Australian Capital Territory

Nature Conservation (Draft Reserve Management Plan—Canberra Nature Park) Public Consultation Notice 2019

Notifiable instrument NI2019—650

made under the

Nature Conservation Act 2014, s 179 (Draft reserve management plan—public consultation)

1 Name of instrument

This instrument is the *Nature Conservation (Draft Reserve Management Plan—Canberra Nature Park) Public Consultation Notice 2019.*

2 Commencement

This instrument commences on the day after its notification day.

3 Draft reserve management plan

I have prepared the Canberra Nature Park Draft Reserve Management Plan 2019 (the ***draft reserve management plan***) at schedule 1 to this instrument.

4 Public consultation period

(1) I invite written submissions from anyone about the draft reserve management plan. Submissions may be sent to:

Director, Parks Planning and Policy
Environment, Planning and Sustainable Development Directorate
GPO Box 158
CANBERRA ACT 2601
Email: environment@act.gov.au

(2) Submissions may only be given during the public consultation period. The public consultation period begins on the notification day of this instrument and ends at close of business, 16 December 2019.

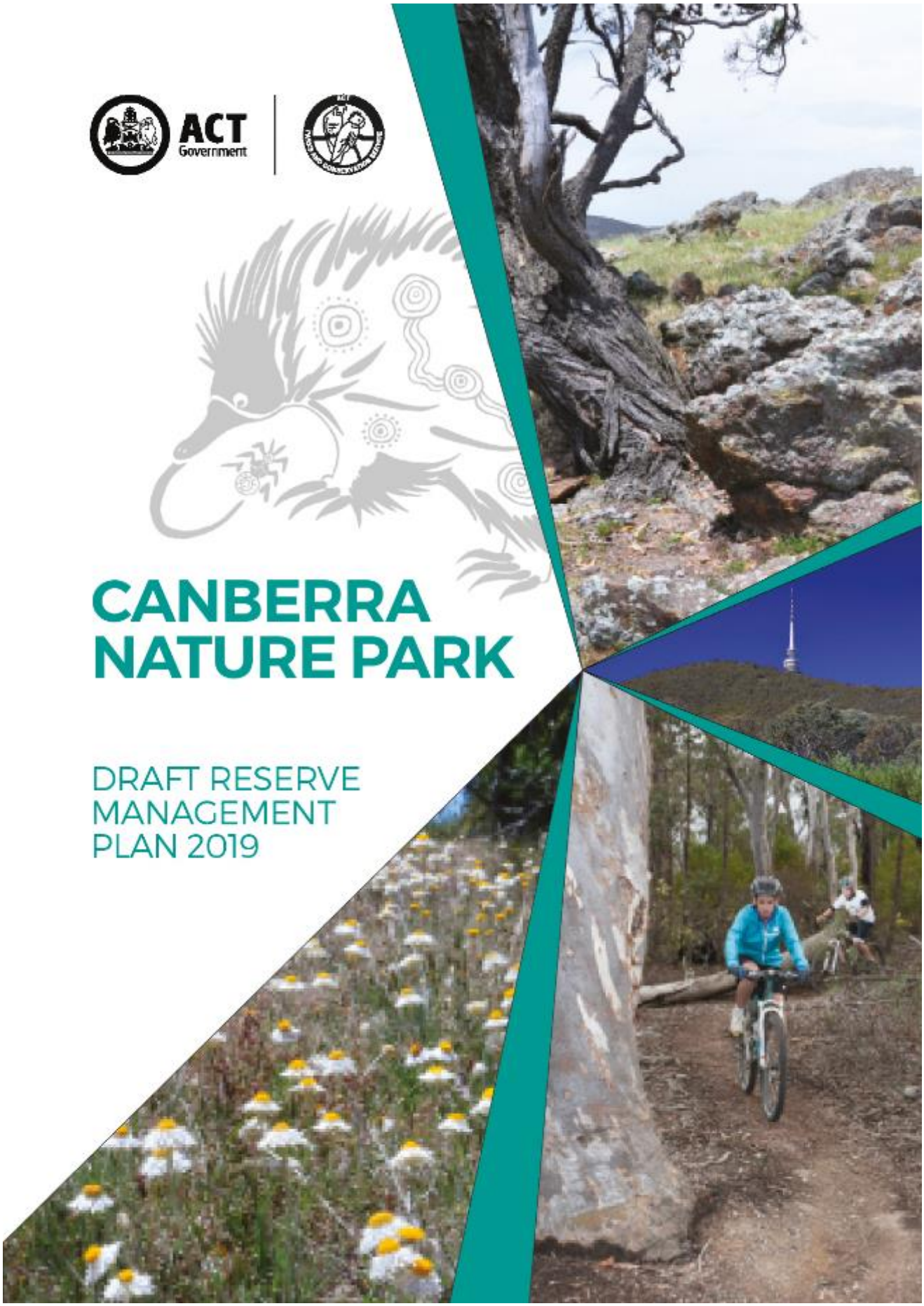
(3) The draft reserve management plan is available for inspection during business hours at Ground Floor South, Dame Pattie Menzies House, 16 Challis Street, Dickson and can be viewed online at http://www.environment.act.gov.au and on the Your Say website at http://www.yoursay.act.gov.au.

Ian Walker
Executive Group Manager, Environment
Custodian

24 September 2019

Schedule 1
(See section 3)

ACT Government



CANBERRA NATURE PARK

DRAFT RESERVE MANAGEMENT PLAN 2019

YOUR SAY

The Environment, Planning and Sustainable Development Directorate welcomes your comments on the Canberra Nature Park Draft Reserve Management Plan 2019.

YOU CAN MAKE COMMENTS BY:

Visiting: www.yoursay.act.gov.au

Email: epsddcomms@act.gov.au

Post: Director, Parks Planning and Policy
Environment, Planning and Sustainable Development Directorate
PO Box 158, Canberra ACT 2601

Enquiries: Access Canberra on 13 22 81

For public Information sessions please check YOURSAY for dates and locations.

COMMENTS CAN BE MADE UNTIL COB MONDAY 16 DECEMBER 2019

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Any personal information received in the course of your submission will be used only for the purposes of this community engagement process. Names of organisations may be included in any subsequent consultation report, but all individuals will be de-identified unless prior approval is gained.

CANBERRA NATURE PARK

DRAFT RESERVE MANAGEMENT PLAN 2019

ACKNOWLEDGMENTS

The ACT Government acknowledges Ngunnawal people as the Traditional Custodians of the ACT, and honours the cultural legacy of their ancestors and the ongoing responsibility they still carry in managing Country today. The region was also a significant meeting place for neighbouring language and clan groups including the Ngambri, Ngarigu, Wolgalu, Gundungurra, Yuin and Wiradjuri people – who came for ceremonies, trade, seasonal resources, exchange of knowledge and to maintain spiritual, social and environmental connectivity between traditional caretakers. For thousands of years these Nations have maintained a tangible and intangible cultural, social, environmental, spiritual and economic connection to these lands and waters. This is an acknowledgment of the individuals themselves; elders past, present and emerging, and of their continued connection to Country.

The ACT Government is grateful to the organisations and individuals who contributed to the preparation of this draft reserve management plan for Canberra Nature Park. These include Traditional Custodians, ParkCare groups, recreation user groups, conservation groups, other non-government organisations and Canberra Nature Park staff.

This draft reserve management plan has been developed by the ACT Parks and Conservation Service in the Environment, Planning and Sustainable Development Directorate.

Published by the Environment, Planning and Sustainable Development Directorate.

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Photographs

Front Cover Rocky knoll on Crace Grasslands Nature Reserve, Telstra Tower on Black Mountain Nature Reserve, Hoary Sunray (*Leucochrysum albicans*) (all Mark Jekabsons) and bike rider on Bruce Ridge Nature Reserve (Andrew Tatnell).

Back Cover Eastern Grey Kangaroo (*Macropus giganteus*), Button Everlasting (*Coronidium scorpioides*), Shingleback Lizards (*Tiliqua rugosa*) and fencepost (all Mark Jekabsons).

Flora and fauna collage – pages iv-v Hoary Sunray (*Leucochrysum albicans*) (Lois Padgham), Button Wrinklewort (*Rutidosis leptorrhynchoides*) (Margaret Calms), Austral bugle (*Ajuga australis*), Button Everlasting (*Coronidium scorpioides*), Swainsona sp. and Wahlenbergia sp. (Lesley Peden), Painted Honeyeater (*Grantiella picta*) (Geoffrey Dabb), Shingleback Lizards (*Tiliqua rugosa*) and Eastern Grey Kangaroo (Mark Jekabsons), Boobook Owls (*Ninox novaeseelandiae*) (Andrew Tatnell). Other images from ACT Parks and Conservation Service Library.

Mixed collage – page xv

Interpretive signage, stone steps, nesting box, dog walker, Mulligans Flat woolshed (Mark Jekabsons), bike rider (Andrew Tatnell) fire fuel reduction (Lois Padgham). Other images from ACT Parks and Conservation Service library.

All other photographs are as identified.

Echidna logo Brendon Little

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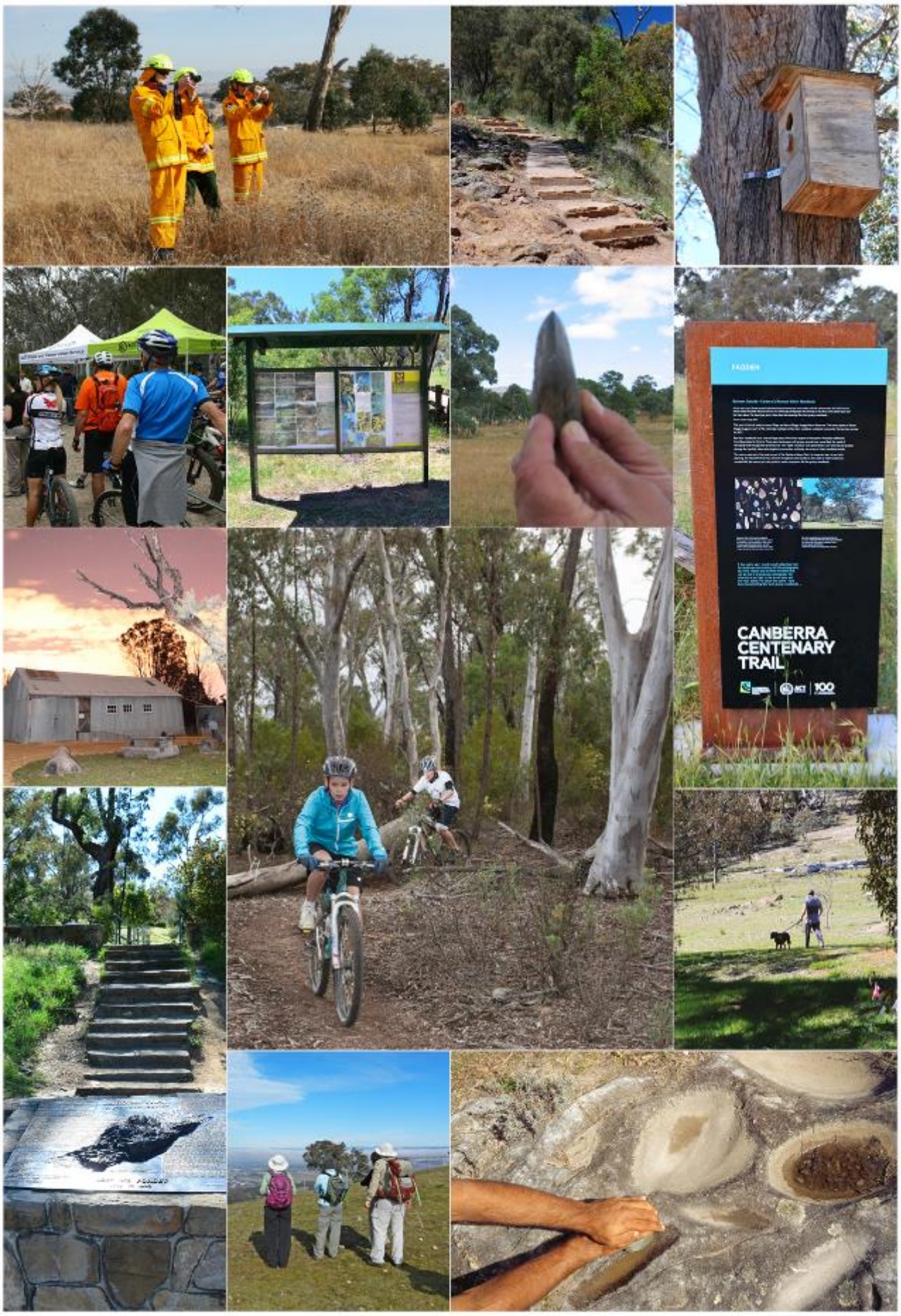


MINISTERIAL FOREWORD

Canberra Nature Park is integral to the city's image, lifestyle and liveability. The value of Canberra Nature Park to the growing and increasingly urban city of Canberra is immense. In partnership with our community, the government has a key role in protecting, preserving and enhancing the natural environment while also considering the needs of a growing city.

We understand that Canberra Nature Park is a precious resource that is valued for its intrinsic qualities as well as the many social, environmental and economic benefits it provides.

As part of our natural environment, Canberra Nature Park connects communities, reflects our culture, provides a classroom for life-long learning, provides resilience against a changing climate, gives us clean air and water, contributes to our economy and is part of an evolving tourism industry. Canberra Nature Park protects forested rocky hills and ridge lines, grassy woodlands on the lower and middle slopes, and lowland native grasslands. These precious areas are what give our city its distinctive character as the nation's "city in the landscape".

Many of Canberra Nature Park's nature reserves were created in the 1970s and early 1980s and set aside under the National Capital Plan to protect their scenic landscape qualities. Since the late 1980s, however, additional reserves have been established to protect threatened species and ecological communities. Canberra Nature Park also provides an extraordinary opportunity for nature-based experiences and an active lifestyle that so many Canberrans value.

I encourage you to enjoy Canberra Nature Park, to understand more about its natural and cultural values, and to use it to support your physical and emotional well-being.

Effective planning and management for Canberra Nature Park aims to maintain and restore ecologically sustainable and resilient landscapes in the face of climate change, to conserve natural and historic heritage values, and to support Aboriginal connection to Country.

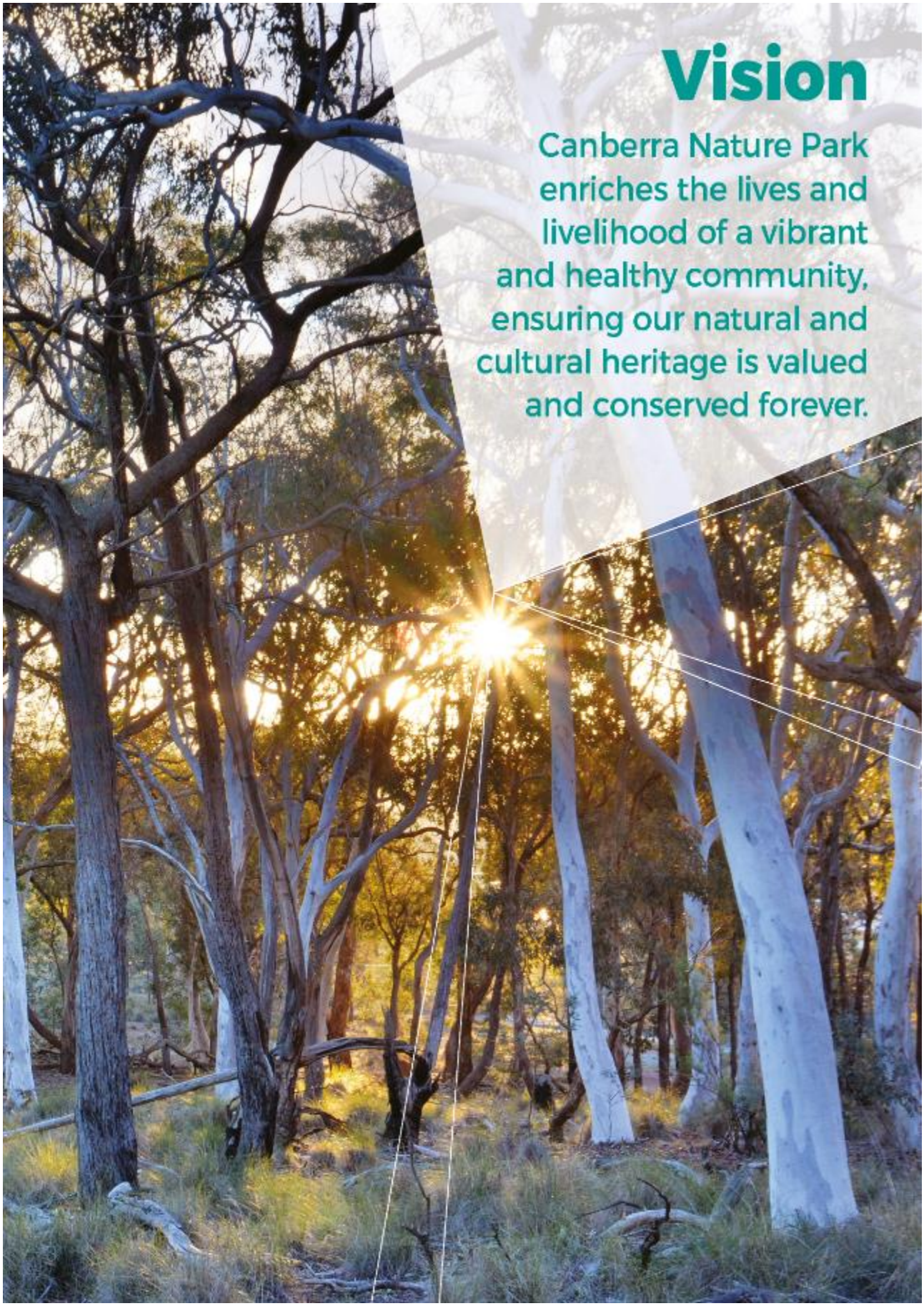
This draft management plan has been prepared under the *Nature Conservation Act 2014* and sets out how the ACT Parks and Conservation Service will protect the natural and cultural values of Canberra Nature Park into the future, while also welcoming visitors and enriching the life of the Canberra community. The ACT Government recognises the significant role that volunteers play in helping to meet these objectives.

Much consultation has already been undertaken in preparing this draft plan, and the contributions of individuals and organisation (see Acknowledgments) are greatly appreciated. The draft plan consolidates the outcomes of this consultation.

If you have an interest in the future of Canberra Nature Park, I encourage you to make a submission on this draft plan.

Mick Gentleman MLA

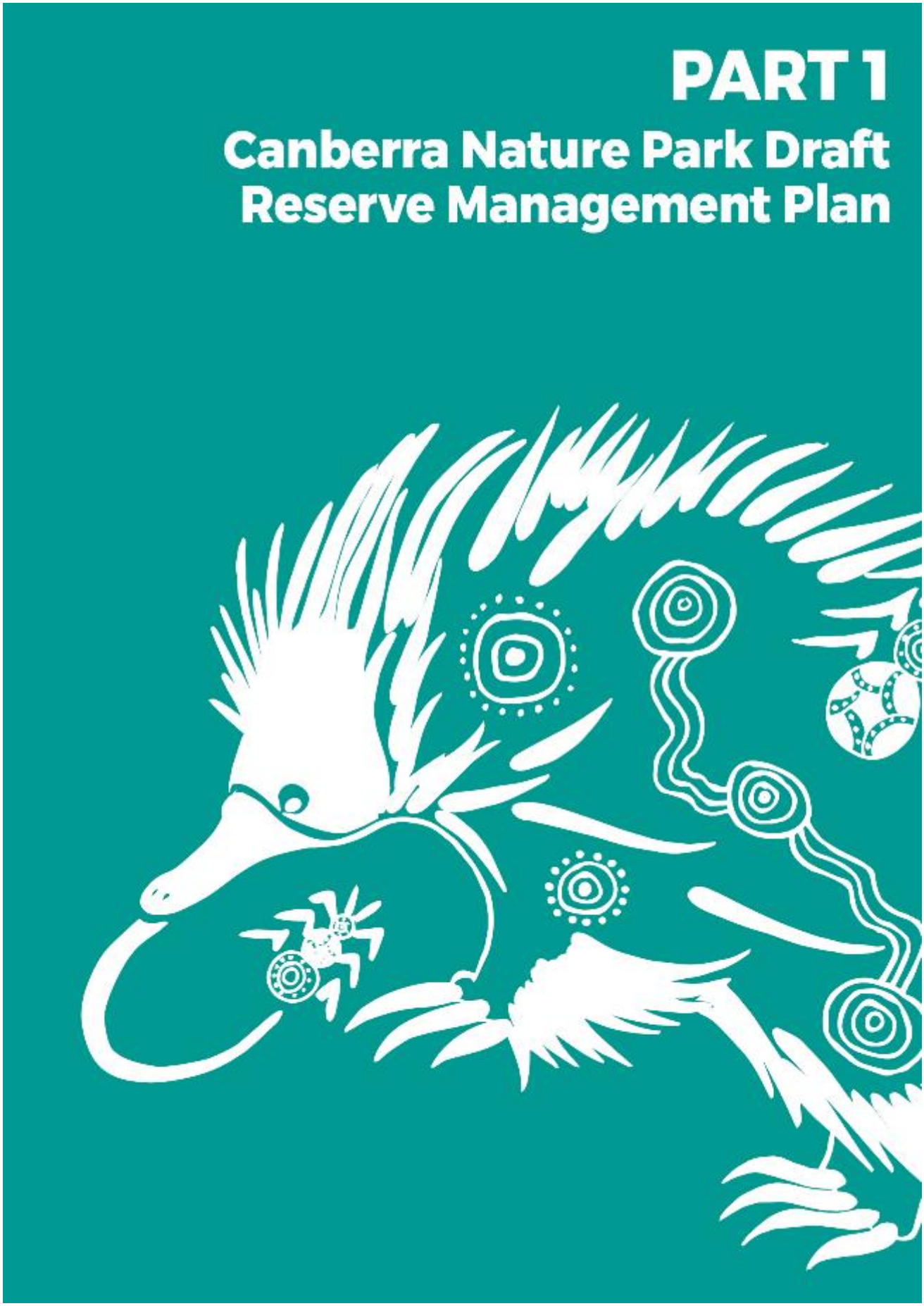
Minister for the Environment and Heritage



Mulligans Flat Nature Reserve (Mark Jekabsons)

PART 1

Canberra Nature Park Draft Reserve Management Plan



CHAPTER 1
INTRODUCTION

CANBERRA NATURE PARK:

- includes 37 nature reserves
- > 11,000 hectares
- protects critically endangered ecological communities and threatened species
- is accessible - almost 50% of Canberrans live within 500 metres
- contributes to the "Bush capital" character
- offers low key recreational activities.

THE RESERVE MANAGEMENT PLAN:

- sets a long term vision
- describes important values
- establishes goals and objectives
- provides actions for implementation over 10 years.

Grassy woodland at Mulligans Flat Nature Reserve (Mark Jekabsons)

1 INTRODUCTION

1.1 Canberra Nature Park

Canberra Nature Park reserves are located on the lands of the Ngunnawal people, who together with visiting neighbouring nations, managed this landscape for more than 25,000 prior to European colonisation and the establishment of the ACT. Canberra Nature Park protects places and objects of Aboriginal and historic heritage significance. The ACT Parks and Conservation Service respects and acknowledges Aboriginal connection with Country – past and present – and is committed to facilitating greater partnerships with local Traditional Custodians to manage Country together for the benefit of future generations.

Renowned as the city in the landscape, Canberra is unique in providing over 400,000 Canberrans with easy access to nature. With over 25% of Canberra's population living within 100 metres, and almost 50% living within 500 metres of a reserve, Canberra Nature Park makes a significant contribution to the ACT's city in the landscape brand and is highly valued for nature-based recreation, including walking, running, dog walking, cycling, mountain biking, horse riding, and group activities such as orienteering and rogaining.

With Canberra's urban densification and an increasing population, Canberra Nature Park provides the living infrastructure needed to sustain life and maintain Canberra's liveability - setting us apart from many other cities in the world. The benefits include climate resilience, purification and detoxification of water, air and soil, nature-based experiences (health, education, tourism and recreation), aesthetic values, spiritual and cultural experiences, mental and physical health and well-being, and economic values. Canberra Nature Park is an integral natural feature of Canberra, attracting families to live and work in the ACT and attracting businesses that recognise the benefits of workers being able to access nature.

The landscape values of the inner hills and ridges that make up Canberra Nature Park were recognised in Walter Burley Griffin's 1912 winning design for the layout of the National Capital. More than half of Canberra Nature Park reserves are identified in the National Capital Plan as Designated Areas— "having the special characteristics of the National Capital" and remain key components in the broader landscape that forms a backdrop to the National Capital.

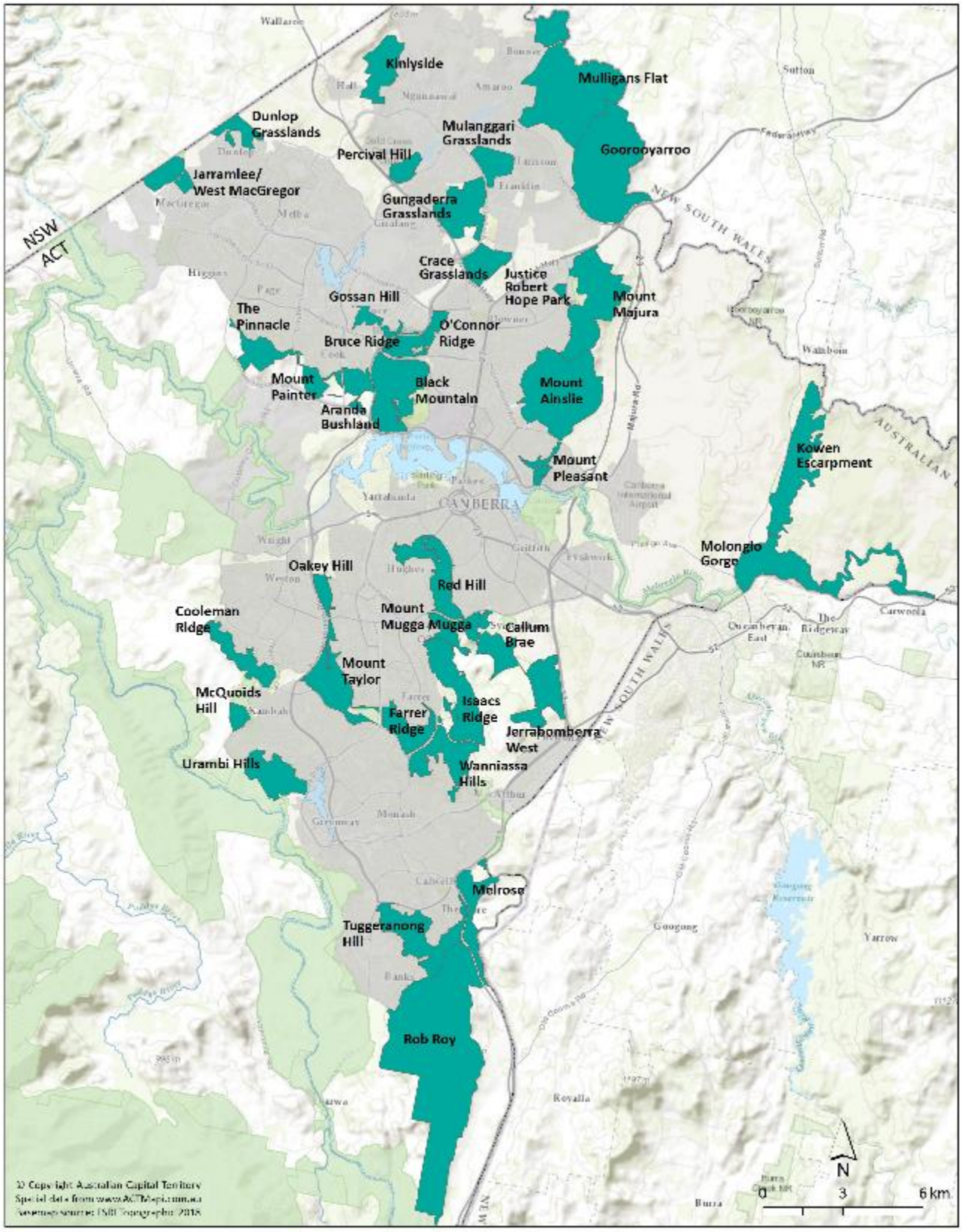
Canberra Nature Park comprises 37 nature reserves protecting remnant natural vegetation in and around urban Canberra. Many of the reserves include Yellow Box–Blakely's Red Gum Grassy Woodland or Natural Temperate Grassland; both ecosystems are critically endangered nationally. A number of threatened or declining animal species that rely on these ecosystems are also found in Canberra Nature Park. The reserves are valuable wildlife corridors, supporting the movement of some species through urban Canberra and into surrounding bushland within the broader region. Protected areas like Canberra Nature Park are increasingly recognised as critical links to building and improving ecological connectivity across the wider landscape, and strengthening resilience against disturbance or threats, such as climate change.

Canberra Nature Park reserves are identified as public land nature reserves in the Territory Plan. The reserves currently cover approximately 11,000 hectares in and around urban Canberra (Figure 1.1, Table 1.1). A small area of public land special purpose reserve at Isaacs Ridge is also included. Table 1.1 lists when each of the 37 nature reserves was protected, indicating the long history of Canberra Nature Park, and also identifies which reserves are within Designated Areas. Several adjacent areas, and other small areas of unleased land, are also managed by the Parks and Conservation Service for environmental outcomes and some may be added to Canberra Nature Park in the future.

1.2 Future nature reserves

Over the life of this plan it is likely that other areas will be added to Canberra Nature Park and managed in accordance with this plan.

Figure 1.1: Map of Canberra Nature Park



CANBERRA NATURE PARK – RESERVE LOCATIONS

Canberra Nature Park Reserve

Other ACT protected areas

Urban Area *(includes Residential, Commerical, Industrial, Community Facilities, Transport and Services, and Urban Parks and Recreation Land Use Zones)*

ACT Government

Table 1.1: Canberra Nature Park Nature Reserves

Nature Reserve	Area (approx. ha)	Year Protected	IUCN Category	Designated Area
Aranda Bushland	104	1993	IV	✔
Black Mountain	434	1970	IV	✔
Bruce Ridge	98	1993	IV	✔
Callum Brae	143	2008	IV	
Cooleman Ridge	187	1993	IV	✔
Crace Grasslands	159	1995	IV	
Dunlop Grasslands	103	1997	IV	
Farrer Ridge	185	1993	IV	✔
Goorooyarroo	829	2004	IV	Part
Gossan Hill	47	1993	IV	
Gungaderra Grasslands (includes Gungahlin Hill)	297	1995	IV	
Isaacs Ridge	387	1993	IV	✔
Jarramlee/West MacGregor Grasslands*	145	2016	IV	
Jerrabomberra West Grasslands*	261	2007	IV	
Justice Robert Hope Park	19	2016	IV	
Kinlyside	228	2014	IV	
Kowen Escarpment	466	1993	IV	
Melrose*	193	1993	IV	
McQuoids Hill	56	1993	IV	✔
Mount Ainslie	637	1993	IV	✔
Mount Majura	502	1993	IV	✔
Mount Mugga Mugga	148	1993	IV	✔
Mount Painter	93	1993	IV	✔
Mount Pleasant	57	1993	IV	✔
Mount Taylor	300	1993	IV	✔
Molonglo Gorge	506	1972	IV	
Mulanggari Grasslands	140	1995	IV	
Mulligans Flat	984	1995	IV	
Oakey Hill	65	1993	IV	✔
O'Connor Ridge	57	1993	IV	✔
Percival Hill	81	2006	IV	
Red Hill	293	1993	IV	✔
Rob Roy	2017	1993	IV	
The Pinnacle	154	1993	IV	✔
Tuggeranong Hill	365	1993	IV	
Urambi Hills	246	1993	IV	
Wanniassa Hills	262	1993	IV	✔

*Temporary name – a Ngunnawal language name, identified through consultation with Traditional Custodians, will be considered for new reserves and dual naming could be considered for some existing reserves.

Note: Many Canberra Nature Park nature reserves were protected in 1993 following the introduction of ACT self-government. Before 1993, ACT agricultural or parks agencies actively managed a number of the areas.
Several of the reserves have been extended since they were first established and minor rationalisation of some reserve boundaries is likely during the life of this plan.

1.3 Statement of significance

Value	Significance
Natural values	Canberra Nature Park protects remnants of woodlands and grasslands that were once widespread across south-eastern Australia. It includes the largest remaining patches of nationally listed critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland in Australia. Canberra Nature Park's reserves also protect critically endangered Natural Temperate Grasslands, important areas of dry forest and other vegetation types, and provide habitat for the largest populations nationally of several threatened grassland plant and animal species.
Landscape	The structure and geometry of Walter and Marion Mahoney Griffin's design for Canberra is inspired by the natural terrain. Hills and ridges, now largely contained within Canberra Nature Park, have been left undeveloped to frame suburbs located in the valleys and form the skyline at the end of key avenues. This landscape setting provides Canberra with a strong identity, and the city is considered to be an outstanding example of 20th century landscape design.
Aboriginal connection to Country	Canberra Nature Park has a rich Aboriginal history and includes many Aboriginal heritage places of cultural and archaeological significance, such as stone artefact scatters and scarred trees, that are protected in consultation with Traditional Custodial groups and Representative Aboriginal Organisations. The Traditional Custodians of the ACT, the Ngunnawal people, and other neighbouring language groups, including the Ngambri, Ngarigo, Wolgalu, Gundungurra, Yuin and Wiradjuri people, continue to have a strong cultural and spiritual relationship with the landscape.
Historic heritage	Pastoral settlement dates back to the 1820s. A small number of historic heritage sites remain in some reserves from 19th and early 20th century use. Preparation to establish the National Capital in the early 1900s included revegetating some inner hills and ridges that are now part of Canberra Nature Park. Protection of Canberra Nature Park reserves has a long history, with Black Mountain, Kowen Escarpment and Molonglo Gorge nature reserves protected in the early 1970s.
Enriching the Canberra community	Canberra Nature Park's extensive natural bushland shapes the urban environment of Canberra and enriches the lives of the people living in our city.
Nature-based experiences	Many Canberra Nature Park reserves provide for a range of nature-based experiences and have high levels of use for walking and running, cycling and mountain biking, dog walking, horse riding, bird watching, orienteering and rogaining. These recreational and tourism opportunities contribute significantly to the health and well-being of the community.
Community engagement	The integration of Canberra Nature Park reserves with the city and suburbs of Canberra provides opportunities to better inform, educate and engage the community in nature conservation and heritage protection. ParkCare groups, active for almost 30 years, have done much to improve the condition of reserves and to promote reserve values.
Research	There is a long history of ecological and taxonomic research within Canberra Nature Park, which contains the type localities of many species. Ongoing research into woodland ecology and restoration, currently focused in the Mulligans Flat and Goorooyarroo reserves, is of international significance and contributes to adaptive management practices for species and ecosystems. Citizen science makes a significant contribution to research across Canberra Nature Park.

These values are discussed in detail in subsequent chapters of this plan.

1.4 Management goals and key outcomes

The long-term goals to protect Canberra Nature Park's values reflect statutory objectives for the management of nature reserves:

1. conserve the natural environment; and
2. provide for public use for recreation, education and research.

The long-term goals are underpinned by key outcomes.

Goals	Key outcomes
Ecosystems and species are managed, in the face of a changing climate, for long-term viability and are well connected across the landscape.	• Structure, function, composition and extent of ecosystems are maintained and/or improved. • Native species diversity and high value habitats are maintained, and enhanced in priority areas. • Landscape connections between ecosystems are enhanced. • Threats, such as weeds, pest animals and inappropriate fire are managed.
Canberra Nature Park makes a significant contribution to the liveability of the city and health of the community.	• Nature-based experiences, including recreation and tourism, are enhanced through the provision of contemporary facilities, programs and information. • Accessibility is increased through the use of innovative technology and enabling facilities. • Canberra Nature Park provides a key venue for activities and experiences that improve community physical, emotional and social well-being.
Canberra Nature Park protects and contributes to the special character of Canberra as Australia's 'city in the landscape'.	• The landscape features of Canberra Nature Park are protected to maintain the visual backdrop and landscape setting of the National Capital.
Traditional Custodians' aspirations to care for Country are respected and enabled and their connection to Country is enhanced, with traditional practices enriching contemporary management and cultural, social and economic benefits accruing to Traditional Custodians and society.	• Traditional Custodians, Representative Aboriginal Organisations and other Aboriginal people are involved in reserve management. • Access to Country for cultural purposes is encouraged and supported. • Aboriginal heritage sites are protected.
Historic heritage values are protected, interpreted and well maintained.	• Significant historic heritage sites are conserved and interpreted to enhance understanding.

Goals	Key outcomes
Life-long connections between people, nature and parks are created through learning opportunities inspired by nature.	• Visitor experience is enriched by a range of opportunities and activities that promote appreciation, understanding and care of the natural and cultural values. • Community stewardship of reserves through volunteer activities contributes to social cohesion, environmental knowledge and shared management. • The knowledge and wisdom of Canberra's community is harnessed to inform reserve management. • Novel and diverse partnerships with private, corporate, NGO and government sectors enhance reserve management. • Local schools use Canberra Nature Park for nature based learning. • Online information about the about natural, cultural and social values of Canberra Nature Park is readily accessible.
Scientific evidence underpins management decisions.	• Programs are implemented that provide an evidence-based framework for increased management effectiveness. • Universities are involved in long term social and ecological research programs.

1.5 Purpose and structure of the reserve management plan

1.5.1 Purpose

The purpose of this management plan is to:

- describe the significance of Canberra Nature Park's values
- outline the legislative and policy context for management
- set the vision, goals and objectives for management, and identify policies and actions to achieve the objectives
- provide a basis for the community to understand and engage in reserve management.

This plan provides direction and guidance to the land manager (the ACT Parks and Conservation Service), volunteers, visitors, proponents of activities and uses, Traditional Custodians, neighbours and others with an interest in the area.

The plan is a legal document, replacing the Canberra Nature Park Management Plan 1999.

1.5.2 Structure

Part 1 of this plan describes the values of Canberra Nature Park, discusses management considerations, and sets out the overall goals, policies, objectives and actions for management. These terms are used in the following way:

Goals and key outcomes: Statements that set the broad directions and desired outcomes for management in the long term.

Objectives: Statements of desired outcomes over the life of this plan that are more specific than goals.

Policies: Underlying positions on issues that provide the basis for a consistent management response.

Actions: Specific undertakings, consistent with the policies, carried out to achieve the objectives over the life of this plan.

Part 2 of this plan groups reserves into landscape complexes that have similar values and management approaches. Individual reserve profiles provide summary information for each reserve including:

- key values
- overview of management direction and priorities
- maps showing natural values (Chapter 2 and Part 2) and reserve management zones (Chapter 6).

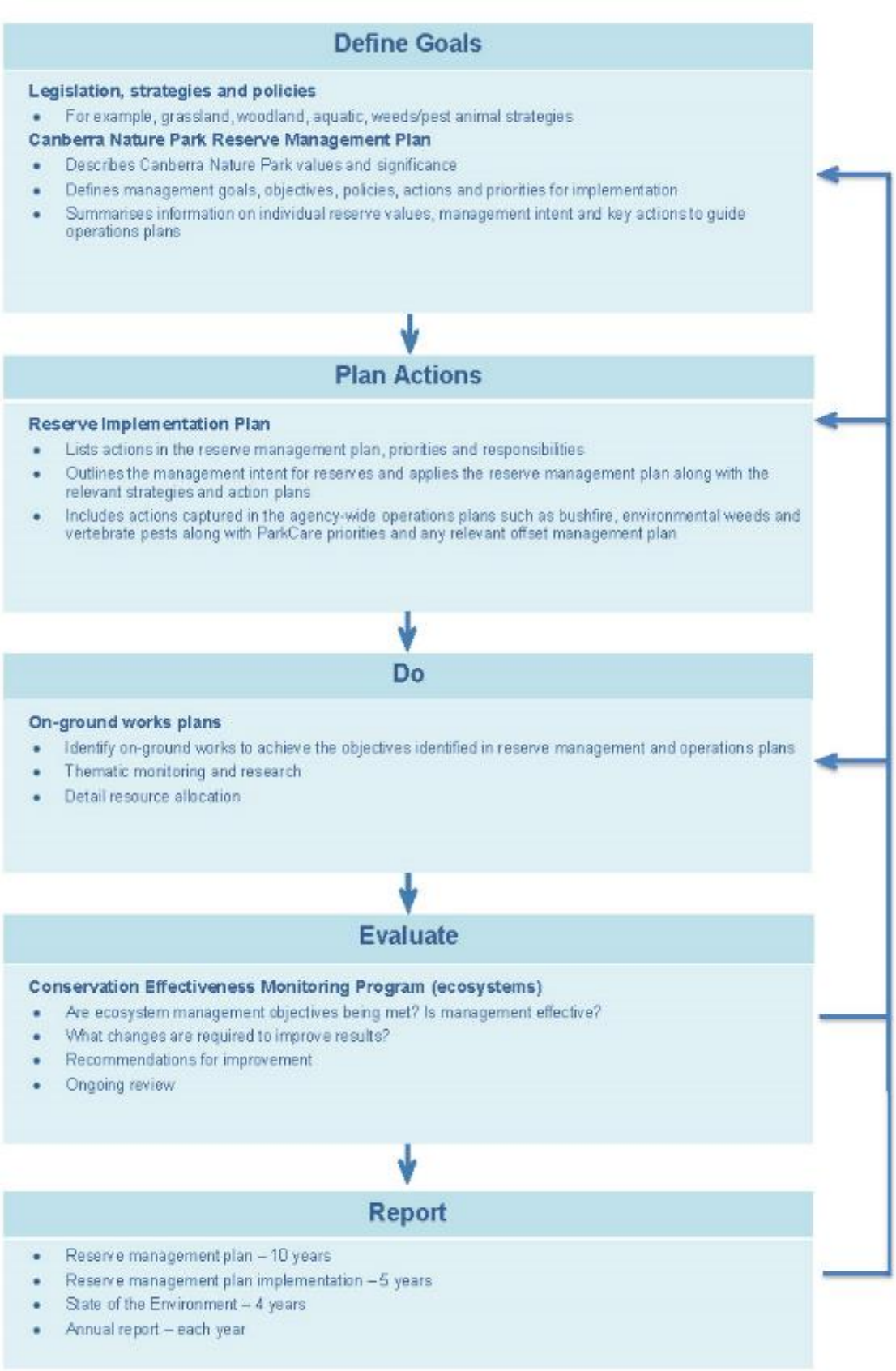
1.6 Management framework

The management of Canberra Nature Park is underpinned or influenced by a wide range of legislation, planning and policy documents and strategies.

Management of the values of Canberra Nature Park is guided by this plan, and will be supported by reserve implementation plans that will provide detail on how the objectives and actions identified in this plan will be achieved through on-ground activities.

The relationships between these key elements is shown in Figure 1.2.

Figure 1.2: Key elements that guide management of Canberra Nature Park



1.7 Implementation of the management plan

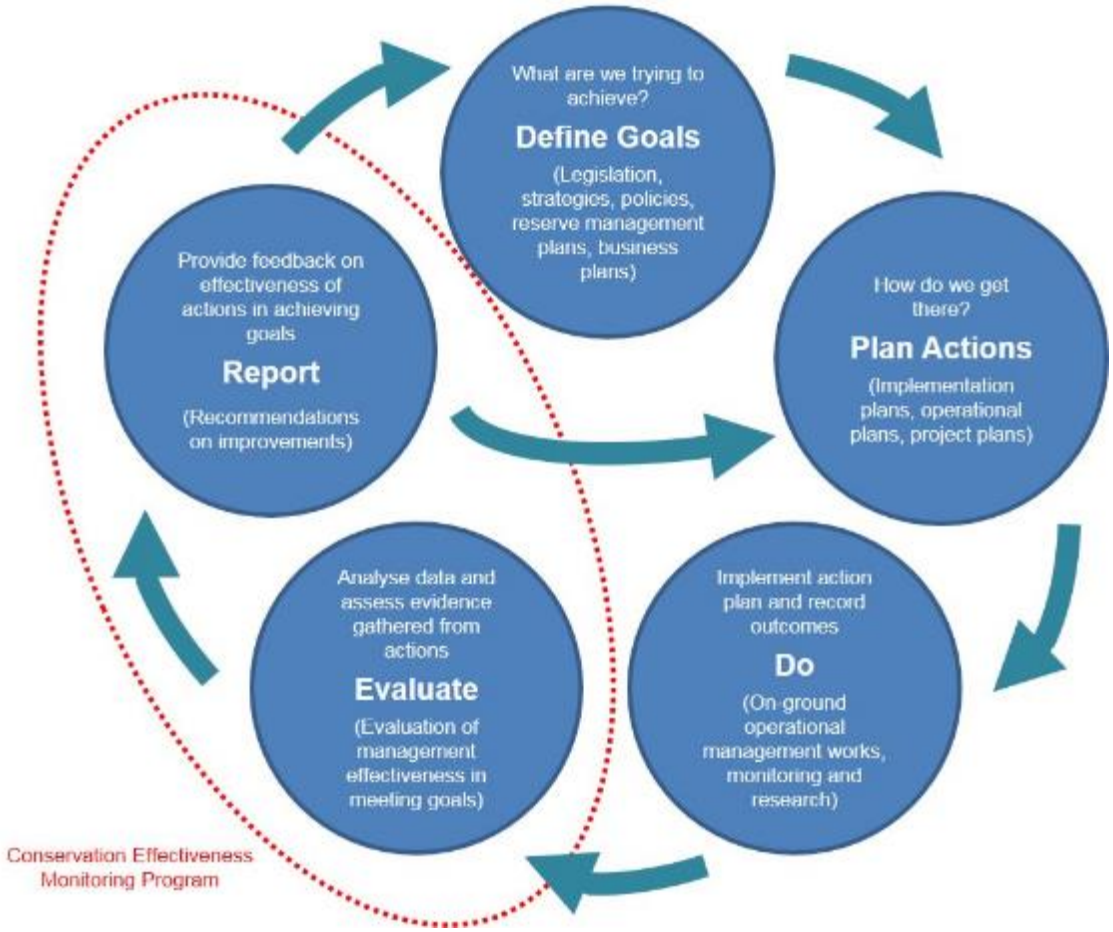
The specific objectives, policies and actions defined in this plan for managing the values of Canberra Nature Park (and the threats to those values) are to be implemented during the next ten years. The actions identified in each chapter are consolidated in the Table of Actions at Appendix 1, with priorities assigned. The table will form the basis of implementation plans to deliver this plan. A report on implementation will be provided to the Minister five years after the plan is approved.

The Commissioner for Sustainability and the Environment conducted an investigation into the management of Canberra Nature Park in 2011. The Commissioner recommended that a monitoring strategy be developed to ensure that threats to reserves were quickly identified and that information was made readily available to ensure better decision making in reserve management. In response, the Conservation Effectiveness Monitoring Program (CEMP) was developed to provide a framework for monitoring ecosystem condition and evaluating the effectiveness of management actions in achieving nature conservation objectives. CEMP includes indicators and metrics to enable evaluation and reporting of ecosystem condition through ecosystem monitoring plans. Application of the CEMP framework across the ACT reserve system will ultimately provide evidence to support land management decisions and is an integral part of an adaptive management approach to improve management effectiveness, as indicated in Figure 1.3.

1.7.1 Strategies, action plans and policies

A range of strategies, action plans and policies inform management of Canberra Nature Park (see Appendix 3) and relevant information will be incorporated into implementation plans.

Figure 1.3: The Adaptive Management Cycle



1.8 Legislation

Key legislation for Canberra Nature Park is listed below. Other legislation and policy documents are listed at Appendix 2.

ACT	
Planning and Development Act 2007	The Planning and Development Act governs land use in the ACT and establishes the Territory Plan. It provides for the identification of public land and its reservation for defined purposes, and outlines requirements for environmental impact assessment. Schedule 3 of the Act defines management objectives for all areas of public land. **Nature Reserve** management objectives are: 1 to conserve the natural environment 2 to provide for public use of the area for recreation, education and research. If there is an inconsistency between the application of these objectives then the second objective is subject to the first objective. **Special Purpose Reserve** management objective is: 1 to provide for public and community use of the area for recreation and education. The Act requires the preparation of public land management plans. If the land is wilderness area, national park, nature reserve, catchment area or a special purpose reserve managed under the *Nature Conservation Act 2014*, then the management plan is prepared under the Nature Conservation Act.
Nature Conservation Act 2014	The Nature Conservation Act prescribes processes for management planning for the conservation reserves. Section 169 defines a reserve. It is the chief legislation for the management of reserves and the protection of native plants and animals in the ACT.
Emergencies Act 2004	The Emergencies Act aims to protect and preserve life, property and the environment. The Act requires the preparation of a Strategic Bushfire Management Plan for the ACT and establishes the ACT Rural Fire Service as the body responsible for operational planning and fire response in rural areas.
Heritage Act 2004	The Heritage Act provides for the recognition, registration and conservation of places and objects of natural and cultural significance, and establishes statutory protection for all Aboriginal places and objects within the ACT. It sets out criteria for determining heritage significance and establishes the ACT Heritage Register.
Human Rights Act 2004	The Human Rights Act acknowledges that Aboriginal and Torres Strait Islander peoples hold distinct cultural rights and must not be denied the right to maintain, protect and develop their culture. The Act also recognises their material and economic relationships with the land, waters and other resources.
Commonwealth	
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	The Environment Protection and Biodiversity Conservation Act is the primary Commonwealth legislation for environment and heritage protection, and outlines the environmental impact assessment process for actions that may have a significant impact on matters of national environmental significance.
Australian Capital Territory (Planning and Land Management) Act 1988	The ACT (Planning and Land Management) Act makes provision for the planning and management of land in the ACT.

1.9 Land planning in the ACT

Planning in the ACT occurs at different scales.

Land use planning: determines in a broad sense which areas of land will be used for what purpose (National Capital Plan, Territory Plan).

Reserve management planning: once land use has been assigned, management plans prescribe how reserved areas such as Canberra Nature Park will be managed to achieve statutory objectives.

Site planning: addresses the design of a particular area or facility (for example, design of picnic areas). This detailed planning may be done in stages, starting with a 'concept plan' or 'master plan. In subsequent stages, detailed design documents are prepared for the construction of the new facilities as part of specific capital works projects.

All land in Canberra Nature Park is Territory Land as defined in the Australian Capital Territory (Planning and Land Management) Act. Its management is the responsibility of the ACT Government; however, it is still subject to the policies of the National Capital Plan as well as the Territory Plan.

The **National Capital Plan** aims to ensure that the Commonwealth's National Capital interests in the Territory are protected. Canberra Nature Park is included in the Hills, Ridges and Buffer Spaces land use category of the National Capital Open Space System (NCOSS). Hills, ridges and buffer spaces are to remain substantially undeveloped in order to protect the symbolic role and Australian landscape character of the hills and ridges as the scenic backdrop to the Parliamentary Zone, the city centre and other National Capital precincts and to ensure that their landscape, environmental and recreation values become an integral part of the National Capital.

In the **Territory Plan**, established under the Planning and Development Act, Canberra Nature Park is largely included in the Non-urban Zone: NUZ3 Hills, Ridges and Buffers. General objectives for this zone cover conservation of significant cultural and natural heritage resources and wildlife corridors, opportunities for appropriate recreation, visual separation of towns, opportunities for environmental education and scientific research activities.

Molonglo Gorge is included in the Non-urban Zone: NUZ4 River Corridor. General objectives for this zone cover conservation of ecological and cultural values of the ACT's major rivers, protecting stream flow and water quality, ensuring the type and intensity of development is sustainable, providing opportunities for appropriate recreation and for environmental education and scientific research activities.

An **International Union for the Conservation of Nature (IUCN) Protected Areas Category** has been assigned to reserves by the Conservator of Flora and Fauna (the Conservator) under the Nature Conservation Act.

All existing Canberra Nature Park nature reserves have been identified as **IUCN Category IV: Habitat/species management area** with a primary management objective to: maintain, conserve and restore species and habitats.

The objectives outlined in this management plan for Canberra Nature Park are consistent with IUCN Category IV as indicated in Appendix 3.

1.10 Management responsibilities in Canberra Nature Park

The Parks and Conservation Service is the custodian of the unleased public land within Canberra Nature Park, and is responsible for managing the area to meet the objectives.

Some areas not currently protected as nature reserve are also managed by the Parks and Conservation Service. Whilst there is no statutory basis for managing these areas as reserves, they are generally managed to achieve the same goals and objectives as those outlined in this plan. These areas are identified as 'Other land managed by ACTPCS' on zoning maps for individual reserves in Part 2 of this plan.

1.10.1 Areas within Canberra Nature Park subject to lease, licence or other arrangement

Rural leases

Rural leases apply in Kinlyside and West MacGregor Grasslands, and over parts of Crace Grasslands, Kowen Escarpment, Rob Roy, Tuggeranong Hill and Urambi Hills nature reserves. Land Management Agreements, which include requirements to protect nature conservation values, apply in these areas (see section 10.8).

Other leases

Other private leases exist within Canberra Nature Park[1], for example, the Broadcast Australia National Transmission Station has a lease in Gungaderra Grasslands Nature Reserve. A management plan has been prepared by the lessee to protect nature conservation values within the lease area.

Areas subject to licences and permits

Licences and permits can be issued to undertake activities within reserves. Licences are issued under the Nature Conservation Act and the Planning and Development Act, and permits are issued under the *Public Unleased Land Act 2013.* Whilst the activities are not managed by the Parks and Conservation Service, they are generally supervised by it.

Utility infrastructure

To service urban areas, utility infrastructure (such as water reservoirs and telecommunication towers) has been built in a majority of reserves. Some have lease arrangements. Formalised management arrangements, for example management agreements and/or codes of practice, are established between the Parks and Conservation Service and utility providers. Utility infrastructure is not shown on maps in Part 2.

Tenancy agreements

A few residential houses are within Canberra Nature Park[1] and operate under tenancy agreements. These agreements are subject to conditions and are likely to be reviewed over the term of this plan.

A variety of activities occur[1] in several other small areas within Canberra Nature Park. These areas are generally identified as restricted access areas on the maps in Part 2 and are managed by other organisations. These arrangements may be reviewed or formalised over the life of this plan.

[1] A legacy of previous administrative arrangements.

Excluded area

The Canberra National Pistol Club has a lease on the eastern side of Mount Ainslie. This area is identified as a Special Purpose Reserve, is not part of Canberra Nature Park, and the provisions of this management plan do not apply.

The Woolshed at Mulligans Flat Nature Reserve (Mark Jekabsons)

Mulligans Flat Nature Reserve (Mark Jekabsons)

Mount Majura Nature Reserve (Mark Jekabsons)

Mount Taylor Nature Reserve (Mark Jekabsons)

Wattle seeds (PCS Library)

2 PLANTS AND ANIMALS

2.1 Ecosystems

The grasslands, woodlands and forests[2] of Canberra Nature Park are of regional and national conservation significance due to the size and connection of vegetation patches, and the habitat they provide for rare and threatened species.

Over one third of the area of Canberra Nature Park supports nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland, and approximately 10% supports nationally critically endangered Natural Temperate Grassland or habitat of threatened grassland animals and plants. Several threatened plant species (Table 2.1) are found in Canberra Nature Park, along with more than 100 rare and uncommon plant species.

The locations of vegetation types in Canberra Nature Park are summarised in Figure 2.1.

Yellow Box-Blakely's Red Gum Grassy Woodland in Justice Robert Hope Park Nature Reserve (Andrew Tatnell)

2.1.1 Woodland

Canberra Nature Park woodlands cover around 6500 hectares and are generally found on the deeper, more fertile soils of the middle and lower slopes of hills at altitudes between 600 and 900 metres, in areas not susceptible to cold air drainage.

Yellow Box (*Eucalyptus melliodora*)–Blakely's Red Gum (*Eucalyptus blakelyi*) Grassy Woodland, listed as an endangered community in the ACT and critically endangered nationally, covers approximately 3743 hectares in Canberra Nature Park. The community has a sparse shrub layer and an understorey that contains a high diversity of grasses and forbs. Important reserves for the community include Mulligans Flat, Goorooyarroo, Kinlyside, Mount Majura, Mount Ainslie, Red Hill, Mount Mugga Mugga, Callum Brae, Isaacs Ridge, Farrer Ridge, Tuggeranong Hill and Rob Roy.

The woodland in Mulligans Flat–Goorooyarroo and the lower slopes of Mount Majura–Mount Ainslie is the largest known remaining patch of Yellow Box–Blakely's Red Gum Grassy Woodland in Australia. The sites within the Red Hill–Mount Mugga Mugga–Isaacs Ridge–Callum Brae–Jerrabomberra West–Wanniassa Hills–Farrer Ridge–Mount Taylor complex is the second largest known remnant patch, exceeding 1500 hectares.

[2] There have been numerous classifications used to name vegetation communities in the ACT. The current classification uses the communities described by Armstrong et al. *Plant Communities of the Upper Murrumbidgee catchment in New South Wales and the Australian Capital Territory* (*Cunninghamia (2012) 13(1): 125-266*). Additional native and derived vegetation communities have also been described where vegetation did not fit within the descriptions by Armstrong et al. Descriptions of these communities can be found at <www.environment.act.gov.au/__data/assets/pdf_file/0009/576846/CPR_Technical_Report_28.pdf>.

Mulligans Flat–Goorooyarroo is the site of the Mulligans Flat–Goorooyarroo Woodland Experiment, a research project of international importance, with a particular focus on woodland ecology and restoration. See Chapter 9 for additional information.

Canberra Nature Park woodland remnants have a particularly diverse native understorey, with over 200 woodland plant species recorded in Mulligans Flat, Goorooyarroo, Mount Majura, Mount Ainslie, Red Hill, Farrer Ridge, Tuggeranong Hill and Rob Roy.

Drooping She-oak (*Allocasuarina verticillata*)–Lowland Woodland to Open Forest occurs on shallow infertile hill slopes with a wide range of trees including Yellow Box, Blakely's Red Gum, Brittle Gum (*Eucalyptus mannifera*), Scribbly Gum (*Eucalyptus rossii*), Kurrajong (*Brachychiton populneus*) and Parramatta Green Wattle (*Acacia parramattensis*). Mid-layer and ground-layer diversity is low. This woodland is largely found on Mount Majura, Mount Ainslie, Red Hill, Isaacs Ridge, Mount Taylor, Tuggeranong Hill and Rob Roy. Drooping She-oak is a critical foraging resource for the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami*).

Red Box (*Eucalyptus polyanthemos*)–Tall Grass–Shrub Woodland to Open Forest generally occurs on lower and mid slopes with a north to north-easterly aspect, on soils derived from sedimentary rocks. It is characterised by an overstorey comprising almost entirely of Red Box. This woodland has a restricted distribution with relatively large occurrences within Rob Roy, Tuggeranong Hill, Callum Brae, Black Mountain, Aranda Bushland, Kowen Escarpment and Mount Ainslie.

Snow Gum (*Eucalyptus pauciflora)* Grassy Woodland is listed as an endangered ecological community in NSW and has a very limited distribution in the ACT and region, usually around the fringes of valley-floor frost hollows. Twenty hectares of this woodland occurs on the cooler south and south-easterly facing slopes of Mount Majura and Mount Ainslie, while small patches are associated with frost hollows within Aranda Bushland, Mount Painter and Gungaderra Grasslands nature reserves.

The Draft ACT Native Woodland Conservation Strategy (ACT Government 2019a), which will supersede the current ACT Lowland Woodland Conservation Strategy (ACT Government 2004), outlines conservation goals, objectives and actions for lowland woodland and woodland dependent species.

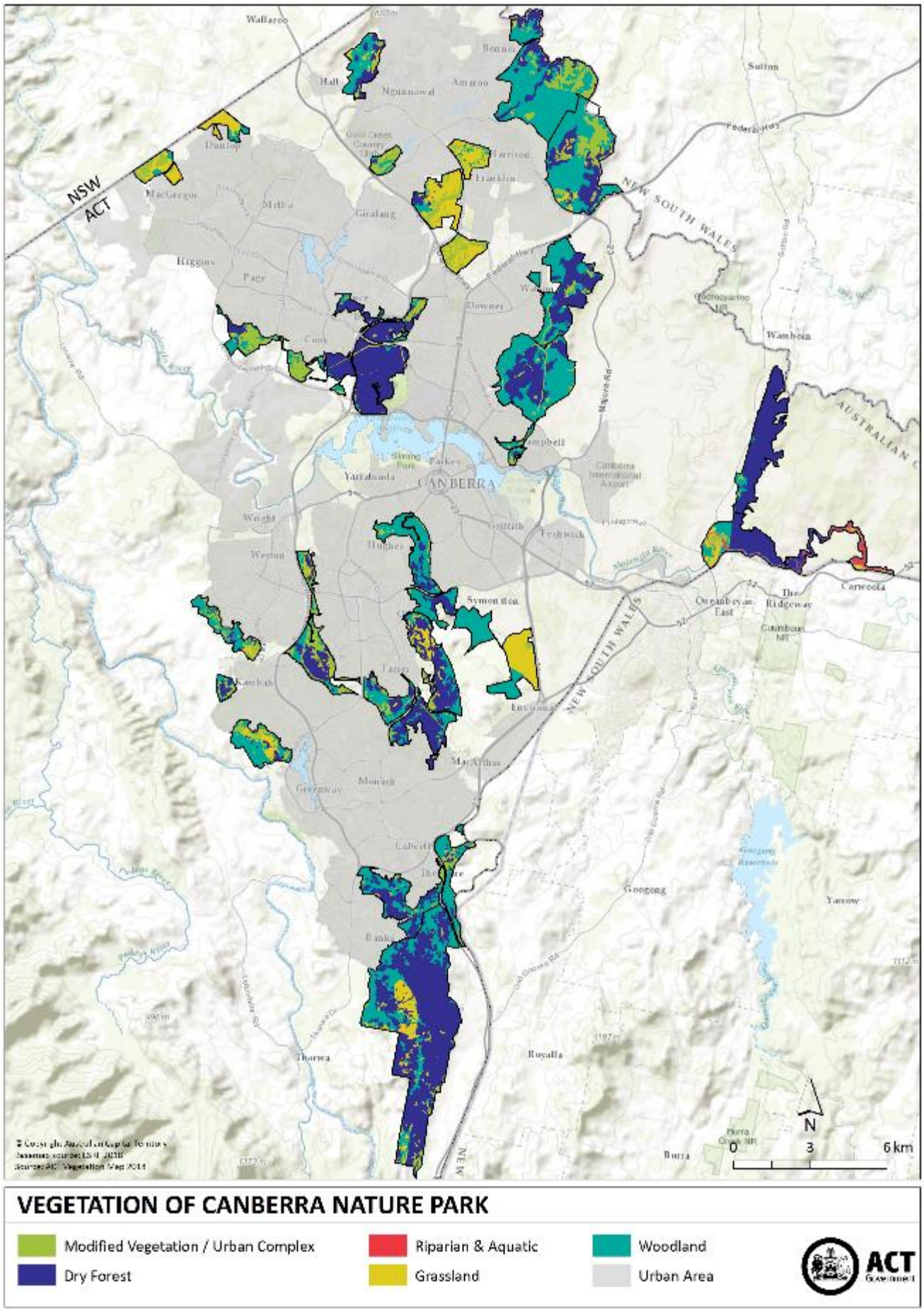
ACT woodland restoration

The ACT and Australian governments have contributed $3.1 million for the ACT woodlands restoration project as part of a larger program to consolidate and connect 60,000 hectares of the largest remaining areas of Yellow Box-Blakely's Red Gum woodland in Australia. Activities include:

- improving woodland habitat connectivity
- enhancing woodland habitat, for example, by adding coarse woody debris and a shrub layer
- improving landscape scale conservation
- implementing research outcomes
- encouraging community participation, including 43 community groups, schools and organisations and 18 rural landholders.

Since 2004, Mulligans Flat and Goorooyarroo nature reserves have been the focus of a long-term research partnership between the ACT Government, the Australian National University and CSIRO to better understand and rehabilitate the structure and function of box–gum woodland ecosystems. This has included: replenishing fallen timber habitat; trialling fire regimes; and removing introduced predators while reintroducing locally extinct fauna, including 'ecosystem engineers' such as the Eastern Bettong (*Bettongia gaimardi*), within a large predator-proof enclosure (see section 9.1.1).

Figure 2.1: Vegetation of Canberra Nature Park



2.1.2 Natural Temperate Grassland

Canberra Nature Park includes around 900 hectares of natural temperate and other native grassland, located in the Jerrabomberra, Majura, Belconnen, Molonglo and Gungahlin valley floors.

Natural Temperate Grassland of the South Eastern Highlands (NSW and ACT) is listed as a critically endangered community nationally, and as endangered in the ACT.

The ACT has some of the largest remaining patches of Natural Temperate Grassland in Australia, which represent a significant proportion of reserved areas for this community nationally (ACT Government 2005, NSW Office of Environment and Heritage 2011). These areas, and connected areas of other native grassland, are also recognised as major habitat for several nationally threatened grassland animals and plants.

While low plant diversity dominates grasslands within Canberra Nature Park (comprising a mix of native and exotic pasture species), there are patches of higher plant diversity within Crace, Dunlop, Gungaderra, Mulanggari and Jerrabomberra West grassland reserves. These areas have populations of several plants considered rare within the ACT.

The following four grassland communities fall within the definition of Natural Temperate Grassland (at an ACT and Commonwealth level) and are protected within Canberra Nature Park.

Wallaby Grass (*Rytidosperma spp.*)–Kangaroo Grass (*Themeda triandra*)–Sedge (*Juncus spp*.) Grassland of Occasionally Wet Sites is most commonly found on flats or adjacent to drainage lines or wetlands, and occasionally further upslope. Waterlogging and severe frosts limit the growth of woody vegetation in this community. Within Canberra Nature Park, this community is largely restricted to the Murrumbateman sub-region of the South Eastern Highlands Bioregion. Associated species include Blown Grasses (*Lachnagrostis spp*.), Variable Raspwort (*Haloragis heterophylla*), Common Bogsedge (*Schoenus apogon*) and Tussock Sedge (*Carex appressa*).

Wallaby Grass (*Rytidosperma spp.*)–Yangabil (*Austrostipa bigeniculata*)–Common Everlasting (*Chrysocephalum apiculatum*) Grassland occupies a variety of landscape positions ranging from flats to mid slopes across a range of substrates. Severe frosts, hot drying winds, cracking clays and waterlogging all contribute to limiting the growth of woody plants in this community. This grassland association is also largely restricted to the Murrumbateman sub-region of the South Eastern Highlands Bioregion. The most common species are Short Wallaby Grass (*Rytidosperma carphoides*), Lobed Wallaby Grass (*Rytidosperma auriculatum*), Redleg Grass (*Bothriochloa macra*), Yangabil (*Austrostipa bigeniculata*), Kangaroo Grass (*Themeda triandra*), Common Everlasting (*Chrysocephalum apiculatum*) and Small Matrush (*Lomandra bracteata*).

Kangaroo Grass (*Themeda triandra*)–Wallaby Grass (*Rytidosperma spp.*)–Snow Grass (*Poa sieberiana*) Moist Grassland is found on mid slopes and foot slopes with sedimentary or colluvial lithologies. It is predominantly distributed in the Murrumbateman sub-region, but may also be present in small parts of the Monaro sub-region of the South Eastern Highlands Bioregion within the ACT. Kangaroo Grass tends to dominate, with the other two grasses being sub-dominant. Forbs include Common Everlasting, Scaly Buttons (*Leptorhynchos squamatus*) and Common Woodruff (*Asperula conferta*).

Kangaroo Grass (*Themeda triandra*)–Wattle Matrush (*Lomandra filiformis*)–Wallaby Grass (*Rytidosperma spp.*)–Weeping Grass (*Microlaena stipoides*)–Purple Wiregrass (*Aristida ramosa*)–Common Everlasting (*Chrysocephalum apiculatum*) Dry Grassland is predominantly a mid and upper slope community with occasional occurrences on rocky flats adjacent to streams. Overlooking valleys or plains, these grasslands are exposed to dry hot winds, restricting woody vegetation growth. Common forbs include Bluebells (*Wahlenbergia spp*.), Curved Riceflower (*Pimelea curviflora*) and Ivy Goodenia (*Goodenia hederacea*).

The ACT Native Grassland Conservation Strategy 2017 (ACT Government 2017b) provides the strategic context for the protection, management and restoration of ACT native grasslands. It is a reference document on native grassland for ACT and Australian government agencies with responsibilities for nature conservation, planning and land management, and for the community and other stakeholders with an interest in native grassland conservation.

Jerrabomberra West Grasslands Nature Reserve (Chris Holly)

ACT grasslands restoration

With the support of the Australian and ACT governments, the Parks and Conservation Service is conducting a program of grassland restoration with the objective of improving and expanding habitat for threatened grassland species in several of the grassland reserves in Canberra Nature Park. The program aims to:

- improve the coordination, implementation and monitoring of established management programs in grassland reserves
- implement a site-specific, managed disturbance regime that utilises a combination of grazing, fire and slashing to increase habitat heterogeneity
- trial the use of reinstated surface rock as habitat for grassland lizards and invertebrates
- promote the grassland reserves and encourage community involvement.

2.1.3 Dry forest

Canberra Nature Park supports around 2100 hectares of dry, open eucalypt forest. There are four main dry forest types within Canberra Nature Park:

Red Stringybark (*Eucalyptus macrorhyncha*)–Scribbly Gum (*Eucalyptus rossii*)–Red-anthered Wallaby Grass (*Rytidosperma pallidum*)–Tall Grass Shrub Dry Sclerophyll Open Forest occurs on the ridges, rocky slopes and sandy low nutrient soils of the northern half of the ACT. Other dominant trees include Red Box (*Eucalyptus polyanthemos*) and Brittle Gum (*Eucalyptus mannifera*). Large parts of Black Mountain, Aranda Bushland, Gossan Hill, Bruce Ridge, Mount Ainslie, Mount Majura, Rob Roy and Kowen Escarpment nature reserves support this forest.

The forests on Black Mountain and surrounding areas have developed over millions of years on a large sandstone block in a landscape otherwise dominated by volcanic and alluvial soils. These characteristics have contributed to the occurrence of many uncommon plant species. Black Mountain contains significant old growth occurrences of dry forest, is the only habitat (or ACT stronghold) for 18 plant species and is a habitat for a further 23 species considered rare or uncommon in the ACT. Aranda Bushland also contains a large diversity of uncommon plant species.

Mealy Bundy (*Eucalyptus nortonii*)–Broad-leaved Peppermint (*Eucalyptus dives*)–Shrubby Open Forest occurs on dry rocky volcanic slopes in Rob Roy, Mount Taylor and Kinlyside reserves. The shrub layer is dense and diverse while the groundcover is sparse.

Apple Box (*Eucalyptus bridgesiana*)–Broad-leaved Peppermint(*Eucalyptus dives*)–Tall Shrub Grass Open Forest occurs on relatively moist but rocky volcanic slopes. Shrubs are common, while the understorey is grassy and supports a diversity of herbs. This community is found in Mount Taylor, Wanniassa Hills, Mount Mugga Mugga, Mount Majura, Mount Ainslie, Black Mountain, Aranda Bushland, Molonglo Gorge and Farrer Ridge nature reserves.

Black Cypress Pine (*Callitris endlicherii*)–Brittle Gum (*Eucalyptus mannifera*)–Tall Dry Open Forest occurs in Molonglo Gorge and Rob Roy nature reserves.

Open forest at Black Mountain Nature Reserve (Andrew Tatnell)

2.1.4 Modified vegetation/urban complex

Modified vegetation/urban complex areas have undergone disturbance that has changed the vegetation structure and composition so it no longer resembles the original vegetation communities.

In some areas the change is limited to clearing of the tree canopy. Some of these sites are now undergoing natural succession as shrubs colonise the cleared areas, creating derived native shrublands. These areas are usually strongly dominated by native species but contain a relatively low species diversity compared to unmodified vegetation types.

In other areas the disturbance has been more intense and is ongoing, leading to a more permanent highly modified vegetation structure and composition. In the urban complex, for example, the tree and shrub layers have often been removed and groundcover replaced by disturbance-tolerant annual grasses and broadleaf weeds.

The modified vegetation complex also includes areas where extensive vegetation planting has occurred with both native and exotic species. Some of the sites planted with native species may, with time, develop to a condition that is identifiable as a natural vegetation community. However, other areas will remain in a modified condition. The outcome is influenced by the purpose of the vegetation planting.

2.1.5 Riparian and aquatic vegetation

Riparian vegetation occurs adjacent to watercourses, in the area above the permanent water level where a damper microclimate supports vegetation with different characteristics from adjacent dryland areas (ACT Government 2009b). Two riparian vegetation communities are present in Canberra Nature Park, primarily along the Molonglo River in Molonglo Gorge Nature Reserve. **River Bottlebrush–Burgan Rocky Riparian Shrubland** commonly occurs on bedrock outcrops, rocky banks and sandbars, with Tableland Aquatic and Fringing Vegetation at the water's edge and in the river. Neither of these communities is threatened, but both play a crucial role in protecting water quality and supporting river life, including threatened fish. The riparian vegetation in Molonglo Gorge is considered to be in good condition (ACT Government 2011).

The ACT Aquatic and Riparian Conservation Strategy and Action Plans (ACT Government 2018) identifies key principles for the long-term protection and viability of ACT aquatic and riparian areas.

Riparian vegetation at Molonglo Gorge Nature Reserve (Bill Phillips)

2.2 Threatened plants

Threatened plant species and ecological communities recorded within Canberra Nature Park are listed in Table 2.1 and those on the ACT Heritage Register are listed in Table 2.2.

The following nature reserves are most important for threatened plants:

- Mount Majura, Mount Ainslie and Kowen Escarpment contain most of the plants of the nationally critically endangered Canberra Spider Orchid (*Arachnorchis actensis*).
- Mount Majura, Mount Ainslie and Percival Hill support large populations (thousands of plants) of the nationally endangered Hoary Sunray (*Leucochrysum albicans*). Smaller populations of this endangered daisy also occur in several other open forest, woodland and grassland reserves.
- Red Hill and Crace Grasslands each support over 5000 plants of the nationally endangered Button Wrinklewort (*Rutidosis leptorrhynchoides*). A self-seeding population has been established in an area known as Jerrabomberra East in the Majura Valley.
- Mount Taylor supports a large population of the endangered Small Purple Pea (*Swainsona recta*) with isolated populations occuring on Farrer Ridge and Aranda Bushland.
- Franklin Grasslands supports one of only three known populations of Ginninderra Peppercress (*Lepidium ginninderrense*).
- Mulligans Flat supports the nationally vulnerable Austral Toadflax (*Thesium australe*).
- Tuggeranong Hill, McQuoids Hill, Rob Roy and Kowen Escarpment reserves support Pale Pomaderris (*Pomaderris pallida*), which is vulnerable nationally.

Table 2.1: Threatened plant species and ecological communities found in Canberra Nature Park

Ecological communities	ACT	NSW	C/wealth
Natural Temperate Grassland of the South Eastern Highlands	E		CE
Yellow Box–Blakely's Red Gum Grassy Woodland*	E	E	CE
Snow Gum Grassy Woodland#		E	
Plants			
Austral Toadflax (*Thesium australe*)		V	V
Button Wrinklewort (*Rutidosis leptorrynchoides*)	E		E
Canberra Spider Orchid (*Arachnorchis actensis*)	CE		CE
Ginninderra Peppercress (*Lepidium ginninderrense*)	E		V
Hoary Sunray (*Leucochrysum albicans*)			E
Pale Pomaderis (*Pomaderis pallida*)	V	V	V
Small Purple Pea (*Swainsona recta*)	E	E	E
Silky Swainson-pea (*Swainsona sericea*)		V	

*Commonwealth listing is White Box–Yellow Box–Blakely's Red Gum Grassy Woodlands and Derived Grasslands.

#NSW listing is Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions.

Note: V = Vulnerable, E = Endangered, CE = Critically Endangered

Table 2.2: Natural heritage sites listed on the ACT Heritage Register

Reserve	Registration	Description
Aranda Bushland	Aranda Snow Gums	The remnant Snow Gum patch is the best Canberra example of frost hollow grasslands with edging gums and native vegetation zones largely intact.
	Small Purple Pea	Habitat for Small Purple Pea (*Swainsona recta*)
Red Hill	Button Wrinklewort	Habitat for Button Wrinklewort (*Rutidosis leptorrhynchoides*), with over 5500 plants at 11 separate locations
Mount Taylor	Small Purple Pea	Habitat for Small Purple Pea (*Swainsona recta*)

Note: The current ACT Heritage Register should always be consulted for the latest information before commencing works or other activities that are likely to have an impact in the landscape.

Button Wrinklewort (*Rutidosis leptorrhynchoides*) (John Baker)

Small Purple Pea (*Swainsona recta*) (John Baker)

2.3 Native animals

Canberra Nature Park provides habitat for at least 30 species of reptiles, 10 frogs, 185 birds, 21 native mammals (including 12 species of micro-bats) and numerous invertebrates (Wildlife Atlas of the ACT, Canberra Ornithologists Group, Canberra Nature Map, Frogwatch 2009, and Pennay 2013).

Small to medium sized mammals, such as bettongs and bandicoots, disappeared from the regional landscape soon after the arrival of the fox, which was introduced into Australia in the 1870s. Eastern Bettongs (*Bettongia gaimardi*) and Eastern Quolls (*Dasyurus viverrinus*) have been reintroduced to the Mulligans Flat Sanctuary (see section 9.1.1).

Habitat fragmentation has meant that larger animals like wombats, dingos, monitor lizards and quolls are scarce close to the city and are now more often found in outlying reserves such as Rob Roy or Mount Majura.

There is evidence that foxes, cats and/or simplification of habitat through burning may have had recent impacts on small mammals. For example, the Yellow-footed Antechinus (*Antechinus flavipes*) and Brown Antechinus (*Antechinus stuartii*), both marsupial mice, were previously found on Black Mountain and Mount Ainslie but have not been recorded in these areas since the early 1990s (Kukolic 1990, Devlin 1999). In contrast, Eastern Grey Kangaroo (*Macropus giganteus*) numbers have increased to an extent that in some situations the effect of their grazing has adversely impacted other fauna (Barton et al. 2009, Manning et al. 2013).

The woodlands and grasslands of Canberra Nature Park are important habitat for numerous threatened or declining species.

Juvenile Rosenberg's Goanna (*Varanus rosenbergi*) (Matthew Higgins)

Shingleback (*Tiliqua rugosa*) (Mark Jekabsons)

Echidna (*Tachyglossus aculeatus*) (PCS Library)

2.3.1 Threatened grassland fauna

Threatened grassland species found in Canberra Nature Park:

Golden Sun Moth (*Synemon plana*) is listed as critically endangered nationally and endangered in NSW and the ACT. The grasslands and open woodlands of Canberra Nature Park contain about 783 hectares of habitat of the Golden Sun Moth. These sites, which represent approximately 30% of known habitat in the ACT and 4% nationally, include Mulligans Flat, Goorooyarroo, Crace, Franklin Grasslands, Jerrabomberra West, Dunlop and Mulanggari reserves.

The Golden Sun Moth feeds on C3 grasses (see Glossary) and prefers relatively flat areas in full sun where grass is short-to-medium height with gaps between grass tussocks. Within the ACT, populations achieve highest densities in areas with a relatively high percentage cover of wallaby grasses (*Rytidosperma* species), corkscrew grasses (*Austrostipa* species) or the introduced Chilean Needlegrass (*Nassella neesiana*).

Grassland Earless Dragon (*Tympanocryptis pinguicolla*) is listed as endangered nationally, in Victoria and in the ACT. Grassland in the Majura Valley, including the West Jerrabomberra Nature Reserve, comprises a major proportion of the total remaining habitat of Grassland Earless Dragon. This species is mainly confined to higher quality native grassland (Robertson and Evans 2010).

Perunga Grasshopper (*Perunga ochracea*) is listed as a vulnerable species in the ACT, where it is known from 23 sites and 48 records (Farrow 2012). It is largely confined to Natural Temperate Grassland and more rarely to secondary grassland derived from box–gum grassy woodland. Although there is a paucity of records of the Perunga Grasshopper in the Australian National Insect Collection, it appears to be a rare species restricted to a small area of the Southern Tablelands and South-West Slopes. The Gungahlin and Jerrabomberra grassland reserves appear to be particularly significant habitat for this species.

Pink-tailed Worm-lizard (*Aprasia parapulchella*) is listed as vulnerable nationally, in NSW and the ACT. It is a small, cryptic, legless lizard that is largely confined to the ACT and nearby regions, with isolated small populations in widely separated locations in NSW and near Bendigo in Victoria. In the ACT the lizard mainly occurs along the slopes of the Molonglo and Murrumbidgee River corridors, but is also found on some adjacent outlying hills within Canberra Nature Park—Cooleman Ridge, Farrer Ridge, Isaacs Ridge, Kinlyside, McQuoids Hill, Mount Mugga Mugga, Mount Taylor, Oakey Hill, Wanniassa Hills, Red Hill, Rob Roy, The Pinnacle, Urambi Hills and Tuggeranong Hill.

In the ACT, the Pink-tailed Worm-lizard is most commonly found in open, rocky sites characterised by partially embedded surface rock and the presence of native grasses and forbs and, sometimes, low shrubs.

Striped Legless Lizard (*Delma impar)* is listed as vulnerable, both nationally and in the ACT. Striped Legless Lizards are known to occur over about 1800 hectares in four discrete areas in the ACT: the Gungahlin area, the Majura Valley, land adjacent to Yarrumundi Reach on Lake Burley Griffin, and the Jerrabomberra Valley. These populations are effectively isolated by geographic and anthropogenic barriers.

Table 2.3: Threatened grassland fauna species found in Canberra Nature Park

Animals	ACT	NSW	C/wealth
Golden Sun Moth (*Synemon plana*)	E	E	CE
Grassland Earless Dragon (*Tympanocryptis pinguicolla*)	E	E	E
Perunga Grasshopper (*Perunga ochracea*)	V		
Pink-tailed Worm-lizard (*Aprasia parapulchella*)	V	V	V
Striped Legless Lizard (*Delma impar*)	V		V

Note: V = Vulnerable, E = Endangered, CE = Critically Endangered

Golden Sun Moth (*Synemon plana*) (PCS Library)

Striped Legless Lizard (*Delma impar*) (PCS Library)

Grassland Earless Dragon (*Tympanocryptis pinguicolla*) (PCS Library)

2.3.2 Other grassland fauna

Canberra Raspy Cricket (*Cooraboorama canberrae*), a large, flightless gryllacridid (non-jumping crickets) with small vestiges of wings and long legs, is the only known member of its genus. The species has mostly been recorded within high quality native grassland during surveys for threatened reptiles, predominantly within Canberra but also around Queanbeyan and Bungendore in NSW.

2.3.3 Woodland birds

Ideal woodland bird habitat has a complexity of structure and habitat elements such as fallen logs, a shrub layer and hollow-bearing trees. It generally occurs lower in the landscape on productive moist soils. Large, well connected woodland remnants with a diversity of environments are also more favourable (Paton and O'Conner 2010).

The 6500 hectares of woodland within Canberra Nature Park provides significant habitat for many nationally and regionally threatened bird species (see Table 2.4). The large patch size and connectedness to woodlands in NSW make Canberra Nature Park a regional stronghold for a range of woodland birds. Some of these species are nomadic or migratory and follow flowering resources across eastern Australia.

Seventy-five per cent of all ACT records of the **Regent Honeyeater (*Anthochaera phrygia*)** and 66% of the **Swift Parrot (*Lathamus discolor*)** records, which are both nationally threatened nomadic species, have been recorded in the woodland complex that stretches from Hall through Kinlyside to Mulligans Flat and Goorooyarroo and then on to Mount Majura and Mount Ainslie or the Majura Training Area and Newline Quarry, south of Canberra Airport.

This area is also an ACT stronghold and one of two significant breeding locations for the **Superb Parrot (*Polytelis swainsonii*)**, and provides habitat for most of the ACT listed threatened bird species. However, the **Hooded Robin (*Melanodryas cucullata*)** and **Brown Treecreeper (*Climacteris picumnus*)** have significantly declined and are believed locally extinct in the large reserves of Mulligans Flat and Goorooyarroo.

The threatened **Little Eagle (*Hieraaetus morphnoides*)** has been recorded within Canberra Nature Park, with nests identified near (but outside) nature reserve boundaries. Nesting can be disrupted by frequent and close visitation of people into breeding areas.

Major locations for breeding of threatened woodland birds within Canberra Nature Park are at Campbell Park (lower slopes on the eastern side of Mount Ainslie), Callum Brae and Mulligans Flat-Goorooyarroo reserves.

Painted Honeyeater (*Grantiella picta*) (Geoffrey Dabb)

Regent Honeyeater (*Anthochaera phrygia*) (Geoffrey Dabb)

Table 2.4: Threatened woodland birds found in Canberra Nature Park

Woodland birds	ACT	NSW	C/wealth
Brown Treecreeper (*Climacteris picumnus*)	V	V	
Diamond Firetail (*Stagonopleura guttata*)		V	
Flame Robin (*Petroica phoenicea*)		V	
Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)	V	V	
Gang-Gang Cockatoo (*Callocephalon fimbriatum*)		V	
Hooded Robin (*Melanodryas cucullata*)	V	V	
Little Eagle (*Hieraaetus morphnoides*)	V	V	
Painted Honeyeater (*Grantiella picta*)	V	V	V
Regent Honeyeater (*Anthochaera phrygia*)	CE	CE	CE
Scarlet Robin (*Petroica boodang*)	V	V	
Speckled Warbler (*Chthonicola sagittata*)		V	
Superb Parrot (*Polytelis swainsonii*)	V	V	V
Swift Parrot (*Lathamus discolor*)	CE	E	CE
Varied Sittella (*Daphoenositta chrysoptera*)	V	V	
White Winged triller (*Lalage sueurii*)	V		

Note: V = Vulnerable, E = Endangered, CE = Critically Endangered

2.3.4 Aquatic fauna

Threatened fish and crayfish species historically or currently present in Canberra Nature Park reserves:

- **Murray Cod (*Maccullochella peelii*)** are present in the lower Molonglo River, up to the bottom of Molonglo Gorge; suitable habitat available, limited by low flows.
- **Macquarie Perch (*Macquaria australasica*)** were historically present; habitat limited, translocated to the upper Molonglo Gorge, very low likelihood of occurrence now.
- **Murray River Crayfish (*Euastacus armatus*)** were historically present in the upper and lower Molonglo River or nearby tributaries; habitat is reasonable.

Actions to protect and manage these species are included in the ACT Aquatic and Riparian Conservation Strategy and Action Plans (ACT Government 2018). Other native fish present include the Golden Perch (*Macquaria ambigua*), Australian Smelt (*Retropinna semoni*), Western Carp Gudgeon (*Hypseleotris klunzingeri*) and Mountain Galaxias (*Galaxias olidus*). Exotic fish, especially Carp (*Cyprinus carpio*), heavily dominate fish numbers and fish biomass in the Molonglo River. In NSW, the Molonglo River is stocked with Rainbow Trout (*Oncorhynchus mykiss*). Platypus (*Ornithorhynchus anatinus*) and Water Rats (*Hydromys chrysogaster*) are both found in the Molonglo Gorge area.

2.4 Habitat connectivity and wildlife movement

Maintaining and enhancing ecological connectivity is important to achieve conservation at the landscape scale. The resilience of natural areas—their ability to persevere and adjust despite disturbances and changes in land use and climate—depends on the continuity of ecological processes such as energy flows, nutrient cycles, hydrological cycles and food webs. Natural areas should be relatively resilient if they are larger and better connected, threats are managed and ecological processes and intact native vegetation are maintained.

Much of the ACT's high-value woodland, lowland open forest and habitat is protected within the reserve system, and most of Canberra Nature Park's reserves are well connected to each other and/or to regionally important habitat areas outside the ACT. The only relatively isolated woodland reserve is Percival Hill.

In addition to maintaining core habitat areas within reserves, away from the urban edge, significant connections to the wider landscape of south-eastern Australia need to be maintained and built upon. These include links from Canberra Nature Park to the Murrumbidgee River, Namadgi National Park and then onto the Great Eastern Ranges ecological network (Victoria to far North Queensland), and from Canberra Nature Park through vegetation to the north-east of the ACT (Greater Goorooyarroo) and into the South-West Flyway (woodland connection across central NSW).

In contrast to woodland areas, most grassland sites are fragmented, with limited connectivity. Jerrabomberra West Grasslands Nature Reserve is the only grassland reserve with good connections to woodland. Most grassland fauna, particularly the threatened lizards and insects, are unlikely to cross bitumen roads; Crace, Gungaderra and Mulanggari grassland reserves are therefore essentially isolated from each other. Dunlop and Jarramlee/West MacGregor grassland reserves are connected to native pasture and natural temperate grassland patches in NSW.

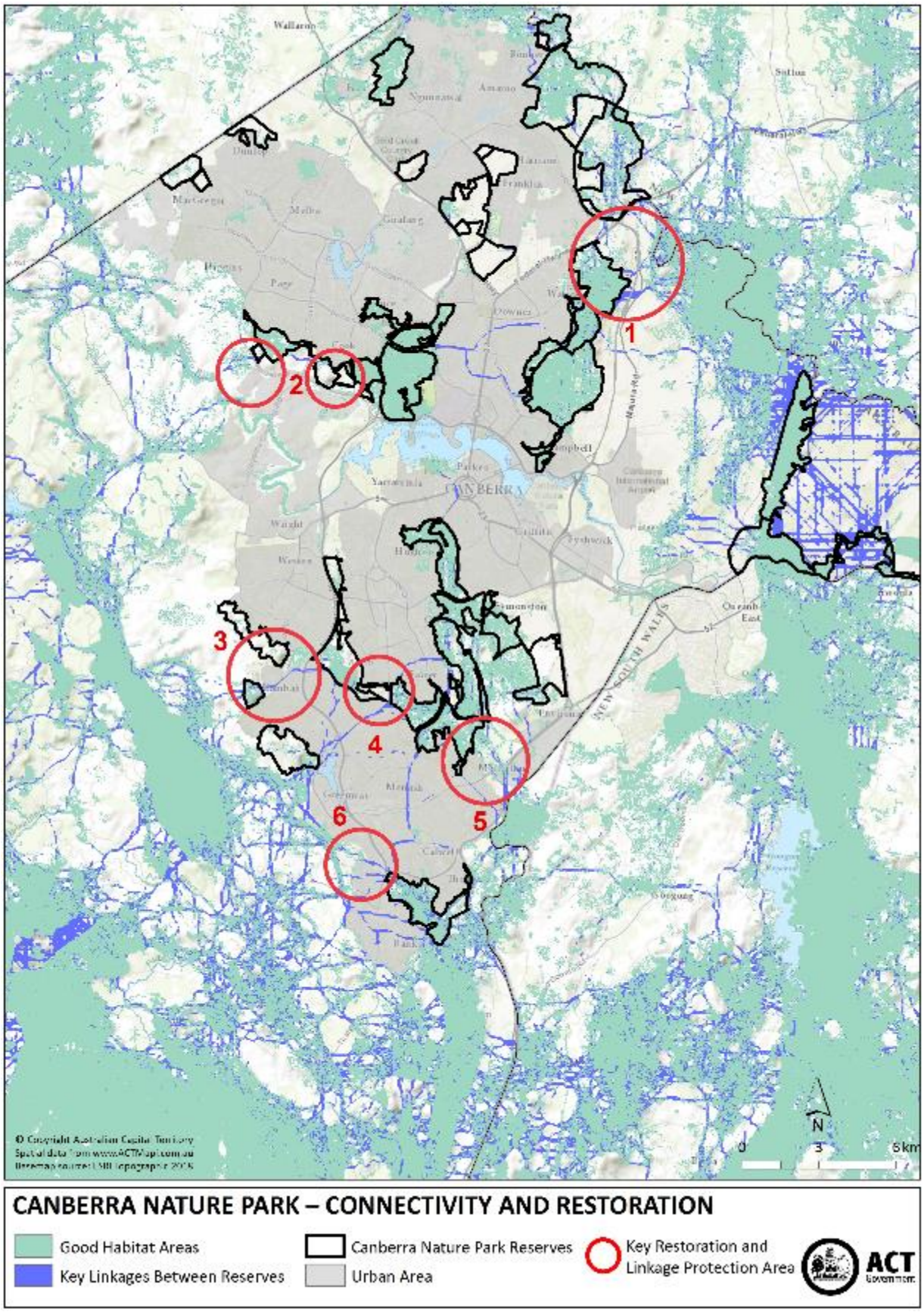
Figure 2.2 shows general habitat value and linkages that are key to improving connectivity and resilience across Canberra Nature Park. Several bottlenecks, or break points in connection, between habitat areas in Canberra Nature Park require protection and focussed management (rehabilitation and assisted natural regeneration). These points, as shown in Figure 2.2 are:

1 between Goorooyarroo and Mount Majura, and Mount Majura and the Military Training Area
2 from Aranda Bushland, through Mount Painter and Pinnacle, to Kama Nature Reserve
3 from Mount Taylor to Cooleman Ridge and then onto McQuoids Hill and the Murrumbidgee River
4 between Farrer Ridge and Mount Taylor
5 from Wanniassa Hills to woodland in the NSW area of Jerrabomberra
6 between Tuggeranong Hill and the Murrumbidgee River.

Since 2012, links and habitat condition across the Belconnen Hills, the Majura Valley and areas around Callum Brae have been improved as part of a wider woodland restoration program.

Enhancing the biodiversity value of urban areas is an important component of the ACT Nature Conservation Strategy 2013—23. Wildlife connectivity between Canberra Nature Park reserves can be improved by strengthening connections between reserves through the urban areas, particularly during planning and design activities. The Parks and Conservation Service will continue to liaise with other agencies and land managers to help improve connectivity between reserves, through urban areas, and across the broader landscape.

Figure 2.2: Landscape connectivity across Canberra Nature Park



Note: Developed by combining information from vegetation, street-tree and land use maps, together with satellite foliage cover and tree-density data, and analysis of the spatial relationships among habitat patches (Barrett and Love 2012). Key linkages between the identified habitat patches were identified and their functionality assessed on the basis of findings by CSIRO that most animals of southern Australian woodlands and forests will usually not cross a canopy gap of more than 100 metres, and will not travel more than 1.1 kilometres away from a patch of at least 10 hectares of suitable living habitat (Doerr et al. 2010)

2.5 Management considerations

2.5.1 Past land use

"*The country is perfectly sound, well-watered with extensive meadows of rich land on either side of the rivers, contains very fine limestone, slate, sandstone and granite fit for building, with sufficient timber for every useful purpose*." Charles Throsby Smith, 1821.

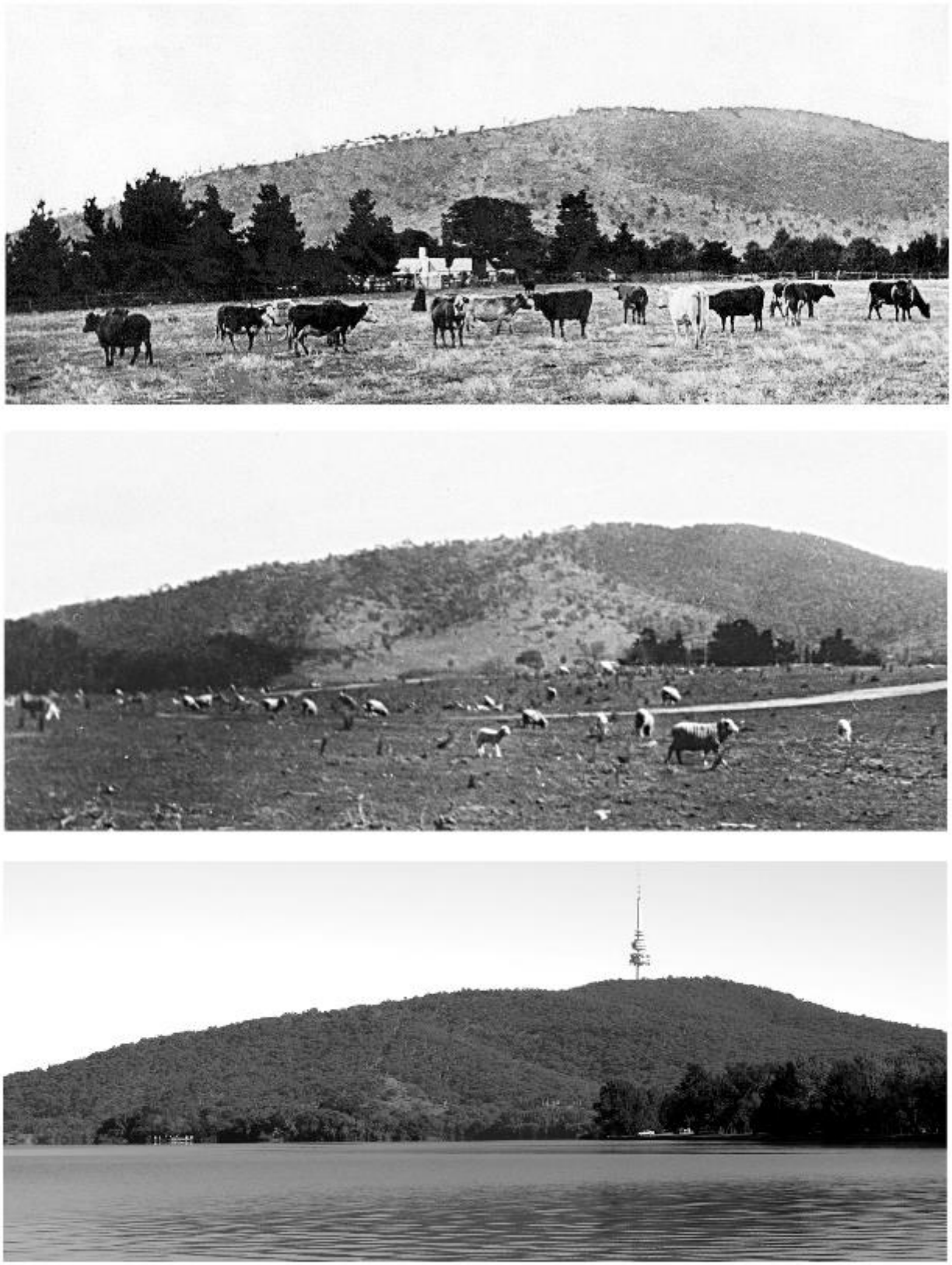
Prior to settlement of the Canberra region, native grasslands, maintained by a combination of cold air drainage, water logging and Aboriginal burning, covered the valley floors. The mid and lower slopes were mainly woodlands, and the rocky ridges supported mainly dry forest.

From the 1820s, pastoral activity brought significant change. Livestock grazed grasslands; woodlands and forests were cleared or thinned to increase grass growth and provide timber; and exotic species of plants and animals were established. In 1911, all lands became leasehold to support the establishment of the National Capital. The short-term nature of leases limited the degree of clearing, cultivation and pasture improvement that could occur. Consequently, the grasslands and woodlands of the ACT were much less impacted than elsewhere in southern Australia by agricultural innovations such as chemical fertilisers, exotic pasture species and new technology such as diesel tractors.

During early development of the National Capital, reforestation of Canberra's denuded ridges was seen as a priority, and landscape-scale plantings were undertaken, many with non-local Australian native species. The need for infrastructure grew with Canberra, and the hills also became preferred sites for power, water and telecommunications infrastructure.

As a result of past land use and land planning, Canberra Nature Park has a range of factors that influence management, including:

- large and well-connected remnant woodland patches
- altered soil fertility and infestations of agricultural weeds
- urban infrastructure such as reservoirs, power lines, telecommunication towers, underground cables and rubbish tips
- an extensive urban interface boundary and associated urban edge issues, such as increased impacts from weeds, domestic animals, fire protection and flood mitigation measures
- a well-established history of recreational use
- areas of dry forest that are regenerating from previous clearing, and woodlands and grasslands that are generally in better condition than those outside of the ACT
- a current management focus on conservation and restoration of native vegetation.



Recovery of vegetation on Black Mountain following clearing in the 1800s. *Top*: circa 1900 (National Library of Australia); *Middle*: 1920 (National Library of Australia); *Bottom*: 2011 (Sarah Ryan). Composite image (Sarah Ryan).

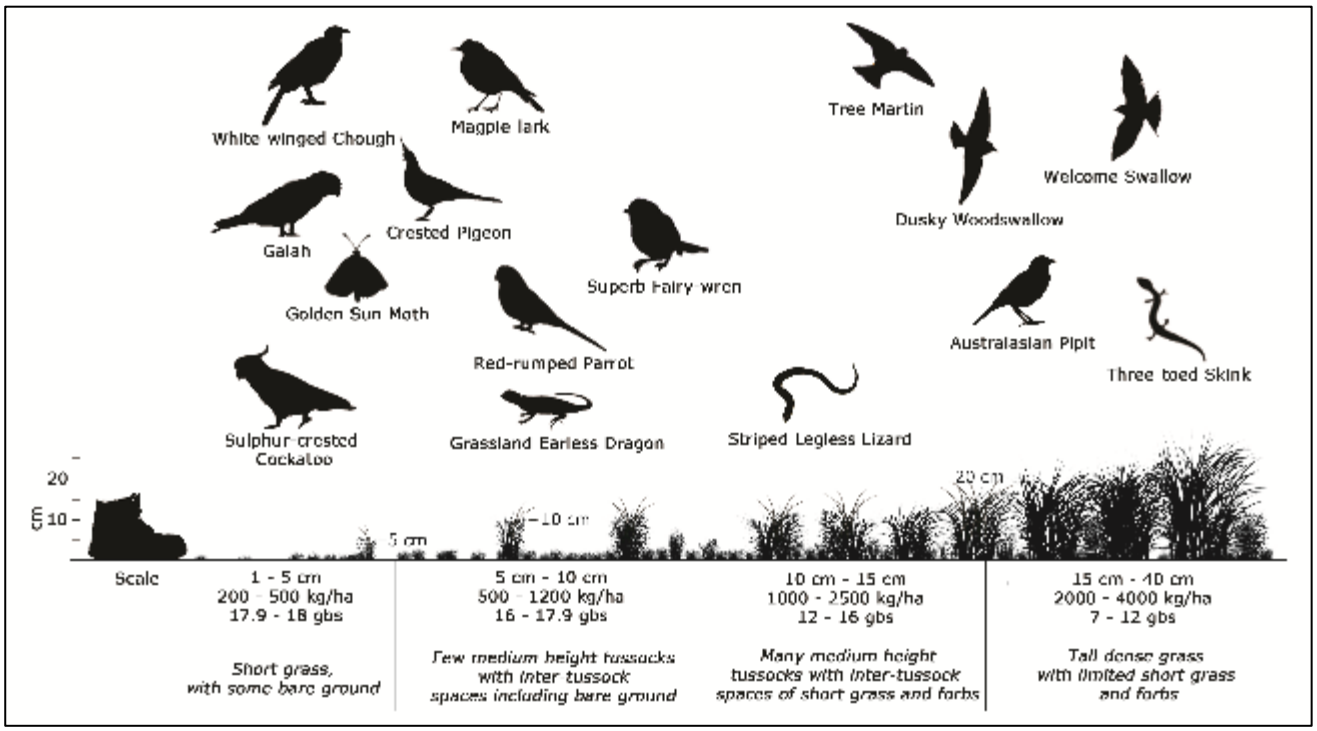
2.5.2 Grazing management

Grazing strongly influences which species are present in native grasslands and grassy woodlands ecosystems. Without grazing, dense grass swards of a few species may form. With moderate grazing the swards are broken up, allowing space for a diversity of plants to grow. Intense grazing can remove almost the entire sward, which may result in adverse impacts on the grassland, such as erosion and loss of species.

In modified grassland communities, particularly where herbivores and/or their predators have been removed, the natural processes that influence grass biomass and structure are usually disrupted and can become too high, too low, or too homogeneous to support a diverse grassland community.

Maintaining heterogeneity is important to provide habitat for a range of species (see Figure 2.4). In general, moderation of grazing pressure, while retaining some areas subject to higher and lower grazing pressure, is considered a sound strategy for conserving biodiversity.

Figure 2.4: Relationships between fauna and grass structure in grasslands and open woodland in south-eastern Australia.



Note: Figure 2.4 is based on native pastures in midsummer, and measurement values would be lower in winter and higher in spring. Gbs (golf ball score) refers to a vegetation density value range (between 0-18) based on the number/amount of 18 golf balls observed (Morgan 2015). Grass herbage mass measures refer to dry weight of standing grass, not including dead non-standing material and non-grass plants. Figure 2.4 is based on quantitative measurements made by the ACT Government and published values in Howland et al. 2014, Howland et al. 2016a and Howland et al. 2016b

Grazing of livestock (sheep or cattle) is used in some Canberra Nature Park reserves to reduce bushfire fuel levels in restricted fenced areas. In some areas, grazing is used to maintain a grass structure favourable for threatened animals.

The Nature Conservation Act prohibits taking non-native animals into a nature reserve without a Nature Conservation Licence, or as a restricted activity under an Activities Declaration. The Conservator's consent is given by issuing a licence under Section 303 of the Planning and Development Act. Licences are monitored by the Parks and Conservation Service to ensure the required outcomes are achieved.

The density of Eastern Grey Kangaroos is high in several Canberra Nature Park reserves, and heavy grazing can threaten the survival of some threatened species. Eastern Grey Kangaroos have been culled annually

since 2009 to improve ecosystem condition in some Canberra Nature Park reserves. Kangaroos are only culled in locations where high numbers pose a threat to ecosystem condition.

Eastern Grey Kangaroos are integral to the conservation and healthy functioning of grassy ecosystems and, as such, the number to cull is based on the number of kangaroos that need to be maintained in the reserve. Management of Eastern Grey Kangaroo populations is in accordance with the Eastern Grey Kangaroo: Controlled Native Species Management Plan (ACT Government 2017c), which was developed through extensive and ongoing research into kangaroo ecology and grazing impacts.

Rabbits also exert heavy grazing pressure in some reserves. While it is not possible to eliminate rabbits from Canberra Nature Park or individual reserves, integrated management strategies aim to reduce rabbit abundance to a level where any impacts are considered acceptable.

Cattle on Cooleman Ridge Nature Reserve (Lois Padgham)

2.5.3 Fire

Using fire for ecological outcomes

Many Australian vegetation communities and native animals have evolved with fire as a natural ecosystem process. Indeed some species rely upon particular fire regimes for regeneration or habitat maintenance.

Fire is applied in Canberra Nature Park to promote ecological values, such as improved habitat for native plants and animals, for example, mosaic burning to promote habitat heterogeneity for the Grassland Earless Dragon (*Tympanocryptis pinguicolla*), or to encourage the regeneration or germination of particular species. Such ecological burning, which is planned in consultation with reserve managers and ecologists, depends on suitable weather, fuel conditions and consideration of the plant or animal ecology.

Ecological burning in Goorooyarroo Nature Reserve (Lois Padgham)

Aboriginal cultural burning

Recognising the significant role of Aboriginal burning in the evolution and maintenance of Australian ecosystems, the Parks and Conservation Service is working towards the integration of traditional ecological knowledge, including traditional burning practices, into the management of Canberra Nature Park.

Involvement of the local Aboriginal community in implementing and monitoring cultural—ecological burns meets the dual objectives of maintaining and improving ecological function and habitat for threatened species, and supporting the continuing connection of Aboriginal people to Country (see section 4.2).

Fire fuel management

Much of Canberra Nature Park borders suburban development, which must be protected from the risk of fire. While fuel reduction activities can reduce both the structure and diversity of vegetation, and increase susceptibility to weed invasion, prescribed burning can also help conserve biodiversity by promoting a mosaic of fire regimes and habitat states.

The primary legislation for bushfire management in the ACT is the Emergencies Act*,* which requires the development of a Strategic Bushfire Management Plan (SBMP). Under the Act, the land manager must, as far as practicable, ensure the area is managed in accordance with the SBMP. If there is an inconsistency between the SBMP and reserve management plans, the reserve management plans have no effect to the extent of the inconsistency.

The SBMP is a five-year plan with a ten-year outlook. Under the SBMP, fire management plans have been prepared and represented spatially in Regional Fire Management Plans, which establish the major fire fuel, access and infrastructure management actions over ten years. The Regional Fire Management Plans are reviewed every five years.

Bushfire Operational Plans, also required under the Emergencies Act, are prepared annually to detail fuel management activities for particular land areas such as individual Canberra Nature Park reserves.

Decisions on the management of fire fuel in natural areas consider:

- protecting human life and valuable built or ecological assets
- the level of fuel accumulation
- fire history
- ecological fire thresholds; for example,the number of years required between fires to allow species to flower and set seed or for fauna species populations to re-establish
- a desire for a mosaic of burnt areas across the ACT with different periods since they were last burnt providing for age class diversity in woodlands and forest ecosystems
- minimising the loss of structural habitat elements such as keystone trees, coarse woody debris and regenerating vegetation.

Some Canberra Nature Park reserves that border suburban development include Inner or Outer Asset Protection Zones. These can be up to several hundred metres wide where shrubs, grasses and other fire fuels are kept at low levels to reduce bushfire intensity and the risk of ember attack to adjacent suburbs. This reduces both the structure and diversity of vegetation within this area and increases susceptibility to weed invasion. For reserves with a long urban edge, the area impacted can be large; for example, around 30% of Red Hill Nature Reserve is managed as an Inner or Outer Asset Protection Zone.

Fire fuel management activities are subject to ecological guidelines that aim to protect rare, threatened and fire-sensitive species; for example:

- leaf litter is removed to protect the fire-sensitive Black Cypress Pine (*Callitris endlicheri*) on Black Mountain and in Aranda Bushland
- spring fuel reduction burns are avoided on Mount Ainslie to protect breeding woodland bird habitat, and avoid stands of mature Drooping She-oaks (*Allocasurina verticullata*), which provide food for the Glossy Black-cockatoo (*Calyptorhynchus lathami*)
- autumn fuel reduction burns are avoided on Tuggeranong Hill to prevent impact on the autumn honeyeater migration.

Planned burns in Canberra Nature Park are generally relatively small patch burns which also aim to minimise any negative impacts.

Fuel reduction burn on Black Mountain Nature Reserve

Cleaning fire vehicle to avoid spreading weeds (PCS Library)

2.5.4 Weeds

Invasive weeds have significant impacts on biodiversity through competition with native plants and degradation of habitat. In particular, weeds are recognised as a significant threat to many of the ACT's threatened species and ecological communities and to the integrity of other vegetation communities.

Canberra Nature Park is particularly susceptible to weed invasion because of its large interface with the urban edge and the relatively high level of disturbance from infrastructure construction, maintenance activities and high levels of public use. Weeds include both exotic species and native Australian species that do not occur naturally in Canberra Nature Park, such as Cootamundra Wattle (*Acacia baileyana*). Invasive grasses such as African Lovegrass (*Eragrostis curvula*), Chilean Needlegrass (*Nassella neesiana*) and Serrated Tussock (*Nassella trichotoma*) are major threats to the grassy ecosystems of Canberra Nature Park. If not controlled, these invasive grasses out-compete native grasses and wildflowers. They also increase fire fuel loads.

Cootamundra Wattle (*Acacia baileyana*) (PCS Library)

The Parks and Conservation Service implements an annual Invasive Weeds Operations Plan, which assigns priority for weed control based on assessment of the risk of invasiveness, impacts, potential distribution, and the feasibility of coordinated control (including cost, weed persistence and current distribution). Priority is given to higher risk weeds, protecting higher value environmental, economic and social assets, and undertaking follow-up control to protect prior investment. ParkCare groups and programs such as the Green Army make an important contribution to weed control in Canberra Nature Park.

Of around 600 introduced plant species found in Canberra Nature Park, 76 species (13%) are targeted for control. However, most of the control work is taken up by only 15 of these species (3% of all introduced plants). These 15 species are widespread weeds. There are also many species that currently have only a restricted occurrence within Canberra Nature Park and are targeted for control before they become widespread. Examples include Spanish Heath (*Erica lusitanica*), Gazania (*Gazania* spp.), Chinese Pistachio (*Pistachio chinensis*), South African Daisy (*Osteospermum ecklonis*) and Western Australian Bluebell Creeper (*Billardiera heterophylla*).

Grazing, slashing and fire are sometimes used to target herbaceous weed species and can be an alternative to, or combined with, herbicide treatment. Revegetation can help to prevent weeds re-establishing, especially in grasslands and grassy woodlands. Biological and integrated control methods may also be used when available.

2.5.5 Pest animals

Pest animals are exotic species that cause environmental, social and economic damage through predation of native animals, grazing of native plants, competition with native animals for food and habitat, and/or altering the structure and function of ecosystems. Pest animals also contribute to the spread of weeds and pathogens and reduce social amenity in high-use areas and adjacent suburbs. Operations to control pest animals and repair damage are a significant management cost.

Pest animal species established in Canberra Nature Park include rabbits, foxes, cats, Indian Mynas, European Wasps and European Honey Bees. Feral pigs, wild dogs and feral deer are not widespread, but do occur in other protected areas, such as Namadgi National Park. It is a management priority to prevent the increase in distribution and abundance of these species.

Rabbits

Rabbits represent the greatest potential threat to the integrity of the reserve system, as reflected in the level of effort and expenditure invested in programs for their control. Grazing pressure from rabbits and digging of warrens adversely affect the condition of nature reserves. Rabbit diggings represent a hazard to reserve users on foot and can cause soil erosion. Rabbits also invade neighbouring suburbs, damage parklands, consume ornamental and food plants and dig up garden beds.

It is not possible to eliminate rabbits from Canberra Nature Park. The aim of control is to reduce rabbit abundance to a level where impacts are considered acceptable and then maintain low abundance through persistent follow-up monitoring and control. This includes removing rabbit harbour such as blackberry and destroying warrens. Research on rabbit control under the Mulligans Flat—Goorooyarroo Woodland Experiment has contributed to the development of principles and techniques used for rabbit management, published in a best practice guide for the ACT (ACT Government 2015a). Help from community groups to locate and monitor warrens has been an important factor in the success of control programs in Canberra Nature Park (for example, Mount Ainslie, Mount Majura and Red Hill). Fostering continued community engagement in this aspect of rabbit control will facilitate future programs. Coordination with neighbouring landholders also helps achieve successful rabbit control.

Foxes

Predation by foxes is a major threat to the survival of native Australian fauna, with medium-sized mammals, ground dwelling and semi-arboreal mammals (such as possums), ground-nesting birds, and freshwater turtles at greatest risk (NSW Scientific Committee 1998). Fox populations are a major concern when planning to reintroduce locally-extinct vulnerable species such as the Eastern Bettong or Bush Stone Curlew to Canberra reserves. Initially, species have been reintroduced behind a fox-proof fence at Mulligans Flat. Foxes also have economic impacts on lamb and poultry producers and are a nuisance as an urban scavenger.

Cost-effective and efficient fox management depends on landscape-scale control programs, which primarily use 1080 poison baiting, a nationally-agreed control method. However, 1080 baiting has restricted use close to urban areas, and fox control within much of Canberra Nature Park remains limited to reserves that are not close to residential areas until other methods become available (for example, fertility control or new toxins). Resource intensive methods such as shooting, trapping and exclusion fencing are only feasible for application around high-value conservation areas or for the protection of threatened species.

Cats

There are around 56,000 owned cats in the ACT, together with an estimated stray cat population of around 25,000 (Eyles and Mulvaney 2013). Reserves surrounded by suburbs, such as Red Hill or Farrer Ridge, may have hundreds of roaming owned or stray cats. Some stray cats become feral. Research has shown that domestic and stray cats kill a large range of native species including birds, sugar gliders, bats, lizards, frogs and a range of invertebrates (Barratt 1997, 1998).

In recognition of the impact that roaming owned cats can have on wildlife, cat containment areas (where cats must be contained on their owner's property) have been declared in several parts of suburban Canberra. There are currently no practical options for broad-scale stray/feral cat control in Canberra Nature Park other than cat containment in adjacent suburbs. Nationally agreed methods of controlling feral cats, such as shooting and trapping, are prohibitively labour-intensive and may be ineffective, but may have some limited application in protecting high value species and assets. An ACT cat management plan is under development.

Feral pigs

Feral pigs have many adverse impacts on the environment, especially when digging for and feeding on native plants and animals, wallowing and disturbing soils in dams, waterholes and other moist areas, destabilising creek banks and accelerating erosion. Feral pigs also spread weeds and disease and can present a direct physical risk to visitors. Predation, habitat degradation, competition and disease transmission by feral pigs is listed as a key threatening process under the EPBC Act.

Feral pigs are not widespread in Canberra Nature Park, but are present in low densities in Rob Roy, Molonglo Gorge and Kowen Escarpment nature reserves, where they are subject to reactive control programs. Feral pigs have occasionally been observed in Goorooyarroo and Black Mountain reserves.

The most cost-effective method for managing feral pigs in the majority of Canberra Nature Park reserves is the early detection and control of new incursions. Feral pig incursions in all reserves are controlled in accordance with nationally agreed methods, mainly trapping and 1080 baiting in reserves that are not close to residential areas.

Wild dogs

Wild dogs have been observed occasionally in Rob Roy Nature Reserve. They are a potential risk to livestock, are urban scavengers, prey on pets and are a reservoir for canine diseases. Wild dogs are currently managed reactively through trapping in response to livestock losses in the areas adjacent to Rob Roy. Effective broad-scale control of established wild dog populations relies on 1080 baiting as part of an integrated management program. However, 1080 baiting cannot be used close to urban areas, which therefore excludes most Canberra Nature Park reserves.

European Wasps

European Wasp (*Vespula germanica*) nests may contain thousands of wasps that are capable of stripping areas around a nest virtually bare of other invertebrates, thereby reducing the food resource available to birds and lizards. European wasps can be highly aggressive if disturbed by people or their pets. Nests are routinely destroyed in high-risk areas (e.g. around picnic and barbecue facilities) on public land. Nests found in Canberra Nature Park will continue to be destroyed.

European Honeybees

European Honeybees (*Apis mellifera*) interact with a wide variety of Australian plants and animals, and research is needed to understand their full impact. Honeybees can reduce seed set in some native species, particularly bird-pollinated plants, and can impact on native birds such as honeyeaters, or on native bees by significantly reducing the amount of available resource. Honeybees also compete with native wildlife for tree hollows. Until there is greater knowledge of the impacts and control of European Honeybees, the current policy of exclusion of hives from nature reserves (ACT Government 2016) will continue. European Honeybee hives are not permitted in Canberra Nature Park without approval from the Parks and Conservation Service.

Indian Myna

The introduced species, Indian (Common) Myna *(Acridotheres tristis)*, is a significant competitor for hollows and poses a threat to species such as the Superb Parrot. Research (Grarock et al. 2012) has found a significant negative relationship between the establishment of the Indian Myna and the abundance of the

hollow-nesting birds. Indian Mynas also have negative impacts on the abundance of small birds, which are driven out of defended territories, and cause an urban nuisance through noise and scavenging behaviour.

A community trapping program has operated in suburban Canberra since 2005 and has significantly reduced the abundance of Indian Mynas in the urban area. Continued monitoring of native bird abundance will help to evaluate the benefits of the trapping program to native species. The efficacy and cost-effectiveness of removing eggs and hatchlings from nesting hollows could also be explored as a management option, particularly in any areas where threatened species, such as the Superb Parrot, are known to nest.

Feral deer

Increasing populations of feral deer species are an emerging pest animal management issue in the ACT and region. Deer form tracks and wallows, browse selectively, damage young trees and shrubs by antler rubbing, compete with livestock and macropods for grazing, and are a potential reservoir of stock disease (ACT Government 2012a). Collisions with feral deer represent a road safety hazard and browsing of urban gardens is an urban nuisance.

Fallow Deer and Sambar Deer have been reported within Canberra Nature Park reserves, but there is no indication that feral deer have established resident populations. In other jurisdictions, established peri-urban deer populations have become a significant management issue and the priority for Canberra Nature Park is to prevent their establishment. Ground shooting according to standard operating procedures is the only option currently available to remove deer from reserve areas.

2.5.6 Biosecurity

Phytophthora spp. is an introduced microscopic soil-borne water mould that causes root rot, and kills many native trees and shrubs by invading and destroying their root systems. When conditions are favourable (warm and moist), the fungus releases spores into the surrounding soil which are easily spread through stormwater, track construction and visitor use. The disease is a nationally listed threatening process. It is difficult to limit the spread of *Phytophthora*, but current best practice includes fencing affected areas, restricting public access and applying hygiene measures such as sanitising tools, machinery, shoes and tyres.

There is currently limited knowledge of the distribution of this pathogen within the ACT, and the Parks and Conservation Service has commenced soil testing to map sites. *Phytophthora cinnamomi* has been identified on Black Mountain (Pratt 1973) and the Parks and Conservation Service will undertake action to limit the impact of the disease in the reserve and at other sites, if identified.

2.5.7 Dieback

The term ‘dieback’ describes the widespread long-term decline of tree health. In the ACT the decline of Blakely’s Red Gum (*Eucalyptus blakelyi*) appears to be widespread and affecting all age classes. Dieback has also been widely observed in Apple Box (*E. bridgesiana*) and to a lesser degree in Ribbon Gum (*E. viminalis*). The cause of the condition decline is unknown. Further research is needed to better understand the range and causes in the ACT; projects have commenced including the use of LiDAR (Light Detection and Ranging) and satellite remote sensing to determine extent, investigation of the potential link with *Phytophthora spp.*, and the interactions of dieback with fire and tree thinning.

2.5.8 Climate change

The ACT is already experiencing warming, with more hot days and fewer cold nights. Future rainfall is predicted to be lower than the current average, less evenly distributed and less predictable. There have been, and will continue to be, more intense and frequent storm events, wetter summers and autumns, and drier winters and springs. The higher temperature, greater storm run-off and shift from winter to summer rainfall is likely to result in overall drier conditions and an increase in the number of high fire danger days and bushfire events (Webb 2011, Hughes and Steffan 2014).

In the last 50 years, CO_2 levels in the atmosphere have risen by 25% and will continue to rise. Increased CO_2 concentrations favour less efficient users of CO_2 and water, such as shrubs and other woody plants, over grasses (Berry and Roderick 2005). Higher CO_2 also favours C4 grass species over C3 species.[3] C4 and C3 plants have different structures and qualities as food plants for animals, and some species can only feed on one or the other. For example, the endangered Golden Sun Moth is only able to feed on C3 grasses (Richter et al. 2011).

Climate change means the ACT's native species are likely to experience quite different local environments than they do now. They will need to adapt to those environmental changes, expand or change their range, or go extinct (Doerr et al. 2013). Species with restricted climatic ranges, small populations and limited ability to adapt or migrate are most likely to suffer dramatic declines or local extinction as suitable habitat disappears in the ACT (ACT Government 2012b). A biodiversity refugia project to identify where native plants are expected to persist under climate change has commenced.

Likely implications of climate change (NSW Office of Environment and Heritage 2011) for ecological communities in Canberra Nature Park are:

- grasslands—woodland invasion due to reductions in both cold air drainage and water logging and increased CO_2 level, reduced productivity, reduced cover of native grasses and annual forbs, increased soil erosion, increased weed invasion particularly of C4 grasses, and changes in species composition
- woodlands—lower spring productivity, loss of geophytic species, increased shrubiness, increases in currently cold-limited weeds and feral species, changes in habitat structure, and changes in species composition
- dry forests—higher frequency of extreme droughts and fires.

Potential implications of climate change for threatened species in Canberra Nature Park include increasing susceptibility of:

- Blakely's Red Gum and Snow Gums to drought-related moisture stress, disease and insect attack
- Grassland Earless Dragon to reductions in spring rainfall, grassland productivity and grass cover
- Striped Legless Lizard to drought-related reductions in spring forbs and new grass growth
- Golden Sun Moth to changes in grassland productivity, shifts in species composition and/or weed invasion of critical inter-tussock spaces
- Regent Honeyeater and Superb Parrot breeding cycles to lower nectar yields in spring-flowering eucalypts (for example, Yellow Box)
- insectivorous birds (for example, Scarlet, Flame and Hooded Robins) to changes in habitat heterogeneity and habitat structure.

The woodlands and open forests of Canberra Nature Park are relatively large and well connected, contain a high native plant diversity (usually in excess of 250 native plant species) and are in a relatively resilient state. However, most of the grasslands have low plant diversity and exist in relatively small, highly fragmented patches, making them more vulnerable to disturbance and climate change.

[3] Perennial grasses can be classified as either C3 or C4 plants. These terms refer to the different pathways that plants use to capture carbon dioxide during photosynthesis. All species have the more primitive C3 pathway, but the additional C4 pathway evolved in species in the wet and dry tropics. For further information refer to the Glossary.

To help ecosystems and species adapt in Canberra Nature Park, reserve managers will focus on options that emphasise natural resilience and are likely to benefit biodiversity regardless of the degree of climate change. Approaches might include:

- increasing resilience by controlling or managing 'non-climate change' ecological stressors such as weeds, native and introduced herbivores, introduced predators, and urban edge effects
- for landscapes—identifying, managing and protecting potential climate refugia, and connections across communities and environmental gradients (in the Canberra area, refugia tend to be cooler moist sites and can occur at the landscape scale, such as Molonglo Gorge or south facing slopes, or at the micro level, such as rock crevasses)
- for ecological communities—promoting resilience through native diversity and, in some cases, accepting transitions to new structural community types
- for species—maintaining large, well connected and genetically diverse populations.

Responses to climate change already observed in Canberra Nature Park

Wildlife and plants within Canberra Nature Park have already changed behaviour, distributional range, time of flowering or breeding activity in response to climate change. Local examples include the following:

- Before 2005, the Superb Parrot was only an occasional spring or summer vagrant within the ACT. Today more than 100 birds are observed in the ACT during spring and summer, with two established nesting sites and overwintering birds. Modelling by the Australian National University has found the bioclimatic range to be highly sensitive to climate change, with predicted range contractions of 47% by 2050 and 75% by 2070. The range is already shifting to the south-east, with the woodland within Canberra Nature Park becoming increasingly important habitat (Manning et al., in press).
- Frogwatch data and expert opinion suggest that several ACT frog species are starting breeding calls earlier in the year.
- The extreme drought coupled with heavy kangaroo grazing from 2006 to 2010 caused a dramatic reduction in the Grassland Earless Dragon population, to the point where there was a real risk of local extinction. Fortunately the lizard population has been recovering since drought conditions ended.
- Several weed species previously restricted to more coastal areas have recently been found in Canberra Nature Park surviving winters and reproducing, whereas previously they would have been killed or restricted by cold temperatures. These species include Moth Vine (*Araujia sericifera*), Madeira Vine (*Anredera cordifolia*), Cobbler's Pegs (*Bidens pilosa*) and Madagascan Fireweed (*Senecio madagascariensis).*

2.6 Plants and animals: management objectives and actions

ECOSYSTEMS, NATIVE ANIMALS AND HABITAT CONNECTIVITY

OBJECTIVES

- Threatened and rare ecological communities (Yellow Box–Red Gum Grassy Woodland, Snow Gum Grassy Woodland, Red Box woodland/open forest and native grasslands) are conserved and rehabilitated.
- The diversity, extent, condition, connectivity and resilience of native ecological communities are maintained and/or improved.
- Threatened native animal species, and the diversity of other animal populations, are conserved.
- Habitat for woodland birds and other native fauna is conserved and improved.
- Habitat connectivity is maintained and strengthened to support ecosystem resilience.
- Threats to native plants, animals and ecological communities are minimised.

ACTIONS

1. Prepare management guidelines, as required, for threatened and significant ecological communities, plants and animals.
2. Plan and implement (assisted) rehabilitation of ecological communities, priority plant species and animal habitat.
3. Prioritise restoration/regeneration activities that:
   - increase habitat size, condition and connection
   - reduce perimeter-to-area ratio of habitat patches
   - assist species movement within and across reserves which contain bottlenecks or break points in connectivity.
4. Make information on the locations of significant and/or sensitive ecological communities, plants and animal habitat accessible to land managers, ParkCarers and contractors.
5. Identify opportunities and requirements to protect habitat diversity and refugia at the landscape and reserve scale.
6. Provide opportunities and support for adjoining landholders and the community to improve ecosystems.
7. Incorporate Aboriginal traditional ecological knowledge and practices into reserve management.
8. Investigate and implement measures to improve genetic diversity of isolated populations of endangered plants and animals including reintroductions of species where and if conditions are suitable and natural recruitment is not possible.
9. Utilise mechanisms under the Nature Conservation Act for the Conservator to close reserves to protect conservation values, for example in key woodland bird habitat during the spring/summer breeding season.
10. Liaise/share information with other agencies and land managers as required to:
    - encourage the protection of scattered trees in modified landscapes, including urban and peri-urban areas
    - minimise impacts from new developments or infrastructure in areas key for connectivity
    - explore possibilities for improving connections within reserves, between reserves, through the urban areas, and to the wider regional landscape.

Grazing management

OBJECTIVES

- Conservation grazing regimes support protection of threatened species and improve ecosystem function.
- Overabundant animal species are managed to reduce impacts on reserve values.

ACTIONS

11 Manage and actively monitor total grazing pressure and impacts to achieve conservation objectives, particularly in grassy ecosystems where threatened animal species have particular habitat requirements.

12 Utilise strategic grazing (by livestock) to achieve conservation and Bushfire Operation Plan objectives.

Fire

OBJECTIVES

- Ecological burning regimes are established, implemented and monitored.
- Cultural burning practices are established, implemented and monitored.
- The adverse impacts of fire-fuel management on biodiversity values are minimised while life and property are protected.

ACTIONS

13 Undertake fire management activities in accordance with the Strategic Bushfire Management Plan for the ACT, and with relevant Regional Fire Management Plans and annual Bushfire Operational Plans.

14 Integrate the requirements of the Strategic Bushfire Management Plan for the ACT with the protection of threatened species, their habitat and ecological function by:

- implementing ecological guidelines for fire fuel and access management operations, protection measures to support the long-term maintenance of plant and animal communities, and retaining habitat refugia by utilising landscape mosaic burning regimes
- monitoring the effectiveness of burning in contributing to conservation outcomes and fire risk mitigation outcomes
- monitoring the impacts of prescribed burning and unplanned fire.

15 Utilise fire to achieve conservation objectives in grassy ecosystems.

16 Plan and implement cultural burns with Traditional Custodians.

Weeds

OBJECTIVES

- Weeds are excluded, eradicated, controlled or contained to minimise and mitigate adverse impacts on conservation values.

ACTIONS

17 Actively manage invasive weeds in accordance with the ACT Weeds Strategy and annual invasive weeds operations plan.

18 Systematically map and monitor the distribution and spread of weeds to detect trends and improve effectiveness of control programs for conservation.

19 Strengthen partnerships with adjacent land managers and the community in weed management to improve cost-effectiveness and reduce weed re-invasion including early detection of new incursions, surveillance and coordinated weed control.

20 Make information accessible to help the community to identify and report new weed species of concern.

Pest animals

OBJECTIVE

- Pest animals are excluded, eradicated or controlled to minimise adverse impacts on conservation values.

ACTIONS

21 Monitor pest animals and implement management actions in accordance with the ACT Pest Animal Management Strategy and annual vertebrate pest operations plans.

22 Monitor and evaluate the effectiveness of pest animal control in relation to conservation outcomes.

23 Strengthen partnerships with adjacent land managers and the community in pest animal management to improve cost-effectiveness and reduce pest re-invasion including surveillance and coordinated pest control.

Biosecurity

OBJECTIVES

- Diseases are excluded, eradicated, controlled or contained to minimise and mitigate adverse impacts on values.
- Research capacity on biosecurity, in particular invasive species, is increased.

ACTIONS

24 Identify options for the early control or exclusion of biosecurity risks.

25 Coordinate disease control in cooperation with adjoining land managers.

26 Support collaborative invasive species research with research partners.

Climate change

OBJECTIVES

- Ecosystem resilience to a changing climate is strengthened.
- Knowledge and understanding of the implications of climate change for the values of Canberra Nature Park is improved and informs management decisions.

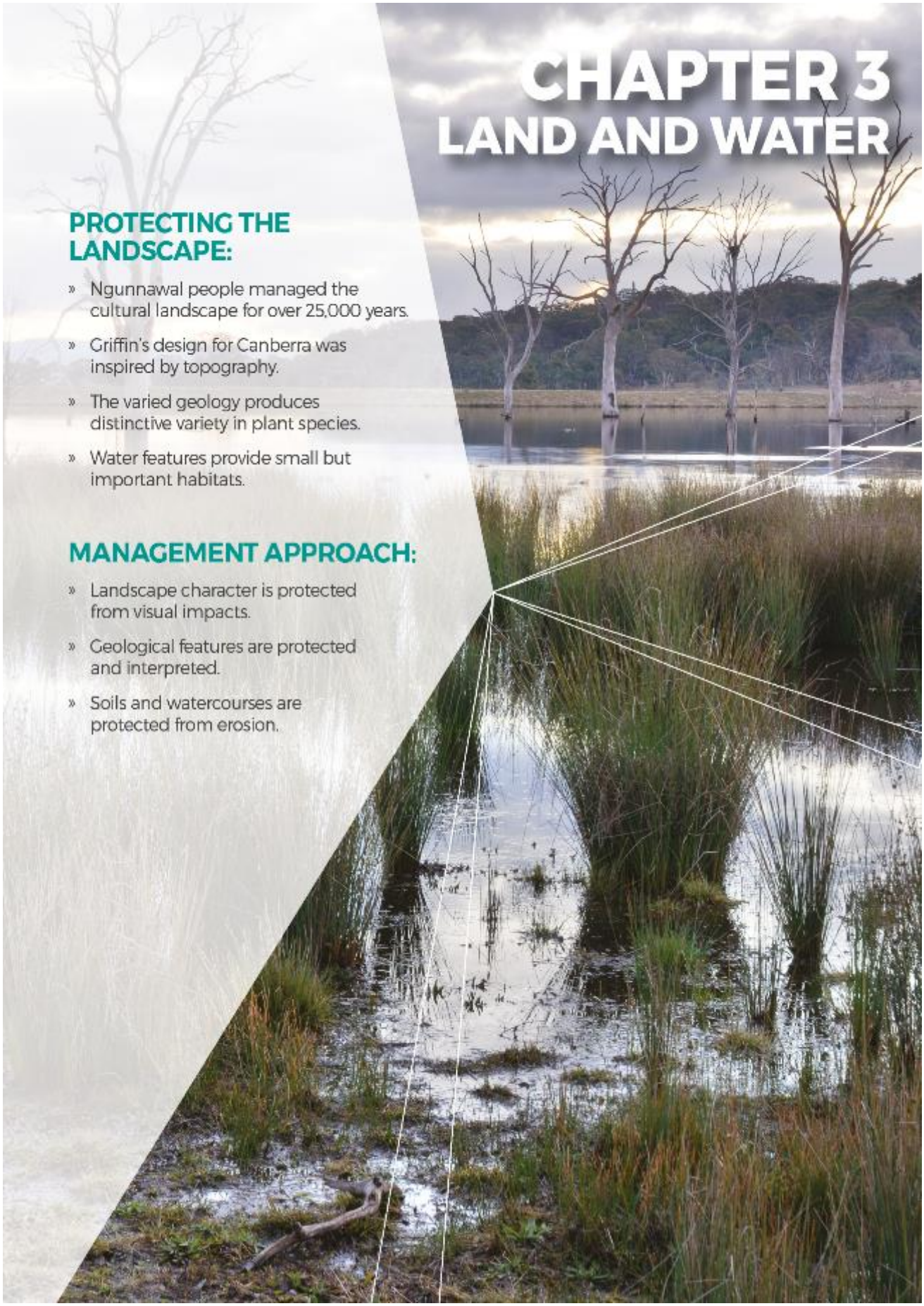
ACTIONS

27 Assess risk and resilience of species and ecological communities to climate change impacts and prioritise the development of management responses for those most at risk.

28 Promote resilience to climate change by:

- maintaining and restoring diversity in ecological communities
- identifying, managing and protecting potential climate refugia and landscape connections
- maintaining large, well connected and genetically diverse populations.

29 Conduct research and trial additional management responses to improve resilience in species/ecological communities to climate change.



Mulligans Flat Nature Reserve (Mark Jekabsons)

3 LAND AND WATER

3.1 Landscapes

The Ngunnawal people, Traditional Custodians of the Canberra region, view Canberra Nature Park as a cultural landscape, derived from thousands of years of Aboriginal land management and embedded with the spirits and stories of their ancestors. Many landscape features have cultural significance as having been created by ancestral beings or as places of ceremony.

The natural beauty of the landscape played a large part in the selection of the 'Limestone Plains' as the site for the National Capital and declaration of the Australian Capital Territory in 1911. Walter Burley Griffin and Marion Mahoney Griffin used the landscape as inspiration in their design for Canberra, and envisioned that the hills surrounding the city (now largely protected as part of Canberra Nature Park) should be kept free of development and re-vegetated with native forests.

The hills and ridges that surround and frame Canberra's urban areas, the major lakes, river corridors, distant mountains and bushland all combine to form the National Capital Open Space System, which provides the visual backdrop and landscape setting for the National Capital. Planning for Canberra consciously incorporates landscape objectives, and protection of landscape character is important in all Canberra Nature Park reserves. This plan recognises the role the landscape plays in shaping the city and enriching the lives of people who live here.

Mount Taylor Nature Reserve (Lois Padgham)

3.2 Geology, soils and land surface condition

The landscape and soils of Canberra Nature Park reflect the geological history of the area. The underlying rocks were formed between 480 and 400 million years ago by the deposition of silt and sand into a deep ocean. Subsequent tectonic plate movements resulted in extensive folding and faulting, volcanic activity, and periods of both submergence and weathering. As a result, geology varies across Canberra Nature Park reserves. Black Mountain, for example, is mostly Black Mountain Sandstone, formed from sediment

deposited in a fan on the sea floor around 440 million years ago, later uplifted and exposed as the surrounding softer plain eroded away.

Other reserves with rocks formed from sediments include those of the Canberra Formation (for example, Mulligans Flat) and the Pittman Formation (for example, Molonglo Gorge).

The geology of other reserves results from volcanic activity, with rocks belonging to either the Laidlaw Volcanics (for example, Mount Mugga Mugga and Tuggeranong Hill) or the Hawkins Suite (for example, Mount Ainslie, Mount Majura and Mount Painter). This variation in underlying geology has produced some distinctive variations in plant species, such as on Black Mountain, which has a significantly richer shrub and forb diversity.

The geological history also influences soil characteristics. The long periods of weathering have produced soils that are relatively infertile, with low organic matter and poor structure. On the upper slopes the soils are shallow, gravelly and prone to erosion. On lower slopes the soils are deeper duplex soils, characterised by sandy topsoils overlying clayey, reddish and yellowish, low fertility subsoils. The subsoils are very vulnerable to erosion if the topsoil is lost. Soils on the plains are deeper and more fertile (Ryan 2011).

3.2.1 Geological features

Significant geological features in Canberra Nature Park include Red Hill hornfels exposures, Mulligans Flat quartz reef outcrop, Mount Majura fossil outcrops, Crace Grasslands hill cuesta, Molonglo Gorge bedded sediments, Tuggeranong Parkway Cutting on Mount Taylor, and Gossan Hill's complex geology including a gossan. Appendix 4 provides more detail on geological features in Canberra Nature Park reserves. Sites on the ACT Heritage Register are in Table 3.1.

Road cutting on Black Mountain Nature Reserve (Mark Jekabsons)

Table 3.1: Geological sites listed on the ACT Heritage Register

Reserve	Registration	Description
Mount Taylor	Tuggeranong Parkway Road Cutting	Significant for the interpretation of the volcanic stratigraphy of the Canberra area during the Silurian period (around 400 million years ago).

Note: The current ACT Heritage Register should always be consulted for the latest information before commencing works or other activities that are likely to have an impact in the landscape.

3.3 Water

As most of Canberra Nature Park consists of hills and ridges, much of the hydrology relates to ephemeral first order streams and gullies, and former farm dams. The exceptions are:

- a 15.5 kilometre stretch of the Molonglo River as it flows through Molonglo Gorge
- the headwaters of Sullivans and Gungaderra creeks within Mulligans Flat and Goorooyarroo reserves
- a mid-section of Gungaderra Creek as it flows across Gungaderra Grassland reserve
- an upper part of Ginninderra Creek as it flows on the eastern edge of Percival Hill.

Although minor in nature, gullies and drainage lines usually support denser vegetation growth and provide a variety of habitats and local refuges that are important for maintaining the biodiversity within reserves.

Some dams within Canberra Nature Park are surveyed annually as part of the Frogwatch program. Up to seven species of frogs have been recorded in dams within reserves on the urban fringe, such as in Dunlop Grasslands, Callum Brae and Mulligans Flat, which have amongst the highest recorded frog diversities within the ACT and surrounding NSW (Frogwatch 2009).

A few regionally rare plant species are found within or on the edge of reserve dams, including Spring Starflower (*Alisma plantago-aquatica*) in Dunlop Grasslands, River Buttercup (*Ranunculus inundatus*) in the Aranda Snow Gums area, and Small Knotweed (*Polygonum plebeium*) in Mulligans Flat and Isaacs Ridge.

Gungaderra Creek has a deeply incised and eroding channel within Goorooyarroo Nature Reserve. Other areas of Gungaderra Creek, Ginninderra Creek and Sullivans Creek within Canberra Nature Park have largely been cleared of native vegetation and are dominated by exotic pasture grasses such as Phalaris (*Phalaris aquatica*), Yorkshire Fog (*Holcus lanatus*) and Tall Fescue (*Festuca elatior*).

Drainage lines and dam edges, because of their extra soil moisture and bare soil, may allow for rapid invasion and dense infestation of weed species such as Chilean Needlegrass (*Nassella neesiana*) or Blackberry (*Rubus fruticosus aggregate*).

Molonglo Gorge Nature Reserve (Brian Prince)

3.4 Management considerations

Landscapes

The National Capital Plan aims to conserve and enhance the landscape features that give the National Capital its character and setting, and protection of landscape is important in managing Canberra Nature Park. Any activities, works and structures within Canberra Nature Park that have potential to interrupt or modify significant landscape elements such as skylines, ridgelines and major views will be discouraged and assessed for visual impact.

Clearing vegetation to allow appreciation of vistas from lookouts, such as Red Hill, may conflict with the protection of ecological values. Management of vegetation should avoid or at least minimise impacts on ecological values, particularly threatened ecosystems and species.

Geological features

Significant geological features must be protected from unnecessary disturbance, and interpretation of some of these sites would increase community understanding of their importance.

Soil and erosion

Sharp (2011) reported that areas of major active gully erosion and undercutting occurred within Callum Brae, Mount Painter, Kinlyside, Mount Mugga Mugga and Urambi Hills. Minor gully erosion in drainage lines was also present in Aranda Bushland, Goorooyarroo, Isaacs Ridge and Red Hill.

High levels of recreational use can lead to erosion of walking tracks and adjacent areas. The creation of informal tracks can lead to further erosion.

Fire and fire suppression, extreme fire and flood events, overgrazing, inappropriate recreation and poor maintenance of roads, trails and tracks can lead to significantly increased erosion, causing loss of vegetation, siltation of rivers and streams, lower water quality and the loss of ecological values. Impacts may be greater during droughts when ground cover is reduced.

To minimise erosion, planning for activities or works that may cause physical disturbance needs to take into consideration factors such as soil type, slope, type of disturbance, season, climatic conditions, location and capacity for remediation. For example, fire planners use an ArcGIS tool to determine erosion prone areas, and to assess how the erosion risk changes depending on fire severity.

3.5 Land and water: management policies, objectives and actions

LAND AND WATER

POLICIES

- Activities, works or infrastructure that adversely impact on the landscapes, soils, geological sites and hydrology of Canberra Nature Park will be avoided or minimised.

Landscape setting

OBJECTIVES

- The visual amenity of Canberra Nature Park's hills, ridges and buffer spaces is retained to protect the landscape setting of the city.

ACTIONS

30 Provide input into design proposals and other works to ensure visual intrusion on the landscape is minimised.

Geology and soils

OBJECTIVES

- Geological values, soils and land surface condition are protected and improved.

ACTIONS

31 Identify, map and protect significant geological sites from disturbance.

32 Analyse soil maps and hydrogeological data to identify risks and areas for monitoring and remediation.

33 Minimise activities that cause physical disturbance to geological features and soil and land surface condition, and impacts on hydrology.

Water

OBJECTIVES

- The condition of creeks, drainage lines and dams is maintained and improved where required.

ACTIONS

34 Protect creeks, drainage lines and dams from disturbance.

35 Rehabilitate damaged creeks, drainage lines and dams and improve the condition of aquatic habitats.

Aboriginal grinding grooves, Tuggeranong Hill Nature Reserve (PCS Library)

4 ABORIGINAL CONNECTION TO COUNTRY

4.1 Aboriginal heritage

"*All landscapes contain the imprint of human use. The way perceptions, beliefs, stories, experiences and practices give shape, form and* meaning *to the landscape is termed a cultural landscape.*"
(Australian Heritage Commission 1998).

Ngunnawal people occupied and actively managed the landscape of the Canberra region for more than 25,000 years prior to pastoral settlement, through traditional burning and other sustainable land management practices.

The collecting of seasonal foods such as the Bogong Moths (*Agrotis infusa*), Mountain Pepper (*Tasmannia lanceolata*) and other delicacies, and annual initiation ceremonies, marriages, corroborees and trade brought large gatherings of Aboriginal people from far and wide to Ngunnawal Country. These gatherings were essential to exchange knowledge and maintain spiritual, social and environmental connectivity between traditional caretakers.

Significant landscape features such as hills, mountains and ridgelines aided navigation and provided vantage points. In addition, many have cultural significance as features created by ancestral beings or as places of ceremony.

Lowland Canberra was rich in food such as kangaroos, lizards, turtles, yabbies, fish, frogs and edible plants. Trees and other plants were used to build shelter and create tools, weapons, canoes, coolamons, baskets and rope. Quarries provided stone for the manufacture of tools and ochre for art, decoration and ceremony.

Ngunnawal people continued to make use of traditional food supplies until at least the mid-nineteenth century. As pastoral occupation was initially relatively limited, the Ngunnawal were probably able to utilise the tablelands and mountains in a traditional manner with only slight modifications. However, with the extension and intensification of pastoral activity, the depletion of traditional food supplies, disease and other factors, the Ngunnawal appear to have become increasingly reliant on relationships with settlers and, in time, appear to have been absorbed into the colonial economy, working and living on various settlements in the region (Thunderstone 2019).

The Ngunnawal continue to feel a deep responsibility to preserve the spirit and stories of their ancestors, embedded throughout the landscape. Neighbouring language groups including the Ngambri, Ngarigo, Wolgalu, Gundungurra, Yuin and Wiradjuri people also maintain a strong association with the region through their ancestral relationships with the area.

Aboriginal places and objects

Table 4.1 shows Aboriginal places (not including artefact scatters or scarred trees) within Canberra Nature Park that are listed on the ACT Heritage Register. Many other sites, predominantly isolated stone artefacts or artefact scatters, are also listed on the register. It is important to note that there are many more Aboriginal places of cultural and heritage significance throughout Canberra Nature Park that are, as yet, unrecorded.

Table 4.1: Aboriginal places (not including artefact scatters or scarred trees) within Canberra Nature Park listed on the ACT Heritage Register

Reserve	Registration	Description
Gossan Hill	Aboriginal ochre quarry and historic mining site	Aboriginal ochre quarry and stone artefact site shows evidence of ochre extraction.
Percival Hill	Aboriginal Grinding Groves	Aboriginal stone grinding site.
Tuggeranong Hill	Theodore Aboriginal Artefact Grinding Site	Aboriginal stone grinding site.

Note: The current ACT Heritage Register should always be consulted for the latest information before commencing works or other activities that are likely to have an impact in the landscape.

The Traditional Custodians and Representative Aboriginal Organisations of the Canberra region view all Aboriginal places and objects as an important part of their history and want not only to have them protected but also to have a greater involvement in their ongoing management and maintenance.

All Aboriginal places and objects in the ACT are protected under the *Heritage Act 2004* and must not be disturbed. Anyone finding an (unregistered) Aboriginal object or place has an obligation to report it to the Heritage Council.

If a person finds what they think is an Aboriginal heritage object (or place), they should not move it or do anything that will impact it. They should note if it is under threat (for example, by machinery or vandalism) and alert the ACT Heritage Council.

Aboriginal Artefact, Farrer Ridge Nature Reserve (Lois Padgham)

Aboriginal artefact, Mulligans Flat Nature Reserve (Lois Padgham)

4.2 Contemporary Aboriginal connection to Country

When Aboriginal and Torres Strait Islander people care for the land, they also care for their culture. The Ngunnawal people have an ongoing strong cultural and spiritual relationship with the landscape. Working on Country gives Aboriginal people a sense of personal pride and affirms their identity through a cultural belonging and connection to the land.

Caring for Country is the Aboriginal and Torres Strait Islander concept of natural resource management; it includes the cultural responsibility of protecting the sites, values, stories and ancestral obligations of that Country as well as nurturing and managing the land. The ACT Government acknowledges that connection to Country holds spiritual, social, historical, cultural and economic importance for Aboriginal and Torres Strait Islander peoples, and that being actively engaged in managing land maintains their cultural identity and has direct benefits to community health and financial well-being.

Access for cultural and social purposes

Traditional Custodians and the broader Aboriginal and Torres Strait Islander community may utilise Canberra Nature Park for cultural and social purposes. These uses could include ceremonies, gatherings, fishing, cooking, healing, resource collection and knowledge transference. The Parks and Conservation Service supports access to Country and use of land and reserves by the Aboriginal community in accordance with guidelines (under development).

4.3 The ACT Parks and Conservation Service Aboriginal rangers

Parks and Conservation Service Aboriginal staff work in various roles across the organisation. They come together as the Murumbung Yurung Murra Rangers to better involve Traditional Custodians in identifying the traditional uses, values and connections to fire, land and water and to capture the contemporary aspirations for management of the cultural landscape.

The Murumbung Yurung Murra Rangers also provide invaluable peer support, mentoring and advocacy within the Parks and Conservation Service and support the Representative Aboriginal Organisations and Traditional Custodians in the protection and interpretation of heritage sites for the enrichment of future generations.

4.4 ACT Aboriginal Fire Management Framework

The Parks and Conservation Service has an ACT Aboriginal Fire Management Framework as part of its commitments in the annual ACT Bushfire Operations Plan. It was developed by the Parks and Conservation's Aboriginal staff in conjunction with Representative Aboriginal Organisations and Traditional Custodians. The framework establishes a set of guidelines and principles for rejuvenation of cultural burning practices and for the involvement of the local Aboriginal community in implementing and monitoring cultural–ecological burns in fire management operations in the ACT. While the primary purpose is cultural renewal, other outcomes include the renewal of native vegetation, safeguarding culturally significant sites, hazard reduction and maintaining the health of groundwater sources and water catchment areas. The project also helps build a connection between the Traditional Custodians and the Parks and Conservation Service.

4.5 Cultural water flows

The ACT is wholly situated within the Murrumbidgee River Catchment, which feeds into the Murray-Darling Basin. The Murray-Darling Basin Plan requires the identification of Indigenous cultural and spiritual values in future water planning and management.

Cultural flows are defined by the Murray Lower Darling Rivers Indigenous Nations (MLDRIN).as “water entitlements that are legally and beneficially owned by Indigenous Nations of a sufficient and adequate quantity and quality, to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations.” (MLDRIN 2007).

The ACT is required to consult with Traditional Custodians to identify the objectives and outcomes of Indigenous people in relation to their water values and uses and also have regard to their views with respect to cultural flows. This requires consideration of water-related sites in the ACT including within Canberra Nature Park.

Aboriginal consultation at Mulligans Flat Nature Reserve (Brian Prince)

4.6 Management considerations

Recognition of Aboriginal culture, protection and conservation of Aboriginal heritage places and objects, and ongoing connection by Aboriginal people to their Country are important considerations for this reserve management plan. The following considerations and issues are pertinent to management.

- Under the Heritage Act, Representative Aboriginal Organisations have a formal, statutory role in Aboriginal heritage assessment and management in the ACT.
- Consultation with Aboriginal people (particularly Traditional Custodians) is a crucial first step in managing Aboriginal cultural heritage places.
- Guidance for conserving and managing places of cultural significance is provided by the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter).
- Recreation and tourism activities need careful consideration where they could be incompatible with the significance or management objectives of an Aboriginal cultural heritage place.

- A strategic approach to the interpretation of Aboriginal cultural heritage should be adopted, involving an inventory of all sites, knowledge about them and their significance, and considering all places within a broader cultural landscape framework.
- All Aboriginal places and objects, including artefact scatters, are considered to be significant by the Aboriginal community, and Aboriginal people generally express the desire for all such sites to be left in situ wherever feasible.
- Aboriginal ecological knowledge, and the interests of Aboriginal people in managing the environment as a cultural landscape, make an important contribution to reserve management and should be actively facilitated.
- Access to Canberra Nature Park by Aboriginal people for cultural purposes should be addressed in guidelines prepared in consultation with Aboriginal people. The guidelines should consider whether restrictions need to be imposed regarding cultural sensitivity.
- The potential for dual naming of reserves and places within them should be considered in consultation with Representative Aboriginal Organisations and Traditional Custodians.

Management of Aboriginal cultural heritage needs to consider:

- the extent to which any proposal maintains and strengthens Aboriginal cultural connections to Country
- how best to recognise the interests of Aboriginal people in the protection and conservation of their heritage, including their involvement in managing cultural information and research
- how to make provision for access by Aboriginal people to their sites and places, including access for transferring cultural knowledge or gathering materials for cultural or ceremonial purposes, and vehicle access by elders to sites not open to public vehicles
- the extent to which management can assist in developing employment, education, training and economic opportunities for Aboriginal people
- the best means to protect and conserve Aboriginal sites and objects, and plan for risks
- the level of access by visitors that will be permitted to Aboriginal cultural heritage places (ranging from prohibition to open access) in recognition of cultural sensitivity
- the interpretation of Aboriginal cultural heritage places as part of the recreation, tourism and education policies in the plan. Not providing information can be a form of protection in some circumstances
- the desire of Traditional Custodians to undertake the interpretation of their cultural heritage within Canberra Nature Park.

The principles for heritage management as outlined in Ask First: A guide to respecting Indigenous heritage places and values (Australian Heritage Commission 2002a) state that that Aboriginal and Torres Strait Islander people:

- are the primary source of information on the value of their heritage and how this is best conserved
- must have an active role in any Indigenous heritage planning process
- must have input into primary decision-making in relation to Indigenous heritage so they can continue to fulfil their obligations towards this heritage
- must control intellectual property and other information relating specifically to their heritage, as this may be an integral aspect of its heritage value.

4.7 Aboriginal connection to Country: management policies, objectives and actions

ABORIGINAL CONNECTION TO COUNTRY

POLICIES

- Aboriginal connection with Country, past and present, is acknowledged and will continue to be supported.
- Aboriginal heritage places and objects will be protected and managed in accordance with statutory requirements and the Burra Charter and its guidelines.
- The principles of Ask First and Free, Prior and Informed Consent will guide engagement with Aboriginal people to identify, conserve and interpret Aboriginal heritage.
- Traditional Custodians will be involved in managing Canberra Nature Park as a living cultural landscape.
- Aboriginal cultural rights will be respected in accordance with the *Human Rights Act 2004*.

Aboriginal connection to Country

OBJECTIVES

- A healthy country Traditional Custodian council is established to guide management of Canberra Nature Park.
- Cooperative management arrangements for Canberra Nature Park are established with Traditional Custodians.
- Canberra Nature Park provides a venue to connect Aboriginal people to Country.
- Aboriginal cultural values, including places and objects, are protected and conserved.
- Traditional Custodians, Representative Aboriginal Organisations and Aboriginal staff are actively involved in conserving and interpreting Aboriginal cultural heritage.
- Aboriginal traditional knowledge is incorporated into reserve management to improve environmental and cultural outcomes.
- Community awareness of Aboriginal cultural heritage and connection to Country is increased.
- The cultural landscape values and Aboriginal history of the reserves are better understood and interpreted.
- Canberra Nature Park reserves are jointly named with an appropriate name identified by Traditional Custodians.

Aboriginal connection to Country

ACTIONS

36 Work with Representative Aboriginal Organisations and Traditional Custodians to progress cooperative management arrangements for Canberra Nature Park.

37 Develop a strategic approach to protecting, managing and interpreting Aboriginal cultural heritage, led by Traditional Custodians.

38 Undertake an assessment of Aboriginal cultural heritage across Canberra Nature Park in partnership with Representative Aboriginal Organisations and the ACT Heritage Council.

39 Encourage and facilitate opportunistic heritage surveys when favourable conditions arise, for example after fires.

40 Develop conservation management plans (approved through ACT Heritage Council) for selected Aboriginal heritage sites, with the early involvement of Traditional Custodians and Representative Aboriginal Organisations.

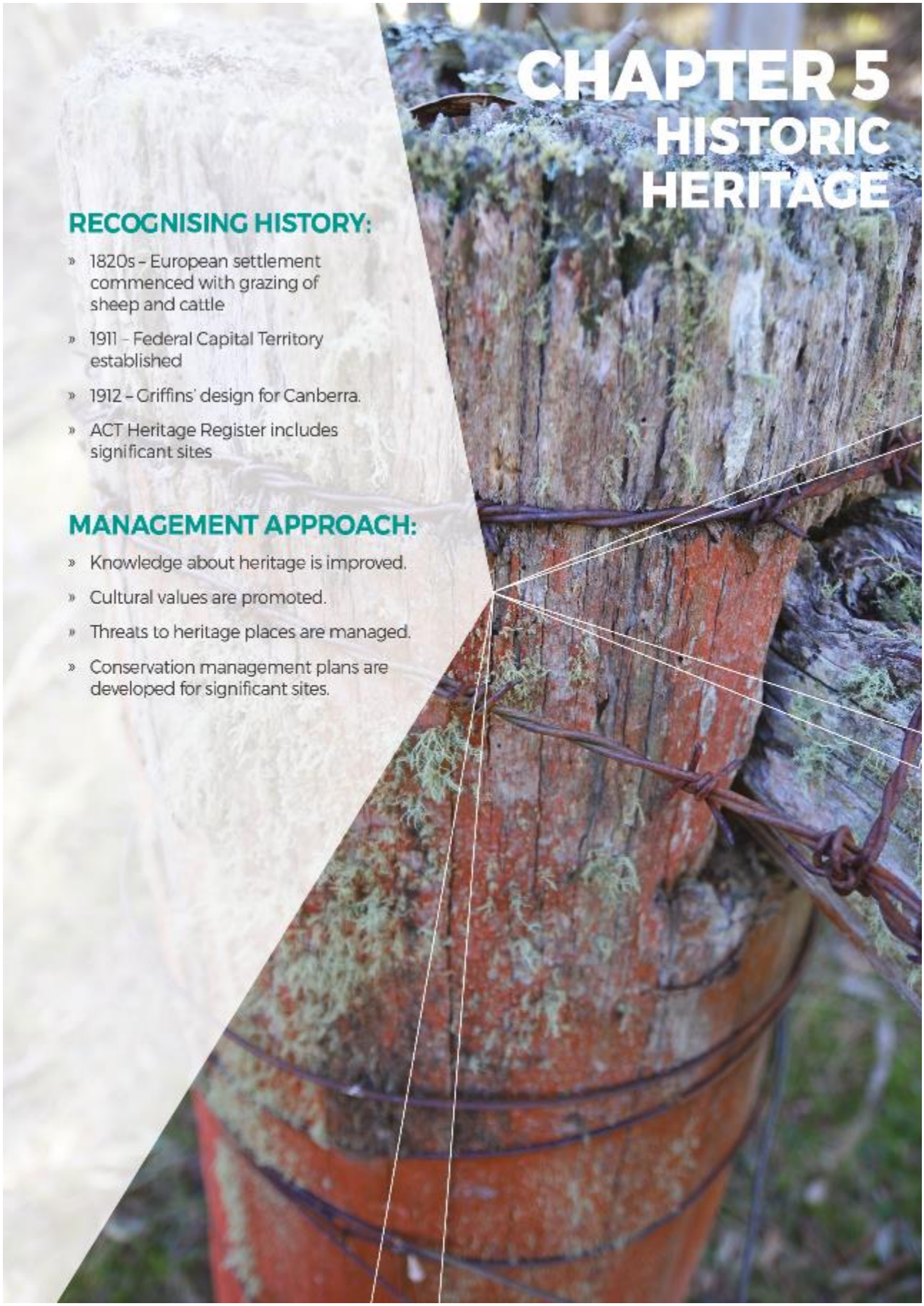
41 Work with Traditional Custodians, Representative Aboriginal Organisations, local Aboriginal groups and Murrumbung Rangers to increase their involvement in management activities, including traditional burning practices, and to achieve their objectives for cultural water flows.

42 Support the development of policies for Traditional Custodians' access to Country for cultural purposes.

43 Continue to assess Aboriginal heritage values prior to works within Canberra Nature Park and modify proposals to avoid interference with or damage to Aboriginal heritage places and/or objects, and report any Aboriginal sites or objects found to the ACT Heritage Council.

44 Consult with Representative Aboriginal Organisations and Traditional Custodians on the naming of new reserves, or dual-naming of existing reserves.

45 Deliver Aboriginal cultural awareness training for Parks and Conservation staff.



Old fence on Mount Majura Nature Reserve (Mark Jekabsons)

5 HISTORIC (NON-ABORIGINAL) HERITAGE

5.1 From first European settlement

The first pastoralists to explore the Canberra region relied on the intimate knowledge of Aboriginal guides. Charles Throsby, Joseph Wild and James Vaughan are credited with the first exploration of the 'Limestone Plains' around 1820, with further excursions extending Throsby's recording of the area over the next few years. Throsby's reports of fertile plains and well supplied rivers soon attracted settlers to the area.

Settlement of the region commenced in the 1820s, when Joshua John Moore was granted 2000 acres (810 hectares) covering the area of the present Canberra city centre. Moore called his station 'Canberry' after the name given by the Ngunnawal people who had occupied the district for millennia.

In 1825 James Ainslie drove sheep down to the district for Robert Campbell and occupied land at the base of Mount Pleasant near the Limestone (Molonglo) River. He called the area 'Pialigo'. A stone cottage was constructed (Limestone Cottage) and this was later extended to become Duntroon House. The Campbell family, who named the property 'Duntroon' after they took up residence, then acquired further land extending to Queanbeyan.

The Limestone Plains lay close to the 'limits of location' set by Governor Darling in 1829 for settlement in NSW. Settlement was not approved west of the Murrumbidgee, although squatters soon moved into the mountains across the river.

Early settlement was initially dominated by large pastoral properties, such as 'Lanyon', 'Tuggeranong', 'Yarralumla' and 'Duntroon', and often held by absentee landlords. Closer settlement was encouraged by the NSW Government through the *Crown Land Acts 1861*, which allowed selectors to purchase government land in lots of moderate size, without auction. 'Free selectors', who were required to live on their properties, set up farms in the Ginninderra district and the Majura Valley.

The focus of early settlement was grazing, with sheep grazed mainly on the eastern side of the Murrumbidgee River and cattle in the mountains west of the river. There was wheat farming on the plains at Tuggeranong and Ginninderra, and mixed farming on the Molonglo floodplain and in the valleys of the Ginninderra and Majura creeks.

The pattern of large freehold stations and small farms persisted until 1911, when the decision to establish the new Federal Capital in the Limestone Plains region was formally declared.

5.2 Post federation

The Federal Capital Territory (later named Australian Capital Territory) was created on 1 January 1911, when the NSW government ceded 2360 square kilometres of land, including the seaport of Jervis Bay, to the Commonwealth Government.

In 1912 Walter Burley Griffin won the design competition for the layout of Canberra, principally because of his sensitivity to the surrounding landscape and its central role in shaping the city design.

In 1919, as elsewhere in Australia, landholdings were resumed by the government and subdivided for settlement of returned soldiers as part of a repatriation scheme. This included areas at Yarralumla, Duntroon, Lanyon, Tuggeranong and Charnwood.

A small number of historic heritage places remain in some Canberra Nature Park reserves from 19th and early 20th century use. Table 5.1 lists historic sites identified on the ACT Heritage Register.

Table 5.1: Historic heritage sites listed on the ACT Heritage Register

Reserve	Registration	Description
Callum Brae & Jerrabomberra West	Callum Brae Precinct	A small part of the heritage-listed precinct is within Callum Brae and Jerrabomberra West nature reserves. The Callum Brae Precinct (including homestead, fences and outbuildings) provides a significant example of a successful World War 1 Federal Capital Territory soldier settlement lease.
Jerrabomberra West Grasslands	Woden Homestead and Environs	The Woden Homestead and environs includes an early homestead (outside the reserve) that has been continuously occupied and managed as an agricultural enterprise. Pastoral management practices in the native grasslands in the north of the property (within the reserve) have ensured the survival of endangered species and ecosystems including the Grassland Earless Dragon, the Golden Sun Moth and Perunga Grasshopper, Natural Temperate Grassland and Yellow Box–Blakely's Red Gum Grassy Woodland.
Melrose	Travelling Stock Route	Heritage value for past stock management practices.
Molonglo Gorge	Kowen Cultural Precinct	The Kowen Cultural Precinct includes several ruins and disused buildings relating to rural 19th century life. The precinct includes a small part of the nature reserve.
Mount Pleasant	Duntroon Dairy	The Duntroon Dairy was constructed before September 1832 and is the oldest standing structure in the ACT. A conservation management plan was prepared in 2013 (ACT Government 2013a).
Mulligans Flat	Old Coach Road	Old Coach Road (Bungendore to Ginninderra) is important for understanding the land use and function of 19th century rural road and transport systems in the region.
	Mulligans Flat Ploughlands	The Mulligans Flat ploughlands show important evidence of a distinctive farming process and a way of life using draught animals.

Note: The current ACT Heritage Register should always be consulted for the latest information before commencing works or other activities that are likely to have an impact in the landscape.

Sites of heritage interest, but not listed on the ACT Heritage Register include:

- remnants of huts or cottages in Mulligans Flat, Goorooyarroo, Crace Grasslands, Mount Painter, Mount Pleasant, Farrer Ridge, Tuggeranong Hill and Rob Roy
- two school sites in Mulligans Flat (constructed in 1896 and 1913)
- ACT border markers in Mulligans Flat and Goorooyarroo
- remnants of old fences
- old quarries on Mount Ainslie, Black Mountain and Red Hill, which were used in the early construction of Canberra
- remnants of mining on Gungahlin Hill.

Cultural heritage plantings

In the 1920s Walter Burley Griffin initiated re-vegetation projects on the then denuded hills around Canberra. For example:

- Mount Mugga Mugga—Argyle Apple (*Eucalyptus cinerea*), White Box (*E. albens*) and Golden Wattle (*Acacia pycnantha*)
- Mount Majura—Kurrajong (*Brachychiton populnea*) and Drooping She-oak (*Allocasuarina verticillata*)
- Red Hill—Crimson Bottlebrush (*Callistemon citrinus*) and Rosemary Grevillea (*Grevillea rosmarinifolia*).

These were largely implemented under the supervision of Chief Nurseryman Charles Weston. Later tree plantings have also been undertaken in a number of reserves, for example:

- Mount Pleasant, Mount Mugga Mugga and Red Hill—Sydney Blue Gum (*E. saligna*)
- O'Connor Ridge—Monterey Pine (*Pinus radiata*)

While some of these plantings have biodiversity, heritage or landscape value, others are exotic or non-local species and a potential weed source. As a long term project, the Parks and Conservation Service will work to document management direction for individual plantings. Consultation will be undertaken with the community.

Duntroon Dairy (ACT Heritage)

5.3 Management considerations

Under the ACT Heritage Act, all ACT Government agencies are required to identify, protect and manage heritage places and objects for which they are responsible. The Act also provides for the preparation of Conservation Management Plans and Heritage Guidelines for the protection of sites of heritage

significance. While some places and objects in Canberra Nature Park are included on the ACT Heritage Register, many more, in particular Aboriginal artefacts, are still to be identified.

The Heritage Register should always be consulted for the latest information before commencing works or other activities that will have any impacts on heritage sites.

Cultural heritage management best practices are set out in the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter) (Australia ICOMOS 2013).

Issues and opportunities around cultural heritage management in Canberra Nature Park include:

- improving knowledge about heritage places and objects, values and significance
- managing threats to the physical fabric of heritage places
- promoting community appreciation of the cultural values of the reserves.

There are opportunities to better understand the historic heritage of Canberra Nature Park though systematic and opportunistic heritage surveys, historical research and documenting knowledge held by the community.

Threats to historic heritage features and places include fire, weed infestations, damage by visitors, high impact recreational activities, management practices, and alterations to physical fabric through refurbishment or redevelopment. Any works on places of historic heritage significance must be guided by the Burra Charter.

Informing and educating visitors about the historic heritage features of Canberra Nature Park can enrich their experiences, increase their appreciation of the cultural values of the reserves and encourage minimal impact behaviour.

5.4 Historic heritage: management policies, objectives and actions

HISTORIC (NON-ABORIGINAL) HERITAGE

POLICIES

- Historic heritage sites will be protected and managed in accordance with statutory requirements and the Burra Charter and its guidelines.
- The history of past land uses and occupation will be reflected in named places and interpretive material.
- Descendants of families with a strong historical association with places in the reserves, and local historians, will be respected and involved in heritage management.

OBJECTIVES

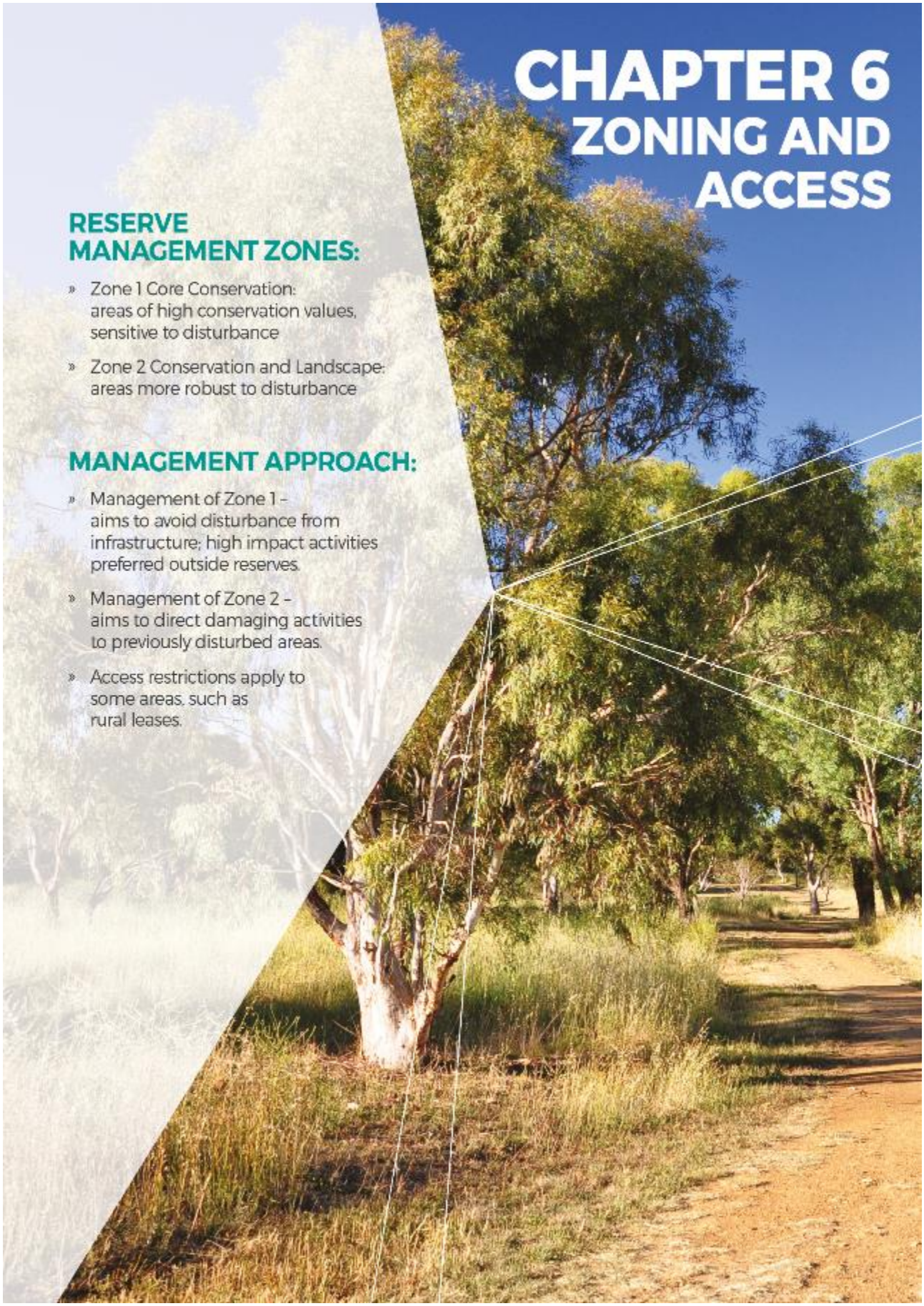
- Historic heritage sites are protected and conserved.
- Awareness of historic heritage, including past land use and the legacy for reserves today, is increased.
- The community is engaged in managing and conserving historic heritage places.

ACTIONS

46 Protect, manage and interpret historic heritage including:

- investigating historic heritage values before commencing works and modifying proposals to avoid impact
- encouraging research and promoting the results where appropriate
- recognising community attachment to heritage places and involving the community in management and interpretation
- mapping all historic plantings and documenting management direction in consultation with the community
- monitoring heritage sites.

47 Develop and review conservation management plans for significant historic heritage sites and implement works as specified.



Management trail at Mulligans Flat Nature Reserve (Mark Jekabsons)

6 ZONING AND ACCESS

6.1 Reserve management zones

The purpose of zoning in Canberra Nature Park is to ensure that any impacts from activities such as the construction of recreational facilities, utility infrastructure or other disturbances are directed into the more robust parts of Canberra Nature Park where conservation values are less likely to be compromised.

Management zones will also be one of the factors considered before approving large recreation group events in reserves. For example, the presence of nesting woodland birds or numerous previous events in the same area could influence an approval.

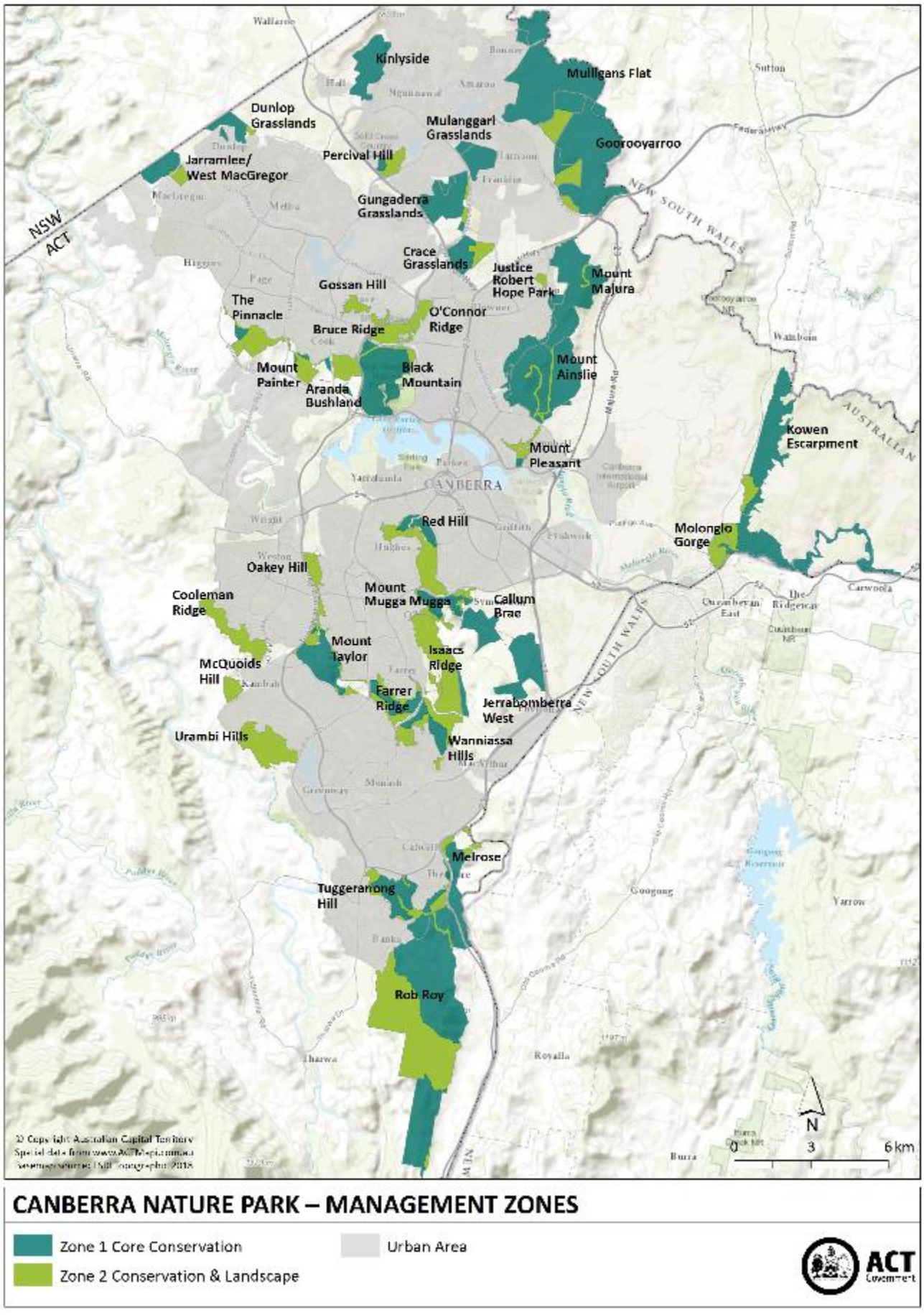
Canberra Nature Park has been divided into two zones (see Table 6.1) based on the distribution of natural and cultural values and the sensitivity of those values to disturbance. Management zones are shown in Figure 6.1 and policies for each management zone are outlined in Table 6.2. Summaries for each nature reserve are in Part 2.

Table 6.1: Management zones in Canberra Nature Park

Zone 1: Core conservation	Zone 2: Conservation and landscape (general protection)
Areas with sensitive values most likely to be impacted by physical disturbance. These may include: • high biodiversity and landscape values • nationally threatened ecosystems • important habitat for threatened species • high density of threatened species • high number and/or diversity of rare and uncommon species • locations where woodland bird species are breeding and sensitive to disturbance • places and objects on the ACT Heritage Register • Aboriginal places and objects of heritage significance • significant geological sites • regenerating areas • areas relatively undisturbed for an extended period. Zone 1 includes areas identified in the ACT Lowland Woodland Conservation Strategy (ACT Government 2004) and the ACT Native Grassland Conservation Strategy and Action Plans (ACT Government 2017)	Areas where the conservation values are less likely to be impacted, and are more robust when disturbed. Zone 2 areas have biodiversity, geodiversity and landscape values that complement Zone 1, but may have a history of greater modification or disturbance by urban infrastructure, generally have lower species diversity, and do not contain large areas of sensitive threatened species habitat.

As an example of how zones have been assigned, Red Hill Nature Reserve has large areas of endangered Yellow Box–Blakely's Red Gum Grassy Woodland. Where the woodland has a diverse and sensitive understorey, it has been categorised as Zone 1. In areas where the understorey is less diverse and more robust, it has been categorised as Zone 2.

Figure 6.1: Canberra Nature Park Zoning



Management of Zone 2 areas will seek to improve their condition over time, in line with the objectives for management of native ecosystems (see section 2.6). If the condition of values in an area improves during the life of this plan (for example, following restoration or rehabilitation work) or if an area becomes less resilient, the area may be rezoned through a minor amendment to the management plan under s.187 of the Nature Conservation Act.

Note that values such as threatened species occur throughout Canberra Nature Park and have specific protection and management measures associated with them, irrespective of the management zone.

6.2 Policies for the location of infrastructure in defined management zones

The intention of the policies in Table 6.2 is to locate damaging activities, such as infrastructure, away from sensitive environments.

Infrastructure has been categorised according to potential impacts:

** Must demonstrate that it is not possible to locate the infrastructure outside a reserve or outside a Zone 1 area.

* May be constructed in Zone 1 or Zone 2.

New infrastructure: All new infrastructure must demonstrate that all reasonable development options and design solutions have been considered and there are no realistic alternatives to the proposed development and that any impacts on reserve values can be avoided, or at least minimised and mitigated. New infrastructure must demonstrate that all options have been investigated to locate the infrastructure on previously disturbed areas.

New infrastructure is subject to ACT Government environmental assessment, except for Designated Areas where approval is the responsibility of the National Capital Authority. If significant impacts are expected on matters of national environmental significance under the EPBC Act, a referral to the Commonwealth will be required.

Existing infrastructure: May be upgraded to improved standards, or maintained in accordance with an approved code of practice, but must minimise impacts on reserve values and utilise lowest impact construction methods.

Table 6.2: Policies for the construction and location of reserve infrastructure in defined management zones

Infrastructure	Zone 1: Core conservation	Zone 2: Conservation and landscape (general protection)
Management buildings/structures** **for example visitor centre, parks depot, fire shed**	**Not preferred**	New: May be developed, but only when directly associated with specific ecological restoration, research or education. Co-locate with existing facilities where possible.
Campground**	**Not preferred**	New: Only if identified in a recreation and tourism strategy.[#]
Recreation hub** **for example, car park, toilet, picnic area**	**Not preferred**	New: Only if identified in a recreation and tourism strategy. [#] Co-locate with existing facilities.

Infrastructure	Zone 1: Core conservation	Zone 2: Conservation and landscape (general protection)
Utility infrastructure** **for example, power line, telecommunication tower, water tank, underground cabling**	**Not preferred**	New: Co-locate with existing services where possible.
Sealed cycle paths** **(shared use)**	**Not preferred**	New: Co-locate with existing services where possible.
Management trails**	**Not preferred**	New: Only if identified as essential for management purposes.
Recreation facilities* **for example, boardwalks, viewing platforms**	**Not preferred** New: May be developed if identified in a recreation and tourism strategy.# Locate on previously disturbed areas, or co-locate with existing recreation facilities.	New: May be developed if identified in a recreation and tourism strategy.# Locate on previously disturbed areas, or co-locate with existing recreation facilities.
Multi-use tracks* (unsealed)	**Not preferred** New: Only if associated with special features. Locate on previously disturbed areas. Existing: May be redesigned and constructed to improved standards utilising lowest impact methods.	New: Locate on previously disturbed areas where possible. Existing: May be redesigned and constructed to improved standards utilising lowest impact methods.
Walking tracks*	New: Only locate on previously disturbed areas. Existing: Priority for track rationalisation, for example, closing informal tracks.	New: Locate on previously disturbed areas where possible. Existing: May be redesigned and constructed to improved standards using lowest impact method.
Maintenance of utility infrastructure	In accordance with an agreed code of practice. Routine access may be permitted if specified in a Management Agreement prepared under the Nature Conservation Act. Management approval is generally required for access.	In accordance with an agreed code of practice. Routine access may be permitted if specified in a Management Agreement prepared under the Nature Conservation Act. Management approval is generally required for access.

The Parks and Conservation Service is currently preparing a recreation and tourism strategy.

6.3 Access restrictions

6.3.1 Resource Protection Area and Closed Reserve Declaration

Under the Nature Conservation Act a reserve (or part of a reserve) may be declared a 'resource protection area', which allows activities to be restricted or prohibited on a temporary or permanent basis; for example, to allow a degraded environment to recover. A resource protection area declaration may only need to be in place until the restoration objective is achieved and is subject to periodic review. It is a disallowable instrument and must be reviewed at least once every three years.

Under the Act a reserve may also be closed by a 'closed reserve declaration'; for example, to protect sensitive bird-breeding habitat from disturbance, or during extreme weather or management activities. The declaration may apply seasonally or over longer periods.

The Parks and Conservation Service will erect signs (and use other communication methods) to inform visitors if access to an area is restricted by a resource protection area or a closed reserve declaration.

6.3.2 ACT Parks and Conservation Service advisory signs

There are areas within Canberra Nature Park where access is influenced by the impact of previous activities; for example, areas where unexploded ordnance has been found or sites contaminated by former rubbish tips. The Parks and Conservation Service will provide advice on access restrictions for these areas as required.

The nature reserve maps in Part 2 show existing restricted access areas. Other areas may be identified in the future. Access to utility or other infrastructure, for example water reservoirs and telecommunication towers, is also restricted but not shown on maps.

6.3.3 Rural leases

Access to rural lease areas within Canberra Nature Park is only permitted with the permission of the lessee. Access may also be prohibited under a closed reserve declaration. Some nature reserve areas are largely surrounded by rural leases and access is only permitted across adjoining unleased Territory land or with the permission of the adjoining lessee.

Dog walking on Farrer Ridge Nature Reserve (Mark Jekabsons)

7 NATURE-BASED EXPERIENCES (RECREATION, HEALTH AND TOURISM)

7.1 Welcoming visitors and managing impacts

The ACT Government encourages and welcomes visitors to Canberra Nature Park to appreciate and take pleasure in nature and, at the same time, aims to raise awareness of the natural and cultural values of the reserves and the importance of conserving them.[4] The government also promotes recreational activities in nature reserves as part of an active lifestyle and as a way of maintaining physical and social health. Canberra Nature Park provides opportunities for active recreation aligned with the ACT Government Healthy Living initiative and programs such as Find Fitness Outdoors.

The Parks and Conservation Service supports the Healthy Parks Healthy People approach, which has four key principles:

- The well-being of all societies depends on healthy ecosystems.
- Parks nurture healthy ecosystems.
- Contact with nature is essential for improving emotional, physical, and spiritual health and well-being.
- Parks are fundamental to economic growth and to vibrant and healthy communities.

Cooleman Ridge Nature Reserve (PCS Library)

[4] As noted in section 1.8 the management objectives for nature reserves under the *Planning and Development Act 2007* are:

1 to conserve the natural environment, and

2 to provide for public use of the area for recreation, education and research.

In the event of an inconsistency between the application of these objectives, the second is subject to the first.

The challenge for the Parks and Conservation Service is to welcome and support visitors in Canberra Nature Park, and at the same time to minimise and manage environmental impacts that may result from recreational activities. These impacts include wildlife disturbance; damage to vegetation or tracks; soil erosion and compaction; exposure of roots, rocks and bedrock; changes in species composition; and the spread of weeds and plant pathogens.

With an increasing population and the development of new suburbs in Canberra, the recreational pressure on Canberra Nature Park will continue to increase over coming years. In meeting this challenge, management approaches outlined in this plan include:

- limiting disturbance in areas that are of high value and/or sensitive to impact
- restricting horse and mountain bike riding to identified tracks
- restricting dog walking (on leash) to identified reserves, and maintaining all other areas as 'dogs prohibited'
- considering the needs of key recreational activities and promoting good visitor behaviour
- limiting access when impacts are more likely to occur, such as not allowing large group events when tracks are wet and avoiding disturbance when birds are nesting
- implementing the Parks and Conservation Service landscape classification system to assess sites and provide a range of visitor opportunities and experiences
- undertaking a review of tracks and trails within Canberra Nature Park, using the assessment criteria outlined in Trails ACT Planning and Management Guidelines 2015—2025 (ACT Government 2015b)
- directing inappropriate recreational activities outside Canberra Nature Park, recognising that it is only one of a diverse range of outdoor recreation areas in the ACT.

The Parks and Conservation Service will continue to promote appropriate use of Canberra Nature Park by providing extensive information on the ACT Government website, including: maps; permissible, restricted and prohibited activities; and details about the plants and animals, geological features and cultural heritage found in reserves.

The Parks and Conservation Service will continue regular liaison with recreational groups that use Canberra Nature Park and seek their input on management decisions relating to recreational activities and facilities.

The Parks and Conservation Service is developing a recreation and tourism strategy to provide direction and priorities for visitor facilities and recreation management throughout the ACT reserve system.

7.2 Tourism

The ACT tourism agency, Visit Canberra, developed the 2020 Tourism Strategy (Domestic Marketing Strategy) to inform and support ongoing marketing programs to increase the value of tourism to the ACT economy. The strategy includes a number of thematic plans including 'Adventure: Try something new i.e. mountain biking, bush walking'. Canberra's natural areas are important to this theme and the Parks and Conservation Service liaises with the ACT tourism industry on nature-based tourism in the conservation estate. The Canberra Centenary Trail is a key facility for tourism promotion and a popular facility for events.

With its diverse ecosystems, ease of access and proximity to accommodation and other services, together with Canberra's image as the city in the landscape, Canberra Nature Park may have opportunities to further develop nature-based tourism; for example, by increased marketing of its values, by providing activities such as guided walks by the Parks and Conservation Service staff, contractors or third party providers, or by helping self-guided tours that utilise a range of interpretive tools, including new technologies.

Centenary Trail (PCS Library)

Proposals for development of any ecotourism activities in Canberra Nature Park must be considered in the context of a strategic approach to ecotourism across the ACT's parks and reserves. There has, for example, been considerable investment in Tidbinbilla Nature Reserve and Namadgi National Park, which already have a profile for providing nature-based tourism experiences, including the capacity for overnight accommodation.

The potential for future nature-based tourism development in Canberra Nature Park will be considered in the context of the development of visitor experience and tourism strategies for the ACT's parks and reserves, which will include protection of conservation values.

7.3 Reserve facilities

Canberra Nature Park contains outstanding natural features, including varied topography offering panoramic views over the city and surrounding areas, threatened ecosystems and species, and significant cultural heritage sites. Information on the values of the reserves is provided on the Parks and Conservation Service website, in brochures, and on reserve signage (see section 8.1 for further information).

Visitors are encouraged to understand and enjoy all that Canberra Nature Park has to offer through the provision of infrastructure and facilities that support nature-based experiences and greater understanding of reserve values. There is an extensive network of tracks and trails, providing access for recreational activities and for management purposes such as fire management.

The Parks and Conservation Service will continue to review the suitability of park facilities to meet the need of a growing population and will endeavour to ensure that contemporary facilities are provided in locations that are the most important to visitor experiences.

7.3.1 Tracks and trails

A key resource for visitor access to Canberra Nature Park is the network of management trails and walking/multi-use tracks in many reserves. Maps are available at <www.environment.act.gov.au/parks-conservation/parks-and-reserves/explore/canberra_nature_park>.

Tracks and trails do not include sealed roads on which the general public may drive motor vehicles, such as those to the summit of Black Mountain, Mount Ainslie, Mount Pleasant and Red Hill, which are maintained by Transport Canberra and City Services.

The following definitions for tracks and trails are used in this plan.

Management trails are vehicle trails that have generally been designed and constructed to meet the required standards for their purpose. They are used by the Parks and Conservation Service and the ACT Rural Fire Service for park management activities. These trails are also used by utilities or other service providers for the construction, repair or maintenance of infrastructure, and contractors undertaking land management activities.

Motor vehicles driven by the public are not generally permitted on these trails, but short-term access may be approved by the Parks and Conservation Service by a licence or permit.

Management trails are maintained by the Parks and Conservation Service and/or utilities. Trail surfaces may be sealed, unsealed or graded. A majority of the trails meet the standards outlined in the ACT Bushfire Management Plan 2014 for access by light unit, tanker, rigid float and articulated float.

Slashed management trails are unhardened trails created by slashing vegetation to provide essential management access.

Walking tracks have generally been designed and constructed for their purpose and are maintained by the Parks and Conservation Service, sometimes with support from ParkCare volunteers.

New walking tracks will meet Class 3 of Australian Standard AS 2156.1—2001 Walking Tracks: Classification and Signage. A track management plan is required for all tracks in Canberra Nature Park and should include a classification scheme for all existing walking tracks in line with the Australian Standard.

Walking tracks are designed for pedestrian traffic only; uses other than walking or running can degrade tracks and result in conflict between users.

Multi-use tracks (unsealed) have been designed and constructed for walking, cycling and mountain biking. These tracks are maintained by the Parks and Conservation Service, sometimes with support from ParkCare volunteers or recreational user groups. The tracks generally meet the Class 3 walking track standard and follow best practice for mountain bike tracks for attributes such as slope, alignment and drainage.

Multi-use tracks in Canberra Nature Park currently include sections of the Canberra Centenary Trail and tracks in Bruce Ridge Nature Reserve.

Sealed cycle paths (shared use) are designed and constructed to cycleway standards and maintained by Roads ACT.

Equestrian trails are generally management trails and are also used by others. Equestrian trails may also be overlain by other trail types, such as management trails or multi-use tracks. Equestrian trails are identified on reserve Activities Declarations.

Informal tracks have been created by repeated recreational use. These tracks do not meet professional track specifications and may cause environmental impact such as erosion or impact on threatened species.

Trails ACT Planning and Management Guidelines 2015—2025 identifies the need to undertake a review of tracks and trails across the ACT, and includes assessment criteria to guide decisions on whether an existing track should be closed, upgraded or maintained or, if appropriate, a new track created.

The assessment criteria include consideration of: potential impacts on sensitive environmental and cultural sites; recreational value, including links as part of a track network; maintenance issues; and requirements for emergency access. The criteria will be used to review tracks in Canberra Nature Park, including closing informal tracks. Priority will be given to the most heavily used reserves. The review will include community consultation.

7.4 Nature-based activities

Canberra Nature Park provides Canberra residents and visitors with an extraordinary opportunity for nature-based experiences close to residential areas. In addition to providing a venue for social activities such as picnics or other social gatherings, the park's reserves are commonly used for active pursuits such as running or walking, cycling, mountain biking, dog walking, horse riding, orienteering, rogaining and geocaching. Bird or animal watching is a motive for many visitors, wildflower appreciation for others, while some just enjoy the opportunity to sit and relax in a natural environment setting (MARS 2016).

7.4.1 Walking and running

Walking and running are permitted and are the most popular recreational activities in Canberra Nature Park, together accounting for around half of all visits. Walking and running are permitted in all reserves and on all management trails, multi-use tracks and walking tracks in the reserves. While walking or running off-track is not prohibited, repetitive pedestrian traffic over the same areas can result in trampling of vegetation and the development of informal tracks, leading to changes in hydrology, erosion and other adverse impacts. Walkers and runners are therefore encouraged to stay on existing tracks and follow best practice as outlined in Box 1.

Box 1: Walking — best practice

- Stay on walking, multi-use or management tracks.
- Do not take short cuts or create new tracks.
- Do not shift rocks or fallen branches to mark informal tracks.
- Avoid disturbing plants and animals.

7.4.2 Orienteering

Orienteering involves participants navigating their way around a identified 'course' using a map. A key element of orienteering course planning is to present participants with route choices, some faster but more physically or navigationally challenging than others. Sensitive areas are avoided during course planning and by marking particular areas on the map as 'out of bounds'. Orienteering ACT organises many events within Canberra Nature Park, and orienteers also train individually within the reserves.

Areas within Canberra Nature Park have been important for the development of orienteering in the ACT since the sport was established in 1971 and have become even more important since the loss of some pine forests in the 2003 bushfire reduced the number of suitable forested areas.

Orienteering activities in one of Canberra Nature Park's reserves (ACT Orienteering Association)

7.4.3 Rogaining

Rogaining is the sport of long distance cross-country navigation. Rogaines are generally day and night events in which teams of two to five members travel entirely on foot, navigating by map and compass. The ACT Rogaining Association advise that Canberra Nature Park is typically used one to three times per year.

7.4.4 Dog walking

Dog-walking is a popular activity in Canberra Nature Park. Limiting access for dogs to some areas of Canberra Nature Park is important in order to protect sensitive environmental areas and species as dogs can have a significant impact on reserve values. For example, dogs may:

- harass, chase, maim, kill and/or orphan wildlife (both day-active and nocturnal wildlife)
- disturb wildlife feeding or breeding patterns through their scent, presence and defecation/urination
- introduce diseases, such as distemper virus, parvovirus or Murray Valley Encephalitis virus, and transport parasites, such as hydatids, into wildlife habitats
- conflict with other reserve visitors.

Dogs are prohibited in reserves unless an Activities Declaration under the Nature Conservation Act indicates that dogs are permitted in the reserve subject to certain conditions, such as a requirement that the dog must be on a leash. Dog access is also subject to *Domestic Animals Act 2000* declarations, and dogs off leash or harassing wildlife can be impounded or destroyed under the Act.

Dogs are permitted in 23 of the 37 Canberra Nature Park reserves (see Table 7.1) and must be on leash and under control at all times. Allowing dogs into these nature reserves is a continuation of past practice and acknowledges the significant value many people in neighbouring suburbs place on the activity. If the presence of dogs is found to be having a significant impact on reserve values, the approval for dog walking in some locations may be reviewed. Visitors with dogs should follow best practice as outlined in Box 2.

Callum Brae and Mulligans Flat—Goorooyarroo nature reserves, and the mid to lower slopes on the eastern side of Mount Ainslie are important breeding habitat for threatened woodland birds. Dogs are prohibited in these reserves, with the exception of Mount Ainslie.

When considering access for dogs in new Canberra Nature Park reserves, the Parks and Conservation Service takes account of:

- likely disturbance to rare or threatened species
- possible impacts on other species (such as nesting birds), mobility of kangaroos near roads and access to dams
- potential conflict with other reserve users.

Access restrictions do not apply to assistance animals or dogs otherwise exempted under the Domestic Animals Act. The Conservator may issue a Nature Conservation Licence for specialist dog trainers, for example the Australian Customs Service and Australian Federal Police.

Dog walking at Mount Taylor Nature Reserve (Lyndal Padgham-Floyd)

Box 2: Dog walking — best practice

- Always keep your dog on leash, preferably no longer than three metres.
- Ensure that you are able to physically restrain the dog on the leash.
- Stay on a track to reduce the area influenced by the dog's smell and behaviour.
- Avoid disturbing groups of kangaroos.
- Keep dogs out of dams and waterways.
- Do not lead your dog when riding a horse or bicycle.
- Ensure your dog does not harass or conflict with other visitors.
- Remove dog droppings.

7.4.5 Horse riding

The ACT has an extensive network of equestrian trails, including sections of the Bicentennial National Trail that extends from Cooktown in Queensland to Healesville in Victoria. Many ACT Government horse holding paddocks are adjacent to Canberra Nature Park reserves and equestrian trails are generally located in close proximity to these paddocks to facilitate accessible and pleasant riding experiences.

Horses are prohibited in reserves unless an Activities Declaration under the Nature Conservation Act indicates that horse riding is permitted on identified trails. Table 7.1 identifies Canberra Nature Park reserves where horse riding is permitted.

Restricting horse riding to identified trails helps to limit environmental impacts, which can include damage to vegetation, soil compaction and erosion, introduction of weed species, and accidental transport of pathogens. This restriction also helps minimise conflicts with other users and reduces risks to the riders and their animals. Horse riders in Canberra Nature Park should follow best practice as outlined in Box 3.

Box 3: Horse riding — best practice

- Stay on identified equestrian trails. Forming new trails by taking short cuts damages plants and wildlife habitat.
- Avoid riding during or immediately after wet weather conditions.
- Avoid spreading weeds by ensuring that horses have access to clean feed.
- Ensure horses are under control at all times.
- Do not allow horses to graze on any vegetation while within Canberra Nature Park.
- Do not allow horses in dams or watercourses.
- Be considerate of other reserve users and avoid conflict with other visitors, such as people walking dogs or riding bicycles.

Horse riding in Canberra Nature Park will continue to be managed under the principles and policies set out in Appendix 5 of Horse Riding in Canberra Nature Park (Environment ACT 1999).

While balancing the needs of recreational horse riders with those of other users and the conservation of natural and cultural values, the Parks and Conservation Service will trial the provision of additional horse riding access on defined trails in a small number of Canberra Nature Park reserves.

Proposals for new equestrian trails in Canberra Nature Park will consider such factors as:

- reserve zoning
- avoiding areas that have important values: for example, sensitive wildlife habitat, or threatened, rare or uncommon species
- physical constraints such as grade, slope-alignment angle, soil type and soil moisture, type of tread construction, surfacing and drainage
- trail design—which should focus on side-hill trail alignments with limited grades and frequent grade reversals to minimise soil erosion, muddiness and tread widening
- connections with the existing horse trail network
- avoiding conflict with other reserve users
- horse and rider safety.

7.4.6 Cycling and mountain biking (including e-bikes)

Cycling and mountain biking are popular activities in many Canberra Nature Park reserves for both commuting and recreation. In the ACT, the definition of bicycle includes power-assisted pedal cycles (also known as e-bikes) with a power output not exceeding 200 watts (see Glossary for full definition).

Canberra Nature Park has an extensive network of management trails and multi-use tracks where cycling is permitted. Cycling and mountain biking are not permitted on walking tracks. Canberra Nature Park features two key mountain bike initiatives. **Canberra Centenary Trail** circuits the ACT covering approximately 140 kilometres. Some sections of the trail, on Mount Ainslie and Mount Majura for example, are for walkers only. These sections have duplicate routes that cater for cyclists. At **Bruce Ridge Nature Reserve,** the Parks and Conservation Service and Friends of Bruce Ridge have worked together on the network of mountain bike tracks that have been designed, or realigned, to limit ecological impact and improve safety for other users. Table 7.1 identifies Canberra Nature Park reserves where cycling and mountain biking are permitted.

Other mountain biking areas outside the ACT reserve system include Stromlo Forest Park, Majura Pines, Isaacs Pines, Sparrow Hill, Kowen Pines, Tuggeranong Pines, Fadden Pines and Yerrabi Ponds. The development of mountain bike areas such as that in Majura Pines, which is next to a nature reserve, must consider likely flow-on effects for the adjacent reserve. These may include an increase in the number of mountain bike riders using the reserve. The creation of informal tracks is to be prevented.

Development of new multi-use tracks within Canberra Nature Park must consider:

- reserve zoning
- avoiding any areas that have important values, for example sensitive wildlife habitat, or threatened, rare or uncommon species
- physical constraints such as grade, slope-alignment angle, soil type and soil moisture, type of tread construction, surfacing and drainage
- track design—which should focus on side-hill track alignments with limited grades and frequent grade reversals to minimise soil erosion, muddiness and tread widening
- connections with the existing mountain bike track network
- avoiding conflict with other reserve users
- rider safety.

Riders within Canberra Nature Park should follow best practice as outlined in Box 4.

Box 4: Cycling and mountain biking — best practice

- Ride on management trails or mountain bike/multi use tracks only.
- Do not take short cuts, form new tracks, build jumps or other structures.
- Respect the rights of others, for example walkers and horse riders. Slow down and give them right of way.
- Leave animals, plants and rocks where you find them.
- Do not ride in large groups.
- Avoid riding in wet, muddy conditions.
- Keep bikes clean to prevent the spread of weeds and plant diseases.
- Avoid skidding as it breaks the soil surface and leads to erosion.

Cycling on a management trail, Mulligans Flat Nature Reserve (PCS Library)

Cycling on a multi-use track, Bruce Ridge Nature Reserve (Andrew Tatnell)

Table 7.1: Reserves where dogs, horses and cycles are permitted/not permitted

Nature Reserve	Dogs*	Horses*	Cycles*
Aranda Bushland (No dogs in Aranda Snow Gums)	✓	✗	✓
Black Mountain	✗	✗	✓
Bruce Ridge	✓	✗	✓
Callum Brae	✗	✗	✓
Cooleman Ridge	✓	✓	✓
Crace Grasslands#	✗	✓	✓
Dunlop Grasslands	✗	✓	✓
Farrer Ridge	✓	✓	✓
Goorooyarroo	✗	✗	✓
Gossan Hill	✓	✗	✓
Gungaderra Grasslands	✗	✗	✗
Isaacs Ridge	✓	✓	✓
Jarramlee/West MacGregor Grasslands#	✗	✓	✗
Jerrabomberra West Grasslands	✗	✗	✗
Justice Robert Hope Park	✓	✗	✗
Kinlyside#	✗	✗	✗
Kowen Escarpment#	✓	✗	✓
Melrose	✗	✗	✓
McQuoids Hill	✗	✓	✓
Mount Ainslie	✓	✓	✓
Mount Majura	✓	✓	✓
Mount Mugga Mugga	✓	✗	✓
Mount Painter	✓	✓	✓
Mount Pleasant	✓	✗	✓
Mount Taylor	✓	✓	✓
Molonglo Gorge	✓	✗	✗
Mulanggari Grasslands	✗	✗	✗
Mulligans Flat (Equestrian trail in Little Mulligans)	✗	✓	✓
Oakey Hill	✓	✓	✓
O'Connor Ridge	✓	✗	✓
Percival Hill	✓	✗	✓
Red Hill	✓	✗	✓
Rob Roy#	✗	✗	✓
The Pinnacle	✓	✓	✓
Tuggeranong Hill#	✓	✗	✓
Urambi Hills#	✓	✓	✓
Wanniassa Hills	✓	✓	✓

* Dogs must be on leash, and horse riding and cycles are only permitted on identified trails.
# No access to rural lease area without permission from rural lessee.

Note: Additional horse riding trails to be trialled in a small number of reserves. Check current information in Activities Declarations at <www.legislation.act.gov.au/a/2014-59/ni.asp>.

7.4.7 Geocaching

Geocaching is an outdoor activity in which participants use a global positioning system (GPS) receiver to find the location of a cache. Geocaching is only permitted in Canberra Nature Park nature reserves where it does not involve digging holes and burying objects, depositing objects within cultural heritage sites or littering. Virtual geocaching is preferred. The placement of a physical cache in Canberra Nature Park requires the permission of the reserve manager. Sensitive areas, such as Zone 1 areas, should be avoided.

Best practice approaches are outlined in Box 5.

Box 5: Geocaching — best practice

- Do not locate caches off-track in Zone 1 areas, in dams, water courses, or cultural heritage sites
- Do not create informal tracks or damage vegetation.

7.4.8 Fishing and yabbying

Fishing is not permitted within Canberra Nature Park, except in the Molonglo River Gorge Nature Reserve, which is declared as trout waters under the *Fisheries Act 2000*. Seasonal closures and size limits apply. Only artificial fly and lure fishing is permitted in trout waters.

Yabbying and collection of fishing bait is not permitted within Canberra Nature Park.

7.4.9 Abseiling, rock climbing and bouldering

In Canberra Nature Park reserves where cliffs exist, abseiling and rock climbing will not be permitted. Bouldering is permitted but should be avoided in Zone 1 areas.

7.4.10 Metal detecting/fossicking

The use of metal detectors for fossicking has the potential to adversely impact the natural or cultural values of Canberra Nature Park through, for example, damaging native plants, removing soil or stone or damaging a site or object of archaeological interest, and may result in in offences under several ACT laws, including the *Public Unleased Land Act 2013* the *Nature Conservation Act 2014* and the *Heritage Act 2004*.

In addition, many of the reserves in Canberra Nature Park contain threatened species research and monitoring sites, which are marked with metal tags that lie just below the surface. These tags are a vital component of the research and would be at high risk of disturbance from fossicking activities.

The use of metal detectors in Canberra Nature Park will be permitted only with the approval of the reserve manager and will be restricted to special circumstances such as short term searching for lost personal property. The use of metal detectors for general fossicking is not permitted.

7.4.11 Archery

Archery is not permitted in Canberra Nature Park. *Under the Nature Conservation Act 2014*, it is an offence for a person to possess or use a bow or arrow in a reserve.

7.4.12 Non-powered and powered flight

Non-powered flight

Hang gliding and paragliding are not common activities within Canberra Nature Park as there are few suitable areas close to public roads. Hang gliding and paragliding are forms of aviation and subject to Civil Aviation Safety Authority regulations.

The Parks and Conservation Service has granted an agreement to the ACT Hang Gliding and Paragliding Association to use a launching site within Rob Roy Nature Reserve. Access to other reserves is subject to management permission. Issues considered in providing a permit or licence include:

- the activity must be conducted in accordance with Civil Aviation Safety Authority regulations
- participants must be members of a club that is affiliated with the Hang Gliding Federation of Australia, which provides public liability insurance
- a launching site is to be located only on a previously disturbed area
- wash down of vehicles is required prior to entry to avoid spreading weeds
- no access on days of total fire ban.

Hot air balloons are regularly flown in the skies above Canberra Nature Park. Landing hot air balloons within a nature reserve is not permitted except under a nature conservation licence and with permission from the Civil Aviation Safety Authority, or in an emergency.

Powered flight (low altitude)

Personal aircraft, such as ultralights and motorised paragliders, are not permitted to land or take off in Canberra Nature Park, except in an emergency.

7.4.13 Drones

Drones—also known as unmanned aerial vehicles (UAV) or remotely piloted aircraft (RPA)—are considered by the Civil Aviation Safety Authority to be aircraft, with their use governed by Commonwealth aviation law. While the Parks and Conservation Service recognises that drones can be useful for search and rescue, event photography, management activities and scientific research, their recreational use can adversely affect wildlife and impact on the privacy and enjoyment of visitors. The lithium polymer batteries used in drones can cause small but intense fires on impact. Drones can also represent a serious risk to park operations such as fire management.

In consideration of these risks, flying of drones, including taking off and landing, is a prohibited activity within Canberra Nature Park.

Operation of drones may be approved for some purposes, such as conservation research, through a licence granted under the provisions of the *Nature Conservation Act 2014* (Chapter 11). Where a licence is granted, conditions will apply to ensure that the activity is consistent with the management objectives for the reserve, and that there are no adverse impacts on visitors or reserve values.

7.4.14 Model aircraft

Two model aircraft clubs are currently authorised to fly model aircraft in two Canberra Nature Park reserves—Crace Grasslands and Jerrabomberra West Grasslands nature reserves.

7.5 Booked group events

Some Canberra Nature Park reserves are frequently used for group events such as orienteering, rogaining, athletics (running) and mountain biking. The most heavily used reserves are Mount Ainslie, Mount Majura, Black Mountain and Bruce Ridge.

Permits for events are required under the *Public Unleased Land Act 2013* and restrictions may be applied to protect reserve values. For events involving 100 or more participants, or requiring complex arrangements, event planning should be in consultation with the Parks and Conservation Service and other government agencies such as ACT Roads, and be well in advance of the event. Fees are charged for some types of events and activities.

Event organisers are strongly encouraged to consider possible impacts on nature reserve values when planning an event, in particular to avoid impacts on areas with high and/or sensitive natural or cultural values (Zone 1: Core Conservation). Organisers are also requested to consider alternative locations when seeking an event permit, as the preferred site may not be approved.

When the Parks and Conservation Service assesses a permit application, it considers:

- restrictions on some activities in Zone 1: Core Conservation areas
- seasonal conditions, for example wildlife breeding period, species in flower or setting seed, total fire ban declared
- operational requirements, for example fire fuel reduction activities, weed or feral animal control, or kangaroo management activities
- weather conditions, for example wet weather or drought, that impact on soil condition and potential erosion of tracks
- potential safety issues, for example risk of bushfire and mobility of kangaroos near roads
- potential conflicts with other visitors or booked events
- the need for event infrastructure, for example toilet facilities, waste/rubbish disposal, parking, staging areas, and the site's capability to withstand high intensity use for short periods
- ensuring existing tracks are used wherever possible, and no new tracks are created
- the need for special arrangements to cater for occasional large national or international events (a detailed event management plan will be required for large events)
- any risk management plans required as part of the application.

Impacts can be avoided or mitigated by the careful selection of staging areas and the routes of courses, by avoiding sensitive areas or sites, by cancelling or postponing events in adverse conditions, and by providing appropriate facilities. Public notification of major events is important to advise other visitors/users. Monitoring of activities will inform future management decisions by the Parks and Conservation Service.

7.6 Commercial activities

Commercial activities are those undertaken by organisations, businesses or individuals where there is a charge for services or products. Group events held by volunteer not-for-profit organisations that charge event fees are not considered to be commercial activities.

Access for commercial operators is provided in accordance with the Parks and Conservation Service licencing system (under development). Preparation of an environmental management plan may be required for commercial activities.

7.7 New recreational activities

New recreational activities may emerge over the life of this plan, and the Conservator will consider the following issues before allowing or prohibiting the activity:

- relevant legislative provisions and government policies
- the goals, objectives and policies in this management plan
- potential impacts on wildlife and conservation values
- potential impacts on cultural heritage values
- loss of amenity to other recreational users
- options for undertaking high-impact activities elsewhere outside Canberra Nature Park
- public health and safety and the exposure to risk of park management staff or other users.

7.8 Monitoring recreational use and visitor satisfaction

The ACT Government conducts regular surveys of the community to help determine community and visitor awareness, use and satisfaction with the ACT open space system, including nature reserves.

In 2016—2017 64% of ACT residents had visited Canberra Nature Park in the last 12 months, with several visits to a reserve being common. High levels of satisfaction (98%) were recorded for the overall management of Canberra Nature Park. The most common reasons for visiting were: walking, jogging, sitting and relaxing, and showing children a bush area. A majority of survey respondents supported cycling and mountain biking. The most visited Canberra Nature Park reserves were Black Mountain, Mount Ainslie, Mount Majura, Red Hill, and Mount Taylor nature reserves. Survey respondents requested more signs and environmental information for some reserves.

The permit approval system is used to collect data on booked group events. Limited other data is collected on the amount, types and distribution of informal recreational use of reserves. Trails ACT Planning and Management Guidelines identifies the need to collect user data to better understand visitor use, and notes that external data sources, for example Strava and MapMyFitness, can provide useful information. Relevant industry and community organisations should also be consulted about availability of data.

Additional data on informal recreational use of reserves will be collected to give the Parks and Conservation Service a better understanding of the needs of visitors, and whether they can be met, while also protecting and maintaining the conservation values of reserves.

7.9 Visitor safety

The Parks and Conservation Service aims to provide a safe and enjoyable experience for visitors to nature reserves. Canberra Nature Park is generally a safe place to visit; however, accidents and incidents can occur in natural settings and park managers cannot take responsibility for visitors' safety.

Risk of serious harm can be avoided if visitors take reasonable care and if reserve management has adequately evaluated and mitigated serious hazards.

The duty of park managers is to identify foreseeable risks and to take reasonable steps to avoid or reduce them, particularly for people who may not have the skills, knowledge or experience to recognise the risk or its magnitude. Actions may include signs, closure of particular areas, maintenance or reconstruction work, and visitor education.

7.10 Molonglo Gorge and Kowen Escarpment nature reserves

Molonglo Gorge and Kowen Escarpment nature reserves, located next to the Kowen Forest pine plantation north-east of Queanbeyan, have previously been managed by ACT Forests together with the pine plantation for many years. Both nature reserves are now managed as part of Canberra Nature Park and in accordance with the goals, objectives and policies outlined in this plan.

As a result, some recreational and other activities previously approved in Kowen Escarpment Nature Reserve are no longer appropriate, including trail bike riding and most 4WD driving. Off-trail use of trail bikes and 4WD vehicles will not be permitted. The use of motorised vehicles on management trails will be reduced and will only be permitted with the approval of the reserve manager.

Consideration will be given to approving motorised vehicle use on management trails within Kowen Escarpment Nature Reserve only for limited 4WD driver training or where it is required to provide safe connection between areas of the broader Kowen Forest for an event.

Parks and Conservation Service staff will liaise with organisations seeking approval to undertake recreational or other activities no longer permitted and assist where possible in recommending alternative locations. A transition period will be implemented for phasing out these previously permitted activities.

7.11 Prohibited activities

Prohibited activities within Canberra Nature Park include:

- killing or taking native animals or plants
- yabbying
- disturbing or removing rocks or soil
- felling, collecting or removing native timber
- camping
- lighting fires
- driving motor vehicles
- riding trail bikes
- entering a closed reserve
- vandalism
- dumping of rubbish and littering.

Under the *Nature Conservation Act 2014*, it is an offence to possess or use, in a reserve

a) a firearm; or
b) a spear, spear gun, bow or arrow; or
c) a trap, net, snare or other device designed, or capable of being used, to take or capture an animal; or
d) a substance that is capable of being used to take or capture an animal.

7.12 Nature-based experiences: management policies, objectives and actions

NATURE-BASED EXPERIENCES (RECREATION, HEALTH AND TOURISM)

POLICIES

- Nature-based experiences, including recreation, health and tourism activities, will be encouraged and supported through the provision of contemporary facilities, programs and information.
- Activities that are consistent with government initiatives and programs to encourage healthy and active living will be supported where appropriate within Canberra Nature Park.
- The Parks and Conservation Service will regularly liaise with user groups and seek their input on decisions relating to activities and facilities.
- Restrictions on dogs in all nature reserves will continue to apply, including retention of the 'on leash' requirement.
- Approval for dog walking in some locations will be reviewed if dogs are found to be having a significant adverse impact on reserve values.
- Cycling and mountain biking are not permitted on walking tracks.
- Off-trail use of motorised vehicles in Molonglo Gorge and Kowen Escarpment is prohibited and their use on trails in the reserves will be reduced.
- Consideration will be given to approving motorised vehicle use on management trails within Kowen Escarpment Nature Reserve only for limited 4WD driver training or where it is required to provide safe connections between areas of the broader Kowen Forest for an event.

Nature-based Recreation

OBJECTIVES

- The accessibility and amenity of Canberra Nature Park is enhanced and community enjoyment of nature and the benefits it provides is increased.
- Residents and visitors have a greater appreciation of the natural and cultural values of Canberra Nature Park and the range of nature-based experiences available.
- Newly arrived Canberrans and visitors are welcomed to Canberra Nature Park through enjoyable, culturally appropriate, interactive experiences that encourage regular visits.
- Levels and types of visitor use are consistent with the conservation of natural and cultural heritage.
- Park managers have a greater understanding of existing types and levels of recreation and visitor use.

ACTIONS

48 Establish a visitor experience framework for Canberra Nature Park consistent with the Territory wide framework.

49 Support community involvement in nature-based experiences through provision of enhanced facilities and visitor programs, the use of innovative technology, and increased availability of information.

50 Gather spatial and temporal data on visitor use (including through the use of new technology) to better inform management of Canberra Nature Park.

51 Use the Trails ACT Planning and Management Guidelines criteria to review tracks and trails and prepare a track management plan, including closing informal tracks and classifying any new tracks in accordance with Australian standards.

52 Review Horse Riding in Canberra Nature Park: Management Principles and Policies to ensure it incorporates and reflects current research.

53 Trial the provision of additional horse riding access to defined trails in a small number of reserves.

54 Develop and implement a strategy to reduce the on-trail use of motorised vehicles in Molonglo Gorge and Kowen reserves.

55 Implement measures to mitigate hazards to visitor safety.

Nature-based Health and Well-being

OBJECTIVES

- Nature-based activities in Canberra Nature Park contribute to the improved emotional, physical, and spiritual health and well-being of our community.
- Canberra Nature Park is valued for the health and well-being benefits it provides.

ACTIONS

56 Support ACT Government initiatives for healthy and active living in Canberra Nature Park reserves (where appropriate).

57 Encourage partnerships and cooperation with relevant organisations to improve and promote the health and community benefits of nature-based activities.

58 Explore partnerships with health providers to increase use of Canberra Nature Park as a venue for healing and well-being.

59 Provide culturally appropriate activities for new Canberrans to experience nature, to feel safe and to develop an understanding of ACT's natural and cultural values.

Nature-based Tourism/Events

OBJECTIVES

- Tourism activities within Canberra Nature Park are primarily related to an appreciation of its natural and cultural values.
- The potential for nature-based tourism activities in Canberra Nature Park is considered in the context of a strategic approach to visitor experience and ecotourism across ACT reserves, and conservation of the natural environment.

ACTIONS

60 Promote Mulligans Flat Woodland Sanctuary and Jerrabomberra Wetlands (separate management plan) as key destinations for environmental education activities, supported by the Woodlands and Wetlands Trust.

61 Implement the ACT 2020 Tourism Strategy (Domestic Marketing Strategy), where applicable, in nature reserves.

62 Explore opportunities for holding appropriate community "events" in Canberra Nature Park.

Identifying native grasses (Andrew Tatnell)

8 COMMUNITY INVOLVEMENT

8.1 Nature's classroom – providing educational experiences in Canberra Nature Park

Reserves play an important role as 'nature's classroom' and can create life-long connections between people and nature by providing multiple ways for people of all ages to learn from and be inspired by nature. Interpretation and environmental education activities help the community, including reserve visitors, to understand and appreciate the values and management objectives for Canberra Nature Park. Many local institutions utilise Canberra Nature Park for environmental education and there is further potential for the Parks and Conservation Service to encourage and facilitate these activities.

Successful community engagement fosters stewardship—an aware and engaged community is more likely to become involved in protecting and maintaining reserve values. An important element of community engagement is to provide reserve users with sufficient information to enable them to understand the potential impacts of recreational activities and the reasons for the limitations placed on some activities in some areas. Information about Canberra Nature Park is provided on the Parks and Conservation Service website, in brochures, on signs within some reserves, and on ACT Government ACTMAPi. Methods and media used to increase awareness of reserve values also include smartphone apps, self-guided walks, guided events, newspaper articles, radio and television interviews, and online content.

8.2 Community involvement in management

Partnerships are important for making the best use of resources, encouraging innovation, gathering knowledge and helping the Parks and Conservation Service to deliver better outcomes for parks and people. The Parks and Conservation Service engages with an extensive range of community organisations, research and educational institutions, recreational user groups and neighbours who have an interest in Canberra Nature Park. Many make a significant contribution to maintaining and supporting reserve values.

Citizen science activities by groups such as Canberra Nature Map, Canberra Ornithologists Group, Frogwatch, Waterwatch and Vegwatch also provide valuable data on Canberra Nature Park values for use by managers and as information for the public.

8.2.1 ParkCare

"People wanted to care for these beautiful places, and in caring, wanted to do their bit for the environment in which they lived, and became involved in a labour of love working to restore, nurture and conserve what is so valued about these places." Wendy Rainbird, Friends of Farrer Ridge, 2016.

ParkCare is a partnership between the Parks and Conservation Service and community members with an interest in caring for the natural and cultural environment. ParkCare groups have operated in Canberra Nature Park for almost 30 years. Their activities include revegetation, weed control, seed collection, erosion control, vegetation mapping, water quality monitoring, track maintenance, guided walks, public education, biodiversity surveys, and maintenance and restoration of heritage places. Many ParkCare groups have prepared information specific to a particular reserve; for example, Mount Painter vegetation plan and Cooleman Ridge regeneration report. The Friends of Mount Majura and Red Hill Regenerators have extensive websites.

ParkCare activities make an important contribution to protecting and improving Canberra Nature Park reserves, with volunteers contributing significant time to conservation work. Work plans are developed for each ParkCare group and approved by the Parks and Conservation Service to ensure all activities align with management objectives for a reserve.

The Parks and Conservation Service aims to provide a positive, safe and rewarding volunteer experience and has established a ParkCare Hub at <www.environment.act.gov.au/parks-conservation/parks-and-reserves/get-involved/the-ParkCare-initiative>. Volunteer activities are subject to the ACT Parks and Conservation Volunteer Code of Conduct and Volunteer Policy.

From time to time, ParkCare groups seek ACT or Australian government funding to undertake projects within a reserve. It is important that, before starting the funding application process, the ParkCare group ensures the project contributes to activities outlined in the ParkCare work plan and is supported by the Parks and Conservation Service.

ParkCare volunteers mapping a rabbit warren, Mount Ainslie Nature Reserve (PCS Library)

ParkCare volunteers at Mulligans Flat Nature Reserve (PCS Library)

Canberra Nature Park—ParkCare in 2019 (New ParkCare groups may be established)

- Cooleman Ridge ParkCare
- Farrer Ridge ParkCare
- Friends of Aranda Bushland
- Friends of Black Mountain
- Friends of Bruce Ridge
- Friends of Mount Majura
- Friends of Mount Painter
- Friends of Mount Pleasant
- Friends of Mulligans Flat
- Friends of the Pinnacle
- Friends of Tuggeranong Hill
- Isaacs Ridge/Mount Mugga Mugga ParkCare
- Mount Ainslie Weeders
- Mount Taylor ParkCare
- Oakey Hill ParkCare
- Red Hill Regenerators
- Urambi Hills ParkCare

Extensive effort by ParkCare volunteers has reduced weeds on Red Hill Nature Reserve. *Top*: 1974 (Chris Pavich); *Bottom*: 2012 (Michael Mulvaney)

8.2.2 Aboriginal and Torres Strait Islander groups

Parks and Conservation Service Aboriginal staff operate guided walks and cultural activities for the public and field trips for the local Aboriginal and Torres Strait Islander community (within ACT managed lands), providing insight into the cultural landscape and traditional natural resource management skills. Other activities operated by local Traditional Custodians are supported and promoted.

The Parks and Conservation Service is continuing to improve engagement with Aboriginal people so they may provide advice on caring for the parks and reserves across the ACT.

It is envisaged that a stronger relationship with Aboriginal groups will facilitate more opportunities for Representative Aboriginal Organisations, Traditional Custodians and their families, and other local Aboriginal groups to obtain greater access to Country and to have more opportunity to be involved in land management and cultural activities. In addition, as part of a commitment in the ACT Aboriginal Fire Management Framework, the Parks and Conservation Service is running training courses to enable Traditional Custodians and other members of the local Aboriginal and Torres Strait Islander community to be involved in cultural burning and post-burn monitoring programs.

Canberra Nature Park offers opportunities for further land management programs that involve the local Aboriginal community and provide meaningful work on Country as well as economic development opportunities.

8.2.3 The Woodlands and Wetlands Trust

The Woodlands and Wetlands Trust (the Trust) was established in 2012 with the goal of ensuring that "Mulligans Flat Woodland Sanctuary and Jerrabomberra Wetlands are managed to provide rich and diverse environments for current and future generations".

The Trust is governed by a board of community representatives with expertise in science, public administration, fundraising and outreach. The two reserves are managed in partnership between the community, government and private sector in a way that aims to achieve improved ecosystem restoration and, through educational and eco-tourism opportunities, inspire conservation values within the community of the Canberra region.

The Trust raises funds to support conservation activities in Mulligans Flat Woodland Sanctuary and Jerrabomberra Wetlands. In Mulligans Flat, the Trust's focus has been on supporting the Woodlands Sanctuary, where a joint ACT Government–Australian National University–CSIRO research partnership is conducting woodland restoration research inside a predator-proof fence. The research includes the introduction of locally extinct species such as the Eastern Bettong and Eastern Quoll.

The Trust includes a focus on community engagement, promoting nature based recreation and educational activities in the sanctuary, including regular guided twilight walking tours that provide visitors with the opportunity to catch a glimpse of bettongs, curlews and other nocturnal animals in their natural habitat. The Trust also supports volunteer activities through the Friends of Mulligans Flat.

8.2.4 Other organisations and groups

Other organisations and groups that actively participate in research, promotion and management activities in Canberra Nature Park include:

- conservation organisations—National Parks Association of the ACT Inc., Canberra Ornithologists Group, Friends of Grasslands, Conservation Volunteers Australia, Greening Australia, SEE-Change, Bush on the Boundary, Landcare ACT, the Conservation Council ACT Region and Ginninderra, Southern ACT and Molonglo Catchment Groups.
- Waterwatch
- Frogwatch
- educational organisations—ACT schools, Australian National University, University of Canberra and Canberra Institute of Technology.

8.3 Neighbours

The location of Canberra Nature Park within an urban setting means that a large number of residential properties and other land uses are immediately adjacent, or close to reserve boundaries. Neighbours include:

- residential and institutional neighbours
- horse paddocks and agistment areas
- ACT Rural Landholders Association, Landcare groups and rural leaseholders. Rural leases have been issued over some areas of Canberra Nature Park (Kowen Escarpment, Rob Roy, Tuggeranong Hill, Urambi Hills, Crace Grasslands, West MacGregor Grasslands and Kinlyside) and some rural leases adjoin reserves.

Neighbours have the potential to impact either positively or negatively on reserve values. Neighbours can actively assist in achieving reserve management objectives; for example, by preventing spread of weeds, controlling dogs and cats, not dumping garden waste and limiting light and noise impacts.

8.4 Opportunities for further community involvement

There are opportunities for the Parks and Conservation Service to enhance the interpretation and education information provided for Canberra Nature Park reserves to increase knowledge on reserve values. This could include working in partnership with neighbours and community organisations, educational institutions and conservation organisations that have a strong interest in, and knowledge about reserves. There may be opportunities to expand the ParkCare program to incorporate international volunteers.

8.5 Community involvement: management policies, objectives and actions

Nature's classroom - providing educational experiences in Canberra Nature Park

POLICIES

- The Parks and Conservation Service will support environmental education and interpretation activities across Canberra Nature Park to increase community understanding and stewardship of reserve values.

OBJECTIVES

- Connections between people and nature are created by providing multiple ways for people of all ages to learn and be inspired by nature.
- Education and interpretation increases community understanding of reserve values and involvement in their protection.
- Online information about the about natural, cultural and social values of Canberra Nature Park is readily accessible.
- Canberra's kindergarten and primary school students have access to nature-based learning activities in Canberra Nature Park.
- Visitors are aware of and comply with legislation and policies that guide access to, and appropriate use of, Canberra Nature Park.

ACTIONS

63 Deliver an interpretation strategy for Canberra Nature Park.

64 Encourage and facilitate increased educational programs and interpretation activities throughout Canberra Nature Park by working in partnerships with institutions and organisations that have a strong interest in, and knowledge of, reserve values.

65 Provide reserve users with accessible information to encourage appreciation of the natural, cultural and social values of Canberra Nature Park and appropriate use of the reserves.

66 Engage Traditional Custodians and Representative Aboriginal Organisations in the interpretation of cultural heritage values, including the possible establishment of sites that interpret how Aboriginal people use Canberra Nature Park, its food and its plants.

67 Establish ranger-led learning activities for kindergarten and primary school aged children, linked to the education curriculum.

68 Establish park-school relationships with all schools in close proximity to Canberra Nature Park.

69 Update and promote best practice guidelines for reserve visitors and user-groups.

70 Provide educational material on topical issues such as:

- current research
- management of kangaroo populations
- risks to reserves posed by invasive garden plants.

Community involvement in park management

POLICIES

- The Parks and Conservation Service will forge stronger partnerships and relationships with volunteers, neighbours, Traditional Custodians and Representative Aboriginal Organisations to increase community involvement in reserve management.

OBJECTIVES

- The knowledge and wisdom of Canberra's community is harnessed to inform and enhance reserve management.
- Community engagement programs and activities improve management outcomes for Canberra Nature Park.
- Traditional Custodians and other local Aboriginal groups have increased involvement in land management and cultural activities.
- Novel and diverse partnerships with private, corporate, NGO and government sectors contribute to the conservation of Canberra Nature Park and the environmental and socio-economic fabric of the ACT.

ACTIONS

71 Encourage and support volunteering, for example through ParkCare, catchment groups, schools and other community groups.

72 Expand the ParkCare model to support the participation of international volunteers.

73 Ensure partners and volunteers are safe and equipped to manage day to day activities.

74 Maximise the contribution that communities can make to Canberra Nature Park by exploring innovative ways to tap into community skills, knowledge and enthusiasm.

CHAPTER 9
RESEARCH AND MONITORING

SUPPORTING AND ENCOURAGING RESEARCH:

- Research supports evidence based management.
- Woodlands and grasslands research includes the Mulligans Flat-Goorooyarroo Woodlands Experiment.
- Citizen science activities provide valuable information about natural values.

MANAGEMENT APPROACH:

- ACT Government research - threatened species, woodland and grassland ecology and restoration, kangaroo grazing and fire ecology.
- Conservation Effectiveness Monitoring Program (CEMP) - a framework for monitoring and evaluating ecosystem condition and management effectiveness.
- CEMP supports adaptive, evidence based decision making.

Grassland Earless Dragon (*Tympanocryptis pinguicolla*) (PCS Library)

9 RESEARCH AND MONITORING

9.1 Natural values research

The ACT Government continues to invest in research to deepen the knowledge and build evidence to improve conservation and management of the natural environment in Canberra Nature Park. Facilitating partnerships between the government and research institutions is a priority.

Canberra Nature Park includes 'site' or 'type' localities of many invertebrate species, and several plant species and geological formations. Black Mountain Nature Reserve is particularly rich in this regard. Numerous scientific papers have been written using data collected by researchers at the Australian National University, University of Canberra, CSIRO, Australian Geological Survey Organisation and ACT Government.

The collaborative research by the government, the Australian National University and CSIRO into woodland restoration at Mulligans Flat and Goorooyarroo nature reserves is of international significance (see section 9.1.1).

Research undertaken in Canberra Nature Park has included studies on fungi, orchids, arboreal mammals, kangaroo grazing, impacts of invasive or overabundant species, declining woodland bird populations, and ecological restoration. Tens of academic research projects can be underway at any one time.

The ACT Government undertakes its own research and encourages and guides the research of others. Current government research is focused on threatened species, kangaroo grazing, fire ecology, and woodland and grassland ecology and restoration.

Research provides the knowledge base for management. The ability to adapt management based on new research information will remain a key part of the management of Canberra Nature Park.

A licence is required for research activities within Canberra Nature Park and, as a condition of the licence, a written report of the research findings must be submitted to the Parks and Conservation Service when the activity is completed.

9.1.1 Woodlands research

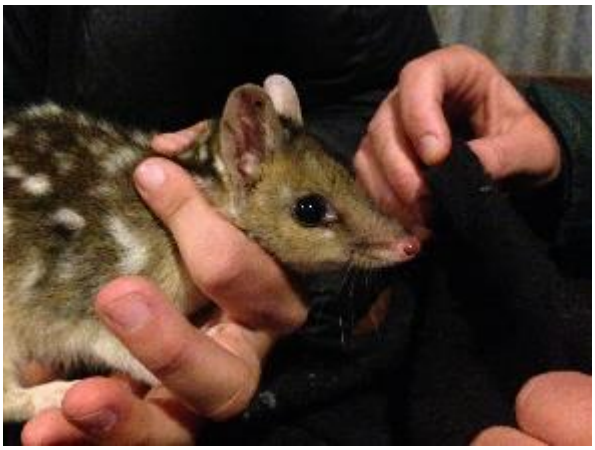
Since 2004, Mulligans Flat and Goorooyarroo nature reserves have been the site of the long-term Mulligans Flat—Goorooyarroo Woodland Experiment (Manning et al. 2011; Shorthouse et al. 2012). The experiment is a woodland research and restoration partnership between the ACT Government, Australian National University, CSIRO and others, funded by partners and successive Australian Research Council Linkage grants. The research is aimed at a whole-of-ecosystem understanding of box–gum grassy woodlands with a focus on restoring the structure and function to increase biodiversity.

The partnership aims to inform evidence-based conservation management in the ACT. Conservation treatments to date include replenishing fallen timber habitat with dead trees, excluding kangaroos from certain areas and experimental burning of some areas. The response of woodland biodiversity is monitored, including through: surveys of vegetation and fauna; research on arthropod assemblages; abundance of ground dwelling skinks; the impact of kangaroo grazing; and monitoring plots to trial different fire regimes.

Emerging from the research partnership, in 2009 the predator-proof Mulligans Flat Woodland Sanctuary was established within the Mulligans Flat Nature Reserve to extend research to include species reintroductions, especially of locally extinct fauna. The Sanctuary encompasses 485 hectares of box–gum woodland, protected by 11 kilometres of rabbit, cat and fox-proof fencing.

Eastern Bettong (*Bettongia gaimardi*), Eastern Quoll (*Dasyurus viverrinus*), Bush Stone Curlew (*Burhinus grallarius*), Brown Treecreeper (*Climacteris picumnus*) and New Holland Mouse (*Pseudomys novaehollandiae*)—all threatened species—have been re-introduced into the Sanctuary after many decades

of local extinction. There are plans to extend the Sanctuary and also to reintroduce Yellow-Footed Antechinus (*Antechinus flavipes*) and Eastern Chestnut Mouse (*Pseudomys nanus*). The Sanctuary is supported by the Woodland and Wetlands Trust through expert advice, fund raising, innovative management, community support, education and nature-based recreation.



Eastern Quoll (*Dasyurus viverrinus*), Mulligans Flat Nature Reserve (Adrian Manning)

Researchers fitting a collar onto an Eastern Bettong (*Bettongia gaimardi*), Mulligans Flat Nature Reserve (Don Fletcher)

Release of an Eastern Bettong at Mulligans Flat Nature Reserve (ACT Conservation Research)

9.1.2 Grasslands research

Research undertaken by the ACT Government, often in partnership with research organisations such as local universities and CSIRO, has significantly contributed to the body of knowledge about the ecology and management of native grasslands and grassland species. This particularly applies to grassland threatened species and management of Eastern Grey Kangaroos. However, knowledge gaps still remain, such as long-term effects of grazing, burning and slashing/mowing regimes, the ecology of grassland species, and methods to promote threatened species recovery.

The ACT Grassland Enhancement Program is being implemented as a partnership between the Parks and Conservation Service, Greening Australia and ACT Natural Resource Management, and is partly funded by the Australian Government National Landcare Program. Activities include:

- undertaking research into restoring natural disturbance regimes, primarily using fire
- researching the habitat requirements of threatened grassland species
- investigating techniques to replace exotic species with native species.

9.1.3 Citizen science

Citizen science activities, carried out by organisations such as Frogwatch, Waterwatch, Vegwatch, Australian Native Plants Society and the Canberra Ornithologists Group, are proving to be effective ways of gaining new information and increasing community understanding and appreciation of the natural values of Canberra Nature Park. ParkCare groups are using GIS mapping tools to record and report on issues such as the occurrence of weeds, rabbits and rabbits warrens, and informal tracks.

Canberra Nature Map (<https://canberranaturemapr.org/>) is an innovative mobile device app, developed and supported by volunteers, that allows anyone to report sightings of plant, animal, insect and fish species. The platform, supported by the ACT Government, provides public access to more than 1 million records of over 4,500 local species and in excess of 250,000 wildlife images, and engages citizen scientists, naturalist groups and the public alike.

Canberra Nature Map aims to:

- accurately map every rare plant and endangered animal in the ACT and maintain records for future generations
- improve public education and awareness of the diversity and significance of Canberra's natural areas
- influence development decisions and protect Canberra's natural values by providing critical species location data to government.

By providing readily accessible and up-to-date location information, Canberra Nature Map enables a precautionary approach to be taken towards the management and protection of the uncommon species found within our reserves.

9.2 Cultural heritage research

Research that increases knowledge and helps in the conservation of Aboriginal and historic sites and places, and the ongoing connection by Aboriginal people to Country, will be further encouraged and supported.

The Parks and Conservation Service is working with ACT Heritage to develop an overarching cultural heritage management system that outlines the principles, policies and procedures that will be implemented by the Parks and Conservation Service to manage and conserve Aboriginal places and objects on protected land.

9.3 Monitoring

Monitoring provides information on how a particular feature or indicator is trending over time and helps managers and policy makers make more informed decisions. It will often involve the repeated counting, measurement and/or assessment of a variable, or variables, using standard methods each time.

Monitoring:

- informs how effective particular management actions have been and the level of threats present
- provides direction into what future management may be appropriate
- links management to conservation outcomes.

Monitoring within Canberra Nature Park has largely related to the abundance and distribution of threatened or declining species and the condition of reserve ecological values and responses to fire. Specific monitoring will continue for each of the vegetation communities in Canberra Nature Park, with key indicators selected to link management actions, their effect on the pressures on biodiversity, and consequences for the state of biodiversity.

The ACT Government will be monitoring the condition of Canberra Nature Park through the Conservation Effectiveness Monitoring Program (CEMP), which provides a framework for monitoring and evaluating the condition of ecosystems and the effectiveness of management in achieving conservation objectives. The CEMP will gather monitoring information collected across government and non-government sectors and report this information in a coordinated format that supports adaptive, evidence-based decision making.

Monitoring programs that contribute to adaptive management of Canberra Nature Park include:

- ACT Government Conservation Research Program
  - survey and monitoring of species such as Striped Legless Lizard (*Delma impar)*, Grassland Earless Dragon (*Tympanocryptis pinguicolla*), Superb Parrot (*Polytelis swainsonii*), Button Wrinkle Wort (*Rutidosis leptorrynchoides*), Canberra Spider Orchid (*Arachnorchis actensis*) and Small Purple Pea (*Swainsona recta*)
  - longitudinal studies of groundcover condition in grassy ecosystem sites
- citizen science activities
- the long-term Canberra Ornithologist Group Woodland Bird Monitoring program, which is undertaken across 11 Canberra Nature Park reserves (and another five locations).

Approval conditions under the EPBC Act require that environmental offset sites that have been included within Canberra Nature Park are also subject to a monitoring program. Monitoring is required to demonstrate how management interventions, as outlined in the offset management plans, have maintained or improved the condition, extent or population size of the relevant matters of national environmental significance protected within each offset site. Data from the offsets monitoring program will contribute towards assessing the condition of ecosystems within Canberra Nature Park through the CEMP.

Surveying vegetation on Black Mountain Nature Reserve (ACT Conservation Research)

Top: Kangaroo fertility research (ACT Conservation Research); *Bottom*: Grassland Earless Dragon research (PCS Library)

9.4 Research and monitoring: management policies, objectives and actions

RESEARCH AND MONITORING

POLICIES

- Research that improves knowledge and contributes to increased management effectiveness of natural and cultural values will be supported.
- Opportunities will be sought for collaborative partnerships with universities and other research sectors and institutions to inform and improve park management.
- Citizen science will be supported.

OBJECTIVES

- Research and monitoring inform adaptive management of natural and cultural values.
- ACT Government research provides a sound evidence base for land management and conservation decisions in Canberra Nature Park.
- Univerities in Canberra have established long term social and ecological research programs across Canberra Nature Park.

ACTIONS

75 Continue to support research partnerships with universities and other research institutions.

76 Continue to develop and implement the Conservation Effectiveness Monitoring Program to inform adaptive management across Canberra Nature Park.

77 Prioritise research with a focus on:

- ecology and population genetics of threatened or declining species
- processes driving the abundance, distribution and condition of reserve ecological values
- vegetation and wildlife response to fire regimes
- developing effective restoration/management techniques for threatened communities and species habitat
- the desirability and feasibility of reintroducing locally extinct native animal species
- the implications of climate change for the biota of the region
- developing a better understanding of the types, levels and impacts of recreation and visitor use
- supporting the Mulligans Flat—Goorooyarroo Woodland Experiment, Mulligans Flat Woodland Sanctuary, and the Woodlands and Wetlands Trust.

78 Support and promote the use of citizen science and integrate results into management.

Look out on Mount Ainslie Nature Reserve (Mark Jekabsons)

10 PLANNING, APPROVALS AND COMPLIANCE

This chapter considers a number of functions and requirements not considered elsewhere in this plan. If an activity is proposed and there is uncertainty regarding approval processes, the advice of the Parks and Conservation Service should be before the activity starts.

10.1 Environmental assessment and approval

Environmental assessment requirements for developments in the ACT are contained in the Planning and Development Act. Schedule 4 of the Act lists development proposals that trigger the requirement for environmental impact assessment (Part 4.3, see item 3). Any development proposal within a nature reserve or special purpose reserve will require the preparation of an environmental impact assessment unless the Conservator provides an Environmental Significance Opinion (ESO) indicating that the proposal is not likely to have a significant adverse environmental impact. This does not apply if the works are exempted under a code of practice made by the Conservator.

Development is defined in s.7 of the Act and includes building, earthworks or other construction work, carrying out work that would affect the landscape, and using the land. It is preferable that environmental considerations be part of the early stages of any development proposal (an environmental planning approach). Where a number of projects are planned, it is desirable to address these collectively in order to determine cumulative impacts.

Designated Areas

Proposed works in reserves that are Designated Areas within Canberra Nature Park are not subject to Territory development assessment processes, and must be approved by the National Capital Authority.

For works in Designated Areas, a Nature Conservation Licence under the Nature Conservation Act will be required in addition to the above requirements. The provisions of the Heritage Act also apply to activities of non-Commonwealth entities on Designated Land.

Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act, any action that has, will have, or is likely to have a significant impact on matters of national environmental significance, such as Commonwealth-listed threatened species or ecological communities, must be referred to the Commonwealth for approval. As many Canberra Nature Park reserves have threatened species or communities present, any proposals for major works within reserves are likely to trigger assessment under the EPBC Act.

10.2 Management operations and environmental protection

Maintenance of environmental quality is a legislative and government policy requirement in managing Canberra Nature Park. Part of the role of management is to manage human activities that have the potential to impact on reserve values and visitors.

Maintenance works undertaken by the Parks and Conservation Service are subject to the relevant approval code/s of practice and require works plans to be prepared.

Public utilities

The Conservator may propose a management agreement with any public utility agency that supplies gas, electricity, water or sewerage services, or any entity responsible for the construction, repair and maintenance of navigation serving beacons and telecommunications within Canberra Nature Park (under the Nature Conservation Act, Chapter 12). The agreement will outline standards and conditions to avoid or minimise any conflict with management objectives for a reserve and the conditions will also apply to contractors undertaking work for public utility providers.

Major work by utility suppliers and other agencies will be subject to a licence under the Nature Conservation Act or Environmental Impact Assessment approval.

Water quality

Clean water is essential for the health of aquatic ecosystems, to provide safe drinking water and for recreation. Conservation goals for the river and riparian zones in Canberra Nature Park are set out in the ACT Aquatic and Riparian Conservation Strategy and Action Plans (ACT Government 2018).

The Environment Protection Regulation 2005 sets out water quality standards for the protection of waterways relating to issues such as pollution, storm water discharge, etc.

Water and energy use

It is desirable for Canberra Nature Park to implement efficient systems for the use of energy and water in line with ACT Government policies: the ACT Water Strategy 2014—2044: Striking the Balance (ACT Government 2014); Living with a Warming Climate, ACT Climate Change Adaptation Strategy (ACT Government 2016) and ACT Climate Change Strategy 2019—2025 (ACT Government 2019b).

Air quality

Smoke from prescribed burning and bushfires is likely to occur seasonally. The Parks and Conservation Service is authorised by the Environment Protection Authority under the *Environment Protection Act 1997* to conduct prescribed burning. The Smoke Management Conditions and Smoke Management Guidelines for Prescribed Burning are specified under Environmental Authorisation 0412. <http://www.environment.act.gov.au/environment/epa_search>.

Waste management

Rubbish bins are not provided within Canberra Nature Park and visitors generally accept that they take away their rubbish. This policy will be continued.

Chemicals and hazardous materials

Chemicals and hazardous materials are used in Canberra Nature Park for pest plant and animal control, fire suppression, and in the course of routine management activities. It is the responsibility of managers and contractors to ensure that the requirements of the Environment Protection Act and any subsequent environmental authorisations are met as well as occupational health and safety requirements.

Public roads, lookouts, and catch and cut-off drains

Public roads border many Canberra Nature Park reserves and lead to summit lookouts on Red Hill, Mount Ainslie, Black Mountain, Mount Taylor and Mount Pleasant. Maintenance and management of the roads and lookouts has the potential to adversely impact reserve values; for example, weed seed distribution through mowing/slashing, ignition of fires by people in passing vehicles (either deliberately or accidentally) and littering.

Catch and cut-off drains have been built upslope of suburbs (sometimes within the nature reserve boundary) to protect residential areas from surface water run-off. Design and construction is determined by the local site conditions but drains are often integrated into management trails on the edges of reserves.

The upgrade and maintenance of roads, lookouts and drains can cause disturbance to soils, drainage problems and disruption to visitor access. This infrastructure is the responsibility of Transport Canberra and City Services (TCCS). The Parks and Conservation Service and TCCS will continue to cooperate to address any concerns arising from this infrastructure.

10.3 Firearms and other weapons

Possession and use of firearms is not permitted in Canberra Nature Park. Under the Nature Conservation Act, it is also an offence to use or possess other weapons (such as bows and arrows), or a trap, net, snare or other device capable of capturing animals without a licence from the ACT Conservator. Firearms and other weapons may be used only for management purposes by authorised officers in accordance with legislation and ACT Government policy, including codes of practice.

10.4 Domestic animals

The Nature Conservation Act prohibits taking non-native animals onto a nature reserve except as permitted by the Conservator (through an Activities Declaration or a Nature Conservation Licence) (see sections 7.4.4 and 7.4.5). Dog walking and horse riding are permitted only in reserves indicated in Table 7.1. Restrictions do not apply to assistance animals or dogs otherwise exempted under the Domestic Animals Act.

10.5 Resource extraction

Resource extraction, such as stone from quarries or cutting timber for fence posts, is part of the history of Canberra Nature Park. In accordance with the legislative objectives for nature reserves, resource extraction is limited to small scale use of local materials for management purposes only. An example would be local sourcing of road and track materials, which may be preferable to obtaining materials from elsewhere that may contain potential weeds or pathogens. The following activities are prohibited:

- timber cutting and firewood removal (except for management purposes)
- taking rocks, gravel or soil (except for management purposes)
- taking, killing, picking, defacing or otherwise disturbing natural or cultural features (unless licenced by the Conservator, for example for research).

10.6 Contaminated sites

Contaminated sites in Canberra Nature Park are derived primarily from past land uses. They include former rural sheep dips, historic municipal landfills and old building waste dumps with some sites identified as containing bonded asbestos. These sites are managed in accordance with the Contaminated Sites Environment Protection Policy (ACT Government 2017d), made under the Environment Protection Act. Management of these sites will involve site investigations and appropriate sampling as required as a basis for public health and environmental risk assessment. Management plans will be developed to ensure protection of human health and the environment where a risk exists, and a remedial action plan will be prepared for any site assessed as posing an unacceptable public health and/or environmental risk. Suitably qualified environmental consultants will be engaged for actions associated with contaminated sites.

10.7 Suburban residents and neighbours

Access to residential back yards

Suburban residents neighbouring a reserve may seek short-term approval from the Parks and Conservation Service for vehicle access through a reserve, for example to access a residential back yard. Fees and conditions apply and rehabilitation of any impacts on soil or vegetation is required.

Destruction of termite nests within a nature reserve

Termites are an important component of Australian ecosystems, and termite nests within Canberra Nature Park are a part of the natural values of reserves. However, termites may at times present a risk to structures within or adjacent to reserves. A termite nest within a reserve may be destroyed if it is a suspected source of infestation for a suburban house or other infrastructure. The agreed approach and the approval process is outlined in the ACT Government Termite Control Guidelines and Policy.

Removal of a tree within a nature reserve

Native trees within a reserve boundary are not permitted to be removed except for public safety. If a tree within a reserve is a safety concern, for example a tree on a suburban boundary, a request for an assessment may be made to the Parks and Conservation Service.

Native trees within a reserve boundary will not be removed to improve solar access for neighbouring houses. Reserve neighbours considering installation of a solar system must take into account shading from reserve trees prior to installation.

Trees within reserves may be removed for management purposes, for example as part of an ecological thinning program.

Memorials within a nature reserve

The Small Memorials Policy in ACT Forests and Reserves applies within Canberra Nature Park. Only small memorials, as described in the policy, will be considered and approval is subject to decision by the Regional Manager of the relevant area.

In areas identified in the National Capital Plan as Designated Areas, Guidelines for Commemorative Works in the National Capital apply.

Unauthorised residential lease encroachments

In some older suburbs, the boundary between a residential lease and a nature reserve may not be well defined on the ground, and some suburban neighbours have built structures outside their residential lease and within the nature reserve (unleased public land).

Intentional urban encroachment into a nature reserve, for example from structures, garden beds and plantings, is not acceptable and removal and repair of the area may be required by law.

Areas within Canberra Nature Park managed under tenancy agreements or other arrangements

There are a few small areas within Canberra Nature Park that are not currently managed by the Parks and Conservation Service (see section 1.10.1). These areas are subject to either tenancy agreements or other less formal arrangements, which will be reviewed during the life of this plan.

10.8 Rural leases

Rural leases apply in Kinlyside and West MacGregor Grasslands nature reserves and in parts of Crace Grasslands, Kowen Escarpment, Rob Roy, Tuggeranong Hill and Urambi Hills nature reserves. Rural leases are issued under the Planning and Development Act, and lessees are required to prepare a Land Management Agreement documenting an agreed approach to the management of soil, water, native vegetation, pest plants and animals, drought and bushfire risk.

Where rural lease and nature reserve both apply, the Land Management Agreement must be consistent with the objectives outlined in this management plan and must be approved by the Conservator. For example, stock grazing in Kinlyside supports the management of Golden Sun Moth populations, and grazing in Crace Grasslands supports Striped Legless Lizard habitat.

The nature reserve maps in Part 2 show existing rural lease areas.

10.9 Compliance and enforcement

The Parks and Conservation Service has a risk-based approach to regulation, promoting voluntary compliance through education and prioritising compliance and enforcement activities based on risk of harm.

Parks and Conservation Service staff are authorised Conservation Officers under the Nature Conservation Act and may exercise a range of powers to protect, conserve and enhance the biodiversity of the ACT. These powers include issuing directions to protect and restore damage to our nature reserves. Where appropriate, infringement notices may be issued for a range of offences, or prosecution action may be commenced via the Office of the Director of Public Prosecutions for breaches of the Nature Conservation Act or other legislation.

10.10 Planning, approvals and compliance: management policies, objectives and actions

PLANNING, APPROVALS AND COMPLIANCE

POLICIES

- Relevant statutory processes will be followed for all proposed activities and works in Canberra Nature Park.
- New infrastructure will utilise the lowest impact option and will only be located:
  - in already disturbed areas or co-located with other services
  - with reference to reserve management zones.

OBJECTIVES

- Appropriate environmental assessments are undertaken to ensure that reserve values are not damaged or compromised.
- Monitoring of activities ensures that actions avoid or minimise impact on reserve values, and that any damage is repaired.
- Visitors comply with all legislative and policy requirements.
- Rural leases over nature reserves are managed for identified conservation outcomes.

ACTIONS

79 Ensure all works proposed in reserves are subject to appropriate assessment and approval processes to minimise impacts on reserve values, including habitat connectivity.

80 Implement hygiene protocols during all works, management activities and events.

81 Monitor management activities and approved works and report non-compliance against approval conditions.

82 Seek to recover costs associated with rehabilitating damage caused by others.

83 Increase compliance efforts to minimise impacts of illegal and inappropriate behaviour on reserve visitors and conservation values.

84 Record and analyse incidents of behaviour in breach of legislation or incompatible with the provisions of this plan and take appropriate action.

85 Harness technology to improve delivery and reporting of management actions.

86 Identify, assess and manage risks associated with contaminated sites in reserves, in accordance with the Contaminated Sites Environment Protection Policy 2017 made under the *Environment Protection Act 1997*.

87 Ensure that Land Management Agreements prescribe the protection of identified values.

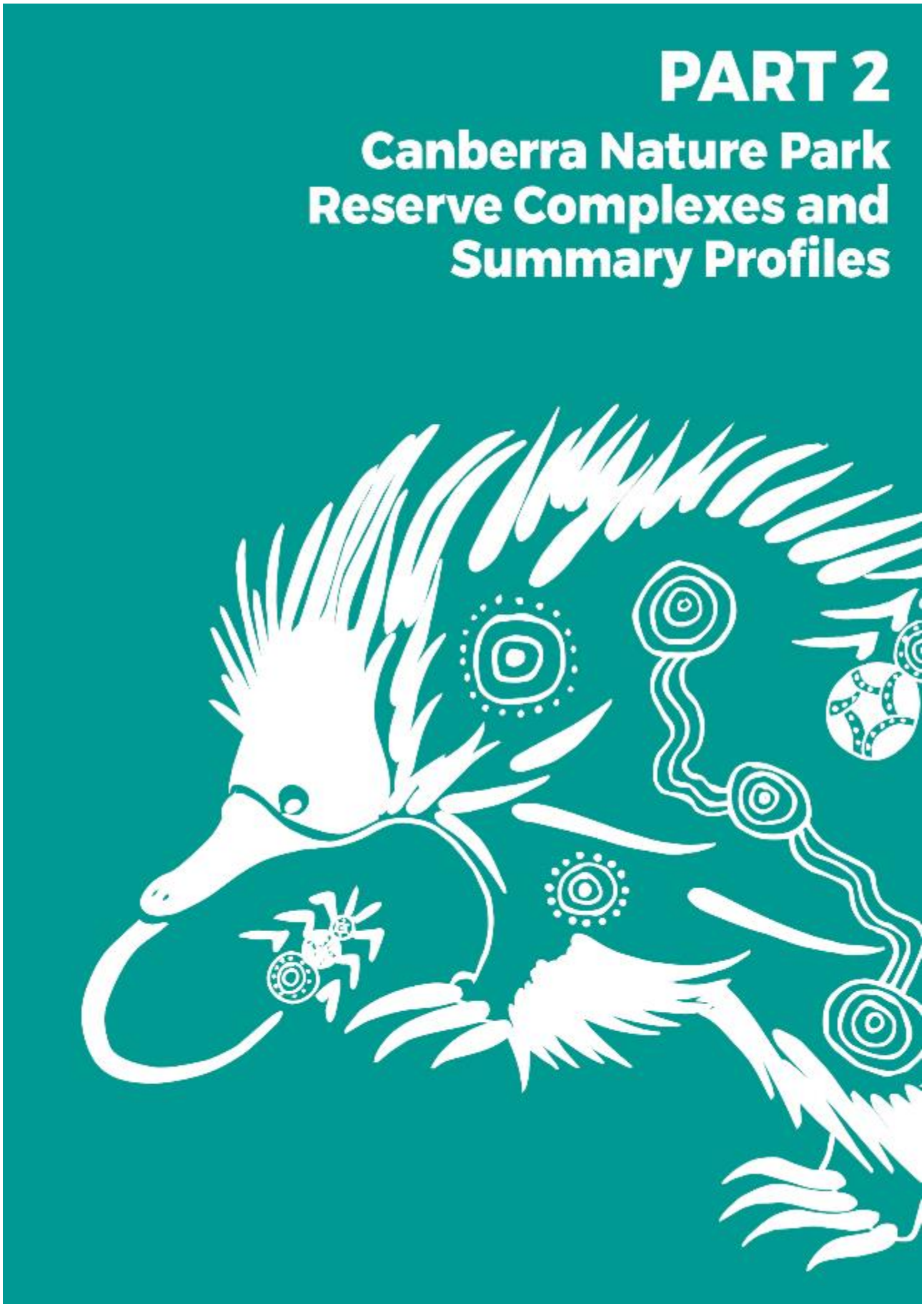
88 Support lessees to protect identified conservation values on rural leases.

89 Monitor conservation values in rural leases within Canberra Nature Park.

90 Review tenancy agreements and other informal arrangements for areas not managed by the Parks and Conservation Service.

PART 2

Canberra Nature Park Reserve Complexes and Summary Profiles



RESERVE COMPLEXES

Canberra Nature Park is made up of 37 individual reserves, many of which are conjoined or close to one another. Others share similar geology, vegetation communities and habitat niches.

Grouping reserves with similar characteristics, management priorities and/or geographical proximity into 'complexes' helps land managers prioritise management activities in individual reserves in the context of the surrounding landscape.

Considering reserves as a 'complex' helps management in a number of ways:

- Maintaining ecological connectivity across the landscape is a key management priority for conservation of woodland communities. Linking woodlands between component reserves, neighbouring complexes and other ecological communities—such as grassland, riparian, wetland and forest areas—serves to strengthen landscape habitat heterogeneity, thereby aiding dispersal of species, supporting access to refugia in extreme conditions, and building resilience in a changing climate.
- A landscape-scale perspective for operational programs such as pest plant and animal control and kangaroo and fire management can help in prioritising and allocating resources, staff and volunteer effort for the most effective outcomes. For example, grasslands in Gungahlin are isolated from one another by urban infrastructure—considering grassland management across a complex allows for more strategic planning and implementation of management activities.
- Ecological burning, grazing stock rotation and seasonal monitoring require high-level planning and coordination of resources at multiple levels. Undertaking these activities across multiple sites achieves better conservation outcomes and more efficient use of time and resources.
- A complex perspective also supports a strategic approach to planning for infrastructure and recreational use within reserves.

Canberra Nature Park reserves have been grouped into the following complexes:

NORTHERN WOODLANDS—These are high quality nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland and other forest communities, with good links to regional woodlands over the NSW border.

CENTRAL GRASSLANDS—This group of reserves represents Natural Temperate Grassland and associated native and exotic grasslands, as well as areas of remnant woodland. Reserves fall into groups at two locations—the Gungahlin Valley and Belconnen.

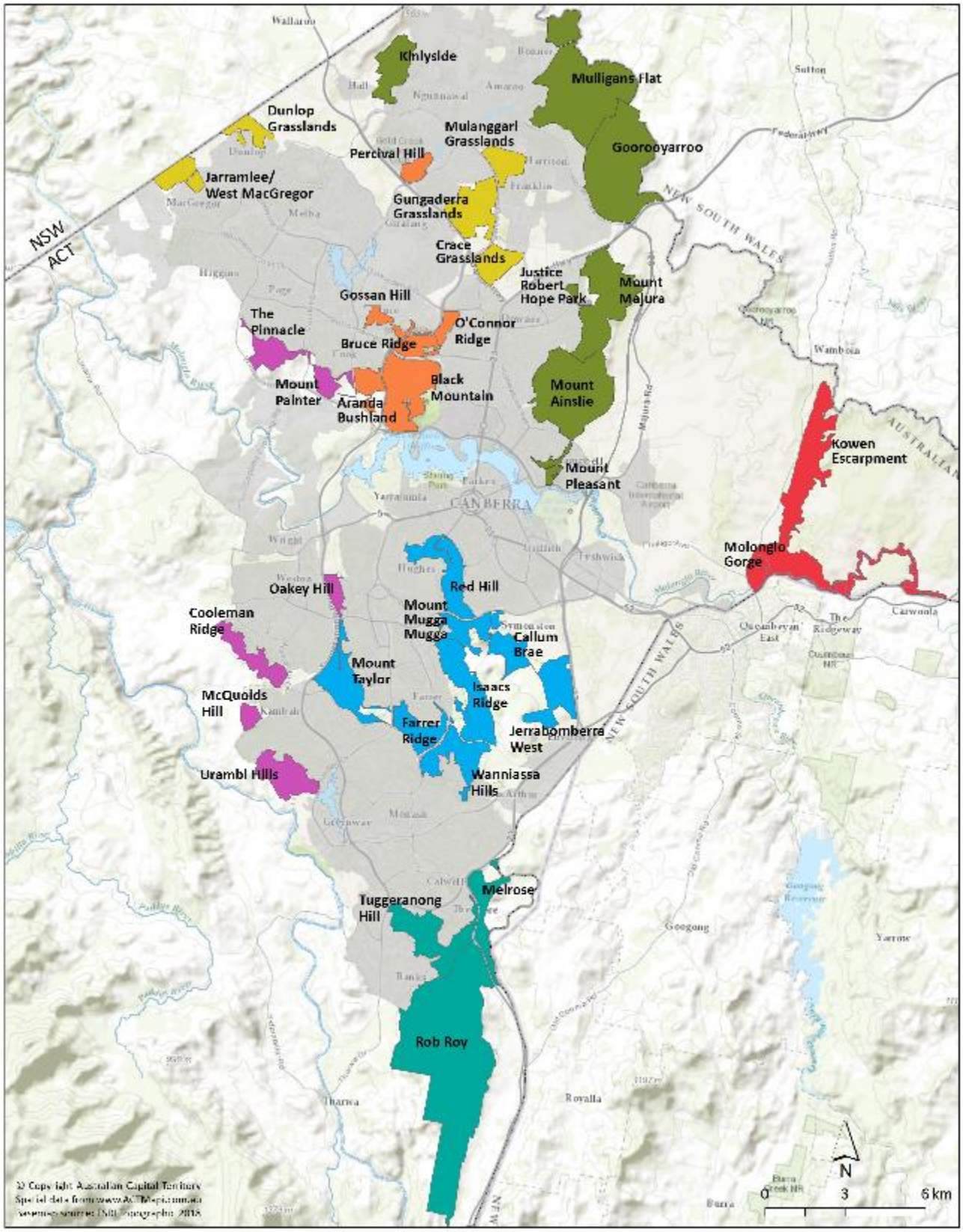
SANDSTONE RESERVES—The distinctive sandstone geology underlying Black Mountain and nearby reserves supports a rich and diverse vegetation unusual in the ACT, with a high number of rare and threatened plant species.

CONNECTIONS WITH RIVERS—Reserves in this group, which are generally more disturbed than other complexes, share key management aims of restoring vegetation and conserving Pink-tailed Worm-lizard habitat.

KOWEN ESCARPMENT AND MOLONGLO GORGE—These reserves, containing dry forest and woodland communities, are located along the 'Queanbeyan Fault'. Molonglo Gorge includes the only reserved river corridor in Canberra Nature Park. The reserves are part of an important north–south regional wildlife corridor and are the major habitat of several plant species rare in the ACT.

WODEN WOODLANDS AND GRASSLANDS—Located south of Lake Burley Griffin, this complex supports high quality box–gum woodland transitioning into the grasslands of the Jerrabomberra Valley.

SOUTHERN HILLS—These reserves protect large areas of high quality dry forest community and associated woodlands. With less urban edge than other groups and good connection across to Namadgi National Park and the Australian Alps national parks, this complex has a greater potential to support wild small mammal populations.



CANBERRA NATURE PARK – RESERVE COMPLEXES

- Northern Woodlands
- Central Grasslands
- Sandstone Reserves
- Connections with Rivers
- Kowen Escarpment & Molonglo Gorge
- Woden Woodlands & Grasslands
- Southern Hills
- Urban Area

Northern Woodlands

Goorooyarroo, Justice Robert Hope Park, Kinlyside, Mount Ainslie, Mount Majura, Mount Pleasant and Mulligans Flat nature reserves

Description

Located in Canberra's north, this group of reserves represents the transition of dry sclerophyll forest on the hills and ridges to woodlands on the lower slopes, merging with the grasslands remaining on the floor of the Majura Valley. Stands of Drooping She-oak and rare Snow Gum Grassy Woodland occur in some areas.

These forest and woodland vegetation communities form part of an extensive corridor that extends beyond the northern ACT border as well as connecting through the Majura Training Area down to the Molonglo River. It is an important part of several regional wildlife movement corridors, including the Great Eastern Ranges corridor, which runs from Victoria to North Queensland, generally along the coastal escarpment, and the Southern Flyway, a connection of woodland vegetation across the ACT and the southern slopes and central west of NSW.

The complex includes the Mulligans Flat and Goorooyarroo reserves that together form the largest and best quality reserved area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland in Australia. The Mulligans Flat-Goorooyarroo Woodland Experiment and associated Mulligans Flat Woodland Sanctuary have been established in these reserves.

Nature reserves in this grouping are generally in good condition, supporting areas rich in wildflowers, including rare and threatened plants, and habitat for a variety of mammal, bird, reptile and invertebrate species.

These Northern Woodlands reserves are popular with local residents and tourists alike. The Sanctuary sees interstate visitors drawn to the attractions of the reintroduced native species such as the Eastern Bettong and Eastern Quoll. Mount Ainslie, Mount Majura and Mount Pleasant attract a significant number of Canberra residents and the Mount Ainslie Summit track provides visitors with panoramic views over the city and beyond to the mountains. With the exception of Kinlyside, a range of low-key recreational facilities, including part of the Centenary Trail, will continue to provide reserve visitors with opportunities to access and enjoy a range of activities that are compatible with the protection of natural and cultural values.

Future directions

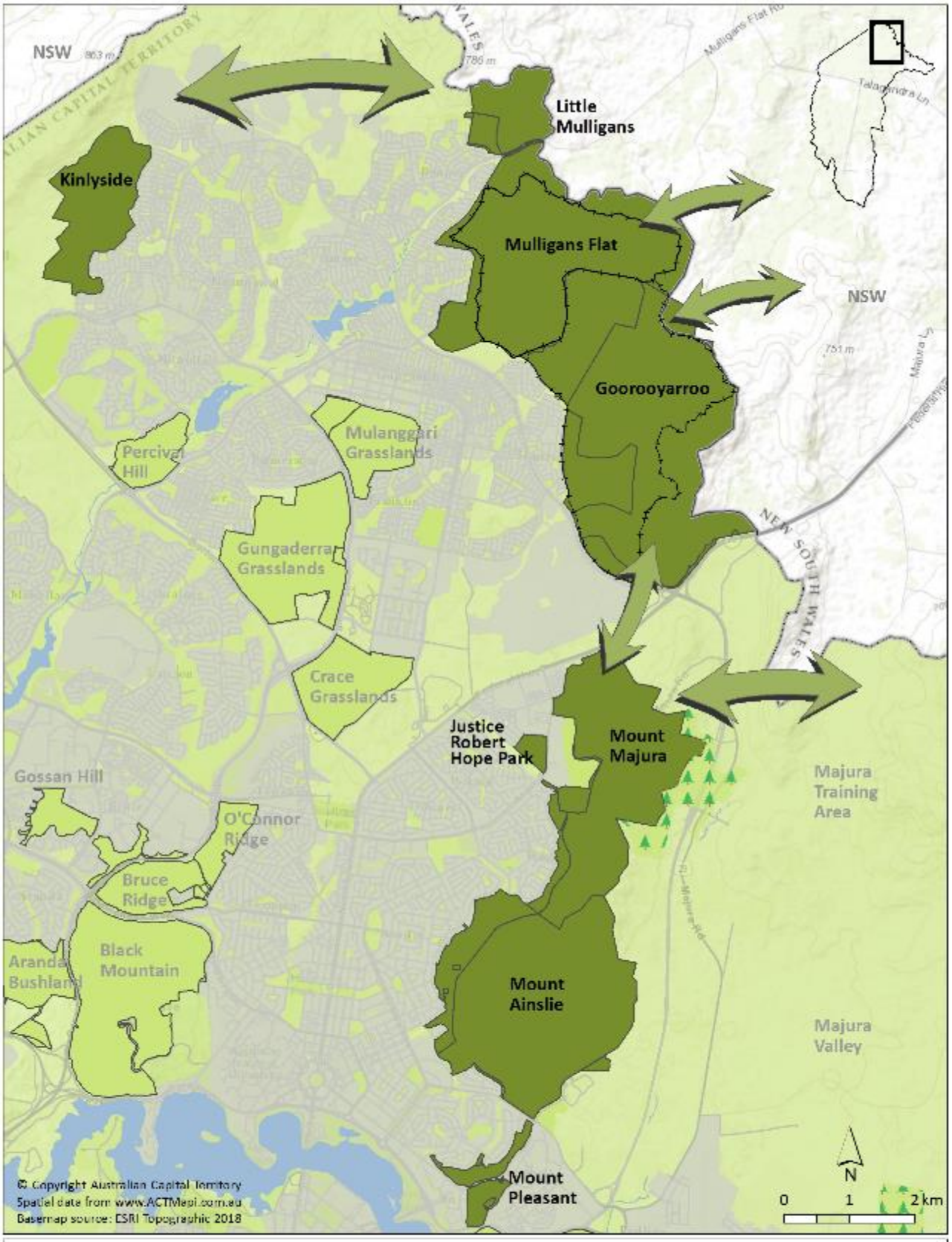
The addition of reserved lands (from environmental offsets), including Justice Robert Hope Park, Kinlyside and the extensions to Mulligans Flat and Goorooyarroo Nature Reserves, has increased the area of endangered ecological communities and threatened species under protection and strengthened the ecological connectivity in this landscape. These additions, and the extension of the Mulligans Flat Woodland Sanctuary predator-proof fence, will provide further refuge for a number of threatened and declining plant and animal species, thereby building resilience in this landscape to face the uncertain challenges of climate change.

In the Northern Woodlands complex, strengthening linkages within and between component reserves and beyond into neighbouring complexes and woodland areas in NSW will support ecosystem function and resilience. On-reserve infrastructure across much of the northern complex is complemented by off-reserve facilities that offer visitors a range of nature-based recreation and tourism experiences.

Significant Aboriginal and historic cultural sites across this landscape indicate the historical layering of ancient culture and Canberra's origins. Support for continuing Aboriginal connection to Country will facilitate the conservation and interpretation of Aboriginal heritage and the contribution of traditional ecological and cultural knowledge to continuously improve land management.

Reserve profiles and zone maps

The following summary profiles for each of the reserves in this complex outline the landscape and local level management intent specific to each reserve. The management plan and relevant strategies will inform the land management programs and priorities across Canberra Nature Park. The accompanying zone maps serve to assist the community and Canberra Nature Park stakeholders and partners with expectations and direction for land use activities, consistent with conservation of the natural environment.



NORTHERN WOODLANDS – LANDSCAPE CONNECTIONS

Northern Woodlands Complex
Landscape Connection
Woodland Sanctuary Fence
Pine Plantation
Non-urban Area
Urban Area
Rivers & Lakes

ACT Government

GOOROOYARROO NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Goorooyarroo Nature Reserve (829 hectares) was established in 2004 and extended in 2014 (environmental offset). A small part of the reserve is Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve forms part of a 2000 hectare contiguous area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland in the northern ACT, providing important wildlife habitat and a wildlife movement corridor linking through to the Majura Valley, the Molonglo River and into NSW.

NATURAL VALUES: Goorooyarroo protects:

- the largest remaining area of Yellow Box–Blakely's Red Gum Grassy Woodland in the ACT (1384 hectares in the Mulligans Flat–Goorooyarroo combined area) and the largest reserved extent nationally
- a regional stronghold for several threatened or uncommon woodland plant, grasshopper, lizard, bird and mammal species
- part of one of the largest areas of habitat for the critically endangered Golden Sun Moth (*Synemon plana*) in the ACT region
- one of the few areas where the vulnerable Superb Parrot (*Polytelis swainsonii*) is known to regularly breed within the ACT
- the internationally important Mulligans Flat–Goorooyarroo Woodland Experiment.

CULTURAL VALUES: The ACT Heritage Register lists 28 Aboriginal heritage sites. Other historic heritage places of interest include survey markers, a stone fence and a slab hut ruin.

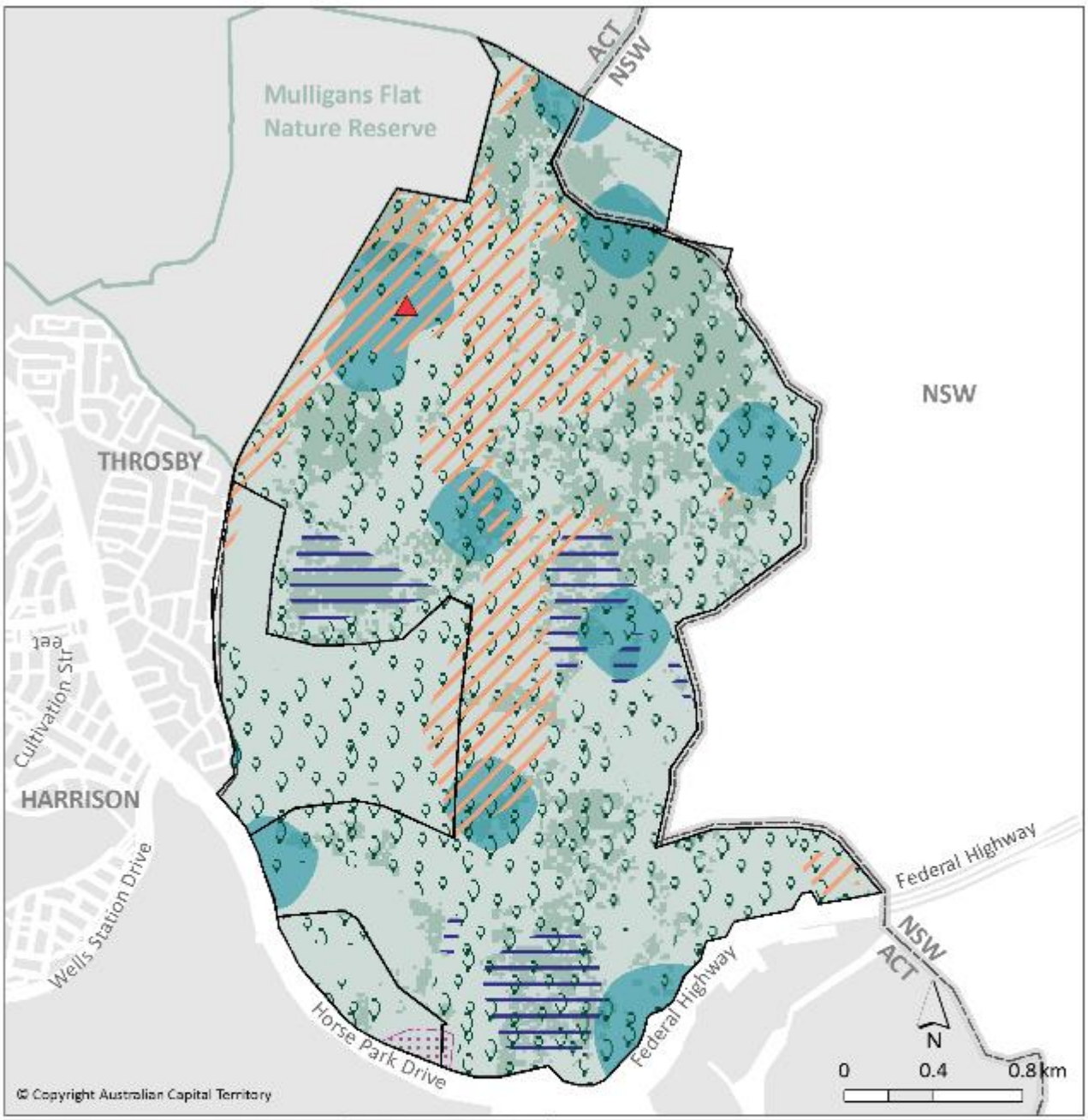
RECREATION: Goorooyarroo is heavily used for walking and cycling, particularly on the Centenary Trail. Dogs are prohibited in the reserve.

PARKCARE: Canberra Ornithologists Group has monitored birds in the north of the reserve since 1998 and in the south since 2004.

MANAGEMENT: The long-term aim for the reserve is to conserve and rehabilitate the extent and understorey condition of box–gum woodland, the extent of Golden Sun Moth and Striped Legless Lizard habitat, maintain a Superb Parrot breeding population, and to continue support for the Woodlands and Wetlands Trust and the Mulligans Flat-Goorooyarroo Woodland Experiment.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage offset areas in accordance with offset management plans
- continue to support the Mulligans Flat-Goorooyarroo Woodland Experiment
- support the development and management of an extended Mulligans Flat Woodland Sanctuary
- facilitate improved recreational management and interpretation in partnership with the Woodlands and Wetlands Trust
- develop and implement a conservation management plan for significant cultural sites
- protect grassland fauna and woodland bird habitat, including Superb Parrot breeding trees.



Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10.

JUSTICE ROBERT HOPE PARK NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Justice Robert Hope Park (19 hectares) was established in 2016 as an environmental offset. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is on the lower slopes of Mount Majura and is relatively flat with scattered mature trees and a grassy understorey. It is a small part of an extensive area of forest and woodland in the northern ACT that provides important wildlife habitat and a wildlife movement corridor linking through to the Majura Valley, the Molonglo River and into NSW.

NATURAL VALUES: Justice Robert Hope Park protects:

- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- large old hollow-bearing trees (200—400 years old) that provide nesting hollows and are important seasonal nectar sources and foraging habitat for canopy-dwelling birds and arboreal fauna.

CULTURAL VALUES: The reserve is named after Justice Robert Marsden Hope AC CMG QC (1919—1999), a barrister, judge and the first Chairman of the Heritage Council of NSW. Justice Hope's Committee of Inquiry into the National Estate led to acknowledgment of the concept of a National Estate and its protection as part of our heritage. See <www.northcanberra.org.au/watson-woodlands-working-group-2/>.

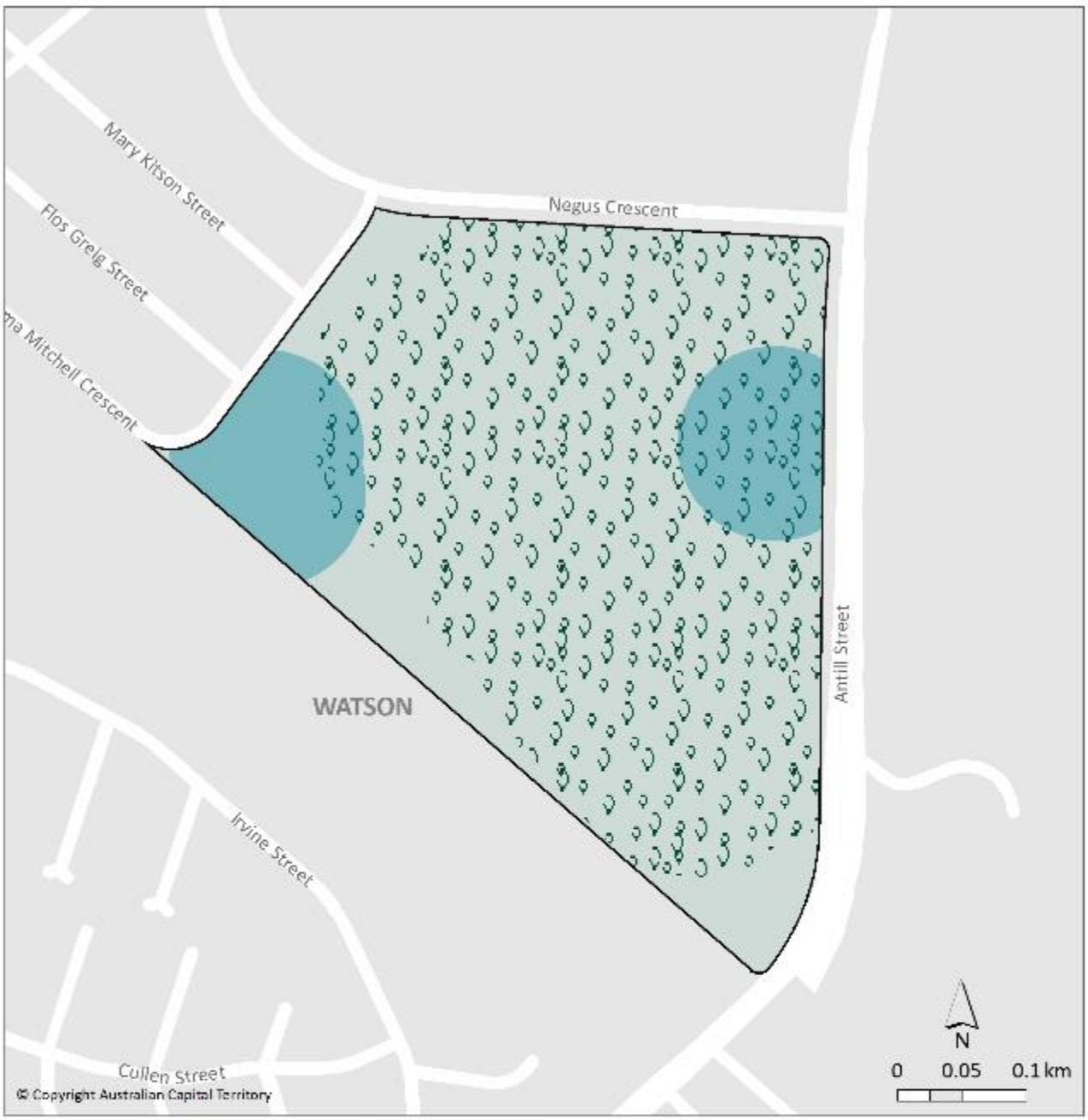
RECREATION: Pedestrian access points have been established into the Justice Robert Hope Park. Dogs on leash are permitted.

PARKCARE: Watson Woodlands Working Group (a member of Watson Community Association) helps protect the area and undertakes volunteer activities in the nature reserve. See <www.northcanberra.org.au/wp-content/uploads/2009/01/Woodlands-History1.pdf>.

MANAGEMENT: The long-term management aim is to improve the overall reserve condition.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage the offset area in accordance with the offset management plan
- monitor rehabilitation work following infrastructure development on the western edge
- continue to conserve ground cover diversity with the support of the Watson Woodlands Working Group.



KINLYSIDE NATURE RESERVE (CLOSED RESERVE)

Andrew Tatnell

ESTABLISHMENT: Kinlyside Nature Reserve (228 hectares) was established in 2014 as an environmental offset under the Gungahlin Strategic Assessment. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve forms part of a 2000 hectare contiguous area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland in the northern ACT, providing important wildlife habitat and a wildlife movement corridor linking through to the Majura Valley, the Molonglo River and into NSW.

NATURAL VALUES: Kinlyside protects:

- a large area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- a woodland understorey with several plant species considered rare in the ACT
- important habitat for threatened and regionally declining woodland birds, including the Diamond Firetail (*Stagonopleura guttata*), Southern Whiteface (*Aphelocephala leucopsis*) and Varied Sitella (*Daphoenositta chrysoptera*)
- habitat for a large population of endangered Golden Sun Moth (*Synemon plana*) and a small population of vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*).

Kinlyside has been conservatively grazed by stock for many decades. This has:

- prevented thick sapling regrowth that inhibits quality Golden Sun Moth and Pink-tailed Worm-lizard habitat
- supported Golden Sun Moth requirements for relatively short grasslands (dominated by spaced Wallaby and Corkscrew grass tussocks)
- supported a high quality understorey.

CULTURAL VALUES: The ACT Heritage Register lists 30 Aboriginal heritage sites, including scarred trees where bark and timber were removed for cultural use. Some features of 19th century landscape use also remain.

RECREATION: Kinlyside is a closed nature reserve (s. 259 of the Nature Conservation Act). There is no public access and dogs are prohibited.

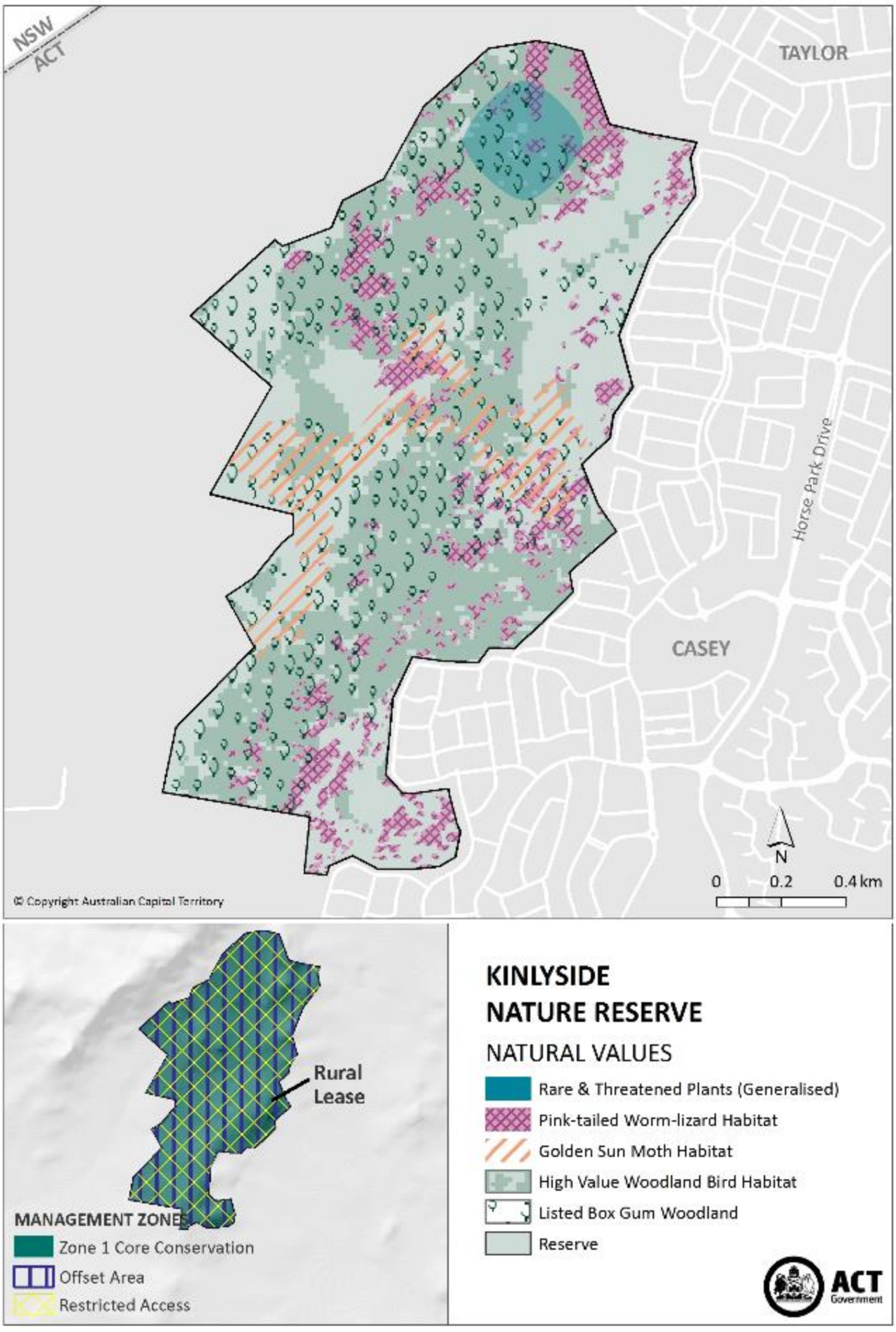
ACCESS RESTRICTIONS: Kinlyside is a rural lease. Access to the reserve is prohibited except for the lessee, and a person authorised by the lessee.

PARKCARE: Canberra Ornithologists Group has monitored birds in the area since 1998.

MANAGEMENT: The long-term management aim is to conserve and improve the extent and understorey condition of box–gum woodland and the extent and condition of Golden Sun Moth habitat. Management will be in accordance with the offset management plan. Conservative stock grazing will continue.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage in accordance with an offset management plan
- continue to work with the rural lessees to manage the reserve for conservation outcomes
- use grazing as a method for fire fuel management adjacent to the suburb of Casey.



MOUNT AINSLIE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mount Ainslie Nature Reserve (637 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive area of forest and woodland in the northern ACT that provides important wildlife habitat and a wildlife movement corridor linking through to the Majura Valley, the Molonglo River and into NSW.

NATURAL VALUES: Mount Ainslie protects:

- a large area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- important breeding habitat of threatened and regionally declining woodland birds and raptors
- stands of Drooping She-oak (*Allocasuarina verticillata*), which are an important foraging resource for the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)
- major habitat of the critically endangered Canberra Spider Orchid (*Arachnorchis actensis*) and endangered Hoary Sunray (*Leucochrysum albicans*); habitat for ten rare plant species; breeding habitat for the rare Rosenberg's Goanna (*Varanus rosenbergi*).

CULTURAL VALUES: The reserve is a significant Aboriginal men's cultural place, and a key landmark in the northern ACT for Aboriginal groups travelling south into the mountains. The ACT Heritage Register lists over 30 Aboriginal heritage sites, including culturally modified trees.

RECREATION: The reserve is heavily used by walkers, runners and cyclists and for organised events. The Centenary Trail passes through the reserve and the scenic lookout is a popular tourist destination. Dogs are permitted on leash. Horse riding is permitted on identified equestrian trails.

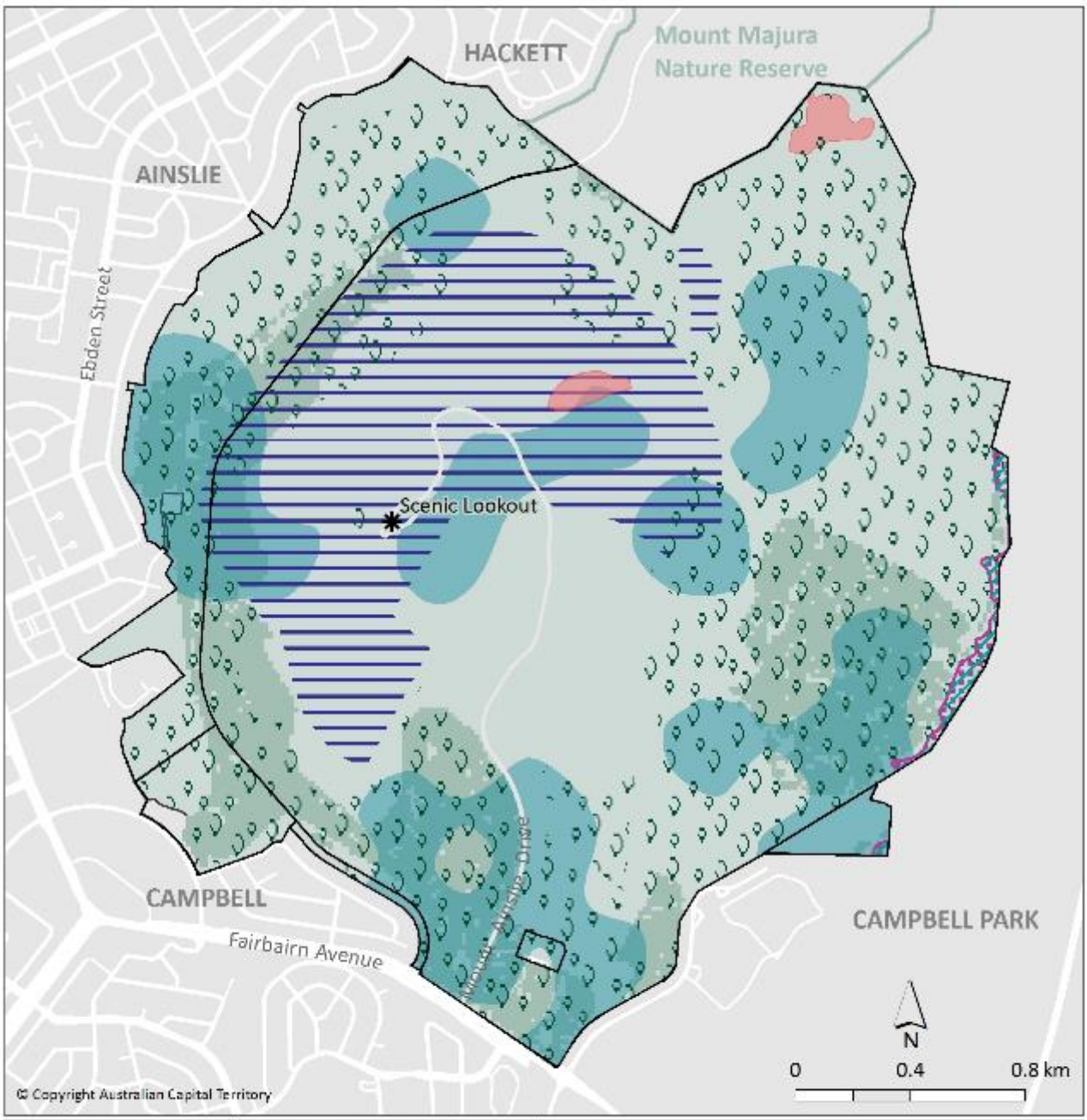
ACCESS RESTRICTIONS: Unexploded ordnance (UXO) has been found on the eastern side of the reserve and access to this area is restricted. Signs guide visitor use.

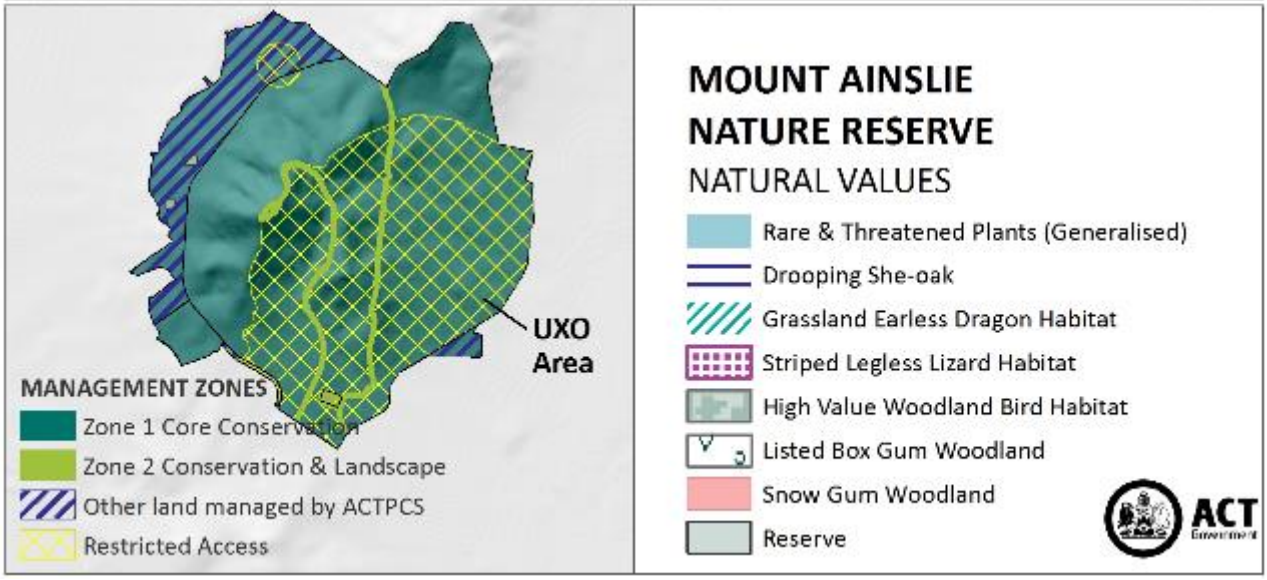
PARKCARE: Mount Ainslie Weeders has undertaken activities on Mount Ainslie since the early 1990s. Canberra Ornithologists Group has monitored birds in the reserve since 2000.

MANAGEMENT: The long-term management aim for the reserve is to conserve the diversity and abundance of native plant species and improve habitat structure for woodland animals.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- protect bird breeding habitat on the eastern side of Mount Ainslie during breeding season
- protect the Canberra Spider Orchid site and other threatened and rare plant sites
- manage overgrazing by kangaroos in accordance with the Eastern Grey Kangaroo: Controlled Native Species Management Plan
- protect the stands of Drooping She-oak as a food source for the Glossy Black-cockatoo
- manage the increasing recreation across the reserve through improved signage and enforcement
- review, rationalise rehabilitate and stabilise tracks to reduce erosion and other impacts
- support Mount Ainslie Weeders in rehabilitating the former tip site and undertaking other work.





Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10.

MOUNT MAJURA NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mount Majura Nature Reserve (502 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive area of forest and woodland in the northern ACT that provides important wildlife habitat and a wildlife movement corridor linking through to the Majura Valley, the Molonglo River and into NSW.

NATURAL VALUES: Mount Majura protects:

- stands of Drooping She-oak (*Allocasuarina verticillata*), an important foraging resource for the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)
- a large area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland on the lower slopes, and rare Snow Gum Grassy Woodland on the eastern slopes
- regionally important breeding habitat for many threatened and regionally declining woodland birds
- nectar producing woodland/forest, which attracts threatened or declining nomadic or migratory woodland birds, e.g. Swift Parrot (*Lathamus discolour*) and Regent Honeyeater (*Anthochaera phrygia*)
- major habitat of critically endangered Canberra Spider Orchid (*Arachnorchis actensis*) and endangered Hoary Sunray (*Leucochrysum albicans*) and habitat for several other rare plants; breeding habitat for the rare Rosenberg's Monitor (*Varanus rosenbergi*).

CULTURAL VALUES: The reserve is an important Aboriginal women's cultural place and provided a key landmark in the northern ACT for Aboriginal groups travelling south into the mountains.

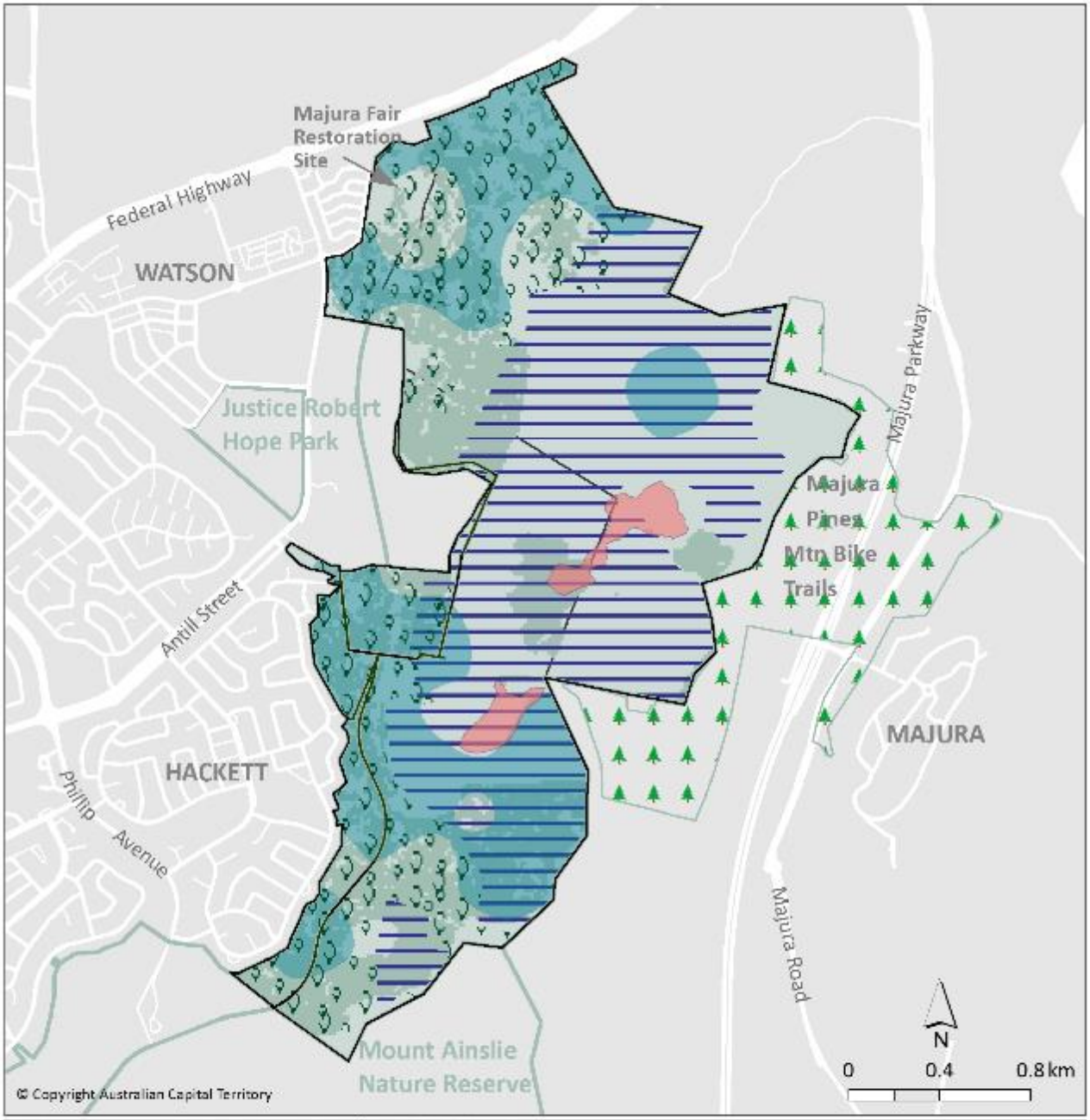
RECREATION: Mount Majura is heavily used by walkers, runners and cyclists and for organised events. The Centenary Trail passes through the reserve. Dogs are permitted on leash. Horse riding is permitted on identified equestrian trails.

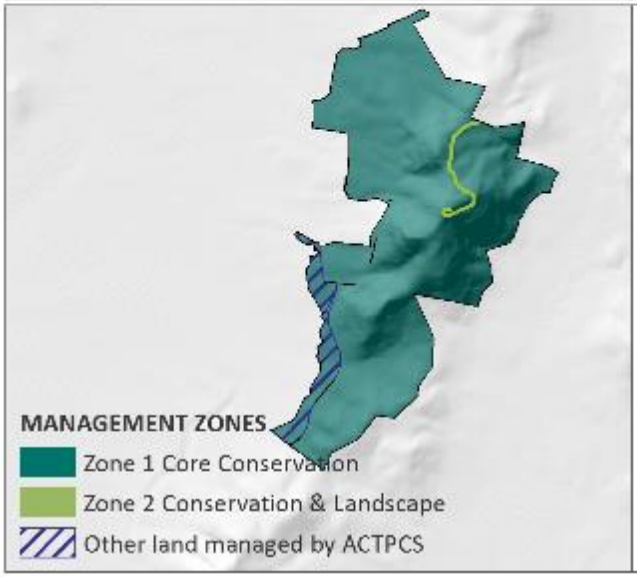
PARKCARE: Friends of Mount Majura has undertaken significant habitat restoration works across the reserve, particularly in areas impacted by past grazing practices. Canberra Ornithologists Group has monitored birds in the reserve since 1998.

MANAGEMENT: The long-term aim for the reserve is to conserve and rehabilitate the diversity and abundance of native plant species and improve habitat structure for woodland animals.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage overgrazing by kangaroos in accordance with the Eastern Grey Kangaroo: Controlled Native Species Management Plan
- support the increasing recreational use of the reserve through improved signage and compliance
- continue habitat improvement and restoration works in partnership with the Friends of Mount Majura
- protect bird breeding areas, Glossy Black-cockatoo habitat, the Canberra Spider Orchid site and other threatened and rare plants
- investigate 'single track' options to connect Majura Pines and Hackett, to minimise environmental impact and illegal mountain bike use on walking tracks
- continue to support Friends of Mount Majura.





MOUNT MAJURA NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Drooping She-oak
- High Value Woodland Bird Habitat
- Listed Box Gum Woodland
- Snow Gum Woodland
- Pine Plantation
- Reserve

ACT Government

Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

MOUNT PLEASANT NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mount Pleasant Nature Reserve (57 hectares) was established in 1993. The reserve is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is a small part of an extensive area of forest and woodland in the northern ACT that provides important wildlife habitat and a wildlife movement corridor linking through to the Majura Valley, the Molonglo River and into NSW.

NATURAL VALUES: Mount Pleasant protects:

- a small area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- records of threatened bird species, the Little Eagle (*Hieraaetus morphnoides*) and Speckled Warbler (*Pyrrholaemus saggitatus*).

CULTURAL VALUES: The ACT Heritage Register lists three Aboriginal heritage sites and the Duntroon Dairy which was built in 1832 to supply products to the Duntroon Estate. The dairy is considered the ACT's oldest standing building and is an important reminder of a self-sufficient way of life on a (then) remote pastoral property. The lower western slope of Mount Pleasant includes a plantation of mixed species that were established under the supervision of Charles Weston as part of Burley Griffin's plan to re-forest Canberra's denuded inner hills.

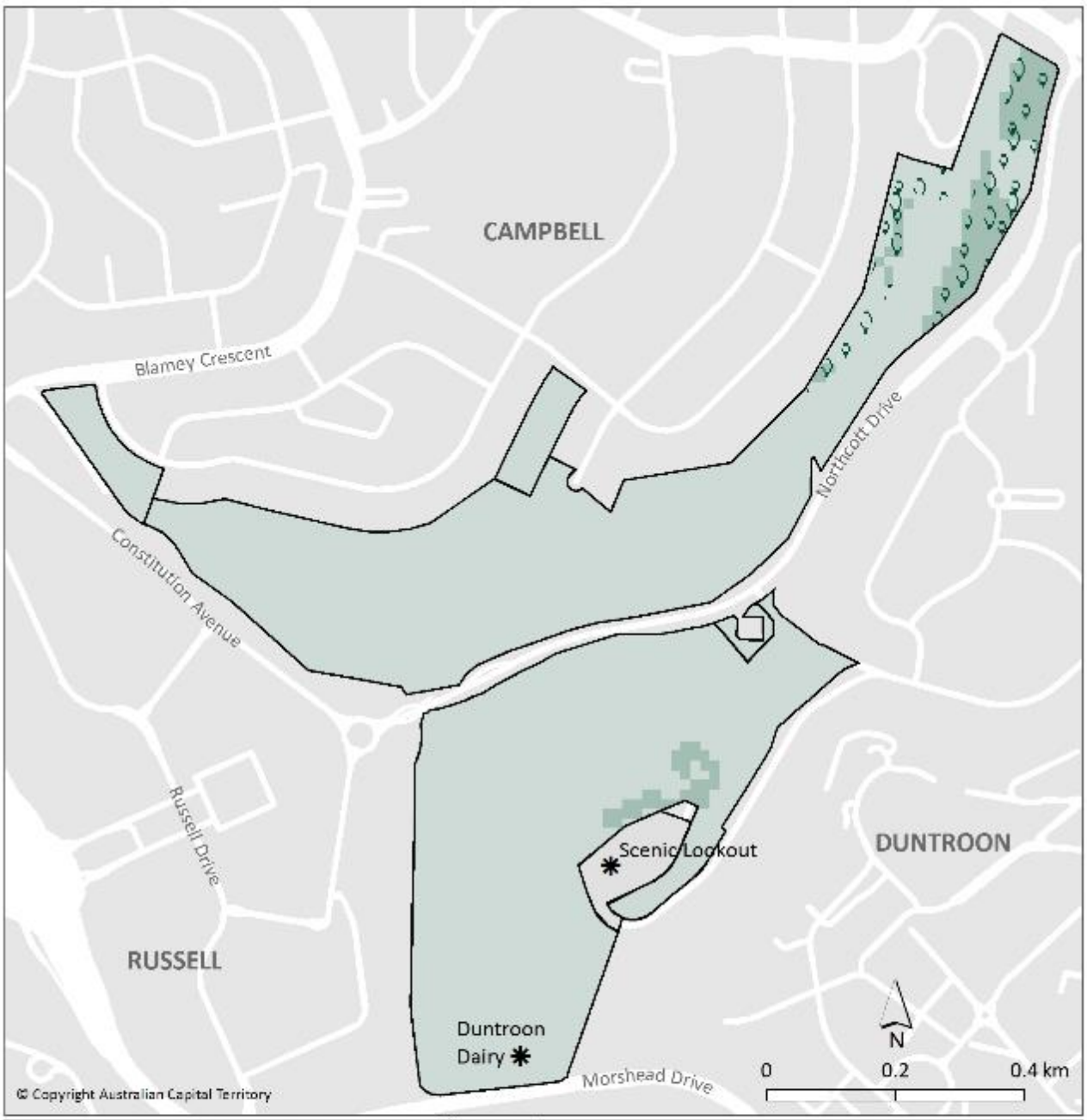
RECREATION: The reserve is heavily used by walkers, runners and cyclists and organised events. A scenic lookout near the summit has a number of memorials. Dogs are permitted on leash.

PARKCARE: Friends of Mount Pleasant has undertaken activities on the western side of the reserve with an emphasis on eliminating woody weeds and invasive exotic groundcover.

MANAGEMENT: The long-term management aim for the reserve is to conserve vegetation structure for birds.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain woodland condition and connectivity to other reserve areas
- manage Duntroon Dairy according to the Conservation Management Plan
- continue to support Friends of Mount Pleasant.



Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

MULLIGANS FLAT NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mulligans Flat Nature Reserve (984 hectares) was established in 1993, and additional areas have been added including an environmental offset in 2014. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve forms part of a 2000 hectare contiguous area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland in the northern ACT, that provides important wildlife habitat and a wildlife movement corridor linking to the Majura Valley, the Molonglo River and into NSW.

NATURAL VALUES: Mulligans Flat protects:

- the largest remaining area of Yellow Box–Blakely's Red Gum Grassy Woodland in the ACT (1384 hectares in the Mulligans Flat and Goorooyarroo combined area) and the largest reserved extent nationally
- a regional stronghold for several threatened or uncommon woodland plants and grasshopper, lizard, bird and mammal species
- a major component of one of the largest areas of continuous habitat in the ACT region for the critically endangered Golden Sun Moth (*Synemon plana*).

CULTURAL VALUES: The ACT Heritage Register lists over 50 Aboriginal heritage sites, the Old Coach Road and the Mulligans Flat Ploughlands within the reserve. Other historic heritage sites include remnants of huts/homesteads, schools, woolsheds and border markers.

RECREATION: The fenced wildlife Sanctuary attracts visitors, particularly those interested in wildlife conservation. Regular guided activities are a feature. The reserve is heavily used for walking and cycling, including on the Centenary Trail. Horse riding is permitted only on the Bicentennial National Trail along the southern edge of Little Mulligans. Dogs are prohibited.

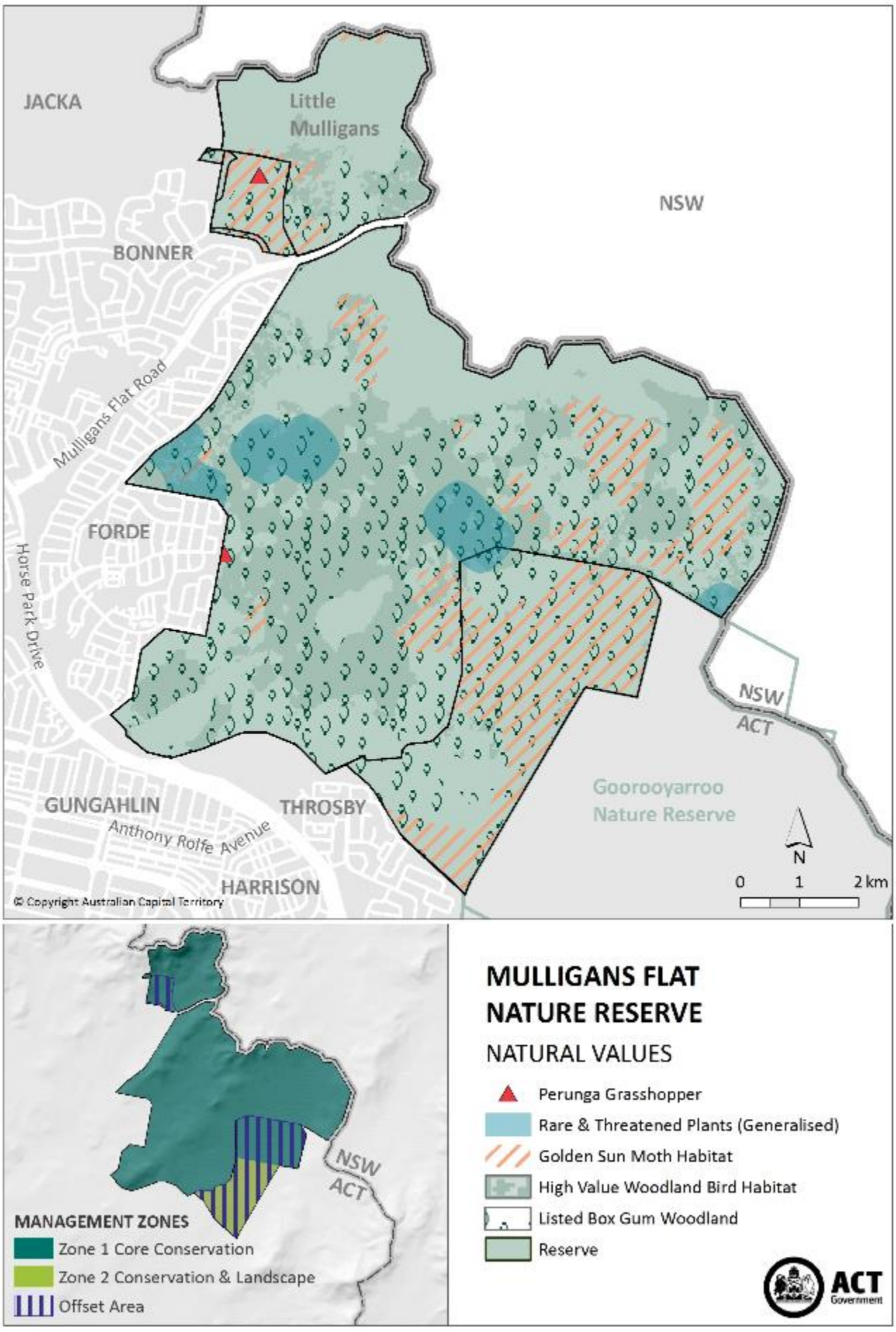
RESEARCH: Together with Goorooyarroo, the reserve is a key part of a woodland research site of international importance. Research is supported by the Woodlands and Wetlands Trust <www.woodlandsandwetlands.org.au/>.

PARKCARE: Friends of Mulligans Flat formed in 2011. The group contributes to weed and pest control and to monitoring activities, and leads interpretive walks. The Canberra Ornithologists Group has monitored birds in the reserve since 1995.

MANAGEMENT: The long-term aim for the reserve is to conserve and rehabilitate the box–gum woodland, Golden Sun Moth habitat and Superb Parrot breeding sites. Support for the Woodlands and Wetlands Trust and the Mulligans Flat-Goorooyarroo Woodland Experiment will continue.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage offset areas in accordance with offset management plans
- continue to support the Mulligans Flat—Goorooyarroo Woodland experiment
- support the development and management of an extended Mulligans Flat Woodland Sanctuary
- facilitate improved recreational management and interpretation
- develop and implement a conservation management plan for the significant cultural sites
- continue to support Friends of Mulligans Flat.



Central Grasslands

Crace, Dunlop, Gungaderra, Jarramlee/West MacGregor and MulanggariGrasslands Nature Reserves.

Description

This group of reserves in Canberra's northern suburbs protects remnants of nationally critically endangered Natural Temperate Grassland and other native grasslands, transitioning to box–gum woodland in some areas.

The reserves provide important habitat for threatened and declining grassland reptile and invertebrate species, and support populations of rare and threatened plants. Woodland areas provide habitat for rare and threatened woodland birds.

The presence of numerous stone artefacts in the reserves provides physical evidence of the long history of Aboriginal occupation of the region. The Aboriginal chert quarry complex in Mulanggari Grasslands Nature Reserve is highly valued by Ngunnawal people and significant for the information it provides on Aboriginal technology, occupation and resource use.

Recreational use of the reserves is relatively low: in many areas only low-level activities such as walking or bird watching are compatible with the maintenance of reserve values. Dogs are not permitted in several of the reserves.

Future directions

Management of the central grasslands will focus on protecting and improving grasslands that provide habitat for threatened and declining species of reptiles, invertebrates and plants.

This will involve developing and implementing improvement programs to sustain ecosystem function, including promoting structural complexity and heterogeneity across grasslands in partnership with scientists, the local Aboriginal community, citizen scientists and the community.

Continuing effective weed control, and management of fire and grazing pressure to maximise conservation outcomes will be important aspects of managing these reserves.

Strengthening links between reserves and beyond to other woodland, grassland and riparian areas will support landscape scale heterogeneity and improve ecosystem function and resilience.

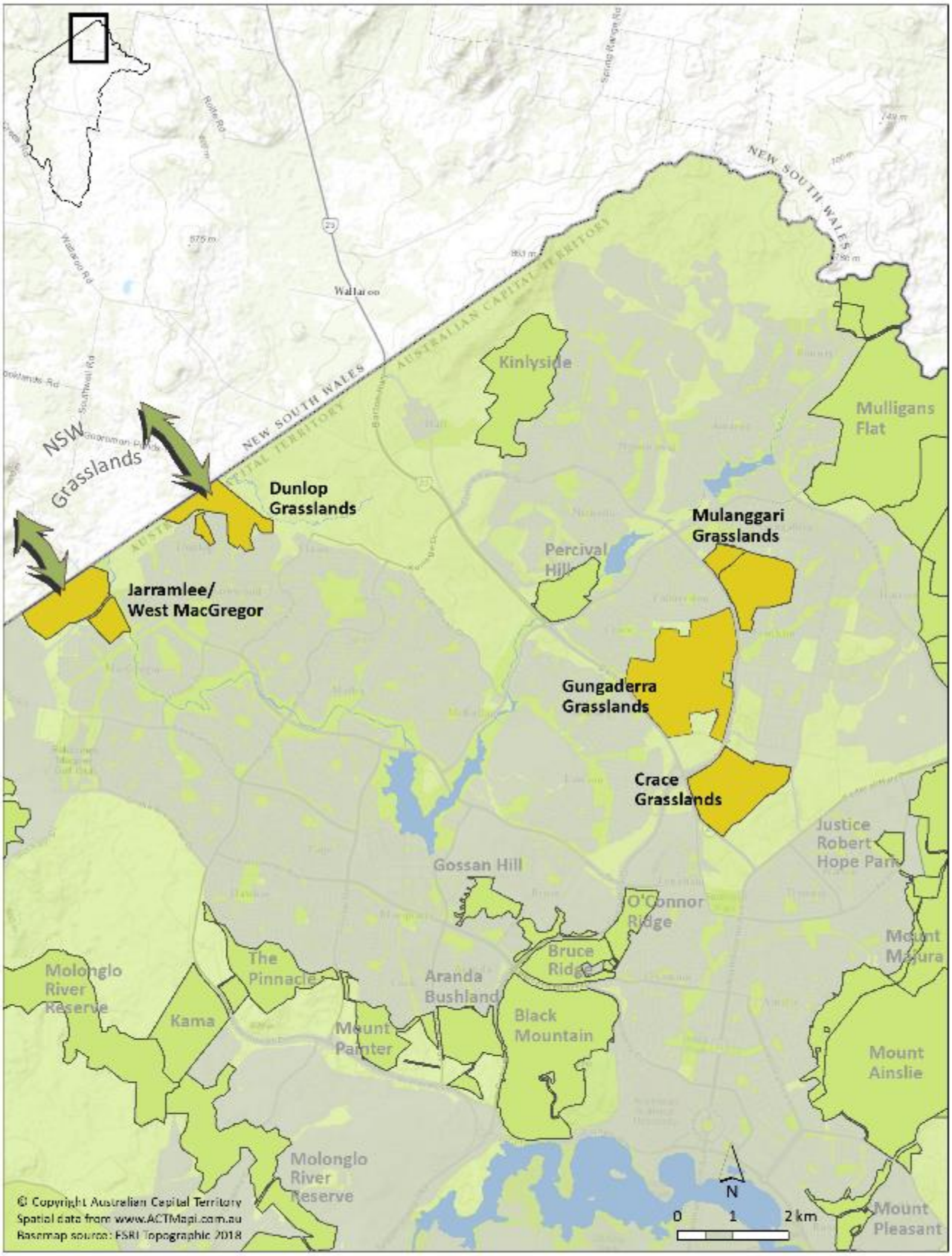
Actions required under offset management plans will be implemented in relevant areas.

Increasing community understanding of grassland values and engagement in their protection, particularly in neighbouring suburbs, will be an important factor in the long-term conservation of these grassland environments.

Cultural heritage sites will be protected and interpreted where appropriate. Support for continuing Aboriginal connection to Country will facilitate the conservation and interpretation of Aboriginal heritage and the contribution of traditional ecological and cultural knowledge to continuously improve land management.

Reserve profiles and zone maps

The following summary profiles for each of the reserves in this complex outline the landscape and local-level actions to guide management. The management plan and relevant strategies will inform land management programs and priorities across Canberra Nature Park. The accompanying zone maps serve to assist the community and Canberra Nature Park stakeholders and partners with expectations and directions for land use activities, consistent with conservation of the natural environment.



CENTRAL GRASSLANDS – LANDSCAPE CONNECTIONS

Central Grasslands Complex
Non-urban Area
Rivers & Lakes
Landscape Connection
Urban Area

ACT Government

CRACE GRASSLANDS NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Crace Grasslands Nature Reserve (159 hectares) was gazetted in 1995. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

NATURAL VALUES: Crace Grasslands protects:

- a large remnant of endangered Natural Temperate Grassland on the Crace Hill slopes (approximately 10% of the reserve)
- large populations of vulnerable Striped Legless Lizard (*Delma impar*), critically endangered Golden Sun Moth (*Synemon plana*) and endangered Button Wrinklewort (*Rutidosis leptorrhynchoides*)
- habitat of several other threatened or regionally uncommon plant species.

CULTURAL VALUES: The ACT Heritage Register lists one Aboriginal heritage site. Places of historic heritage interest include the remnants of James Cooper's house (an early settler), indicated by mature exotic trees.

RECREATION: Only passive, low-impact recreation activities using existing tracks are compatible with this reserve. Dogs are prohibited. Horse riding and cycling are permitted only on the identified equestrian trail.

ACCESS RESTRICTIONS: A rural lease applies to the eastern third of the reserve. Public access to this area is prohibited without the permission of the lessee.

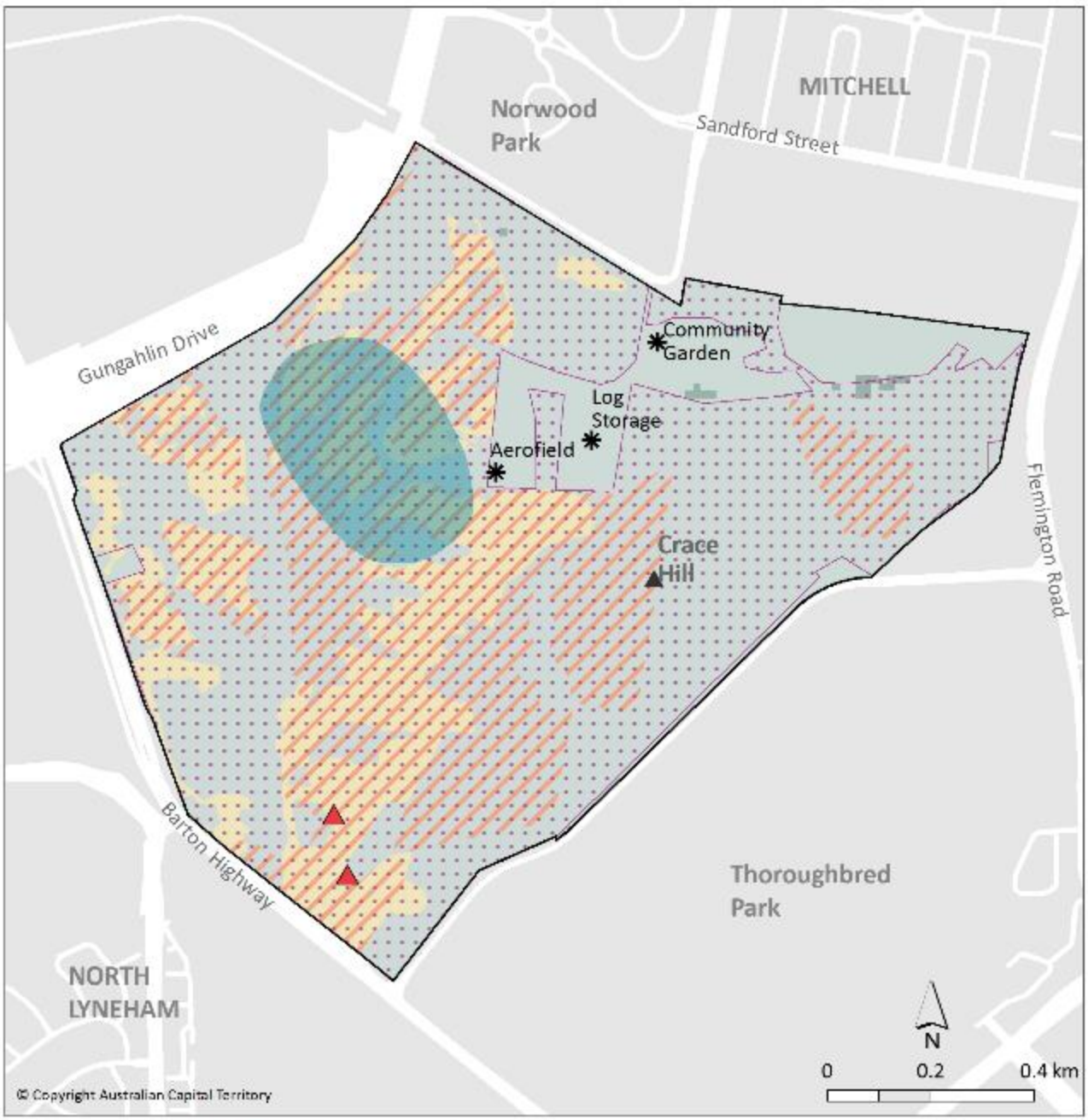
The Belconnen Model Aero Club and Canberra Organic Growers Society community garden currently occupy small areas of the reserve, along with an ACT Government log storage area. Formal management arrangements have yet to be established with these organisations. Recreational users are not permitted in these areas.

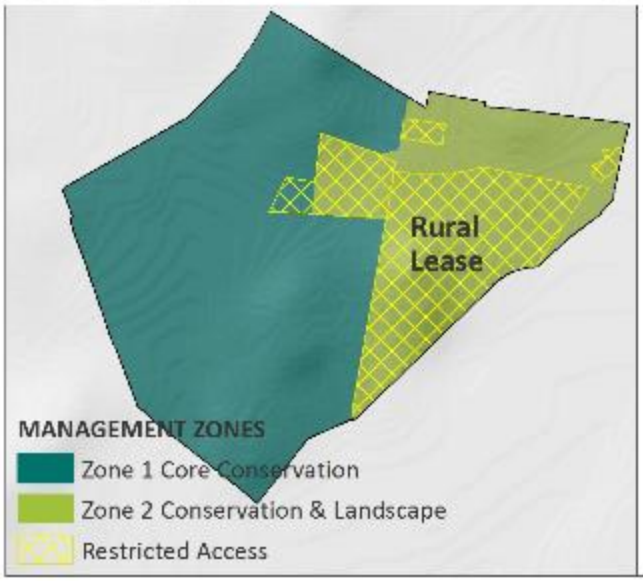
PARKCARE: Friends of Grasslands works to build community support for grassy ecosystem recovery.

MANAGEMENT: The reserve has a long history of grazing by stock. The long-term management aim is to conserve and rehabilitate habitat for rare and threatened plants and animals by increasing the extent and condition of native grasslands.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- implement a site-specific grazing, fire or slashing regime to increase habitat quality for Striped Legless Lizard and Golden Sun Moth
- trial the use of reinstated surface rock as habitat for grassland lizards and invertebrates
- trial restoration techniques in areas dominated by Phalaris grass
- establish formal management arrangements with Belconnen Model Aero Club, the Canberra Organic Growers Society community garden and the ACT Government log storage area.





CRACE GRASSLANDS NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Perunga Grasshopper
- Striped Legless Lizard Habitat
- Golden Sun Moth Habitat
- Natural Temperate Grassland
- High Value Woodland Bird Habitat
- Reserve

ACT Government

DUNLOP GRASSLANDS NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Dunlop Grasslands Nature Reserve (103 hectares) was gazetted in 1997. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: Dunlop Grasslands, neighbouring grasslands in NSW and the nearby Jarramlee/West MacGregor Grasslands Nature Reserve form a large, continuous grassland habitat for species such as the Golden Sun Moth. Connectivity is being improved by restoration activities.

NATURAL VALUES: Dunlop Grasslands protects:

- a relatively large remnant of nationally critically endangered Natural Temperate Grassland
- a medium-sized population of critically endangered Golden Sun Moth (*Synemon plana*) (the combined Dunlop Grasslands, Jarramlee/West MacGregor Grasslands and NSW grasslands form one of the largest Golden Sun Moth habitat areas in the region)
- a small patch (20 hectares) of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- one of a few known habitats of the rare and locally endemic Canberra Raspy Cricket (*Cooraboorama canberrae*)
- a small population of Water Plantain (*Alisma plantago-aquatica*), a regionally rare plant.

CULTURAL VALUES: The ACT Heritage Register lists 11 Aboriginal heritage sites. One site contains glass artefacts, reflecting a period of rapid and dynamic change in the region's history.

RECREATION: Only passive, low-impact recreation activities using existing tracks are compatible with this reserve. Horse riding and cycling are permitted only on the Bicentennial National Trail, which crosses the reserve from east to west and runs along the southern edge. Dogs are prohibited.

ACCESS RESTRICTIONS: Recreational use of the previous landfill site at the eastern end of the reserve is discouraged.

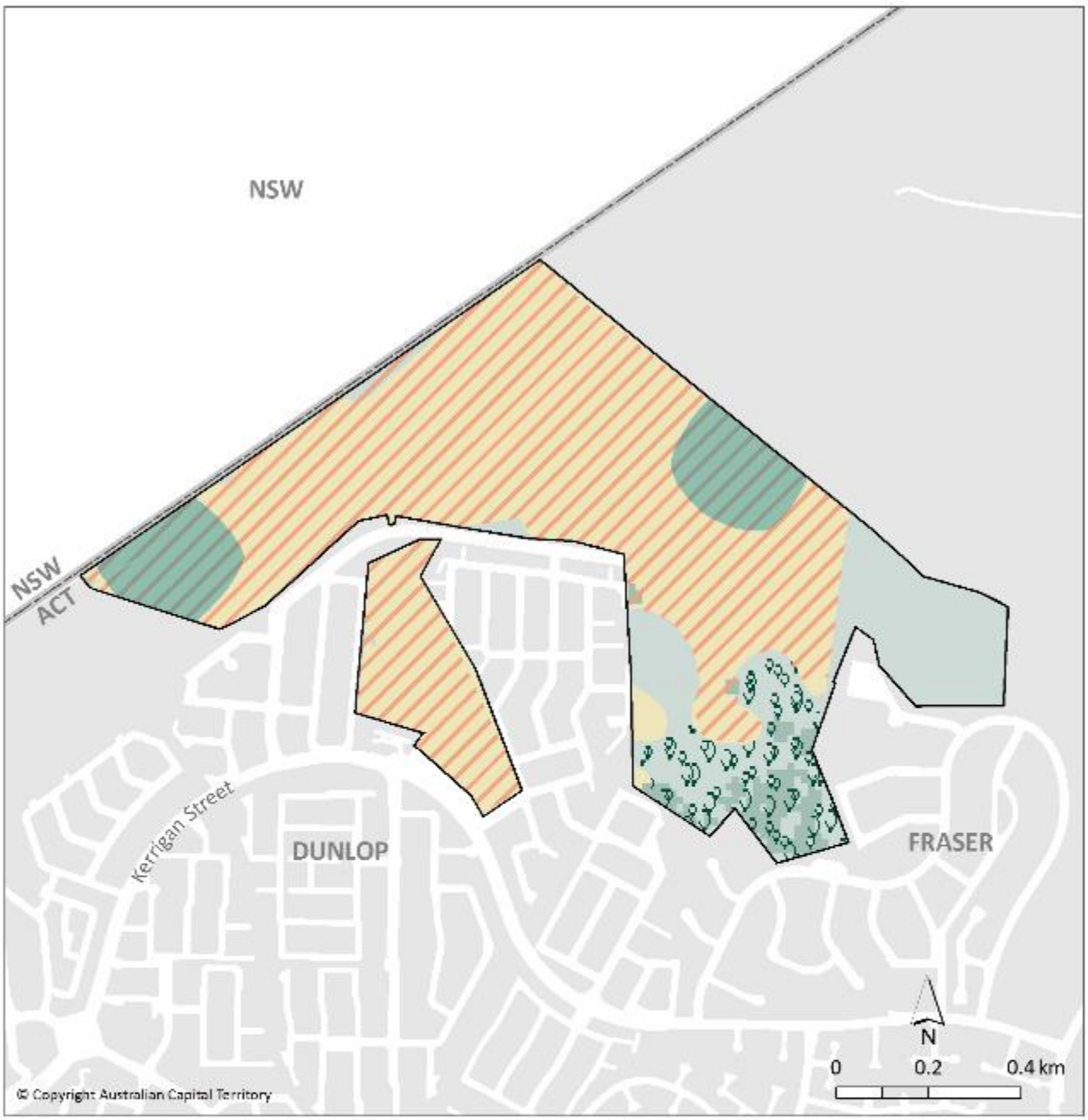
PARKCARE: Friends of Grasslands works to build community support for grassy ecosystem recovery.

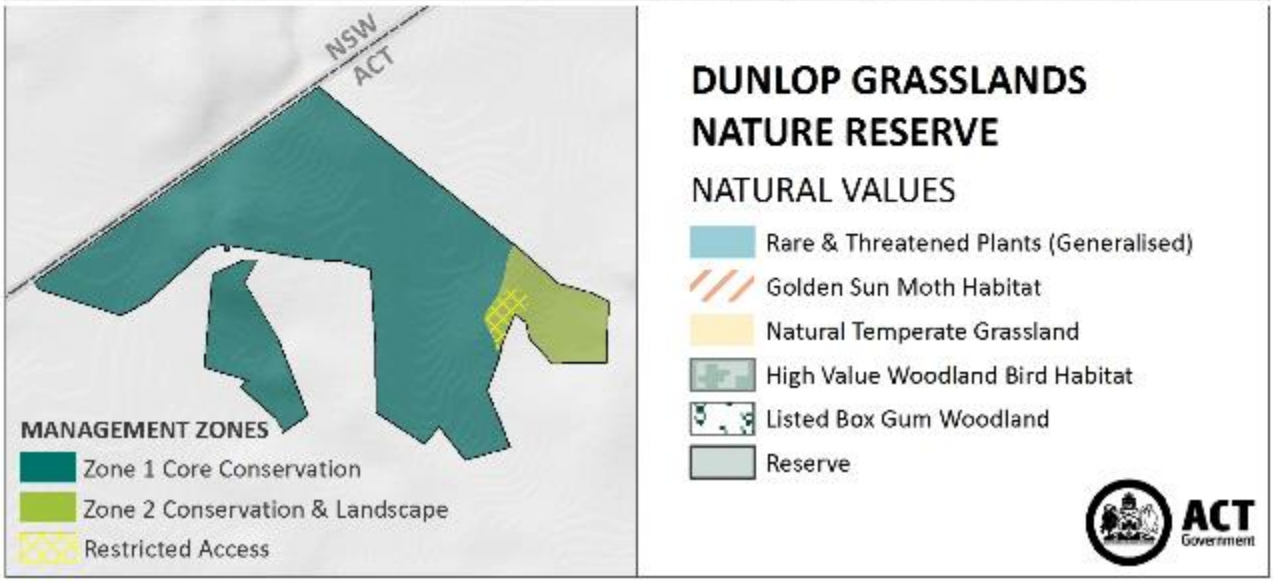
MANAGEMENT: The area has a long history of stock grazing and, as a result, vegetation condition in Dunlop Grasslands is mixed. Approximately ten hectares is dominated by exotic grasses and only a few areas have high native forb diversity.

The long-term aim is to conserve and rehabilitate native vegetation cover across the reserve and extend the area of Natural Temperate Grassland and habitat for Golden Sun Moth and Canberra Raspy Cricket.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- implement a site-specific grazing, fire or slashing regime to increase habitat quality for Golden Sun Moth
- trial the use of reinstated surface rock as habitat for grassland lizards and invertebrates
- trial restoration techniques in areas dominated by Phalaris grass.





GUNGADERRA GRASSLANDS NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Gungaderra Grasslands Nature Reserve (297 hectares) was gazetted in 1995 and extended in 2014 (environmental offset). The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

NATURAL VALUES: Gungaderra Grasslands protects:

- a relatively large remnant of nationally critically endangered Natural Temperate Grassland
- the largest known population of the vulnerable Striped Legless Lizard (*Delma impar*)
- a large population of the rare Key's Matchstick Grasshopper (*Keyacris scurra*)
- one of the few known locations of the vulnerable Perunga Grasshopper (*Perunga ochracea*)
- a small population of the critically endangered Golden Sun Moth (*Synemon plana*)
- several rare plant species
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland (30 hectares) on Gungahlin Hill, providing important habitat for rare and threatened woodland birds.

CULTURAL VALUES: The ACT Heritage Register lists seven Aboriginal heritage sites. One site contains glass artefacts, reflecting a period of rapid and dynamic change in the region's history.

RECREATION: Only passive, low-impact recreation activities using existing tracks are compatible with this reserve. Dogs, horses and bicycles are prohibited.

ACCESS RESTRICTIONS: Recreational access to the National Transmission Station site at the corner of Barton Highway and Bellenden Street is not permitted.

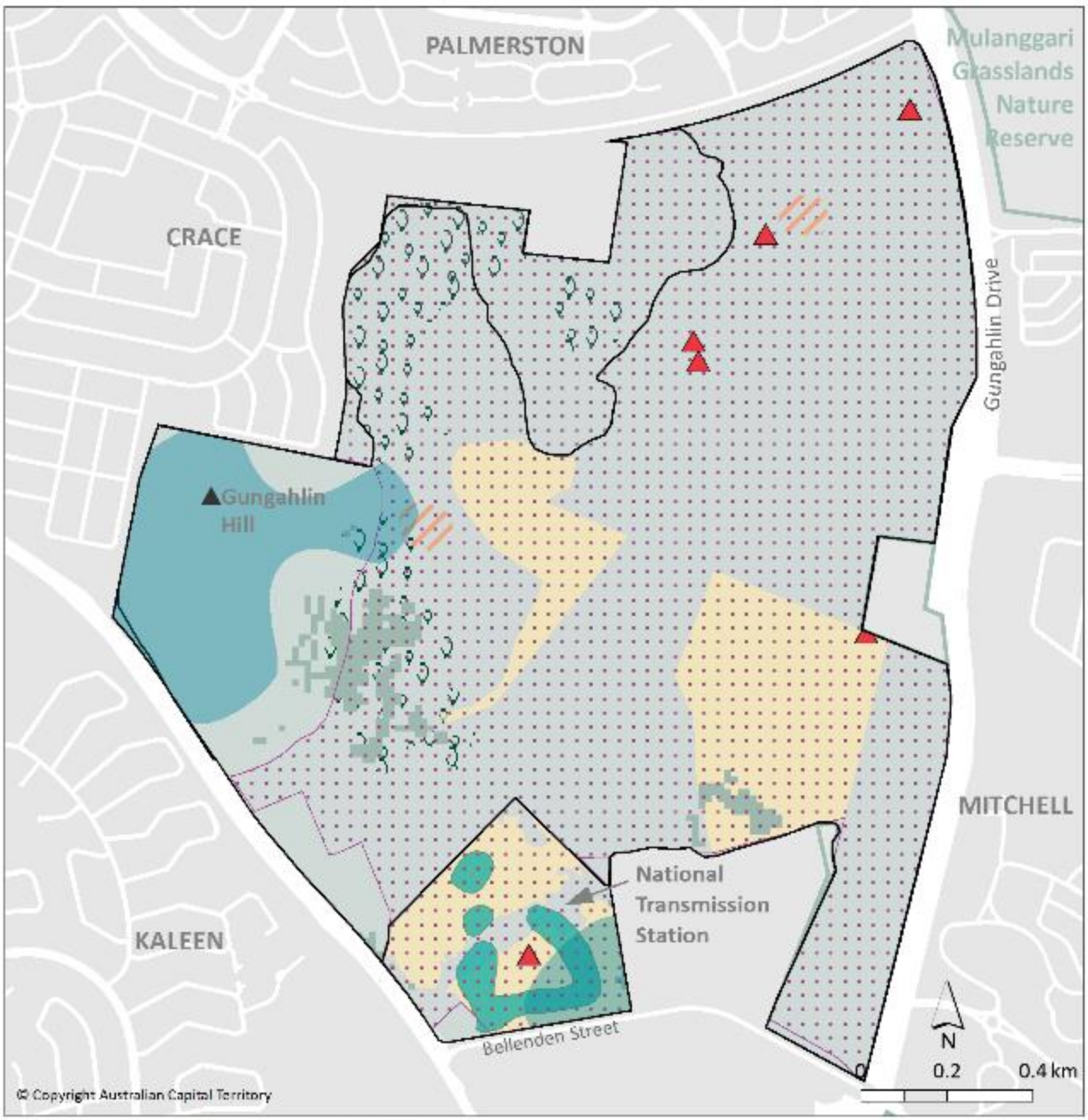
PARKCARE: Friends of Grasslands works to build community support for grassy ecosystem recovery.

MANAGEMENT: Gungaderra Grasslands has a long history of stock grazing. Plant diversity has been reduced but grassland structure and habitat have been maintained. Exotic grasses dominate along the creek line and in the old quarry area. The woodland on Gungahlin Hill is in relatively good condition.

Management aims to increase the ecological condition and connectivity of Striped Legless Lizard, Golden Sun Moth and declining woodland bird habitat.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage offset area in accordance with the offset management plan
- implement a site-specific grazing, fire or slashing regime to increase habitat quality for Striped Legless Lizard and Golden Sun Moth
- trial the use of reinstated surface rock as habitat for grassland lizards and invertebrates
- trial restoration techniques in areas dominated by Phalaris grass
- trial habitat improvement works, including placement of woody debris and improvement plantings that restore the complexity of mid-storey shrub layer for small bird habitat.



JARRAMLEE/WEST MACGREGOR GRASSLANDS NATURE RESERVE (PART CLOSED RESERVE)

Andrew Tatnell

ESTABLISHMENT: Jarramlee/West MacGregor Grasslands Nature Reserve (145 hectares) was established in 2016 as an environmental offset. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: Jarramlee/West MacGregor Grasslands, neighbouring grasslands in NSW and Dunlop Grasslands form a large continuous grassland habitat for species such as the Golden Sun Moth. Connectivity is being improved by restoration activities.

NATURAL VALUES: Jarramlee/West MacGregor Grasslands protects:

- the second largest recorded population of the critically endangered Golden Sun Moth (*Synemon plana*) in the ACT (the combined NSW and Jarramlee/West MacGregor grasslands make the Golden Sun Moth habitat area one of the largest in the region)
- patches of nationally critically endangered Natural Temperate Grassland that form one of a few known habitats of the rare and locally endemic Canberra Raspy Cricket (*Coorabooorama canberrae*)
- a small area of woodland and some pre-existing plantings—utilised by threatened and regionally declining woodland birds.

CULTURAL VALUES: The ACT Heritage Register lists 13 Aboriginal heritage sites. The ploughlands on the river flats are an historic place of interest. The highest point of the reserve, at 590 metres (Stony Knob), was used as a trig point by Percy Sheaffe and his team in February 1911 for the survey line between Mount Coree and One Tree Hill.

RECREATION: Only passive, low-impact recreation activities using existing tracks are compatible with this reserve. Dogs are prohibited. The Bicentennial National Trail crosses the reserve on the north-eastern end. Horse riding is permitted only on identified equestrian trails.

ACCESS RESTRICTIONS: West MacGregor is currently subject to a rural lease, and public access is prohibited without the permission of the lessee.

Subsidence has occurred in a small area in the south-east of Jarramlee (near West MacGregor). This part of the reserve has been declared closed (s. 259 of the Nature Conservation Act) and access is prohibited.

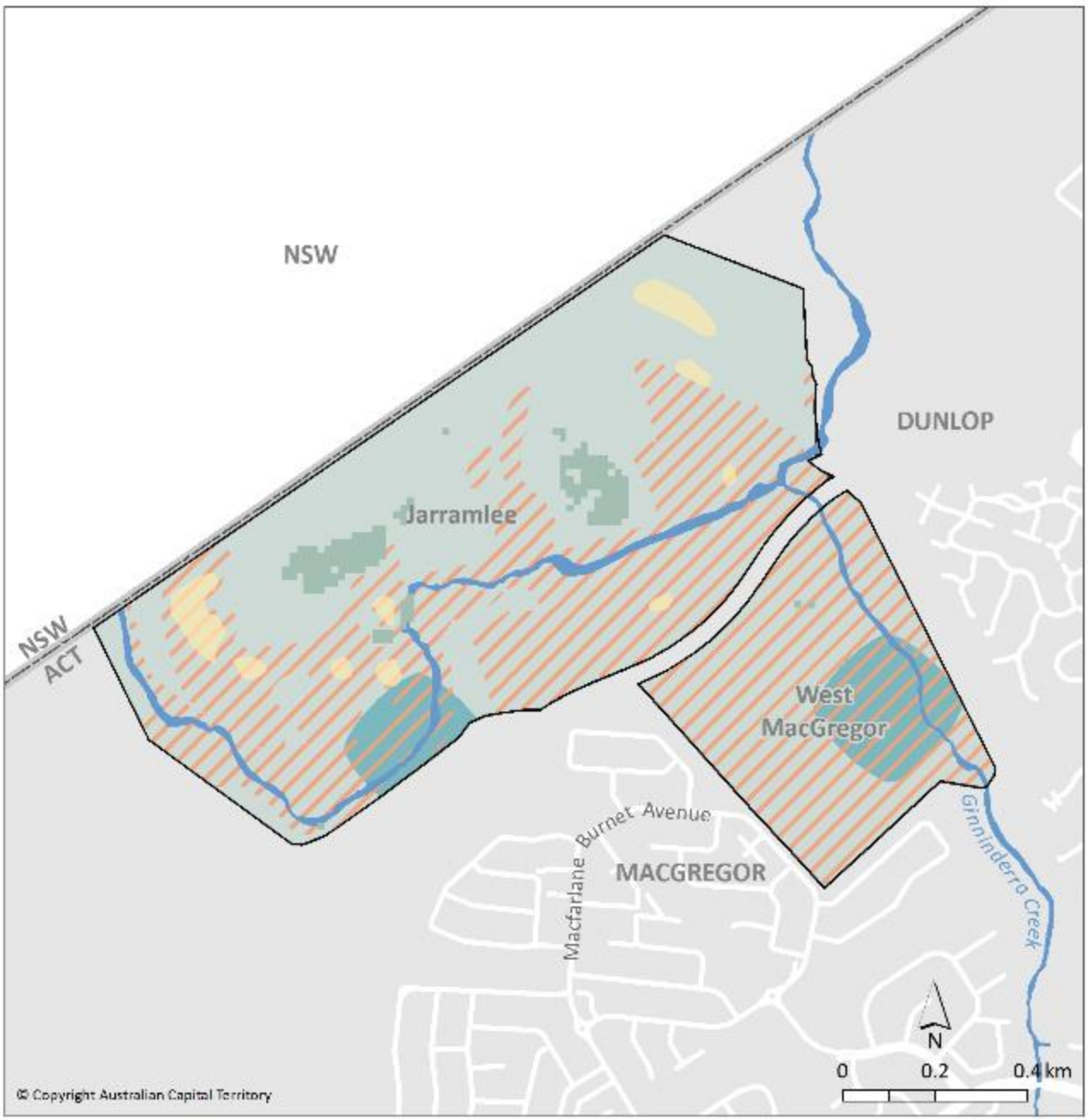
PARKCARE: Friends of Grasslands works to build community support for grassy ecosystem recovery.

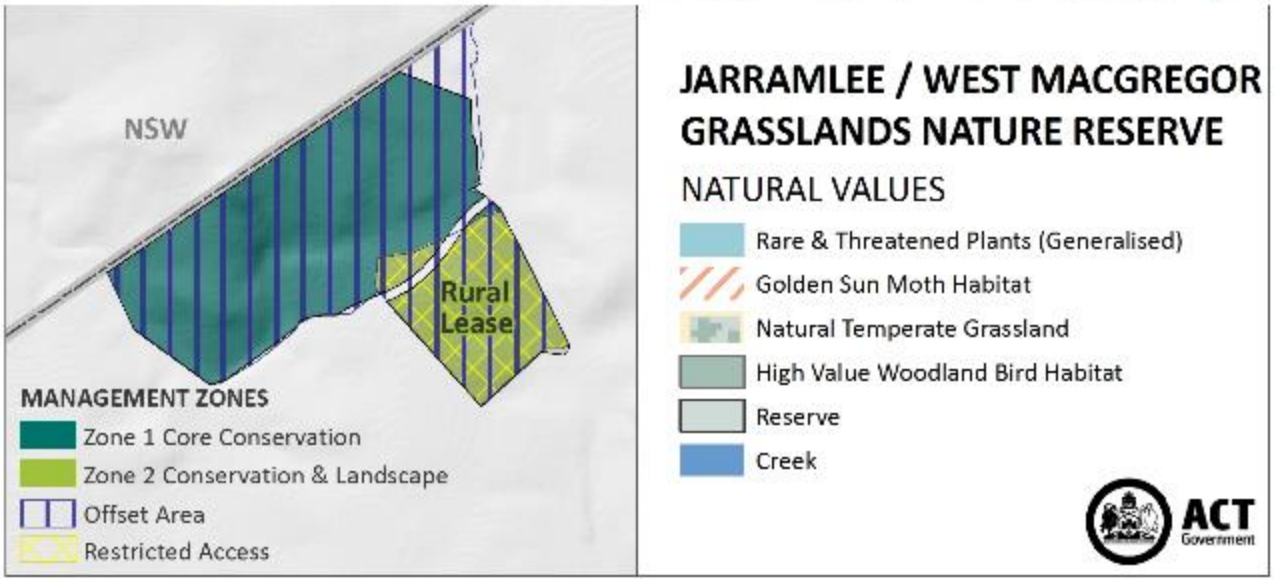
MANAGEMENT: Jarramlee/West MacGregor Grasslands Nature Reserve has a long history of stock grazing. Chilean Needlegrass (*Nassella neesiana*) dominates in some areas along creek lines and the majority of the Golden Sun Moth population occurs in these areas. (Chilean Needlegrass is closely related to the native grasses that the moth feeds on).

Management of the reserve aims to increase the ecological condition and connectivity of habitat for Golden Sun Moth and declining woodland birds.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage the area in accordance with the offset management plan.





MULANGGARI GRASSLANDS NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mulanggari Grasslands Nature Reserve (140 hectares) was established in 1995 and extended in 2014 (environmental offset). The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

NATURAL VALUES: Mulanggari Grasslands protects:

- a relatively large remnant of nationally critically endangered Natural Temperate Grassland, supporting small populations of several nationally and regionally rare or threatened plants
- one of the largest known populations of the vulnerable Striped Legless Lizard (*Delma impar)*
- a medium sized population of the critically endangered Golden Sun Moth (*Synemon plana*), and one of a few known habitats of the vulnerable Perunga Grasshopper (*Perunga ochracea*)
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland on the ridge tops in the west and north of the reserve
- trees that have been a roosting site of the vulnerable Superb Parrot (*Polytelis swainsonii)*.

CULTURAL VALUES: The ACT Heritage Register lists an Aboriginal chert quarry complex, valued by the Ngunnawal people and significant for the information it provides about Aboriginal technology, occupation and resource use. Evidence of 19th century pastoral use includes a small extractive pit and remnants of an old fence.

RECREATION: Only passive, low-impact recreation activities using existing access tracks are compatible with this reserve. Dogs, horses and bicycles are prohibited.

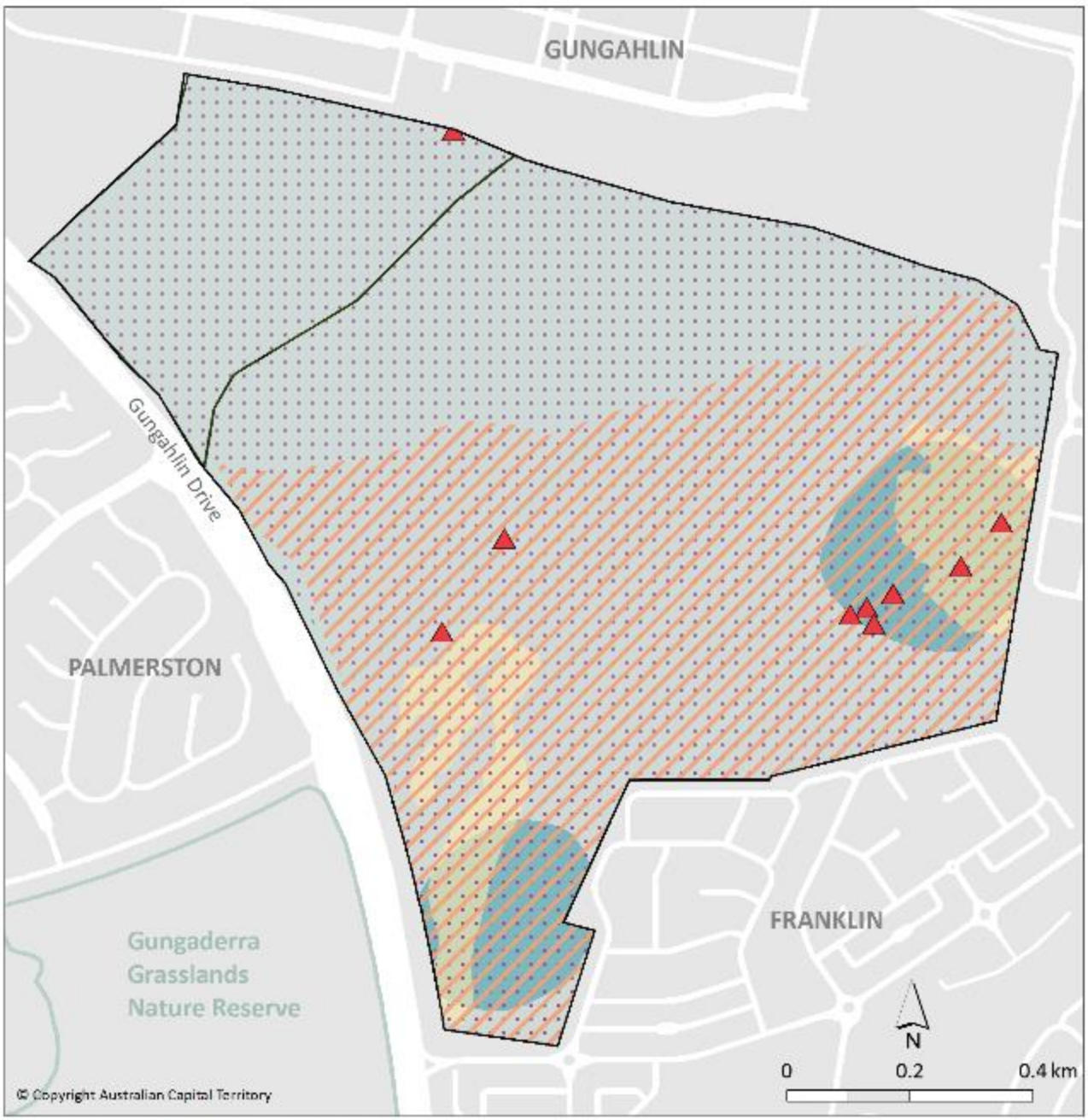
PARKCARE: Friends of Grassland works to build community support for grassy ecosystem recovery.

MANAGEMENT: Mulanggari Grasslands has a long history of stock grazing; approximately one third of the reserve is exotic pasture, one third is native pasture lacking in forb diversity, and one third is Natural Temperate Grassland. On ridge tops in the west and north the grasslands grade into partially cleared Yellow Box–Blakely's Red Gum Grassy Woodland.

Management of Mulanggari Grasslands aims to increase the ecological condition and connectivity of the Natural Temperate Grassland and the habitat quality for Striped Legless Lizard, Golden Sun Moth and declining woodland birds.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage the offset area in accordance with the offset management plan
- protect the Aboriginal chert quarry complex from disturbance, support research and interpret (where appropriate)
- implement a site-specific grazing, fire or slashing regime to increase habitat quality for Striped Legless Lizard and Golden Sun Moth
- trial the use of reinstated surface rock as habitat for grassland lizards and invertebrates
- trial restoration techniques in areas dominated by Phalaris grass.



Sandstone Reserves

Aranda Bushland, Black Mountain, Bruce Ridge, Gossan Hill, O'Connor Ridge and Percival Hill Nature Reserves

Description

This group of reserves west of Canberra's CBD is underlain by Silurian Black Mountain Sandstone and related metasediments, resulting in a higher diversity of plant species than other areas of Canberra Nature Park. The reserves are generally well connected to one another and link with other areas of woodland and forest to provide a wildlife movement corridor through to the Molonglo and Murrumbidgee rivers.

The sandstone reserves contain high conservation value woodland and forest communities, including box—gum and remnant Snow Gum Grassy Woodlands, transitioning to grassland. Areas of old-growth dry forest occur on Black Mountain.

The woodlands and forests have high faunal diversity, support a high number of rare and threatened plant species, provide core habitat for rare and threatened woodland birds, and are a key component of the north–south migration route for honeyeaters. Black Mountain in particular is known for its richness and diversity of rare plants, including many species of orchid.

The presence of numerous stone artefacts in the reserves provides physical evidence of the long history of Aboriginal occupation of the region. The Aboriginal ochre quarry on Gossan Hill was an important resource for Aboriginal people, who used the ochre for art and ceremony. Black Mountain is significant as a site used for corroborees and other gatherings.

Recreational use of the reserves is high, particularly walking on Black Mountain and mountain biking on Bruce Ridge, where a number of multi-use tracks have been established. Lookouts on Black Mountain, including Telstra Tower, provide extensive scenic views over the city and to the mountains. The geological features of Gossan Hill attract visits from schools and other educational institutions. Dogs on leash are permitted in the majority of reserves but not on Black Mountain or in the Aranda Snow Gums area.

Most of these reserves are surrounded by urban development, which must be protected from the risk of fire. Fire fuel reduction in Inner or Outer Asset Protection Zones adjacent to residential areas (which can be up to several hundred metres wide), reduces both the structure and diversity of vegetation.

Future directions

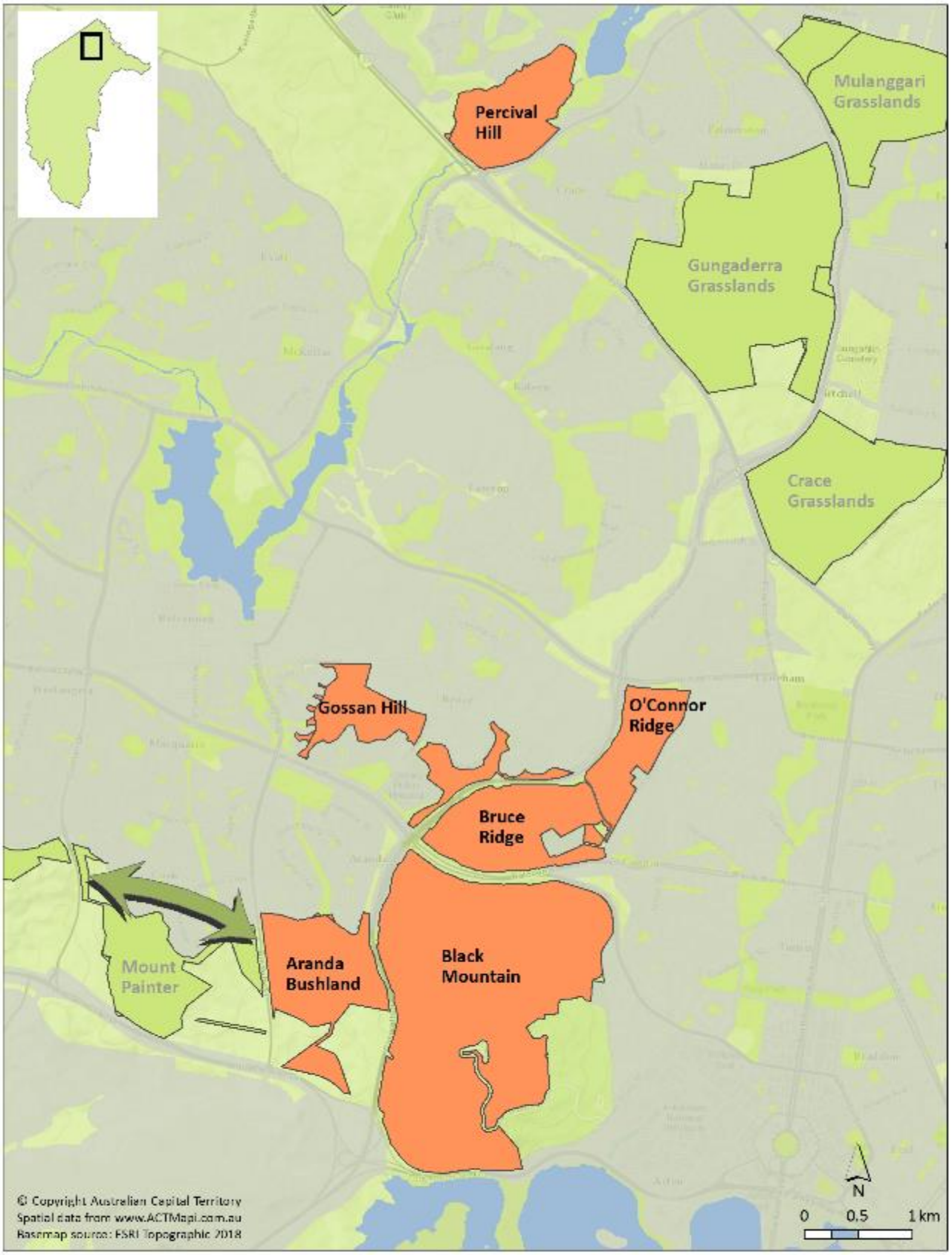
Management of these reserves will focus on protecting and conserving high conservation forest and woodlands and component rare plant species, some of which are endemic to this area. There is a need to improve understanding of the impact of fire on sandstone vegetation types, orchids and other rare species, to help manage ecological values and fire abatement zones. Monitoring and limiting the spread of *Phytophthora* is a priority in some areas.

Strengthening linkages within and between component reserves in the sandstone complex and beyond to the Molonglo and Murrumbidgee river corridors will support ecosystem function and resilience. The reserves will continue to accommodate a range of recreational facilities to provide opportunities and access for reserve users compatible with the conservation of natural and cultural values. Monitoring mountain biking and reviewing tracks will be important elements of managing recreational use of the reserves.

Significant Aboriginal and historic cultural sites across this landscape indicate the historical layering of ancient culture and Canberra's origins. Support for continuing Indigenous connection to Country will facilitate the conservation and interpretation of Aboriginal heritage and the contribution of traditional ecological and cultural knowledge to continuously improve land management.

Reserve profiles and zone maps

The following summary profiles for each of the reserves in this complex outline the landscape and local-level actions to guide management. The management plan and relevant strategies will inform land management programs and priorities across Canberra Nature Park. The accompanying zone maps serve to assist the community and Canberra Nature Park stakeholders and partners with expectations and directions for land use activities, consistent with conservation of the natural environment.



ARANDA BUSHLAND NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Aranda Bushland Nature Reserve (104 hectares) was established in 1993, and the Snow Gums area was protected as nature reserve in 2006 and managed as part of Aranda Bushland. The area is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive area of wooded vegetation that includes Black Mountain, O'Connor Ridge, Bruce Ridge, Mount Painter, and The Pinnacle nature reserves and provides a wildlife movement corridor through to the Molonglo and Murrumbidgee rivers.

NATURAL VALUES: Aranda Bushland protects:

- important woodland bird habitat, including for threatened Speckled Warbler (*Chthonicola sagittata*), Varied Sittella (*Daphoenositta chrysoptera*) and White Winged Triller (*Lalage sueurii*)
- a high diversity of plants considered rare in the ACT, with significant populations of several species, including the Small Purple Pea (*Swainsona recta*) (on the ACT Heritage Register)
- small areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland and Natural Temperate Grassland in the southern end of the reserve
- the Snow Gum Grassy Woodland in the southern end of the reserve. This area, known as the Aranda Snow Gums area, is on the ACT Heritage Register as the best preserved example of its type in and around the Canberra suburbs.

CULTURAL VALUES: The ACT Heritage Register lists seven Aboriginal heritage sites within the reserve.

RECREATION: Aranda is heavily used by walkers, runners, and cyclists. Dogs are permitted on leash in the main part of the reserve, but not in the Snow Gums area.

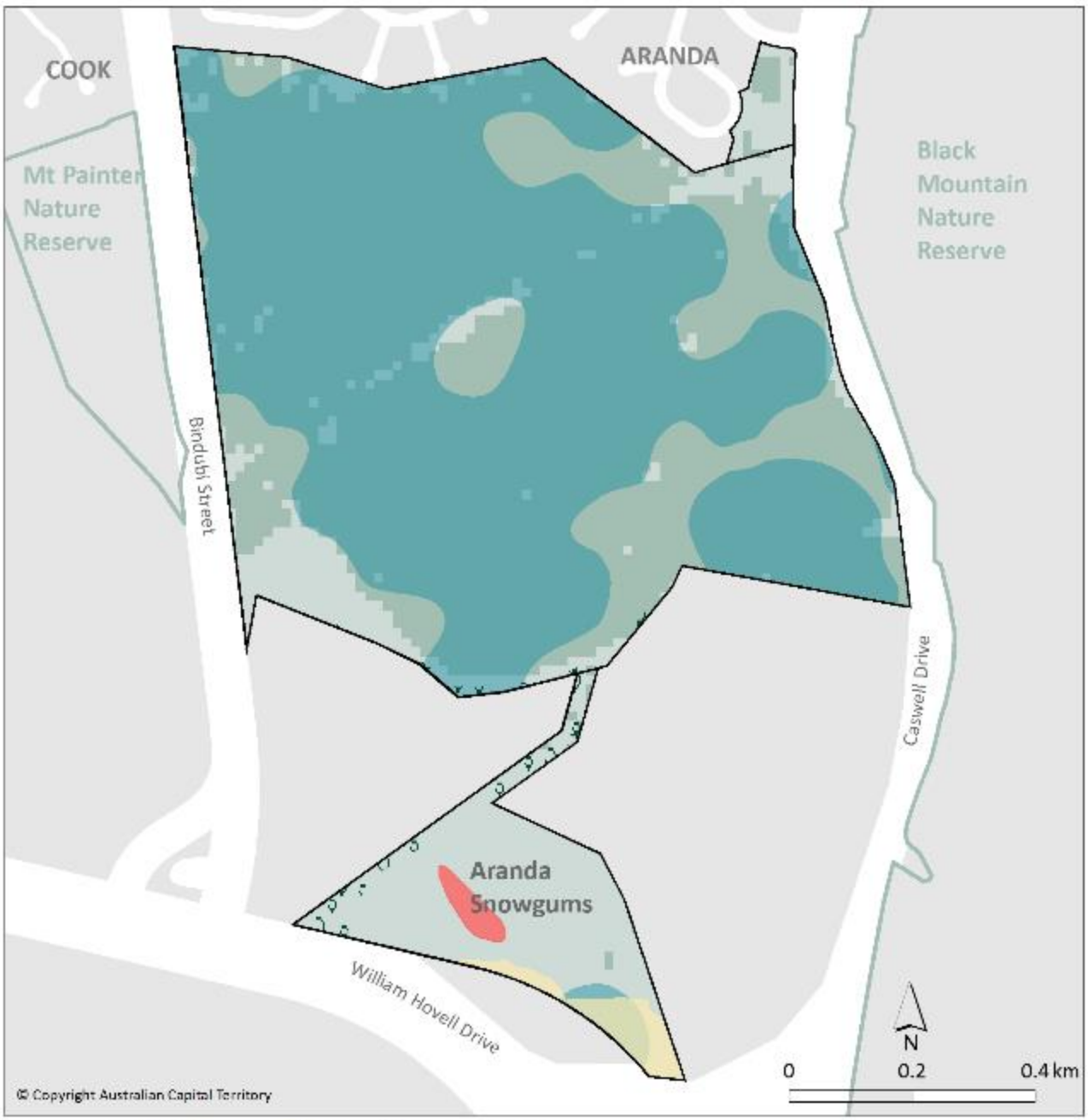
PARKCARE: Friends of Aranda Bushland, established in 1990, is active in removing weeds, undertaking revegetation and monitoring and maintaining tracks in the reserve. The group's Frost Hollow to Forest Walk and field guide *Our Patch* provide information on the ecological communities in the reserve.

MANAGEMENT: The reserve has a relatively low weed cover following significant effort over many years by ParkCare and the Parks and Conservation Service.

The long-term aim for the reserve is to conserve the forest–woodland–grassland complex and vegetation diversity.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain plant diversity and improve woodland condition and connectivity
- support Friends of Aranda Bushland's restoration efforts in the Snow Gum Grassy Woodland.



ARANDA BUSHLAND NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Natural Temperate Grassland
- High Value Woodland Bird Habitat
- Listed Box Gum Woodland
- Snow Gum Woodland
- Reserve

ACT Government

BLACK MOUNTAIN NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Black Mountain Nature Reserve (434 hectares) was established in 1970 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive area of wooded vegetation that includes Aranda Bushland, O'Connor Ridge, Bruce Ridge, Mount Painter and The Pinnacle nature reserves and provides a wildlife movement corridor through to the Molonglo and Murrumbidgee rivers.

NATURAL VALUES: Black Mountain protects:

- sandstone geology that supports a rich shrub and herb diversity, providing habitat for more than 60 orchid species; approximately 40 nationally and regionally rare plant species are located here
- a significant research and teaching site, and the location of important ecological studies into soil, fire, plant and animal ecology. Black Mountain is the type locality of many invertebrate species and some plants and geological formations
- regularly visited by several threatened and declining nomadic or migratory birds, including the Scarlet Robin (*Petroica multicolor*) and Gang-Gang Cockatoo (*Callocephalon fimbriatum*)
- significant areas of old-growth dry forest.

CULTURAL VALUES: Black Mountain is significant place for Aboriginal people. It was the site of continued corroborees in historical times, and an important gathering place for Aboriginal groups travelling south into the mountains. It is a landmark in the ACT and a key feature in the design geometry of the National Capital. Historic heritage sites in the reserve include a small quarry used to provide stone for local buildings such as St John's Anglican Church in Reid. The ACT Heritage Register lists 31 Aboriginal heritage sites within the reserve.

RECREATION: The reserve is heavily used by walkers, runners and cyclists and for organised events. Several scenic lookouts, including Telstra Tower, provide views over Canberra. The Centenary Trail passes through the reserve. Dogs are prohibited.

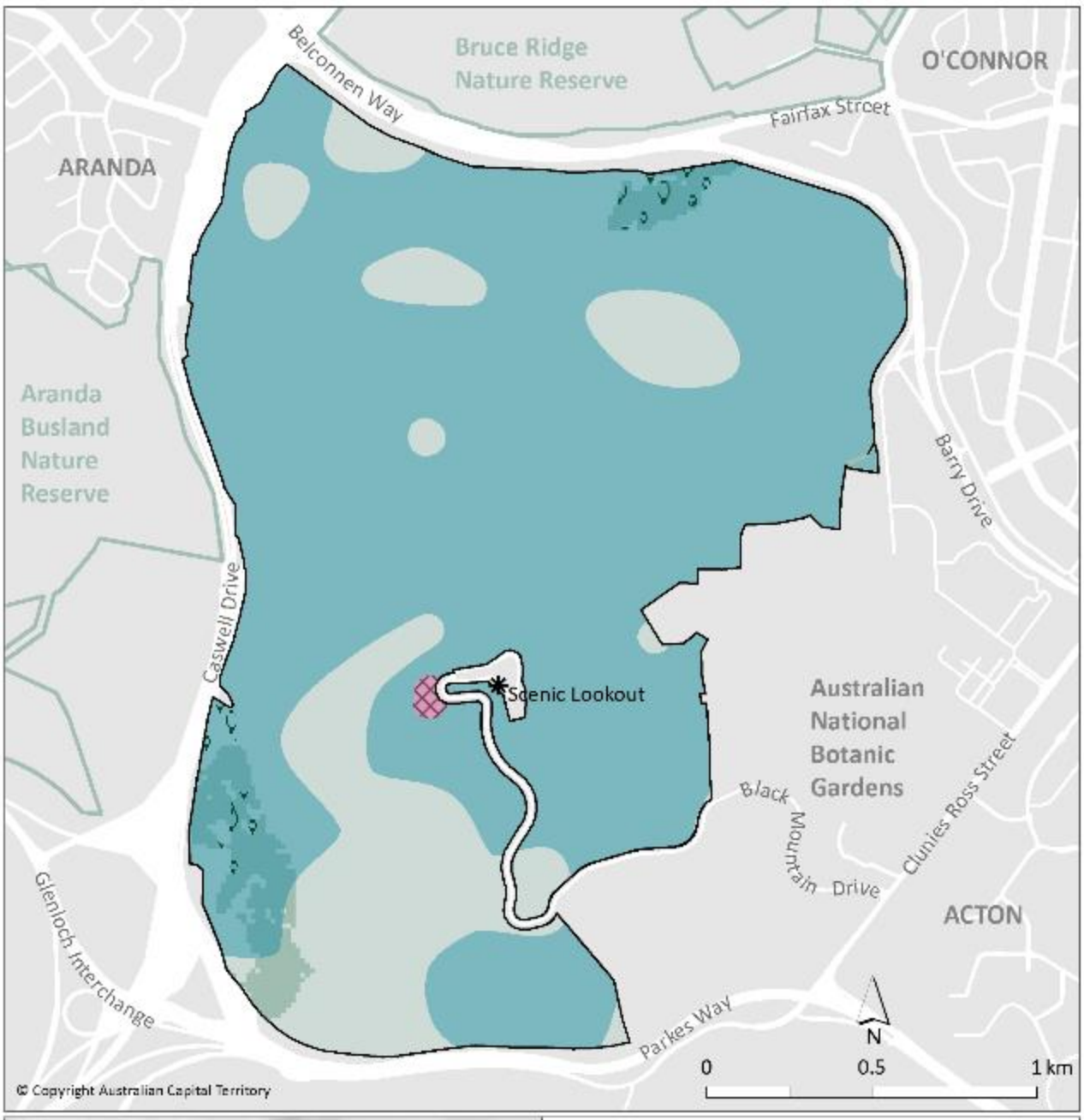
PARKCARE: Friends of Black Mountain, established in 2001, works to support reserve management.

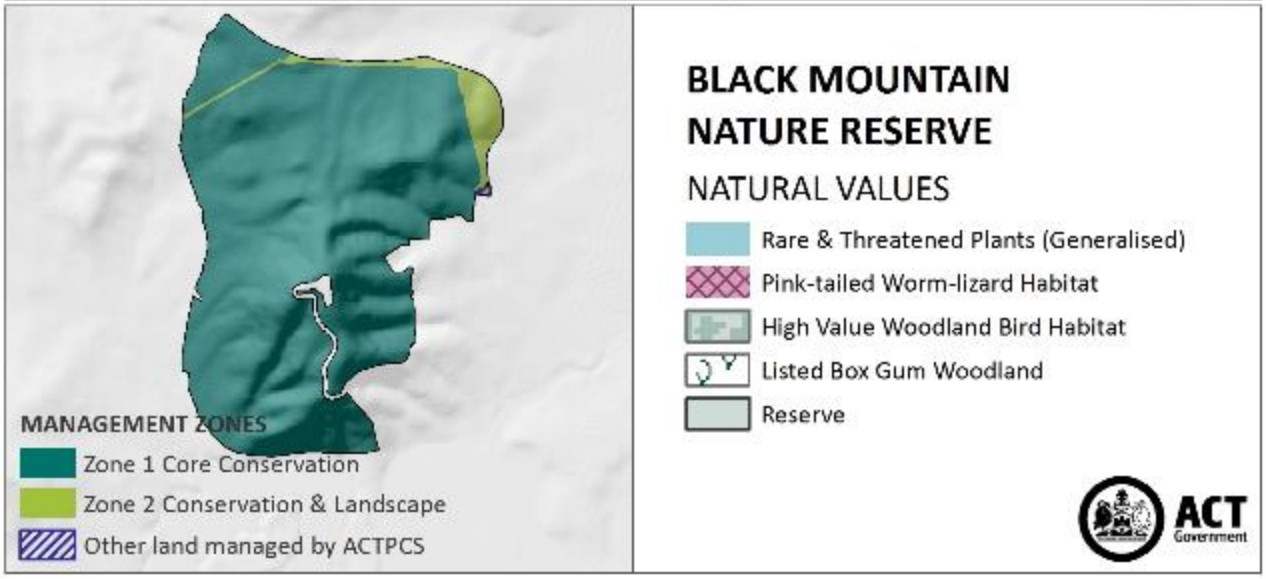
MANAGEMENT: Parts of Black Mountain have been impacted by utility infrastructure and maintenance, including an old tip site. The root-rot pathogen *Phytophthora cinnamomi* was identified in the reserve and in the neighbouring Australian National Botanic Gardens in the 1970s (Pratt 1973).

The long-term management aim is to conserve the forest-woodland complex and its biodiversity.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain the reserve's rich biodiversity, with a focus on orchid populations, old-growth forest and structural habitat for a range of species
- review and improve signage, rationalise tracks and monitor increased recreation across the reserve
- undertake action to avoid further spread of *Phytophthora cinnamomi*
- continue to support the Friends of Black Mountain.





Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

BRUCE RIDGE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Bruce Ridge Nature Reserve (98 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive area of wooded vegetation that includes Aranda Bushland, Black Mountain, O'Connor Ridge, Mount Painter and The Pinnacle nature reserves and provides a wildlife movement corridor through to the Molonglo and Murrumbidgee rivers.

NATURAL VALUES: Bruce Ridge protects:

- part of the dry forest vegetation complex found on metasediments in the Black Mountain area that has high plant diversity and notable orchid species
- open forest—woodland that is part of a wider landscape used by woodland species, including a few threatened or regionally declining bird species
- a small area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland on lower slopes.

CULTURAL VALUES: The ACT Heritage Register lists eight Aboriginal heritage sites within the reserve.

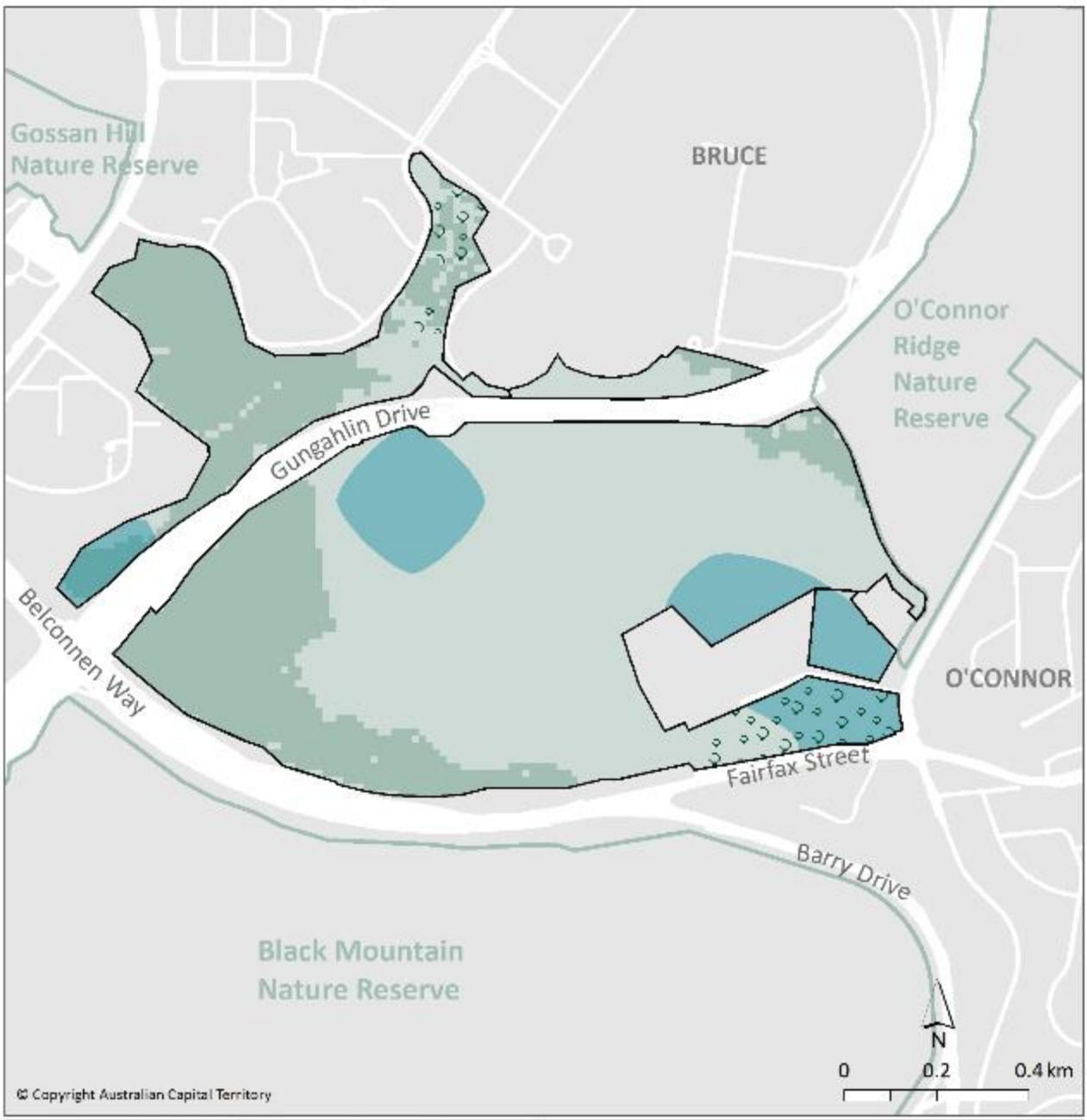
RECREATION: Bruce Ridge is heavily used by walkers, runners and cyclists and for organised events. In the west of the reserve, a network of multi-use tracks has been established by the Parks and Conservation Service, working with Friends of Bruce Ridge. In developing the track network, a number of informal tracks were closed, parts of some tracks were re-routed, and stabilisation work was undertaken in order to avoid significant adverse impact on the reserve values. Dogs are permitted on leash.

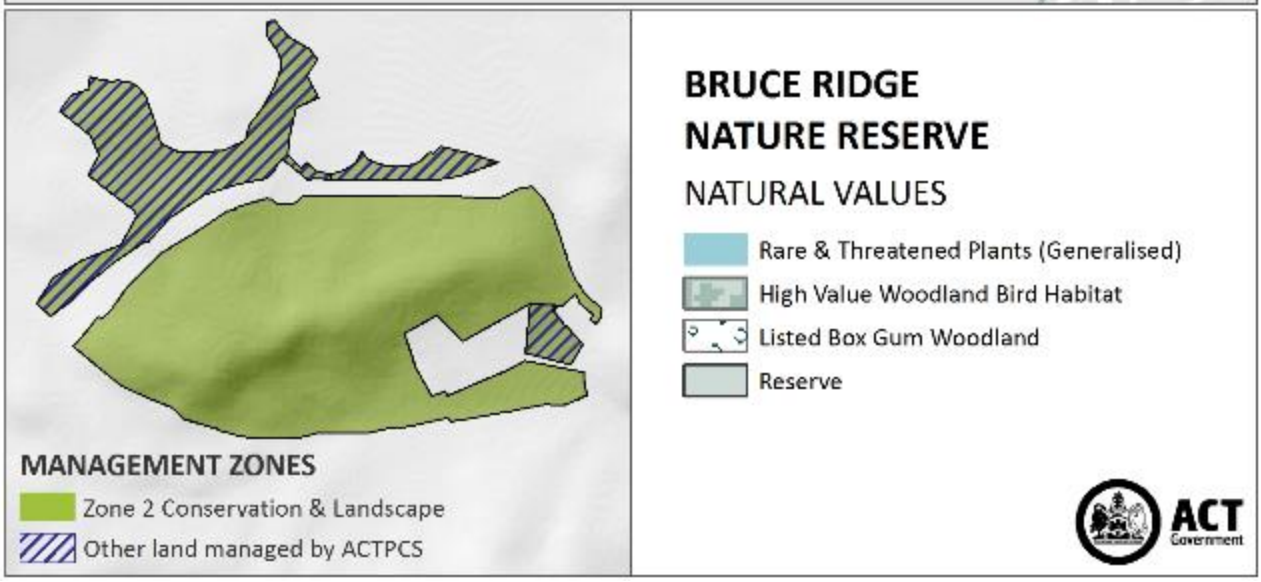
PARKCARE: Friends of Bruce Ridge has been active since 2010 and works to support reserve management.

MANAGEMENT: Bruce Ridge is a small reserve. It has a shrubby understorey, coarse woody litter and scattered small plants in the ground layer. Many of the orchid populations are relatively small. The area north-west of Gungahlin Drive is managed by the Parks and Conservation Service to complement the nature reserve values. The long-term aim for the reserve is to conserve the forest—woodland complex and rare species.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain forest and woodland condition and connectivity to other habitat patches
- continue to support Friends of Bruce Ridge to maintain the track network within the reserve.





Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

GOSSAN HILL NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Gossan Hill Nature Reserve (47 hectares) was established in 1993. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is connected to Bruce Ridge Nature Reserve (separated by Haydon Drive) and then on to Black Mountain Nature Reserve (separated by Belconnen Way).

NATURAL VALUES: Gossan Hill protects:

- a complex well-exposed geology that includes unusual geological features and exposures of educational value. Notable features include outcrops of gossan, a road cut on College Street, and exposures of very old Tertiary soil profiles
- part of the dry forest vegetation complex found on metasediments in the Black Mountain area with high plant diversity and notable orchid species
- open forest—woodland that is an important part of a wider landscape used by woodland species, including a few threatened or regionally declining bird species
- a small area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland on the lower part of the reserve (based on volcanic geology).

CULTURAL VALUES: The ACT Heritage Register lists an Aboriginal ochre quarry, which is one of few known sites in the ACT and is highly valued by Aboriginal people. Historically, large gatherings were held here, with the ochre used for art and ceremony. It is reported that an Aboriginal pathway once connected Gossan Hill to another known ochre quarry in the suburb of Franklin. Several stone artefact scatters have been recorded in the reserve.

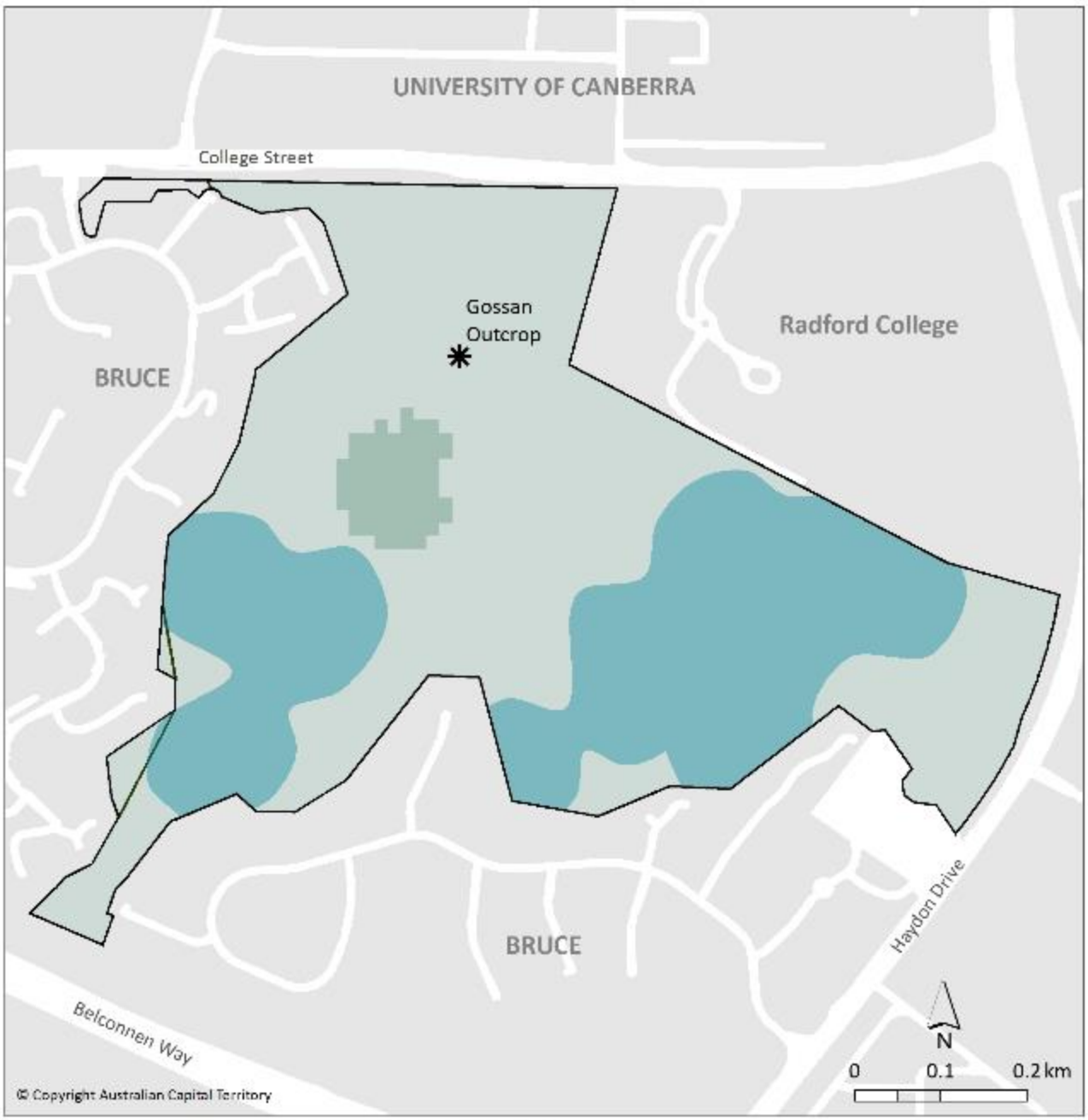
RECREATION: The reserve is heavily used by walkers, runners and cyclists. It is used as a geology teaching resource by several local educational institutions. Dogs are permitted on leash.

MANAGEMENT: Gossan Hill is a small reserve with a large urban interface, and subject to intensive fire fuel management. Treasure Flower Daisy (*Gazania linearis*), an invasive weed species, has been found in the reserve.

The long-term management aim is to conserve the forest—woodland complex and rare species.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain forest and woodland condition and connectivity to other habitat patches
- manage the Aboriginal ochre quarry in consultation with Traditional Custodians
- protect geological sites from disturbance
- eradicate Treasure Flower Daisy from the reserve.



GOSSAN HILL NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- High Value Woodland Bird Habitat
- Reserve

ACT Government

Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

O'CONNOR RIDGE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: O'Connor Ridge Nature Reserve (57 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: O'Connor Ridge is part of an extensive area of wooded vegetation that includes Aranda Bushland, Black Mountain, Bruce Ridge, Mount Painter and The Pinnacle nature reserves and provides a wildlife movement corridor through to the Molonglo and Murrumbidgee rivers.

NATURAL VALUES: O'Connor Ridge protects:

- a dry forest vegetation complex found on metasediments in the Black Mountain area that has a high plant diversity and many orchid species
- open forest and woodland that is an important part of a wider landscape used by woodland species, including a few threatened or regionally declining bird species
- a small area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland.

CULTURAL VALUES: The ACT Heritage Register lists four Aboriginal heritage sites within the reserve.

RECREATION: O'Connor Ridge is heavily used by walkers, runners and cyclists. Dogs are permitted on leash.

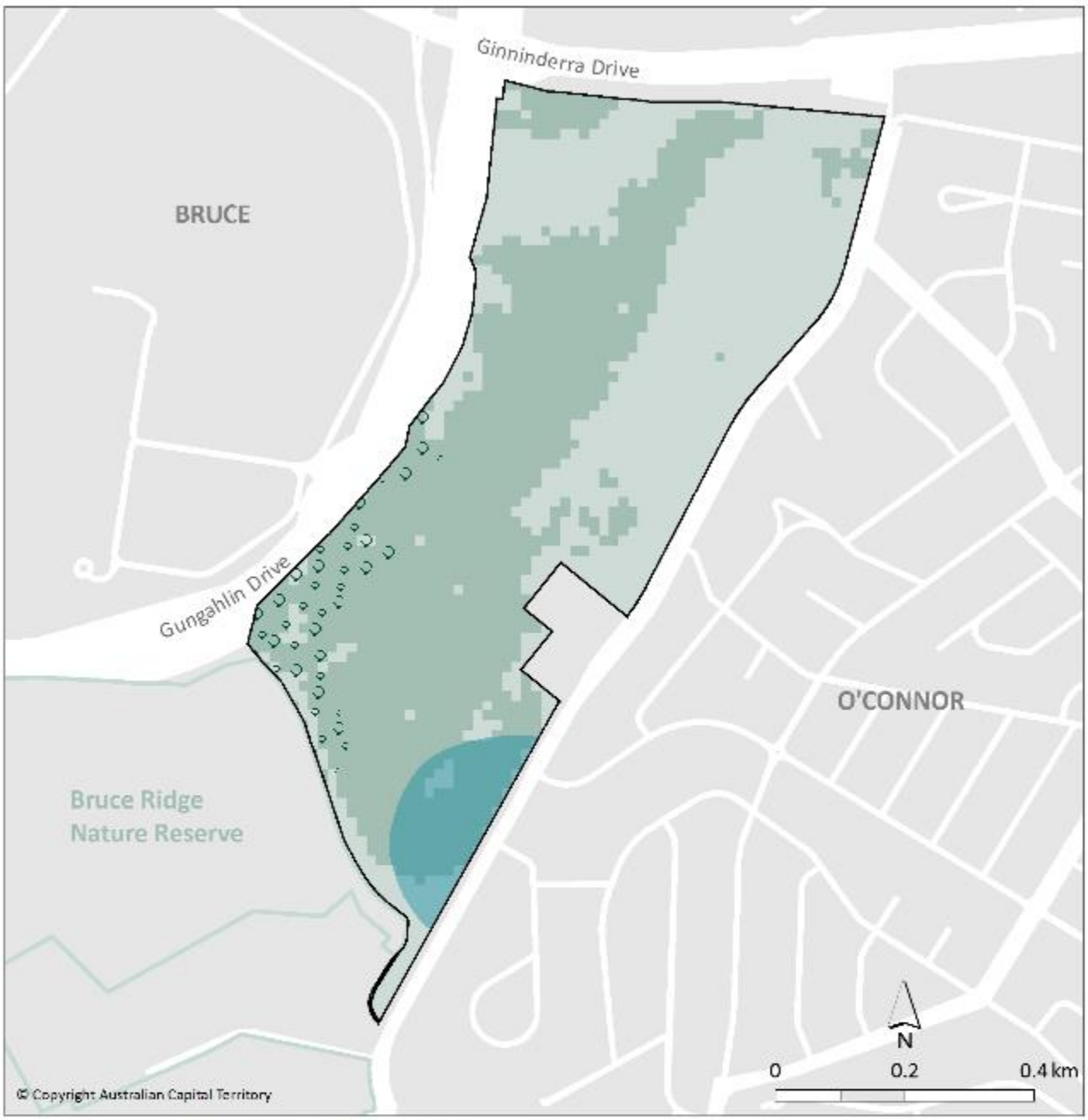
ACCESS RESTRICTIONS: Access to the old tip site in the northern part of the reserve is discouraged.

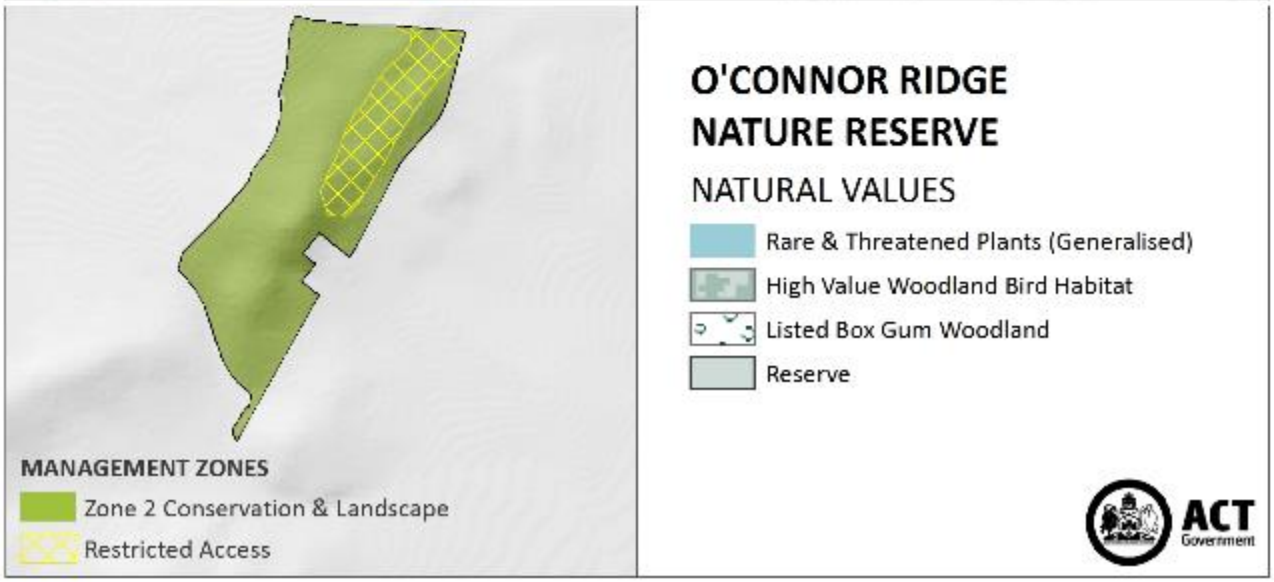
MANAGEMENT: O'Connor Ridge is a small reserve close to suburban development. The northern part is highly disturbed and includes an old tip site, a pine windbreak, and native tree and wattle plantings. Weeds are widespread in these disturbed areas but are reasonably sparse within the dry open forest across the rest of the reserve. O'Connor Ridge has been impacted by a very high level of utility infrastructure.

The long-term aim for the reserve is to rehabilitate the condition of native vegetation and to maintain connectivity values.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- consider opportunities to encourage additional recreational use of O'Connor Ridge in order to relieve pressure from Black Mountain (which has higher ecological values)
- investigate the former tip site for contamination and rehabilitate if necessary.





PERCIVAL HILL NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Percival Hill Nature Reserve (81 hectares) was established in 2006. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is connected to the broader landscape along the Ginninderra Creek corridor.

NATURAL VALUES: Percival Hill protects:

- a large population of the endangered Hoary Sunray (*Leucochrysum albicans*) in dry forest on the western side. The area is also the habitat of the rare and restricted Black Mountain Donkey Orchid (*Diuris nigromontana*)
- small areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland on the lower slopes of the reserve
- habitat of the vulnerable Striped Legless Lizard (*Delma impar*) in grassland along Ginninderra Creek.

CULTURAL VALUES: Aboriginal Grinding Grooves within the reserve are listed on the ACT Heritage Register and stone artefact scatters have also been recorded.

RECREATION: A network of tracks across the reserve provides access for walkers and cyclists. Dogs are permitted on leash.

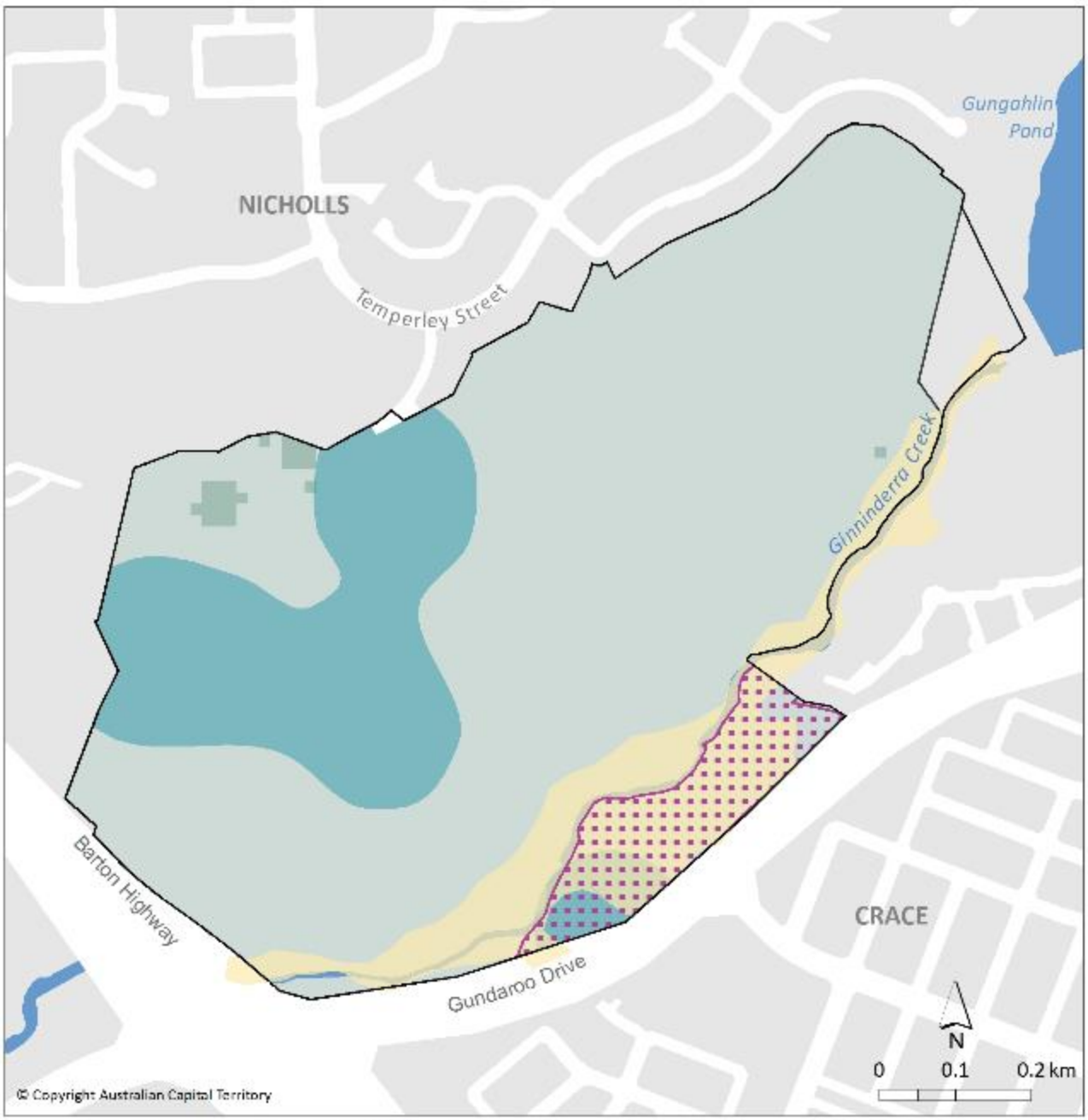
ACCESS RESTRICTIONS: The reserve is one of a few areas in the ACT where the highly invasive weed species Spanish Heath (*Erica lusitanica*) has established. Access to the area of Spanish Heath infestation at the south-west end of the reserve is restricted to avoid spreading the weed.

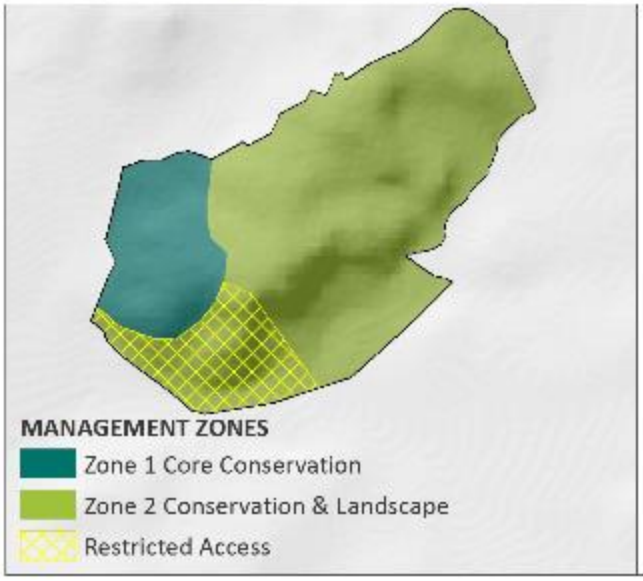
MANAGEMENT: Percival Hill is a small reserve and much of its area was previously cleared for stock grazing. Eucalypts were planted along the ridge line in the 1980s. Parts of Percival Hill have been impacted by utility infrastructure, and there is an extensive network of management vehicle trails. Stock grazing occurs on nearly 50% of the reserve for fire management.

The long-term management aim is to conserve the Aboriginal grinding groove site, the Yellow Box–Blakely's Red Gum Grassy Woodland, the large population of Hoary Sunray, and other rare plants.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- improve management of the axe-grinding grooves in consultation with Traditional Custodians and Representative Aboriginal Organisations
- protect threatened and rare plants
- protect Striped Legless Lizard habitat along Ginninderra Creek
- eradicate Spanish Heath
- control weeds in areas of native understorey.





PERCIVAL HILL NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Striped Legless Lizard Habitat
- Natural Temperate Grassland
- High Value Woodland Bird Habitat
- Reserve
- Creek

ACT Government

Connections with rivers

Cooleman Ridge, McQuoids Hill, Mount Painter, Oakey Hill, The Pinnacle and Urambi Hills nature reserves.

Description

This group of reserves along the western edge of Canberra's urban area is dominated by remnant dry forest transitioning to woodlands, including nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland, and rocky grasslands. The reserves contribute to connectivity between other Canberra Nature Park reserves to the east and the Murrumbidgee and Molonglo rivers to the west.

The reserves support significant populations of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*) and provide habitat for the Glossy Black-cockatoo (*Calyptorhynchus lathami*) and landscape connectivity for woodland birds. They support populations of rare and threatened plants, including the vulnerable Pale Pomaderris (*Pomaderris pallida*).

The presence of stone artefacts throughout the reserves provides physical evidence of the long history of Aboriginal occupation of the region. Aboriginal and historic cultural sites across this landscape indicate the historical layering of ancient culture and Canberra's origins.

The reserves have a high level of recreational use and an extensive network of management trails and walking tracks. The Bicentennial National Trail passes through, or is adjacent to, all the reserves in this group. Dogs are permitted on leash in all reserves in this complex.

Future directions

Management of these reserves will focus on restoring woodland communities to promote ecological function and to strengthen links across the landscape with adjacent woodlands and to the Molonglo and Murrumbidgee rivers.

Conserving and improving habitat for Pink-tailed Worm-lizard is a priority that may require management of vegetation in rocky grasslands to ensure the ongoing viability of Pink-tailed Worm-lizard populations.

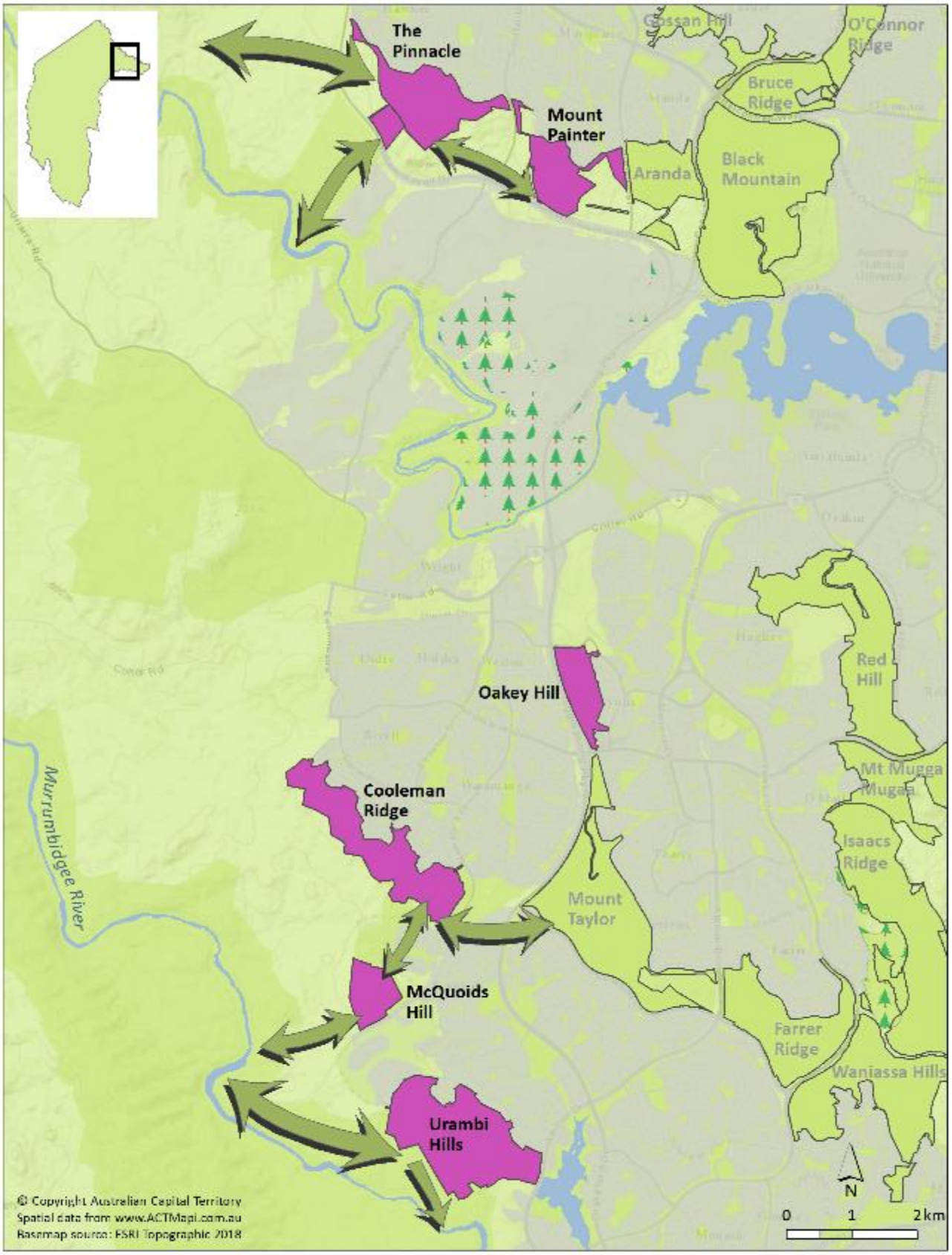
Measures may be required to protect reserves from encroachment of invasive grasses from surrounding urban areas, and grazing pressure from kangaroos and rabbits needs to be effectively managed.

The reserves will continue to accommodate a range of recreational activities that are compatible with the maintenance of natural and cultural values. Monitoring informal recreational use will be an important element of reserve management.

Historic heritage sites will be protected and, where appropriate, interpreted. Support for continuing Aboriginal connection to Country will facilitate the conservation and interpretation of Aboriginal heritage and the contribution of traditional ecological and cultural knowledge to continuously improve land management.

Reserve profiles and zone maps

The following summary profiles for each of the reserves in this complex outline the landscape and local-level actions to guide management. The management plan and relevant strategies will inform land management programs and priorities across Canberra Nature Park. The accompanying zone maps serve to assist the community and Canberra Nature Park stakeholders and partners with expectations and directions for land use activities, consistent with conservation of the natural environment.



CONNECTION WITH RIVERS – LANDSCAPE CONNECTIONS

Connection with Rivers
Landscape Connection
Pine Plantation
Non-urban Area
Urban Area
Rivers & Lakes
ACT Government

COOLEMAN RIDGE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Cooleman Ridge Nature Reserve (187 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of linked woodland, rimming the north of the Tuggeranong Valley that also includes Mount Taylor, Farrer Ridge and Wanniassa Hills nature reserves to the east and the Murrumbidgee River to the west.

NATURAL VALUES: Cooleman Ridge protects:

- rocky areas that support a large population of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- several small patches of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland, with a few regionally rare plants present in the understorey
- remnant and regenerating woodland that, together with its high connectivity value, provides important habitat for woodland birds.

CULTURAL VALUES: The ACT Heritage Register lists two Aboriginal heritage sites within the reserve.

RECREATION: Cooleman Ridge has high recreational use including walking, running, cycling, dog walking and horse riding. The Centenary Trail and Bicentennial National Trail pass through the reserve. Dogs are permitted on leash. Horse riding is permitted only on identified equestrian trails.

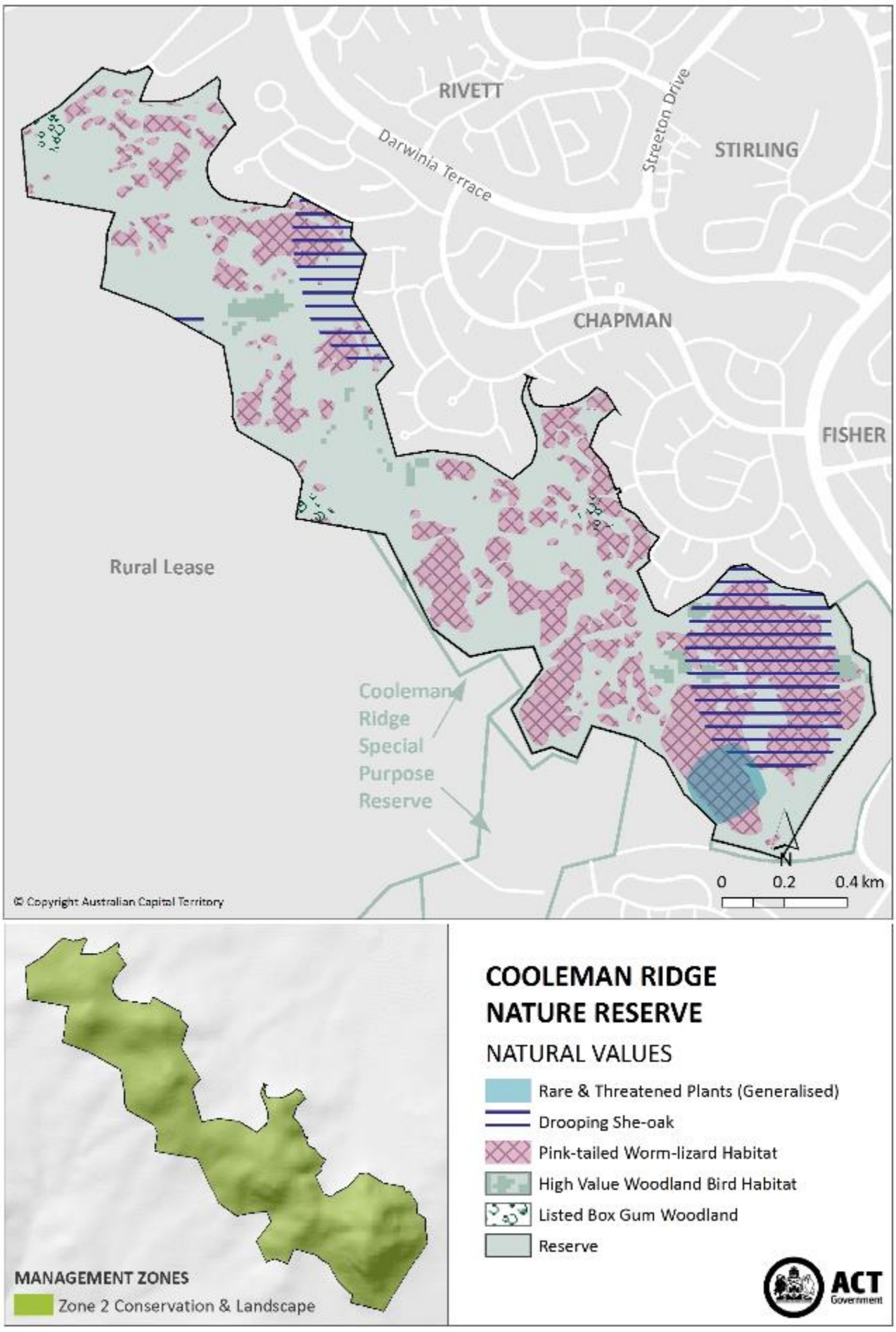
PARKCARE: Cooleman Ridge ParkCare group undertakes activities that include woodland restoration, weed control, establishment of walking tracks and an ongoing study of the effects of grazing.

MANAGEMENT: The area was grazed by stock as part of the 'Yarralumla' pastoral property. Over the last few decades, the reserve has been restored from a mixture of improved exotic paddocks and low-diversity native pasture (with high weed cover) to an area of regenerating woodland.

The long-term management aim is to conserve and rehabilitate Pink-tailed Worm-lizard habitat and rare plant populations, to continue rehabilitation of woodland, and to maintain connectivity.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- protect and improve Pink-tailed Worm-lizard habitat
- maintain and improve connectivity of woodlands
- investigate options to improve groundcover diversity
- improve habitat for declining woodland birds
- develop the walking track network on Mount Arawang
- continue to support Cooleman Ridge ParkCare.



MCQUOIDS HILL NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: McQuoids Hill Nature Reserve (56 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is close to Cooleman Ridge Nature Reserve and the Murrumbidgee River, separated by horse paddocks and rural land. Though small, the reserve is important in supporting wildlife movement from nature reserves to the east (Mount Taylor, Farrer Ridge and Wanniassa Hills) through to the Murrumbidgee River.

NATURAL VALUES: McQuoids Hill protects:

- rocky areas that support the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland, with a few regionally rare plants present in the understorey
- a small patch of vulnerable Pale Pomaderris (*Pomaderris pallida*)
- part of a forested area that is a key connection to the Murrumbidgee River and important for wildlife movement
- regenerating and remnant woodland that, together with high connectivity value, provides habitat for threatened and declining woodland birds
- the vulnerable Little Eagle (*Hieraaetus morphnoides*) which has been recorded as breeding within the reserve, however, there are no recent records.

RECREATION: The Bicentennial National Trail passes through the western side of the reserve. Horse riding is permitted on identified equestrian trails. Dogs are not permitted.

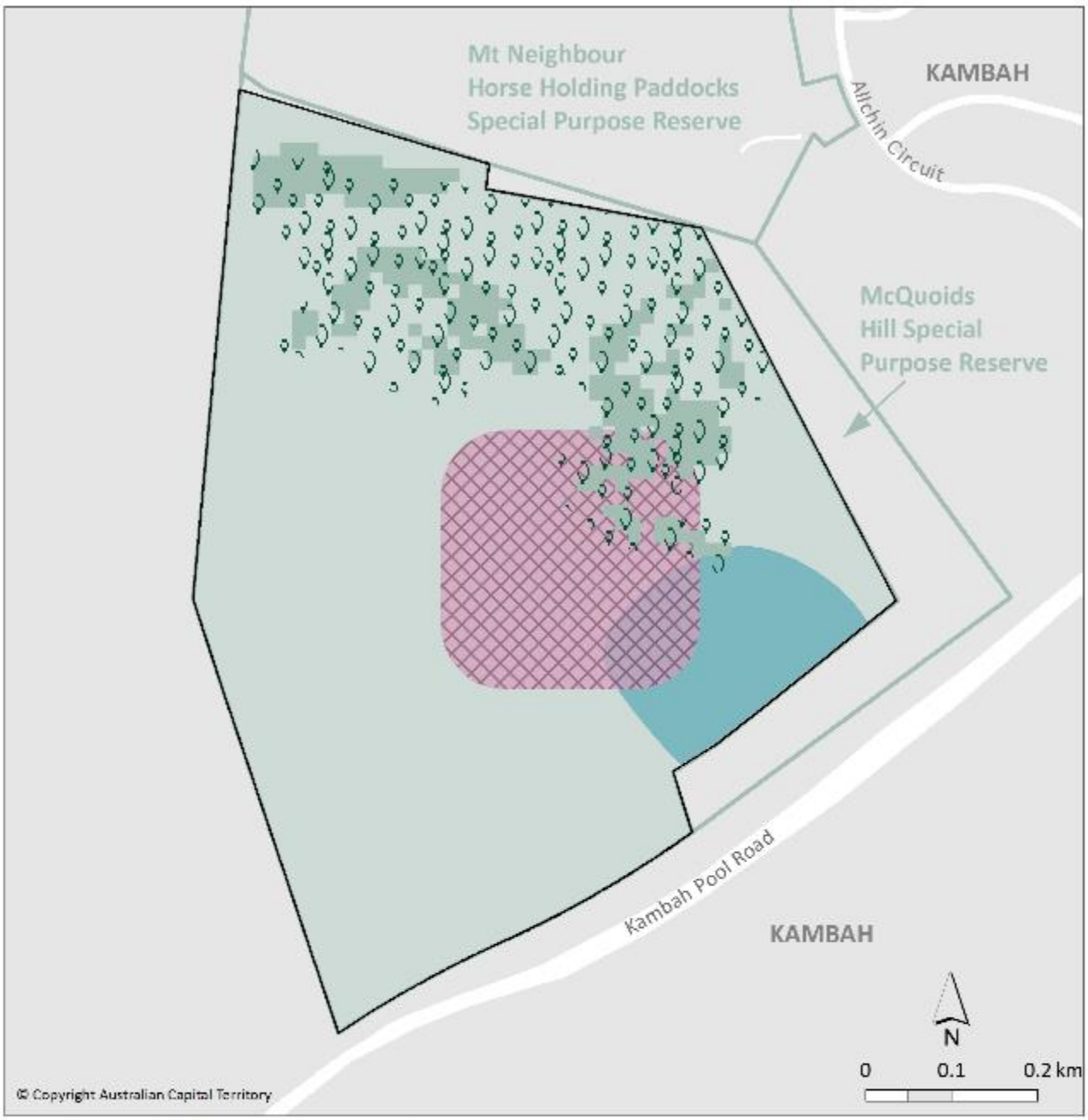
MANAGEMENT: Pastoral settlement of the Tuggeranong district dates back to the 1820s, and the McQuoids Hill area has primarily been used for stock grazing.

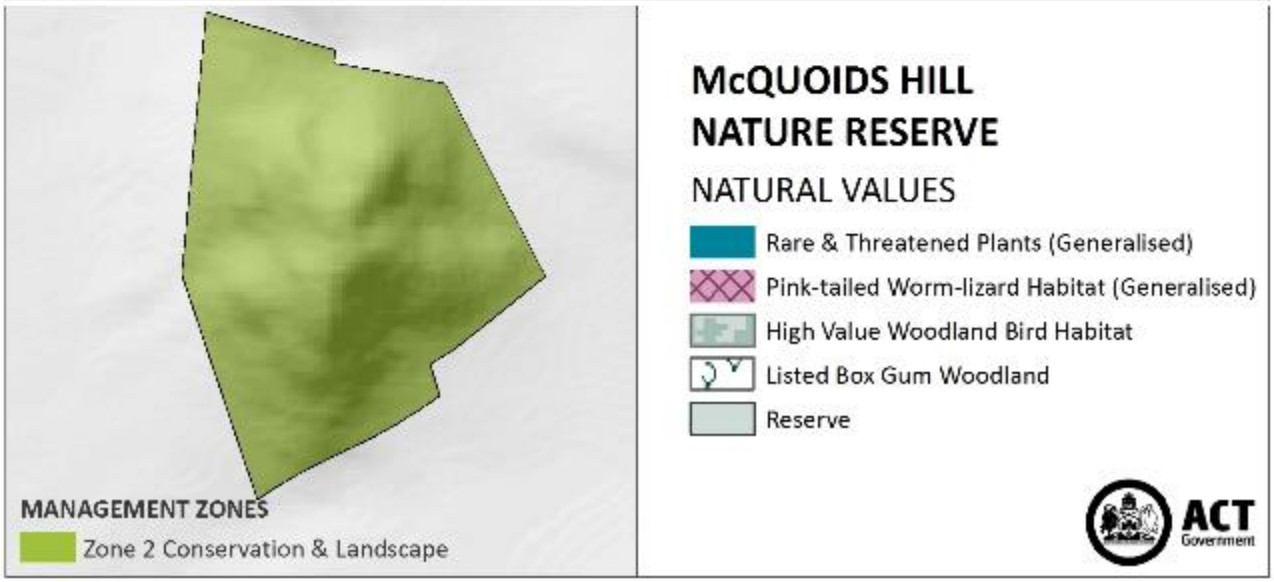
Much of the reserve protects box—gum woodland with a grass and shrub understorey. The north-eastern slopes have been cleared of trees, with native perennial grasses largely retained but sparse. Much of the rocky grassland to the south-west is covered in dense exotic grassland.

The long-term management aim is to conserve and improve Pink-tailed Worm-lizard and woodland bird habitat, and to maintain connectivity value.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain woodland condition and connectivity to other reserve areas
- map the extent of Pink-tailed Worm-lizard habitat.





MOUNT PAINTER NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mount Painter Nature Reserve (93 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is a key component in an extensive landscape of remnant woodland vegetation extending from Black Mountain and O'Connor Ridge in the east to the Molonglo and Murrumbidgee rivers in the west.

NATURAL VALUES: Mount Painter protects:

- a small area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- habitat of several plants that are rare in the ACT
- the 'Wildflower Triangle' (approximately 10 hectares) behind the suburb of Cook, which has high habitat value for woodland birds and a high diversity of plants, including several rare species.

CULTURAL VALUES: The ACT Heritage Register lists one Aboriginal heritage site within the reserve. The remnant of a hut belonging to early settler Roderick McDonald is located close to the reserve boundary in the adjacent horse paddock.

RECREATION: The Bicentennial National Trail passes along the northern edge of the reserve and through the Wildflower Triangle in the eastern section. Horse riding is permitted on this trail and the identified equestrian trail on the eastern perimeter of the main section of the reserve. Dogs are permitted on leash.

PARKCARE: Friends of Mount Painter has been active since 1989, with regular activities that include weed and erosion control, planting trees and shrubs, mapping rabbit burrows and counting the kangaroo population.

MANAGEMENT: Mount Painter has been grazed since pastoral settlement in the 1830s and is substantially cleared of native trees and understorey vegetation. Heavy grazing pressure has resulted in erosion of the shallow, infertile soils on the steeper slopes and in gullies.

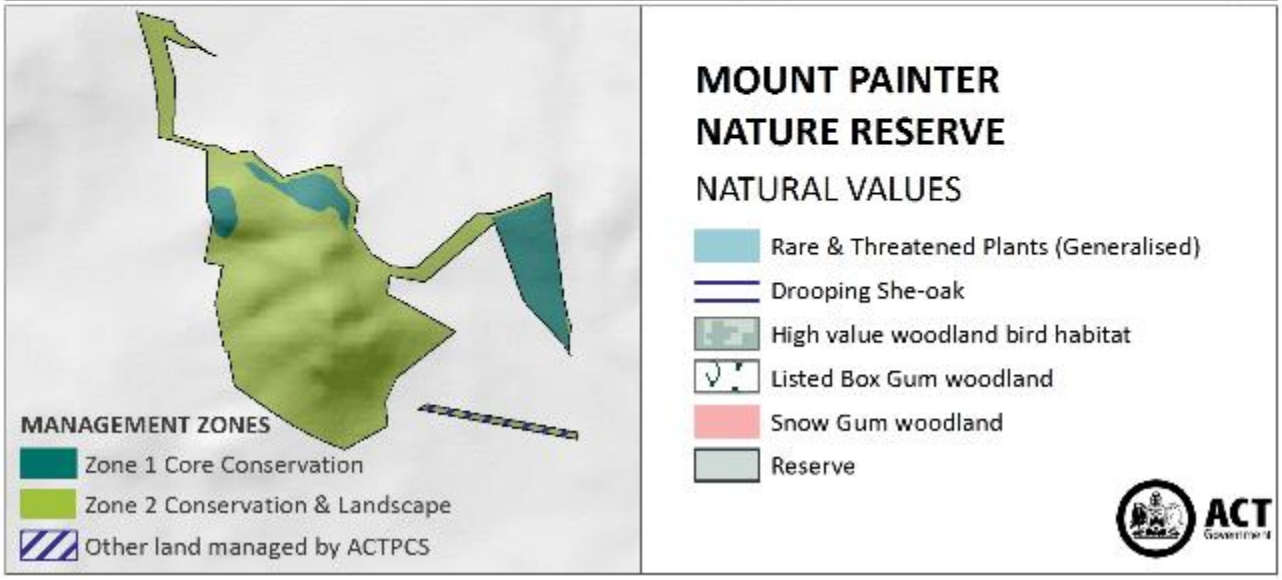
Mount Painter has been subject to much recent weed control, and the dominant ground cover species are moving from thistle and exotic annual grasses to native grasses.

There have been several attempts to restore the native tree and shrub layer, with varying degrees of success, and erosion control works have also been undertaken.

The long-term management aim is to conserve the Wildflower Triangle and rehabilitate the woodland and open-forest vegetation to strengthen its value as habitat, and as part of a significant wildlife movement corridor.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- protect and improve the Wildflower Triangle and existing box—gum woodland
- maintain and supplement revegetation plantings to improve landscape connectivity
- continue to undertake measures to promote ground cover
- continue to support the Friends of Mount Painter ParkCare.



Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

OAKEY HILL NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Oakey Hill Nature Reserve (65 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is linked to Mount Taylor and is part of a wider woodland complex with connection west to the Murrumbidgee River. It is part of a woodland landscape used by threatened and regionally declining woodland birds and other woodland fauna.

NATURAL VALUES: Oakey Hill protects:

- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland in the south-east and north-west of the reserve, and four plant species considered rare in the ACT
- a population of vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- a stand of Black Cypress Pine (*Callitris endlicheri*)
- part of the Tuggeranong Parkway Road Cutting, a significant ACT geological site, valued for scientific study and teaching purposes.

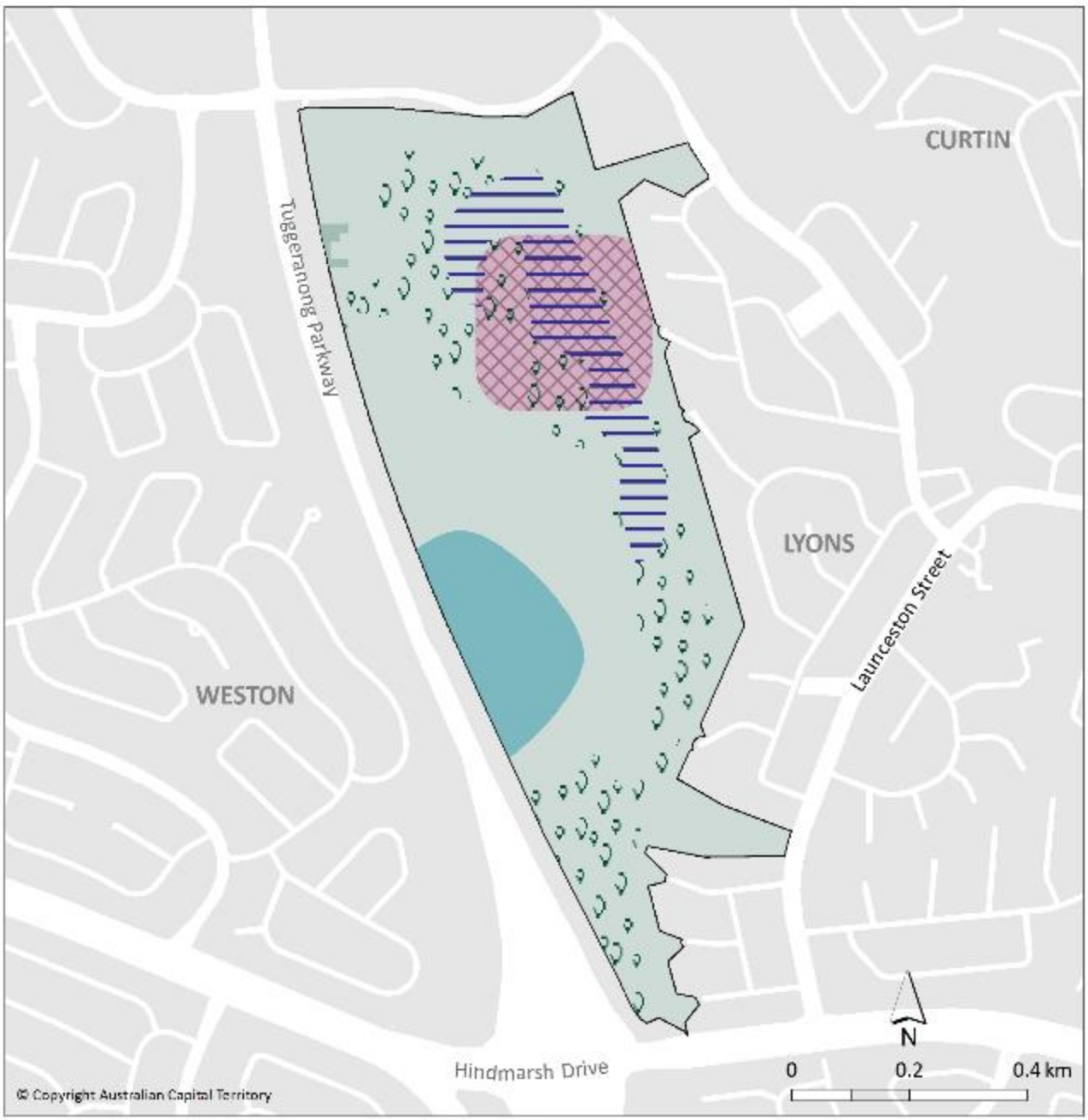
RECREATION: Oakey Hill is popular for walking, running and cycling. The Bicentennial National Trail is located on the lower slopes. Dogs are permitted on leash. Horse riding is permitted on the identified equestrian trail along the eastern boundary of the reserve.

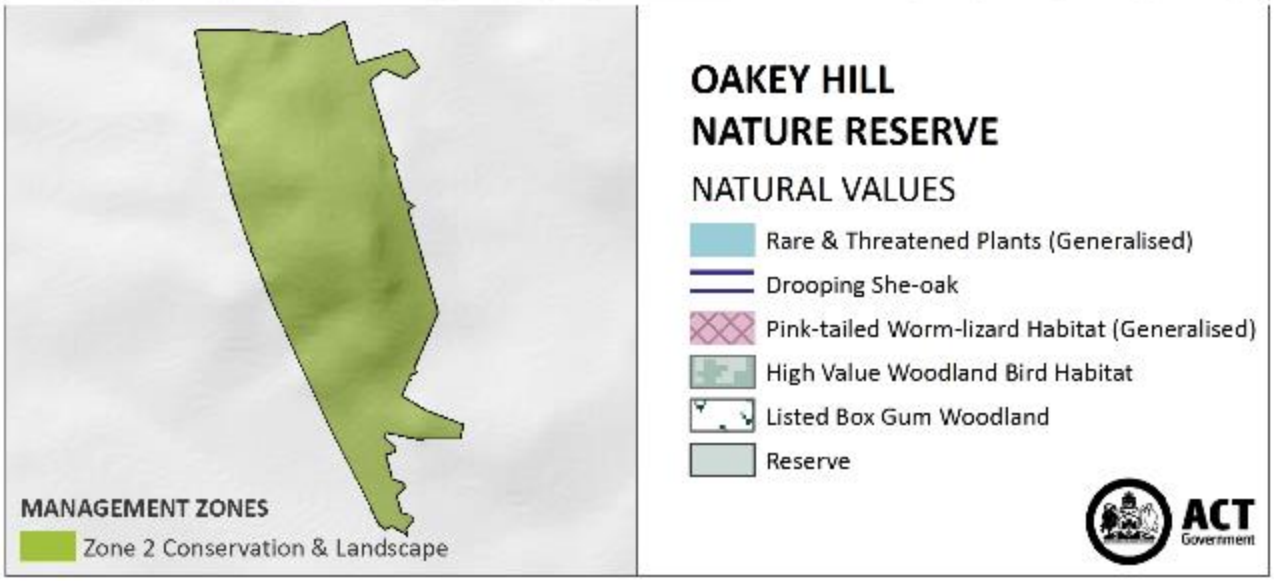
PARKCARE: Oakey Hill ParkCare, established in 2003, undertakes activities such as weed control, gully and track restoration, and collecting Bird Atlas information.

MANAGEMENT: Oakey Hill is a small reserve with a long history of grazing by stock. The long-term management aim is to rehabilitate native vegetation and to conserve woodland connectivity and Pink-tailed Worm-lizard habitat.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- improve the extent and diversity of native woodland vegetation
- identify and map the extent of Pink-tailed Worm-lizard habitat
- continue to support Oakey Hill ParkCare.





THE PINNACLE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: The Pinnacle Nature Reserve (154 hectares) was established in 1993 and extended in 2016 (environmental offset). The reserve is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is a key link in an extensive landscape of remnant wooded vegetation stretching from Black Mountain and Bruce and O'Connor ridges in the east to the Molonglo and Murrumbidgee rivers in the west.

NATURAL VALUES: The Pinnacle protects:

- a small area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland, and habitat of a few plants that are rare in the ACT
- habitat of several threatened and declining woodland birds, and is an important link for the regional movement of woodland birds
- habitat of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*).

CULTURAL VALUES: The ACT Heritage Register lists five Aboriginal heritage sites within the reserve.

RECREATION: The reserve is popular for walking and running. The Bicentennial National Trail passes through the reserve, along the northern and southern boundaries. Dogs are permitted on leash. Horse riding is permitted on identified equestrian trails.

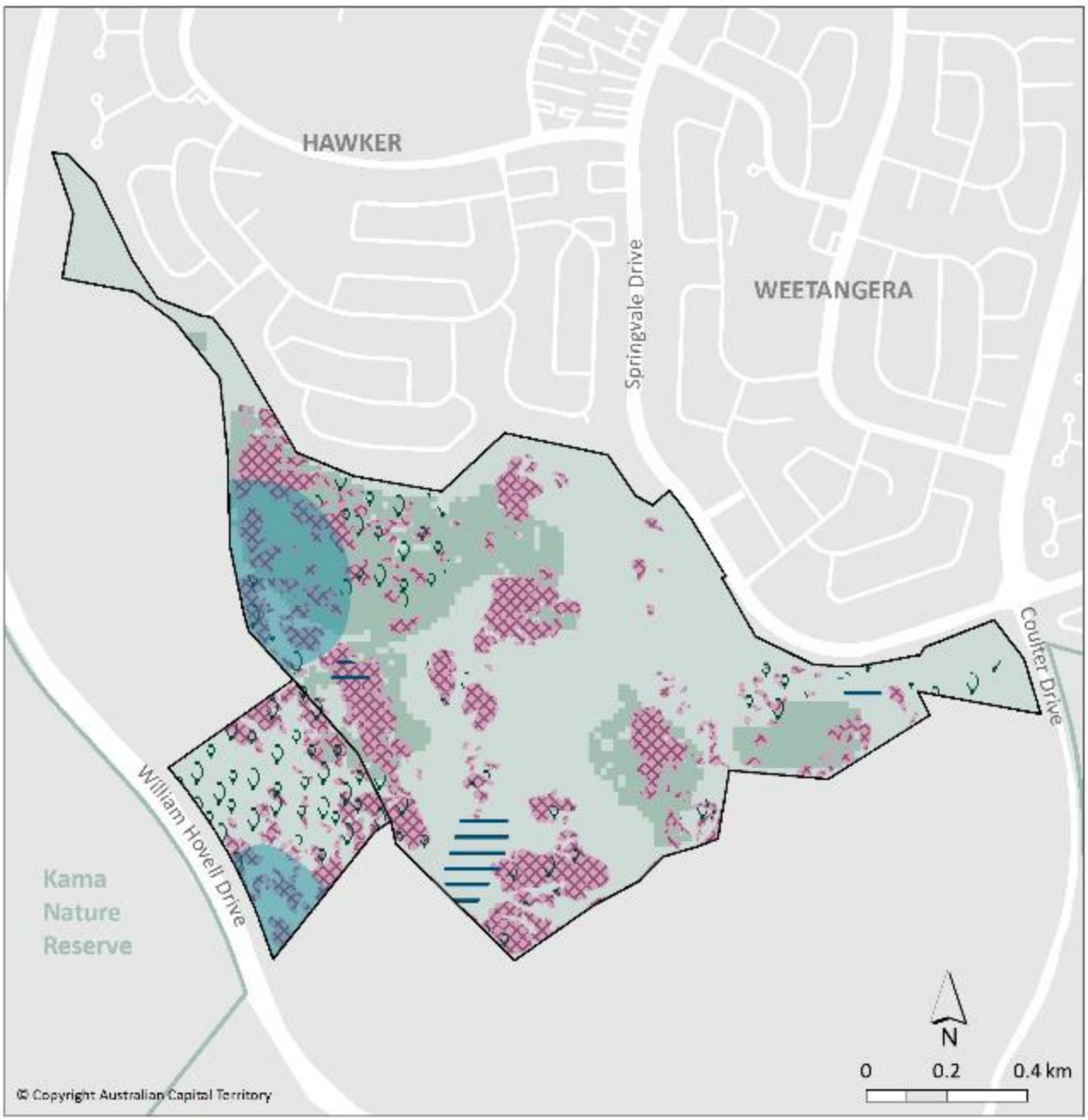
PARKCARE: Friends of The Pinnacle undertakes regular activities that include weed and erosion control, rabbit and kangaroo monitoring, and guided walks. The group is trialling a range of treatments aimed at increasing native grass and herbaceous species.

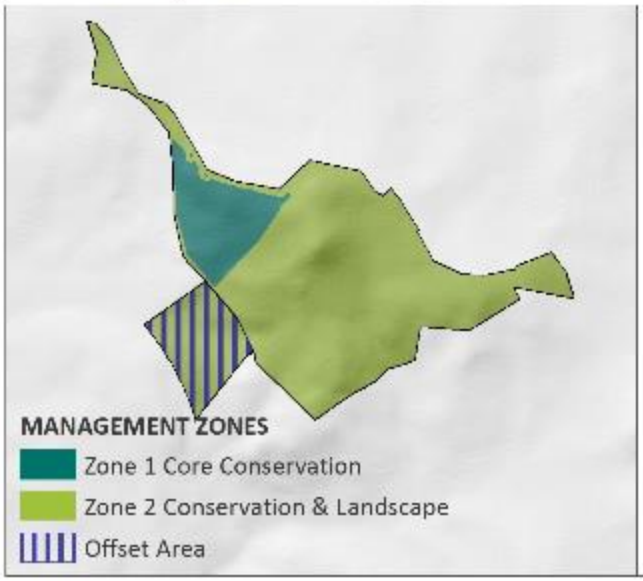
MANAGEMENT: The Pinnacle has been substantially cleared and modified, but the area of moderate to good understorey has expanded in recent years. Over 4000 trees and shrubs were planted on the reserve through Government employment schemes in the mid-1980s. Many of these species are not endemic to the area.

The long-term management aim is to conserve bird habitat, vegetation condition and wildlife connectivity, and to conserve Pink-tailed Worm-lizard habitat.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage the offset area in accordance with the offset management plan
- maintain plant diversity and improve woodland condition
- maintain and improve connectivity to other woodland areas
- maintain Pink-tailed Worm-lizard habitat
- continue to support Friends of The Pinnacle ParkCare group.





THE PINNACLE NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Drooping She-oak
- Pink-tailed Worm-lizard Habitat
- High Value Woodland Bird Habitat
- Listed Box Gum Woodland
- Reserve

ACT Government

URAMBI HILLS NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Urambi Hills Nature Reserve (246 hectares) was established in 1993. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is connected to the Murrumbidgee River and Brindabella Mountains via Bullen Range to the west, and McQuoids Hill and Cooleman Ridge nature reserves to the north.

NATURAL VALUES: Urambi Hills protects:

- rocky areas that support a large population of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland over about 60 per cent of its area (though much of that community is in a poor to moderate condition)
- habitat for threatened and declining woodland birds moving through the landscape.

CULTURAL VALUES: The ACT Heritage Register lists three Aboriginal heritage sites within the reserve. The remnant of an old building on the north bank of Tuggeranong Creek, at the western end of the reserve, is evidence of earlier farming activity.

RECREATION: The reserve is used for walking, running and cycling. Horse riding is permitted on the Bicentennial National Trail, which passes through the reserve along the northern boundary. Dogs are permitted on leash.

ACCESS RESTRICTIONS: A small area of land in the west of the reserve is under rural lease and public access is prohibited without the permission of the lessee.

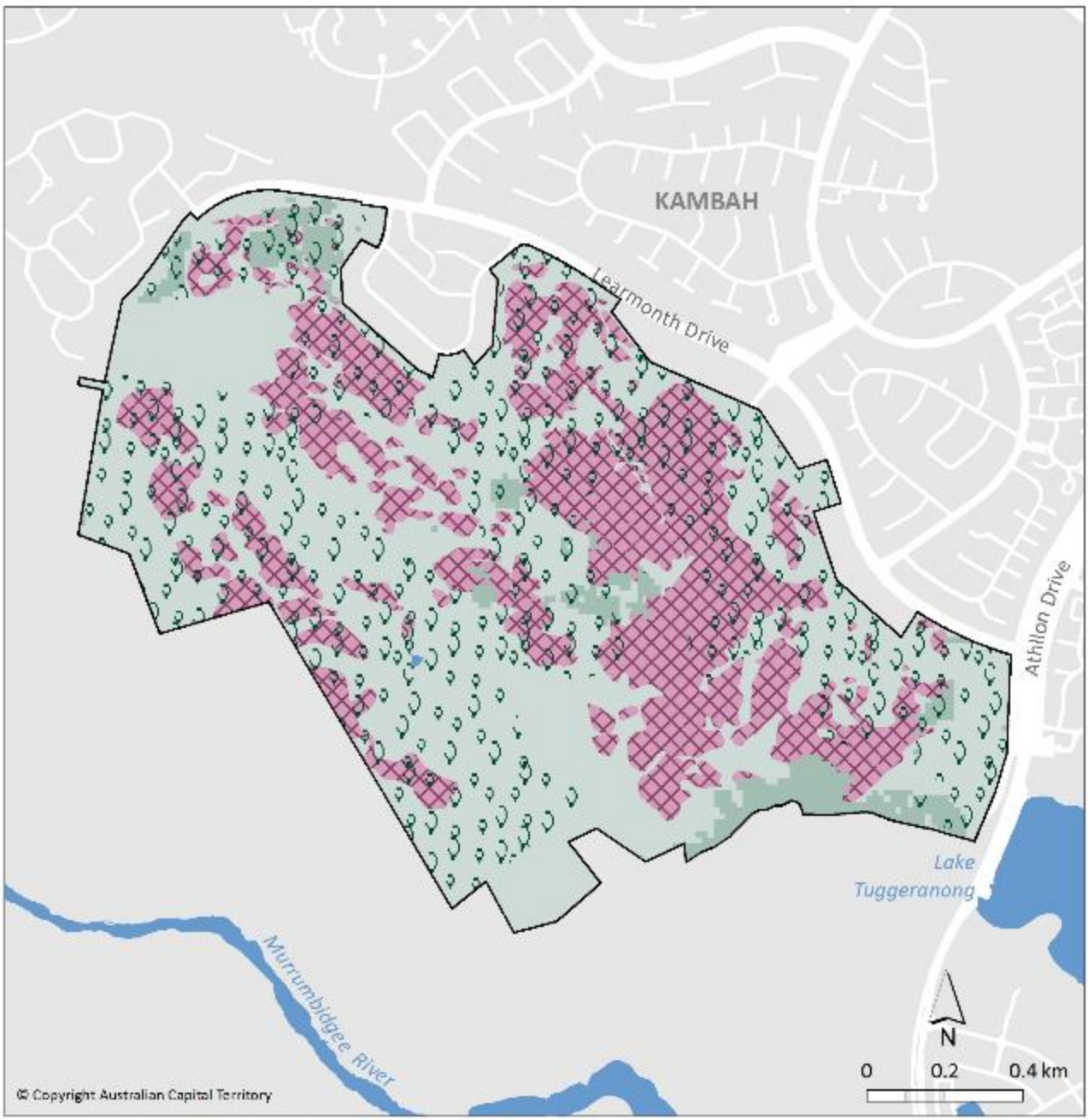
PARKCARE: Friends of Urambi Hills undertakes activities in the reserve.

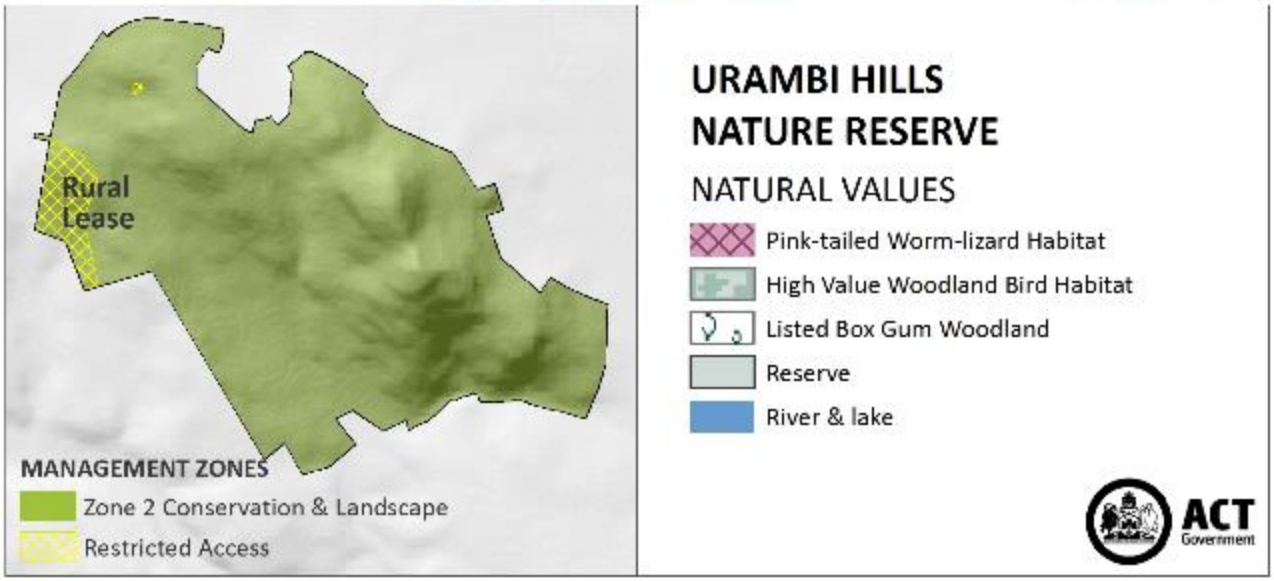
MANAGEMENT: The majority of the reserve has been cleared of trees and has a long history of stock grazing. The groundcover is a mix of native and exotic species. Rocky areas have a high diversity of native groundcover species.

The long-term management aim is to maintain and improve Pink-tailed Worm-lizard habitat and woodland condition and connectivity.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- continue habitat improvement work with a focus on structure, including placement of woody debris and replacement of exotic shrubs with native shrub species that provide habitat for woodland birds
- improve woodland connectivity in targeted areas
- protect and improve Pink-tailed Worm-lizard habitat
- continue to support Urambi Hills ParkCare group.





Kowen Escarpment and Molonglo Gorge

Kowen Escarpment and Molonglo Gorge nature reserves

Description

These reserves are part of a significant regional wildlife corridor that follows the uplifted land along the Queanbeyan fault and connects woodland and open forest in the vicinity of Googong Dam with woodlands in the north of the ACT and surrounding NSW, and links to the Southern Flyway — a connection of woodland vegetation across the southern slopes and central west of NSW and the ACT. The reserves support remnant patches of Snow Gum (*Eucalyptus pauciflora*) and significant populations of rare plants.

The forested slopes of Kowen Escarpment are too steep for pastoral or plantation activity, and the area is relatively isolated from suburban areas; consequently, vegetation on the reserve is in relatively good condition and supports many rare and threatened plant species. The dramatic landscape of Molonglo Gorge has high aesthetic value and provides an outstanding opportunity to study the characteristics and structure of bedded sediments. Part of the reserve supports nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland.

The presence of numerous stone artefacts in the reserves provides physical evidence of the long history of Aboriginal occupation of the region. Molonglo Gorge and the Burbong area are of special significance to Aboriginal people, and the area is known to be a major Aboriginal pathway south into alpine areas. Several historic heritage sites are located partially within the reserve.

The reserves accommodate a range of recreational opportunities and access for reserve users. Walking and picnicking is popular in Molonglo Gorge, particularly along the river, while Kowen Escarpment has a history of higher impact activities, including four-wheel driving and trail bike riding.

Future directions

Management of these reserves will focus on protecting and conserving high conservation value forest and woodland communities, rare plant species, geological values and cultural values. There is a need to: assess native woodland and forest communities to better understand and protect reserve values; protect natural and cultural values from high impact recreation activities and inappropriate fire regimes; and protect and restore linkages to surrounding woodlands and forest. Protecting and maintaining populations of rare plants is a priority.

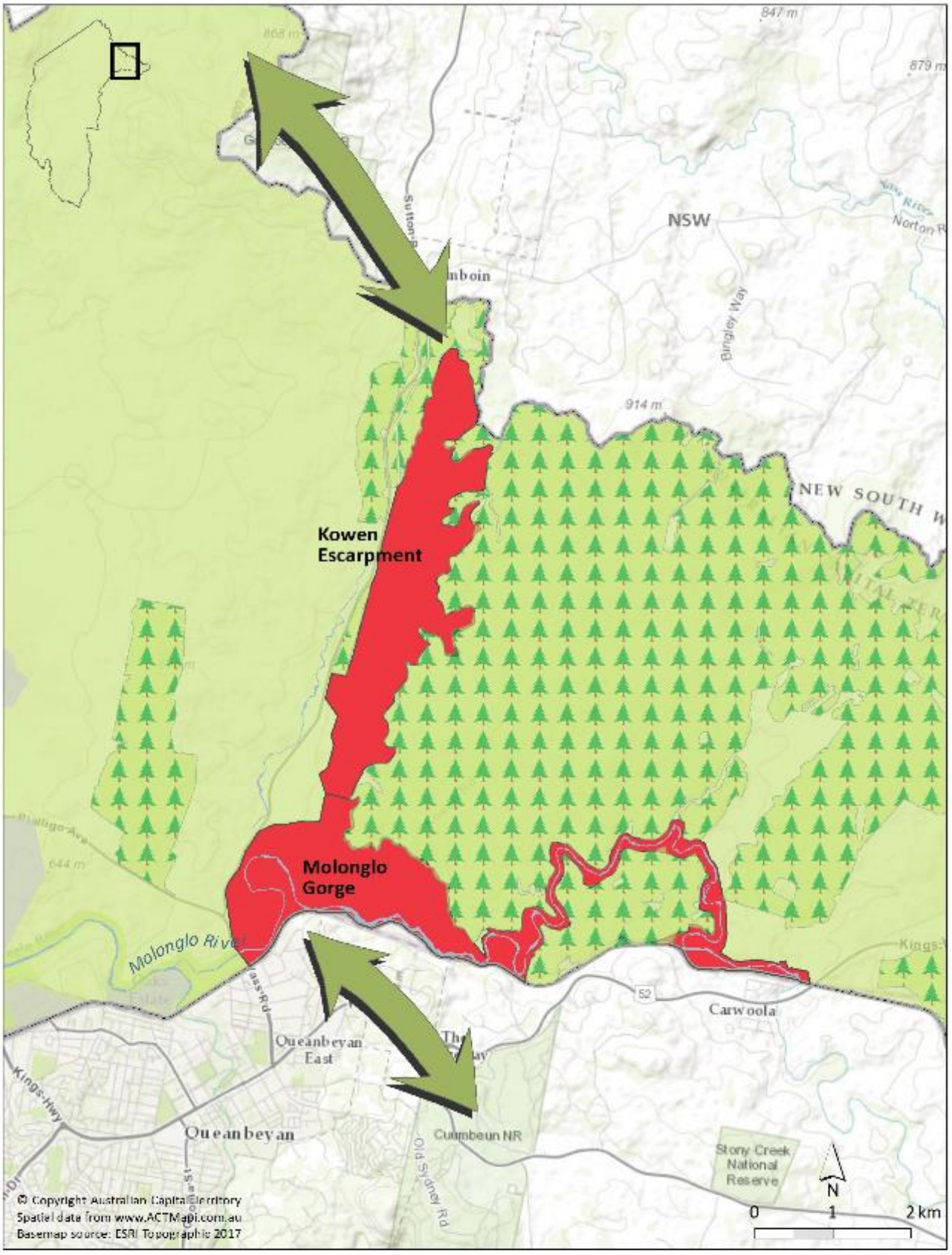
While the reserves will continue to accommodate a range of recreational facilities, to provide opportunities and access for reserve users compatible with the maintenance of natural and cultural values a review of recreational activities will be undertaken to ensure that recreation is compatible with the maintenance of these values into the future.

High impact recreational activities will be phased out and recreation compatible with the protection of the natural and cultural values will be promoted. Recreational facilities in the reserves will be upgraded where required.

Historic heritage sites will be protected and, where appropriate, interpreted. Support for continuing Aboriginal connection to Country will facilitate the conservation and interpretation of Aboriginal heritage and the contribution of traditional ecological and cultural knowledge to continuously improve land management.

Reserve profiles and zone maps

The following summary profiles for each of the reserves in this complex outline the landscape and local-level management intent specific to each reserve. The management plan and relevant strategies will inform the land management programs and priorities across Canberra Nature Park. The accompanying zone maps serve to assist the community and Canberra Nature Park stakeholders and partners with expectations and directions for land use activities, consistent with conservation of the natural environment.



KOWEN ESCARPMENT & MOLONGLO GORGE – LANDSCAPE CONNECTIONS

Kowen Escarpment & Molonglo Gorge
Landscape Connection
Non-urban Area
Pine Plantation
Urban Area
Rivers & Lakes
ACT Government

KOWEN ESCARPMENT NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Kowen Escarpment Nature Reserve (466 hectares) was established in 1993. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: Kowen Escarpment is part of a significant regional wildlife corridor that follows the uplifted land along the Queanbeyan fault, connects woodland and open forest in the vicinity of Googong Dam with woodlands in the north of the ACT and surrounding NSW, and links to the Southern Flyway—a connection of woodland vegetation across the ACT and the southern slopes and central west of NSW.

NATURAL VALUES: Kowen Escarpment protects:

- an important wildlife corridor of forested, uplifted land along the Queanbeyan Fault that is used by a number of threatened woodland bird species
- small populations of critically endangered Canberra Spider Orchid (*Arachnorchis actensis*), endangered Hoary Sunray (*Leucochrysum albicans*) and vulnerable Pale Pomaderris (*Pomaderris pallida*) and provides habitat for four rare species
- a small area of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- a sparse population of the vulnerable Koala (*Phascolarctos cinereus*) (recorded in the wider Kowen-Majura Training Area) contributing to the maintenance/local movement of the Koala population.

CULTURAL VALUES: Under previous management arrangements several Aboriginal stone artefacts were recorded within the reserve and removed.

RECREATION: The reserve has a long history of recreational use that is not appropriate in a nature reserve; for example, four-wheel-driving, motor biking and pig hunting. Illegal vehicle use has caused erosion and creek sedimentation, and off-road motorcycles have impacted significant plants. Limited bushwalking and bird watching occurs along forest tracks. Dogs are permitted on leash. The adjacent pine plantations are popular for motor sports.

ACCESS RESTRICTIONS: A small area of land in the south-west of the reserve is under rural lease. Public access to this area is prohibited without the permission of the lessee.

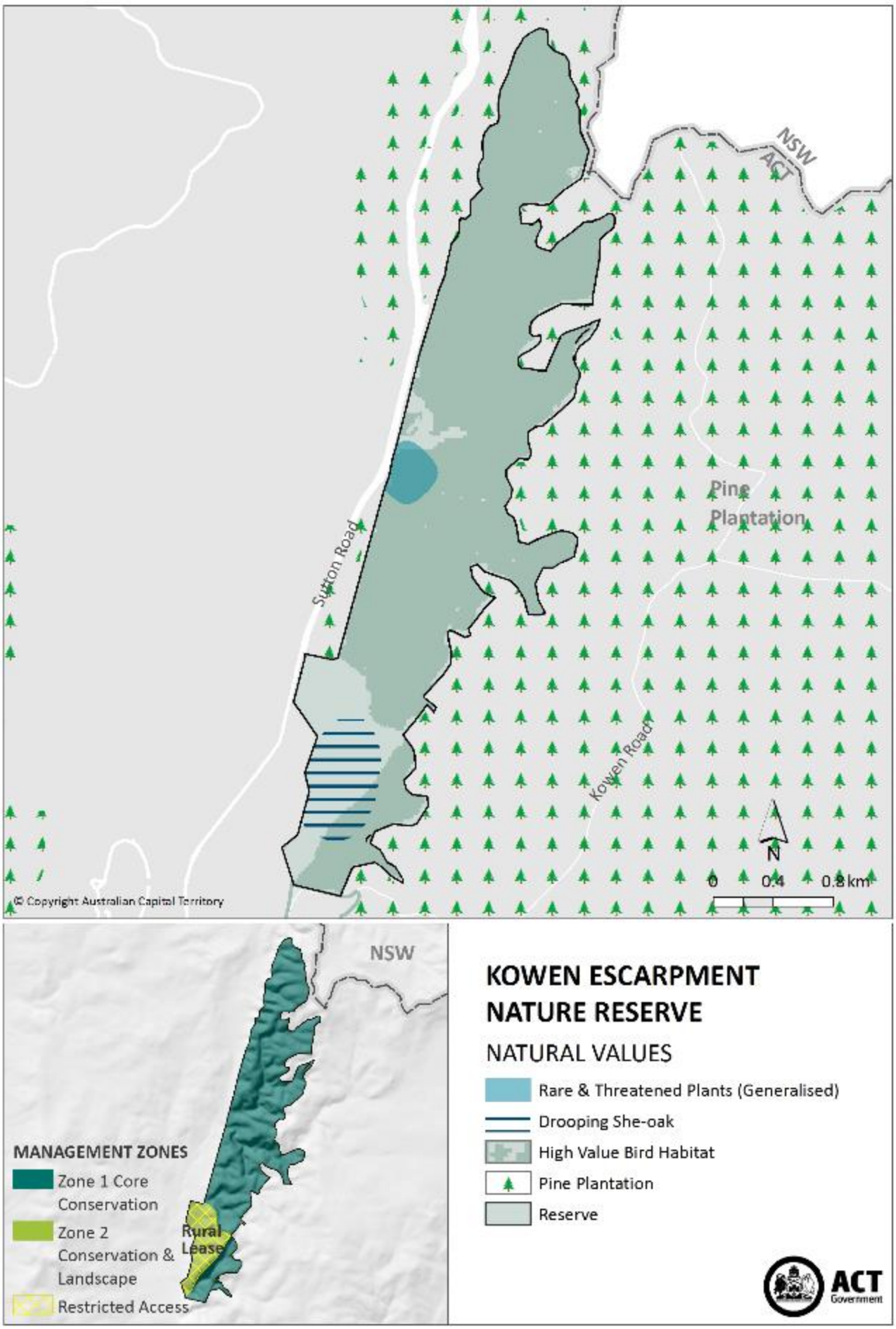
MANAGEMENT: Kowen Escarpment is a steep forested ridge with slopes in excess of 25 degrees. Pastoral settlement on the adjacent Kowen plateau began in 1831 and pine plantations were established in 1927.

Pine wildings have spread into the reserve from the adjacent pine plantations. Prescribed burns are regularly undertaken within the reserve to protect the pine plantation from wildfire.

The long-term management aim is to protect connectivity values, and populations of significant plants.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- manage the spread of pine wildings
- prohibit off-track motorised vehicle use
- avoid motorised vehicle use on-track (except for possible approval when required for approved 4WD training or to provide safe connection between areas of the broader Kowen Forest during an event)
- increase measures to restrict illegal access and use of the reserve.



MOLONGLO GORGE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Molonglo Gorge Nature Reserve (506 hectares) was established in 1972. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of a significant regional wildlife corridor that follows the uplifted land along the Queanbeyan fault, connects woodland and open forest in the vicinity of Googong Dam with woodlands in the north of the ACT and surrounding NSW, and links to the Southern Flyway—a connection of woodland vegetation across the ACT and southern slopes and central west of NSW.

NATURAL VALUES: Molonglo Gorge protects:

- part of a regionally important wildlife corridor of forested uplifted land along the Queanbeyan Fault that is used by a number of threatened woodland bird species
- 40 hectares of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland on river flats and lower slopes
- an outstanding regional locality to study the characteristics and structure of bedded sediments
- a dramatic landscape of aesthetic significance.

CULTURAL VALUES: Molonglo Gorge and the Burbong area hold a special association for Aboriginal people as a major traditional pathway south into alpine areas. The ACT Heritage Register lists two Aboriginal heritage sites within the reserve, and surveys in adjacent areas indicate that more are likely to be present. The Kowen Cultural Precinct, listed on the ACT Heritage Register, includes several historic sites adjacent to or partially within the reserve, including homesteads, the village of Burbong and the old road (and river ford) leading to the Kowen Public School.

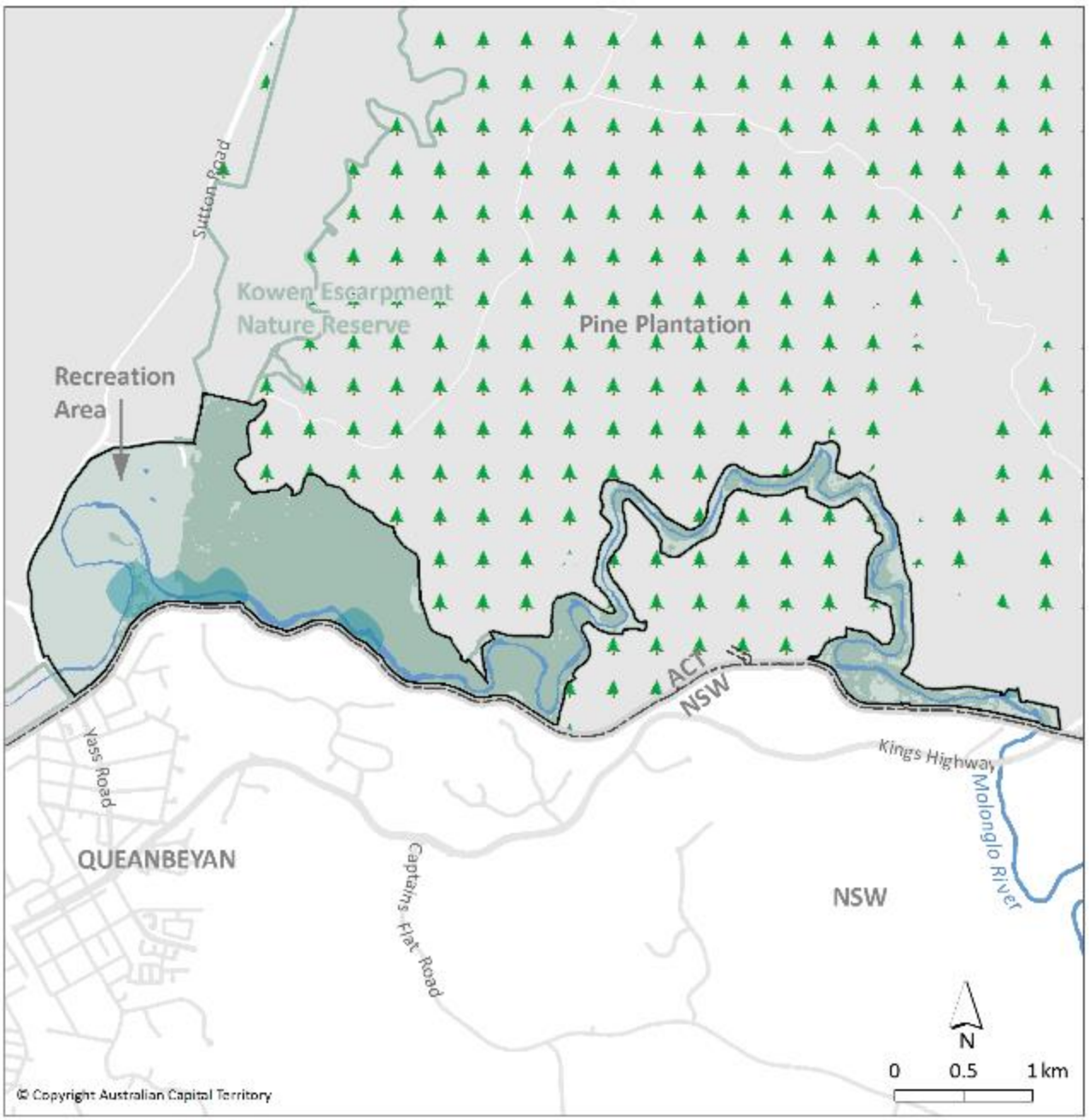
RECREATION: Molonglo Gorge has a popular picnic site with a large parking area, toilets, playground, and a walking track along the river. Dogs are permitted on leash.

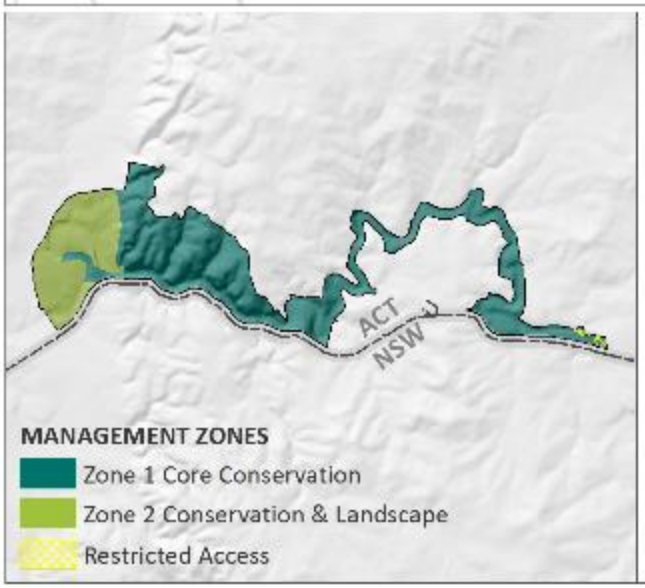
ACCESS RESTRICTIONS: A small section (~2.8 ha) area at the upstream end of the reserve is subject to a rural lease. Access to this area is prohibited except for the lessee, and a person authorised by the lessee.

MANAGEMENT: There is a long history of sheep grazing in the vicinity of Molonglo Gorge from the 1830s. Small-scale gold mining operations occurred in the 1880s, and pine plantations were established from 1927. The collapse of waste spoil dumps at the Captain Flat mine in 1939, 1942 and 1945 released large quantities of heavy metals into the Molonglo River, and concentrations of these pollutants remain high in river sediments. The long-term management aim is to conserve habitat, vegetation communities and rare plants, and develop recreation facilities.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- prohibit off-track motorised vehicle use and phase out recreational use of motorised vehicles on-track
- increase measures to restrict illegal access and use of the reserve
- maintain picnic and adventure play facilities at Molonglo Gorge recreation area
- avoid disturbing polluted sediments in the Molonglo River
- investigate management required for heritage sites.





MOLONGLO GORGE NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- High Value Bird Habitat
- Pine plantation
- Molonglo River
- Reserve

ACT Government

Woden Woodlands and Grasslands

Callum Brae, Farrer Ridge, Isaacs Ridge, Jerrabomberra West, Mount Mugga Mugga, Mount Taylor, Red Hill and Wanniassa Hills nature reserves.

Description

The Woden Woodlands and Grasslands complex encompasses a large area of continuous, high-quality nationally critically endangered Yellow Box–Blakely's Red Gum woodland, part of one of the largest, best-connected and most diverse areas of box–gum woodland remaining in Australia. The woodlands transition to dry sclerophyll forest on the hill tops, and merge into large areas of nationally critically endangered Natural Temperate Grassland on the Jerrabomberra Valley floor, with links to NSW.

The reserves provide important habitat for wildlife and a movement corridor along the wooded ridges to the south and west, connecting with the Murrumbidgee River.

Reserves in the Woden Woodlands and Grasslands complex are generally in good condition, supporting areas with good ground cover diversity, including threatened and rare plant species, as well as habitat for a variety of animal species. The reserves are particularly known for their diversity of woodland birds and grassland reptiles.

The presence of stone artefacts and culturally modified trees indicates a long history of Aboriginal occupation in the valley and surrounding hills. Layered with this history are more recent historic sites, including pastoral buildings, evidence of solider settlement lease blocks on the neighbouring Callum Brae private lease, and early 20th century plantings in a number of reserves, initiated under Burley Griffin's plan for reforesting denuded hills and ridges.

Most of the woodland reserves in this complex have high levels of recreational use, with a network of management trails and other tracks, including part of the Centenary Trail. Walking tracks with interpretive signs and lookout points provide the visitor with information and panoramic views. Only low-impact, passive recreational activities are compatible with values in the grasslands reserves and Callum Brae, and dogs are not permitted in these areas.

Future directions

In the last decade, surveys have shown an overall improvement in the condition of woodlands, from moderately modified towards partially modified, across much of this complex. The area under protection has been extended, with the addition of Callum Brae and Jerrabomberra West nature reserves.

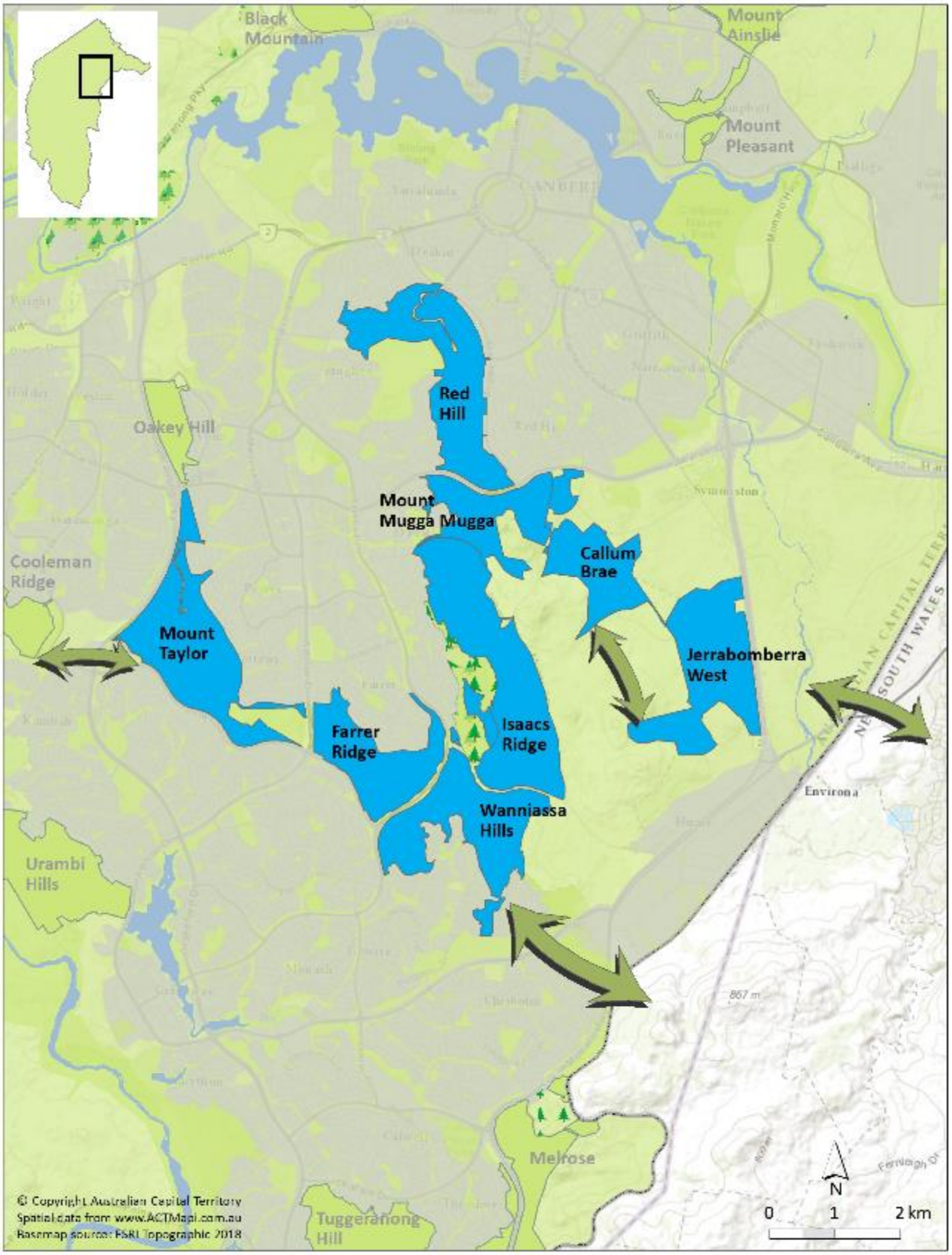
Future additions of reserves to this complex from environmental offsets are expected to increase the area of endangered ecological communities under protection, provide further protected habitat for a number of threatened and declining plant and animal species, and build resilience in the landscape.

Management focus will be on the continual improvement of the condition of Yellow Box–Blakely's Red Gum Grassy Woodland and Natural Temperate Grassland and increasing and/or improving habitat for threatened species and declining woodland birds.

Historic heritage sites will be protected and, where appropriate, interpreted. Support for continuing Aboriginal connection to Country will facilitate the conservation and interpretation of Aboriginal heritage and the contribution of traditional ecological and cultural knowledge to continuously improve land management.

Reserve profiles and zone maps

The following summary profiles for each of the reserves in this complex outline the landscape and local level actions to guide management. The management plan and relevant strategies will inform land management programs and priorities across Canberra Nature Park. The accompanying zone maps serve to assist the community and Canberra Nature Park stakeholders and partners with expectations and directions for land use activities, consistent with conservation of the natural environment.



CALLUM BRAE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Callum Brae Nature Reserve (143 hectares) was established in 2008. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive landscape of remnant wooded vegetation that provides a wildlife movement corridor through to NSW in the east, to the Murrumbidgee River in the west, and to the southern ACT through Tuggeranong Hill and Rob Roy nature reserves.

NATURAL VALUES: Callum Brae protects:

- part of one of the largest, best-connected and most diverse areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland remaining in Australia
- high-quality breeding and foraging habitat for woodland birds, including threatened or regionally declining species: Diamond Firetail (*Stagonopleura guttata*), White Winged Triller (*Lalage sueruii*), Varied Sittella (*Daphoenositta chrysoptera*) and Southern Whiteface (*Aphelocephala leucopsis*)
- good habitat for small numbers of Scarlet Robin (*Petroica boodang*) and Flame Robin (*Petroica phoenicea*), especially in autumn and winter, and seasonal visits from the Dusky Woodswallow (*Artamus cyanopterus*)
- habitat of the vulnerable Perunga Grasshopper (*Perunga ochracea*), one of a few known locations.

CULTURAL VALUES: The reserve has a long history of pastoral use and protects part of the ACT Heritage Register listed 'Callum Brae' precinct, an outstanding ACT example of a Federal Capital Territory soldier settlement rural lease. Three small red brick huts on the western border of the reserve were built to store munitions for use at the adjacent quarry.

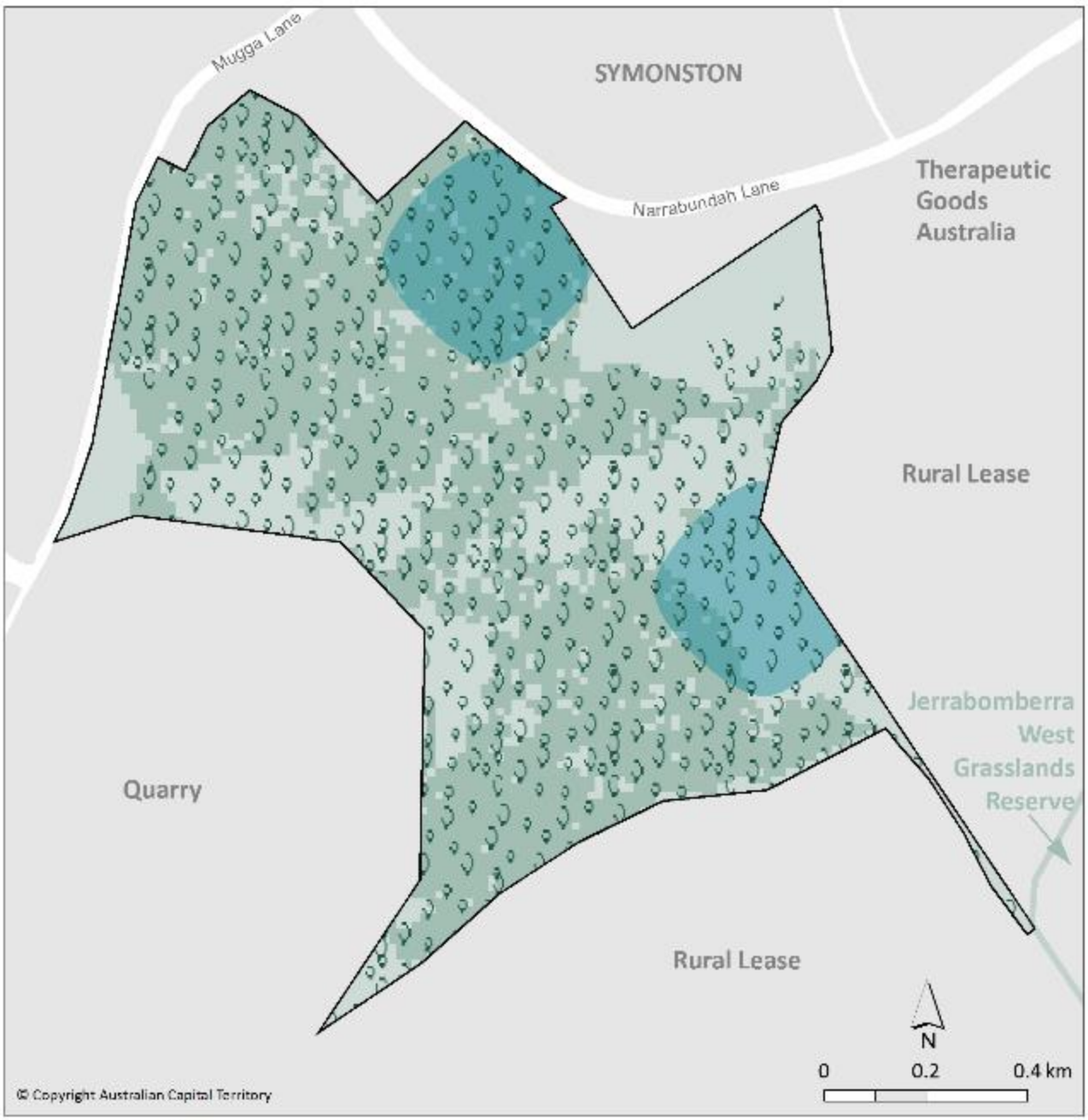
RECREATION: The reserve has several pedestrian access points and a network of slashed management trails for low key recreation. Dogs are prohibited.

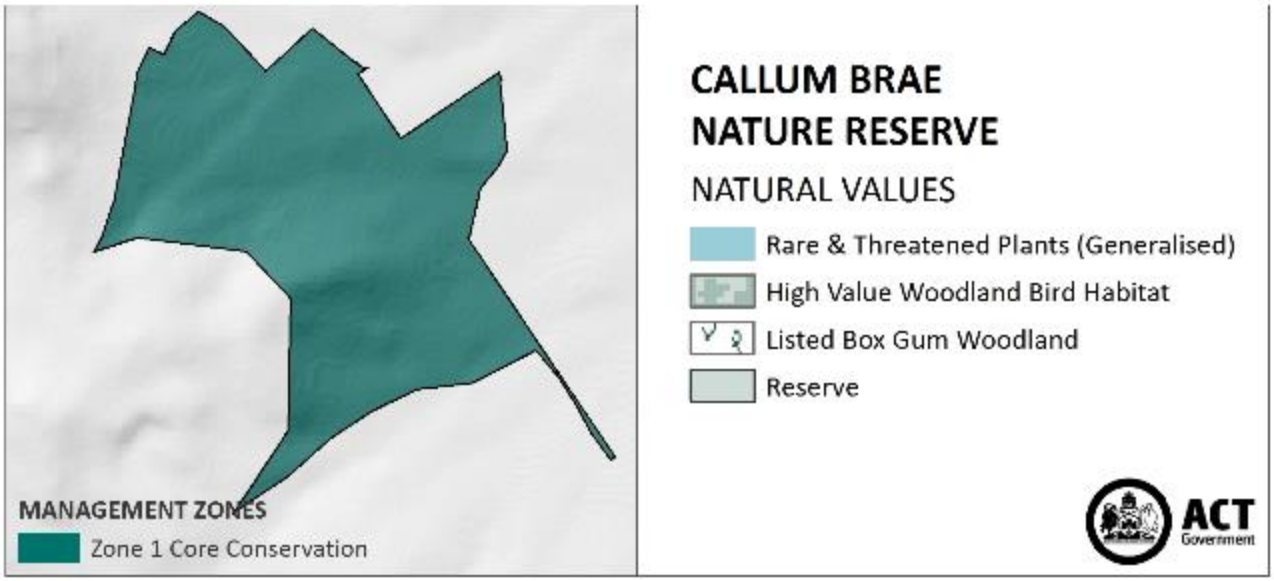
PARKCARE: Canberra Ornithologists Group has monitored birds in the reserve since 1998 as part of a long-term woodland bird monitoring program across grassy woodlands.

MANAGEMENT: The reserve has previously been grazed by stock. It has no shared boundaries with suburbs. The long-term management aim is to conserve and rehabilitate the structure and condition of vegetation and to maintain connectivity with other woodland areas to ensure there is ongoing viable habitat for threatened and declining woodland birds.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- continue habitat improvement works, including placement of woody debris and plantings to restore the complexity of mid-storey shrub layer for small bird habitat
- investigate dieback in Blakely's Red Gum
- protect the historic munitions stores.





FARRER RIDGE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Farrer Ridge Nature Reserve (185 hectares) was established in 1993. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive landscape of remnant wooded vegetation that provides a wildlife movement corridor through to NSW in the east, to the Murrumbidgee River in the west, and to the southern ACT through Tuggeranong Hill and Rob Roy nature reserves.

NATURAL VALUES: Farrer Ridge protects:

- grassy woodland with a diverse, high-quality understorey that provides habitat for rare plant species, including the endangered Small Purple Pea (*Swainsona recta*) and Hoary Sunray (*Leucochrysum albicans*)
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland over about one third of the area
- rocky areas that provide habitat for the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*).

CULTURAL VALUES: The ACT Heritage Register lists three Aboriginal heritage sites within the reserve. The remnants of a cottage (Grady's house) are located on the western side.

RECREATION: The reserve is popular for walking, running and cycling, including group events. Horse riding is permitted on identified equestrian trails. Dogs are permitted on leash.

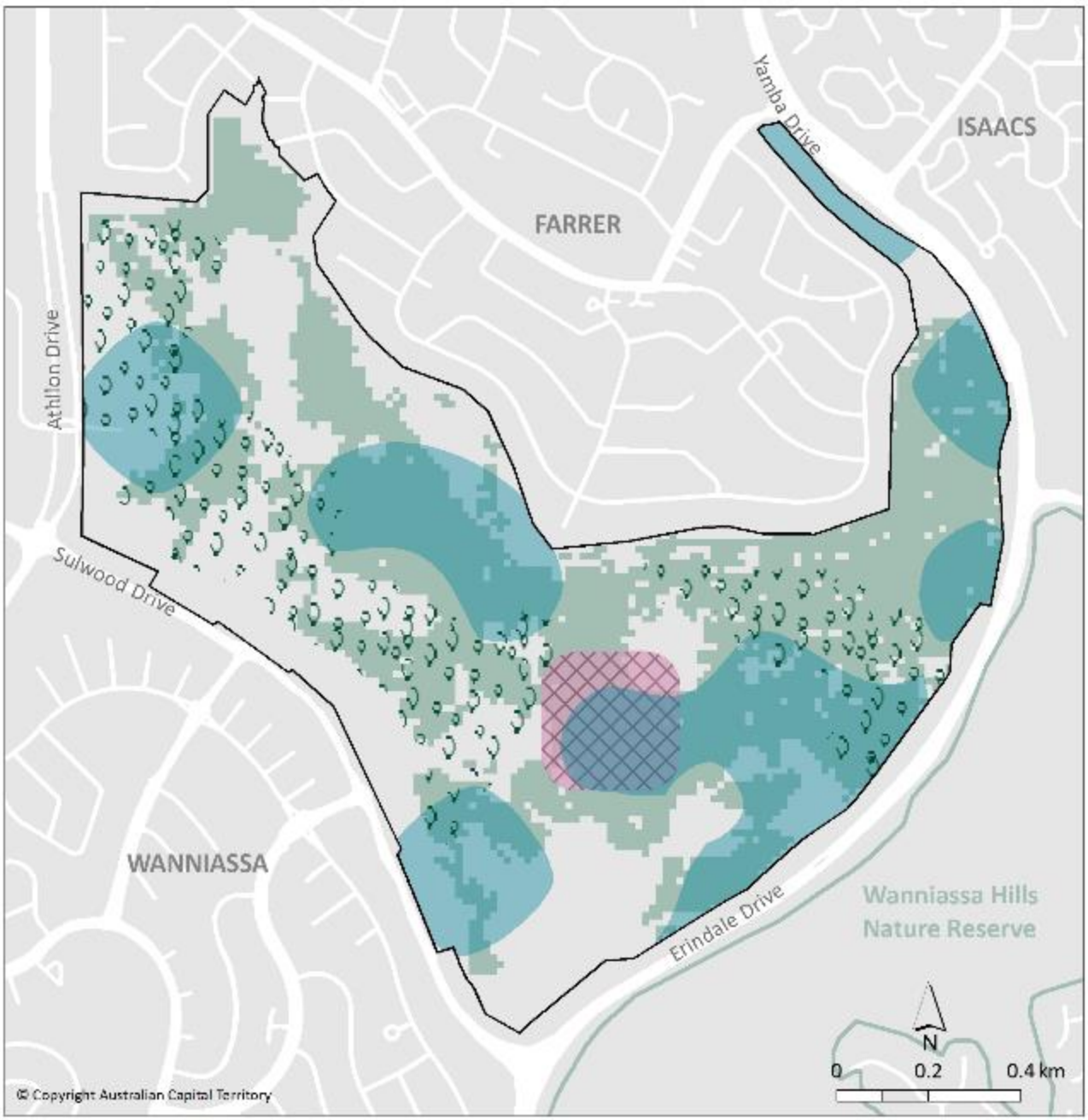
PARKCARE: Farrer Ridge ParkCare, established in 1989, undertakes weed and erosion control, interpretive walks, vegetation mapping, and propagation of native plants from local seed.

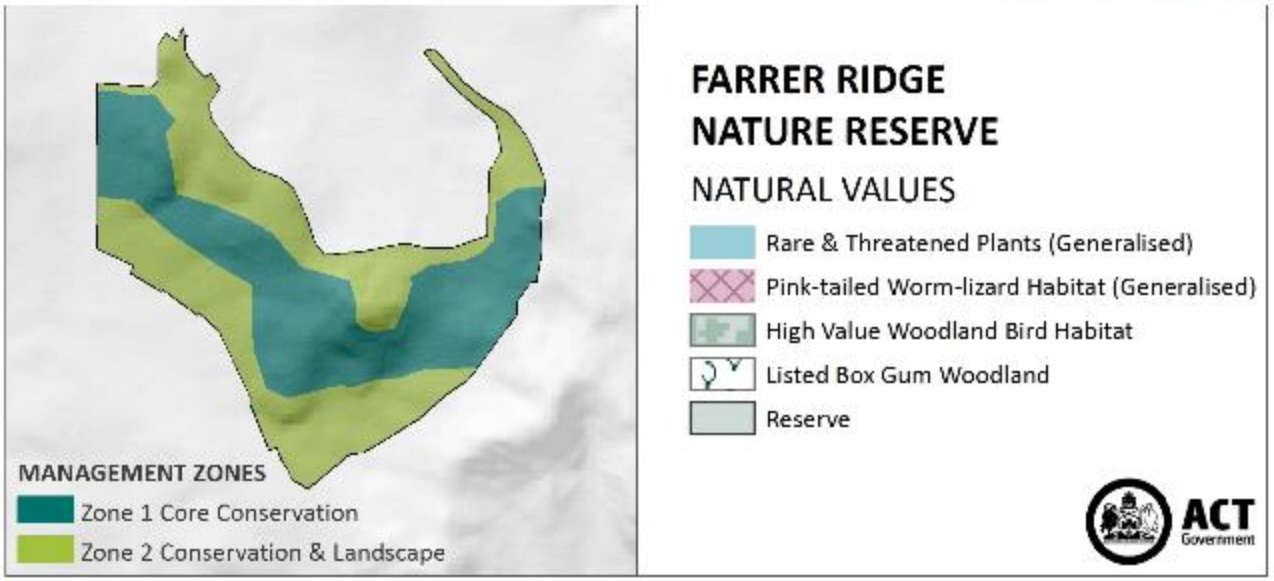
MANAGEMENT: Farrer Ridge was extensively burnt in 2003 with a high tree mortality. Significant regeneration is now occurring, from lignotubers rather than from the recovery of mature trees.

The long-term management aim for the reserve is to conserve native plant diversity, including populations of rare plants, and to maintain connectivity with other woodland areas.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain plant diversity and improve woodland condition
- improve connectivity between woodland patches
- improve habitat for Pink-tailed Worm-lizard
- continue to support Farrer Ridge ParkCare.





ISAACS RIDGE NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Isaacs Ridge Nature Reserve (387 hectares) was established in 1993 and extended in 2012 and 2014 (environmental offset). The reserve is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area. A small special-purpose reserve adjacent to the western side is managed as part of Canberra Nature Park.

CONNECTIVITY: The reserve is part of an extensive landscape of remnant wooded vegetation that provides a wildlife movement corridor through to NSW in the east, to the Murrumbidgee River in the west, and to the southern ACT through Tuggeranong Hill and Rob Roy nature reserves.

NATURAL VALUES: Isaacs Ridge protects:

- an important part of one of the largest, best-connected and most diverse areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland remaining in Australia
- an important breeding and foraging habitat for woodland birds, and recent plantings of Drooping She-oak (*Allocasuarina verticillata*) aim to restore foraging habitat for the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami*)
- habitat (a small area) for the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- one of three known ACT locations for the semi-aquatic Small Knotweed (*Polygonum plebeium*).

CULTURAL VALUES: The ACT Heritage Register lists one Aboriginal heritage site within the reserve.

RECREATION: Dogs are permitted on leash except in the offset area on the eastern side. Horse riding is permitted on identified equestrian trails. Part of the Centenary Trail passes along the western edge of the reserve. The special-purpose reserve and adjacent pine forest are a focus for recreational use, and a network of multi-use tracks has been established.

ACCESS RESTRICTIONS: Access to the former tip site in the south-west corner of the reserve is discouraged.

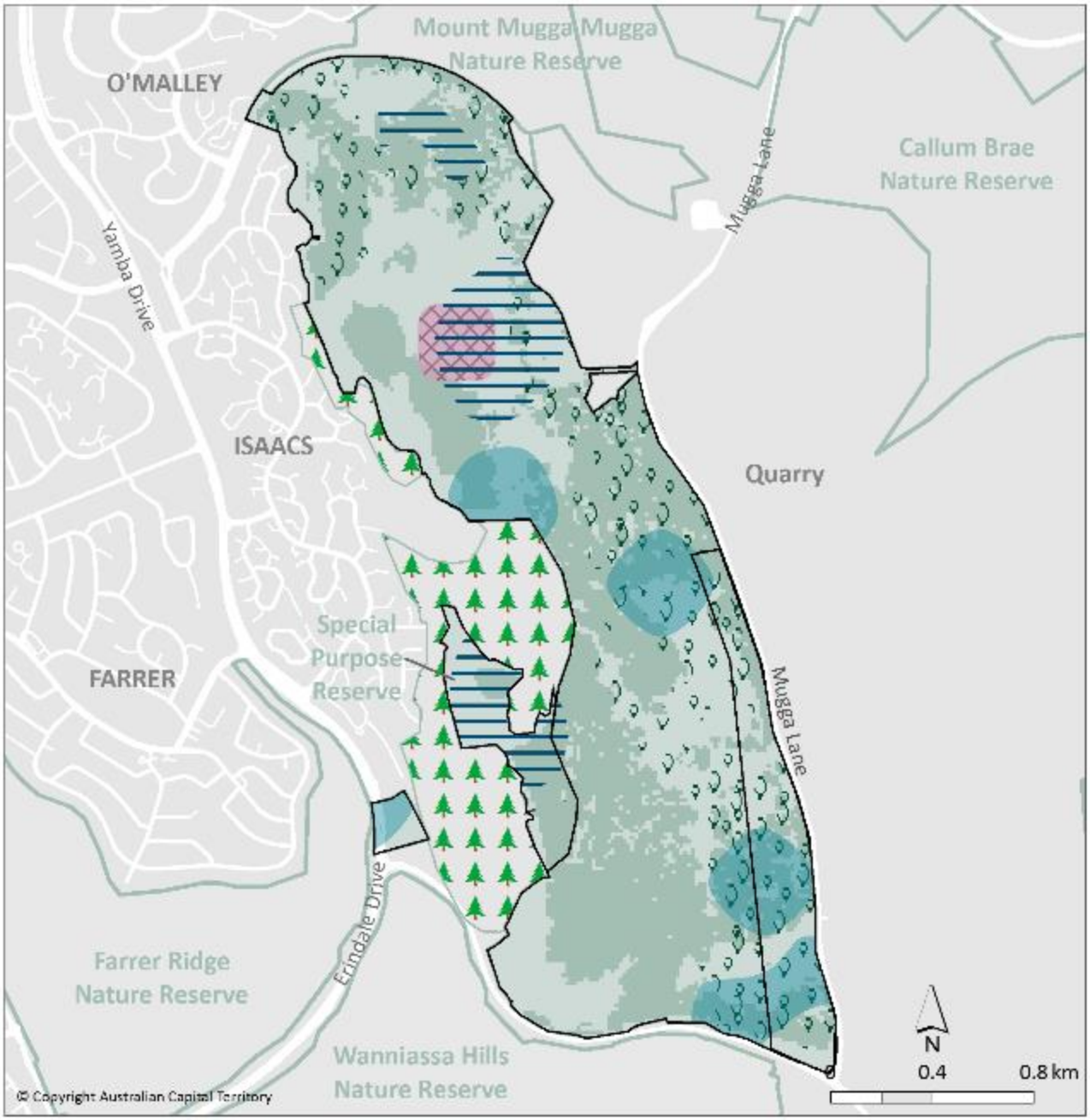
PARKCARE: Isaacs Ridge/Mount Mugga Mugga ParkCare undertakes activities that include revegetation and weed control. Canberra Ornithologists Group has monitored birds in the offset area since 1998.

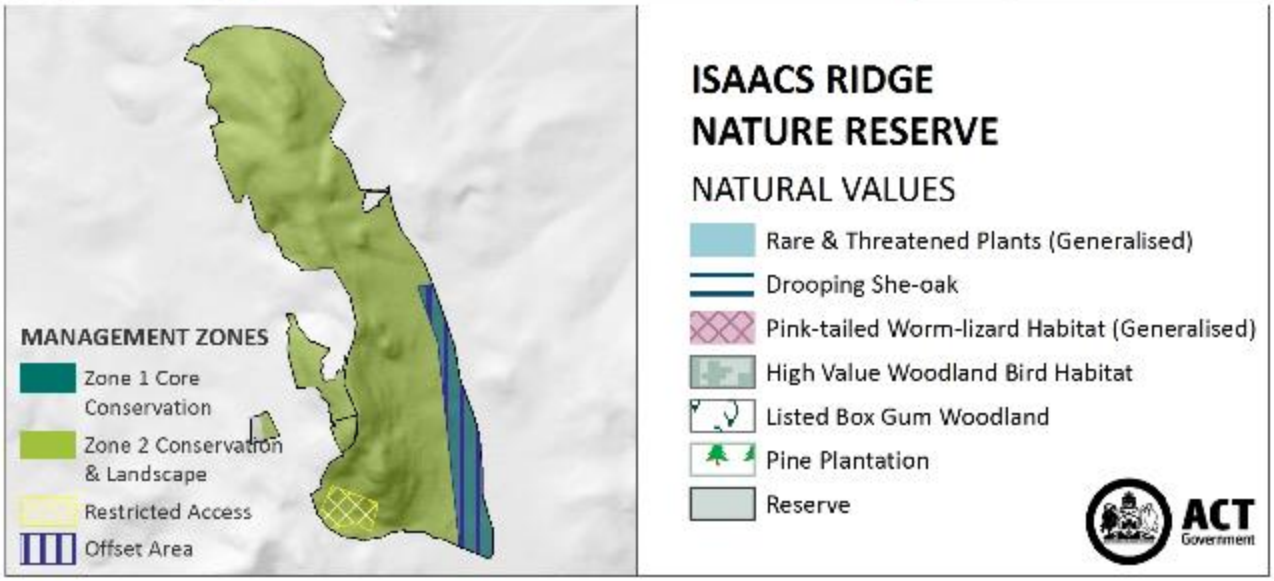
MANAGEMENT: Isaacs Ridge has steep slopes and shallow infertile soils that are susceptible to erosion. The reserve has previously been extensively cleared and grazed by stock. Two pine plantations border the reserve on the western side. An additional 39 hectares of woodland has recently been added to the reserve on the eastern side requiring specific management under an offset management plan.

The long-term management aim for the reserve is to extend the area of woodland and to rehabilitate its condition and structure.

KEY ACTIONS: In addition to actions identified in Part 1 of this, reserve management will aim to:

- manage the offset area in accordance with the offset management plan
- maintain plant diversity and woodland connectivity, and improve woodland condition
- maintain the wet gully at the southern end of the reserve as a drought refuge for woodland birds
- map the extent of Pink-tailed Worm-lizard habitat
- continue support for Isaacs Ridge/Mount Mugga Mugga ParkCare.





JERRABOMBERRA WEST GRASSLANDS NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Jerrabomberra West Grasslands Nature Reserve (261 hectares) was established in 2007. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: This reserve is part of a large grassland-woodland complex of more than 1000 hectares that has one of the largest, best-connected and most diverse box–gum woodland areas remaining in Australia.

NATURAL VALUES: Jerrabomberra West Grasslands protects:

- one of the largest ACT areas of nationally critically endangered Natural Temperate Grassland (180 hectares) and nationally critically endangered Yellow Box–Red-Gum Grassy Woodland
- habitat for the endangered Grassland Earless Dragon (*Tympanocryptis pinguicolla*), one of three reserves nationally in which the 'northern' form of the lizard is known to occur
- populations of three other threatened species: Striped Legless Lizard (*Delma impar*), Golden Sun Moth (*Synemon plana*) and Perunga Grasshopper (*Perunga ochracea*); and a diverse reptile habitat
- habitat for small numbers of threatened Scarlet Robin (*Petroica boodang*) and Flame Robin (*Petroica phoenicea*), particularly in autumn and winter, and the rare Dusky Woodswallow (*Artamus cyanopterus*) and Diamond Firetail (*Stagonopleura guttata*), which breed in the reserve
- habitat for rare plant species
- one of the few known locations of the rare and locally endemic Canberra Raspy Cricket (*Cooraboorama canberrae*) and open rocky areas within the woodland that are likely habitat of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*).

CULTURAL VALUES: The ACT Heritage Register lists four Aboriginal heritage sites. The reserve also protects part of two heritage listed sites: the Callum Brae Precinct and the Woden Homestead and Environs.

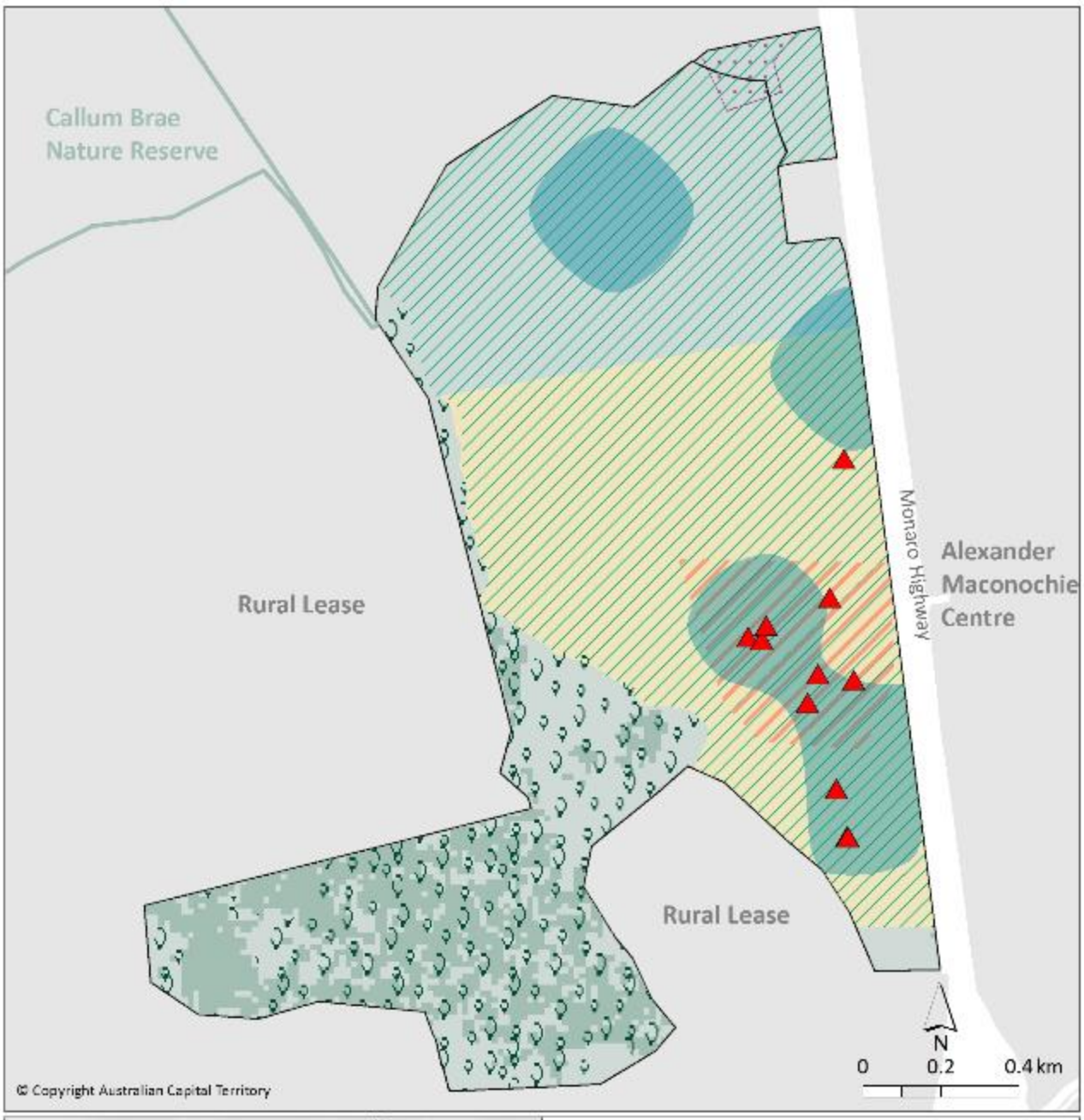
RECREATION: Access to the reserve is from Callum Brae Nature Reserve and a network of slashed management trails. The National Recovery Plan for the Grassland Earless Dragon (*Tympanocryptis pinguicolla*) requires restricted access and limited visitor use. Only passive, low-impact recreation activities are compatible with maintaining reserve values. Dogs, horses and bicycles are not permitted.

PARKCARE: Canberra Ornithologists Group has conducted seasonal monitoring at sites in the woodlands since 2005. Friends of Grasslands advocates for grasslands conservation.

MANAGEMENT: Jerrabomberra West management aims to increase the ecological condition and connectivity of the Natural Temperate Grassland and Yellow Box–Blakely's Red Gum Grassy Woodland community, with a focus on the habitat of Grassland Earless Dragon and declining woodland birds.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- implement a site-specific grazing, fire or slashing regime to increase habitat quality for Grassland Earless Dragon, Striped Legless Lizard and Golden Sun Moth
- trial the use of reinstated surface rock as habitat for grassland lizards and invertebrates and restoration technique in areas dominated by Phalaris
- continue habitat improvement works, including plantings, to restore mid-storey shrub layer complexity for small bird habitat.



Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

MOUNT MUGGA MUGGA NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mount Mugga Mugga Nature Reserve (148 hectares) was established in 1993, with an addition in 2005, and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive landscape of remnant wooded vegetation that provides a wildlife movement corridor through to NSW in the east, to the Murrumbidgee River in the west, and to the southern ACT through Tuggeranong Hill and Rob Roy nature reserves.

NATURAL VALUES: Mount Mugga Mugga protects:

- part of one of the largest, best connected and most diverse areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland remaining in Australia
- important breeding and foraging habitat for woodland birds, including threatened species Diamond Firetail (*Stagonopleura guttata*), Hooded Robin (*Melanodryas cucullata*) and Speckled Warbler (*Chthonicola sagittata*)
- habitat for vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*) and Perunga Grasshopper (*Perunga ochracea*).
- The vulnerable Little Eagle (*Hieraaetus morphnoides*) has been recorded as breeding within the reserve, but there are no recent records. Wedge-tailed Eagles (*Aquila audax*) nest on the eastern slopes.

CULTURAL VALUES: The ACT Heritage Register identifies a number of Aboriginal heritage sites within the reserve. Early 20th century plantings (initiated by Walter Burley Griffin, supervised by Charles Weston) continue to flourish. Species include Argyle Apple (*Eucalyptus cinerea*), White Box (*Eucalyptus albens*) and Golden Wattle (*Acacia pycnantha*).

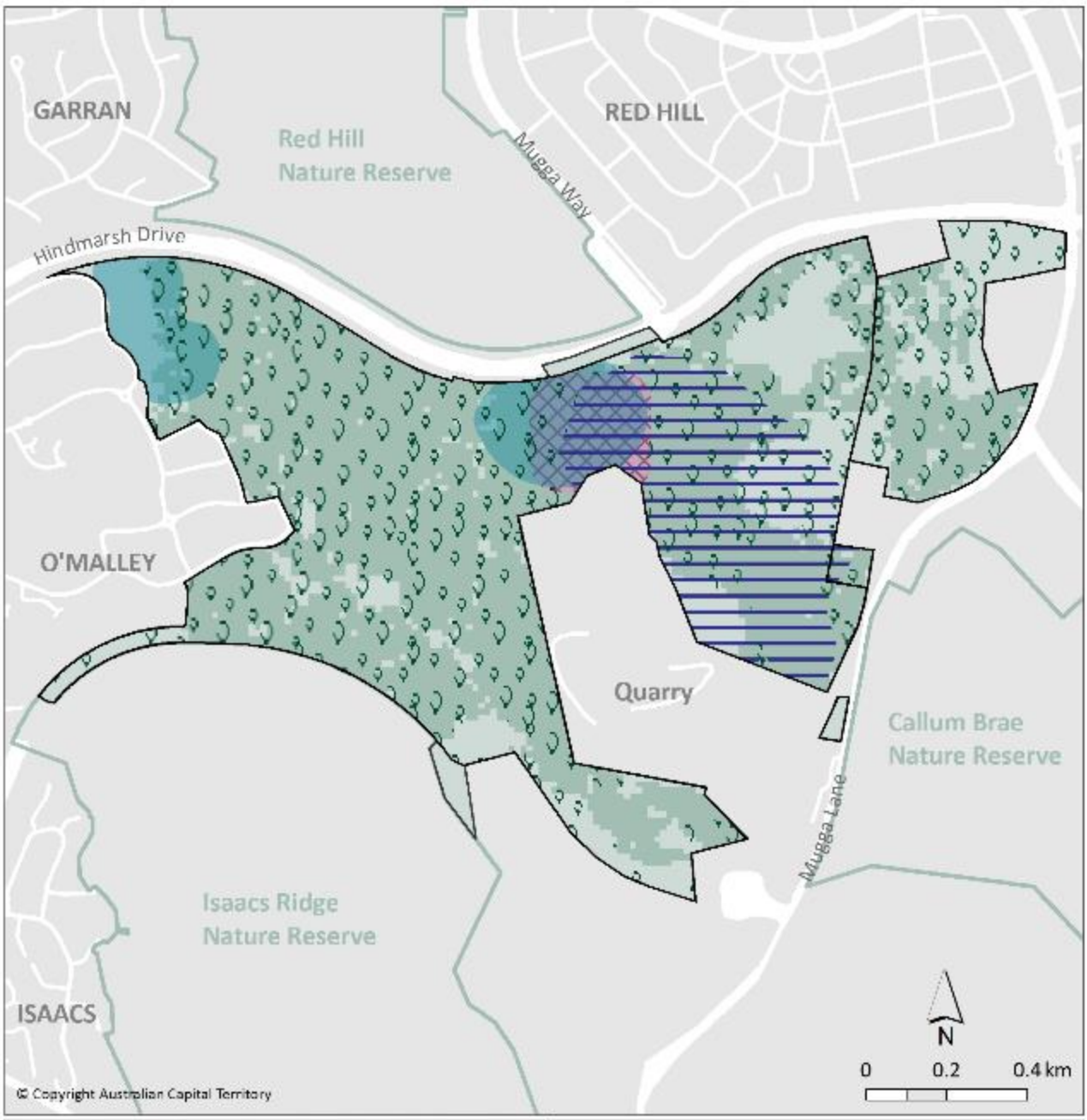
RECREATION: The Centenary Trail passes through the reserve. Dogs are permitted on leash.

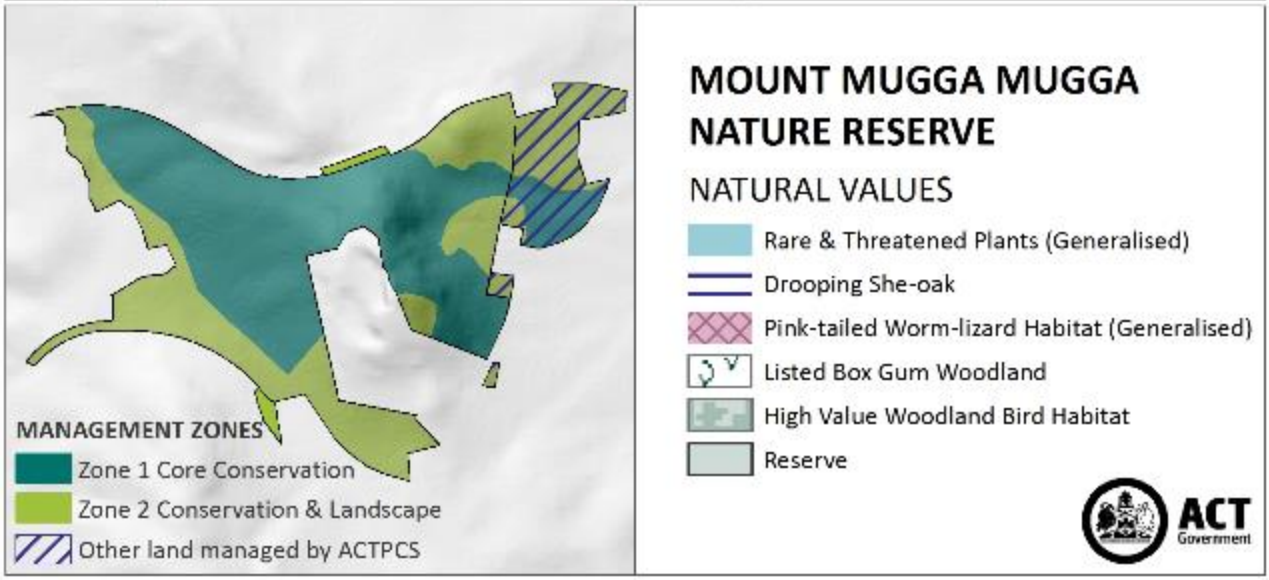
PARKCARE: Isaacs Ridge—Mount Mugga Mugga ParkCare undertakes regular activities including planting and weed control.

MANAGEMENT: The long-term management aim is to conserve the existing significant woodland bird habitat and historic plantings, rehabilitate vegetation structure, and support connectivity to other woodland areas.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- improve woodland structure to support woodland bird habitat and connectivity
- investigate options for remediation of significant gullies
- continue to support Isaacs Ridge—Mount Mugga Mugga.





Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

MOUNT TAYLOR NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Mount Taylor Nature Reserve (300 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive landscape of remnant wooded vegetation that provides a wildlife movement corridor through to NSW in the east, to the Murrumbidgee River in the west, and to the southern ACT through Tuggeranong Hill and Rob Roy nature reserves.

NATURAL VALUES: Mount Taylor protects:

- a diverse high-quality woodland complex which protects the largest and heritage listed ACT population of the endangered Small Purple Pea (*Swainsona recta*) (approximately 10% of the national population)
- habitat for plant species rare in the ACT
- important habitat for threatened and regionally declining woodland birds
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland on the western slopes
- a large population of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- the geologically significant Tuggeranong Parkway Cutting, which is on the ACT Heritage Register.

CULTURAL VALUES: The ACT Heritage Register lists two Aboriginal heritage sites within the reserve, including a culturally modified tree.

RECREATION: Mount Taylor is popular for walking, running and cycling. A walking track leads to the summit. Horse riding is permitted on identified equestrian trails. Dogs are permitted on leash.

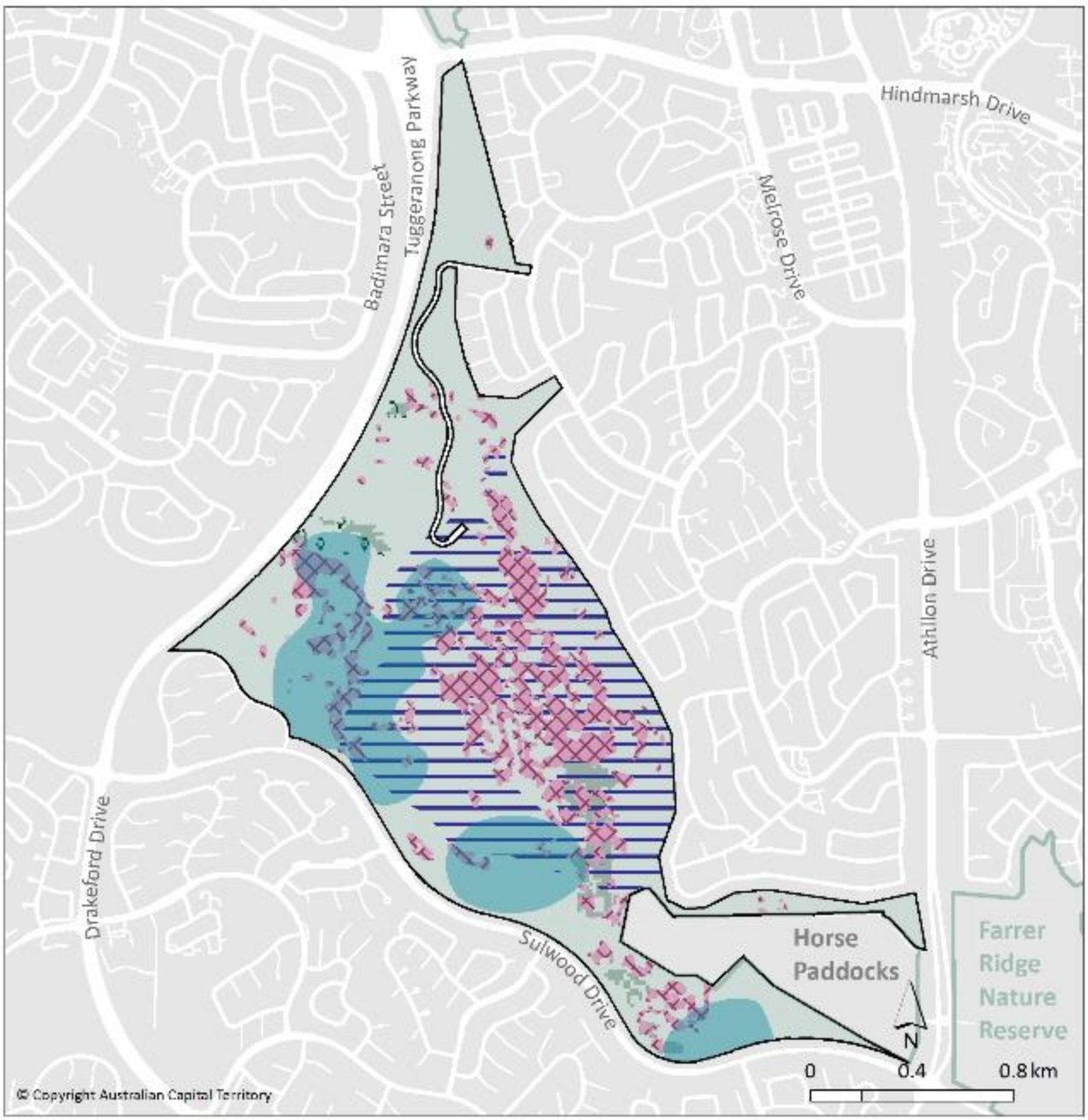
PARKCARE: Mount Taylor ParkCare, established in 1989, undertakes activities that include weed control, monitoring kangaroo numbers, stabilising erosion, and collecting Bird Atlas information.

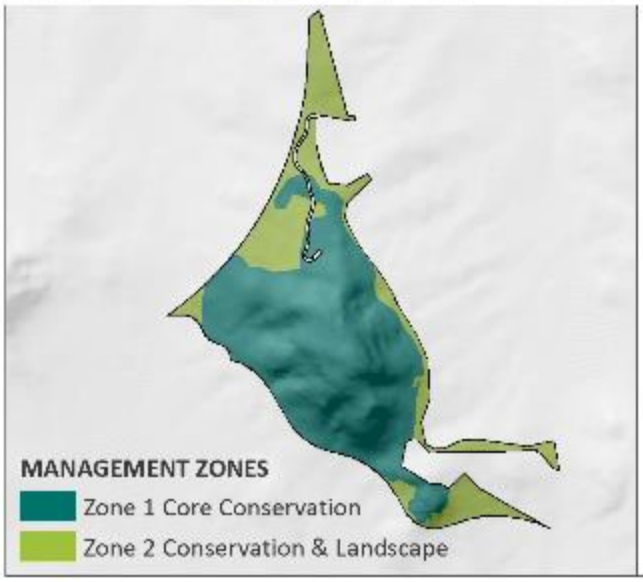
MANAGEMENT: Mount Taylor was extensively cleared and grazed in the past, but significant regeneration has now occurred; all vegetation layers (trees, shrubs and ground cover) exhibit good structure and diversity. Large areas of Drooping She-oak (*Allocasuarina verticillata*) are beginning to mature and will, in future, provide a food source for the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami*).

The long-term management aim is to support forest and woodland regeneration and to protect threatened species.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain and improve woodland condition and connectivity
- monitor impacts on Pink-tailed Worm-lizard habitat
- monitor grazing pressure on Small Purple Pea
- explore opportunities for increased horse riding access
- continue to support Mount Taylor ParkCare.





MOUNT TAYLOR NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Drooping She-oak
- Pink-tailed Worm-lizard Habitat
- High Value Woodland Bird Habitat
- Listed Box Gum Woodland
- Reserve

ACT Government

RED HILL NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Red Hill Nature Reserve (293 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive landscape of remnant wooded vegetation that provides a wildlife movement corridor through to NSW in the east, to the Murrumbidgee River in the west, and to the southern ACT through Tuggeranong Hill and Rob Roy nature reserves.

NATURAL VALUES: Red Hill protects:

- part of one of the largest, best-connected and most diverse areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland in Australia
- the fifth largest known population of the endangered Button Wrinklewort (*Rutidosis leptorrhynchoides*) (on the ACT Heritage Register) and major ACT habitat of the rare Pale Flax Lily (*Dianella longifolia)*
- habitat of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*) and Perunga Grasshopper (*Perunga ochracea*)
- a nesting site for the Gang Gang Cockatoo (*Callocephalon fimbriatum*), listed as vulnerable in NSW.

CULTURAL VALUES: Burley Griffin's vision of hills with colourful flowering vegetation was implemented by Charles Weston with non-endemic species planted from 1917 to 1920. Crimson Bottlebrush (*Callistemon citrinus*), Rosemary Grevillea (*Grevillea rosmarinifolia*) and Darling Pea (*Swainsona galegifolia*) remain today.

RECREATION: The reserve is popular for walking, running, cycling, and group events. Scenic lookouts provide views over Canberra's Parliamentary Zone to the mountains beyond. Dogs are permitted on leash.

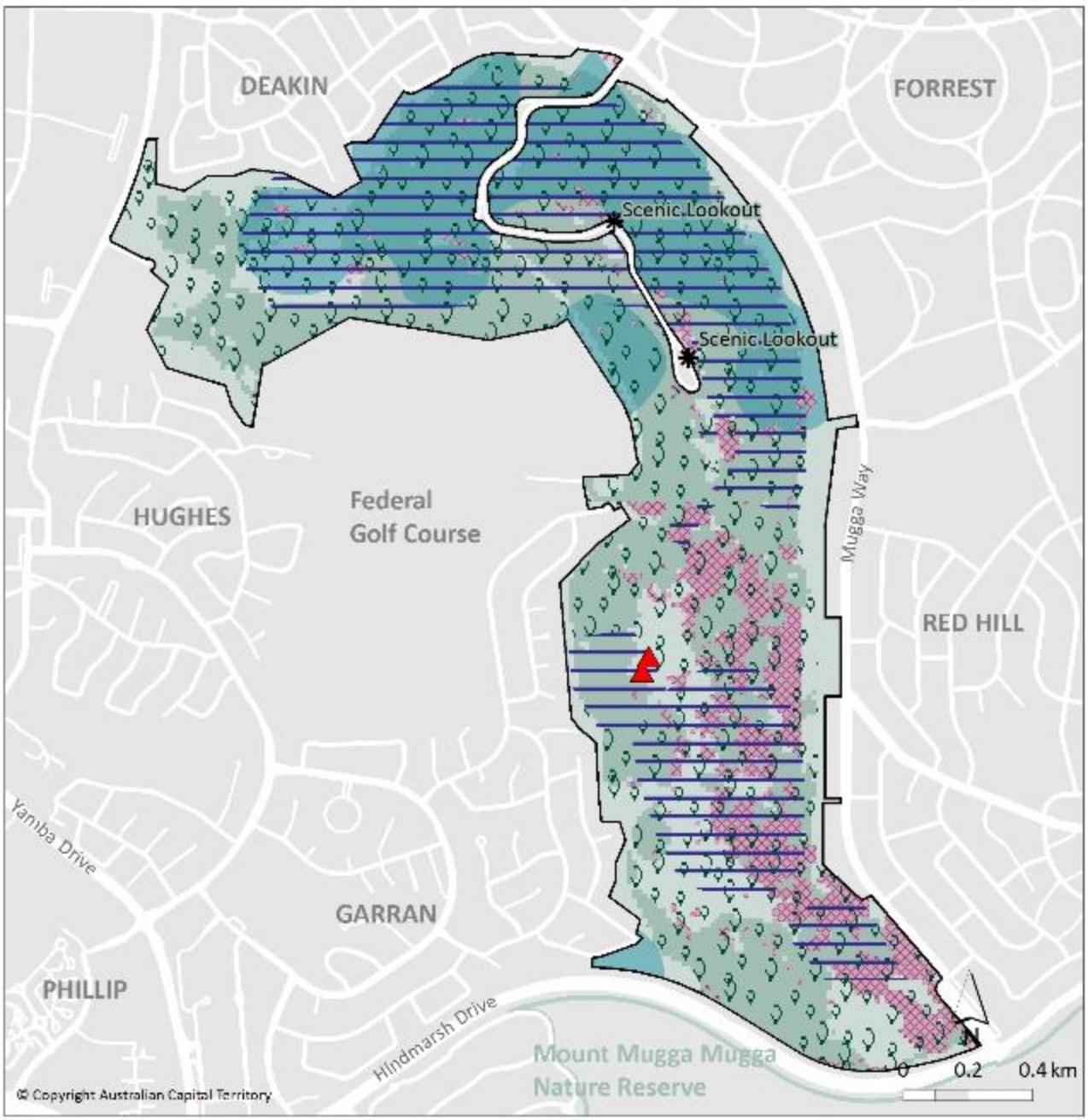
ACCESS RESTRICTIONS: Access to the old tip site at the western end of the reserve is discouraged.

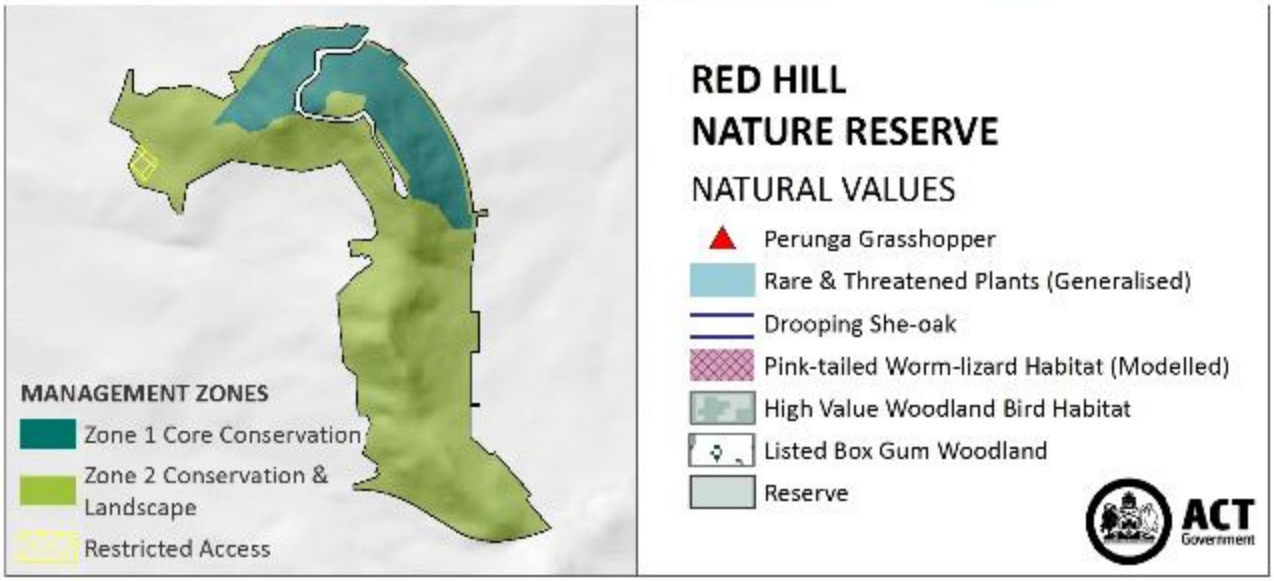
PARKCARE: Red Hill Regenerators ParkCare, established in 1988, undertakes activities that include removing weeds, rationalising tracks, planting forbs and shrubs, guiding walks and mapping rabbit warrens. ParkCare has helped to significantly reduce weed cover since 1995. The Canberra Ornithologists Group has monitored birds in the reserve since 1998.

MANAGEMENT: Red Hill has a long history of stock grazing. Cattle were removed from the reserve in 1995. Past grazing and weed invasion from neighbouring gardens have modified the original vegetation. The long-term management aim is to conserve native plant diversity and populations of rare plants.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- improve woodland condition and maintain connectivity to surrounding woodland areas
- improve habitat for threatened and declining woodland bird species
- maintain Pink-tailed Worm-lizard habitat
- investigate options for improving Gang Gang Cockatoo habitat and protect known breeding trees
- remediate the former tip site
- continue to support Red Hill Regenerators ParkCare.





WANNIASSA HILLS NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Wanniassa Hills Nature Reserve (262 hectares) was established in 1993 and is a Designated Area under the National Capital Plan. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is part of an extensive landscape of remnant wooded vegetation that provides a wildlife movement corridor through to NSW in the east, to the Murrumbidgee River in the west, and to the southern ACT through Tuggeranong Hill and Rob Roy nature reserves.

NATURAL VALUES: Wanniassa Hills protects:

- a high diversity of open forest and woodland plant species including several that are uncommon in the ACT
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland (on about 15% of the reserve)
- connectivity between large woodland areas in Woden and Tuggeranong, and to forest and woodland areas in NSW
- important habitat for threatened and regionally declining woodland birds (because of high condition vegetation and connectivity)
- a population of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*) in rocky areas
- the Wedge-tailed Eagle (*Aquila audax*) nests in the reserve.

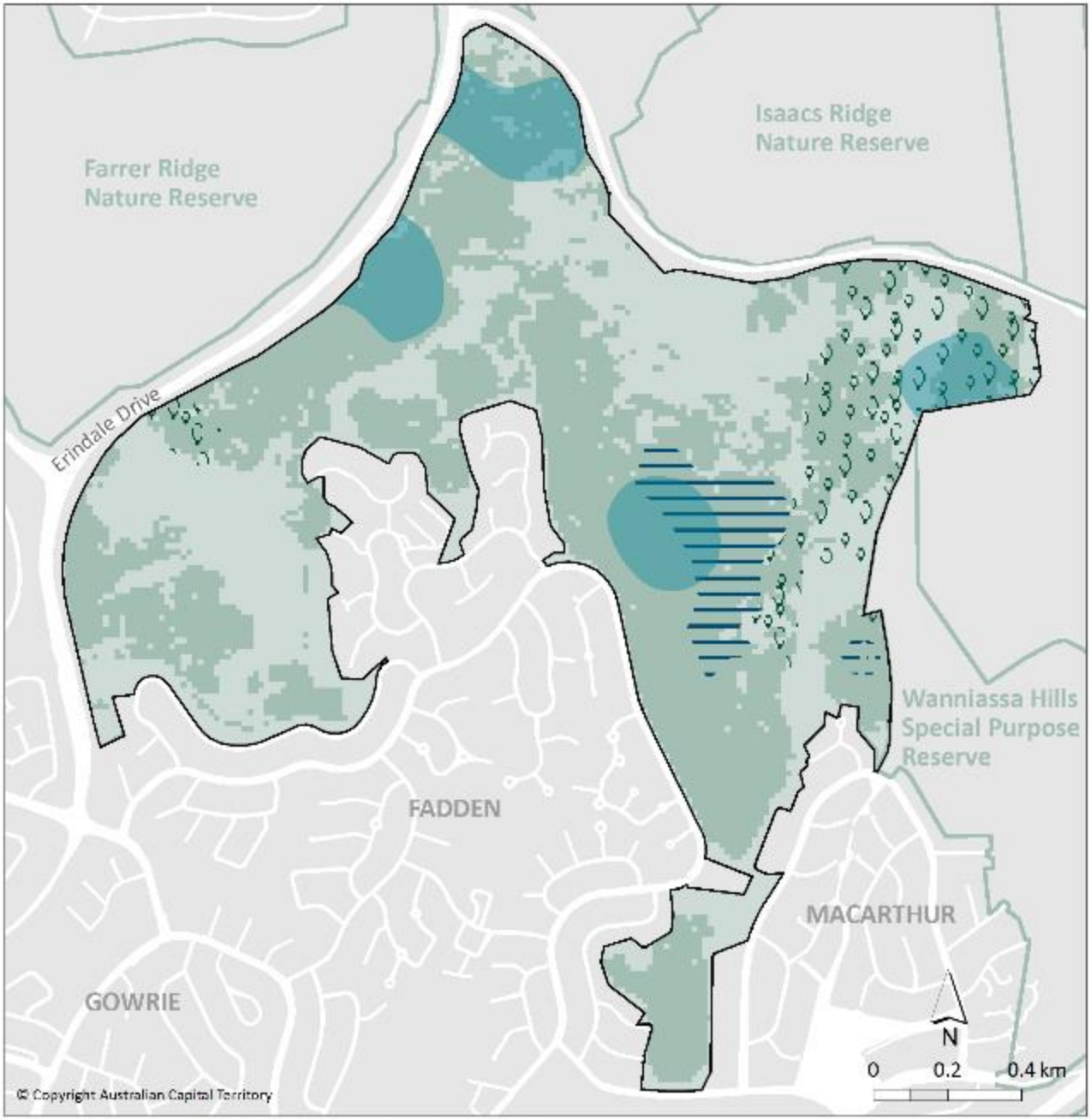
RECREATION: The reserve is popular for walking, running and cycling. The Centenary Trail passes through the north-eastern corner of the reserve. Horse riding is permitted on a section of identified equestrian trail, which passes along the eastern section of the northern boundary. Dogs are permitted on leash.

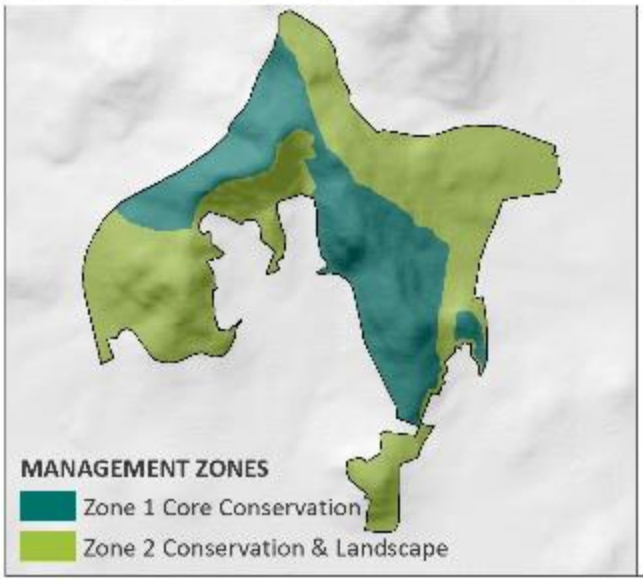
MANAGEMENT: Wanniassa Hills has both high-quality open forest and heavily disturbed former grazing land.

The long-term management aim is to support forest and woodland regeneration and to protect rare species.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- survey for Pink-tailed Worm-lizard and map extent of habitat
- improve woodland condition and maintain connectivity to surrounding woodland areas.





WANNIASSA HILLS NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Drooping She-oak
- High Value Woodland Bird Habitat
- Listed Box Gum Woodland
- Reserve

ACT Government

Southern Hills

Melrose, Rob Roy and Tuggeranong Hill nature reserves

Description

This group of reserves in southern Canberra includes large areas of dry forest and woodland, with links west to Namadgi National Park and the Murrumbidgee River, and east to woodland and forest in NSW in the vicinity of Googong Foreshores and the Tinderry Nature Reserve.

The reserves provide important habitat for woodland birds and an important corridor for wildlife movement across the landscape and a key east–west honeyeater migration route. The reserves support areas of nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland and Drooping She-oak (*Allocasuarina verticillata*) open forest, including some old-growth forest. The stands of Allocasuarina are a food source for the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami*). The isolation of much of the southern areas from the urban fringe means these areas are more likely to support populations of small mammals.

Widespread populations of the nationally vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*) occur in the reserves, as well as a number of rare plant species.

The presence of numerous stone artefacts in the reserves provides physical evidence of the long history of Aboriginal occupation of the region. The stone-axe grinding groove site in Tuggeranong Hill Nature Reserve is highly valued by the Ngunnawal people, and is significant for the information it provides on Aboriginal technology, occupation and resource use.

While there are pedestrian access points and a management trail on Tuggeranong Hill, access to Melrose and Rob Roy reserves is limited, and recreational use is low because they are relatively remote from suburban development. Dogs are not permitted in Melrose or Rob Roy nature reserves.

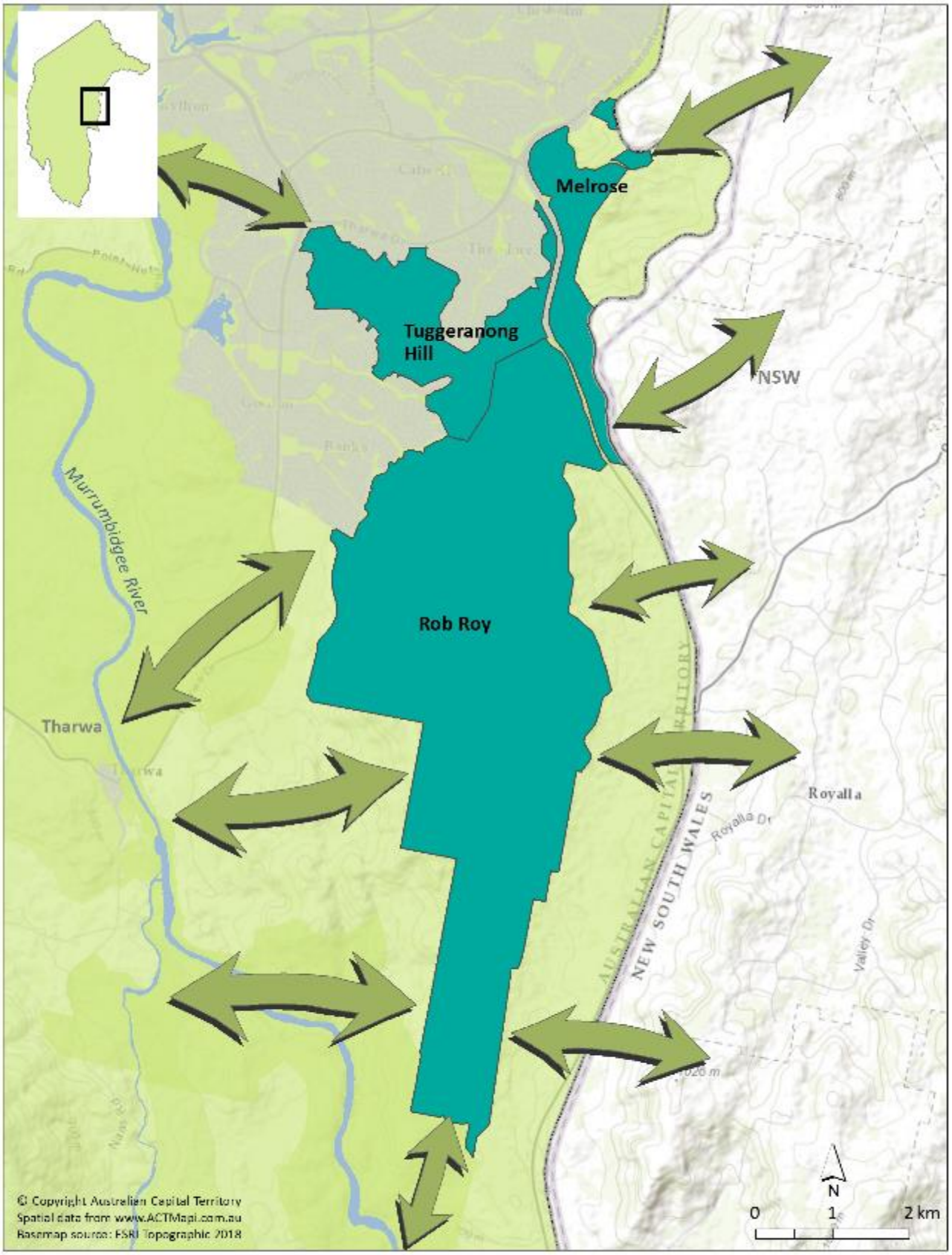
Future directions

Management of the southern woodlands will focus on protecting and restoring linkages to surrounding woodlands, the Murrumbidgee River and south to the alpine region. Continual improvement of woodland condition and protection of rare plants will be a focus, particularly in Melrose Nature Reserve, as well as the conservation of Glossy Black-cockatoo and Pink-tailed Worm-lizard habitats.

Historic heritage sites will be protected and, where appropriate, interpreted. Support for continuing Aboriginal connection to Country will facilitate the conservation and interpretation of Aboriginal heritage and the contribution of traditional ecological and cultural knowledge to continuously improve land management.

Reserve profiles and zone maps

The following summary profiles for each of the reserves in this complex outline the landscape and local-level actions to guide management. The management plan and relevant strategies will inform land management programs and priorities across Canberra Nature Park. The accompanying zone maps serve to assist the community and Canberra Nature Park stakeholders and partners with expectations and directions for land use activities, consistent with conservation of the natural environment.



MELROSE NATURE RESERVE

Brian Prince

ESTABLISHMENT: Melrose Nature Reserve (193 hectares) was established in 1993. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve is an important link for wildlife moving from Rob Roy and Tuggeranong Hill into woodland and forest in NSW in the vicinity of Googong Foreshores and the Tinderry Nature Reserve.

NATURAL VALUES: Melrose protects:

- important woodland–open forest bird habitat, which includes a recorded nest tree that may be used by the vulnerable Little Eagle (*Hieraaetus morphnoides*)
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland (on about 20% of the reserve)
- large populations of Silky Swainson-pea (*Swainsona sericea*) and Wedge Diuris (*Diuris dendrobioides*) and a small population of the vulnerable Pale Pomaderris (*Pomaderris pallida*). The endangered Buttercup Doubletail (*Diuris aequalis*) has been recorded in the adjacent rail reserve.
- a population of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*).

CULTURAL VALUES: The ACT Heritage Register lists two Aboriginal heritage sites within the reserve and a Travelling Stock Route in the north-east of the reserve. The remnants of a house site, probably the home of the Brennan family, is found on a level terrace to the east of Tuggeranong Creek.

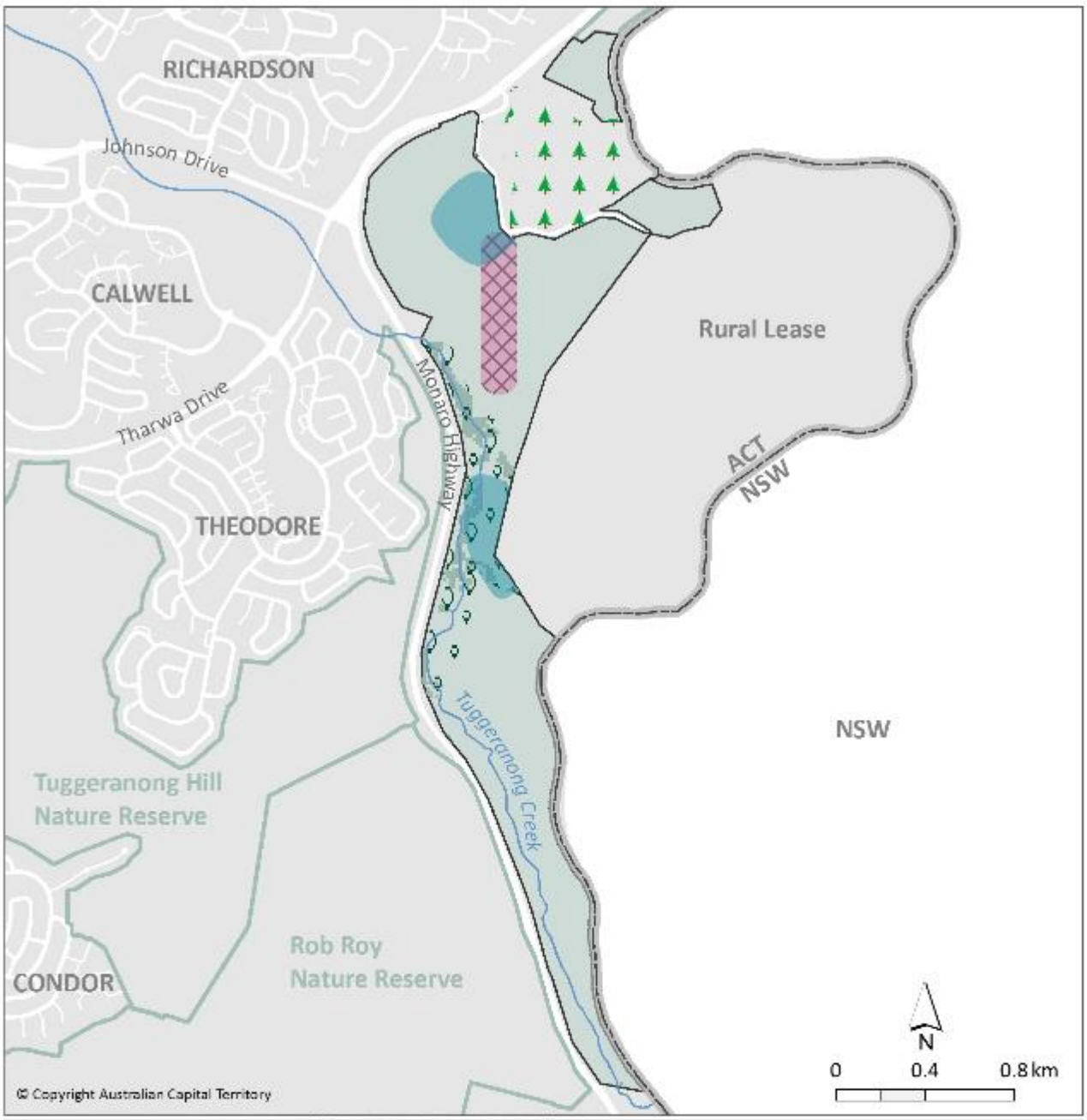
RECREATION: Recreational use of the reserve is limited. Dogs are prohibited. A mountain bike track has been established in the adjacent pine forest.

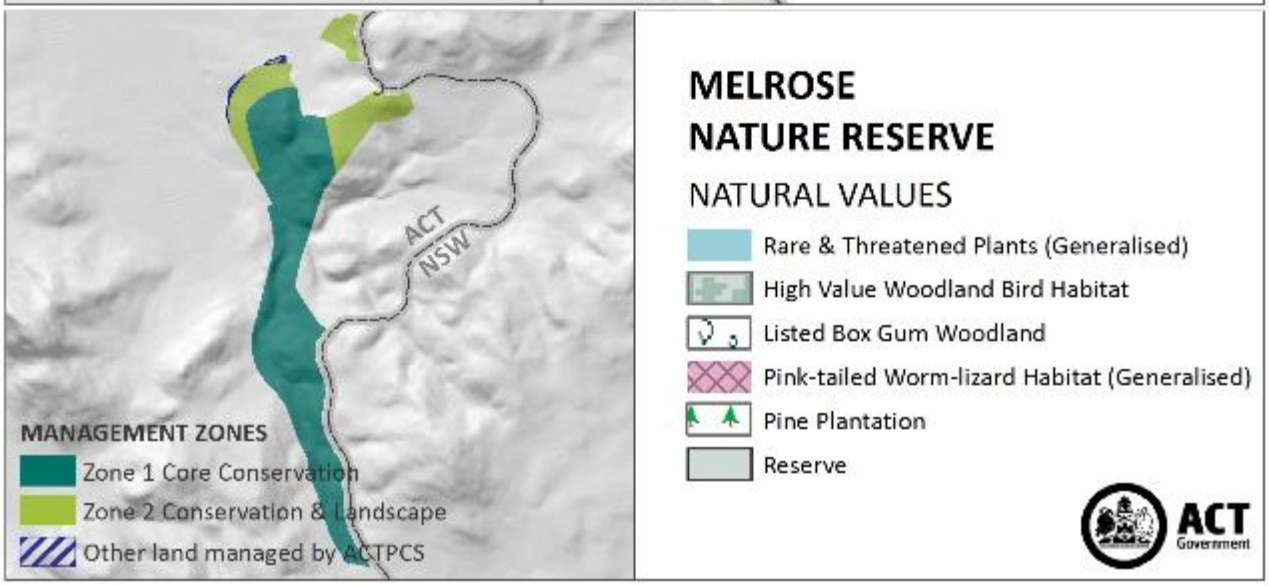
MANAGEMENT: There has been some clearing within the reserve, but vegetation is generally in good condition with a diverse understorey. The adjoining rail reserve has high conservation value and is a major habitat of the endangered Small Purple Pea (*Swainsona recta*). A pine plantation borders the reserve at the northern end.

The long-term management aim is to conserve connectivity and woodland bird habitat as well as populations of native plants, and to investigate the extent of Pink-tailed Worm-lizard habitat.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain plant diversity and improve woodland condition, with a focus on protecting populations of rare plants
- identify and map the extent of Pink-tailed Worm-lizard habitat.





Note: For information on areas identified as **other land managed by ACTPCS** refer to s. 1.10

ROB ROY NATURE RESERVE (PART CLOSED RESERVE)

Andrew Tatnell

ESTABLISHMENT: Rob Roy Nature Reserve (2017 hectares) was established in 1993. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve has good connectivity with Tuggeranong Hill Nature Reserve, the Murrumbidgee River and Namadgi National Park, as well as with Googong Foreshores and the Tinderry Nature Reserve in NSW.

NATURAL VALUES: Rob Roy protects:

- important woodland bird habitat (the reserve has high connectivity and is generally isolated from urban development impacts)
- nationally critically endangered Yellow Box–Blakely's Red-Gum Grassy Woodland (over about 10% of its area)
- a widespread population of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- major habitat for several plant species that are rare in the ACT, and for a several regionally rare species
- small populations of the vulnerable Pale Pomaderris (*Pomaderris pallida*) and endangered Hoary Sunray (*Leucochrysum albicans*)
- important wildlife movement across the landscape, for example migrating honeyeaters
- the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami*), which has been recorded in the reserve.

CULTURAL VALUES: The ACT Heritage Register lists over 40 Aboriginal heritage sites. The remnants of an early settler homestead (possibly the Gibbs family) are found in the reserve.

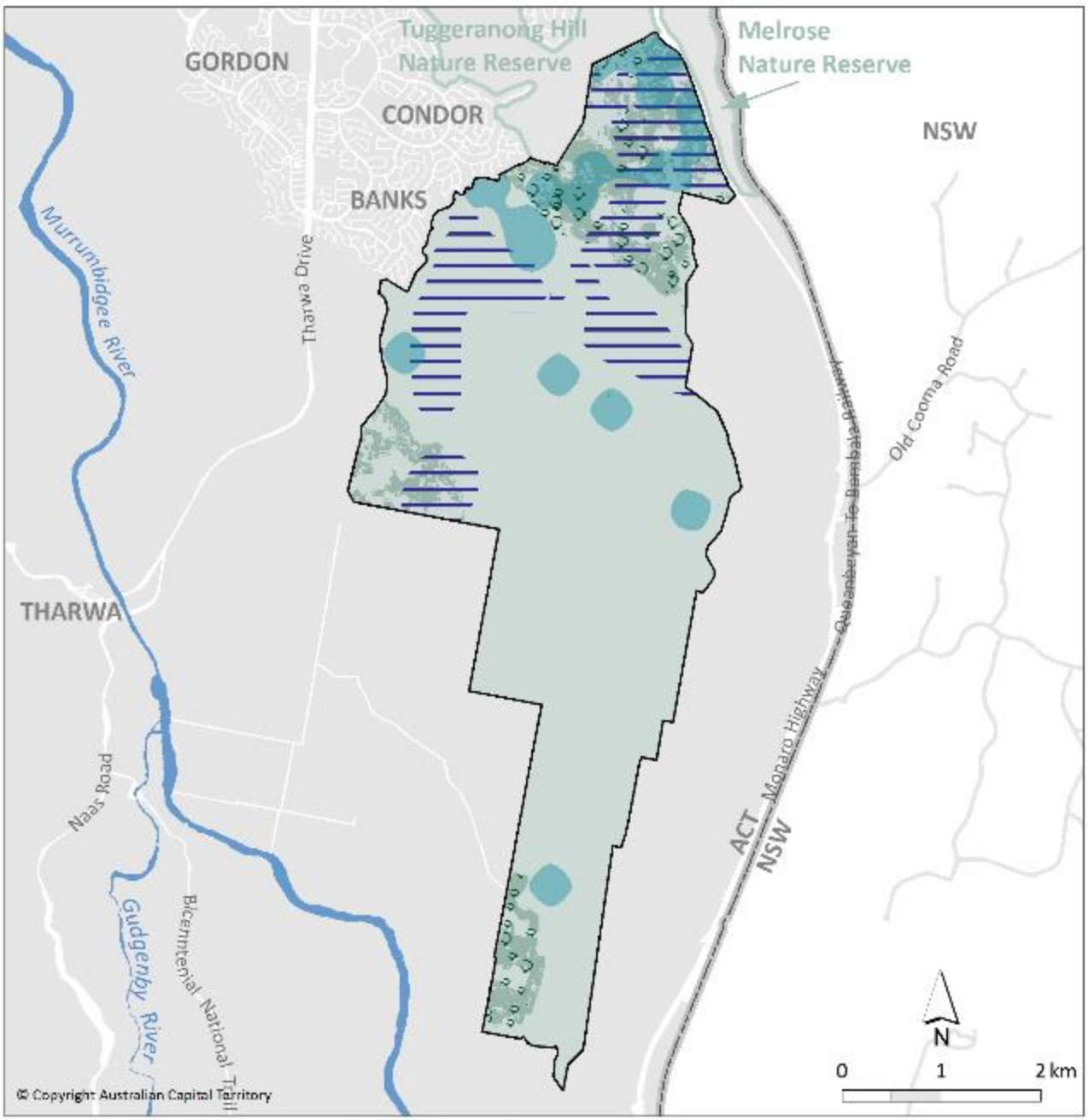
RECREATION: Access is currently limited as parts of the reserve are closed and it is largely surrounded by rural land. Dogs are not permitted.

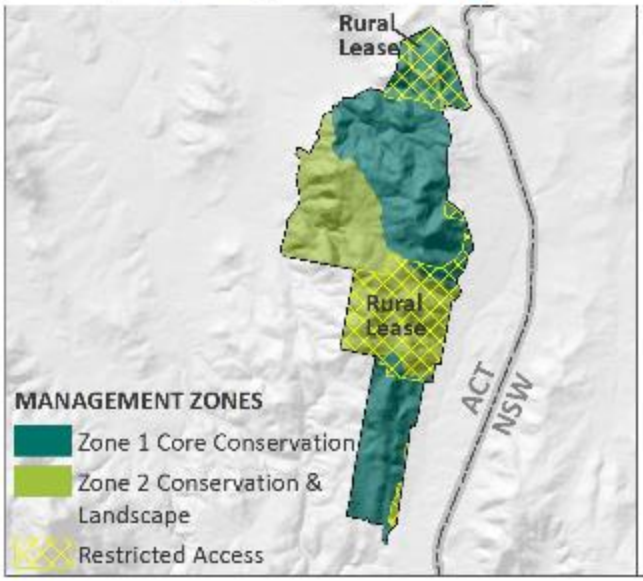
ACCESS RESTRICTIONS: The northern and middle areas of the reserve are under rural leases and have been declared closed under s. 259 of the *Nature Conservation Act 2014*. Access to these areas is prohibited except for the lessee, and people authorised by the lessee.

MANAGEMENT: The reserve has a long history of grazing by both sheep and cattle. There has been significant tree-clearing in the north-west and diversity in the ground layer is depleted. Parts of the reserve have high-quality woodland-open forest understorey, while other areas are either exotic or native pasture and have a high weed cover. The long-term management aim is to conserve connectivity, woodland bird habitat and Pink-tailed Worm-lizard habitat.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- maintain plant diversity and improve woodland condition
- investigate options for the rehabilitation of the former leased land on the north-west side of the reserve
- identify and map the extent of Pink-tailed Worm-lizard habitat.





ROB ROY NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Drooping She-oak
- High Value Woodland Bird Habitat
- Listed Box Gum Woodland
- Reserve
- River

ACT Government

TUGGERANONG HILL NATURE RESERVE

Andrew Tatnell

ESTABLISHMENT: Tuggeranong Hill Nature Reserve (365 hectares) was established in 1993. The Conservator has assigned the reserve to IUCN protected area management category IV: habitat/species management area.

CONNECTIVITY: The reserve links through Rob Roy Nature Reserve to Namadgi National Park and the Murrumbidgee River and east into NSW and the Tinderry Nature Reserve.

NATURAL VALUES: Tuggeranong Hill protects:

- a large woodland/forest area important for regional wildlife movement
- nationally critically endangered Yellow Box–Blakely's Red Gum Grassy Woodland
- important habitat for woodland birds
- a large area of Drooping She-oak (*Allocasuarina verticillata*) open forest, including some old-growth areas, which are a food source for the vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami*)
- a large population of the vulnerable Pale Pomaderris (*Pomaderris pallida)*
- a large population of the vulnerable Pink-tailed Worm-lizard (*Aprasia parapulchella*).

CULTURAL VALUES: Aboriginal grinding grooves within the reserve are listed on the ACT Heritage Register. Stone artefact scatters have also been recorded.

RECREATION: The reserve is popular for walking, running and cycling. Dogs are permitted on leash.

ACCESS RESTRICTIONS: Public access to the rural lease area in the south-east of the reserve is prohibited without the permission of the lessee.

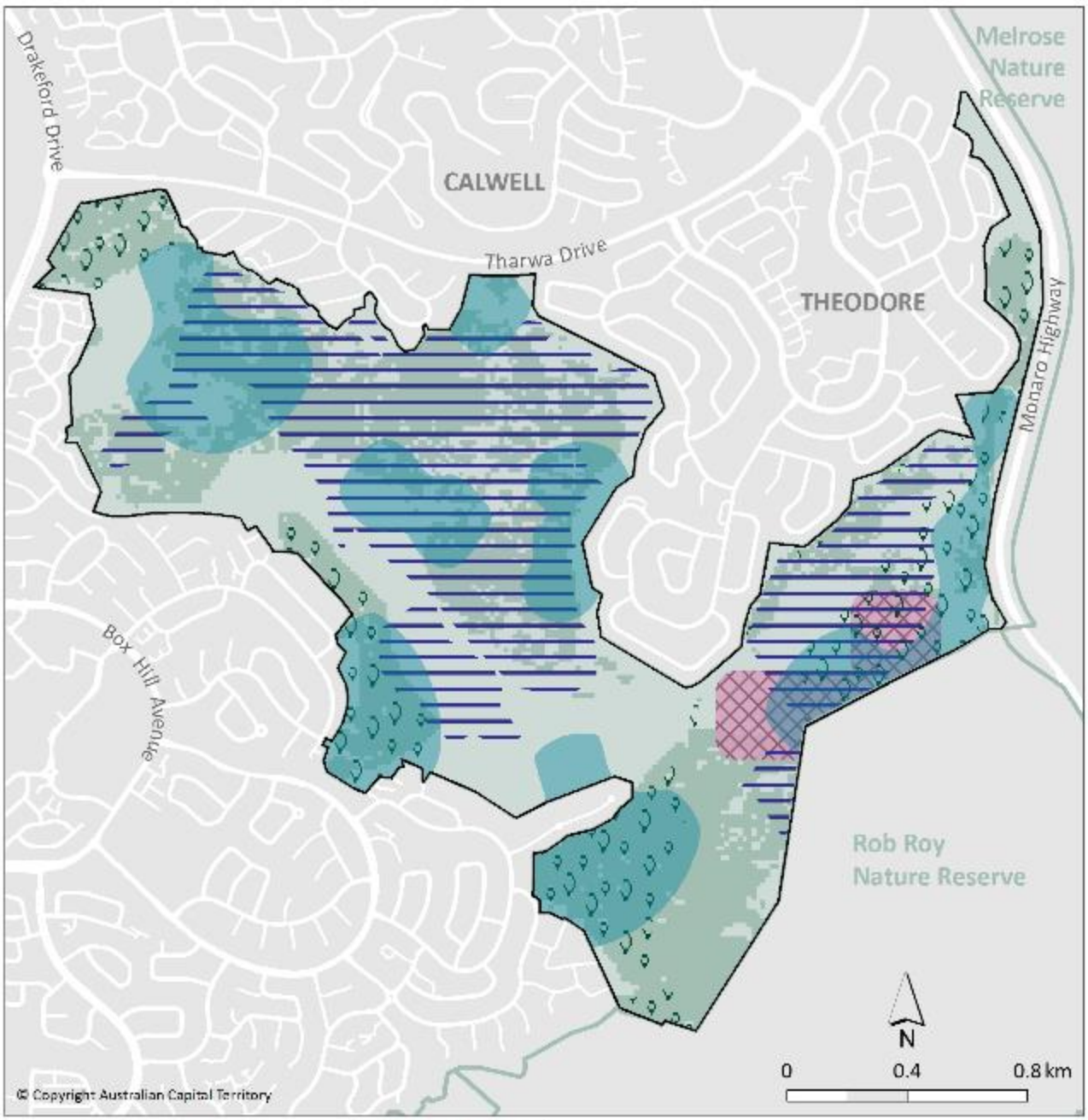
PARKCARE: Canberra Ornithologists Group has monitored birds in the reserve since 2000.

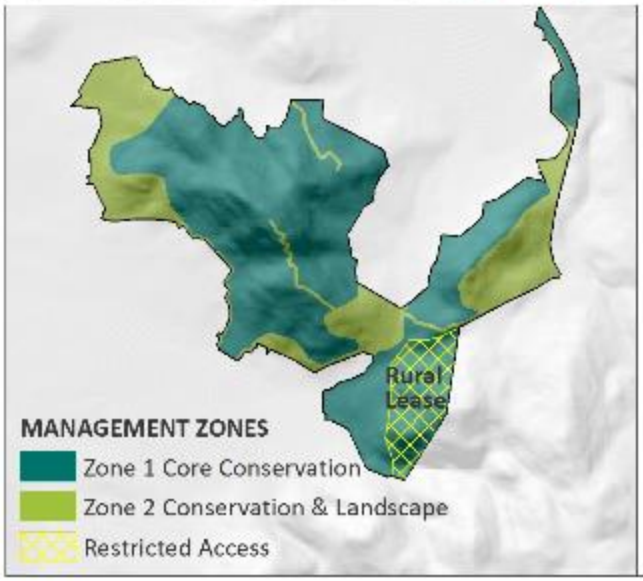
MANAGEMENT: Much of the woodland is in good condition and supports a high diversity of over 200 native plant species. Sheet erosion has occurred on some hill slopes.

The long-term management aim is to conserve vegetation diversity, condition and connectivity, and to conserve Pink-tailed Worm-lizard habitat and the Aboriginal axe-grinding groove site.

KEY ACTIONS: In addition to actions identified in Part 1 of this plan, reserve management will aim to:

- improve management of the axe-grinding grooves in consultation with Traditional Custodians
- maintain plant diversity and improve woodland condition
- investigate options to stimulate cone production in Drooping She-oak stands to provide a food source for Glossy Black-cockatoo
- identify and map the extent of Pink-tailed Worm-lizard habitat.





TUGGERANONG HILL NATURE RESERVE

NATURAL VALUES

- Rare & Threatened Plants (Generalised)
- Drooping She-oak
- Pink-tailed Worm-lizard Habitat (Generalised)
- High Value Woodland Bird Habitat
- Listed Box Gum Woodland
- Reserve

ACT Government

Appendices

CONTENTS:

Early Nancy (*Wurmbea dioica*) (Mark Jekabsons)

APPENDIX 1: TABLE OF ACTIONS

Priority for implementation of actions

High: Implemented within three years of the publication of this plan
Medium: Implemented within five years of the publication of this plan.
Low: Implemented within the life of this plan
*** Ongoing actions:** Some actions will be ongoing throughout the life of the plan.

	ACTIONS	PRIORITY
	Chapter 2: Plants and animals	
	Ecosystems, native animals and habitat connectivity	
1	Prepare management guidelines, as required, for threatened and significant ecological communities, plants and animals.	High*
2	Plan and implement (assisted) rehabilitation of ecological communities, priority plant species and animal habitat.	High*
3	Prioritise restoration/regeneration activities that: – increase habitat size, condition and connection – reduce perimeter-to-area ratio of habitat patches – assist species movement within and across reserves which contain bottlenecks or break points in connectivity.	High*
4	Make information on the locations of significant and/or sensitive ecological communities, plants and animal habitat accessible to land managers, ParkCarers and contractors.	High*
5	Identify opportunities and requirements to protect habitat diversity and refugia at the landscape and reserve scale.	High*
6	Provide opportunities and support for adjoining landholders and the community to improve ecosystems.	Medium*
7	Incorporate Aboriginal traditional ecological knowledge and practices into reserve management.	Medium*
8	Investigate and implement measures to improve genetic diversity of isolated populations of endangered plants and animals including reintroductions of species where and if conditions are suitable and natural recruitment is not possible.	Low/ Medium
9	Utilise mechanisms under the Nature Conservation Act for the Conservator to close reserves to protect conservation values, for example in key woodland bird habitat during the spring/summer breeding season.	High*
10	Liaise/share information with other agencies and land managers as required to: – encourage the protection of scattered trees in modified landscapes, including urban and peri-urban areas – minimise impacts from new developments or infrastructure in areas key for connectivity – explore possibilities for improving connections within reserves, between reserves, through the urban areas, and to the wider regional landscape.	Medium*
	Grazing management	
11	Manage and actively monitor total grazing pressure and impacts to achieve conservation objectives, particularly in grassy ecosystems where threatened animal species have particular habitat requirements.	High*
12	Utilise strategic grazing (by livestock) to achieve conservation and Bushfire Operation Plan objectives.	Medium*

ACTIONS	PRIORITY
Chapter 2: Plants and animals	
Fire	
13 Undertake fire management activities in accordance with the Strategic Bushfire Management Plan for the ACT, and with relevant Regional Fire Management Plans and annual Bushfire Operational Plans.	High*
14 Integrate the requirements of the Strategic Bushfire Management Plan for the ACT with the protection of threatened species, their habitat and ecological function by: – implementing ecological guidelines for fire fuel and access management operations, protection measures to support the long-term maintenance of plant and animal communities, and retaining habitat refugia by utilising landscape mosaic burning regimes – monitoring the effectiveness of burning in contributing to conservation outcomes and fire risk mitigation outcomes – monitoring the impacts of prescribed burning and unplanned fire.	High*
15 Utilise fire to achieve conservation objectives in grassy ecosystems.	High*
16 Plan and implement cultural burns with Traditional Custodians.	High*
Weeds	
17 Actively manage invasive weeds in accordance with the ACT Weeds Strategy and annual invasive weeds operations plan.	High*
18 Systematically map and monitor the distribution and spread of weeds to detect trends and improve effectiveness of control programs for conservation.	Medium*
19 Strengthen partnerships with adjacent land managers and the community in weed management to improve cost-effectiveness and reduce weed re-invasion including early detection of new incursions, surveillance and coordinated weed control.	Medium
20 Provide information to help the community to identify and report new weed species of concern.	Medium*
Pest animals	
21 Monitor pest animals and prioritise management in accordance with the ACT Pest Animal Management Strategy and annual vertebrate pest operations plans.	High*
22 Monitor and evaluate the effectiveness of pest animal control, in relation to conservation outcomes.	Medium
23 Strengthen partnerships with adjacent land managers and the community in pest animal management to improve cost-effectiveness and reduce pest re-invasion including surveillance and coordinated pest control.	Low
Biosecurity	
24 Identify options for the early control or exclusion of other biosecurity risks.	Medium
25 Coordinate disease control in cooperation with adjoining land managers.	Low
26 Support collaborative invasive species research with research partners.	Medium
Climate change	
27 Assess risk and resilience of species and ecological communities to climate change impacts and prioritise the development of management responses for those most at risk.	Medium
28 Promote resilience to climate change by: – maintaining and restoring diversity in ecological communities – identifying, managing and protecting potential climate refugia and landscape connections – maintaining large, well-connected and genetically diverse populations.	Medium

ACTIONS		PRIORITY
Climate change (continued)		
29	Conduct research and trial additional management responses to improve resilience in species/ecological communities to climate change.	Medium
Chapter 3: Land and water		
Landscape setting		
30	Provide input into design proposals and other works to ensure visual intrusion on the landscape is minimised.	High
Geology and soils		
31	Identify, map and protect significant geological sites from disturbance.	High*
32	Analyse soil maps and hydrogeological data to identify risks and areas for monitoring and remediation.	High*
33	Minimise activities that cause physical disturbance to geological features, soil and land surface condition, and impacts on hydrology.	Medium
Water		
34	Protect creeks, drainage lines and dams from disturbance.	High*
35	Rehabilitate damaged creeks, drainage lines and dams and improve the condition of aquatic habitats.	Medium*
Chapter 4: Aboriginal connection to country		
36	Work with Representative Aboriginal Organisations and Traditional Custodians to progress cooperative management arrangements for Canberra Nature Park.	Medium
37	Develop a strategic approach to protecting, managing and interpreting Aboriginal cultural heritage, led by Traditional Custodians.	Medium
38	Undertake an assessment of Aboriginal cultural heritage across Canberra Nature Park in partnership with Representative Aboriginal Organisations and ACT Heritage Council.	Medium
39	Encourage and facilitate opportunistic heritage surveys when favourable conditions arise, for example after fires.	Medium
40	Develop conservation management plans (approved through ACT Heritage Council) for selected Aboriginal heritage sites, with the early involvement of Traditional Custodians and Representative Aboriginal Organisations.	Medium
41	Work with Traditional Custodians, Representative Aboriginal Organisations, local Aboriginal groups and Murrumbung Rangers to increase their involvement in management activities, including traditional burning practices, and to achieve their objectives for cultural water flows.	High*
42	Support the development of policies for Traditional Custodians' access to Country for cultural purposes.	High
43	Continue to assess Aboriginal heritage values prior to works within Canberra Nature Park and modify proposals to avoid interference with or damage to Aboriginal heritage places and/or objects, and report any Aboriginal sites or objects found to the ACT Heritage Council.	High*
44	Consult with Registered Aboriginal Organisations and Traditional Custodians on the naming of new reserves, or dual-naming of existing reserves.	Medium
45	Deliver Aboriginal cultural awareness training for Parks and Conservation staff.	Medium

ACTIONS	PRIORITY
Chapter 5: Historic (non-Aboriginal) heritage	
46 Protect, manage and interpret historic heritage including: – investigating historic heritage values before commencing works and modifying proposals to avoid impact – encouraging research and promoting the results where appropriate – recognising community attachment to heritage places, and involving the community in management and interpretation – mapping all historic plantings, and documenting management direction in consultation with the community – monitoring of heritage sites.	Medium*
47 Develop and review conservation management plans for significant historic heritage sites and implement works as specified.	Medium*
Chapter 7: Nature-based experiences	
Nature-based Recreation	
48 Establish a visitor experience framework for Canberra Nature Park consistent with the Territory wide framework.	Medium
49 Support community involvement in nature-based experiences through provision of enhanced facilities and visitor programs, the use of innovative technology, and increased availability of information.	Medium*
50 Gather spatial and temporal data on visitor use (including through the use of new technology) to better inform management of Canberra Nature Park.	Medium*
51 Use the Trails ACT Planning and Management Guidelines criteria to review tracks and prepare a track management plan, including closing informal tracks and classifying any new tracks in accordance with Australian standards.	High
52 Review Horse Riding in Canberra Nature Park: Management Principles and Policies, to ensure that it incorporates and reflects current research.	Medium
53 Trial the provision of additional horse riding access to defined trails in a small number of reserves.	High
54 Develop and implement a strategy to reduce the on-trail use of motorised vehicles in Molonglo Gorge and Kowen reserves.	High
55 Implement measures to mitigate hazards to visitor safety.	High*
Nature-based Health and Well-being	
56 Support ACT Government initiatives for healthy and active living in Canberra Nature Park reserves (where appropriate).	Medium*
57 Encourage partnerships and cooperation with relevant organisations to improve and promote the health and community benefits of nature-based activities.	Medium*
58 Explore partnerships with health providers to increase use of Canberra Nature Park as a venue for healing and well-being.	Medium*
59 Provide culturally appropriate activities for new Canberrans to experience nature, to feel safe and to develop an understanding of ACT's natural and cultural values	Medium*

ACTIONS		PRIORITY
Nature-based Tourism		
60	Promote Mulligans Flat Woodland Sanctuary and Jerrabomberra Wetlands (separate management plan) as key destinations for environmental education activities, supported by the Woodlands and Wetlands Trust.	High*
61	Implement the ACT 2020 Tourism Strategy (Domestic Marketing Strategy), where applicable, in nature reserves.	High*
62	Explore opportunities for holding appropriate community "events" in Canberra Nature Park.	Medium*
Chapter 8: Community involvement		
Nature's classroom - providing educational experiences in Canberra Nature Park		
63	Deliver an interpretation strategy for Canberra Nature Park.	High
64	Encourage and facilitate increased educational programs and interpretation activities throughout Canberra Nature Park by working in partnerships with institutions and organisations that have a strong interest in, and knowledge of, reserve values.	Medium*
65	Provide reserve users with accessible information to encourage appreciation of the natural, cultural and social values of Canberra Nature Park and appropriate use of the reserves.	Medium*
66	Engage Traditional Custodians and Representative Aboriginal Organisations in the interpretation of cultural heritage values, including the possible establishment of sites that interpret how Aboriginal people use Canberra Nature Park, its food and its plants.	Medium*
67	Establish ranger-led learning activities for kindergarten and primary school aged children, linked to the education curriculum.	Medium*
68	Establish park-school relationships with all schools in close proximity to Canberra Nature Park.	Medium*
69	Update and promote best practice guidelines for reserve visitors and user-groups.	High
70	Provide educational material on topical issues such as: – current research – management of kangaroo populations – risks to reserves posed by invasive garden plants.	Medium
Community involvement in park management		
71	Encourage and support volunteering, for example through ParkCare, catchment groups, schools and other community groups.	High*
72	Expand the ParkCare model to support the participation of international volunteers.	Low
73	Ensure partners and volunteers are safe and equipped to manage day to day activities.	High*
74	Maximise the contribution that communities can make to Canberra Nature Park by exploring innovative ways to tap into community skills, knowledge and enthusiasm.	Medium*

ACTIONS		PRIORITY
Chapter 9: Research and monitoring		
75	Continue to support research partnerships with universities and other research institutions.	Medium*
76	Continue to develop and implement the Conservation Effectiveness Monitoring Program to inform adaptive management across Canberra Nature Park.	High*
77	Prioritise research with a focus on: – ecology and population genetics of threatened or declining species – processes driving the abundance, distribution and condition of reserve ecological values – vegetation and wildlife response to fire regimes – developing effective restoration/management techniques for threatened communities and species habitat – the desirability and feasibility of reintroducing locally extinct native animal species – the implications of climate change for the biota of the region – developing a better understanding of the types, levels and impacts of recreation and visitor use – supporting the Mulligans Flat-Goorooyarroo Woodland Experiment; Mulligans Flat Woodland Sanctuary; and Woodlands and Wetlands Trust.	Medium
78	Support and promote the use of citizen science and integrate results into management.	Medium*
Chapter 10 Planning, Approvals and Compliance		
79	Ensure all works proposed in reserves are subject to appropriate assessment and approval processes to minimise impacts on reserve values, including habitat connectivity.	High*
80	Implement hygiene protocols during all works, management activities and events.	High*
81	Monitor management activities and approved works and report non-compliance against approval conditions.	Medium
82	Seek to recover costs associated with rehabilitating damage caused by others.	High
83	Increase compliance efforts to minimise impacts of illegal and inappropriate behaviour on reserve visitors and conservation values.	High*
84	Record and analyse incidents of behaviour in breach of legislation or incompatible with the provisions of this plan and take appropriate action.	High*
85	Harness technology to improve delivery and reporting of management actions.	High*
86	Identify, assess and manage risks associated with contaminated sites in reserves, in accordance with the Contaminated Sites Environment Protection Policy 2017 made under the *Environment Protection Act 1997*.	High*
87	Ensure that Land Management Agreements prescribe the protection of identified values.	Medium*
88	Support lessees to protect identified conservation values on rural leases.	Medium*
89	Monitor conservation values in rural leases within Canberra Nature Park.	Medium*
90	Review tenancy agreements and other informal arrangements for areas not managed by the Parks and Conservation Service.	Medium

APPENDIX 2: LEGISLATIVE AND POLICY FRAMEWORK

The primary legislative and policy framework for management of Canberra Nature Park is outlined in Section 1.2 and includes The Territory Plan, the *Nature Conservation Act 2014*, the *Planning and Development Act 2007*, the Nature Conservation Strategy, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) and IUCN categorisation.

Other legislation, strategies and action plans relevant to Canberra Nature Park are described below.

International

The United Nations Convention on Biological Diversity is an international legal instrument for the conservation and sustainable use of biological diversity. Australia ratified the Convention in 1983 and, in line with it, prepared a national strategy.

National

The *Australian Capital Territory* (*Planning and Land Management*) *Act 1988* (Commonwealth) established the National Capital Authority with responsibility for preparing and administering a National Capital Plan. The Act defines two categories of land in the ACT: National Land managed by the Commonwealth, for example the National Triangle; and Territory Land managed by the ACT Government on behalf of the Commonwealth.

Australia's Biodiversity Conservation Strategy 2010—2030 and Strategy for the National Reserve System 2009—2030 provide frameworks for protecting biological diversity and maintaining ecological processes and systems. Throughout Australia, attention is being directed to protecting and building ecological connectivity across the wider landscape in the face of climate change. Under the auspices of the National Reserves System Cooperative Program, Australia has been divided into 85 bioregions. These are large, geographically distinct areas of land with common characteristics such as climate, ecological features, and plant and animal communities (DEWHA 2009a). The ACT falls within the Australian Alps and South Eastern Highlands bioregions, sharing its environmental characteristics with surrounding NSW and parts of Victoria.

The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance and associated guidelines provide a best practice standard for managing cultural heritage sites in Australia. Some Aboriginal communities do not consider these guidelines to be appropriate.

ACT legislation

Animal Diseases Act 2005 provides for the control of endemic and exotic diseases of animals.

Animal Welfare Act 1992 promotes vertebrate animal welfare, and controls activities that cause suffering to animals. The Act includes the gazetted code of practice for culling kangaroos and wallabies: Animal Welfare (Humane Shooting of Kangaroos and Wallabies) Code of Practice 2014 (No 1).

Crimes Act 1900 consolidates statutes related to criminal law.

Domestic Animals Act 2000 requires that certain animals, including dogs and cats, be identified and registered, setting out the duties of owners, carers and keepers. The Act includes provisions for declaring cat curfews in nominated areas.

Environment Protection Act 1997 provides a regulatory framework to reduce and eliminate the discharge of pollutants into the air, land and water.

Prohibited Weapons Act 1996 prohibits the possession of certain dangerous weapons and other articles.

Firearms Act 1996 provides for the use of firearms by park personnel.

Fisheries ACT 2000 aims to conserve native fish species and habitats and to sustainably manage ACT fisheries.

Pest Plants and Animals Act 2005 lists pest plants and animals and provides for the development of pest animal and pest plant management plans.

Public Health Act 1997 provides for the protection of the public from public health risks, including those relating to water quality.

Public Unleased Land Act 2013 provides for the use of public unleased land while ensuring the amenity and natural value of public places are not diminished.

Roads and Public Places Act 1937 provides for temporary roads, temporary closure of roads and use of public places.

Stock Act 2005 contains regulations for the control of stock and ruminants.

Litter Act 2004 provides for the control and regulation of litter, including dumping.

Trespass on Territory Land Act 1932 provides for the regulation of straying stock, illegal camping and unauthorised occupation of public or private land.

Water Resources Act 2007 provides for the sustainable use and management of ACT water resources; the protection of aquatic ecosystems and aquifers from damage and, where practicable, reversal of past damage.

ACT strategies and plans

Eastern Grey Kangaroo: Controlled Native Species Management Plan 2017 sets out the approach to be adopted in maintaining wild populations of Eastern Grey Kangaroos in the ACT while managing their environmental, economic and social impacts and ensuring their welfare.

ACT Aquatic and Riparian Conservation Strategy and Action Plans 2018 takes an integrated territory-wide approach, within a regional context, to the protection and management of the rivers and riparian areas in the ACT that support threatened species and ecological communities, and seeks to maintain and improve the natural integrity of the rivers and riparian zones.

ACT Lowland Woodland Conservation Strategy (2004, under revision 2019) sets out a strategic, integrated approach to protecting, maintaining and improving the condition of the ACT's remaining lowland woodlands.

ACT Native Grassland Conservation Strategy and Action Plans 2017 will guide the protection, management and restoration of native grasslands and their component species over the next 10 years.

ACT Nature Conservation Strategy 2013–2023 establishes a policy framework for conservation of biodiversity across all tenures in the ACT. The strategy's vision for nature conservation in the ACT over the next decade is for 'biodiversity rich, resilient landscapes stretching from the inner city to the mountains, where well-functioning ecosystems can meet the needs of people and the environment'.

ACT Pest Animal Management Strategy 2012—2022 sets out the steps in a strategic approach to developing and implementing a vertebrate pest animal management program.

Strategic Bushfire Management Plan for the ACT, Version Three sets out strategies and specific actions by which the ACT community and the ACT Government can better manage bushfires and reduce the bushfire risk to life, property and the environment.

ACT Weeds Strategy 2009—2019 aims to reduce the impact of weeds on the environment, the economy, human health and amenity, and recognises that weed management is an integral component of sustainable management of natural resources and the environment.

APPENDIX 3: IUCN CATEGORY IV MANAGEMENT OBJECTIVES[5] AND CANBERRA NATURE PARK

The Conservator has assigned[6] all Canberra Nature Park nature reserves to IUCN Category IV: Habitat/Species Management Area. The *Nature Conservation Act 2014* (s 174 (3)) requires that the reserves will be managed in accordance with the IUCN objectives. The following table identifies policies and objectives within the Canberra Nature Park Draft Reserve Management Plan which contribute to the IUCN Category IV objectives.

IUCN Category IV: Habitat/Species Management Area	Canberra Nature Park Draft Reserve Management Plan 2019
PRIMARY OBJECTIVE: To maintain, conserve and restore species and habitats.	**2.6 PLANTS AND ANIMALS** **OBJECTIVES** **Ecosystems, native animals and habitat connectivity** • Threatened and rare ecological communities (Yellow Box–Red Gum Grassy Woodland, Snow Gum Grassy Woodland, Red Box woodland/open forest and native grasslands) are conserved and rehabilitated. • The diversity, extent, condition, connectivity and resilience of native ecological communities are maintained and/or improved. • Threatened native animal species, and the diversity of other animal populations, are conserved. • Habitat for woodland birds and other native fauna is conserved and improved. • Habitat connectivity is maintained and strengthened to support ecosystem resilience. • Threats to native plants, animals and ecological communities are minimised. **Grazing management** • Conservation grazing regimes support protection of threatened species and improve ecosystem function. • Overabundant animal species are managed to reduce impacts on reserve values. **Fire** • Ecological burning regimes are established, implemented and monitored. • Cultural burning practices are established, implemented and monitored. • The adverse impacts of fire-fuel management on biodiversity values are minimised while life and property are protected. **Weeds** • Weeds are excluded, eradicated, controlled or contained to minimise and mitigate adverse impacts on conservation values. **Pest animals** • Pest animals are excluded, eradicated or controlled to minimise adverse impacts on conservation values.

[5] From *Procedure for applying IUVN Protected Area Categories to ACT Reserves* approved by the ACT Minister for the Environment and Sustainable Development, September 2012.

[6] Notifiable Instrument N12016-526, September 2016.

IUCN Category IV: Habitat/Species Management Area	Canberra Nature Park Draft Reserve Management Plan 2019
	Biosecurity • Diseases are excluded, eradicated, controlled or contained to minimise and mitigate adverse impacts on values. • Research capacity on biosecurity, in particular invasive species, is increased. **Climate change** • Ecosystem resilience to a changing climate is strengthened. • Knowledge and understanding of the implications of climate change for the values of Canberra Nature Park is improved and informs management decisions.
	3.5 LAND AND WATER
	POLICIES • Activities, works or infrastructure that adversely impact on the landscapes, soils, geological sites and hydrology of Canberra Nature Park will be avoided or minimised. **OBJECTIVES** **Landscape setting** • The visual amenity of Canberra Nature Park's hills, ridges and buffer spaces is retained to protect the landscape setting of the city. **Geology and soils** • Geological values, soils and land surface condition are protected and improved. **Water** • The condition of creeks, drainage lines and dams is maintained and improved where required.
	6.1 RESERVE MANAGEMENT ZONES
	Management zones The purpose of zoning is to ensure that any impacts from activities such as the construction of recreational facilities or utility infrastructure or other disturbances are directed into the more robust parts of Canberra Nature Park were conservation values are less likely to be compromised. Zone 1: Core Conservation areas have sensitive values most likely to be impacted by physical disturbance. Zone 2: Conservation and landscape (general protection) area areas where conservation values are less likely to be impacted, and more robust when disturbed.
	9.4 RESEARCH AND MONITORING
	POLICIES • Research that improves knowledge and contributes to increased management effectiveness of natural and cultural values will be supported. • Opportunities will be sought for collaborative partnerships with universities and other research sectors and institutions to inform and improve park management. • Citizen science will be supported. **OBJECTIVES** • Research and monitoring inform adaptive management of natural and cultural values. • ACT Government research provides a sound evidence base for land management and conservation decisions in Canberra Nature Park.

IUCN Category IV: Habitat/Species Management Area	Canberra Nature Park Draft Reserve Management Plan 2019
	• Universities in Canberra have established long term social and ecological research programs across Canberra Nature Park.
	10.10 PLANNING, APPROVALS AND COMPLIANCE
	POLICIES • Relevant statutory processes will be followed for all proposed activities and works in Canberra Nature Park. • New infrastructure will utilise the lowest impact option and will only be located: - in already disturbed areas or co-located with other services - with reference to reserve management zones. **OBJECTIVES** • Appropriate environmental assessments are undertaken to ensure that reserve values are not damaged or compromised. • Monitoring of activities ensures that actions avoid or minimise impact on reserve values, and that any damage is repaired. • Visitors comply with all legislative and policy requirements. • Rural leases over nature reserves are managed for conservation outcomes.
OTHER OBJECTIVES: To protect vegetation patterns or other biological features through traditional management approaches;	**4.7 ABORIGINAL CONNECTION TO COUNTRY** **POLICIES** • Aboriginal connection with Country, past and present, is acknowledged and will continue to be supported. • Aboriginal heritage places and objects will be protected and managed in accordance with statutory requirements and the Burra Charter and its guidelines. • The principles of Ask First and Free, Prior and Informed Consent will guide engagement with Aboriginal people to identify, conserve and interpret Aboriginal heritage. • Traditional Custodians will be involved in managing Canberra Nature Park as a living cultural landscape. • Aboriginal cultural rights will be respected in accordance with the *Human Rights Act 2004*. **OBJECTIVES** • A healthy country Traditional Custodian council is established to guide management of Canberra Nature Park. • Cooperative management arrangements for Canberra Nature Park are established with Traditional Custodians. • Canberra Nature Park provides a venue to connect Aboriginal people to Country. • Aboriginal heritage values, including places and objects, are protected and conserved. • Traditional Custodians, Representative Aboriginal Organisations and Aboriginal staff are actively involved in conserving and interpreting Aboriginal cultural heritage. • Aboriginal traditional knowledge is incorporated into reserve management to improve environmental and cultural outcomes. • Community awareness of Aboriginal cultural heritage and connection to Country is increased.

IUCN Category IV: Habitat/Species Management Area	Canberra Nature Park Draft Reserve Management Plan 2019
	• The cultural landscape values and Aboriginal history of the reserves are better understood and interpreted. • Canberra Nature Park reserves are jointly named with an appropriate name identified by Traditional Custodians. **Aboriginal cultural burning** The Parks and Conservation Service has an ACT Aboriginal Fire Management Framework as part of its commitments in the annual ACT Bushfire Operations Plan, developed by Aboriginal staff in conjunction with Representative Aboriginal Organisations and Traditional Custodians. **Murumbung Yurung Murra Rangers** The Parks and Conservation Service Aboriginal staff work in various roles across the organisation. They come together as the Murumbung Yurung Murra Rangers to better involve Traditional Custodians in identifying the traditional uses, values and connections to fire, land and water and to capture the contemporary aspirations for management of the cultural landscape.
OTHER OBJECTIVES: To protect fragments of habitats as components of landscape or seascape-scale conservation strategies;	**2.4 HABITAT CONNECTIVITY AND WILDLIFE MOVEMENT** **Landscape connectivity** Landscape connectivity has been mapped across Canberra Nature Park, and protection and focussed management (rehabilitation and assisted natural regeneration) and key restoration and linkage protection areas are required to support connectivity: 1 between Goorooyarroo and Mount Majura, and Mount Majura and the Military Training Area 2 from Aranda Bushland, through Mount Painter and Pinnacle, to Kama Nature Reserve 3 from Mount Taylor to Cooleman Ridge and then onto McQuoids Hill and the Murrumbidgee River 4 between Farrer Ridge and Mount Taylor 5 from Wanniassa Hills to woodland in the NSW area of Jerrabomberra 6 between Tuggeranong Hill and the Murrumbidgee River. **Complexes** The 37 nature reserves of Canberra Nature Park have been grouped into ‘complexes’ with similar characteristics, management priorities and/or geographical proximity. This helps management take a landscape-scale perspective for strategic planning and operational programs. **Lowland Woodland, Native Grassland and Aquatic Strategies** Habitat connectivity will also be enhanced and protected through the application of the ACT Lowland Woodland Conservation Strategy, the ACT Native Grassland Conservation Strategy and the ACT Aquatic and Riparian Conservation Strategy and Action Plans. These strategies outline conservation goals objectives and actions for the long-term protection of the ecosystems in the ACT
OTHER OBJECTIVES: To develop public education and appreciation of the	**8.5 COMMUNITY INVOLVEMENT** **POLICIES** • The Parks and Conservation Service will support environmental education and interpretation activities across Canberra Nature Park to increase community understanding and stewardship of reserve values. • The Parks and Conservation Service will forge stronger partnerships and relationships with volunteers, neighbours, Traditional Custodians and

IUCN Category IV: Habitat/Species Management Area	Canberra Nature Park Draft Reserve Management Plan 2019
species and/or habitats concerned;	Representative Aboriginal Organisations to increase community involvement in reserve management. **OBJECTIVES** • Connections between people and nature are created by providing multiple ways for people of all ages to learn and be inspired by nature. • Education and interpretation increase community understanding of reserve values and involvement in their protection. • Online information about the about natural, cultural and social values of Canberra Nature Park is readily accessible. • Canberra's kindergarten and primary school students have access to nature-based learning activities in Canberra Nature Park. • Visitors are aware of and comply with legislation and policies that guide access to, and appropriate use of, Canberra Nature Park. • The knowledge and wisdom of Canberra's community is harnessed to inform and enhance reserve management. • Community engagement programs and activities improve management outcomes for Canberra Nature Park. • Traditional Custodians and other local Aboriginal groups have increased involvement in land management and cultural activities. • Novel and diverse partnerships with private, corporate, NGO and government sectors contribute to the conservation of Canberra Nature Park and the environmental and socio-economic fabric of the ACT.
	8.2.1 PARKCARE
	ParkCare groups have operated in Canberra Nature Park for almost 30 years and make an important contribution to protecting and improving reserves, with volunteers devoting significant time and effort to conservation work. Eighteen ParkCare groups are currently active.
	8.2.3 WOODLANDS AND WETLANDS TRUST
	The Woodlands and Wetlands Trust is governed by a board of community representatives with expertise in science, public administration, fundraising and outreach (established 2012). Mulligans Flat Woodland Sanctuary and Jerrabomberra Wetlands are managed in partnership between the community, government and private sectors to achieve improved ecosystem restoration, and through educational and eco-tourism opportunities inspire conservation values within the community of the Canberra region.
OTHER OBJECTIVES: To provide a means by which the urban residents may obtain regular contact with nature.	**7.12 NATURE-BASED EXPERIENCES**
	Active recreation in a natural environment Canberra Nature Park provides Canberra residents and visitors with opportunities for active recreation in a natural environment in close proximity to residential areas. Nature reserves are enjoyed for nature-based recreation including walking, running, bird watching, wildflower appreciation, orienteering, rogaining, cycling and mountain biking, dog walking, horse riding and geocaching. These activities form part of an active lifestyle and as a way of maintaining physical and social health, and align with the ACT Government *Healthy Living initiative* and programs such as *Find Fitness Outdoors* and *Healthy Parks Healthy People*.

IUCN Category IV: Habitat/Species Management Area	Canberra Nature Park Draft Reserve Management Plan 2019
	POLICIES • Nature-based experiences, including recreation, health and tourism activities, will be encouraged and supported through the provision of contemporary facilities, programs and information. • Activities that are consistent with government initiatives and programs to encourage healthy and active living will be supported where appropriate within Canberra Nature Park. • The Parks and Conservation Service will regularly liaise with user groups and seek their input on decisions relating to activities and facilities. • Restrictions on dogs in all nature reserves will continue to apply, including retention of the 'on leash' requirement. • Approval for dog walking in some locations will be reviewed if dogs are found to be having a significant adverse impact on reserve values. • Cycling and mountain biking are not permitted on walking tracks. • Off-trail use of motorised vehicles in Molonglo Gorge and Kowen Escarpment is prohibited and their use on trails in the reserves will be reduced. • Consideration will be given to approving motorised vehicle use on management trails within Kowen Escarpment Nature Reserve only where it is required to provide safe connections between areas of the broader Kowen Forest for an event. **OBJECTIVES** **Nature-based Recreation** • The accessibility and amenity of Canberra Nature Park is enhanced and community enjoyment of nature and the benefits it provides is increased. • Residents and visitors have a greater appreciation of the natural and cultural values of Canberra Nature Park and the range of nature-based experiences available. • Newly arrived Canberrans and visitors are welcomed to Canberra Nature Park through enjoyable, culturally appropriate, interactive experiences that encourage regular visits. • Levels and types of visitor use are consistent with the conservation of natural and cultural heritage. • Park managers have a greater understanding of existing types and levels of recreation and visitor use. **Nature-based Health and Well-being** • Nature-based activities in Canberra Nature Park contribute to the improved emotional, physical, and spiritual health and well-being of our community. • Canberra Nature Park is valued for the health and well-being benefits it provides. **Nature-based Tourism/Events** • Tourism activities within Canberra Nature Park are primarily related to an appreciation of its natural and cultural values. • The potential for nature-based tourism activities in Canberra Nature Park is considered in the context of a strategic approach to visitor experience and ecotourism across ACT reserves, and conservation of the natural environment.

APPENDIX 4: GEOLOGICAL FEATURES OF CANBERRA NATURE PARK

NATURE RESERVE	GEOLOGICAL FEATURES
Black Mountain	• Early Silurian Black Mountain Sandstone (fine-grained quartz sandstone) can be seen at a viewing area car park about half way up the summit road and also along the road at cuttings (forming type locality). This is the only occurrence of this geology in the ACT and has led to a significantly richer shrub and herb flora than elsewhere in the ACT (Ryan 2011). Sandstone was used in the construction of St John's Church and other early colonial buildings in Canberra (Finlayson 2008). • Exposed Pittman Formation (type locality) can be found in a creek bed to the south of Black Mountain (National Capital Development Commission [NCDC] 1988). • There is an Acton Shale member of the Pittman Formation on Caswell Drive road cuttings (NCDC 1988).
Crace Grasslands	• Crace Hill exhibits a distinctive form known as a cuesta (one steep side and one sloping side) and is a locally important example of this landform exposing the Ainslie Volcanics dacitic lavas. Jointing of these rocks, and secondary deposition of limonite (a type of iron ore) and underlying shales and mudstone make Crace Hill an important site for geological education (NCDC 1988).
Gossan Hill	• Gossan Hill has complex geology with different rock types present in a small area, which provides a valuable educational resource. • There is an outcrop of a gossan, containing haematite, goethite and opaline silica. (Gossan, a Cornish word meaning 'iron hat', is a surface outcrop of mainly oxides of iron leached by hot ground water from surrounding rocks. The heat probably resulted from the nearby igneous intrusions.) Over the past 65 million years, the exposed area of the gossan has weathered, impregnating the surrounding soil with coloured ochres. The gossan outcrops were listed on the Register of National Estate (now phased out as a statutory list by the Commonwealth Government). • A road-cut on College Street reveals sedimentary rock of the Ordovician Pittman Formation (about 445 million years old) consisting of folded, thin-bedded fine sandstone and shale with minor chert. • A quartz porphyry (igneous rock with large quartz crystals of presumed Silurian age around 430–415 million years) intrudes into the Pittman Formation at both the eastern and western ends of the road cutting. • The western slope of the hill contains excellent exposures, in erosion gullies, of Tertiary soil profiles, including buried soils and large 'peds', which are characteristic of very old soils (Geological Society of Australia 2013).
Kowen Escarpment / Molonglo Gorge	• Rocks in the Kowen area were laid down as a series of sandstone, shale and siltstone deposits during the Late Ordovician (450 million years ago). The bedding became distorted due to faulting and folding. The escarpment has been uplifted along the north–south Queanbeyan Fault. This uplifting was relatively recent, caused by movements of the Queanbeyan Fault during the Late Tertiary or early Quaternary (2–4 million years ago). • The escarpment is the clearest example of a young fault scarp in the ACT (National Capital Planning Authority 1990). • Molonglo Gorge is an outstanding locality to study the physical characteristics and structure of bedded sediments. It includes the most continuous exposure of Pittman Formation and the most extensive accessible valley floor exposure of sedimentary rocks in the ACT. The recent nature of faulting is illustrated by the well-defined scarp extending north and south of the river, and by hanging valleys where downcutting by tributaries has not kept pace with the rate of incision of the Molonglo Gorge (National Capital Planning Authority 1990).
Mount Ainslie	• Early Silurian Mount Ainslie Volcanics within the Hawkins Volcanic Suite can be seen in cuttings on the summit road and at the summit lookout (Finlayson 2008). • Quarry on the southern slopes represents an excellent exposure of the major rock type of the Mount Ainslie Volcanics (Owen 1988). • Mount Ainslie Volcanics rocky outcrops are on the low ridge immediately north of the War Memorial (NCDC 1988).

NATURE RESERVE	GEOLOGICAL FEATURES
Mount Majura	• Fossil outcrops are found on the lower north-west slopes including corals, trilobites and brachiopods (NCDC 1988).
Mount Mugga Mugga	• The Hindmarsh Drive road cutting (between Mount Mugga Mugga and Red Hill nature reserves) displays a long and complex geological section, intersecting volcanic and sedimentary units of the Mount Painter and the Deakin Volcanics (NCDC 1988). • The disused Mugga Mugga quarry (excluded from, but surrounded by, the nature reserve) is mid-Silurian Mugga Mugga Porphyry rock (member of the Deakin Volcanics), which is a characteristic dark blue-grey rhyodacite porphyry (containing large crystals) that has been widely used throughout the Canberra region, for example as road metal (Finlayson 2008). It is the type locality of the Mugga Mugga Porphyry (Owen 1988).
Mount Painter	• Rocky outcrops of Mount Painter Volcanics (type locality) are a Middle Silurian formation of dark coloured porphyry rock with inclusion (xenoliths) of other rocks and large quartz fragments (NCDC 1988).
Mulligans Flat	• The extensive outcrop of reef quartz is an outstanding example of quartz intrusion along a fault zone (NCDC 1988).
O'Connor Ridge	• Ginninderra Drive cuttings expose the Ordovician Pittman Formation (NCDC 1988).
Percival Hill	• Percival Hill derives from Black Mountain sandstone from marine deposition.
Red Hill	• Hornfels exposures (within mid-Silurian Yarralumla Formation) near the summit of Red Hill are of geological interest and educational value. • The Hindmarsh Drive road cutting (between Mount Mugga Mugga and Red Hill nature reserves) displays a long and complex geological section, intersecting with volcanic and sedimentary units of the Mount Painter and Deakin Volcanics (NCDC 1988).

APPENDIX 5: HORSE RIDING IN CANBERRA NATURE PARK: MANAGEMENT PRINCIPLES AND POLICIES

1. The activity being provided for is recreational trail riding. More specialised activities that involve off-trail or fast riding, such as training for or conducting cross-country or endurance events, are not appropriate and will not be provided for. Commercial horse riding will be subject to the same management principles, in addition to any applicable concessions policy.
2. Horse riding will be confined to specified trails that form part of the ACT horse-trail network. Priority will be given to maintaining trail links that service government horse paddocks and the Bicentennial National Trail. Trails will be identified by appropriate signage.
3. So far as possible, trails will be located near the perimeter of reserves and in zones that have already been extensively modified, so that potential for undesirable impact on nature conservation values can be either avoided or subject to low risk. Gentle grades (less than 7 degrees) will be preferred.
4. Trails will be constructed and maintained to a standard that is characterised by:
    - adequate drainage in wet areas
    - a hard or stable surface so erosion potential is minimized
    - few opportunities for weed establishment by having a hard surface, or being located in a disturbed area that already is dominated by exotic species
    - adequate visibility and passing width for riders and other users.
5. Where discrete sites of scientific, ecological or cultural significance may be subject to, or at risk of damage, horse riding will be excluded or physically separated from these sites by trail location or barriers.
6. Where pre-existing horse-riding activities are in conflict with conservation requirements, rationalisation of horse trails will be necessary. Where such a trail forms an important link in the horse-trail network and there is no readily available alternative route, horse riding may be allowed to continue if the trail is of satisfactory construction and maintenance standard, and impact can be confined to the trail. Changes may need to be staged (for example, to allow an alternative route to be developed before closing a trail segment).
7. A high degree of rider compliance will be required if horse riding on unfenced trails is to continue in Canberra Nature Park. A code of conduct for equestrian use of Canberra Nature Park will be developed in collaboration with the equestrian community.
8. A program for monitoring use of horse trails, compliance with uses constraints (including any code of conduct) and the impact of equestrian activities on nature conservation values, will be developed.
9. Dogs will not be allowed to accompany horses and riders in Canberra Nature Park, because of the potential for accident, injury and disturbance.

    (Environment ACT 1999)

GLOSSARY

Activities Declaration

Under the *Nature Conservation Act 2014,* the Conservator may make an Activities Declaration stating that certain activities must not be carried out in reserves, or may be carried out only if directions or requirements are complied with. A notice about the declaration must be displayed at the reserve. It is an offence to contravene a declaration.

anthropogenic

Anthropogenic means substances, processes, etc. of human origin or resulting from human activity (Dictionary of Ecology, 5th Edition <http://www.oxfordreference.com/>).

bicycle

In the ACT, a **bicycle**[1] means a vehicle with two or more wheels that is built to be propelled by human power through a belt, chain or gears (whether or not it has an auxiliary motor). The definition includes a *power-assisted pedal cycle* but excludes any vehicle that has an internal combustion engine.

A power assisted **pedal cycle**[2] is defined as:

- a pedal cycle to which is attached one or more auxiliary propulsion motors having a combined maximum power output not exceeding 200 watts or
- a Pedalec (A **pedalec**[3] is a power-assisted pedal cycle that may have one or more auxiliary propulsion motors generating a combined continuous rated power output not exceeding 250 watts. Pedalecs are designed to give riders assistance, but only when they are actually pedalling).

In summary, bicycles include power-assisted pedal cycles that generate up to 200 watts and pedalecs that generate up to 250 watts. A pedalec is also a power-assisted pedal cycle.

[1]See *Road Transport (General) Act 1999*

[2]See Vehicle Standard (Australian Design Rule-Definitions and Vehicle Categories) 2005. These are vehicle standards determined under the *Motor Vehicles Standards Act 1989* (Cwlth)

[3]See European Committee for Standardization *EN 15194:2009 or EN 15194:2009+A1:2011 Cycles – Electrically power assisted cycles – EPAC Bicycles*

conservation

When applied to natural heritage, conservation means all the processes and actions of looking after a place so as to retain its natural significance and always includes protection, maintenance and monitoring. It may also involve actions to repair degradation and includes conserving natural processes of change (Australian Natural Heritage Charter 2002).

When applied to species and ecological communities, conservation refers to all the processes and actions aimed at the maintenance of those entities in perpetuity. This is also expressed as the 'conservation of biological diversity'.

When applied to cultural heritage, conservation means all the processes of looking after a place so as to retain its cultural significance. Cultural significance means aesthetic, scientific, social or spiritual value for past, present or future generations (Australian Heritage Commission, 2013). Conservation may also be applied to specific objects.

C3 and C4 native grass

Perennial grasses can be classified as either C3 or C4 plants. These terms refer to the different pathways that plants use to capture carbon dioxide during photosynthesis. All species have the more primitive C3 pathway, but the additional C4 pathway evolved in species in the wet and dry tropics. The first product of carbon fixation in C3 plants involves a 3-carbon molecule, while C4 plants initially produce a 4-carbon molecule that then enters the C3 cycle. These differences are important because the two pathways are also associated with different growth requirements. C3 plants are adapted to cool season establishment and growth in either wet or dry environments. C4 plants are more adapted to warm or hot seasonal conditions under moist or dry environments. (NSW Department of Primary Industries <http://www.dpi.nsw.gov.au/agriculture/pastures-and-rangelands/native-pastures/what-are-c3-and-c4-native-grass>).

designated areas

Designated areas are areas identified by the National Capital Authority as "having the special characteristics of the National Capital" and are protected from development.

enhancement

When applied to ecosystems, enhancement means adding organisms, genotypes, species or elements of habitat or geodiversity to those that naturally exist in a place (Australian Heritage Commission, 2002b).

When applied generally, enhancement means raising to a higher degree; intensifying; magnifying; raising the value of, and is used to describe partial restoration measures (Macquarie Dictionary).

management trails

Management trails have been designed and constructed for use by vehicles (management only) to meet the required standards for their purpose. They are used by the Parks and Conservation Service and Rural Fire Service for park management activities. These trails are also used by public utilities or other service providers for the construction, repair or maintenance of infrastructure.

heterogeneity

Heterogeneity means different in kind, unlike; composed of parts of different kinds; having widely unlike elements or constituents; not homogeneous (Macquarie Dictionary).

informal tracks

Informal tracks have been formed by repeated recreational use. These tracks do not meet professional track specifications and may cause environmental damage such as erosion or impact on threatened species.

maintenance

Maintenance means the continuous protective care of the biodiversity and geodiversity of a place (Australian Heritage Commission, 2002b).

modification

Modification means altering a place to suit proposed uses that are compatible with the natural significance of the place (Australian Heritage Commission, 2002b).

monitoring

Monitoring means ongoing review, evaluation and assessment to detect changes in the natural integrity of a place, with reference to a baseline condition (Australian Heritage Commission, 2002b).

Monitoring involves assessing the characteristics of something over a period of time, and will often involve repeatedly counting, measuring and/or assessing a variable or variables. It is only fully effective when a standardised method is used each time. Monitoring is focused on baseline conditions and long-term trends.

multi-use tracks

Multi-use tracks have been designed and constructed for both walking and mountain biking. These tracks are maintained by the Parks and Conservation Service, sometimes with support from ParkCare volunteers. The tracks generally meet the Class 3 walking track standard, and follow best practice for mountain bike tracks for attributes such as slope, alignment and drainage.

Natural Temperate Grassland

Natural Temperate Grassland is listed as an endangered ecological community in the ACT under the *Nature Conservation Act 2014*. This community forms part of the Natural Temperate Grassland of the Southern Tablelands (NSW and ACT) ecological community, which has been listed nationally as critically endangered.

preservation

Preservation means maintaining biodiversity of a place at the existing stage of succession, or maintaining existing geodiversity (Australian Heritage Commission, 2002b).

protection

Protection means taking care of a place by managing impacts to ensure that natural significance is retained (Australian Heritage Commission, 2002b).

rare and uncommon plant species

Rare and uncommon plant species are those known from five or fewer ACT locations.

refugia

Refugia means an isolated area where extensive changes—most typically due to changing climate—have not occurred. Plants and animals formerly characteristic of the region in general find a refuge from unfavourable conditions in these areas (Dictionary of Ecology, 5th Edition).

regeneration

Regeneration means the natural recovery of natural integrity following disturbance or degradation (Australian Heritage Commission, 2002b).

rehabilitation

Rehabilitation refers to the improvement in condition of land and/or ecological communities and their component species following degrading disturbance. Rehabilitation may involve regeneration, restoration or reinstatement, representing progressively greater degrees of human intervention (Australian Heritage Commission, 2002b).

reinstatement

Reinstatement means to introduce to a place one or more species or elements of habitat or geodiversity that are known to have existed there naturally at a previous time, but that can no longer be found at that place (Australian Heritage Commission, 2002b).

research

Research involves systematic investigations into a significant question (usually deriving from an established discipline) or 'problem' with the aim of establishing new knowledge. It is conducted over a period of time, may involve the investigation of relationships between variables and varying levels of analysis, and will be related to the philosophical and theoretical foundations of a discipline. Research can involve survey and monitoring.

restoration

Restoration means returning existing habitats to a known past state or to an approximation of the natural condition by repairing degradation, by removing introduced species or by reinstatement (Australian Heritage Commission, 2002b).

survey

Survey involves establishing the characteristics (or baseline condition) of something in a comprehensive or general way—a building, the vegetation of an area, or a group of people. It often involves counting, measuring and/or assessing a variable or variables.

Snow Gum Grassy Woodland

Snow Gum Grassy Woodland forms part of the NSW-listed endangered ecological community, Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions. The community is rare in the ACT.

walking tracks

Walking tracks have been designed and constructed and generally lead to special features, such as scenic views. Walking tracks are maintained by the Parks and Conservation Service, sometimes with support from ParkCare volunteers. Walking tracks generally meet Class 3 of Australian Standard AS 2156.1-22001 Walking Tracks–Classification and Signage.

Yellow Box– Blakely's Red Gum Grassy Woodland

Yellow Box–Blakely's Red Gum Grassy Woodland is listed as an endangered ecological community in the ACT under the *Nature Conservation Act 2014*. This community forms part of the White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, which has been listed nationally as critically endangered under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*.

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