lapwing	
<i>Zosterops lateralis</i>	Silvereye	
Mammals		
<i>Felis catus</i>	Feral Cat*	
<i>Lepus europaeus</i>	European Hare*	
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	
<i>Macropus rufogriseus</i>	Red-necked Wallaby	
<i>Mus musculus</i>	House Mouse*	
<i>Oryctolagus cuniculus</i>	European wild rabbit*	
<i>Rattus rattus</i>	Black Rat*	
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	
<i>Trichosurus vulpecular</i>	Common Brushtail possum	
<i>Vulpes vulpes</i>	European Red Fox*	
<i>Wallabia bicolor</i>	Swamp Wallaby	
Reptiles		
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	MNES, NSW and ACT listed
<i>Christinus marmoratus</i>	Marbled Gecko	
<i>Ctenotus robustus</i>	Striped Skink	
<i>Delma inornata</i>	Olive Legless Lizard	
<i>Egernia cunninghami</i>	Cunningham's Skink	
<i>Hemiergis decresiensis</i>	Three-toed Skink	

Scientific Name	Common Name	Notes
<i>Lampropholis delicata</i>	Garden Skink	
<i>Morethia boulengeri</i>	Boulenger's Skink	
<i>Pogona barbata</i>	Common Bearded Dragon	
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	
<i>Pseudonaja textilis</i>	Eastern Brown Snake	
<i>Ramphotyphlops nigrescens</i>	Blackish blind snake	
<i>Tiliqua scincoides</i>	Eastern Blue-tongued Lizard	
Amphibians		
<i>Crinia parinsignifera</i>	Plains Froglet	
<i>Crinia signifera</i>	Common Eastern Froglet	
<i>Limnodynastes dumerilii</i>	Pobblebonk	
<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog	
<i>Litoria peronii</i>	Peron's Tree Frog	
<i>Litoria verreauxii</i>	Whistling Tree Frog	
<i>Neobatrachus sudelli</i>	Spotted Burrowing Frog	
<i>Uperoleia laevigata</i>	Smooth Toadlet	

Appendix C. Specific management objectives, indicators, triggers and contingencies

Pursuant to condition 4(c) in the approval decision, this OMP must also include objectives, performance indicators, trigger values and contingency or remediation measures associated with the following management issues. Refer to section 4 for details.

Management Issue	Objective	Performance Indicator (Monitoring)	Trigger Value	Contingency [#]	Remediation
Soil erosion	To control current incidence of erosion and minimise the occurrence of new erosion.	Erosion is not to progress more than 0.1 metre per year. Erosion progression will be monitored at the nick-points using marker posts and photo points. This is to ensure that works remain effective, and that the soil stabilises.	If erosion progresses at a rate of more than 0.1 metre per year.	The current erosion control measures were based on advice received by an experienced soil conservation practitioner. The works will include actions (i.e. tree planting) that will not provide immediate benefit. Additional advice will be sought from a suitably qualified expert if the erosion is progresses at a rate greater than 0.1 meter per year.	As per advice from qualified expert.

Management Issue	Objective	Performance Indicator (Monitoring)	Trigger Value	Contingency [#]	Remediation
Pest animals (rabbits)	To control the rabbit population within the Offset Area	Rabbit numbers will be monitored as part of the established survey program (section 4.3.2). This will inform of overall changes to the rabbit population over the entire nature reserve and not just the Offset Area. The aim is to maintain rabbit numbers at 2-3 per kilometre within the Pinnacle Nature Reserve.	If numbers (as counted during the spotlight survey) increase above 3 rabbits per kilometre.	Increase resources towards rabbit control within the Offset Area.	Given the resources allocated (and secured) to monitor and control rabbits within the Offset Area, and the frequency at which rabbit numbers are counted (biannually), it is not likely that the rabbit population will grow to numbers where remediation aimed at addressing this issue is required.
Stock grazing	To use grazing as a tool to maintain biomass at levels suitable for the MNES and to comply with bushfire fuel management requirements. Stock grazing will be implemented as is described in section 4.1.1. Stock grazing is identified as a management tool rather than a management issue.	The biomass levels will be assessed by PCS staff. These levels will be assessed prior to stock grazing. Stocking rates will be determined based on seasonal biomass reduction requirements. Stock will be removed once the desired biomass levels are reached.	The risks are: overgrazing or undergrazing - as identified by post grazing biomass levels. This could be due to difficulties accessing stock at required times or lack of communication between PCS staff and grazier.	-	Assess and improve internal operations.

Management Issue	Objective	Performance Indicator (Monitoring)	Trigger Value	Contingency [#]	Remediation
Weeds	To reduce the cover of key invasive species (as identified in section 4.3.1)	The cover and diversity of weeds will be monitored within the Offset Area (as described in section 6).	Contingency measures will apply if the cover and diversity of weeds increases above the average of levels for 2015 and 2016 for more than 3 consecutive years.	Increase the resources allocated to undertake weed control within the Offset Area. Commence trials to test alternative methods of weed control (this may include alternative methods of herbicide use, seeding with native grasses, burning trials etc). Advice will be sought from ACT Government ecologists to determine appropriate methods to trial and to establish the experimental design.	Given the resources allocated (and secured) towards monitoring and controlling weeds within the Offset Area, it is not likely that the cover and diversity of weeds will increase to the point where remediation is required. Nonetheless, PCS will commit to undertaking such works (i.e. revegetation) if the cover and diversity of weeds remains consistently above the average of 2015 and 2016 levels
Pathogens	To reduce the risk of pathogens (in particular <i>Phytophthora</i>) entering the Offset Area.	The guidelines outlined in section 4.3.4 are produced and followed by PCS staff, volunteers and contractors. Staff will be informed of their responsibility to comply with these guidelines and they will form part of works programs for contractors working in the Offset Area.	-	-	-

Management Issue	Objective	Performance Indicator (Monitoring)	Trigger Value	Contingency [#]	Remediation
Fire (to maintain the ecological integrity of ecosystems)	PCS does not commit to undertake any ecological burns over the life of this OMP.	-	-	-	-
Unwanted access (including the use of fencing and signage)	The Offset Area is public land, therefore access is not restricted. The boundary of the Offset Area will be fenced. Gates will be locked; however they will remain accessible to walkers. Nature Reserve and activity declaration signage will be erected in accordance with requirements under the <i>Nature Conservation Act 2014</i> .	No formal monitoring program will be implemented. Incidental monitoring of prohibited activities (under the NC Act) will occur as part of the duties of PCS staff.	-	-	-

Management Issue	Objective	Performance Indicator (Monitoring)	Trigger Value	Contingency [#]	Remediation
Assisted regeneration and revegetation	To protect regenerating plants and undertake revegetation works to improve native species and diversity towards benchmark level and to address specific land management issues (e.g. erosion).	The performance of these activities will be measured based on the contribution they make towards improving the condition of the box gum woodland community (monitored in accordance to program described in Section 6) and the contribution towards abating the erosion gully (see above for triggers, contingency and remediation plans to address this issue). In a bid to ensure revegetation works are delivered to a high standard, all works will be subject to a maintenance program. Maintenance of all revegetation works will be the responsibility of the revegetation project contractors.	-	-	-

[#]A 10% contingency is allocated within the Offset Area budget. In addition, the estimated funds allocated for each action in Section 7 can be transferred between actions. This provides flexibility with how individual actions undertaken in the Offset Area are delivered and is consistent with an adaptive management strategy.

Appendix D. Invasive Weed Control Calendar

Species	Treatment	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Serrated Tussock	Spraying												
	Chipping												
Chilean Needlegrass	Spraying												
	Chipping												
African Lovegrass	Spraying												
	Chipping												
St John's Wort	Spraying												
Blackberry	Spraying												
Broom/Gorse	Spraying												
	Cut/stump												
Willows	Spraying												
	Cut/stump or frill/inject												
Other woody weeds (e.g. Sweet Briar)	Spraying												
	Cut/stump												
Nodding Thistle	Spraying												
	Chipping												
Other Broadleaf (e.g. Patterson's Curse, Scotch Thistle)	Spraying or wick wiper												
	Chipping												
	Grazing												

The darker shading reflects optimal times for control (easier identification, less off-target damage, more effective control).

Timing of spring-summer control is later in Mountain areas and earlier in Tableland areas.

If there has been a hot-dry summer extending into autumn – then spraying woody weeds in autumn may fail.

For weed identification: WEEDeck www.sainty.com.au, Apps – Environmental Weeds of Australia and NSW WeedWise, Guidebook – Weeds of the South-East by Richardson et al <http://www.publish.csiro.au/pid/6820.htm>

For herbicide prescriptions: NSW Department of Primary Industry WeedWise app or the Noxious and Environmental Weed Control Handbook <http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/publications/noxious-enviro-weed-control>