

# Nature Conservation (Molonglo River Reserve) Reserve Management Plan 2019

## Disallowable instrument DI2019–192

made under the

Nature Conservation Act 2014, s 183 (Draft reserve management plan—Minister to approve, return or reject) and s 184 (Draft reserve management plan—Minister’s approval and notification)

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### 1 Name of instrument

This instrument is the *Nature Conservation (Molonglo River Reserve) Reserve Management Plan 2019*. \*

### 2 Commencement

This instrument commences on the day after its notification day.

### 3 Approval of draft reserve management plan

I approve the draft reserve management plan at schedule 1 to this instrument as the Molonglo River Reserve Management Plan 2019.

### 4 Revocation

The *Land (Planning and Environment) approval of plan of management for Lower Molonglo River Corridor 2001* (DI2001-298) is revoked.

Mick Gentleman MLA  
Minister for the Environment and Heritage  
24 July 2019

\*Name amended under Legislation Act, s 60

## Schedule 1



**ACT**  
Government



# MOLONGLO RIVER RESERVE

RESERVE MANAGEMENT PLAN

2019

## ACKNOWLEDGEMENTS

The ACT Government acknowledges the Traditional Custodians of the ACT, the Ngunnawal people. We respect their continuing culture and the unique contribution they make to the life of this area.

This reserve management plan for the Molonglo River has been developed by the ACT Parks and Conservation Service, in the ACT Environment, Planning and Sustainable Development Directorate. (EPSDD).

EPSDD acknowledges the many people who provided advice and assistance in the preparation of the reserve management plan.

The draft plan was available for public comment from 8 February 2018 to 23 March 2018. All submissions received have been considered in this final plan.

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Note: All references in this plan to Traditional Custodians refer to the Ngunnawal people.

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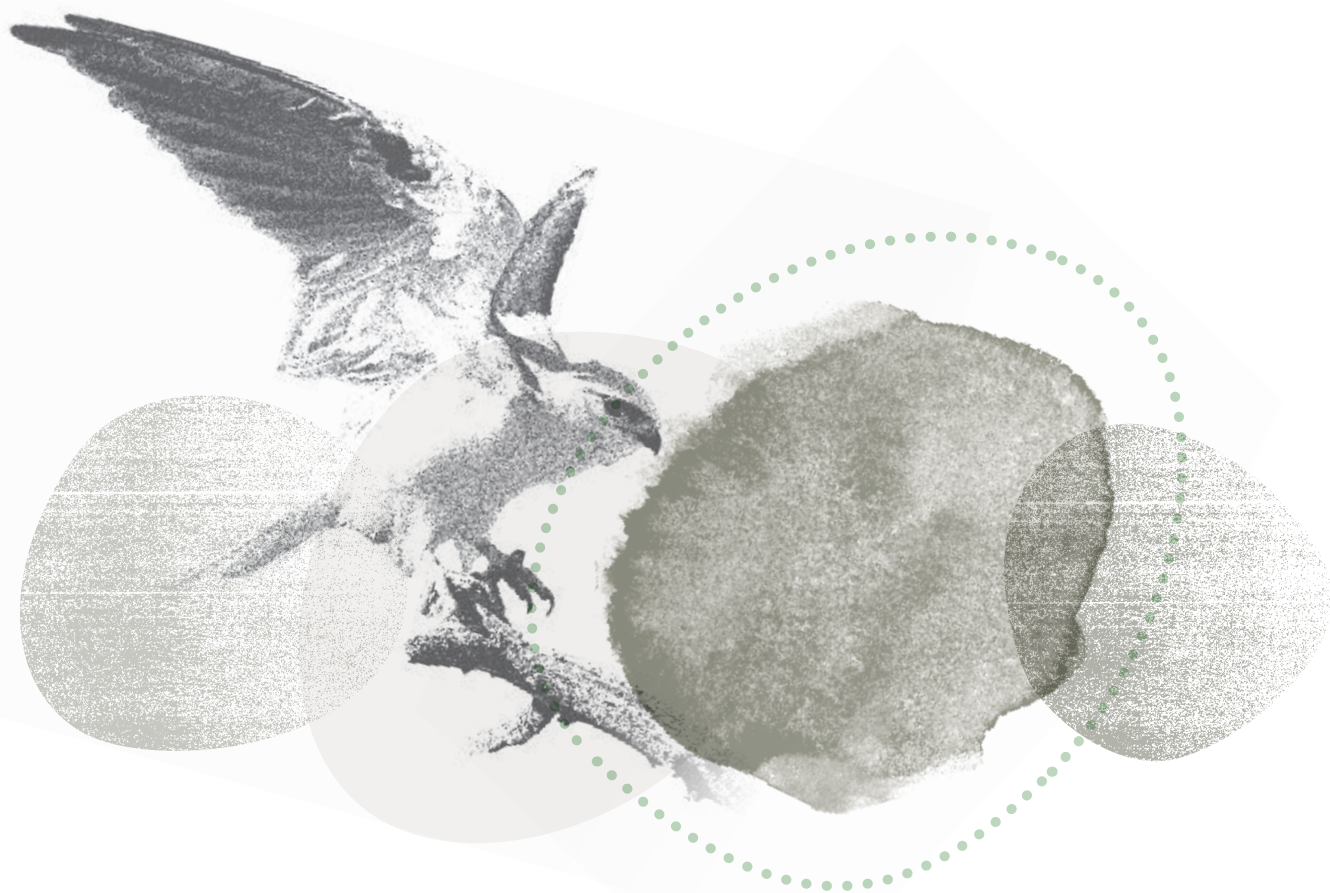
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# MOLONGLO RIVER RESERVE

RESERVE MANAGEMENT PLAN

2019



# CONTENTS

<b>1. INTRODUCTION .....</b>	<b>11</b>
1.1 Introduction.....	12
1.2 Values and significance.....	12
1.3 Summary of management objectives, policies and Actions .....	13
<b>2. THE RESERVE MANAGEMENT PLAN .....</b>	<b>23</b>
2.1 Objectives .....	24
2.2 Purpose.....	24
2.3 Structure .....	24
2.4 Governance and implementation.....	25
2.5 Knowledge .....	26
2.6 Policies and actions .....	33
<b>3. LAND DESIGNATIONS, BOUNDARIES, MANAGEMENT ZONES AND BUFFERS .....</b>	<b>29</b>
3.1 Objectives .....	30
3.2 Land designations, boundaries and management zones.....	30
3.3 Kama buffer.....	31
3.4 Policies and actions.....	32
<b>4. CONTEXT.....</b>	<b>37</b>
4.1 Regional setting.....	38
4.2 The reserve and its local setting .....	38
4.3 Reserve history and prior land uses.....	42
4.4 Government legislation, agreements, plans and strategies .....	42
<b>5. GEOLOGY, LANDFORMS, SCENERY AND SOILS .....</b>	<b>47</b>
5.1 Objectives .....	48
5.2 Introduction.....	48
5.3 Management considerations.....	52
5.4 Policies and actions.....	54
<b>6. ECOLOGICAL CONSERVATION .....</b>	<b>57</b>
6.1 Objectives .....	58
6.2 Introduction.....	58
6.3 Threatened habitat.....	66
6.4 Dryland matrix.....	69
6.5 River and riparian.....	70
6.6 River and riparian management considerations .....	71
6.7 Managing conservation in the reserve as a whole .....	74
6.8 Policies and actions.....	77

<b>7. CULTURAL HERITAGE VALUES .....</b>	<b>79</b>
7.1 Objectives.....	80
7.2 Connection with Country .....	80
7.3 Aboriginal history and heritage sites.....	81
7.4 Management considerations.....	81
7.5 European cultural history.....	82
7.6 Management considerations.....	84
7.7 Policies and actions .....	85
<b>8. RECREATION.....</b>	<b>87</b>
8.1 Objectives .....	88
8.2 Recreation demand.....	88
8.3 Prohibited recreational activities .....	89
8.4 Permitted recreational activities and their management.....	90
8.5 Safety.....	96
8.6 Policies and actions.....	97
<b>9. INFRASTRUCTURE, FIRE PROTECTION AND OPERATIONS.....</b>	<b>99</b>
9.1 Objectives .....	100
9.2 Infrastructure .....	100
9.3 Fire protection and management .....	102
9.4 Reserve operations.....	104
9.5 Policies and actions .....	105
<b>10. NEIGHBOURS AND COMMUNITIES .....</b>	<b>107</b>
10.1 Objectives.....	108
10.2 Neighbours.....	108
10.3 Communities .....	109
10.4 Policies and actions .....	111
<b>REFERENCES .....</b>	<b>112</b>
<b>APPENDICES.....</b>	<b>117</b>

## LIST OF TABLES

Table 1.0: Significant attributes of the reserve.....	13
Table 1.1: Summary of long term objectives for the reserve, the policy approaches that will be taken for each objective and actions in the first 10 years.....	15
Table 6.1: Threatened communities and species that live in the reserve, depend on it seasonally, or, in the case of fish, have been present in the past and could potentially be returned .....	59
Table 6.2: Consolidated actions in the NES Plan that apply to the Molonglo River Reserve .....	68
Table 6.3: Action plans for the recovery of threatened vegetation communities relevant to the Reserve.....	68
Table 6.4: Action plans for threatened species previously or potentially present in the Lower Molonglo River, and for aquatic communities in the ACT .....	74
Table 6.5: Abatement strategies for broad scale threats to conservation in the ACT.....	75
Table 6.6: Action plan for the Little Eagle.....	74
Table 8.1: Prohibited recreational activities.....	90
Table 8.2: Permitted recreation activities and their conditions.....	91
Table 9.1: Infrastructure in the reserve – present and anticipated.....	100

## LIST OF FIGURES

Figure 1.1: The urban and rural sections of the reserve.....	12
Figure 2.1: AMS Management Planning Framework .....	25
Figure 3.1: Boundaries and public land overlays for Molonglo River Reserve .....	34
Figure 4.1: Molonglo River Reserve in its regional setting.....	39
Figure 4.2: Molonglo River Reserve – local setting and place names.....	40
Figure 5.1: Classification of slope in the Molonglo River Reserve .....	50
Figure 6.1: Vegetation communities of the Molonglo River Reserve.....	60
Figure 6.2: The three ecological management zones in the Molonglo River Reserve.....	62
Figure 8.1: Indicative tracks and trails for different recreation users in the reserve .....	92
Figure 9.1: Proposed fire management zones and interactions with threatened habitat.....	103

# MINISTERIAL FOREWORD



The ACT Government acknowledges the Ngunnawal people as the Traditional Custodians of the ACT, and respects their continuing culture and the unique contribution they make to the life of our region.

The Molonglo River Reserve is our community's newest reserve. It follows the Molonglo River from Scrivener Dam to the confluence of the Murrumbidgee River Corridor Reserve and comprises approximately 1,280 hectares. The Molonglo River Reserve will be recognised and valued most for its beautiful river landscape and for supporting nationally threatened species and communities.

The habitat for the Pink-tailed Worm-lizard is among the best quality remaining in Australia, and the patches of Box-Gum Grassy Woodland amongst the best representations of that vegetation community in the ACT. The Superb Parrot is also known to visit the big Yellow Box trees and it is hoped this area will become a stronghold for the species in the ACT.

I am mindful that the 55,000 residents that will eventually call the Molonglo Valley home should have easy access to this stretch of river which will quickly become familiar as 'their patch' of the bush capital. While the humans are moving in next door, the river and its surrounds is already home to 92 species of birds, 5 species of native fish and crayfish and more than 200 species of plants. This of course presents opportunities and challenges for the management of this special area as the newest addition to the ACT's conservation estate.

The purpose of the reserve management plan is to set out the proposed policies and actions that would conserve and enhance the natural environment whilst addressing key risks and catering for a variety of recreational opportunities.

While various recreation activities will be permitted throughout the reserve, a new 35 hectare recreation hub is currently being designed near the Whitlam and Denman Prospect communities that flank the area on either side. This special purpose reserve will concentrate public activity into safe and durable recreational areas that facilitate broader landscape connections for user groups and minimise human impacts on the river corridor and habitat areas.

Our capacity to look after our parks and reserves depends on people being engaged and the ACT Government recognises the significant role that Canberrans will play in contributing to the successful management of the Molonglo River Reserve.

The Molonglo River has played a vital role in the life of people in this region from the earliest of times. This ribbon of nature through an urban environment is available to all Canberrans to explore and enjoy.

A stylized, handwritten signature in black ink, appearing to read 'MG'.

Mick Gentleman MLA  
Minister for Environment and Heritage

# ABBREVIATIONS

ACT	Australian Capital Territory
ACTPLA	ACT Planning and Land Authority
BGW	Box-Gum Grassy Woodland (equivalent to 'White Box-Yellow Box Grassy Woodland' and 'Derived Native Grassland' in the EPBC Act)
CEMP	Construction Environmental Management Plan
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EPSDD	Environment, Planning and Sustainable Development Directorate, ACT Government
ESA	ACT Emergency Services Agency
LMWQCC	Lower Molonglo Water Quality Control Centre
MNES	Matters of National Environmental Significance
MoU	Memorandum of Understanding
NES	National Environmental Significance
NTG	Native Temperate Grassland (equivalent to 'Native Temperate Grassland of the South Eastern Highlands' in the EPBC Act)
NSW	New South Wales
OAPZ	Outer Asset Protection Zone
PAD	Potential Archaeological Deposit
PTWL	Pink-tailed Worm-lizard
SBMP	Strategic Bushfire Management Plan
SFAZ	Strategic Firefighting Advantage Zone
SLA	Suburban Land Agency, ACT Government
TCCS	Transport Canberra and City Services Directorate, ACT Government

# GLOSSARY

**Activities Declarations:** A legal instrument (*a notifiable instrument*) under the *Nature Conservation Act 2014* that prohibits or restricts users activities in reserves.

**Asset Protection Zone:** A zone that ensures a separation between bushland and habitable dwellings or other defined assets.

**Adaptive Management Strategy:** The Molonglo River Reserve Adaptive Management Strategy (May 2013) is a key commitment arising out of the NES Plan. It forms the foundation on which the Matters of National Environmental Significance values in the Molonglo area are protected and enhanced through ongoing improvement in management practices.

**Ecological Management Guidelines:** The Molonglo River Reserve and Offset Areas Ecological Management Guidelines (February 2015) guide management for conservation values, especially five matters of national environmental significance in land beside and near the Molonglo River, downstream of Scrivener Dam and Lake Burley Griffin, ACT.

**Environmental flows:** A system for managing the quantity, timing and quality of water flows below a dam, with the goal of sustaining freshwater and estuarine ecosystems and the human livelihoods that depend on them.

**Inner Asset Protection Zones:** Strips of land, of variable width, immediately adjacent to vulnerable assets, where fuel hazard is to be reduced to comparatively low levels. May be complemented by an Outer Asset Protection Zone.

**Kama:** Formerly Kama Nature Reserve and part of Canberra Nature Park, now incorporated into the Molonglo River Reserve. It is listed on the ACT Heritage Register as Kama Woodland/Grassland, Belconnen and consists of Blocks 1419, 1386 and parts of 1596 and 181 and verge of William Hovell Drive adjacent to Blocks 1419, 1386 and 1596, Belconnen District.

**Lower Molonglo River:** The Molonglo River from Scrivener Dam to its confluence with the Murrumbidgee River.

**NES Plan:** The Molonglo Valley Plan for the Protection of Matters of National Environmental Significance. A plan agreed between the ACT and Australian Governments to ensure that the conservation impacts of development will be offset by a range of conservation gains nearby.

**Operational Plan:** The day-to-day management planning tool that will provide detail about the on-ground works and activities.

**Outer Asset Protection Zones:** Strips of land adjacent to some Inner Asset Protection Zones, where fuel hazard is to be reduced to comparatively low levels to further reduce bushfire intensity and the risk of ember attack to adjacent houses and assets.

**(The) plan:** The Molonglo River Reserve Management Plan. The Plan's purpose is to give clear direction on how biodiversity, land and waters of the Molonglo River Reserve will be used and managed to satisfy both nature conservation and recreation objectives.

**Procedures Manual:** The Molonglo River Reserve Procedures Manual (September 2014) provides the core monitoring program designed to meet the monitoring requirements identified in the NES Plan.

**Rural section:** The downstream section of the reserve that is bordered by rural land.

**Strategic Firefighting Advantage Zones:** Corridors established to break up major fire runs in instances where conditions permit. These zones are strategically located to slow the spread of unplanned fires and reduce fire intensity and spotting.

**(The) reserve:** Molonglo River Reserve, the reserve that is the subject of this reserve management plan.

**Urban section:** The upstream section of the reserve that is bordered by urban land.









# MOLONGLO RIVER RESERVE





Aerial view of Molonglo River Reserve rural section



# 1. INTRODUCTION

## **VISION** for the Molonglo River Reserve

The Molonglo River Reserve is our treasured natural ‘front yard’ with its river and gorges, and rich biodiversity providing a variety of conservation, research, recreational and educational experiences for all.



## 1.1 Introduction

The Molonglo River Reserve follows the Molonglo River from Scrivener Dam downstream to the confluence with the Murrumbidgee River Corridor Reserve. The total length of the river within the reserve is 23 kilometres and the area is 1280 hectares.

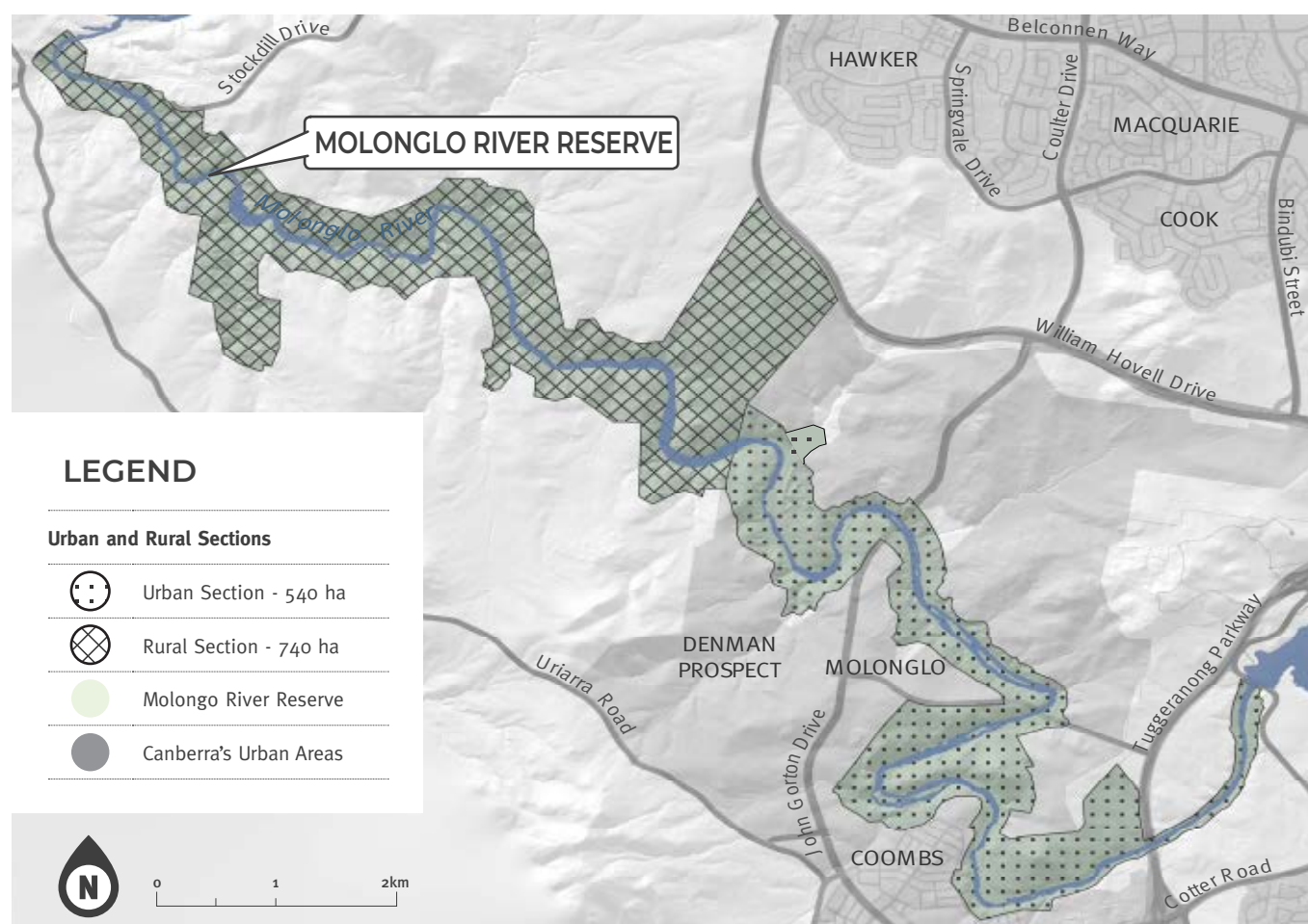
A key characteristic of the reserve is that the upstream section, formerly pine forests and grazing country around a river with degraded riparian vegetation, will become the central landscape feature and open space in the suburbs of the Molonglo Valley. At the same time, the nationally threatened communities and species that live in the reserve must be protected. The downstream section will remain bordered by rural land. To simplify communication about the upstream and downstream sections, they are termed 'urban' and 'rural' respectively in this plan (Refer Figure 1.1). There is no hard boundary between the two sections.

The Molonglo River Reserve Management Plan sets out a clear and agreed set of long term objectives for the reserve and outlines the policy approaches for achieving the objectives. The plan also gives clear guidance on how the land and waters of the reserve will be managed and used.

## 1.2 Values and significance

The values and significance of the Molonglo River Reserve are derived from what features of the reserve are most important to enhance or protect. Table 1.1 documents and highlights the values of the reserve that are most significant and that shape the directions in the plan.

**Figure 1.1** The urban and rural sections of the reserve



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**Table 1.0** Significant attributes of the reserve

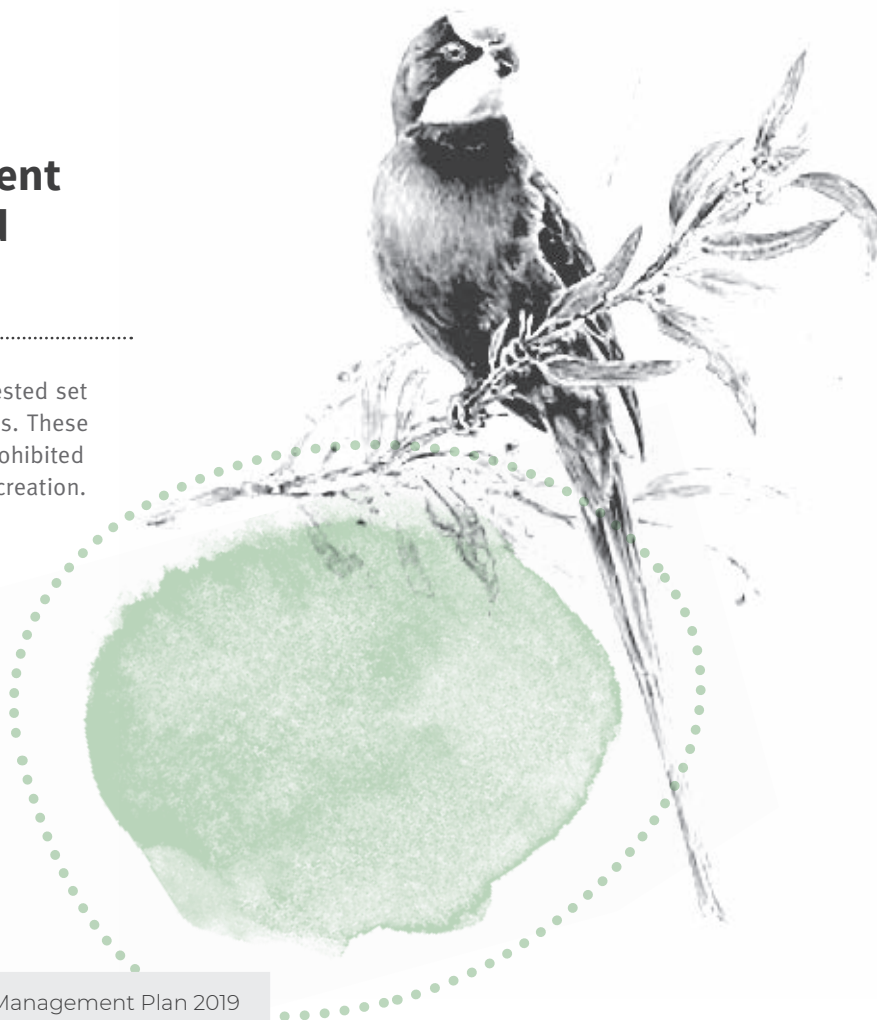
Feature	Attributes valued by people	Type of value*	Significance
			Local = ACT Regional = SE NSW National = Australia
The river and corridor in the wider landscape.	As a designated part of Canberra's National Capital Open Space System, the reserve contributes to the designed framing of Canberra with natural bushland and the creation of a strong sense of place for the national capital. (Current and future)	Use	Locally high
Twelve kilometres of a perennial river flowing through an urban area.	A substantial natural centrepiece running through the Molonglo Valley suburbs and past a commercial centre. Most residents will live less than a kilometre from the river. (Current and future)	Use	Locally outstanding. The only residential area in Canberra that fronts a largely natural river.
A meandering, incised river with gorges and varied river forms, from pools to rapids. The water level can rise and fall dramatically.	The diversity of river scenery and its range of water flows increases the visual interest for people. (Current and future)  The diversity of river forms supports a diversity of aquatic life and improves water quality. (Current and increase in future)	Use	Locally outstanding
The presence of running water in the landscape.	Water has symbolic meanings for people in many cultures and a special significance in a dry continent. (Current and future)	Use	Locally high
Middle Silurian faunal fossils over a 50 hectare site on the slopes above the river in the rural section.	The site is listed in the ACT for its heritage value. It is the best-known and richest deposit of Middle Silurian faunal fossils in eastern Australia. (Current and future)	Existence	Locally outstanding Regionally high
Home to two nationally threatened ecosystems and five nationally threatened species (one plant, two birds, one fish and one lizard).	The largest remaining population of Pink-tailed Worm-lizard in Australia and the location of the type specimen for this species. (Current and future)  Kama Woodland, one of the ACT's best examples of Box-Gum Woodlands, is a nationally threatened ecosystem. (Current and future)	Existence	Nationally high
Diverse habitats and a permanent source of water.	Very species rich for its size (1% of the area of the ACT). More than 75% of the bird species recorded in the ACT use riparian areas at some time. The Molonglo and the Murrumbidgee river corridors together have a higher diversity and abundance of raptors than any other place in the ACT region and uncommonly seen species such as platypus are found in the river.  The reserve is also home to a number of plants and birds that are special in the ACT for their rarity, endemism, being at the edge of their range or providing a key functional role in supporting other species. Some of the riparian areas are in excellent condition and five of the twelve species of native fish and crayfish found in the ACT are found in the river. (Current and future)	Existence	Locally very high Regionally high
The river provides a watered and vegetated corridor through the landscape, with cross connections to other woodlands via Kama.	Important corridors for birds and other wildlife movement. Some of the riparian vegetation is in excellent condition. (Current and future).	Existence	Locally outstanding Regionally high
A watered and vegetated corridor for people moving through the landscape.	In the past, a source of water, food and campsites for local Aboriginal people and a major movement corridor for Aboriginal people travelling through the region for ceremonial purposes. An important place in Aboriginal stories and cultural practices of today. (Current and future)	Use and Existence	Regionally high

Feature	Attributes valued by people	Type of value*	Significance
			Local = ACT Regional = SE NSW National = Australia
A trail network that aims eventually to connect the river along both sides, with several crossing points between them.	A diversity of opportunities for low intensity recreation, from short to long walks and rides to picnicking, nature watching and fishing. Locations encompass a variety of urban and wilder, more remote settings. (Current and increase in future)	Use	Locally very high
Trail connections to wider networks of walking, cycling and equestrian trails.	Contributes to a substantial network of recreational opportunities in and around Canberra. (Current and increase in future)	Use	Locally high
Two recreation parks, one at each end of the urban section.	Opportunities for higher intensity recreation and for special events. (Future)	Use	Locally very high
Remains of Riverview farm, occupied by an early settler family.	Riverview has significant heritage value. (Current and future)	Existence	Locally high
A living laboratory.	A place for scientists, land managers and land carers to further scientific knowledge about Australia's biophysical assets and processes, and in particular to learn in a planned way about ecological rehabilitation of sites such as those that are in poor condition in the reserve. (Current and future)	Use	Locally high
A living classroom.	Doorstop opportunities for people, including school and university students, to gain individual and social satisfaction from learning about nature or engaging in its care. (Future)	Use	Locally high

\* All values have a bequest value when left in good condition for future generations

## 1.3 Summary of management objectives, policies and actions

The plan is structured by topic, each with a nested set of management objectives, policies and actions. These are summarised in Table 1.0. Permitted and prohibited recreation uses are outlined in Chapter 9 – Recreation.



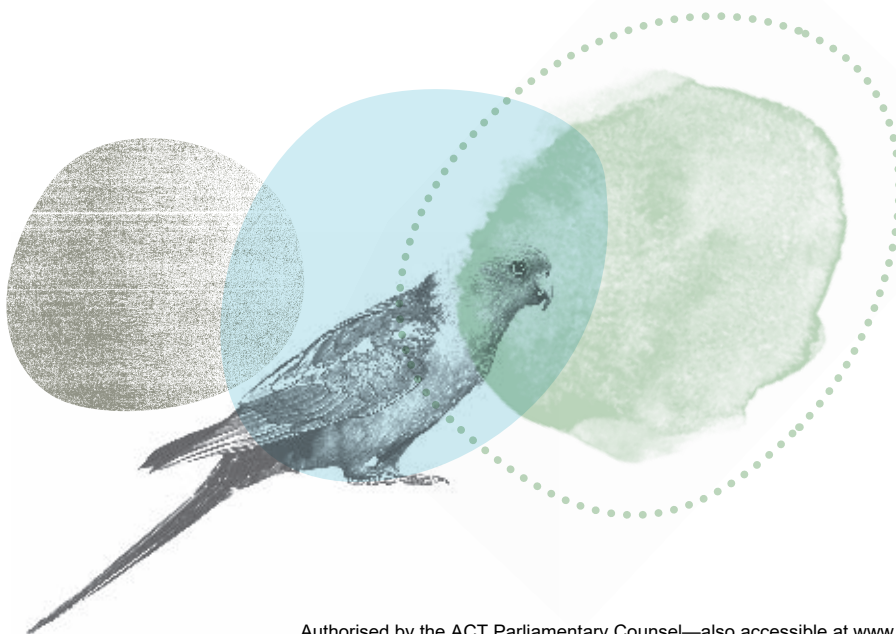
**Table 1.1: Summary of long term objectives for the reserve, the policy approaches that will be taken for each objective and actions in the first 10 years**

#	Objectives	#	Policy	#	Action	Timing*	Priority**
THE RESERVE MANAGEMENT PLAN (CHAPTER 2)							
1	Inform future decision making with a structured, evidence-based process.	1.1	Strategic consultation with the community will be proactive and planned.	1.1.1	Seek input from relevant community organisations to ensure management decisions include knowledge gained from citizen science.	Short term	High
		1.2	Adaptive management principles will be applied to reserve management.	1.2.1	Implement the Adaptive Management Strategy that includes the NES matters applying within the reserve.	Ongoing	High
				1.2.2	Fill gaps in biodiversity data for the whole of the reserve, including using citizen science activities where appropriate.	Medium term	High
				1.2.3	Review progress of all objectives in the plan in year 5 (for adjustment) and year 10 (to inform the subsequent plan).	Medium term	High
2	Foster the development of new knowledge and its application to management actions for achieving other reserve objectives.	2.1	Work strategically and collaboratively with key researchers.	2.1.1	Assess research proposals that require access to the reserve on the basis of their relevance, ecological impact and management support required.	On demand	Medium
				2.1.2	With research partners, seek opportunities for funding of research projects of mutual interest.	On demand	Medium
				2.1.3	Synthesise new knowledge and ensure it reaches reserve staff and community stakeholders.	Ongoing	Medium
LAND DESIGNATIONS, MANAGEMENT ZONES AND BOUNDARIES (CHAPTER 3)							
3	Reserve boundaries, management zones and buffers adequately protect the reserve's threatened species and communities.	3.1	Future changes in boundaries and management zones must be consistent with the objectives of the plan, and in particular not compromise the capacity to protect threatened species and communities.	3.1.1	Monitor urban edge development, its impacts and policy changes that might impact on the capacity to effectively protect threatened species and communities; and propose appropriate actions if that capacity is threatened.	Ongoing	Medium

#	Objectives	#	Policy	#	Action	Timing*	Priority**
<b>GEOLOGY, LANDFORMS, SCENERY AND SOILS (CHAPTER 5)</b>							
4	Conserve the condition of the heritage geological site.	4.1	Protect the site from disturbance.	4.1.1	Avoid significant infrastructure development at the heritage geological site. If the proposed activity is likely to diminish the heritage significance of the place, a Statement of Heritage Effect must be prepared and approved by the ACT Heritage Council (s61G of the <i>ACT Heritage Act 2004</i> ).	Ongoing	High
				4.1.2	Avoid disturbing outcrops or subsurface limestone when designing infrastructure such as trails, trenches and fences.	Ongoing	High
		4.2	Raise awareness of the value of the site.	4.2.1	Consider opportunities for site interpretation including on site and on-line interpretation material.	Short term	Medium
5	Maintain and enhance landscape function in the long term.	5.1	Soil disturbance is avoided in the first place or site remediated when disturbed.	5.1.1	Design routes and trails to minimise the risk of people trampling or riding off path.	Ongoing	High
				5.1.2	Apply the design and construction approach used in new sections of the Centenary Trail to new trails in the reserve, where appropriate.	Ongoing	High
				5.1.3	Promote a culture of people staying on tracks and trails, vehicles remaining on roads and tree litter and rocks remaining in place.	Ongoing	High
				5.1.4	Works plans for all significant reserve management activities will include the mitigation of soil and habitat disturbance.	Ongoing	High
		5.2	Monitor, manage and remediate soil disturbance and erosion.	5.2.1	Remediate eroding areas that are near or have crossed their landscape function threshold.	Ongoing	High
				5.2.2	Monitor the impact of grazing, especially from cattle, macropods and rabbits and take action to modify the grazing pressure if soil surface condition is likely to approach thresholds.	Ongoing	Medium
6	Provide community access to a diversity of scenery and views within the reserve that are dominated by natural features.	6.1	The 'naturalness' of the reserve will be protected.	6.1.1	Design structural elements within the reserve to ensure integration with landscape character and ecological objectives.	Ongoing	High
		6.2	Identify and provide access to a diverse set of views, and protect their 'naturalness'.	6.2.1	Select a set of views that reflect the diversity of natural features, and identify and map them to give them status and aid in wayfinding.	Short term	Medium



#	Objectives	#	Policy	#	Action	Timing*	Priority**
<b>ECOLOGICAL CONSERVATION (CHAPTER 6)</b>							
7	The population size and condition of threatened species and communities is at least maintained or condition improved; the diversity of all other native species is conserved; and the ecological condition of the dryland matrix is improved.	7.1	On-ground activities will be designed and implemented through a suite of plans informed by ecological management guidelines for the reserve and an adaptive management approach. (Applies to all Objectives 7-9.)	7.1.1	Develop a set of scientifically-based ecological management guidelines that incorporate the NES agreements (Table 6.2), bushfire protection, action plans (Table 6.3, Table 6.4, Table 6.6) and threat abatement plans (Table 6.5) and provide integrated guidance to designing the on-ground activities for achieving the goals.	Completed	High
				7.1.2	Develop 3 year operational plans for discrete areas that prioritise the on-ground actions for each area.	Ongoing	High
				7.1.3	Prepare works plans that incorporate licensing and environmental protection requirements for all works undertaken in the reserve.	Ongoing	High
				7.1.4	Implement the Molonglo River Reserve Adaptive Management Strategy for the NES areas to track progress and adjust management as learning grows; and review other objectives in years 5 and 10.	Ongoing	Medium
8	Improve the ecological condition in the river and riparian zone to support the recovery of native fish in the river.	8.1	A long term river habitat restoration plan will guide recovery of ecological values in the river and riparian zone	8.1.1	Investigate the extent to which outflows from LMWQCC deter some fish species from entering the Molonglo River from the Murrumbidgee and if required, investigate options for changing the point or pattern of discharge.	Short term	Medium
				8.1.2	In consultation with the National Capital Authority, review the impact of the release of cold water from Scrivener Dam and explore options for improving the quality of water released from the dam.	Short term	Medium
				8.1.3	Combine Actions 8.1.1 to 8.1.2 with other appropriate measures from the ACT Aquatic and Riparian Conservation Strategy in a Lower Molonglo River Restoration Plan.	Medium term	Medium
9	Connectivity within and outside the reserve is addressed and improved.	9.1	Connectivity within and outside the reserve will be improved.	9.1.1	Analyse connectivity, identify gaps and target the gaps for habitat rehabilitation.	Short term	High



#	Objectives	#	Policy	#	Action	Timing*	Priority**
<b>CULTURAL HERITAGE VALUES (CHAPTER 7)</b>							
10	Cultural heritage within the Molonglo River Reserve is identified and conserved to retain its significance.	10.1	Aboriginal heritage places and objects will be protected.	10.1.1	Aboriginal cultural heritage will be managed in accordance with statutory requirements, National Heritage principles, and guidelines for Aboriginal cultural heritage places.	Ongoing	High
				10.1.2	Develop and implement Conservation Management Plans for the following sites and areas: MRC14, MRC15, MRC17, PAD1, PAD5 and the Special Cultural place.	Short term	High
				10.1.3	Monitor the effectiveness of the conservation actions and adapt the management plans if required.	Ongoing	Medium
				10.1.4	Return agreed salvaged artefacts to Country in accordance with Return to Country Protocols developed in consultation with Representative Aboriginal Organisations (RAOs) and the ACT Heritage Council.	Short term	Medium
				10.1.5	Develop and apply a protocol for action in the event of new sites being found in accordance with the provisions of the <i>Heritage Act 2004</i> .	Short term	Medium
				10.1.6	Review and if required, resurvey the rural section of the reserve for Aboriginal sites and apply the same mechanisms to their protection as in the urban section.	Short term	Medium
		10.2	The major European heritage sites will be protected.	10.2.1	Conforming to statutory requirements and best practice principles, implement the Conservation Management Plan for Riverview.	Short term	High
				10.2.2	Prepare and implement a conservation management plan for the limestone quarry that aligns with measures developed to conserve the heritage listed geological site (Objective 4).	Short term	Low
				10.2.3	Monitor the effectiveness of the conservation actions and adapt the management plans if required.	Ongoing	Medium



#	Objectives	#	Policy	#	Action	Timing*	Priority**
11	Cultural heritage is to be interpreted and (where appropriate) promoted to foster community appreciation of past and continuing connections.	11.1	Aboriginal connection with Country, past and present, will be visibly promoted.	11.1.1	With Aboriginal involvement, seek government approval to name the reserve with an Aboriginal name.	Short term	High
				11.1.2	Include Aboriginal perspectives in all major promotion and interpretation material.	Ongoing	High
		11.2	Aboriginal people will be involved in the management and interpretation of the reserve.	11.2.1	The right of the Ngunnawal community and the RAOs to be consulted and involved in issues that affect their interests will be respected and protocol for how consultation should occur will be developed.	Ongoing	High
				11.2.2	Establish a site that interprets how Ngunnawal people used the river, its food and its plants.	Short term	High
				11.2.3	Identify and document traditional Aboriginal cultural knowledge and, where appropriate, use it in reserve management through partnerships with Aboriginal people.	Ongoing	Medium
		11.3	The history of past land uses and occupation will be reflected in named places and interpretive material.	11.3.1	Synthesise and make publically available an occupation and land use history of the Lower Molonglo Valley 1820-2014, including specific reference to historical sites within the reserve boundaries.	Short term	High
				11.3.2	Promote and reflect the history in the naming of local places and in interpretation material.	Ongoing	Low
		11.4	Descendants of families with a strong historical association with the places in the reserve, and local historians, will be respected and involved.	11.4.1	Involve descendants, former users of the area and local historians in the planning, maintenance and interpretation of European cultural heritage in the reserve.	Ongoing	High
		RECREATION (CHAPTER 8)					
12	Provide a range of recreation opportunities that are valued by users and that can coexist with other values and objectives for the reserve.	12.1	Provide a range of recreation opportunities differentiated by their level of intensity, allowing low intensity activities in the nature reserve and providing for higher intensity activities in the special purpose reserves.	12.1.1	Reflect the distinction between low and high intensity activities in the choice and design of recreation facilities.	Ongoing	High
				12.1.2	Incorporate the distinction between low and high intensity activities into promotion about the reserve.	Ongoing	Medium
				12.1.3	Make permitted and non-permitted recreation activities clear on signage and in promotional material (Refer Tables 8.1 and 8.2).	Ongoing	Medium
				12.1.4	Evaluate new recreation proposals according to the criteria in Section 8.4.12.	On demand	High
				12.1.5	Evaluate commercial proposals according to the criteria in Section 8.4.13.	On demand	High
				12.1.6	Prepare landscape plans for the special purpose reserves.	Short term	High
				12.1.7	Regularly seek feedback from users and use it to guide management.	Ongoing	High

#	Objectives	#	Policy	#	Action	Timing*	Priority**
13	Residents in Molonglo Valley view, treat and protect the reserve as their ‘treasured front yard’ and set a new high standard in the ACT for their behaviour in a reserve.	13.1	Manage impact through appropriate detailed design of recreation facilities and by addressing the behaviour of users from early on in reserve establishment.	13.1.1	Develop detailed plans for trails and facilities in successive portions of the reserve as development proceeds.	Ongoing	High
				13.1.2	Develop and implement a program that includes working with user and community groups to codify, encourage and monitor people’s behaviour in the reserve and applying sanctions where appropriate.	Ongoing	High
14	The reserve adds value to the ACT as a distinct recreation destination, a long-distance recreation link, and an attractive contribution to the Canberra Open Space System.	14.1	Maintain and enhance trail linkages to destinations beyond the reserve, working with adjoining land managers to maintain or improve connectivity.	14.1.1	Maintain existing trail linkages and improve linkages in the rural section of the reserve.	Ongoing	High
15	Visitor safety is addressed in the design of information, facilities and operations.	15.1	Minimise the risk of harm to people by designing and managing facilities to suitable safety standards and by providing community education and on-site warnings.	15.1.1	Design, build and maintain all facilities, including trails to standards that minimise risks to visitors and natural assets.	Ongoing	High
				15.1.2	Provide clear descriptions and safety information to visitors at reserve entrances, in published guides about the reserve and at specific locations where danger is high.	Ongoing	High
				15.1.3	Work with schools, local community networks and recreation groups to educate users about dangers in the reserve.	Ongoing	Medium
				15.1.4	Develop and maintain an Emergency Response Plan for the Molonglo River Reserve, in conjunction with the Australian Federal Police, the Emergency Services Agency, National Capital Authority and other organisations. The plan may include protocols for closing the reserve or parts of it on days of high fire danger or flooding.	Short term	High
				15.1.5	Warn visitors about temporary hazards (e.g. herbicide spraying, bait laying, controlled burns).	Ongoing	High
INFRASTRUCTURE, FIRE PROTECTION AND OPERATIONS (CHAPTER 9)							
16	Avoid or minimise the impact on reserve values of building and maintaining infrastructure and facilities in or nearby the reserve.	16.1	The values, objectives and relevant policies of the plan will be used to guide advice and actions on the impacts of construction and maintenance works.	16.1.1	Provide advice to proponents of constructed works and facilities about how impact is to be mitigated.	On demand	High
				16.1.2	Monitor and report non-compliance with legislative requirements relating to construction activities and sediment and contaminant flows from neighbouring properties.	Ongoing	High
				16.1.3	Monitor construction activities for inadvertent impact, and design and negotiate appropriate mitigation.	Ongoing	High
				16.1.4	Monitor the impact of using natural creek lines as drainage channels from stormwater ponds and rehabilitate channels or modify their design if required.	Ongoing	High

#	Objectives	#	Policy	#	Action	Timing*	Priority**
17	Achieve fire protection for people and property in ways that also effectively protect threatened habitat and other ecological conservation values.	17.1	Requirements of the Strategic Bushfire Management Plan will be met in ways that minimise loss of threatened habitat and ecological function.	17.1.1	Complete the PTWL rehabilitation trial in Patch K and progressively apply the results to PTWL buffers and moderate and high PTWL habitat patches in Outer Asset Protection Zones in the urban sections.	Ongoing	High
				17.1.2	Incorporate requirements into the Molonglo Development Fire Management Strategy and the Regional Fire Management Plans that apply to the rural section, and implement them in operational plans.	Ongoing	High
				17.1.3	Prohibit the use of open fires in the reserve (Chapter 8).	Ongoing	High
18	Suitable access and associated infrastructure is available for fire management.	18.1	An access plan for fire management will be developed that maximises the use of existing management tracks and does not impact on NES matters, except where permitted in the NES Plan.	18.1.1	Develop and implement a fire access plan, taking into account all the other objectives in the plan.	Short term	High
19	Minimise harm to people and the environment from reserve operations.	19.1	Relevant legislation and ACT Government policy will be applied to all management actions that have a risk of harm to people and wildlife.	19.1.1	Ensure staff are aware of and comply with prescriptions applying to all activities in the reserve, particularly those involving: <ul style="list-style-type: none"><li>• pesticides and weedicides;</li><li>• firearm use;</li><li>• ecological and fuel reduction burning.</li></ul>	Ongoing	High
				19.1.2	Apply standard ACT Government duty of care to all activities in and associated with the reserve.	Ongoing	High
		19.2	Reserve operations will not compromise agreed objectives in the plan.	19.2.1	Assess operational activities for their environmental impact and mitigate any impacts.	Ongoing	High
NEIGHBOURS AND COMMUNITIES (CHAPTER 10)							
20	Achieve productive working relationships with neighbours that contribute to maintaining reserve values	20.1	Establish and maintain good neighbour relationships.	20.1.1	Promote co-operation and exchange of information about the management of the reserve with neighbours.	Ongoing	Medium
				20.1.2	Support the involvement of neighbours and their input in revegetation and other environmental activities within the reserve.	Ongoing	High
21	Achieve strong community support for the reserve and active contributions towards its management.	21.1	A planned approach will be used to make good use of existing community mechanisms.	21.1.1	Develop and implement a communication and engagement plan on the basis of the objectives in the plan.	Short term	Medium
				21.1.2	Develop MoUs with community groups and organisations for carrying out collaborative community engagement activities in the reserve.	Short term	High

\* Timing is indicative of the period during the 10 year life of the plan when the action is envisaged to occur (Short term = Years 1-5, Medium term = Years 6-10). The timing of some actions will be dependent on resource availability.

\*\* Priority refers to the relative importance of each action in achieving the objectives of the plan, including conforming to all relevant legislation and government agreements.







## 2. THE RESERVE MANAGEMENT PLAN

Molonglo River pools



## 2.1 Objectives

**Objective 1:** Inform future decision making with a structured, evidence-based process.

**Objective 2:** Foster the development of new knowledge and its application to management actions for achieving other reserve objectives.

## 2.2 Purpose

The Molonglo River Reserve Management Plan identifies the values of the reserve and describes how the objectives will be implemented and promoted in the reserve. The plan provides direction and guidance to the land manager, visitors, volunteers, neighbours and general public about how the Molonglo River Reserve will be managed over the next ten years.

The plan has been prepared as required by the provisions of the *Nature Conservation Act 2014* and the *Planning and Development Act 2007*. The Nature Conservation Act describes the process for preparing the plan, and Schedule 3 of the Planning and Development Act describes the objectives for the different types of reserves.

The plan is supported by research findings across a wide range of disciplines from ecology to economics, as well as transdisciplinary studies that bring that knowledge together for application to real-world challenges.

These are identified by number and there are 21 objectives for the reserve in this plan.

**Policies:** the general approaches that will be taken to achieve the objective. These are identified by number. Some objectives might require a combination of policies.

**Actions:** specific activities required to implement the policies. They might be a one-off 'action' or the application of an ongoing policy and are identified by number.

Each policy or action has a unique identifier. For example Action 1.1.1 can be tracked back up the hierarchy, in this case to Policy 1 of Objective 1. The plan's structure will allow for transparent and efficient monitoring, adaptive management and reporting so that the objectives, policies and actions can transparently flow into the Ecological Management Guidelines.

The objectives, strategic directions and major policies and actions in the plan set the framework for detailed operational planning for the reserve. These details are not included in the plan but a commitment to develop and implement them is incorporated into a number of the actions in the plan. These will then become incorporated into the operational plans for the reserve. Supporting guidelines and plans include:

- Molonglo River Reserve Adaptive Management Strategy (2013)
- Procedures Manual for Monitoring Vegetation and Habitat Condition in Molonglo River Reserve (2014)
- Ecological Management Guidelines for Molonglo River Reserve (2015)

## 2.3 Structure

The plan is structured so that each level in the hierarchy takes its direction from the one above. The objectives (see Table 1.1) are arranged so that they are clustered around recognisable topics such as ecological conservation, cultural heritage values, recreation etc.

**Objectives:** the long term, sustainable outcomes desired that will endure past the term of this plan.





## 2.4 Governance and implementation

The ACT Parks and Conservation Service is the reserve land manager and is formally responsible for managing the reserve and implementing the plan. This plan is one of the statutory requirements that contribute towards proper governance and good decision-making in relation to the reserve. The plan represents agreed directions, approach and an initial set of actions but there will be considerable additional decision-making that is required through the life of the plan. This section outlines a structured approach for guiding this decision-making.

A number of the policies and actions contained in the plan require collaboration with other government directorates and agencies, community organisations, adjacent landholders, private organisations, schools, universities and commercial interests. In these cases, the responsibility for initiating and facilitating the actions still rests with the land manager.

The land manager is also required to report to the ACT Government on the implementation of the plan at least once every 5 years, and to review the plan, including consultation with the public, every ten years from its commencement.

Costs associated with implementation of the Plan and any related policy will be subject to budget approval.

### 2.4.1 Adaptive management

The plan sets out objectives for realising the desired values of the reserve in the long term, and the policies and main actions that will work towards them in the life of this plan. Scientific research and past management experience has helped to narrow the range of socio-ecological responses expected from management actions, and that knowledge has supported this plan. However uncertainties will still remain, both for the ecosystems in their current state and as they respond to rehabilitation efforts and future drivers of change (e.g. increased human use, vegetation management for fire protection, removal of grazing, alteration in surface and groundwater hydrology, disturbance from infrastructure and climate

change). ‘Adaptive management’ is an approach that has been developed to help reduce uncertainty, structure management interventions so that they focus on the most important questions, maximise the rate of learning and better assure the outcomes desired.

The Molonglo River Reserve Adaptive Management Strategy (AMS) has been developed and approved for the threatened habitats in the reserve that are covered by the NES Plan. This includes areas inside the reserve, as well as some offset areas outside the reserve. The strategy spells out the monitoring responsibilities and a process for evaluating the results. Progress towards NES Plan outcomes is also reported annually to the Australian Government. The AMS planning management framework as it applies to the reserve is shown in Figure 2.1.

Figure 2.1: AMS Management Planning Framework



An adaptive management approach to the areas covered by the NES Plan is already in place. This covers the most critical conservation objectives but represents less than half the area of the reserve (Chapter 5). Many other reserve objectives fall fully or partially outside the area covered by the NES Plan and a system for monitoring their progress and developing and applying new knowledge to their achievement is required. Operational plans are to be used for planning specific monitoring activities.

The baseline ecological condition information is good for the ecosystems and species of national significance in the urban section and Kama but variable in coverage for all other areas across the reserve. There is a lack of good biodiversity data about the natural assets and their condition across the reserve as a whole – in part because this is the first time that this particular area has been the focus of a set of conservation objectives. There is an opportunity to enlist community volunteers in the monitoring activities associated with adaptive management. The developing practice of ‘citizen science’ and the capacity provided by the Global Positioning System (GPS), digital capture and reporting into central databases like the Atlas of Living Australia make this a feasible way of complementing knowledge developed by professionals.

The adaptive management strategies referred to so far focus on the ecological conservation objectives for the reserve. The same principles broadly apply to all other objectives and these will be included in the review of progress of the whole plan at mid-term and near its conclusion.

## 2.5 Knowledge

Despite being a small region, the ACT is home to a large variety of research groups active in areas directly or closely relevant to the management challenges in the reserve. Groups include the ACT Government’s Conservation Research unit in the Environment, Planning and Sustainable Development Directorate, the Institute of Applied Ecology at the University of Canberra, the Fenner School at Australian National University, and the CSIRO. These research organisations also include social scientists with interests in understanding interactions of social and ecological systems, an area of potential value for this reserve, considering the close proximity of urban and conservation land.

The Ecological Management Guidelines contain current knowledge about the ecosystems of the reserve and the management actions required to rehabilitate and protect them. However, the reserve would also benefit in the

longer term from research on more fundamental questions focused around:

- climate change and its impacts; adaptation options for conservation, including reviewing the nature of conservation objectives in a changing climate
- social behaviours, policies and conservation
- restoration ecology and/or the creation of novel ecosystems to fulfil specific objectives in the reserve (e.g. conservation and fire protection; conservation and recreation management)
- relationship between conservation measures within the reserve and conservation measures at the regional scale
- development of best control measures for weeds that are especially invasive in the reserve, such as African Lovegrass.

### 2.5.1 Management considerations

Research that addresses management questions relevant to reserve objectives or wider ecological or socio-ecological issues is encouraged. Major management considerations include the following.

Research focusing on questions relevant to the plan’s objectives will provide the most value to the reserve. The research will largely fall out of the adaptive management process and potential research projects can then be scoped collaboratively between researchers and managers. Establishing ongoing relationships with researchers enables more efficient, committed and fruitful collaborations when they are needed.

Sites in the urban section of the reserve will have high visibility and a high potential for public education but will be more at risk from unwitting misuse or deliberate vandalism. Scientists’ activities in places of high visibility need to be clearly indicated so that the reasons for their behaviour are understood and not mimicked (e.g. turning over rocks looking for Pink-tailed Worm-lizards, taking plants for identification). Reserve management will help protect sites but managing such risks needs to be built into the experimental design.

Research projects must involve minimal risk to conservation objectives in the reserve. Licences that must be obtained under existing legislation include: taking or killing animals or picking native plants (*Nature Conservation Act 2014*) and banding birds or bats (*Nature Conservation Act 2014* and the Australian Bird and Bat Banding Authority). Projects that involve broader vegetation and ground disturbance will require the same mitigation measures as construction projects.

With a rich research community at hand, and the Molonglo Valley development designed with sustainability, including

biodiversity conservation as an objective, a research project that evaluates the effectiveness of those measures over time would be a potential and valuable project.

## 2.6 Policies and actions

Governance and implementation	
<b>Objective 1: Inform future decision making with a structured, evidence-based process.</b>	
Policy	Action
1.1 Strategic consultation with the community will be proactive and planned.	1.1.1 Seek input from relevant community organisations to ensure management decisions include knowledge gained from citizen science.
1.2 Adaptive management principles will be applied to reserve management.	1.2.1 Implement the Adaptive Management Strategy that includes the NES matters applying within the reserve. 1.2.2 Fill gaps in biodiversity data for the whole of the reserve, including using citizen science activities where appropriate. 1.2.3 Review progress of all objectives in the plan in year 5 (for adjustment) and year 10 (to inform the subsequent plan).
Knowledge	
<b>Objective 2: Foster the development of new knowledge and its application to management actions for achieving other reserve objectives.</b>	
Policy	Action
2.1 Work strategically and collaboratively with key researchers.	2.2.1 Assess research proposals that require access to the reserve on the basis of their relevance, ecological impact and management support required. 2.2.2 With research partners, seek opportunities for funding of research projects of mutual interest. 2.2.3 Synthesise new knowledge and ensure it reaches reserve staff and community stakeholders.



Pink-tailed Worm-Lizard  
habitat restoration



Molonglo River reserve



### 3. LAND DESIGNATIONS, BOUNDARIES, MANAGEMENT ZONES AND BUFFERS





Pedestrian trail through Reserve

## 3.1 Objective

**Objective 3: Reserve boundaries, management zones and buffers adequately protect the reserve's threatened species and communities.**

## 3.2 Land designations, boundaries and management zones

The Molonglo River Reserve is public land designated as nature reserve and special purpose reserve in the Territory Plan (refer Figure 3.1).

The management objectives for these are:

**Nature reserve:**

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

**Special purpose reserve:** to provide for public and community use of the area for recreation and education.

### 3.2.1 Special purpose reserves

Two special purpose reserves are included in the Molonglo River Reserve. The reserves have yet to be formally named and will be identified in this plan as Special Purpose Reserve (North) and Special Purpose Reserve (South). Special Purpose Reserve (North) is located around the site that was previously used as sludge ponds associated with Canberra's sewage treatment plant at Weston Creek. The purpose of this special purpose reserve is to facilitate a node of recreation facilities and minimise impact on conservation areas. The area is defined by the existing flat terraces above the river. The boundary of the nature reserve has been drawn to encompass PTWL habitat and a 20 metre buffer around it, and the river frontage is zoned as nature reserve. People will be able to access the river

however the riparian zone should remain free of built recreation infrastructure.

Special Purpose Reserve (South) is centered on Ryans Hill and is bounded to the east by the Tuggeranong Parkway and the Molonglo River to the south. The boundary on the river side is designed to edge an existing management road and connect the strip of nature reserve along the river.

### 3.2.2 Future boundary changes

As development proceeds and practical issues in determining the urban edge arise, there may be a need to review the reserve boundary again. The Territory Plan, under Section 96A of the *Planning and Development Act 2007* can be amended to revise the reserve boundaries where the land is unleased territory land and the change is consistent with both the apparent intent of the original boundary line and the objective for the zone. Changes to the boundaries must be consistent with the objectives of the plan, and in particular not compromise the capacity to protect threatened species and communities.

### 3.2.3 Future boundary changes

Internal zoning is an additional tool commonly used in protected area management to clearly delineate activities that can occur in various parts of the reserve in relation to conservation priorities. Zoning must reflect substantially different management combinations between the zones



in order to be useful, practical and clear to managers and visitors alike.

In this relatively small, long and narrow reserve where high priority conservation areas are intertwined with medium priority conservation areas across the reserve, no additional value would be provided by further management zoning beyond that already provided by the two public land designations. An alternative approach for describing areas with differing conservation requirements has been developed and is described in Chapter 7.2.

### 3.3 Kama buffer

The ACT Government has committed through the NES Plan that an urban edge buffer will be retained between the eastern edge of Kama and the urban development to protect Kama's high conservation value from the impacts of an urban edge. The buffer is to be located outside the Molonglo River Reserve (which includes Kama) and therefore the provisions of this plan do not apply to the buffer area.

The details of the treatment and boundary of the buffer will be included as part of the planning for Molonglo Stage 3 to be developed by the Environment, Planning and Sustainable Development Directorate. The treatment and boundary of the Kama buffer has been determined through the Environmental Impact Statement (EIS) exemption process under Section 211 of the *Planning and Development Act 2007*. An EIS Exemption was granted by the ACT Minister for the Environment and Heritage with a number of conditions that are to be taken into account by the planning and land authority when assessing any development applications for the project. Condition 5 stated that *'The treatment and boundary of the Kama Nature Reserve buffer within the Future Urban Area must be consistent with the recommendations in the Kama Interface Management Strategy'* (Capital Ecology).

#### 3.3.1 Protection against urban edge effects

Urban impacts on reserves frequently extend beyond the edge of urban developments. Buffers are frequently used to absorb or reduce impact, especially for small nature reserves like Kama (155 hectares). Opportunities for mitigation of edge effects can also be provided for in Estate Development Plans. The nature and significance of the impact on conservation outcomes depends on the context and a number of different mechanisms. The following urban edge effects have been scientifically established in Australia and are relevant to Kama.

- For **woodland bird** communities in the ACT the increased proximity to the urban boundary can have a strong negative impact on the occurrence and abundance of specialist woodland-dependent bird species. These birds include some that are migratory and some that are listed as threatened in the ACT, such as the Brown Treecreeper (*Climacteris picumnus*) and Scarlet Robin (*Petroica multicolour*).
- For **native flora**, exotic weeds are commonly found inside reserves as the physical disturbance that occurs at the urban edge provides openings for invasion. Garden plantings and established urban weeds also create a high exotic seed load. Impacts commonly extend further into reserves as the housing development ages and spread faster along drainage lines and tracks or roads into the reserve.
- For **insectivorous bat** communities in the ACT, significantly reduced echolocation activity and species richness have been recorded in built-up urban environments compared to habitats such as nature reserves and urban greenspace areas (open space and parklands). These findings suggest that some animal groups may be especially sensitive to indirect human disturbances associated with urban infrastructure (e.g. houses and roads), including artificial noise and light that may pose barriers to movement and dispersal.
- For **marsupial communities**, some species have been shown to be adversely affected by urban encroachment. For example, the Yellow-bellied Glider (*Petaurus australis*) avoids forest that edges urban development in coastal New South Wales. Establishing lower impact broad-acre peri-urban areas adjacent to the urban fringe can benefit more sensitive species.



- Some **invasive pests** such as the Common Myna (*Acridotheres tristis*) are known to increase in abundance in urban areas in the ACT. Species like the Common Myna compete with native bird species over limiting nesting sites such as tree hollows, which may be exacerbated at the urban boundary.
- **Hyper aggressive native species** such as the Noisy Miner (*Manorina melanocephala*), Red Wattlebird (*Anthochaera carunculata*) and common hollow-nesting species such as the Crimson Rosella (*Platycercus elegans*) become increasingly prevalent within urban edge environments outcompeting other species, including Superb Parrots (*Polytelis swainsonii*) and Swift Parrots (*Lathamus discolor*), from using limited resources (e.g. nectar producing shrubs and tree hollows).
- The incursion of **domestic cats** (*Felis catus*) into nature reserves in Western Australia revealed that the linear roaming distance of a single cat can exceed 300 metres. Predation by pet cats can have considerable impacts on native fauna at the urban boundary and buffer zones can minimise risks of incursion.
- The impact of **domestic dogs** (*Canis familiaris*) on wildlife communities at the urban-reserve boundary is of high concern. For example, in Tasmania predation of native wildlife in nature reserves by dogs was comparable to that of cats (Holderness-Roddam and McQuillan 2014).

### 3.3.2 Fire management in the buffer

The buffer will be managed as an Asset Protection Zone, consistent with the commitment in the NES Plan. It is proposed that Kama be managed as a Strategic Firefighting Advantage Zone (SFAZ) and appropriate management actions are dealt with in Chapter 9. However, in the context of the restoration work underway in Kama it is especially critical that fuel reduction is carried out in a manner that considers restoration outcomes.





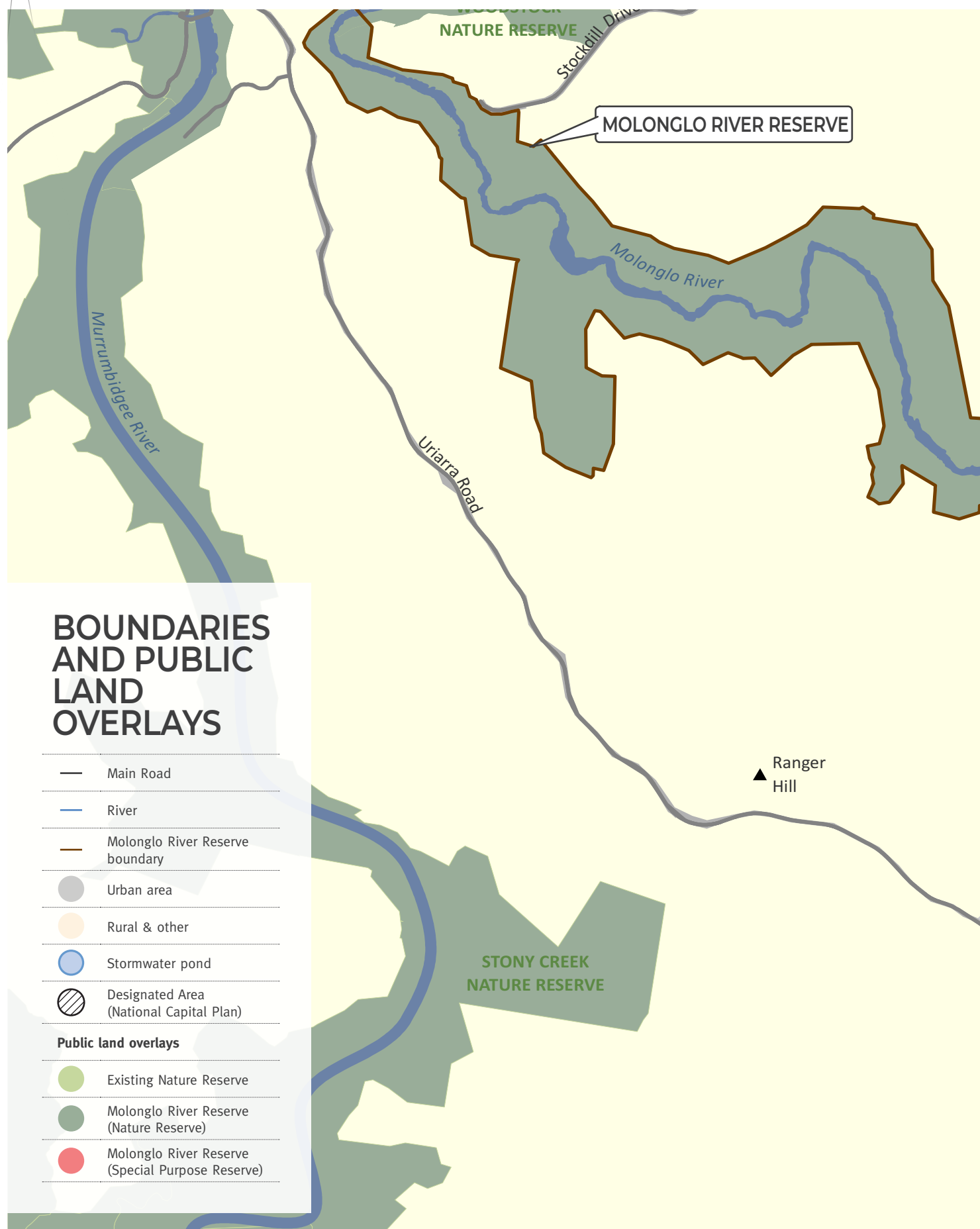
### 3.4 Policies and actions

Reserve boundary			
Objective 3: Reserve boundaries, management zones and buffers adequately protect the reserve’s threatened species and communities.			
Policy		Actions	
3.1	Future changes in boundaries and management zones must be consistent with the objectives of the plan, and in particular not compromise the capacity to protect threatened species and communities.	3.1.1	Monitor urban edge development, its impacts and policy changes that might impact on the capacity to effectively protect threatened species and communities; and propose appropriate actions if that capacity is threatened.



Pink-tailed Worm-Lizard

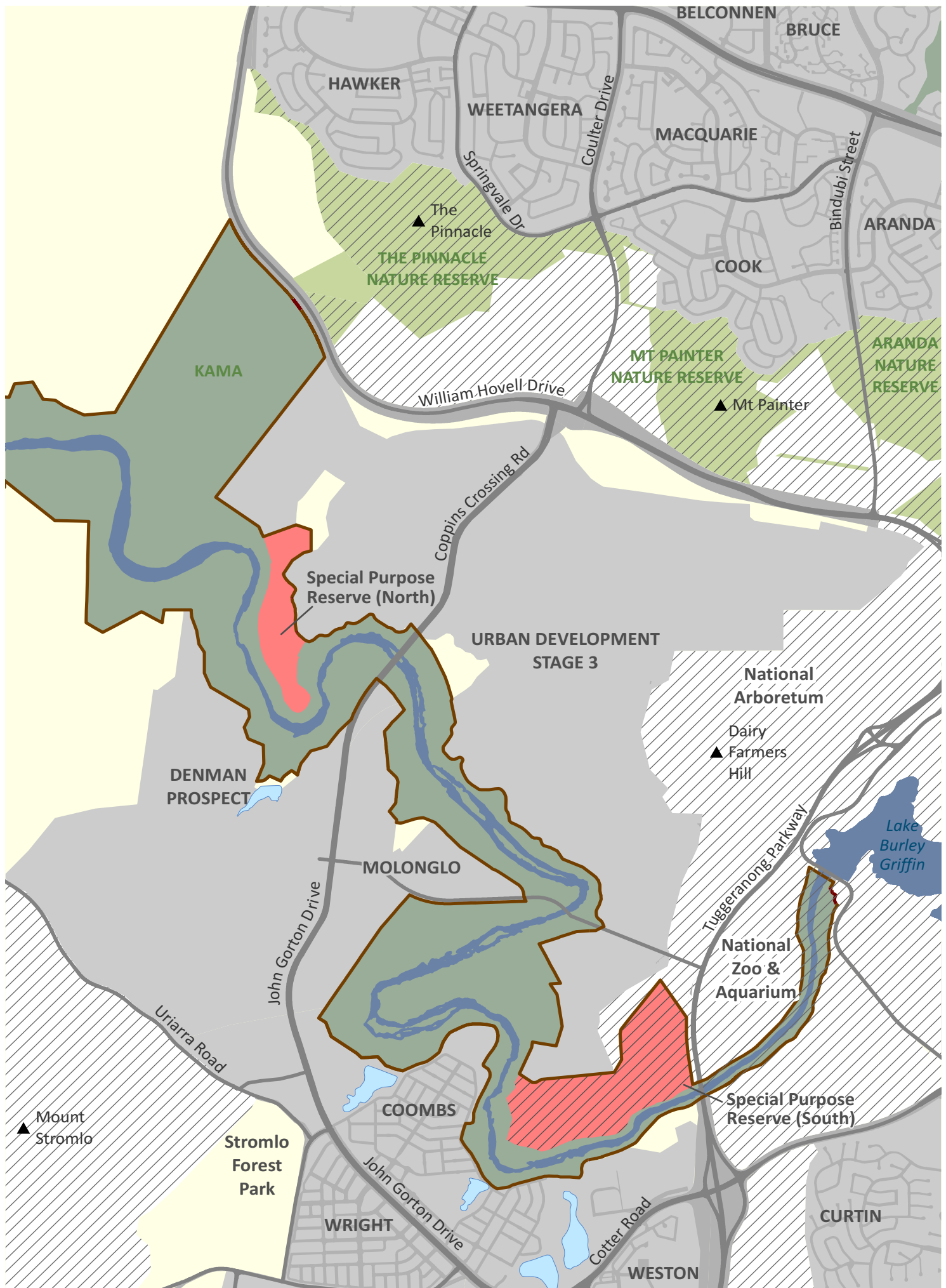
**Figure 3.1** Boundaries and public land overlays for Molonglo River Reserve



0 250 500 1,000  
Metres



**Disclaimer:** ACT Government does not warrant that the data is free from errors. Data Copyright (c). Australian Capital Territory, Canberra 2019.







Aerial view over Barrer Hill to Lake Burley Griffin



## 4. CONTEXT

## 4.1 Regional setting

The Molonglo River Reserve straddles the Molonglo River for its last 23 kilometre run from Scrivener Dam into the Murrumbidgee River. It lies in the Murrumbateman subregion south of the Eastern Highlands bioregion of Australia and is set in a landscape that has mixed rural and urban uses (Figure 4.1).

Hydrological and wildlife connectivity with the regional setting of the reserve are particularly important for their ecological connections with the wider region.

### 4.1.1 Hydrological connectivity

The Molonglo River is a tributary of the Murrumbidgee River, a major river in the Murray-Darling Basin. The Molonglo River catchment, largely in NSW, covers 200,000 hectares. The 115 kilometre long river originates in Tallaganda State Forest in the Great Dividing Range above Captains Flat. Tailing dams from old mines in that area have leached heavy metal contaminants into the Molonglo River in the past and traces still remain. The river then flows through agricultural land where farming practices like tree clearing, willow planting and stock access to the river have contributed to an altered river ecology and a reduction in water quality.

The largest tributary of the Molonglo is the Queanbeyan River, which is dammed at Googong Dam upstream of Queanbeyan. It contributes to water supplies for Canberra as well as Queanbeyan. Treated sewage from Queanbeyan is released into the Molonglo River and untreated sewage has occasionally escaped during floods. The Molonglo is dammed by Scrivener Dam to form Lake Burley Griffin, a central feature of the design for Canberra. Water flows in the Lower Molonglo River are highly dependent on releases of water from Scrivener Dam as most of the catchment area is above the dam. The tributaries below the dam contribute only a small proportion of total flows. Measures are in place to mitigate many of the impacts of the upstream land uses but the location of the reserve at the lower end of the river means that the ecology in the river is still accumulatively influenced by past and current actions upstream in the river and catchment.

### 4.1.2 Wildlife connectivity

For wildlife, connections into the wider region are also important, especially for birds. Kama forms an important link between the Murrumbidgee River Corridor Reserve and the reserves of Canberra Nature Park in the north of Canberra including Mt Majura, Black Mountain, Aranda Bushland, Mt Painter and the Pinnacle. The vegetation along the river also features in wildlife linkages to the west and south and into NSW.

## 4.2 The reserve and its local setting

The Molonglo River Reserve is located in the Molonglo Valley, partly in and partly outside the urban envelope of Canberra in the ACT (Figure 4.2). It is largely a river corridor reserve that is located either side of the Molonglo River between Scrivener Dam and the junction with the Murrumbidgee Corridor Reserve, about a kilometre before the Molonglo joins the Murrumbidgee.

The reserve is long and narrow in shape. It varies from less than 300 metres wide near Coombs to a 2 kilometre wide section where it encompasses Kama. But generally it is less than 500 metres wide with the river effectively dividing the reserve into two as there are few river crossings. The basic areal statistics for the reserve are shown in Appendix 2.

The winding river, its channel, gorges and riverine vegetation are the key visual features of the reserve.

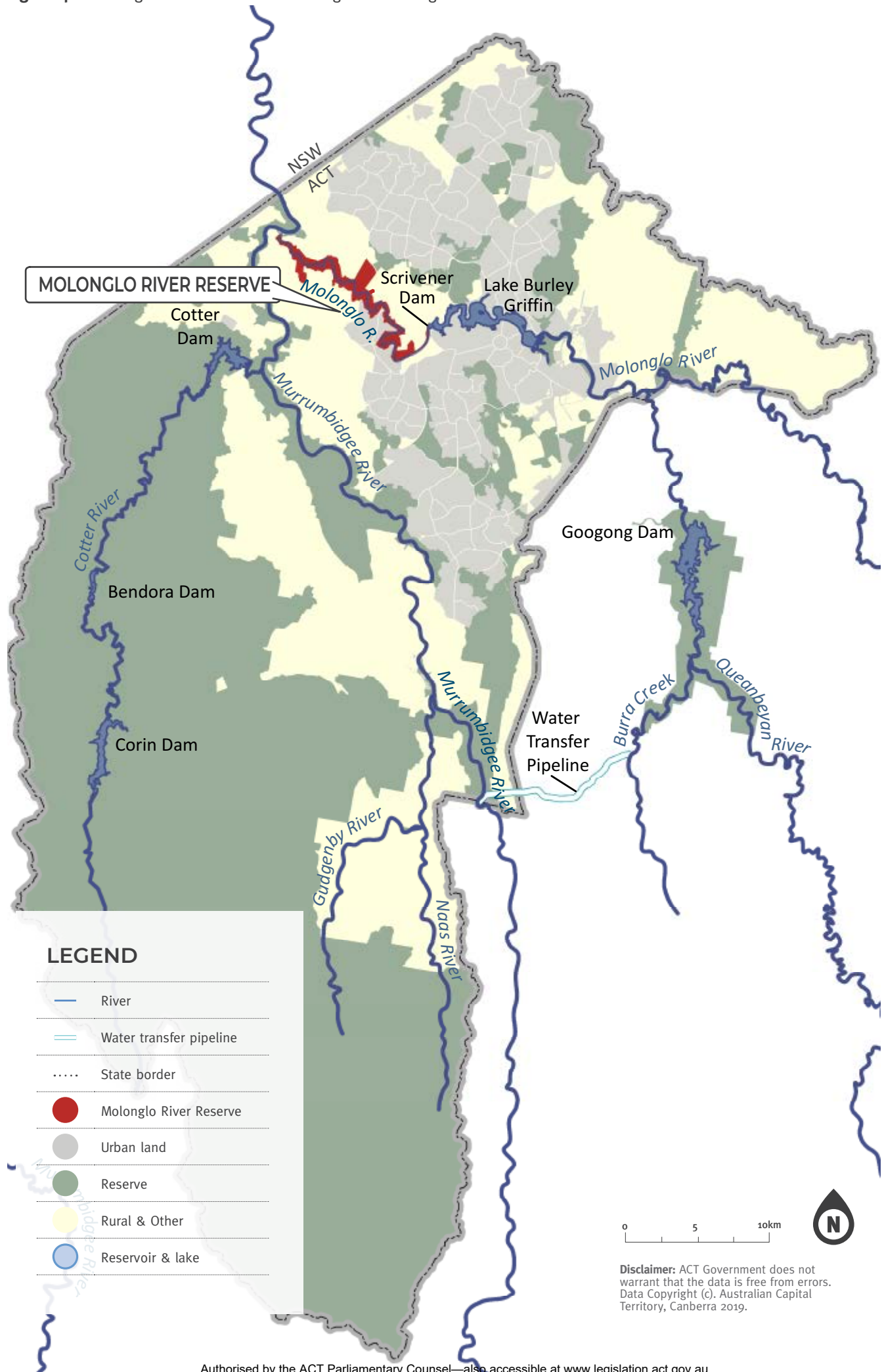
Along with the long sloping grasslands and grassy woodlands above the river, the reserve has diverse habitats and high biodiversity values. This is despite the area's history of active agricultural, forestry and recreation use and consequent degradation in some areas.

The Molonglo Valley is being developed as a new urban settlement for approximately 55,000 people. Over a 30-year timeframe, work will proceed in three stages: Stage 1 (south of the Molonglo River) – the suburbs of Coombs, Wright and North Weston; Stage 2 (southwest of the river) – the suburbs of Denman Prospect, with a local centre and Molonglo, with the principal commercial centre; and Stage 3 (northeast of the river) additional suburbs, with a secondary commercial (group) centre and local centres.

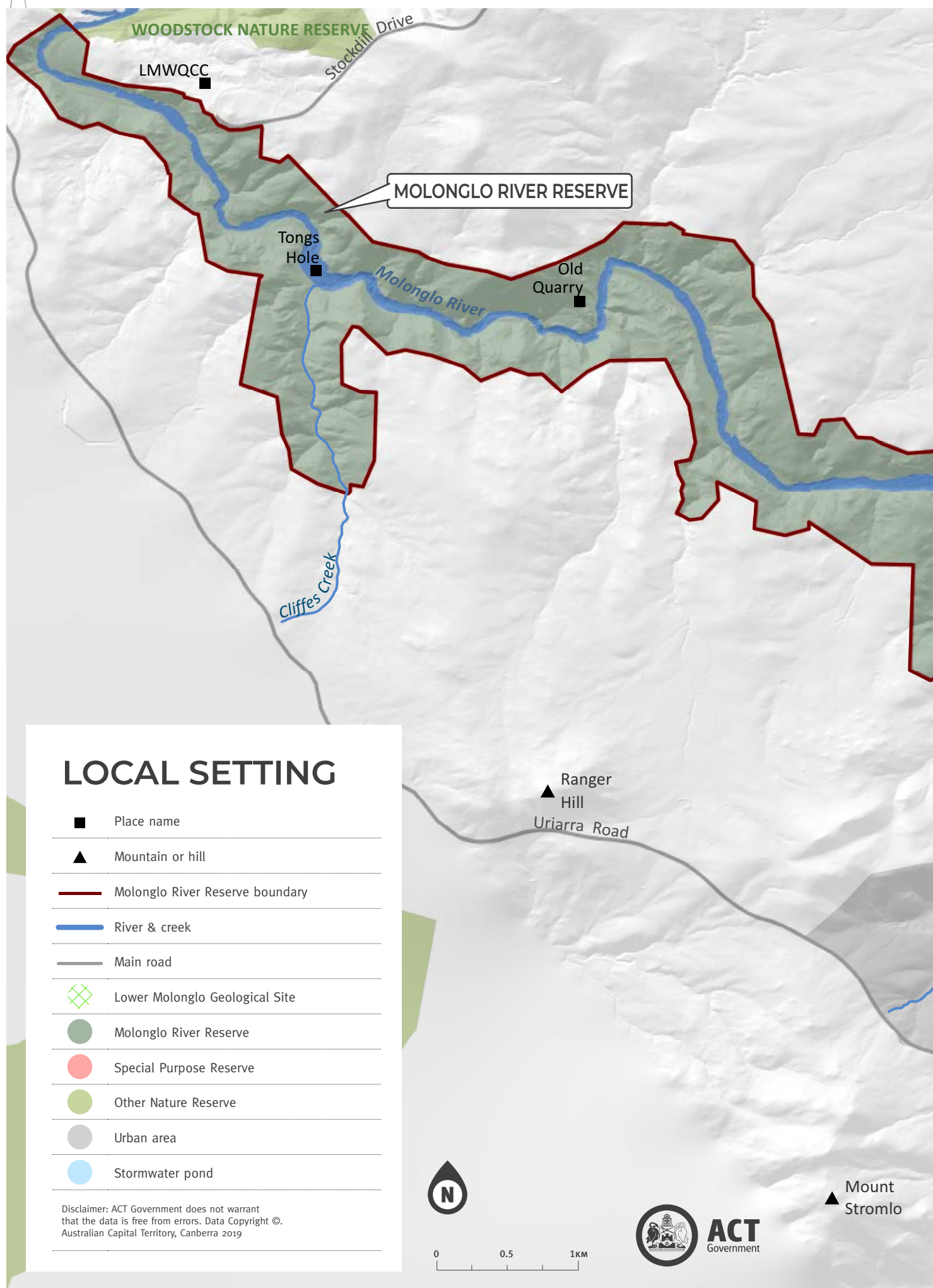
The development will be guided by principles and policies set out in the Territory Plan. Improving the sustainability of urban development is a core theme of the Molonglo Valley development and the planning documents identify the river corridor as a key component of achieving it. Many of the principles for place making in the Molonglo Valley are also relevant to the reserve, and the reserve plays a role in fulfilling them for the valley as a whole. Those principles are: respond to site, create connectivity, encourage diversity, grow and adapt over time, tell stories, nurture community and reinforce identity. The proximity of a large urban population raises expectations about the use of the reserve by local people and increases the day-to-day management challenge.



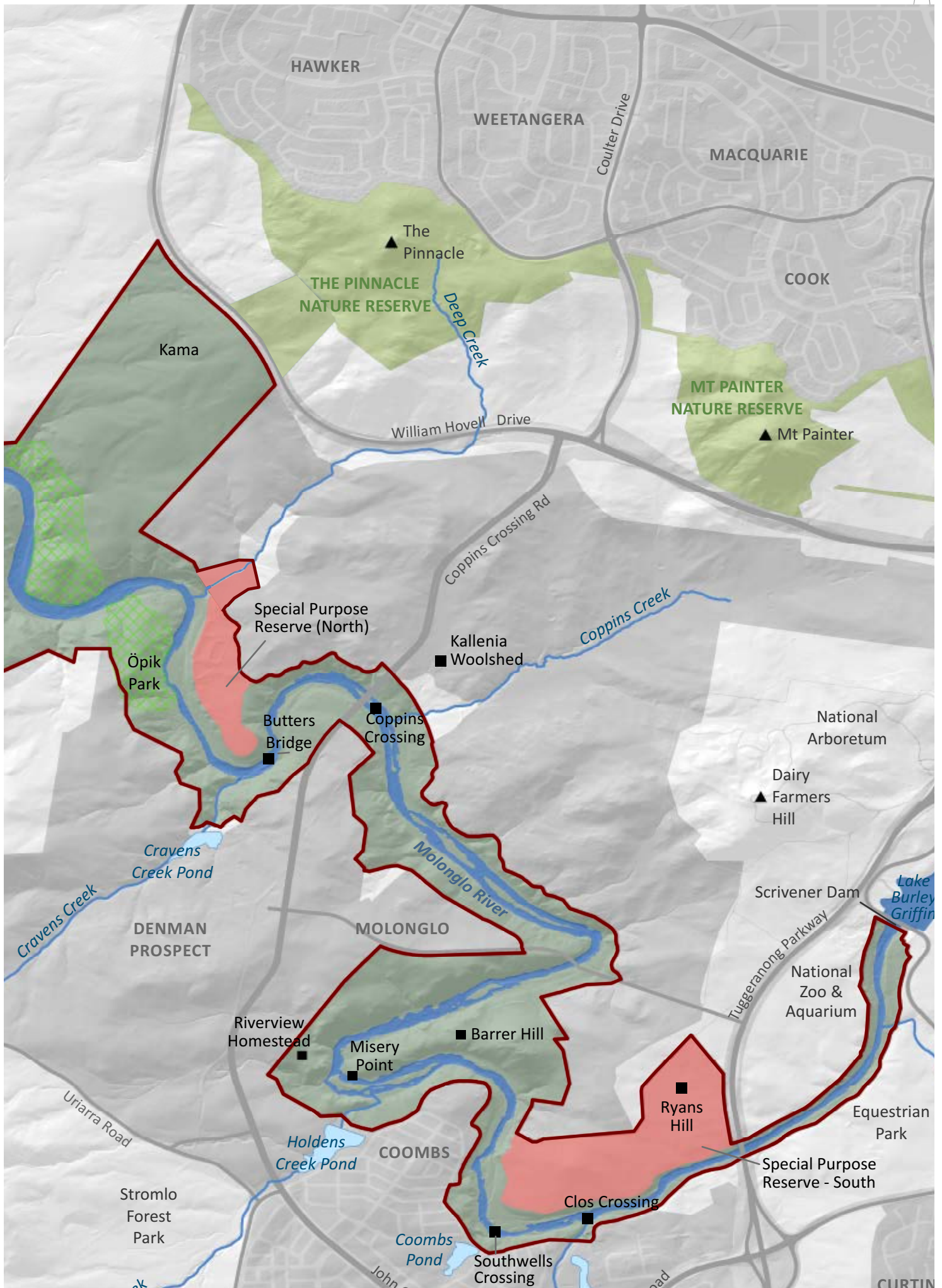
**Figure 4.1** Molonglo River Reserve in its regional setting



**Figure 4.2** Molonglo River Reserve – local setting and place names







### 4.2.1 Place names

Key features of the reserve in its local setting and some existing place names associated with it are in Figure 4.2. The reserve name may be changed by the land custodian to reflect Ngunnawal language. Specific places within the reserve may also be named.

### 4.2.2 Urban and rural sections

In the urban section, which is about 540 hectare (42% of the total area), the reserve will be surrounded by residential development along most of its length, with a commercial centre facing the river in the suburb of Molonglo. In the rural section, about 740 hectare (58% of the total area), the reserve is largely surrounded by rural leases used for livestock grazing.

### 4.2.3 Linkages in and out of the reserve

Locally, the linkages to other nature and recreation reserves nearby is very important, especially considering the long narrow nature of the reserve. The ecological linkages are important for wildlife species that require cover to move around in the landscape, and for species to adapt their location as the climate warms. The recreation linkages broaden the choice of recreational opportunities available locally, and also connect the reserve into longer distance trails. The ACT Centenary Trail and the Bicentennial National Trail pass through the reserve and several major recreation destinations are close by. These include Stromlo Forest Park, the National Arboretum Canberra, the National Zoo and Aquarium, and a little further away, Lake Burley Griffin and the Murrumbidgee River.

## 4.3 Reserve history and prior land uses

The reserve consists of three areas with different histories of progression into reservation as public land. The rural section downstream of Coppins Crossing has been public land since at least the inception of the Territory Plan in 1993. In 2001 it became the Lower Molonglo River Corridor Nature Reserve with a dedicated Plan of Management.

Kama was reserved in the Territory Plan as nature reserve in 2008 and also placed on the ACT Heritage Register in recognition of its significant natural heritage values. Before that it was being managed by ACT Government for its conservation values, after having being withdrawn from rural lease in the 1970s.

The remaining area, the corridor from Scrivener Dam nearly down to Coppins Crossing has been used for pine plantations, recreation and grazing since the 1920s and been classified as special purpose reserve and urban open space. A small area was used as sludge ponds associated with the sewage treatment works at Weston Creek between the 1920s and 1970s. Canberra's sewerage treatment was then moved to the Lower Molonglo Water Quality Control Centre near the end of the river and the main sewer pipeline built in the corridor on the north-eastern side of the river. The whole length of the river corridor became a formal part of Canberra's open space system in the 1970s. In 2001 and 2003 severe fires burnt up along the river and through the pine forests, prompting the reconsideration of maintaining pine plantations on Canberra's vulnerable north-western margins.

No part of the reserve has a long history of being managed as a nature reserve, and the legacies of past land and water uses contribute to some of the challenges the plan has had to address.

## 4.4 Government legislation, agreements, plans and strategies

The major pieces of legislation and governmental agreements that have contributed to shaping the plan are outlined below. There are many other statutory and government agreements that shape the plan in specific ways. For example, Recovery Plans for Threatened Species (termed Action Plans in the ACT), and these are described in the relevant chapters that follow. A summary of relevant legislation is provided below.

### 4.4.1 Commonwealth Government legislation and plans

The **National Capital Plan** (NCP) is a plan prepared under Commonwealth legislation (*Australian Capital Territory (Planning and Land Management) Act 1988*). The NCP prescribes the Molonglo River as a River Corridor within the National Capital Open Space System. The NCP outlines specific principles and policies for river corridors. The principle for river corridors is to *protect and enhance the environmental quality, landscape setting and the natural and cultural resources of the Murrumbidgee and Molonglo River Corridors*. A Nature Conservation Area is a permitted use in the river corridor. The NCP defines a Nature Conservation Area as an area declared or intended to be declared under relevant ACT legislation to be a reserve area.





ACT Government inter-directorate planning field trip



Riparian Vegetation

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects matters of national environmental significance (MNES). Urban development in the Molonglo Valley will affect five matters of national significance:

1. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box-Gum Woodland)
2. Natural Temperate Grassland of the South Eastern Highlands (Native Temperate Grassland)
3. *Aprasia parapulchella* (Pink-tailed Worm-lizard)
4. *Polytelis swainsonii* (Superb Parrot)
5. *Lathamus discolor* (Swift parrot).

The ACT and Australian Governments have agreed to a range of actions to ensure that the conservation impacts of development will be offset by a range of conservation gains nearby. The agreed actions are detailed in the NES Plan. Some of these actions fall outside the designated area of the reserve. Those actions that largely depend on the reserve management plan are summarised in Table 6.2. There are no direct conservation measures for the Superb Parrot, Swift Parrot and the Rainbow Bee-eater (an EPBC protected migratory bird that visits the Molonglo Valley) as they are considered to depend on Box-Gum Woodland which is itself a priority for conservation.

Under the *Water Act 2007*, control of Australian Government water resources (including Lake Burley Griffin) in the ACT will be referred to the ACT Government. Following that referral, the NCA and the ACT Government will together formulate how to meet environmental flow obligations both in Lake Burley Griffin and in the Molonglo River downstream.

#### 4.4.2 ACT Government legislation, plans and strategies

The *Planning and Development Act 2007* governs land use in the ACT. The Act establishes the Territory Plan; provides for the identification of public land and its reservation for defined purposes; defines management objectives for each category of public land; and provides for environmental impact assessment.

The ACT Planning Strategy (2018) is the key strategic document for managing growth and change in the Territory and is an important tool for coordinating growth with infrastructure, transport and community facilities. Specifically, the purpose of the Strategy under the *Planning and Development Act 2007* is 'to promote the orderly and sustainable development of the ACT, consistent with the social, environmental and economic aspirations of the people of the ACT in accordance with sound financial principles'.

The *Nature Conservation Act 2014* is the primary legislation for the protection of native plants and animals in the ACT, including declaration of threatened species and ecological communities. The Act also provides the process for developing and approving reserve management plans for areas identified as 'reserves'. Activities declarations are used to regulate recreation activities in the reserve, and there is a range of offence and penalty provisions that apply in the reserve. This Act also establishes the ACT Parks and Conservation Service as the land manager of the reserve.

The *Nature Conservation Strategy 2013-23* is a document for all land management, planning, business and community sectors in the ACT to guide a coordinated and integrated approach to nature conservation. The Strategy will help to guide future management of the Territory's open spaces, rural areas, urban areas, riverine corridors and nature reserves, and guide investment of funding and resources.





The **ACT Water Strategy 2014-44 – Striking the Balance** provides strategic guidance to manage the Territory’s water resources. This policy includes an outcome ‘Healthy Catchments and Waterbodies’ and a number of strategies that help shape the plan. In particular, these include:

- Strategy 1 – Achieve integrated catchment management across the ACT and region
- Strategy 2 – Protect and restore aquatic ecosystems in urban and non-urban areas
- Strategy 3 – Manage stormwater and flooding
- Strategy 7 – Engage the community on understanding and contributing to a more sustainable city.

The **Emergencies Act 2004** requires the ACT Government to develop a Strategic Bushfire Management Plan. The purpose of this plan is to provide a basis for bushfire hazard assessment and risk analysis; bushfire prevention including hazard reduction; agency and community preparation and response to bushfires. The Act also requires land managers to take reasonable steps to prevent the outbreak and spread of fire on their lands or onto neighbouring properties, and to prepare operational plans for the mitigation of bushfire risk on the land they manage.

The **Heritage Act 2004** provides for the recognition, registration, conservation and promotion of places and objects of heritage significance and the protection of all Aboriginal places and objects in the ACT. Several places in the reserve are already listed or may become listed under the Act. Cultural heritage sites listed on the ACT Heritage Register require the development of a Conservation Management Plan to guide management and decisions about any changes to the use and/or fabric of the place.

One of the commitments of the NES Plan was the preparation of a **concept plan** for a Molonglo River Park, consisting of the corridor for some 13 kilometres each side of the Molonglo River in the urban section. This area of about 582 hectares falls wholly within the reserve. It will be a central feature of the urban development of Molonglo; protecting important ecological values, while

adding greatly to the amenity of the new residents of Molonglo Valley. The Territory Plan envisages the River Park as being:

*... an important natural asset to the ACT and region [and that] the environmental quality, landscape setting, natural and cultural values of the river corridor be reinforced by the provision of an open space corridor on each side of the Molonglo River ... and a balanced range of recreational activities.*

A concept plan for Molonglo River Park was developed in 2012 and its fundamental principles for the urban section of the reserve are largely reflected in this plan. In particular, public consultation over the concept plan supported the proposal to reclassify a significant portion of the park from special purpose reserve to nature reserve in order to better reflect the ecological values of the site and the management emphasis in the future. In accordance with this reclassification, and on the basis of more detailed site assessments, two significant features of the concept plan have been refined. These are:

- realigning the trunk path so it falls within the Inner Asset Protection Zone, thus utilising the lighting corridor of the edge road and minimising lighting impact and fragmentation of the reserve
- centralising recreation facilities such as parks, access roads, car parking, barbecues and toilets to two special purpose reserves. This will reduce the overall impact on visual amenity, habitat, soil disturbance and fragmentation in the reserve as a whole.

While the concept plan was endorsed by the ACT Government as a planning tool, the reserve management plan is the statutory instrument that determines the objectives, policies and actions for the reserve, of which the urban section is one part.







# 5. GEOLOGY, LANDFORMS, SCENERY AND SOILS

Molonglo River riparian corridor



## 5.1 Objectives

**Objective 4:** Conserve the condition of the heritage geological site.

**Objective 5:** Maintain and enhance landscape function in the long term.

**Objective 6:** Provide community access to a diversity of scenery and views within the reserve that is dominated by natural features.

## 5.2 Introduction

### 5.2.1 Geology

The geology of the reserve is largely of volcanic origin dating from the Silurian period with some outcropping of limestone from the subsequent Devonian. The limestone and shale outcrops, which are scattered across an area of about 50 hectares on both sides of the river slopes between Kama and a point about 3 kilometres upstream of Coppins Crossing, are significant. The site is listed on the ACT Heritage Register for its rich evidence of marine fossils, including corals, trilobites, brachiopods, gastropods and ostracods, including some species first described from specimens from this site. It is one of the best-known and richest Middle Silurian faunal assemblages in eastern Australia, dating from 425 million BP. The outcrop is of value in dating similarly aged rocks elsewhere in the region, and is well known to geologists and paleontological societies. The heritage listing reports that the site is generally in good condition.

### 5.2.2 Landforms

The reserve displays a variety of river landscape forms due to the meanders in the river caused by the intersections of old fault lines, and the long period of weathering and geological stability allowing deep incision of the river into the landscape. In the rural section the river has cut a 100 metre deep, winding and rocky channel in a landscape of rolling hills. Kama woodland sits on a long hill slope facing towards the river. In the urban section, cliffs and rock faces mark the south bank, facing gentler slopes on the north bank of the still meandering river. In the uppermost reach below Scrivener Dam the river is more gently incised in a rolling landscape and the river is considerably straighter.

### 5.2.3 Soils

The soil landscape group of the rural section is largely Paddy's River with incised channels. The risk of gully erosion is high. Soils on the slopes upstream are similar to those downstream and erosion in the gullies is evident. In Kama and the urban section, there are soils of the Burra Landscape Group, which like the Paddy's River Group are generally strongly acidic and also have low fertility and a low available water holding capacity. They are also susceptible to moderate mass movement (terracing), sheet erosion and localised shallow soils. Deeper and better drained soils in the urban section are largely of the Williamsdale Landscape Group. In the river channel there are also pockets of alluvial soils of the Pialligo Group.

### 5.2.4 Topography

The topography of the reserve is characterised by considerable slope (Figure 5.1). The valley is generally one of rolling hills, into which the river channel is incised, deeply in places. Kama, further from the river, is gently sloping but the remainder of the reserve has relatively little flat land. Outside the river channel only 18% of the land in the urban section has a slope of less than 12.5% which is considered the upper limit for developing recreation facilities with little land disturbance. The safe slope for mowing for fuel management is 20%.

### 5.2.5 Landscape function

Landscape Function Analysis has been applied in the ACT in a survey of landscape condition in all the reserves of Canberra Nature Park. The rural section of the Molonglo River Reserve (excluding Kama) was visually estimated as having satisfactory landscape function across 90 to 95%



of its area, with 5 to 10% approaching critical condition. Once a critical condition is reached it is very difficult to re-concentrate sufficient resources in the area for it to become self-regulating again. The major causes of deterioration in condition were fire and annual weeds, with grazing by rabbits, deer and goats a minor cause. In Kama, landscape function was similar and the main impact was from grazing by kangaroos. No assessment has been made of the urban section, but its past lack of protection, recent fire damage and its higher density of weeds means it is likely to have patches that are at or near the threshold. Repeated fires (natural or controlled), a high density of annual weeds that leave large patches of soil bare in summer and autumn, and any development activity that leaves large areas of land smooth and bare, are other threats to maintaining good landscape function in the reserve.

### 5.2.6 Scenery

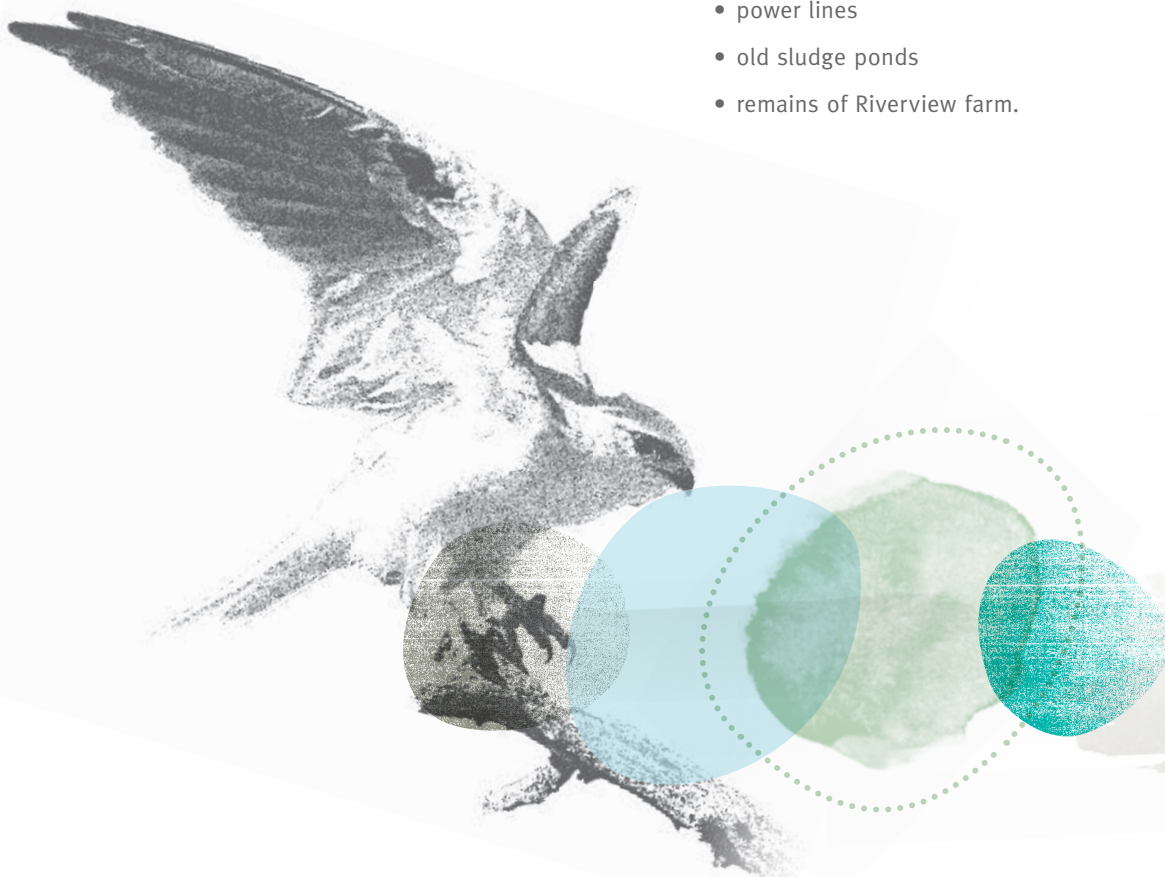
The scenery of the reserve is produced by a combination of its landforms, water, vegetation and man-made features. The river is the central scenic feature in the reserve. Its incision in the landscape means that its presence it is not often visible from a distance, particularly in the rural section. In this section, the winding line of Casuarina tree tops is often the only signal that there is a river hidden in the landscape.

The mosaic of open grassland and woodland above the river channel allows distant views of this meandering line. Closer to the river, rock outcrops and cliff edges provide views of the water and the twists and turns of the river. Rock reef outcrops and islands within the river bed make interesting features whether viewed from above, or down at water level. Native vegetation dominates in the river channel. In Kama, views are more enclosed and the vegetation provides the major point of visual interest. In the urban section, sloping grasslands above the river provide wide open views across the urbanising valley but within the reserve, the tops of rock faces and knolls inside the meanders provide good viewpoints down into and along the river.

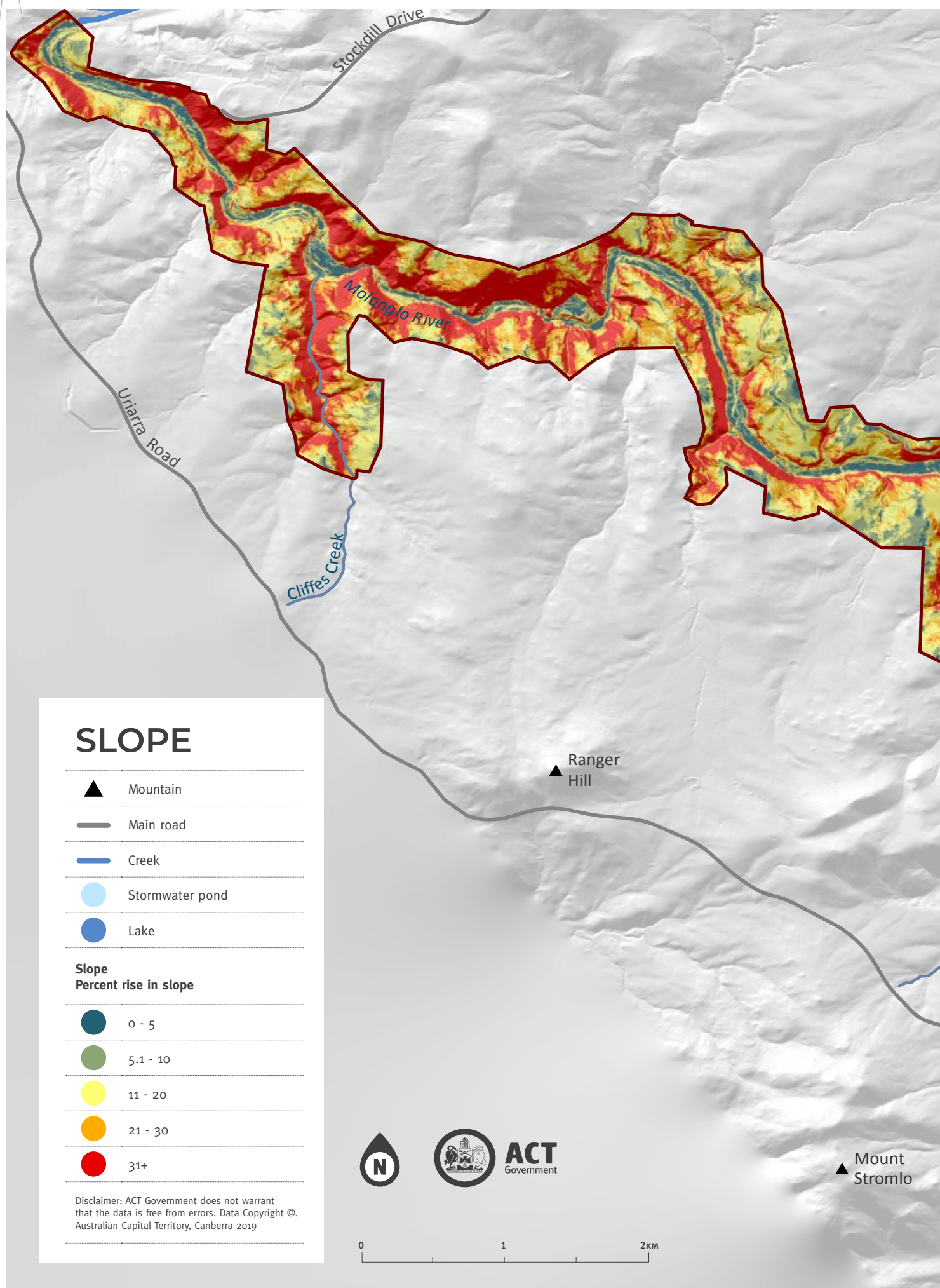
Higher and longer views of the river in the landscape in the urban section are provided from Barrer Hill and Bold Hill. At river level, there is again a variety of pools, rock reefs, rapids and islands. In the uppermost reach of the river, the river is straight and the vegetation is dominated by exotic species.

Existing structures in the reserve include:

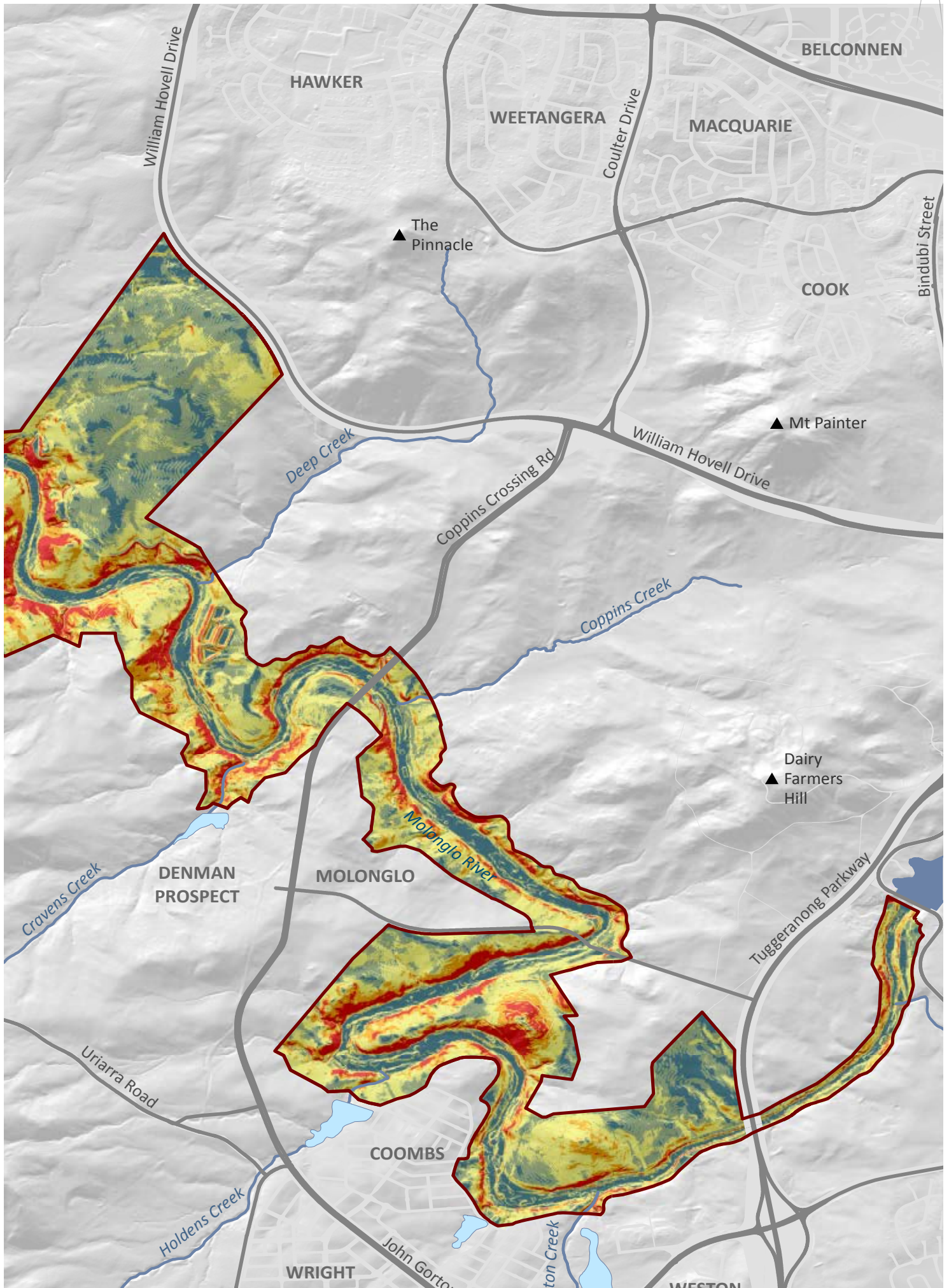
- management roads
- sewer pipeline which is occasionally visible where it breaks the surface to cross tributary creeks
- sewer pipeline vents and other smaller pieces of infrastructure associated with this pipeline
- buried water main
- river crossings
- power lines
- old sludge ponds
- remains of Riverview farm.



**Figure 5.1** Classification of slope in the Molonglo River Reserve







Additional planned and proposed infrastructure in or near the reserve is listed in Table 9.1.

As seen from points within the reserve or from a high point on the other side of the river, middle distance views in the urban section are largely determined by the urban edge and the suburbs beyond. The edge will usually be bounded by first a path, then a local street and the frontages of residential properties. In the commercial centre, an urban park, retail, civic and higher density residential features will face the reserve. Creek lines will also be visible as open space leading up to retention basins and beyond. These will be planted with native species for ecological linkage to the reserve but will also serve as green threads providing visual linkages to more distant views. In the uppermost reach of the river, where the reserve is very narrow, the backyard of the National Zoo and Aquarium and Scrivener Dam are prominent features.

The view into the reserve from the urban areas is also relevant as it shapes the middle-distance view for residents at the urban edge. The river is not always visible and it is the vegetation above the river bank and the slope upwards across the river that will largely determine these views. This will be largely grassland with scattered trees.

In the longer distance are familiar landmarks such as Black Mountain Tower, the white domed observatory on Mt Stromlo and the Arboretum whose plantings will become more visible and distinctive as they grow. The longer distance is also framed with vegetated hills and ridges in the urban section, components of the National Capital Open Space System. The rural section is framed by the treed ridgeline to the east (Kama, Mt Painter etc.) and grazed rural leases to the west.

## 5.3 Management considerations

### 5.3.1 Lower Molonglo Geological Site

The Lower Molonglo Geological Site's heritage listing means that it must be:

*conserved and appropriately managed in a manner respecting its heritage significance and the features intrinsic to that heritage significance, and consistent with a sympathetic and viable use or uses. Any works that have a potential impact on significant fabric (and / or other heritage values) shall be guided by a professionally documented assessment and conservation policy relevant to that area or component (ACT Heritage Council 2013).*

Actions most likely to degrade the site are rock collection and vandalism by visitors, and trail or road construction. The fossil bearing limestone underlies most of the site, so damage to the resource is not restricted to the outcrops that are above ground.

The site is not currently identified or interpreted but its location is known to geologists and access via existing management roads is relatively easy. With the increase in people living close to the site, it is certain to be visited more frequently. As the fossil outcrops are scattered over the 50 hectare site, physical protection is not feasible. The strategy for protection of the outcrops is based on raising the perception of their value through guiding the access and providing interpretation. Besides its heritage value, the site has an educational value and a value in contributing to the range of experiences the reserve offers.

### 5.3.2 Land surface condition

The combination of erodible soils and sloping topography makes this reserve particularly vulnerable to deterioration in land surface condition (landscape function), which in turn reduces the capacity of that land to support vegetation growth and diminishes water quality in streams and the river.

The sustainable land use recommendations for the main soil types in the reserve are:

Williamsdale Soil	
Landscape Group:	Avoid activities that bring to the surface or expose the dispersible subsoils and hard setting A2 horizon.
Burra Soil	
Landscape Group:	Maintain ground cover at or above 70% to minimise potential sheet erosion.
Burra Group:	Watercourses should be fenced off from stock.

Achieving and maintaining a healthy soil surface condition not only raises the potential for habitat restoration and protection, but reduces future management costs. In particular healthy soil surface condition reduces the need for weed control and reduced cost of water quality interventions. Degraded patches in the landscape are also likely to be perceived as 'ugly' and detract from its scenic value. They also encourage people to walk across them, compounding the difficulty in restoring them with a vegetated cover.

Little as possible soil disturbance should occur in the reserve. To fulfil other objectives for the reserve, the slope, soil type, type of disturbance, area, and capacity



for remediation need to be considered. Construction Environmental Management Plans (CEMPs) are already required for areas covered in the NES Plan and complementary measures need to apply elsewhere in the reserve.

Large patches of land surface which are now at or near the landscape function threshold will be targeted as a priority for remediation. Conversely, where condition is satisfactory, and particularly on the more sloping land, activities that reduce landscape function, like removing physical barriers, will be restricted. Over-grazing is another threat to landscape function that will be monitored and controlled.

Natural events, like fire or intense pockets of rainfall might lead to short term loss of soil cover and temporary crossing of the threshold but the expectation is that these places would recover naturally. Achieving the objective depends upon preventing patches remaining in poor condition for long periods of time.

### 5.3.3 Scenery

The diversity of scenery associated with the river is potentially the major attraction in the reserve although it is not currently widely visited for this purpose due to limited access. In the context of a reserve where the conservation of natural features and processes is the primary objective, developing and protecting the scenic values will be guided by a principle of retaining the reserve's 'naturalness' except in the concentrated recreation zones.

The main management consideration in achieving the scenery objective is deciding where new (or modifications to existing) structures will be placed in the reserve, and how they are designed. Other objectives and management considerations relating to ecological objectives will also contribute to these decisions. Recreation trails fall within the category of man-made structures and a balance will be needed between providing access and safety mechanisms (e.g. guard rails) and maintaining natural vistas.

The strategy for achieving the scenery objective is to focus scenic protection on a set of identified views, provide access to them and protect their 'naturalness'. The Molonglo River Park Concept Plan notes potential viewing sites in the urban section and established processes for assessing the impact of development proposals on landscape character and views. The following design principles are to be taken to account when considering the design and placement of new structures or the modification to existing structures within the reserve:

- avoid large structures on high points except where no other feasible alternatives are available

- avoid tall structures, particularly in lower parts of the landscape except where no other feasible alternatives are available
- locate structures in parts of the landscape where they are less visible from a distance
- use colours that blend with the background
- design trails to follow natural contours and curve through the landscape
- use natural materials where feasible (e.g. soil or gravel in preference to bitumen or concrete)
- use the same quality of design as is used in urban areas (to convey that the structure and its surroundings are of equivalent value and worthy of equivalent respect)
- apply the principles more rigorously in the views identified as most significant.

At the boundaries, rehabilitation plans inside the reserve will consider how plantings can be used, after meeting conservation and fire management objectives, to enhance views into the reserve.

## 5.4 Policies and actions

### HERITAGE GEOLOGICAL SITE

**Objective 4: Conserve the condition of the heritage geological site.**

Policies	Actions
4.1 Protect the site from disturbance.	<p>4.1.1 Avoid significant infrastructure development at the heritage geological site. If the proposed activity is likely to diminish the heritage significance of the place, a Statement of Heritage Effect must be prepared and approved by the ACT Heritage Council (<i>s61G of the ACT Heritage Act 2004</i>).</p> <p>4.1.2 Avoid disturbing outcrops or sub-surface limestone when designing infrastructure such as trails, trenches and fences.</p>
4.2 Raise awareness of the value of the site.	4.2.1 Consider opportunities for site interpretation including on site and on-line interpretation material.

### LAND SURFACE CONDITION

**Objective 5: Maintain and enhance landscape function in the long term.**

Policies	Actions
5.1 Soil disturbance is avoided in the first place or site remediated when disturbed.	<p>5.1.1 Design routes and trails to minimise the risk of people trampling or riding off path.</p> <p>5.1.2 Apply the design and construction approach used in the new sections of the Centenary Trail to new trails in the reserve, where appropriate.</p> <p>5.1.3 Promote a culture of people staying on tracks and trails, vehicles remaining on roads and tree litter and rocks remaining in place.</p> <p>5.1.4 Works plans for all significant reserve management activities will include the mitigation of soil and habitat disturbance.</p>
5.2 Monitor, manage and remediate soil disturbance and erosion.	<p>5.2.1 Remediate eroding areas that are near or have crossed their landscape function threshold.</p> <p>5.2.2 Monitor the impact of grazing, especially from cattle, macropods and rabbits and take action to modify the grazing pressure if soil surface condition is likely to approach thresholds.</p>

### SCENERY

**Objective 6: Provide community access to a diversity of scenery and views within the reserve that is dominated by natural features.**

Policies	Actions
6.1 The 'naturalness' of the reserve will be protected.	6.1.1 Design structural elements within the reserve to ensure integration with landscape character and ecological objectives.
6.2 Identify and provide access to a diverse set of views, and protect their 'naturalness'.	6.2.1 Select a set of views that reflect the diversity of natural features, and identify and map them to give them status and aid in wayfinding.





Black-shouldered Kite  
*Elanus axillaris*



Superb Parrot  
*Polytelis swainsonii*



## 6. ECOLOGICAL CONSERVATION

## 6.1 Objectives

- Objective 7:** The population size and condition of threatened species and communities is at least maintained or condition improved; the diversity of all other native species is conserved; and the ecological condition of the dryland matrix is improved.
- Objective 8:** Improve the ecological condition in the river and riparian zone to support the recovery of native fish in the river.
- Objective 9:** Connectivity within and outside the reserve is improved.

## 6.2 Introduction

In and around Kama alone, 92 species of bird have been recorded, and the Molonglo Valley is a hunting and breeding ground for 12 species of birds of prey. The reserve, along with the Murrumbidgee River nearby, is one of the few areas in the ACT that supports a breeding pair of the Little Eagle. An active nest was identified in the Molonglo corridor in 2002 to 2003 and nesting and foraging territories have since been identified in more detail. Five of the twelve species of native fish and crayfish in the ACT are found in the river.

Plants are also unusually diverse. In the last comprehensive survey in the rural section, 225 plant species were recorded in about 700 hectares. Approximately twelve bat species, five frog species, twenty reptile species, platypus, water rats and other mammals were also recorded. All these organisms, along with fungi, lichens, myriad invertebrates and microorganisms provide not only genetic diversity but a diversity of functions that support the lives of other species and deliver important ecological functions. These functions can include the regulation of water, nutrient and material flows across the land surface, soil stability and water infiltration, water quality in the river and connectivity across the landscape.

This diversity reflects the mix of both riverine and dryland ecosystems in the reserve. These have been substantially modified by the last 180 years of land and water management practices across south eastern Australia which have left few areas in the condition they were in at the time of European settlement. A list of the threatened species and communities known to be, or to have once been, in the reserve and their conservation status under various legislation is in Table 6.1.

Based on similarity with where they are found elsewhere, other threatened species may also be present (e.g. Hoary Sunray and Button Wrinklewort, found in Natural Temperate Grassland elsewhere in the ACT).

The major vegetation communities found in the reserve are listed and mapped in Figure 6.1. The area of each community is listed in Appendix 2.



**Table 6.1:** Threatened communities and species that live in the reserve, depend on it seasonally, or, in the case of fish, have been present in the past and could potentially be returned

Species/community	Common name	Cwlth*	ACT**	NSW***
<b>Community</b>				
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Box-Gum Grassy Woodland	Critically endangered R+, NES+	Endangered R+, NES+	
Natural Temperate Grassland of the South Eastern Highlands	Natural Temperate Grassland	Critically endangered R+, NES+	Endangered R+, NES+	
<b>Plants</b>				
<i>Pomaderris pallida</i>	Pale Pomaderris	Vulnerable	-	Vulnerable
<b>Birds</b>				
<i>Xanthomyza phrygia</i>	Regent Honeyeater	Endangered R+	Endangered R+	Critically endangered
<i>Lathamus discolor</i>	Swift Parrot	Endangered R+, NES+	Vulnerable R+, NES+	Endangered
<i>Polytelis swainsonii</i>	Superb Parrot	Vulnerable R+, NES+	Vulnerable R+, NES+	Vulnerable
<i>Melanodryas cucullata</i>	Hooded Robin	-	Vulnerable R+	Vulnerable
<i>Climacteris picumnus</i>	Brown Treecreeper	-	Vulnerable R+	Vulnerable
<i>Grantiella picta</i>	Painted Honeyeater	-	Vulnerable	Vulnerable
<i>Daphoenositta chrysoptera</i>	Varied Sitella	-	Vulnerable	Vulnerable
<i>Lalage sueurii</i>	White-winged Triller	-	Vulnerable (R+) Action Plan 27	-
<i>Hieraaetus morphnoides</i>	Little Eagle	-	Vulnerable R+	Vulnerable
<i>Merops ornatus</i>	Rainbow Bee-eater	a)	-	-
<b>Fish (A)</b>				
<i>Bidyanus</i>	Silver Perch	Critically endangered	Endangered	Vulnerable
<i>Macquaria australasica</i>	Macquarie Perch	Endangered	Endangered R+	Endangered
<i>Maccullochella macquariensis</i>	Trout Cod	Endangered R+	Endangered	Endangered
<i>Maccullochella peelii</i>	Murray Cod	Vulnerable R+	-	-
<b>Reptiles</b>				
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	Vulnerable NES+	Vulnerable	Vulnerable
<b>Invertebrates</b>				
<i>Euastacus armatus</i>	Murray River Crayfish	-	Vulnerable R+	-
<i>Perunga ochracea</i>	Perunga Grasshopper	-	Vulnerable R+	-

(A) Nationally and ACT threatened fish that were present in or near the Lower Molonglo historically but are not found or rarely found there now include silver perch, Macquarie perch and trout cod.

Critically endangered – at extremely high risk of extinction in the wild in the immediate future

Endangered – at very high risk of extinction in the wild in the immediate future

Vulnerable – at high risk of extinction in the medium term future

R+ An approved recovery plan exists for this individual species or this community.

(R+) This species is covered by a threatened community recovery plan.

NES+ Protected under the Molonglo Valley Plan for the Protection of Matters of National Environmental Significance, 2011 (NES Plan). This is the Act that governs the NES plan.

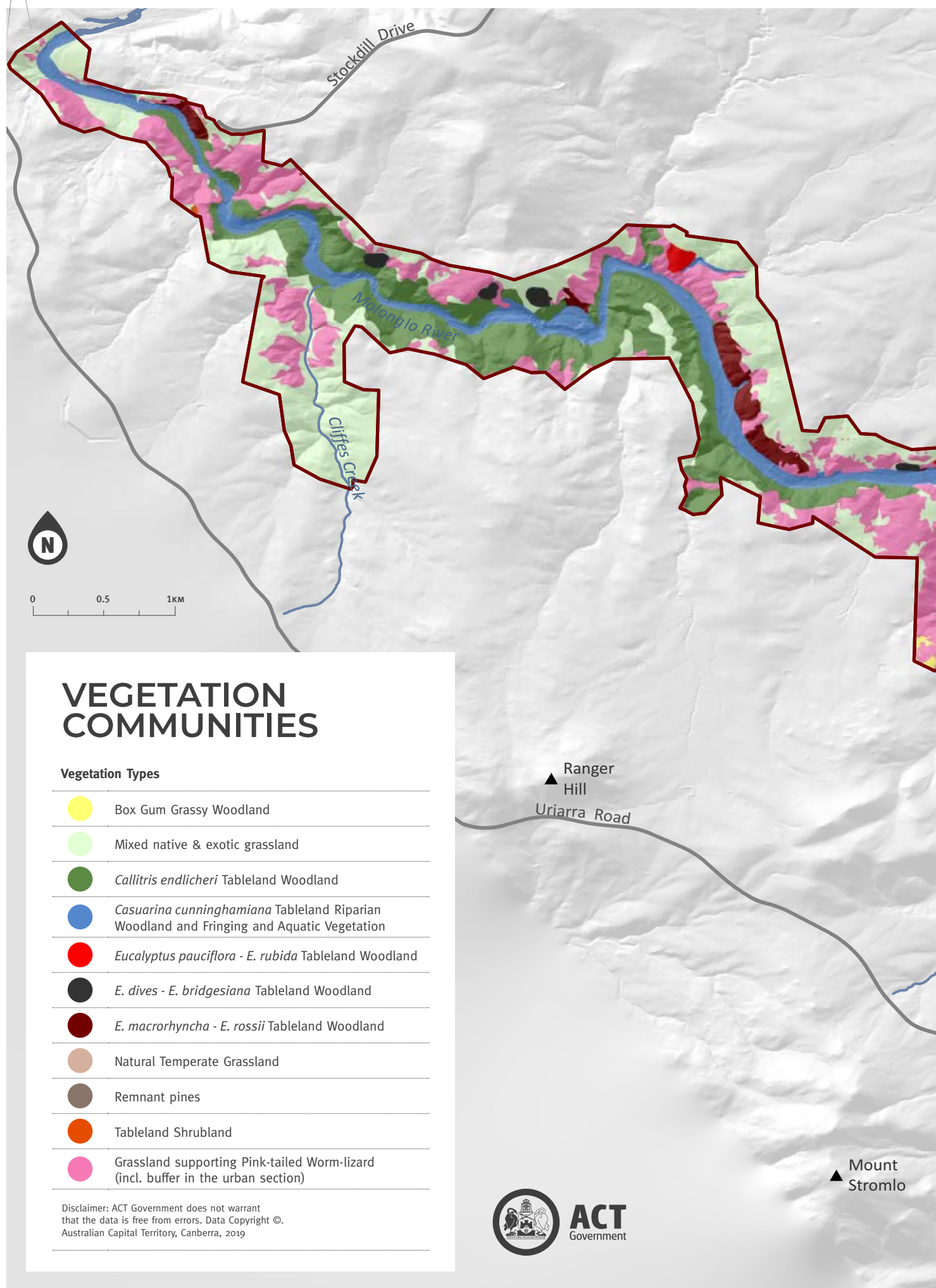
a) The Rainbow Bee-eater is an internationally listed migratory bird also covered by the EPBC Act. It has the same level of protection in the ACT.

\* Listing under the *Environment Protection and Biodiversity Conservation Act* (Department of the Environment 2014)

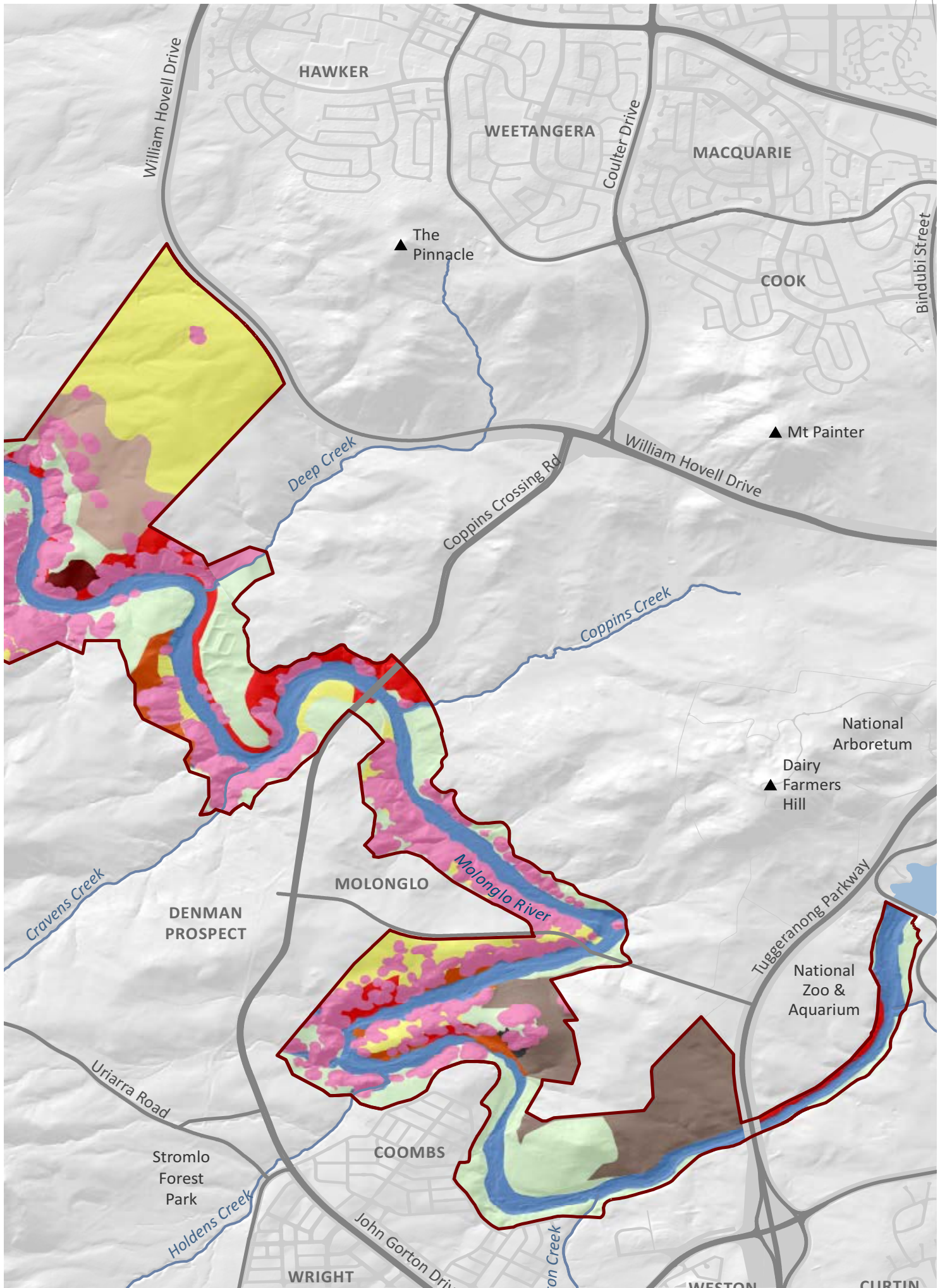
\*\* Listing under the *ACT Nature Conservation Act* (ACT Government 2013c)

\*\*\* Listing under the *Threatened Species Conservation Act 1995* (NSW Environment and Heritage 2014). Included here because the Reserve is close to the border with NSW.

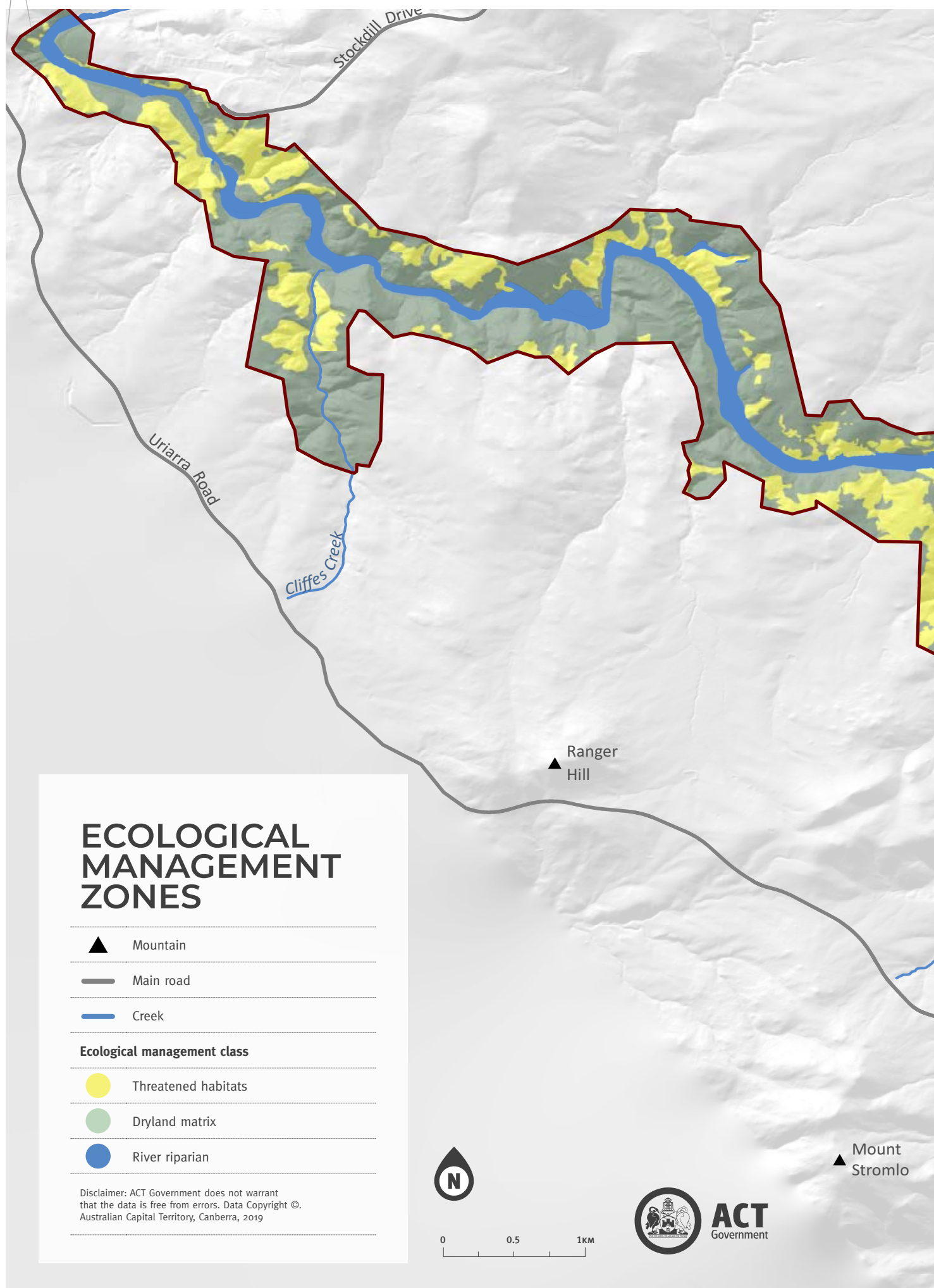
**Figure 6.1** Vegetation Communities of the Molonglo River Reserve



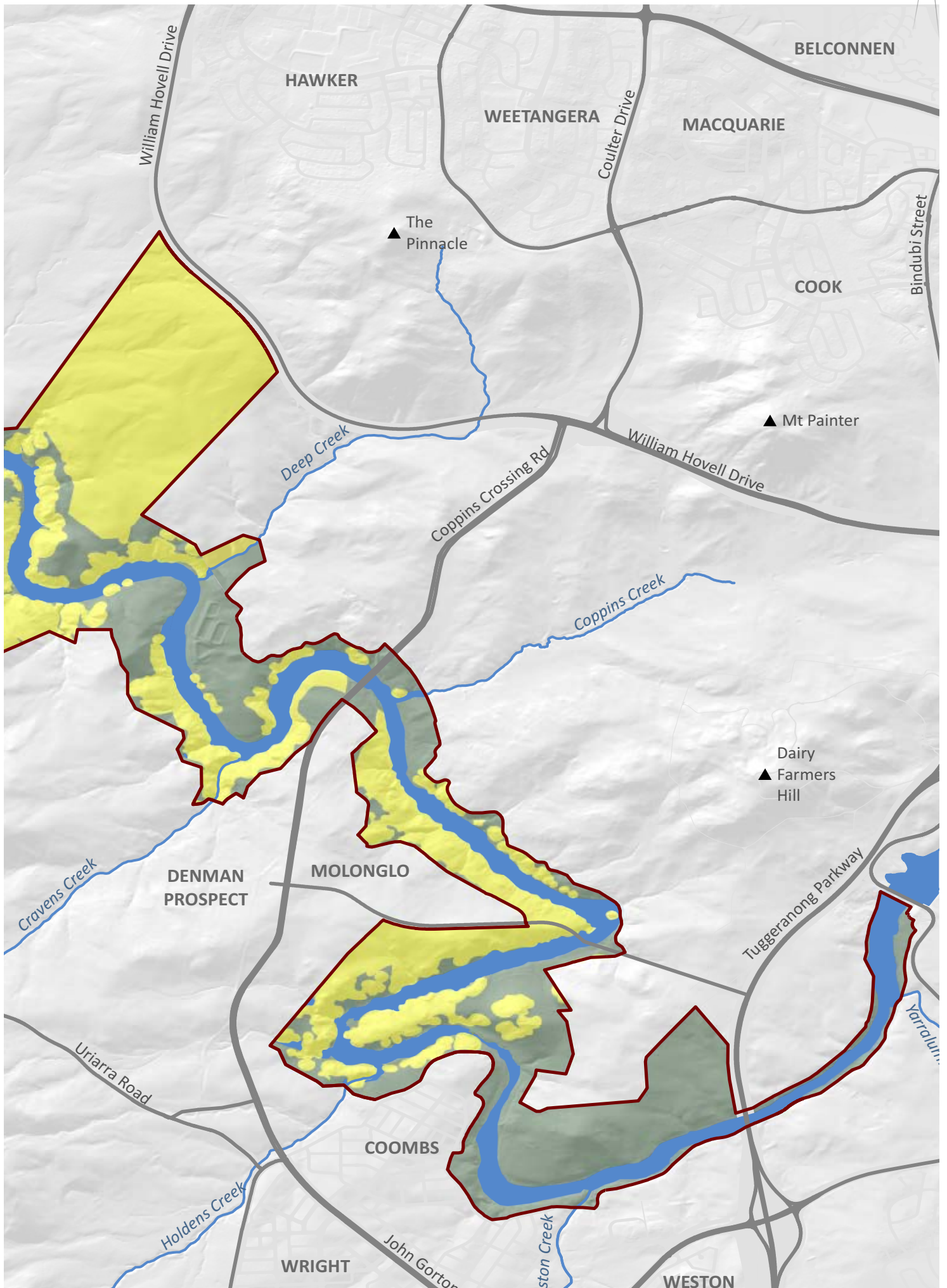




**Figure 6.2** The three ecological management zones in the Molonglo River Reserve.











Swift Parrot  
*Lathamus discolor*





## 6.3 Threatened habitat

This area comprises all the listed threatened vegetation communities and Pink-tailed Worm-lizard (PTWL) habitat in the reserve. In the urban section, it includes the NES specified buffers around PTWL habitat. It does not include buffers in the rural section where there is a lower requirement for protection from disturbance. Threatened habitat defined in this way represents about 497 hectares or about 38% of the reserve.

Before European settlement, the two now-threatened vegetation communities, Box-gum Grassy Woodland (BGW) and Natural Temperate Grasslands (NTG) covered around 65% of the area of the reserve (estimated from Figure 7.1). Clearing, grazing, weed invasion and the establishment of pine plantations have substantially modified these communities and only remnant patches of their original area is sufficiently representative of these communities to merit protected status.

For BGW, the criteria that determine whether a patch should be protected under Commonwealth legislation include having a predominantly native understorey and being greater than 0.1 hectare in size with good non-grass understorey plants, or greater than 2 hectare in size if tree representation is good, but the understorey is modified (Threatened Species Scientific Committee 2006). Under the *Nature Conservation Act 2014* the listed community can encompass lower condition woodlands.

For NTG, the criteria for listing are based on the diversity and cover of native species, the presence of disturbance sensitive species, the diversity of forbs and the proportion of exotic species. The BGW and NTG remnants that meet the listing criteria are scattered through the reserve and together with the scattered patches of grassland that support PTWL are the areas that have the highest priority for protection and rehabilitation in the plan (Figure 6.1, Figure 6.2).

The treeless grassland habitats where PTWL are found have usually been considered as modified BGW or modified NTG which do not meet the criteria for listing as either of these communities. Recent research suggests that the grasslands in PTWL habitat map to one of the eight distinct vegetation associations of NTG called Kangaroo Grass – Purple Wire-grass – Wattle Mat-rush Dry Tussock Grassland. This association has not been previously identified in the ACT. As such, it would meet the Commonwealth criteria for listing as threatened NTG of the Southern Tablelands of NSW and the ACT. Whether or not the grassland community in which PTWL is found has protected status, protection of the threatened PTWL necessitates protecting the habitat in which they live.

Actions that increase the risk of losing the threatened communities and PTWL in the reserve include:

- **Box-Gum Grassy Woodland:** clearing for infrastructure leading to loss of habitat and fragmentation; firewood collection; failure of tree regeneration; rural tree die-back; grazing by any animals at levels which suppress regeneration of trees and alter the understorey; invasion by weeds and feral animals; fire regimes (planned and unplanned) that prevent maintenance of woodland structure and species richness, loss of connectivity to habitat outside the reserve; and alterations in drainage and runoff that lead to changes in moisture and nutrient levels.
- **Natural Temperate Grassland:** land management that leads to overgrazing; soil disturbance (including compaction from vehicles or walkers); inappropriate fire regimes, whether planned or unplanned; weed invasion; tree-planting; and alterations in drainage and runoff that lead to changes in moisture and nutrient levels.
- **Pink-tailed Worm-lizard:** disturbance or removal of rocks; degradation of surrounding Themeda grassland (including the buffers) through weed invasion, trampling, increased erosion or sediment accumulation, inappropriate fire (planned and unplanned) or fire protection measures; predation; tree or shrub establishment; overgrazing and lack of connectivity with other populations; alterations in drainage and runoff that lead to changes in moisture and nutrient levels.
- **Threatened birds generally:** removal of trees (living and dead), removal of fallen timber and litter; predation by feral or uncontrolled domestic animals; invasion of key habitats by introduced pasture plants and weeds or birds (native and alien) that compete for nesting hollows; inappropriate fire regimes (planned and unplanned); overgrazing; lack of connectivity within and outside the reserve; rural tree dieback; and use of chemicals.

### 6.3.1 Agreements in the NES Plan

Five of the species and communities listed in Table 6.1 are subject to specific measures agreed by the ACT and Australian Governments. It is part of this agreement that these actions be incorporated into the plan. The communities and species concerned are:

- Box-Gum Grassy Woodland
- Natural Temperate Grassland
- Pink-tailed Worm-lizard
- Swift Parrot
- Superb Parrot.

The Swift Parrot and Superb Parrot are considered covered by actions that improve the conservation status of BGW.





Nankeen Kestrels  
*Falco cenchroides*



Kama and the urban section of the reserve are offsets under the NES agreement. Not all the NES Plan actions refer to land that falls within the reserve. Those that do are mostly in the urban section and in Kama, and are reproduced in Appendix 1. A consolidated summary of the required actions is in Table 6.2.

The NES Plan outlines the ACT Government's obligations in relation to monitoring and reporting on the implementation of the NES Plan.

The ACT Government is required to produce a publicly available annual report identifying:

- achievement of the MNES conservation outcomes
- progress in completing the actions listed in the NES Plan
- any deviation or non-compliance with the actions.

The Annual Reports are available for viewing online at [www.environment.act.gov.au](http://www.environment.act.gov.au).

**Table 6.2:** Consolidated actions in the NES Plan that apply to the Molonglo River Reserve

Topic	Consolidated action	Action Nos. in NES Plan
Box-Gum Woodland and Pink-tailed Worm-lizard protection	Develop and implement a management plan for the Molonglo River Park* to provide for the maintenance and enhancement of the ecological condition of a) BGW (approximately 73 ha) and b) high and moderate quality PTWL habitat within the park.	9, 10, 36, 38
Box-Gum restoration knowledge	Establish and manage an off-site restoration project, as an indirect offset, for Box-Gum Woodland.	23
Pink-tailed Worm-lizard	Establish a 20 m buffer around high and moderate quality PTWL habitat (other than, for example the areas to be impacted by the bridge crossings and strategically placed walking tracks) within the East Molonglo river corridor*. Manage these areas to ensure the maintenance of their conservation value. Management measures will be incorporated into the management plan for the river corridor.	37
Infrastructure design	Design the infrastructure that will occur in the river corridor to avoid or minimise impacts to BGW and to high and moderate quality PTWL habitat.	3, 30
Managing construction impact	Develop, implement and independently monitor Construction Environmental Management Plans (CEMPs) to ensure that unforeseen direct or indirect impacts on BGW and PTWL from construction activities within the development area and the river corridor are avoided.	4, 31
Kama	Develop and implement a management plan for the Kama Nature Reserve* to provide for the protection, maintenance and enhancement of the ecological condition of a) Box-Gum Woodland, b) Natural Temperate Grassland and c) all PTWL habitat (approximately 6 ha) within the park.	5, 6, 24, 25, 26, 32 and 33
Pink-tailed Worm-lizard habitat in rural section	Continue implementation of the Management Plan for the Lower Molonglo Nature Reserve* to provide for the maintenance of the ecological condition of the high and moderate quality PTWL habitat that occurs there.	40
Adaptive management	Develop and implement an adaptive management strategy.	Section 7

\* this area is now part of the Molonglo River Reserve to which this plan applies

**Table 6.3** Action plans for the recovery of threatened vegetation communities relevant to the Reserve

Threatened Species/Community	Action plans	Reference
Box-Gum Woodland and associated bird species, including: Brown Treecreeper, Hooded Robin, Superb Parrot, Regent Honeyeater	Woodlands for Wildlife: ACT Lowland Woodland Conservation Strategy (Action Plan No. 27)	ACT Government 2004a
Natural Temperate Grassland and Perunga Grasshopper	ACT Native Grassland Conservation Strategy and Action Plan	ACT Government 2017



### 6.3.2 Management considerations

Generally the approach to protecting threatened species and communities is to protect their habitat from further loss, manage threats, improve habitat condition, extend the area through rehabilitation and enhance connectivity. Rehabilitation is especially important in the reserve because its past history of land use has resulted in considerable fragmentation and degradation. Specific approaches and detailed actions for the listed species and communities in this area have been drawn from the action plans in Table 6.3 and incorporated into the Ecological Management Guidelines.

## 6.4 Dryland matrix

The dryland matrix consists of the remainder of the area of the reserve that is not river or riparian. This area represents about 628 hectares or 47% of the reserve. It consists of:

- the remaining areas of BGW and NTG that would originally have been classified in these two communities and that are now a mix of modified and weedy grasslands with scattered trees
- former pine plantations containing mixes of remnant pine trees, self-regenerating pine and native trees with a weedy understorey containing a low proportion of native plants (about 69 ha)
- habitat of Pale Pomaderris (*Pomaderris pallida*), an ACT threatened plant scattered along the river banks in the rural section;
- patches of other vegetation communities:
  - Black Cypress Pine – Brittle Gum Tall Dry Open Forest (about 135 ha)
  - Snow Gum Grassy Woodland (about 72 ha)
  - Broad-leaved Peppermint – Brittle Gum Tall Dry Open Forest (about 7 ha).

These latter communities are not listed as threatened, but Snow Gum Grassy Woodland where it lies between woodland and grassland, is targeted for protection in the ACT Lowland Woodland Conservation Strategy (Action Plan No. 27).

While not meriting protection at the level of threatened communities, this matrix between the less modified patches contains a diversity of native plants, provides important habitat for many species, including threatened species, and acts as crucial connectivity between the scattered areas containing the listed communities inside and outside the reserve. The dryland matrix also

encompasses the two special purpose reserves areas. The sludge ponds and Bold Hill are currently highly modified grasslands and Ryans Hill is a former pine plantation.

Species inside remnant patches may also be partly dependent on the matrix for supplementary or complementary resources and there is growing evidence that matrix quality crucially influences the abundance and composition of species within remnant patches. In the sense that the matrix has been substantially modified, it is a novel ecosystem where objectives can depend less on attaining a prior species composition and structure and more on achieving good landscape function. This allows some scope to manipulate or design to particular objectives, for example minimising bushfire risk through biomass management.

Conservation priority for this area as a whole is medium, with a larger focus on those measures most important for threatened species and communities in or adjacent to the matrix, connectivity across the reserve, improving the condition of patches of remnant BGW and NTG and rehabilitating areas now covered with remnant pine plantations.

### 6.4.1 Management considerations

Because the dryland matrix is more disturbed and has a lower conservation priority, it is the area that will be targeted for recreation use, both in the nature reserve and in the two special purpose reserves. Nevertheless, in the nature reserve in particular, important ecological functions have been identified and must be protected. These include maintaining landscape function and also maintaining habitat for natural soil engineers. Soil engineers like invertebrates, especially termites and ants, but also burrowing bees, wasps and spiders play critical roles in drilling, mixing and processing the soil in grasslands and grassy woodlands. In the process they contribute to soil formation, decomposition and nutrient cycling, carbon and nitrogen fixation and sequestration, infiltration, purification and storage of water. Threats to healthy populations of soil engineers are disturbance and fragmentation, erosion, loss of vegetation (especially woody and understorey vegetation with nectar-bearing flowers for bees), reductions in soil moisture and loss of invertebrate biodiversity (especially invertebrate prey for spiders).

A major threat to the dryland matrix is that its largely open nature, history of recreation use, weediness and evidence of past disturbance creates an impression that it has little conservation value and is 'empty' and available for any human use.

A significant area in the lower eastern corner of the reserve (Figure 6.1) is vegetated with Radiata pine trees.

Part of this area is in a Strategic Firefighting Advantage Zone (SFAZ) and will require fuel management. In the long term it is intended the pines will be replaced with vegetation based on native species. A Box-Gum Woodland restoration project has already begun on Barrer Hill (NES Action 23).

The impact of urban development on local hydrology (surface and groundwater flows) needs to be monitored for its possible impact on vegetation condition on the slopes and banks of the river in the urban section.

## 6.5 River and riparian

The river and its riparian zone represent the remaining area in the reserve, about 203 hectare or 15%. The riparian zone is that area above the water level where a damper microclimate supports vegetation with different characteristics from adjacent dryland areas. The conservation priority for this area is medium to high. It has fewer threatened species and communities but it is the icon of the reserve and generally in better base condition for rehabilitation than the dryland matrix.

### 6.5.1 Conservation goals

Conservation goals for the river and riparian zone in the reserve are already embodied in the 2018 ACT Aquatic and Riparian Conservation Strategy. The strategy builds on the achievements of a previous strategy by providing a regional approach to conservation and management of aquatic and riparian environments. It addresses current and future issues, such as changing climate and focuses on best-practice conservation in an adaptive management framework. The strategy can be viewed at [www.environment.act.gov.au](http://www.environment.act.gov.au).

The ACT Water Resources Environmental Flow Guidelines also set out requirements for environmental flows in the ACT, including flows in the Molonglo River below Lake Burley Griffin. It is a statutory requirement that environmental flows be maintained in all ACT catchments (but not necessarily all river reaches) in order to protect the environmental values of rivers further downstream waters. Environmental flows are expressed in terms of regimes of base flow, riffle maintenance flows, pool or channel maintenance flows and special purpose flows. Every five years the ACT Government revises the guidelines. The draft 2018 Environmental Flow Guidelines were released for public consultation between June–August 2018. The latest guidelines can be viewed at [www.environment.act.gov.au](http://www.environment.act.gov.au).

### 6.5.2 Riparian vegetation

Four riparian vegetation communities are present in the river and riparian zone in the reserve. Two of these communities are found on the sandbars and banks and include River She-oak Dry Riparian Forest and River Bottlebrush–Burgan Rocky Riparian Shrubland. The remaining two are found at the water's edge and in the river and include Tableland Riparian Fringing Aquatic Vegetation and Tableland Aquatic Floating and Submerged Vegetation. None of these communities are threatened. However, the River She-oak community has high significance as a movement corridor for birds, including threatened birds, and the aquatic vegetation is crucial for supporting life in the river, including threatened fish. Willows and other weeds are prevalent in the riparian zone, especially in the first five kilometres below Scrivener Dam.

The condition of the riverine vegetation communities was assessed as very low in the upper reaches grading to moderate to high in the lower gorge section. The main reasons for poor condition were the predominance of weeds and slow recovery from bushfires. A long history of uncontrolled stock access to the river has also damaged the riparian zone in places but recent fencing of river banks in the rural section has been noted to already increase the complexity of riparian zone vegetation. Generally, the aquatic fringing vegetation has retained a higher proportion of native species than the tree and shrub vegetation communities. Common invasive weeds documented included willows, blackberries and radiata pine wildings. African Lovegrass has also established in the lower section. Reach by reach descriptions of the riverine vegetation, including weeds and recommended management actions, are in Peden et al. (2011).

### 6.5.3 Native fish

The status of the five threatened fish and crayfish species listed as historically or currently present is noted in Table 6.1 in the Lower Molonglo River is:

- **Murray Cod:** historically present, present nearby in the Murrumbidgee and stocked into Lake Burley Griffin, potentially present in the Lower Molonglo, suitable habitat available, limited by low flows.
- **Trout Cod:** historically present in nearby tributaries and the Murrumbidgee, suitable habitat available, limited by absence of moderate flows, very low likelihood of occurrence now.
- **Macquarie Perch:** historically present, habitat limited, very low likelihood of occurrence now.
- **Murray River Crayfish:** historically present in the Molonglo or nearby tributaries, habitat is reasonable.



- **Silver Perch:** not recorded in the Lower Molonglo, despite stocking into Lake Burley Griffin, no longer in the Murrumbidgee nearby.

Other fish present include the native fish Golden Perch, Australian Smelt and Western Carp Gudgeon. Exotic fish, especially carp, heavily dominate fish numbers and fish biomass in the river.

The main threats to native fish and their habitat in the Molonglo River are; overfishing, human disturbance, sedimentation, habitat modification, alien species, barriers to fish passage, thermal pollution, discharge from Lower Molonglo Water Quality Control Centre and an inadequate flow regime.

Threats to vegetation condition include: weeds, erosion, bushfire or inappropriate fire prevention measures or regimes and inadequate or inappropriate flows.

#### 6.5.4 River morphology

River morphology describes the shapes of river channels and how they change in shape and direction over time. The morphology of the river is crucial for maintaining habitat in a river and its riparian zone. Through much of its length the Molonglo River is characterised by fast flowing riffle sections broken by long pools, often rock bottomed. There are also minor alluvial banks and fans, especially at bends and the entry points of tributaries. Under natural conditions, the water regime (the timing, pattern and volume of flows) maintains this physical pattern in the river through actions like scouring pools, removing sediments from riffles and clearing vegetation. In turn this is important for water quality and for supporting a variety of habitats and life processes for aquatic and riparian plants and animals.

The banks of the river are also important as potential nesting sites of the Rainbow Bee-eater, a protected migratory species (Table 6.1). The Rainbow Bee-eater is a summer breeding migrant to the ACT. It is an insect eater that builds nests at the end of long tunnels dug into sandy river banks or sandy ridges.

#### 6.5.5 Water quality

Water quality in the river is governed by the quality of the water entering the river and the combination of river morphology, water flow and riparian and aquatic life in the river which filter and process contaminants in the water. The long term median water quality monitored at Coppins Crossing has been rated as moderate but this is less than in most reaches and tributaries upstream in the catchment. New urban development has the potential to diminish water quality but most stormwater from the Molonglo town will eventually pass through bio-retention basins in order to moderate storm water flows and to filter

sediment, nutrients and contaminants from the water. Works have been undertaken in the Yarralumla catchment which will contribute to improving the quality of water flowing in the river. Both Yarralumla Creek and the Lower Molonglo are focus catchments in the bilateral Murray-Darling Basin project 'Improving long term water quality in the ACT and the Murrumbidgee River System'. The project includes a comprehensive water monitoring program so that the effectiveness of water quality actions will be monitored and further improvement in water quality can be targeted to the areas that produce the most pollution.

However, most of the flow in the river arrives through releases from Scrivener Dam and its quality reflects both the quality of water in Lake Burley Griffin and the fact that the released water is drawn from depth and is both colder and less oxygenated than a natural flow.

### 6.6 River and riparian management considerations

#### 6.6.1 Flows

Addressing the issue of altered flow regimes is a major consideration for the long-term health of the river. Suitable habitat (large pools and woody debris) is still present in the river for Murray Cod and Trout Cod but their presence is limited by low flows. There is a sustainable population of Murray Cod in the Murrumbidgee River not far downstream from its confluence with the Molonglo and instituting environmental flows would provide the connectivity up and down the river they require for feeding and breeding. Connectivity with the Murrumbidgee would require resolving whether the outflows from the water treatment plant limit the movement of fish into the bottom reach of the Molonglo, and if that is the case, exploring options for redesigning the outflow accordingly.

Maintaining environmental flows is not only beneficial to fish but to the condition of riparian vegetation. Increasing flows down the Molonglo would also increase the dilution of salts released from LMWQCC, especially in drought years when salt concentrations approach maximum recommended levels.





Box Gum Grassy Woodland







### 6.6.2 Barriers

As well as adequate flows for movement up and down rivers, barriers to fish movement need to be addressed or avoided. Fish need to be able to move up and downstream to find food and to shelter from predators, respond to changing temperatures and water levels and to breed. The siting and design of any low level recreational crossings are to be designed to minimise barriers to fish passage and disturbance of significant river habitat, for example a pool or a riffle section. Guidelines for designing appropriate waterway crossings are available (e.g. Fairfull and Witheridge 2003).

### 6.6.3 People and stock

With a high resident population of people nearby, the river and riparian zone is also at risk of being impacted by inappropriate human activities like illegal fishing, over fishing, disturbance in and around the river (e.g. moving rocks, paddling, disturbing sediment, release of aquarium plants and fish). Prohibited and permitted activities in the reserve are outlined in Chapter 8.

Stock grazing is to be restricted from the river edge and grazing impacts in other areas will be assessed to ensure grazing is an appropriate management action. In particular, the river banks where Rainbow Bee-eaters breed must be protected from damage and their burrow entrances not concealed with vegetation.

**Table 6.4:** Action plans for threatened species previously or potentially present in the Lower Molonglo River, and for aquatic communities in the ACT

Threatened Species/Community	Action plan	Reference
Fish	ACT Aquatic and Riparian Conservation Strategy and Action Plans	ACT Government 2018

### 6.6.4 Action Plans

For threatened species that are dependent on aquatic and riparian areas in the ACT, action plans have been prepared and are detailed in the 2018 Aquatic and Riparian Conservation Strategy and Action Plans (Table 6.4). Each action plan provides a detailed description of the species, its conservation status, ecology and key threats and outlines the major conservation objectives and intended management actions.

The interaction between fire protection and conservation in the reserve is addressed in Chapter 9.

### 6.7.1 Threatened species

One threatened bird species in the reserve depends on a full combination of open woodland, grassland and riparian vegetation. This is the Little Eagle which nests in the rural section of the reserve and requires suitable trees for nesting in and a foraging range of several kilometres. The Little Eagle's protection depends on protecting both the nesting site and an adequate foraging area. Nesting can be disrupted by frequent and close visitation of people into breeding areas. Detailed actions from the recovery plan in Table 6.6 and in the Woodlands for Wildlife Strategy (Table 6.3) have been incorporated into the Ecological Management Guidelines.

## 6.7 Managing conservation in the reserve as a whole

Specific requirements and approaches to protecting threatened species and communities in particular parts of the reserve have been mentioned. Because of their broader scale nature, some remaining issues apply across the whole of the reserve and are better managed at that scale. General strategies for dealing with some of these in the ACT are already developed (Table 6.5) and detailed guidelines have been included in the Ecological Management Guidelines.



**Table 6.5:** Abatement strategies for broad scale threats to conservation in the ACT

Threat	Abatement strategy	Reference
Weeds	ACT Weeds Strategy 2009-2019	ACT Government 2009
Kangaroo overgrazing	ACT Kangaroo Management Plan	ACT Government 2010b
Pest animals	ACT Pest Animal Management Strategy 2012-2022	ACT Government 2012c
Climate change	AP2. A New Climate Change Strategy and Action Plan for the Australian Capital Territory	ACT Government 2012d
	ACT Climate Change Adaptation Strategy - Living with a warming climate	ACT Government 2016

**Table 6.6:** Action plan for the Little Eagle

Threatened Species/Community	Action plan	Reference
Little Eagle	Action Plan No. 35. Little Eagle ( <i>Hieraaetus morphnoides</i> )	ACT Government 2011a

### 6.7.2 Pests and weeds

Invasive weeds that displace native vegetation are of particular concern for ecological conservation across the reserve. African Lovegrass has colonised most of the length of the Lower Molonglo River within the last ten years. Other significant weeds in the reserve include blackberries, willows and St John's Wort. All of these species are declared as pest plants in the ACT. Pest animals recorded in and around the Lower Molonglo River include rabbits, foxes, goats, pigs and fallow deer. Carp, Redfin Perch, Gambusia and Oriental Weatherloach are found within the river.

Invasive plants within the reserve will be managed in accordance with the ACT Weeds Strategy 2009-2019. Pest animals within the reserve will be managed in accordance with the ACT Pest Animal Strategy 2012-2022. Specific actions in relation to invasive plants and pest animals will be outlined in operational plans for discrete areas of the reserve.

### 6.7.3 Climate change

Climate change as a threat will become incorporated into action plans as they are developed and reviewed, as a result of the *Nature Conservation Act 2014*. An adaptive management approach will be essential so that as the degree and type of change reveals itself, management can be adjusted. The ACT Government is committed to assessing the potential impacts of climate change on ecological systems in the ACT and surrounding region. This knowledge will be integrated into environmental management and development planning decisions to ensure our natural environment is conserved and enhanced. Concepts about conservation may need to

evolve too, because today's conservation frameworks were developed at a time when stationary climates, even if variable, were the usual expectation.

General projections for the ACT are that it will experience increased temperatures, changes in the seasonal pattern of rainfall with a possible decline in the average, and increased frequency and intensity of extreme weather events. Higher temperatures and the same or less rainfall will mean more evaporation and drier soils.

The likely impacts of such climate change in our local reserves include:

- disturbances in landscape function leading to loss of habitat
- invasion by more resilient species
- increased fire through both bushfire and more prescribed burning.

Individual species responses are very difficult to predict but species with restricted climatic ranges, small populations and limited ability to migrate, are most at risk. In the reserve particularly, the impact of extreme drought or extreme rainfall events will be most significant for biodiversity, function and use values associated with the river. On the sloping lands, where there are few trees and little litter, erosion risk will increase.

### 6.7.4 Fragmentation and connectivity

Achieving the objectives for threatened species and communities in the reserve depends not only on actions taken in and around the patches where they exist in the reserve, but on how well those patches are connected with others both inside and outside the reserve regardless of land tenure.

Reconnecting fragments across landscapes and regions constitute two scales at which fragmentation is important. Fragmentation also operates at much smaller scales. For example, small reptiles and invertebrates may not cross a road or a trail or an extended patch of bare soil. Banks associated with building trails on sloping land may become impassable to small creatures. The management issue at this scale is less one of reconnecting fragments already established and more one of minimising future fragmentation through the introduction of multiple trails, tracks, roads or other infrastructure. New road crossings are to be designed to allow for wildlife corridors and fencing is to be designed to allow wildlife access to foraging routes.

Two specific types of habitat in the reserve that also need special attention are Pink-tailed Worm-lizard habitat and the habitat provided by large old remnant trees. A specific study on connectivity needs for the Pink-tailed Worm-lizard provides recommendations about the re-connection of sub-populations that are currently separated and the prevention of any new barriers to their dispersal. Their capacity to cross the discharge creek lines from the stormwater ponds is a special concern and must be addressed if works are found to be required to ameliorate erosion in these gullies. Connectivity is ecologically important in the river as well as on land including increasing connectivity with the Murrumbidgee River at the lower end of the river.

Scattered remnant habitat structures, especially large old trees and dead standing trees (snags) contribute significantly to biodiversity value. In particular, scattered trees that are isolated in modified landscapes (e.g. agricultural or urban settings) tend to be disproportionately valuable as habitat resources for wildlife, relative to their size and availability in the landscape.

Large old trees and snags that have increased senescence tend to form and accumulate unique habitat structures such as large complex canopies, numerous exposed dead branches, tree cavities (hollows) with varying dimensions, and coarse and fine fallen woody debris (litter and logs). These habitat structures provide important nesting, sheltering and foraging sites for a multitude of species, including: fungi and epiphytes (e.g. attachment and exploitation of aging and dead wood); birds, bats and marsupials (e.g. perching and resting at dead branches and/or hollow-nesting); and ground-dwelling mammals, reptiles, amphibians, and invertebrates (e.g. foraging in and around fallen debris).

Scattered trees and snags can facilitate dispersal by animal species, acting as 'stepping stones' for wildlife in otherwise impacted landscapes. This is especially important in the light of predicted climatic changes, particularly for dispersal limited and threatened taxa (e.g. Superb Parrots: Manning et al. 2009). The immense time lag (>200-300 years) required to replace large old trees and their associated habitat structures makes the retention of existing old trees particularly critical. Other innovative restoration efforts that involve the recreation of vertical habitat in areas where mature trees are in decline or absent can also have biodiversity benefits. For example, relocating and resurrecting intact dead trees that can be enriched with habitat structures used by wildlife (carved nesting boxes, artificial bark and perch cross-beams).

Wherever possible, targeted protection and retention of scattered and remnant habitat structures like large old and dead trees are to be a high conservation priority. This will ensure that crucial habitat resources and habitat connectivity are maintained. Trees may need to be removed at times for safety reasons or where the health and structure of the tree has been compromised, however this is to be a last resort and other management actions are to be considered first.

The Black Mountain – Belconnen Hills – Lower Molonglo River link is to be considered a high priority for connectivity action. Some linkages from the reserve towards Stromlo Forest Park are already planned. These will follow the old creek lines in which new retention basins are being placed. As well as establishing new corridors, connectivity can also be increased by adding individual connectivity elements between remnant patches, for example trees, shrubs, water bodies, grassland or dead wood.



## 6.8 Policies and actions

Because of the protected status of threatened species and communities, and the planning associated with urban development in the Molonglo Valley, the presence, extent and condition of threatened species and communities in the reserve is well described, especially for those covered by the NES Plan. Objectives and some actions for these species and communities have already been specified in some detail, and general recovery plans and threat abatement plans exist. The major planning considerations are:

- ensuring that the higher level objectives are translated into practical on-ground plans that as they are

implemented across the reserve effectively add up over time into achieving the desired objectives

- ensuring a sound knowledge base on which detailed rehabilitation strategies can be based, including allowing for the requirement to manage fuel loads and help protect urban areas from the risk of wildfire
- maintaining an adaptive approach to the management of threatened species and communities situated within or near a new urban development, where the cumulative impacts of development and residents' behaviour in and outside the reserve are not fully predictable.

### ECOLOGICAL CONSERVATION

**Objective 7: The population size and the condition of threatened species and communities is at least maintained or condition improved; and the diversity of all other native species is conserved; and the ecological condition of the dryland matrix is improved.**

Policies	Actions
7.1 On-ground activities will be designed and implemented through a suite of plans informed by ecological management guidelines for the reserve and an adaptive management approach. (Applies to all Objectives 7-9.)	7.1.1 Develop a set of scientifically-based ecological management guidelines that incorporate the NES agreements (Table 6.2), bushfire protection, action plans (Table 6.3, Table 6.4, Table 6.6) and threat abatement plans (Table 6.5) and provide integrated guidance to designing the on-ground activities for achieving the goals. 7.1.2 Develop 3 year operational plans for discrete areas that prioritise the on-ground actions for each area. 7.1.3 Develop and implement an annual work plan for each operational plan. 7.1.4 Implement the adaptive management strategy for the NES areas to track progress and adjust management as learning grows; and review other objectives in Years 5 and 10.

**Objective 8: Improve the ecological condition in the river and riparian zone to support the recovery of native fish in the river.**

Policies	Actions
8.1 A long term river habitat restoration plan will guide recovery of ecological values in the river and riparian zone.	8.1.1 Investigate the extent to which outflows from LMWQCC deter some fish species from entering the Molonglo River from the Murrumbidgee and if required, investigate options for changing the point or pattern of discharge. 8.1.2 In consultation with the National Capital Authority, review the impact of the release of cold water from Scrivener Dam and explore options for improving the quality of water released from the dam. 8.1.3 Combine Actions 8.1.2 to 8.1.3 with other appropriate measures from the ACT Aquatic and Riparian Conservation Strategy and Action Plans in a Lower Molonglo River Restoration Plan.

**Objective 9: Connectivity within and outside the reserve is addressed and improved.**

Policies	Actions
9.1 Connectivity within and outside the reserve will be improved.	9.1.1 Analyse connectivity, identify gaps and target the gaps for habitat rehabilitation.

Note: See also Chapters 7, 8 and 9 for policies and actions that deal with people's activities in and near the reserve, and Chapter 1 for improving management through adaptive management and targeted research activities.







## 7 - CULTURAL HERITAGE VALUES

Murra Bidgee  
Mullangari event



## 7.1 Objectives

**Objective 10: Cultural heritage within the Molonglo River Reserve is identified and conserved to retain its significance.**

**Objective 11: Cultural heritage is to be interpreted and (where appropriate) promoted to foster community appreciation of past and continuing connections.**

## 7.2 Connection with Country

Aboriginal and Torres Strait Islander people have a connection with their traditional Country that links the past, present and future together and does not separate 'nature' from 'society' or 'people'. When Aboriginal and Torres Strait Islander people care for Country they also care for their culture and well-being, in the present and in the future. Involving them in managing Country is not simply a matter of acknowledging their cultural history and respecting their 'traditional' knowledge from a historical perspective but acknowledging and respecting their knowledge and cultural practices of today.

The traditional custodians of the land and waters of the reserve are the Ngunnawal people. They have managed this landscape for tens of thousands of years and their relationship to the area is still strongly held today. The ACT Government acknowledges the role of landscape in the Ngunnawal people's continuing sense of responsibility for preserving the spirit and stories of their ancestors. It has also committed to a vision for reconciliation that includes Aboriginal and Torres Strait Islander peoples living in the ACT and surrounding region enjoying a quality of life, life expectancy and health status equal to all Canberrans. Other Aboriginal groups with interests in the Canberra region include the Ngarigo, Wolgalu, Gundungurra, Yuin and Wiradjuri people who traditionally, and currently, gathered together in the region.

Opportunities for employment and economic independence are important contributors to quality of life for Aboriginal and Torres Strait Islander people, as they are for everyone else. Jobs that in addition have strong cultural meaning are highly prized by Aboriginal and Torres Strait Islander people because they exemplify the traditional link between ecological and social health.

The socio-economic benefits of Aboriginal and Torres Strait Islander people working on Country have been well described and are an objective, along with environmental objectives, of the Australian Government's Indigenous Rangers Working on Country Program in which over 831 indigenous rangers are employed across Australia (Commonwealth of Australia 2018). A review of the economic outcomes alone of the program found that the program delivered more financial benefit than it cost, by a margin of up to 23%, due to reduced welfare costs and increased tax revenue (Allen Consulting Group 2011). Working on Country is also an opportunity for Aboriginal people of the Stolen Generations or whose ancestors were removed from their land to reconnect with their traditional lands. Some Ngunnawal people living in Canberra and the region today fall into this group.

ACT Parks and Conservation Service employs Aboriginal staff in a variety of roles. They come together as *Murumbung Yurung Murra* to strengthen their identity, acknowledge the importance of their work on Country and forge relationships with local Traditional Custodians of the region. They also support Traditional Custodians in their determination of the identification, protection and interpretation of sites and customary lore across the ACT and understand the importance of cultural heritage enriching lives and for knowledge and experience to be passed on to youth and future generations.

A cultural practice that is relevant to this reserve is small scale patch burning by Aboriginal people working with park managers to achieve ecological outcomes. This is being used in other parts of Australia and has recently been initiated at Jerrabomberra Wetlands Nature Reserve and in Namadgi National Park.



## 7.3 Aboriginal history and heritage sites

As well as being a location with good food and water, the Molonglo River was very significant to Aboriginal people because of its use as a corridor for people travelling across the region for trade and ceremonial purposes. Yuin people from the coast would come out of the mountains in the Captains Flat area and travel down the Queanbeyan and Molonglo Rivers to the Murrumbidgee and on to the Australian Alps, and then return. River corridors provided easy wayfinding and a convenient source of food and water while travelling. Local people had a responsibility for keeping the corridor in good condition for the use of travellers. That would include ensuring a good food supply, easy access points to the river and a clear route to follow. Traditional use of rivers as pathways and a variety of ways in which routes were marked and maintained is quite well documented for south-eastern Australia.

The margins of the Molonglo and Murrumbidgee Rivers were focal points for Aboriginal activity in the region and many signs of their use of the land in this reserve have been recorded, mostly small artefact scatters and single artefact finds. However, artefact collection, a high degree of land disturbance in recent years, inaccurate geolocation information and successive flooding of the floodplains, means that relicts are no longer found in all those places.

A recent survey of the urban section identified a total of 64 Aboriginal heritage sites and 17 Potential Archaeological Deposits (PADs) that had been found previously or were newly recorded in this survey. The significance of these sites has been assessed and on this basis, management requirements for each developed in a conservation management plan. The majority of sites and PADs had low significance and have already been salvage collected or actioned. These have no further management requirements. Thirteen sites and two potential archaeological deposits have management requirements that need incorporating into the plan (Appendix 4). The sites include one special cultural place, two with scarred trees and the remainder are areas containing artefact scatters. The location of some sites may not be published for Aboriginal cultural reasons. The two PADs require conservation in situ.

Evidence from test pits dug at the PAD near Coppins Corner suggests this site was used regularly by Aboriginal people as a short-term camp at times during the mid to late Holocene, dating to the last 5,000 years. The site was probably selected because it is one of the few along the Lower Molonglo River where slightly elevated and level rises with well drained soils occur adjacent to the river. This is consistent with the wider pattern of evidence

established from other deposits in the Molonglo Valley. Sites that are close to the river or its tributaries and where access is easy, such as in bends or near the end of low, level spurs, were preferred for campsites in the Molonglo Valley.

The rural section of the reserve has not been resurveyed recently. Earlier surveys have documented numerous low density artefact scatters but no Aboriginal site of high conservation significance.

Cultural heritage is also expressed in landscapes and how they were, and are still used by Aboriginal and Torres Strait Islander people. The combination of water, and a diversity of grasslands, woodlands and wetlands means that much of the land within the reserve boundary was traversed or used for food gathering and hunting, and as a source of medicine and materials for tool making. The rich supply of fish in the river was noted by early settlers and an account of Aboriginal people fishing in the river near the Duntroon Dairy is given in Shumack (1967). Evidence of patch burning is also contained in early descriptions of the region. A number of plants documented as being used by Ngannawal people in the ACT are, or were likely to have been, found in the reserve.

## 7.4 Management considerations

The main management considerations are:

- the promotion of Aboriginal interests in the reserve, past and present
- establishing how Aboriginal people can play a role in the management of the reserve that is both culturally relevant to them and socially beneficial
- how Aboriginal cultural heritage can best be protected.

The four Representative Aboriginal Organisations (RAOs) declared under the Heritage Act 2004 must be involved in the assessment and management of Aboriginal heritage places and objects.

The establishment of the reserve at the same time as new residents establish themselves is an opportunity for place-making in which Aboriginal people and culture have a visible role. A ceremony (Murra Bidgee Mullangari) on the banks of the Murrumbidgee where Ngannawal and Ngambri people from this region came together with Ngarrindjeri people from the Coorong is an example of activity that had high value for its participants and raised awareness more widely. Of greater permanence and wider visibility would be the use of more Aboriginal names in naming places within the reserve. Further advice on appropriate languages will be sought from Traditional



Conservation of Riverview Homestead

Custodians and a linguistic anthropologist. Consultation will then occur with the United Ngunnawal Elders Council (UNEC) and the ACT Aboriginal and Torres Strait Islander Elected Body.

The most important principle guiding Aboriginal involvement in the reserve is that as descendants of the people who once lived there, they have a right to be involved. The reserve also offers some particular opportunities for a greater involvement of Aboriginal people in its management. The poor condition of some of the habitat requires ecosystem rehabilitation activities that will span a number of years, and these will offer training and employment opportunities beyond those usually required in park management. Some of this work could be done by Aboriginal people.

Considerable work has already been done on identifying, assessing and developing conservation management plans for Aboriginal heritage places and objects in the urban section which is of highest priority given the urban development nearby. The main issue is ensuring

that plans are developed and implemented and, where conservation is to occur on site, to monitor that the protection measures put in place are being effective. With a high population nearby, vandalism is a threat and the conservation management plans should be adaptively revised if there are early indications that they are not providing sufficient protection.

## 7.5 European cultural history

### 7.5.1 From first settlement

The Molonglo River was first encountered by Europeans in 1820, near the present Lake Burley Griffin. The grassy plains and access to good water made it attractive for sheep grazing and it began to be settled from about 1823. Most early establishments were on the flatter grassy



plains and the higher country, so there are few records of people living within the current reserve boundaries in the early days of white settlement. By 1827, James Martin (also known as James Taylor) lived in a three-roomed hut located on the eastern side of Yarralumla Creek, near to its intersection with the Molonglo River. The hut was probably just outside the reserve boundary but he used the land running to the river. This land, like much of the land in the area later became part of Yarralumla, owned by Frederick Campbell (Frei 2014).

Further downstream and on the south side of the Molonglo River, Captain Edmund Harrison Cliffe purchased 4,200 acres ('Craven Estate') and was assigned convicts in 1836. He did not appear to ever live there and his estate was disposed of soon afterwards. Cliff(e)s Creek still carries his name today.

Around the middle of the river and on the north side, Goat Station was established as an outstation of Ginninderra before 1860. Ginninderra was owned by George Palmer. John Coppin and his family lived there in a three-roomed hut from 1860 to 1878, then purchased a small-holder's block nearby on the southern side where they lived until the late 1880s. The location of their second home has not been confirmed. A possible location for it now has little remaining physical evidence of their occupation there and has been assessed as not significant for conservation (O'Brien 2011). The Coppins are commemorated in the name for the local river crossing, Coppins Crossing. John Coppin's descendants still live in the region.

Not far away and also on the southern side, near today's Misery Point, Isaac and Emily Blundell (nee Shumack) purchased a 40 acre small-holder's block in 1878. Their first home was too close to the river and was flooded out, and they built another nearby on higher ground. The death and burial on their property of a baby son, in December 1902, may have led to the name Misery Point. The home, Riverview was occupied by the family until 1913 when it was acquisitioned by the Australian Government. The site represents one of the best surviving examples of the small farm settlements of in the Molonglo Valley that were established after the 1861 Robertson Land Acts which prescribed that the large grazing properties had to make suitable land available for farming by small settlers. The remains at the site include chimney foundations, stone fireplaces, a stone bread oven, garden remnants and the track down to the Molonglo River which was their main source of water. A Conservation Management Plan has been prepared for the site. Descendants of Isaac and Emily live in Canberra today.

A long disused limestone quarry in the geological heritage site (see Chapter 6) and to the south of Kama is also a site dating from settlement history. Little is known about its history but it has been assessed as having moderate significance and a high conservation value. It has been recommended that it be conserved in place.

## 7.5.2 Post Federation

Following acquisition of the land that formed the ACT in 1911, land in rural regions that was not immediately required, was leased to landholders.

Sludge ponds is an area of disused sewage sludge drying ponds that were associated with Canberra's sewage treatment plant at Weston Creek, probably from the late 1960s when odour became an issue as the new suburbs of Weston were developed and the sludge drying ponds were moved. Weston Creek sewage works and the sludge ponds became redundant when a new treatment plant (Lower Molonglo Water Quality Control Centre) was developed near the junction of the Molonglo and Murrumbidgee Rivers in 1978. The area of land containing the sludge ponds are part of Special Purpose Reserve (North). The ponds will be remediated to allow the site to be used as a reserve.

Changes in land use on the slopes of the reserve and adjoining land in the 1900s also have cultural histories associated with them. Grazing has continued on some of the land but a substantial area of pine plantations (Stromlo Forest) was established from the 1920s. During this time, workers in the plantations and many walkers, runners, cyclists and horse riders have used the plantation trails that passed in and out of land that is now in the reserve. Their memories of this use of the land are strong and especially poignant as with the 2003 fires and subsequent urban development, those opportunities are rapidly disappearing. Stromlo Forest Park, on the slopes of Mt Stromlo, is being developed to provide recreation opportunities similar to those that existed in Stromlo Forest. Expectations are also high about the reserve continuing to provide the same recreation opportunities as in the last 40 years.

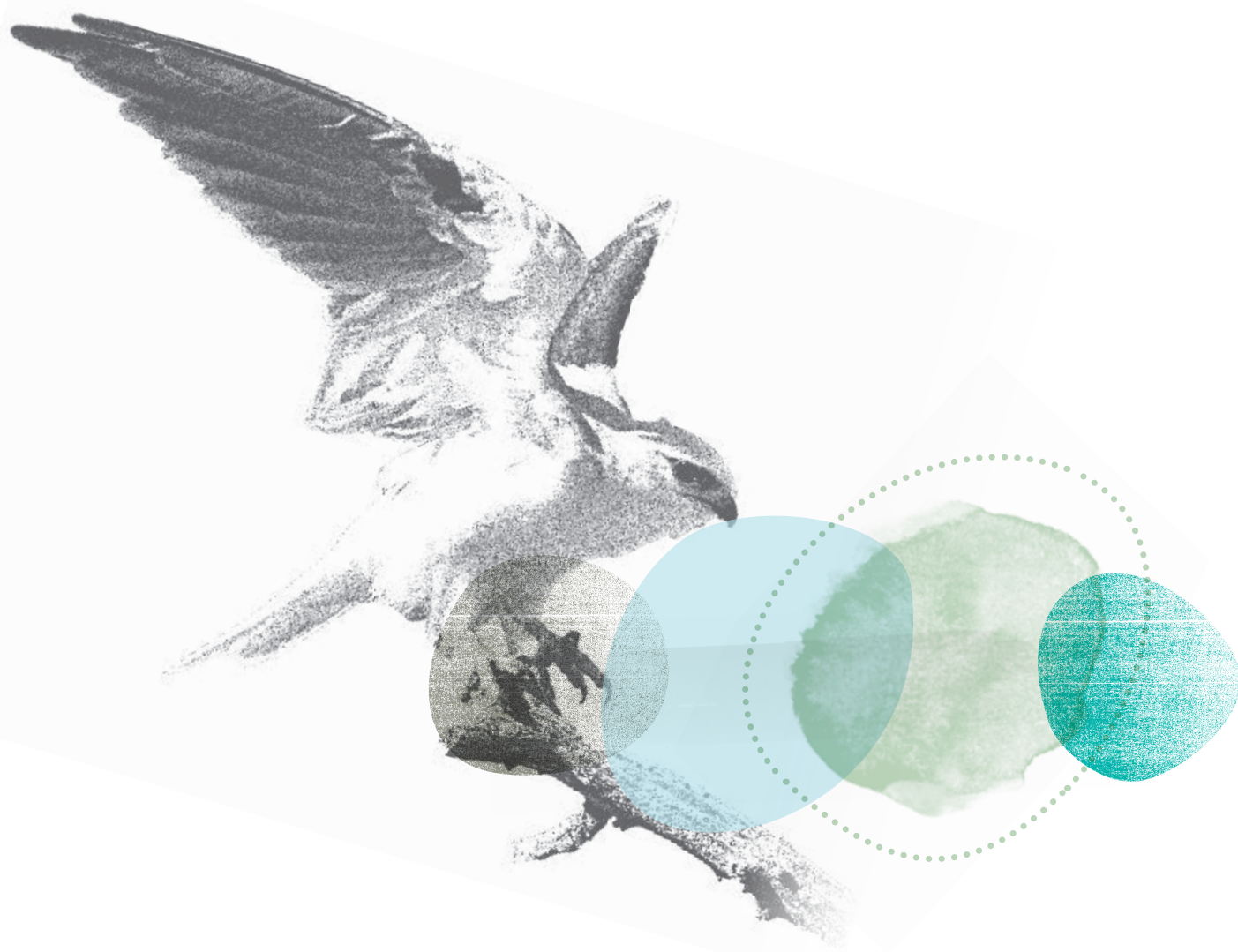
For a white settlement record of less than two hundred years, the reserve has a rich history of dramatic changes in land and water use which have each added different impacts to land and water. From grazing to forestry to massive fires and urbanization and from damming the river to toxic mine spills, the stories of successes, failures and lessons learned add interest and value to the reserve. They also help set the scene and explain to people the need for the rehabilitation efforts that will take time to implement and even longer to have their full effect.

The holotype specimen (the individual on which the species description was based) for the Pink-tailed Worm-lizard was collected in the Coppins Crossing area by R. Barwick and others on 20 December 1971. There is an apparent error in the geolocation data so the precise site cannot be determined. The preserved specimen is kept in the Western Australian Museum. This is a small but significant piece of scientific cultural heritage worth recording due to the importance of this reserve as a key national (and global) conservation site for the species.

## 7.6 Management considerations

The main management issues are ensuring protection of European cultural heritage, both in its physical and in its social forms. With 55,000 new residents in the area, cultural heritage sites will be highly visited and subject to associated impacts. Like the Aboriginal heritage places and objects in the urban section of the reserve, considerable work has already been done on identifying and assessing European heritage places and objects and developing conservation management plans for their protection. Due to the irreplaceability of these places and objects, rapid responses will be required if the protective measures adopted are insufficient protection.

Descendants of the early settlers known to have resided within the reserve area live in Canberra and the region and have family legacies that are now approaching two hundred years in length. Some of them feel a strong sense of attachment to their family heritage and the places where they lived. And the many people with fond memories of recreation time spent around the river have already been mentioned. There is social value in keeping the memories of these places alive, even though they may not be formally recognised as having cultural heritage significance and may not be on heritage registers. Stories about the history of the reserve also enrich it as a place to people who are new to it, as will be most of the residents in the neighbouring suburbs.





## 7.7 Policies and actions

Cultural heritage	
<b>Objective 10: Cultural heritage within the Molonglo River Reserve is identified and conserved to retain its significance.</b>	
Policies	Actions
10.1 Aboriginal heritage places and objects will be protected.	10.1.1 Aboriginal cultural heritage will be managed in accordance with statutory requirements, National Heritage principles, and guidelines for Aboriginal cultural heritage places. 10.1.2 Develop and implement Conservation Management Plans for the following sites and areas: MRC14, MRC15, MRC17, PAD1, PAD5 and the Special Cultural place. 10.1.3 Monitor the effectiveness of the conservation actions and adapt the management plans if required. 10.1.4 Return agreed salvaged artefacts to Country in accordance with Return to Country Protocols developed in consultation with Representative Aboriginal Organisations (RAOs) and the ACT Heritage Council. 10.1.5 Develop and apply a protocol for action in the event of new sites being found in accordance with the provisions of the <i>Heritage Act 2004</i> . 10.1.6 Review and if required, resurvey the rural section of the reserve for Aboriginal sites and apply the same mechanisms to their protection as in the urban section.
10.2 The major European heritage sites will be protected.	10.2.1 Conforming to statutory requirements and best practice principles, implement the Conservation Management Plan for Riverview. 10.2.2 Prepare and implement a conservation management plan for the limestone quarry that aligns with measures developed to conserve the heritage listed geological site (Objective 4). 10.2.3 Monitor the effectiveness of the conservation actions and adapt the management plans if required.
<b>Objective 11: Cultural heritage is to be interpreted and (where appropriate) promoted to foster community appreciation of past and continuing connections.</b>	
Policies	Actions
11.1 Aboriginal connection with Country, past and present, will be visibly promoted.	11.1.1 With Aboriginal involvement, seek government approval to name the reserve with an Aboriginal name. 11.1.2 Include Aboriginal perspectives in all major promotion and interpretation material.
11.2 Aboriginal people will be involved in the management and interpretation of the reserve.	11.2.1 The right of the Ngunnawal community and RAOs to be consulted and involved in issues that affect their interests will be respected and protocol for how consultation should occur will be developed. 11.2.1 Establish a site that interprets how Ngunnawal people used the river, its food and its plants. 11.2.3 Identify and document traditional Aboriginal cultural knowledge and, where appropriate, use it in reserve management through partnerships with Aboriginal people.
11.3 The history of past land uses and occupation will be reflected in named places and interpretive material.	11.3.1 Synthesise and make publically available an occupation and land use history of the Lower Molonglo Valley 1820-2014, including specific reference to historical sites within the reserve boundaries. 11.3.2 Promote and reflect the history in the naming of local places and in interpretation material.
11.4 Descendants of families with a strong historical association with the places in the reserve, and local historians will be respected and involved.	11.4.1 Involve descendants, former users of the area and local historians in the planning, maintenance and interpretation of European cultural heritage in the reserve.





## 8. RECREATION



Holdens Creek  
Hill Lookout



## 8.1 Objectives

- Objective 12:** Provide a range of recreation opportunities that are valued by users and that can co-exist with other values and objectives for the reserve.
- Objective 13:** Residents in Molonglo Valley view, treat and protect the reserve as their ‘treasured front yard’ and set a new high standard in the ACT for their behaviour in a nature reserve.
- Objective 14:** The reserve adds value to the ACT as a distinct recreation destination, a long-distance recreation link, and an attractive contribution to the Canberra Open Space System.
- Objective 15:** Visitor safety is addressed in the design of information, facilities and operations.

## 8.2 Recreation demand

Providing for recreation in the reserve is an objective of its use as public land. It forms a complementary recreation opportunity to those offered within the suburbs and an opportunity to educate and build support for the reserve. With many local recreational users initially being new to the area, there will be a window of opportunity for influencing their expectations about recreational and associated behaviours in the reserve before they become entrenched with usage.

### 8.2.1 Outdoor recreation in the ACT

The ACT has the highest (and increasing) participation in outdoor recreation in Australia, and the highest participation in walking and cycling of any state or territory, according to a survey by the Australian Sports Commission (2010). Participation rates of adults in the ACT in unorganised activities of the type that could occur in the reserve were 48% for walking (8% specified bushwalking), 18% for cycling and 12% for running. Other reported uses were bird watching, horse riding and orienteering. Besides providing personal satisfaction, the individual and social benefits of exercise for health are well recognised.

### 8.2.2 Recent recreational history in the area

In the rural section, recreation opportunities in the recent past have been managed through the 2001 Lower Molonglo River Corridor Management Plan. Recreation

was deliberately kept low key in order to provide a contrast to parks in suburban Canberra. Access was only available on foot or bike and horse riding allowed only on the sewer management road on the north side. Apart from the management tracks there was little additional track building and very little interpretation provided. Walking access from Kama to the management track was added recently. Swimming in the river was not permitted, however fishing (within legal limits) and non-powered boating were permitted.

In the urban section, recreation access in the past was provided largely through forest management policies which, since 1967, had permitted use of forest management tracks for recreation. The pine plantations on both sides of the river and across to Mt Stromlo were widely used and enjoyed by walkers, runners, cyclists and horse riders who came from suburbs across Canberra for the extended recreation opportunities (see Chapter 9). Stromlo Forest Park has been designed to partly substitute for these recreation opportunities that were lost, first in the fires, and then in the urban development of the valley. The Molonglo River corridor was part of the area formerly used for recreation and this has shaped the expectations of those users about its recreation use in the future.

### 8.2.3 Recreation planning in the Molonglo Valley

When development is completed there will be up to 55,000 residents in the valley, many of whom are likely



to want to use the reserve, based on the cited ACT participation rates in recreation. Residents from elsewhere in Canberra, and especially Weston will be additional but less frequent users. To help satisfy urban sustainability objectives for Canberra, the housing density in the valley will be higher than in other districts, delivered through a mix which includes multi-unit dwellings, medium density and standard residential housing. Situated in a valley between two ridges that form part of Canberra's Open Space System, planning has taken into account that there are other recreation opportunities nearby at Stromlo Forest Park, the Arboretum, Lake Burley Griffin as well as at planned facilities in the suburbs and in the Molonglo commercial centre. Planning has also included the concept of a continuous sealed shared cycle and walking path (trunk path) around the urban edge and largely following the reserve boundary.

The *Molonglo River Park Concept Plan* has already scoped the options and provided recommendations for recreational development in the urban section of the reserve. More detailed planning is complete for the reserve area adjacent to Coombs.

#### 8.2.4 Recreation activities

A range of recreation activities for a range of users will be allowed within the reserve. These include but are not limited to:

- **Walking** opportunities suited to a range of ages and physical abilities will be provided for in the reserve. Dog walking is a popular recreational activity in Canberra and this activity will be permitted in the reserve except for in Kama.
- **Picnic** facilities for visitors to the reserve will generally be located in the special purposes reserves however other locations outside these areas may be considered where it can be demonstrated that there will be no detrimental impacts on the conservation values of the reserve.
- **Cycling** opportunities from casual bike rides to long, challenging rides will be provided for on the existing management tracks. Commuter cyclists, who like fast paved surfaces and moderate grades will be provided for by trunk paths outside reserve boundaries.
- **Horse riding** has a long history in the area. Horses will be permitted on certain tracks including the connections to the Arboretum, Stromlo Forest Park, the Yarralumla Equestrian Centre and the Bicentennial National Trail. There are several agistment centres and riding schools located in the region.
- **Linkages to longer trails** for walking, cycling and horse riding are provided for within the reserve. The Centenary Trail, a 145 kilometre self-guided trail for

walkers and cyclists that loops around Canberra passes through the reserve area. The Bicentennial National Trail, a 5,330 kilometre route from Cooktown in far north Queensland to Healesville in Victoria also passes through the reserve and caters for equestrians, walkers and cyclists.

The ACT Conservator of Flora and Fauna identifies restrictions and prohibitions on activities in the reserve through Activities Declarations.

### 8.3 Prohibited recreational activities

Clarity around which recreational activities are allowed and which are not allowed in the reserve is the first step in good recreation management in parks. Based on the legislation that applies to this reserve, experience in managing recreation in Canberra Nature Park, and on the physical and ecological nature of this reserve, recreation activities that **will not be permitted** are those listed in Table 9.1. Two of these require supporting comment:

- **Car rallies** are permitted in the current Lower Molonglo Management Plan, but only on the management track on the north side of the river, with permission and conditions attached. The disturbance (ground surface, wildlife and other users) attached to such events is now considered not compatible with the values and proposed outcomes for the reserve.
- **Swimming** is not permitted in the Lower Molonglo River under the Territory Plan. However, given the river's proximity to new homes, there is a risk that children and adults will swim in the river regardless of prohibitions. Appropriate signage and education campaigns outlining the risks of swimming in the river will be implemented and new residents will be encouraged to use nearby alternative swimming spots located on the Murrumbidgee River, such as the Cotter Reserve and Kambah Pools.

Blue-green algae blooms due to low flows, poor water quality and contamination from Lake Burley Griffin create potential health risks to people. There are also safety risks due to sudden water releases from the lake. Sudden water increases can also occur due to the lack of flood detention in Yarralumla and Weston Creeks.

**Table 8.1:** Prohibited recreational activities

Recreational activity	Permission status
<b>Camping</b>	Not permitted. Fire risk, lack of suitable camping areas and general lack of potable water make camping inappropriate.
<b>Car rallies</b>	Not permitted.
<b>Dog walking</b>	Not permitted in Kama and on selected tracks that pass through sensitive ecological areas. Can be conditionally permitted elsewhere in the Reserve through the Activities Declaration.
<b>Fires</b> Lighting of fires, apart from those lit for fire management purposes by authorised people	Not permitted.
<b>Hot air balloons</b>	Not permitted, except in an emergency or for special events with management permission. Civil Aviation Safety Authority regulations apply (CAAP 157-1(o) Balloon Flight over Populous Areas).
<b>Hunting</b>	Not permitted under provisions of the <i>Nature Conservation Act 2014</i> , the <i>Animal Welfare Act 1992</i> and the <i>Firearms Act 1996</i> .
<b>Off-road vehicle use</b> (trail bikes, 4WD vehicles, other powered vehicles).	Not permitted. The geology of the reserve is not suitable for recreational off-road vehicle use. Potential damage to land surface, sensitive ecological communities and threatened species.
<b>Orienteering and Rogaining</b>	Not permitted.
<b>Swimming</b>	Not permitted under the <i>Territory Plan 2008</i> (Water Use and Catchment General Code).

## 8.4 Permitted recreational activities and their management

A range of other recreational activities are broadly compatible with the objectives of the reserve, subject to them being designed and managed appropriately. A summary of these is listed in Table 8.2 and further rationale for some of the activities follows subsequently.



Holdens Creek Hill Lookout



**Table 8.2:** Permitted recreation activities and their conditions.

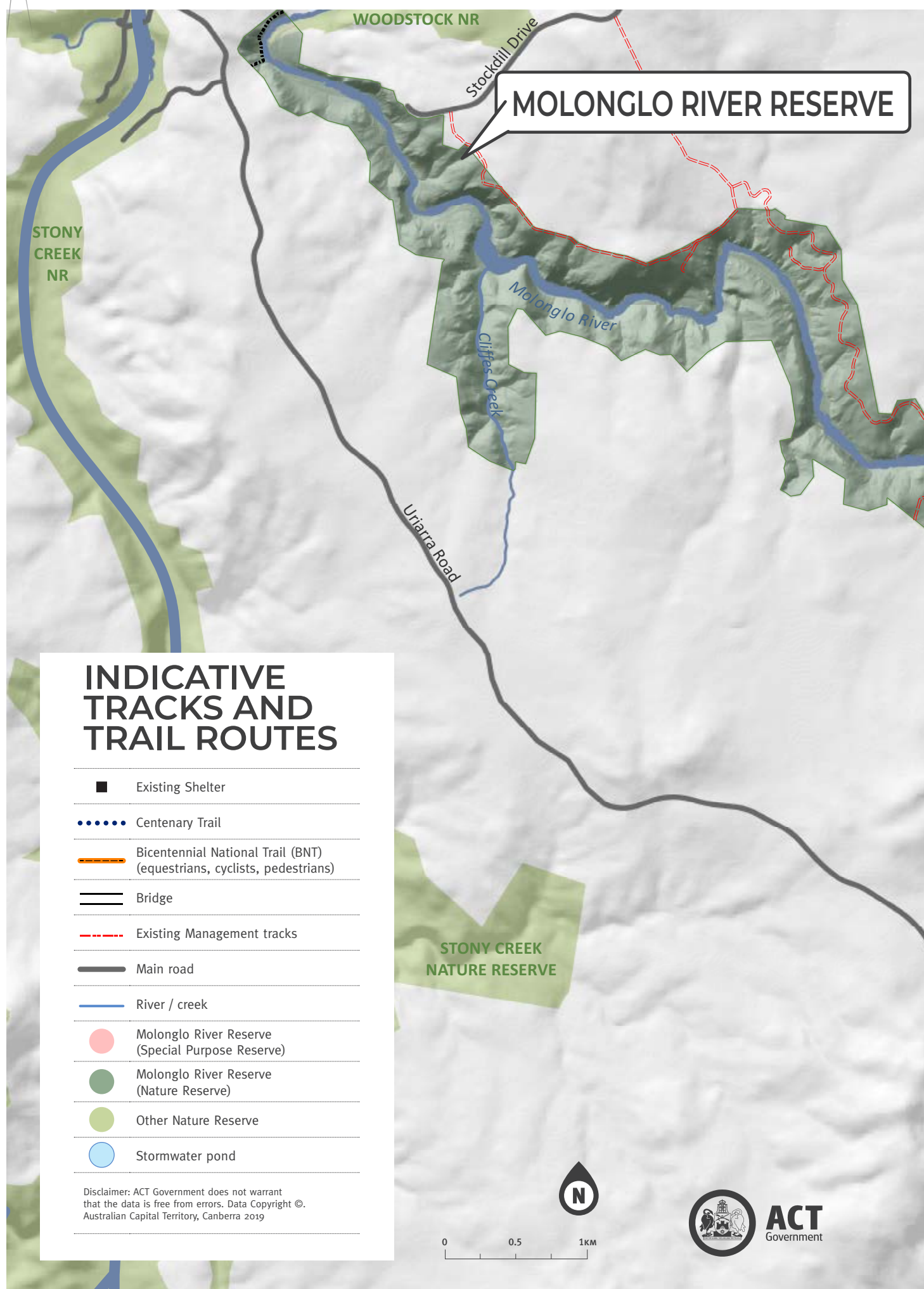
Recreational activity	Permission status and conditions
<b>Bird watching</b> , wildlife and wildflower viewing, nature photography and visiting natural and cultural heritage sites.	Permitted and encouraged. The location of some Aboriginal sites will not be publicised.
<b>Boating</b> – non-powered (e.g. rafting, canoeing). Rafting and canoeing are possible but better access and conditions exist on the Murrumbidgee River.	Permitted.
<b>Cycling</b> (including mountain bike riding)	Permitted on cycling, multi-use paths and management tracks only.
<b>Dogs</b> Under the <i>Nature Conservation Act 2014</i> , dogs are not allowed in nature reserves unless an Activities Declaration applying to the reserve allows for dog walking as is the case in some Canberra Nature Park reserves. Dog walking is currently not permitted in Kama.  On-the-spot fines apply for taking dogs into prohibited areas or not having the necessary equipment to remove droppings or not removing droppings.	Not permitted in Kama and on selected tracks that pass through sensitive ecological areas. These are to be clearly signposted.  Where the Activities Declaration permits dog walking it is conditional on the following: <ul style="list-style-type: none"> <li>• On leash AND on designated walking paths or other hard surfaced areas only.</li> <li>• Dogs must not harass wildlife and must be under the full control of their handler.</li> <li>• Equipment to remove dog droppings must be carried and dog droppings removed from the reserve.</li> <li>• Dogs must not be led by cyclists or horse riders.</li> <li>• Dogs must swim only in designated areas.</li> <li>• Dogs are not allowed within 10 metres of a designated play space (if children are playing on it) or a fireplace designated for cooking.</li> </ul>
<b>Dog sledding</b>	Permitted only in the Special Purpose Reserve - South.
<b>Flying</b> (powered, low altitude machines e.g. ultralights and drones)	Permitted with a permit or where authorised for reserve management or firefighting purposes.
<b>Fishing</b> Under the <i>Fisheries Act 2000</i> , the Lower Molonglo River is classified as 'Open Water' where fishing is allowed with bag, gear, size and seasonal limitations.	Currently permitted but will be reviewed in the light of intensity of activity, aquatic rehabilitation goals for the reserve and disregard of regulations.
<b>Geocaching events</b>	Permitted, conditional on not involving digging holes and burying objects, depositing objects in rock shelters or other cultural heritage sites, or littering. Requires application for permission.
<b>Horse riding</b>	Permitted on management tracks as indicated in Figure 8.1 except for in Kama, on Misery Hill and Barrer Hill subject to an Activities Declaration under the <i>Nature Conservation Act 2014</i> .
<b>Non-commercial group activities</b> (e.g. bush walking clubs, social clubs, tour groups)	Permitted.
<b>Picnicking</b> Picnicking involving car parking, barbecues, large groups etc. will be available in the two special purpose reserves.	Permitted. Limited infrastructure e.g. seats, tables, shelters, paths will be provided for picnicking in the nature reserve.
<b>Rock climbing and abseiling</b>	Permitted only outside the period 01 June to 31 December when raptors are breeding.
<b>Special events</b> Special events are large public gatherings like weddings, ceremonies, concerts or sporting events.	Permitted in Special Purpose Reserves only due to noise and physical disturbance associated with such events which disturbs wildlife, damages soil and vegetation, requires litter management and detracts from amenity for other Reserve users. Requires standard application for permission and conditions.
<b>Walking</b>	Permitted. Walkers will be encouraged to stay on designated walking tracks and management trails. Walking in PTWL habitat is not permitted.

The location, design and management of recreation needs to consider what will be satisfying to a range of users but will not jeopardise conservation objectives. Nearly 40% of the area of the reserve contains threatened habitat (Section 6.3) scattered in patches across the reserve. Particular care is to be taken to ensure that recreation does not diminish their condition or extent.

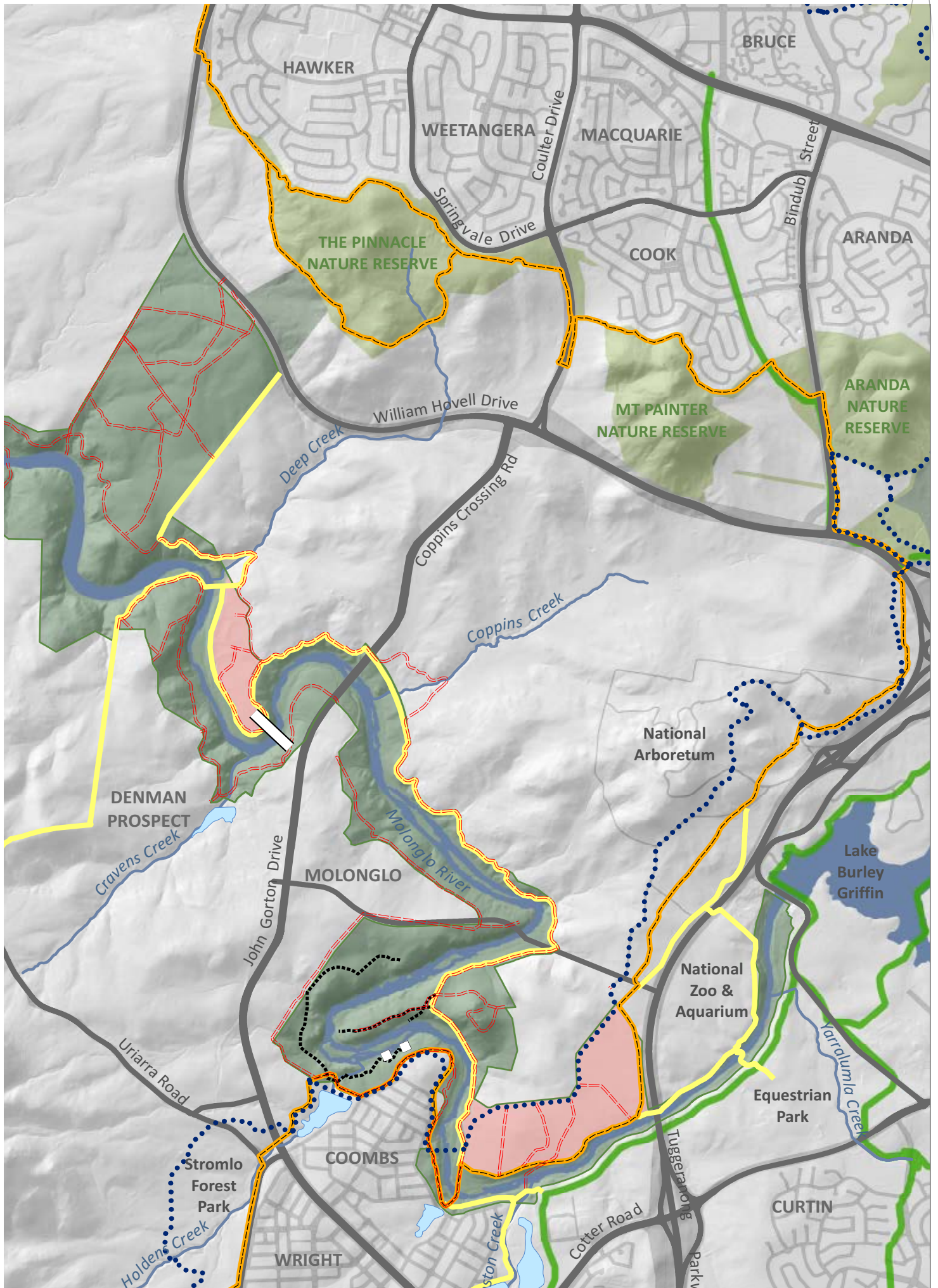
Sections 8.4.1 to 8.4.11 outline the guidelines that will apply to designing and managing permitted recreation activities in the reserve.

An indicative map of tracks and trails in the reserve is at Figure 8.1.

**Figure 8.1** Indicative tracks and trails for different recreation users in the reserve







#### 8.4.1 Protection of Pink-tailed Worm-lizard habitat

Removal or turning over of rocks, and trampling of vegetation are major threats in PTWL habitat. Where these occur in areas of highest intensity use, for example, facing the commercial centre, the areas will be lightly fenced to indicate their presence and interpretation provided. Pedestrian trails in the vicinity of medium and high quality PTWL habitat will be located in the 20 metre buffer zones around the habitat, subject to consideration by a qualified ecologist. If there are no other alternatives for routes, raised walkways that minimise impact on habitat will be used. Trails through BGW and NTG, which are on relatively flat land, have less impact and are generally acceptable, subject to appropriate design considerations and agreement by a qualified ecologist.

#### 8.4.2 Trail density, route design and recreation infrastructure

The long, narrow, sloping nature of the reserve means that there are few bridges over the river, so each side of the river corridor functions independently for local scale recreation. Longer routes that can loop the river will be created over time as new river crossings are added but there may be a demand for shorter looped walks within each side of the river corridor. In the urban section, the corridor on each side of the river is usually only between 200 and 400 metres wide, sloping, and with limited opportunities for finding good routes. In addition, trail building along slopes requires considerable cut and fill. A flat trail one metre wide running along a steeper slope in the reserve would require disturbing the land for a width of up to five metres. Impacts of cutting and filling include degrading the soil surface condition, encouraging weeds, and ecological fragmentation. Continuous braided trails that separate different users are generally not feasible in these circumstances, nor desirable when close to each other for their impact on fragmenting both ecological processes and the naturalistic setting. Therefore route design is to take into account slope and the impact of ground disturbance, and, for similar reasons, recreation infrastructure beyond trail building in the nature reserve will be minimal.

The development of unauthorised tracks by users, either as desire lines or created deliberately, will be managed through signage that indicates users should remain on tracks and by early management intervention in disguising or providing barriers on the tracks.

#### 8.4.3 Separation of activities between nature reserve and special purpose reserve areas

Recreation in the nature reserve areas will be guided to low intensity uses and higher intensity uses provided for in the special purpose reserves. Higher intensity walkers, runners and bike riders will be guided to the special purpose

reserves and other locations nearby, like Stromlo Forest Park and the Arboretum.

#### 8.4.4 Separation of user groups and mix of trail types

Separation of users, or giving them track options, will be possible in some areas of the reserve through a combination of utilising the existing management tracks, the trunk path running along the urban edge and new purpose designed trails. The general principle in both the rural and urban sections will be to use these options to eventually provide a backbone trail on each side of the river with spurs, which may be in the form of small loops, to interesting views from some selected high vantage points and down to the river where access is feasible. Several new river crossings will be provided between the two backbone trails to create opportunities for longer looped walking. Walkers will be able to use all trails and crossings, and other users will be channelled to trails and river crossings most appropriate for their use.

The characteristics of each type of route that will differentiate in part between users are:

- The trunk path will be located outside the reserve boundary and designed as a **shared path**. The path is sufficiently wide to accommodate **cyclists** and **walkers**, including those with limited mobility and slower cyclists. It links with the commuter bike path that connects Weston to Central Canberra and will have river crossings at Butters Bridge and at Coppins Crossing.
- The existing management tracks, which are unsealed roads, can generally be used by walkers and equestrians. An activities declaration will detail which tracks equestrians are permitted to use. Existing arrangements for them to use the management tracks in the rural section of the reserve will remain. Equestrians will be able to cross the river at the existing crossing just below Scrivener Dam, Southwells Crossing and a crossing near where Deep Creek enters the river. A management track will be provided in the Kama buffer which will be able to be used by equestrians.
- Where the land form is suitable, new trails will be developed within the reserve that are designed for walkers to access viewing points and the river. These will be designed in detail in step with the location and timing of residential development and are not shown in Figure 8.1.

#### 8.4.5 Conflict between different user groups

As the intensity of recreation use in the urban section of the reserve increases, the potential for conflict between users will grow, and their satisfaction with the amenity decline. The major cause of conflict is different speeds of travel (fast cyclists, slow cyclists, runners and walkers)



and lack of a clear protocol for overtaking. Other issues include horses taking fright at cyclists, dogs taking fright at horses and vice versa, and walkers having to avoid horse and dog droppings. This conflict is more likely to be an issue in the urban section where the intensity of use will be higher. Stromlo Forest Park provides a recent example of how maps and explicit guidelines can make sharing protocols clearer. Like off-leash dog walking, using social networks to help set and monitor standards is helpful. Not all recreation users belong to groups, but where they do e.g. Pedal Power, ACT Equestrian Association, the groups actively encourage responsible behaviour by their members. The potential for conflict will be reduced by clear trail descriptions and give way signage.

#### 8.4.6 Access for recreation

The very long frontage of the urban boundary with the reserve and the close conjunction with residences means that people are likely to want to access the reserve almost everywhere along this length. The impact of this on threatened habitat and ecological condition, as well as the diminished aesthetics of multiple desire trails forming makes unlimited access unacceptable. Access will be managed by fencing the reserve boundary in the urban section and channelling access to designated points that connect to formed trails. Many of these access points will be in small urban parks near the reserve, including those around the stormwater ponds.

In the rural section, access is available via the management tracks on either side from the Coppins Crossing area and via walking tracks through Kama and from the northern end near the LMWQCC. The need for any further access will be reviewed as usage increases.

#### 8.4.7 Public road entry and car parks

Due to the narrow sloping nature of the reserve, its conservation assets and the ample parking and access points available in the urban area, public roads, car parks and visitor facilities will be provided only in the special purpose reserves.

#### 8.4.8 Rubbish bins

It is increasingly common across Australia for there to be no rubbish bins provided in parks and reserves due to the problems they cause when they overflow, including attracting wildlife. Remnants of what people bring into the reserve can be just as easily taken out with them and no bins will be provided.

#### 8.4.9 Toilets

The preferred location for toilets is within the special purpose reserves. The need and location of such facilities

will be assessed as development occurs in these reserve areas. The provision and maintenance of toilets within the reserve is the responsibility of the land manager unless otherwise agreed.

#### 8.4.10 Fishing

Fishing will continue to be permitted, as it is currently under ACT legislation, unless its impact becomes unmanageable. Issues in continuing to permit fishing include trampling of vegetation in the riparian zone and the risk of fishing regulations (species and numbers of fish caught) being broken in a place where an objective for the river is to improve its ecological condition and achieve the return of native fish that once lived there. The activities and impacts of people fishing will be monitored and if necessary, prohibition of fishing in this part of the river will be sought under the *Fisheries Act 2000*.

#### 8.4.11 Dogs

**Walking dogs** on leash is permitted within the reserve but not within Kama due to its conservation value and size. Compliance with on-leash requirements is an issue. An off-leash area is planned to be provided outside the reserve but dog-owners will remain attracted to walking in or near the reserve, especially if it is closer to their homes than the dog park. The trunk path running along the urban edge and bordering the reserve will cater for some of this demand but not for those who prefer to be inside the reserve.

Provisions in the *Domestic Animal Act 2000* allow for dog owners to be fined for not keeping their dogs on leash in any public area (unless designated as off leash), or not carrying or using equipment to pick up their dog's droppings. A persistent disregard of dog control regulations is a growing issue for park management in the ACT. The level of compliance will be monitored and permission for dog walking in the reserve will be reviewed at the mid-point and at the end of the life of the plan.

**Dog swimming** is generally allowed in Canberra's lakes away from sites where people swim and is currently permitted at three locations on the Murrumbidgee River, including Uriarra Crossing and Uriarra East. There may be an expectation that dog swimming in the Lower Molonglo River will be permitted. If it is determined that there are suitable locations for this activity the locations will be specified in the Activities Declaration to minimise ecological disturbance.

#### 8.4.12 New recreation proposals

New or unanticipated recreational proposals will be evaluated against the same criteria that have guided the separation of focus between low intensity recreation in the nature reserve and high intensity recreation in the special purpose reserves. These criteria will include:

- degree of fit with the vision for the reserve
- impact on conservation values, both of threatened habitat and of ecological function, soil disturbance, fragmentation, and impact on cultural heritage
- loss of amenity to other recreation users in the reserve
- relative benefit to the local community and e) options for doing the same activity elsewhere.

#### 8.4.13 Commercial activities

There are no commercial activities currently operating in the reserve however they are allowed for in legislation and can be useful in augmenting the visitor experience. Commercial activities may involve purpose built infrastructure (e.g. cafes, restaurants, shops) or may be based on activities (e.g. tourism groups, guided walks) that largely depend on the infrastructure already present for regular visitor purposes. The benefits of commercial activity in conservation parks hinge around enhancing the visitor experience (e.g. enjoying a purchased coffee or meal in a natural setting, or a tour with a paid guide), bringing people into the reserve who might not otherwise visit; and deriving an income from the fees that can be used to enhance other values of the reserve. Drawbacks include the intrusion of infrastructure and its environmental impacts, and collateral management and maintenance costs (e.g. roads, parking, and rubbish) that cumulatively add up to more than the income received.

No commercial infrastructure development will be permitted in the nature reserve portion of the reserve. Commercial infrastructure development in the special purpose reserves will be permitted subject to general ACT Government policies that apply to commercial operators in public places and demonstration of negligible impact on the reserve as a whole.

Commercial activities like paid guided tours or pop-up food and coffee vans that use existing facilities and conform with the activities listed in Table 8.2 will be permitted subject to the same general ACT policies and where negligible impact on the reserve and other users can be demonstrated.

#### 8.4.14 Anti-social behaviour

Anti-social behaviour such as vandalism along urban/nature interfaces, dumping rubbish and a persistent disregard of dog control and cat containment regulations is a growing issue for park management in the ACT. Important questions for management are how such potential impacts can be avoided or minimised and what level of impact is acceptable to managers, visitors and the wider community. Local community social sanctions and the close proximity of residents in housing that overlooks the reserve are resources to be drawn upon to address this sort of behaviour.

## 8.5 Safety

Visitor safety is an important feature of reserve management. Although there are a range of potential hazards within the reserve, the risk of serious harm can be avoided if visitors take reasonable care and reserve management has adequately evaluated and mitigated serious hazards. Part of the attraction of outdoor activities is self-reliance and the notion of escaping the everyday constraints of the urban setting. Additionally, risks are often mitigated by the skills, knowledge and experience of the visitor.

Reserve management has a particular responsibility to educate and warn people who may not have the skills, knowledge or experience to recognise the risks in this reserve. Coupled with the likelihood of increased tourist numbers in the reserve, particular considerations should be made for people with limited experience of the Australian bush. Safety provisions must also be made for family groups and school children.

Safety issues in the reserve include the following:

- The risk to people of being caught in a bushfire or a controlled burn.
- Sudden water releases from Scrivener Dam may prevent recreation users who have crossed the river at low level crossings from returning. Sirens at Scrivener Dam and Coppins Crossing are used to sound in advance of these releases from the flood gates. Sudden water increases can also occur due to the lack of flood detention in Yarralumla and Weston Creeks. This risk will increase in importance in the upper few kilometres of the river when there are more children living nearby this section of the reserve. The risks associated with the river in flood are similar to those in urban Canberra in stormwater ponds and drains, where people have drowned in the past. The outlets from the stormwater ponds are close to habitation and will also deliver significant flows after heavy or sustained rainfall.
- River hazards such as rapids, deep pools and sharp, protruding rocks and branches are of concern to children paddling in the river, people trying to cross to the other side or people ignoring the prohibition of swimming.
- Minor falls due to steep or uneven ground in some parts of the reserve and more significant falls from playing or climbing on the many steep rock faces.
- Collisions between different recreational users of the reserve.
- Snake bite. Venomous snakes are found in the reserve, and some may enter properties along the urban edge. Although snakes won't go out of their way to attack people they may bite if surprised or provoked.



- Poisonous substances used by management for pest or weed control (see Chapter 10).
- Policies and actions will be implemented to mitigate the risk of harm including appropriate design of facilities,

clear and adequate signage, publicised temporary warnings, public education and planned response strategies in the event of accidents and emergencies.

## 8.6 Policies and actions

### RECREATION

**Objective 12: Provide a range of recreation opportunities that are valued by users and that can co-exist with other values and objectives for the reserve.**

Policies	Actions
12.1 Provide a range of recreation opportunities differentiated by their level of intensity, allowing low intensity activities in the nature reserve and providing for higher intensity activities into the special purpose reserves.	12.1.1 Reflect the distinction between low and high intensity activities in the choice and design of recreation facilities. 12.1.2 Incorporate the distinction between low and high intensity activities into promotion about the reserve. 12.1.3 Make permitted and non-permitted recreation activities (Tables 8.1 and 8.2) clear on signage and in promotional material. 12.1.4 Evaluate new recreation proposals according to the criteria in Section 8.4.12. 12.1.5 Evaluate commercial proposals according to the criteria in Section 8.4.13. 12.1.6 Prepare landscape plans for the special purpose reserves. 12.1.7 Regularly seek feedback from users and use it to guide management.

**Objective 13: Residents in Molonglo Valley view, treat and protect the reserve as their 'treasured front yard' and set a new high standard in the ACT for their behaviour in a reserve.**

Policies	Actions
13.1 Manage impact through appropriate detailed design of recreation facilities and by addressing the behaviour of users from early on in reserve establishment.	13.1.1 Develop detailed plans for trails and facilities in successive portions of the reserve as development proceeds. 13.1.2 Develop and implement a program that includes working with user and community groups to codify, encourage and monitor people's behaviour in the reserve and applying sanctions where appropriate.

**Objective 14: The reserve adds value to the ACT as a distinct recreation destination, a long-distance recreation link, and an attractive contribution to the Canberra Open Space System.**

Policies	Actions
14.1 Maintain and enhance trail linkages to destinations beyond the reserve, working with adjoining land managers to maintain or improve connectivity.	14.1.1 Maintain existing trail linkages and improve linkages in the rural section of the reserve.

**Objective 15: Visitor safety is addressed in the design of information, facilities and operations.**

Policies	Actions
15.1 Minimise the risk of harm to people by designing and managing facilities to suitable safety standards and by providing community education and on-site warnings.	15.1.1 Design, build and maintain all facilities, including trails to standards that minimise risks to visitors and natural assets. 15.1.2 Provide clear descriptions and safety information to visitors at reserve entrances, in published guides about the reserve and at specific locations where danger is high. 15.1.3 Work with schools, local community networks and recreation groups to educate users about dangers in the reserve. 15.1.4 Develop and maintain an Emergency Response Plan for Molonglo River Reserve, in conjunction with the Australian Federal Police, the Emergency Services Agency, National Capital Authority and other organisations. The plan may include protocols for closing the reserve or parts of it on days of high fire danger or flooding. 15.1.5 Warn visitors about temporary hazards (e.g. herbicide spraying, bait laying, controlled burns).





## 9. INFRASTRUCTURE, FIRE PROTECTION AND OPERATIONS



Picnic shelter at Coombs Riverside

## 9.1 Objectives

**Objective 16:** Avoid or minimise the impact on reserve values of building and maintaining infrastructure and facilities in or nearby the reserve.

**Objective 17:** Achieve fire protection for people and property in ways that also effectively protect threatened habitat and other ecological conservation values.

**Objective 18:** Suitable access and associated infrastructure is available for fire management.

**Objective 19:** Minimise harm to people and the environment from reserve operations.

## 9.2 Infrastructure

Infrastructure in or adjacent to the reserve consists largely of urban services in place before the Molonglo development began, services recently completed or that have approval to proceed and those that are likely to be required to facilitate the Molonglo development. (Table 9.1). The construction, maintenance and access requirements that could impact on the ecological values of the reserve are also outlined in Table 9.1. Where these developments are not already addressed by the NES Plan or a decision made under the *Planning and Development Act 2007*, further approvals will be required that include the need for them to be considered against the requirements of the plan.

The importance of location and design of infrastructure proposals to the scenic values of the reserve and guidance for design that enhances and protects natural scenery is detailed in Chapter 5. Approval to construct such infrastructure is governed by ACT legislation, including the requirement for assessment and mitigation of environmental impact. As far as possible, structures are better located outside the reserve except where it can be clearly demonstrated that no feasible alternatives are available.

**Table 9.1** Infrastructure in the reserve – present and anticipated.

This table lists existing and anticipated infrastructure. Other infrastructure items may be required in the future to accommodate development of Molonglo. All infrastructure will be subject to statutory approvals, as required.

Infrastructure	Location, construction, access and maintenance requirements within the reserve
<b>In place before 2018</b>	
Molonglo Valley Interceptor Sewer (MVIS)	<p>Located along the northern side of the river, mostly near or on the boundary, this 2.5 m diameter pipe is Canberra's main sewer line to the Lower Molonglo Water Quality Control Centre. It is buried for most of its length, except where it crosses five incised creek-lines. There are several vents (small towers) and structures for mechanical ventilation associated with it.</p> <p>Maintained by Icon Water. Road access is required. Sewer crosses the Molonglo River at Clos Crossing which is also maintained by Icon Water.</p>
Power lines	<p>Two transmission (132kV) power lines traverse the reserve and cross the river and a third runs largely outside and parallel to the reserve on its northern side, passing through the reserve in a few places. Some of these may be relocated as part of Molonglo Stage 3 development. An 11kV power line is also located in the northern end of the reserve.</p> <p>Maintained by ActewAGL. Road access is required for maintenance. Possible vegetation management in the corridor under the lines. The power lines require an access track for tower maintenance and vegetation control.</p>
A mains water pipeline	Crosses the reserve south of Coppins Crossing. The water main is buried, including under the river. Maintained by Icon Water. Access to inspection points required.
Low level river crossings (4)	<p>These consist of a public road bridge (Coppins Crossing), a service bridge (Southwells Crossing), the MVIS bridge (Clos Crossing), and a ford used by walkers and horse riders near Equestrian Park.</p> <p>Maintained by ACT Government and Icon Water (Clos Crossing). Road access is required for maintenance.</p>



Infrastructure	Location, construction, access and maintenance requirements within the reserve
Management tracks	<p>Management tracks serving the infrastructure, as noted above, as well as others that served the former pine plantations and other management requirements (e.g. fire protection).</p> <p>Maintained by ACT Government. Used by utility managers, reserve managers, fire operations and recreation users.</p>
A sewer line (Sewer 3 Central)	<p>Crosses the river at Butters Bridge and also passes in and out of the reserve along its boundary.</p> <p>Maintained by Icon Water. Vehicle access required for maintenance.</p>
A high level bridge (Butters Bridge)	<p>Downstream of Coppins Crossing. Carries the sewer line above to the MVIS and also designed to serve as a pedestrian and cyclist crossing.</p> <p>Bridge maintained by ACT Government and sewer maintained by Icon Water. Maintenance access required for the bridge (TCCS) and sewer (Icon Water).</p> <p>At bridge level, access will be along the pedestrian trail but occasional vehicle access will be required below for pier maintenance.</p>
Water quality control ponds (4)	<p>The outflows to the Molonglo River from the ponds pass down existing creek lines within the reserve. Areas surrounding the ponds within the urban boundary will be landscaped and recreation infrastructure will be provided as residential population grows.</p> <p>Constructed and maintained by the ACT Government. Pond construction involves ground disturbance within the reserve where the pond abuts the reserve boundary. Outlets use existing creek lines that flow through the reserve to the river. Erosion control works will be required if creek lines further erode. Adequate creek crossings shall be provided by the proponent of the pond works for tracks and trails downstream of the outflows to accommodate larger water volumes.</p>
<b>Infrastructure planned or likely to be required to complete the development of Molonglo</b>	
A bridge for John Gorton Drive.	<p>Location over the Molonglo River in the Coppins Crossing area. This will be a significant construction project with potential impact on the reserve in the Coppins Crossing area. There will be ground and river disturbance during construction. Multiple services are likely to be carried with the bridge. Access below the bridge will be required for maintenance.</p>
Further sewers to service Molonglo Stage 2 and 3.	<p>Locations to be determined. To be constructed and maintained by Icon Water. Ground disturbance will occur during construction. Vehicle access will be required for maintenance.</p>
New odour control systems and vents for the MVIS.	<p>Locations to be determined. To be constructed and maintained by Icon Water. Ground disturbance will occur during construction of plants and vent towers. Road access required for maintenance.</p>
An 11 kV underground power line plus possible additional overhead power lines.	<p>Location to be determined. Ground disturbance impact will occur during construction. To be constructed and maintained by ActewAGL.</p>
An East-West Arterial bridge.	<p>Location in the Bulga Crossing area. This will be a significant construction project with potential impact on the reserve. There will be ground and river disturbance during construction. Multiple services are likely to be carried with the bridge. Access below the bridge will be required for maintenance.</p>
Possible new water mains and gas lines	<p>Location with the new bridges. Ground disturbance impact at approaches and on-going vehicle access required.</p>
Possible relocation of existing 132 KV and 11 KV power lines	<p>Location on the northern side of the reserve. There will be ground disturbance during construction. To be constructed and maintained by ActewAGL.</p>

### 9.2.1 Management considerations

The main issue during construction is the disturbance of vegetation and soil, not only of the footprint of the structure itself but of usually a much larger area to accommodate the workings of machinery and other temporary support functions like parking, offices, materials and equipment storage and soil stockpiles. Waterways may also be disturbed e.g. in bridge building. Potential impacts of these disturbances include erosion, sediment and contaminant movement away from the site and potentially into waterways, loss of soil structure, the introduction of weeds and alterations to the local hydrology. Many of the soils of the reserve have a very dispersible A2 horizon (subsoil). As long as the surface A1 horizon (surface soil) remains intact, the A2 horizon is protected. Piercing or removing the A1 horizon on slopes allows surface flows to rapidly disperse the soil beneath leading to rapid channelling erosion which

is difficult to subsequently stabilise. Where the construction work involved removing the A1 or the A1 and some A2 layer, they must be removed separately and replaced in the original pattern.

Rehabilitation works after construction is completed are to maintain or improve on the vegetation and habitat that was there previously, in accordance with reserve objectives.

A major mitigating action is to avoid or minimise the amount of disturbance that needs to occur in the first place. The practice to date of using existing creek lines to discharge water from stormwater ponds is a good example, and should be continued. The construction of temporary stormwater ponds within the reserve while permanent ponds are constructed, and the construction of new channels to discharge outflows instead of using established drainage lines, will not be permitted in the reserve. Similarly the

reserve cannot be used for temporary storage of materials, site sheds or equipment or to facilitate earthworks and construction access for works within the urban area.

Disturbance to wildlife may be an issue in the reserve, especially where large construction works over long periods of time occur near or over the river. The riparian vegetation is an important corridor for birds and loss of cover over a distance may preclude smaller birds from using this route. This needs to be addressed in environmental approvals for the work.

Management tracks in the reserve need to be maintained at a good standard as they will become more heavily used with increasing management, recreational and infrastructure construction and maintenance demand. To minimise compaction and the risk of erosion, and for aesthetic reasons, management and contractor vehicles are to stay on tracks and minimise their footprint off-road. Off-road vehicles (e.g. for weed spraying) should be light and have appropriate tyres to minimise vegetation and soil surface damage. Access will be required for ongoing maintenance of infrastructure and must be on existing management tracks only.

Any development in the reserve that requires approval under the *Planning and Development Act 2007* would be assessed against the requirements of the Territory Plan and other relevant legislation, including the *Heritage Act 2004* and the *Environmental Protection Act 1997*. In addition, the NES Plan requires that a development within the urban section needs to have a Construction Environmental Management Plan (CEMP).

## 9.3 Fire protection and management

Bushfire is identified as an extreme risk in the ACT and the topography, aspect, position and shape of the reserve make it a potential avenue for fire to enter the urban area, threatening public safety and urban assets. Widespread high intensity fires are also a risk to values within the reserve from threatened habitat to soil and water quality, cultural heritage and recreation and urban service infrastructure.

Fire protection and management also interacts with a number of reserve management objectives and have been covered in other sections. In summary these are:

- The statutory requirements of the land manager of the reserve are in Section 4.4.2.
- Public safety in the event of a fire, and warnings about planned burns are in Section 8.5 and Objective 15.
- Cooperation with neighbours, both urban and rural over a range of issues, including fire, is in Section 10.2.

### 9.3.1 Fire protection requirements

The statutory requirement of land managers to reduce the risk or severity of bushfire entering the suburbs has been noted (Section 4.4.2) and the Strategic Bushfire Management Plan (SBMP) overrides public land management plans where they are inconsistent (Section 77A, *Emergencies Act 2004*). The general approach in this plan is to select mitigation measures that achieve the required levels of fire protection and are also compatible with achieving ecological objectives.

The NES Plan also refers specifically to fire management:

*Within the strategic assessment area fire management will be aimed at the protection of both built assets and MNES values. This will be achieved through the identification of appropriate Asset Protection Zones and the application of hazard reduction techniques that will both: ensure that the standards for fuel loads in the SBMP are met; and protect MNES values through the use of sympathetic management techniques.*

Proposed Asset Protection Zones within the reserve have been identified by Emergency Services Agency (ESA) in consultation with the Fire Management Unit of the ACT Government. The proposed zones are based on current boundaries and shown in Figure 9.1. The zoning requires approval by the ESA and will then be included in the relevant Regional Fire Management Plan for the area. The Fire Management Unit translates the Regional Plans into annual Bushfire Operational Plans. Any subsequent changes to boundaries may require adjustment to the zones and further approval from ESA.

The key features of asset protection that interact with conservation objectives are the requirement to manage fuel load and to provide access. Fuel management standards that need to be applied in the zones in the reserve are found in the Strategic Bushfire Management Plan. In Outer Asset Protection Zones (OAPZ) vegetation must be managed so that its biomass in summer (estimated from its height and extent of cover) stays below a prescribed level. In Strategic Firefighting Advantage Zones (SFAZ), which are strategically located accessible corridors designed to break up a fire front, fuel load must be maintained below a set level and the canopy must be discontinuous. The remainder of the reserve is designated as a Landscape Fire Management Zone, in which fuel management standards are not applied.

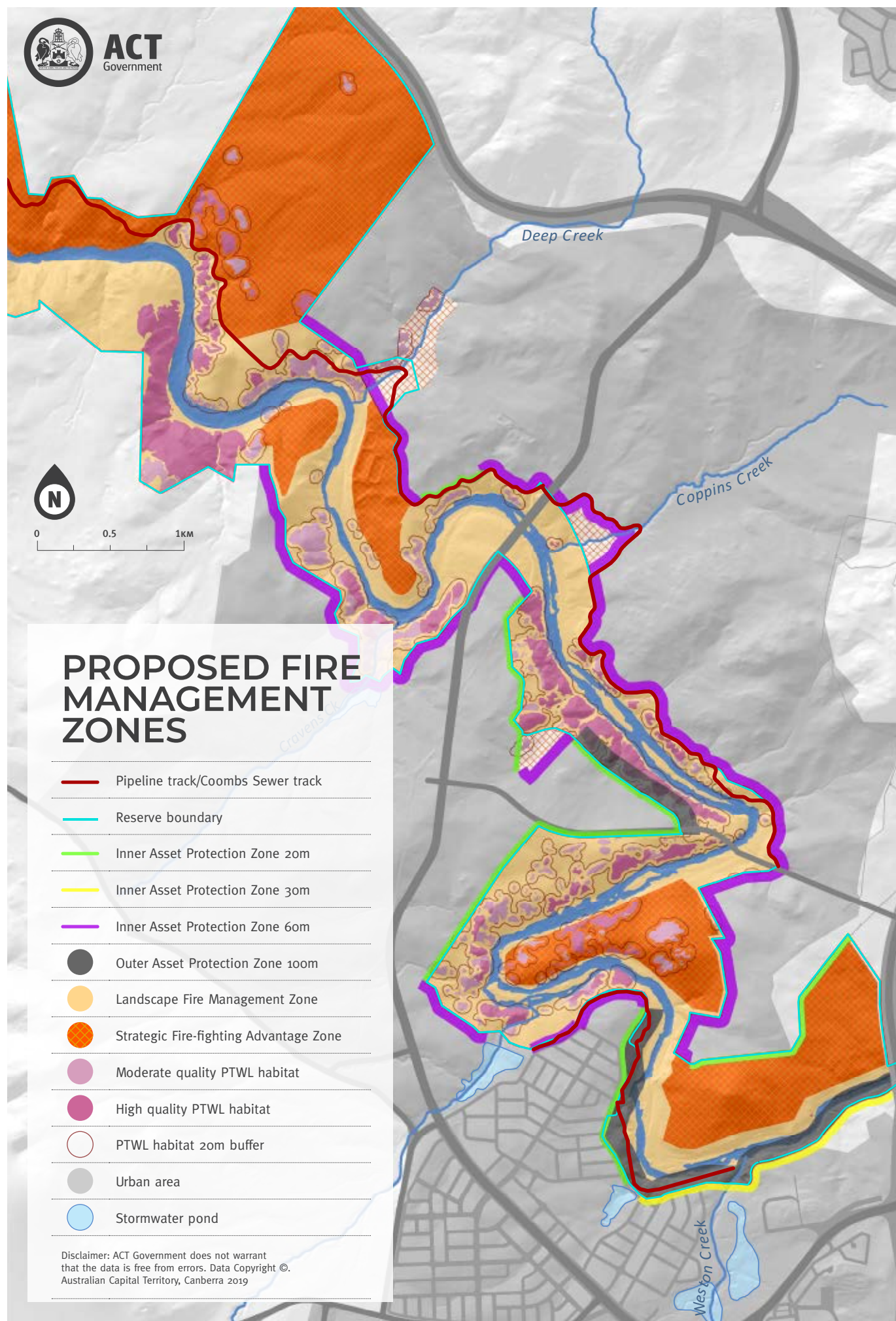
Managing bushfire risk in the reserve will be governed by three plans, due to the diagonal track of the river. These are the Regional Fire Management Plans for Canberra, Cotter and Umburra.

### 9.3.2 Fire protection in Pink-tailed Worm-lizard habitat

The NES Plan requires that measures to control fire risk do not threaten the survival of Pink-tailed Worm-lizard (PTWL) (quoted in Section 9.3.1 above). There are two areas where PTWL habitat and proposed fire protection zones overlap.



**Figure 9.1** Proposed fire management zones and interactions with threatened habitat



In the **urban** area, an OAPZ is proposed in the area where the reserve abuts the planned Molonglo Town Centre and where there is high quality PTWL habitat (see Figure 9.1). This is referred to as Patch K in the NES Plan. PTWL habitat in good condition generally meets the OAPZ standard because a) the area covered by rock produces no biomass and reduces the continuity of fuel, and b) native grasses associated with good quality PTWL habitat are naturally of moderate productivity. However, the buffer zones around the mapped patches of good quality PTWL habitat, the matrix between patches and their buffers, and the moderate quality habitat areas will not generally meet OAPZ standards without some biomass management. This is largely due to the absence of rock (in buffers) and often, higher proportions of introduced grasses like wild oats and *Phalaris*, or weeds like St John's Wort, which on average produce higher biomass than native grasses under the same conditions. Practices traditionally used to meet fire management objectives in OAPZs, like slashing, stock grazing, and hazard reduction burning on a regular basis are not appropriate in PTWL habitat. Therefore these areas will be rehabilitated back to native rocky grasslands. The ACT Government has commenced a trial in Patch K to determine the best grassland rehabilitation methods for this situation.

Residual risk to the survival of Pink-tailed Worm-lizards living in an OAPZ could come from their proximity to urban activity, including the actions of people in the reserve. Fencing, boardwalks and interpretation will provide clear guidance to people about avoiding disturbance to this lizard's habitat (Chapter 5). A healthy population of Pink-tailed Worm-lizards has remained stable on Mt Taylor for the last 20 years, in proximity to housing and people and in the presence of some local disturbance. This gives confidence to the assessment that this risk is manageable in Molonglo River Reserve as the habitat will be more intensively monitored and managed than on Mt Taylor.

Parts of the rural section (which includes Kama) are proposed to be zoned as Strategic Firefighting Advantage Zones (SFAZ). There are patches of high and medium quality PTWL habitat scattered throughout this section, but due to their moderate fuel levels and the less stringent and larger area over which the requirements of a SFAZ can be achieved, it is expected that PTWL habitat in this section can be protected from damage by fire protection measures.

### 9.3.3 Fire protection and conservation in Kama

Kama is zoned as an SFAZ. Fire protection requirements will be achieved using a number of biomass management techniques that are not inconsistent with the conservation objectives for BGW and NTG. These include: ecological burns and planned fuel reduction burns, strategic grazing and herbicides to control high biomass grassy weeds, clumping

of restoration plantings so they can be protected from fuel reduction measures, no further planting of Red Stringybark (*Eucalyptus macrorhyncha*) and tree by tree charring of the lower bark of existing Red Stringybark trees. If these measures do not achieve the necessary fuel reduction, fuel management may be undertaken in accordance with the Ecological Guidelines for Fuel and Fire Management Operations and the Ecological Management Guidelines.

### 9.3.4 Fire protection and conservation elsewhere in the reserve

Fuel reduction issues elsewhere in the reserve include the interaction between connectivity for conservation and fuel breaks to hinder bushfire passage, and the risk to various plant communities of fire (bushfire or planned fire) that is too frequent or too severe. Birds in particular use the cover of the She-oak Forest community to move along the river. This has significance beyond the reserve as it has been identified as an important regional corridor (Manning et al. 2010). While the She-oak community is naturally patchy due to the variable nature of the river, increasing the distance between patches risks the corridor becoming unviable as a movement corridor for some species.

The Black Cypress Pine – Brittle Gum Dry Open Forest (*Callitris endlicheri* in Figure 6.1) is fire sensitive and should never be deliberately burnt. It is proposed that this be zoned as a Landscape Management Zone for fire management. The River She-oak Dry Riparian Forest should only be burnt every 20 to 25 years, and Snow Gum Woodland only every 12 to 50 years. Detailed guidelines for designing fuel and fire management operations so that they limit harm to ecological integrity in the ACT have been prepared and are reflected in the Molonglo Ecological Management Guidelines.

## 9.4 Reserve operations

Besides construction and maintenance activities associated with built facilities, all other operations in the reserve can have a potential impact on the environment or on human health and safety. These include smoke from planned burning; rehabilitation activities, including the removal of remnant pine plantations; use of pesticides and weedicides; and use of firearms. Requirements for most of these are covered by existing legislation or other government policies. Planned burning requires an Environmental Authorisation under the *Environment Protection Act 1997*.



## 9.5 Policies and actions

Infrastructure	
<b>Objective 16: Avoid or minimise the impact on reserve values of building and maintaining infrastructure and facilities in or nearby the reserve.</b>	
Policies	Actions
16.1 The values, objectives and relevant policies of the plan will be used to guide advice and actions on the impacts of construction and maintenance works.	16.1.1 Provide advice to proponents of constructed works and facilities about how impact is to be mitigated. 16.1.2 Monitor and report non-compliance with legislative requirements relating to construction activities and sediment and contaminant flows from neighbouring properties. 16.1.3 Monitor construction activities for inadvertent impact, and design and negotiate appropriate mitigation. 16.1.4 Monitor the impact of using natural creek lines as drainage channels from stormwater ponds and rehabilitate channels or modify their design if required.
Fire Protection and management	
<b>Objective 17: Achieve fire protection for people and property in ways that also effectively protect threatened habitat and other ecological conservation values.</b>	
Policies	Actions
17.1 Requirements of the Strategic Bushfire Management Plan will be met in ways that minimise loss of threatened habitat and ecological function.	17.1.1 Complete the PTWL rehabilitation trial in Patch K and progressively apply the results to PTWL buffers and moderate and high quality PTWL habitat patches in Outer Asset Protection Zones in the urban section. 17.1.2 Incorporate requirements into the Molonglo Development Fire Management Strategy and the three Regional Fire Management Plans that apply to the rural section, and implement them in operational plans. 17.1.3 Prohibit the use of open fires in the reserve (Chapter 8).
<b>Objective 18: Suitable access and associated infrastructure is available for fire management.</b>	
18.1 An access plan for fire management will be developed that maximises the use of existing management tracks and does not impact on NES matters, except where permitted in the NES Plan.	18.1.1 Develop and implement a fire access plan, taking into account all the other objectives in the plan.
Operations	
<b>Objective 19: Minimise harm to people and the environment from reserve operations.</b>	
Policies	Actions
19.1 Relevant legislation and ACT Government policy will be applied to all management actions that have a risk of harm to people and wildlife.	19.1.1 Ensure staff are aware of and comply with prescriptions applying to all activities in the reserve, particularly those involving: <ul style="list-style-type: none"> <li>• pesticides and weedicides</li> <li>• firearm use</li> <li>• ecological and fuel reduction burning.</li> </ul> 19.1.2 Apply standard ACT Government duty of care to all activities in and associated with the reserve.
19.2 Reserve operations will not compromise agreed objectives in the plan.	19.2.1 Assess operational activities for their environmental impact and mitigate any impacts.





# 10. NEIGHBOURS AND COMMUNITIES



Community Planting Day at Barrer Hill  
Box Gum Woodland Restoration area

## 10.1 Objectives

**Objective 20: Achieve productive working relationships with neighbours that contribute to maintaining reserve values.**

**Objective 21: Achieve strong community support for the reserve and active contributions towards its management.**

## 10.2 Neighbours

Activities of neighbours in the urban section that need to be minimised for their potential impact on reserve objectives include: disregard of the cat containment and general dog control regulations, damage to boundary fences and gates, rubbish near the urban edge blowing into the reserve, accidental or deliberate fire lighting and dumping of garden waste over the fences. There are agricultural weeds already in the reserve, but the introduction of a long urban interface to the reserve will bring many new garden plants into close proximity to the boundary and the potential introduction of a new range of weeds.

In the rural section, local rural leaseholders report a range of impacts from people entering their properties through nature reserves or directly from urban areas. These include:

- people, pests and wildlife entering their properties through fences that provide easy access
- fences and gates damaged from people cutting or jumping over them
- off leash or escaped dogs chasing stock
- people entering unlocked gates and leaving them open, allowing stock to escape; emergency services and other authorities cutting fences and leaving gates open without alerting the landholder and allowing stock to escape
- building earth ramps for bikes, disturbing land and stock
- leaving litter, which is unsightly and a potential risk to cattle and sheep
- people, horses and dogs conveying weed seeds onto the property.

In the upper reaches of the river there are also neighbouring enterprises whose land slopes down towards the river and where uncontained sediment and contaminants represent a risk to water quality. This specific risk has been dealt with in Chapter 10 but others may emerge.

Conversely, actions of reserve users, reserve management or material from the reserve itself may also cross the boundary and impact on neighbours. In the urban section, these might include smoke from fuel reduction or ecological burning (although infrequent), wildlife on roads or in properties, litter from the reserve blowing into urban areas and noise from people using the reserve.

### 10.2.1 Opportunities

While managing the negative impact of actions across boundaries needs addressing, the presence of neighbours can also be used to advantage. In the urban section, the development of a sense of place for residents will be strongly shaped by the reserve, especially those living very close to it. With residences facing onto the reserve, the reserve will appear as an extension of a front yard instead of a backyard, and is likely to be better treated than in older Canberra areas where reserves are faced by backyards. Residences facing the reserve, and cars, cyclists and walkers passing along the urban edge will also provide ‘eyes and ears’ over the behaviour of people within sight of the edge.

In the rural section, lessees can play an important role in enhancing characteristics of their land in ways that promote conservation objectives, especially if they are neutral or positive to their economic activity and enhance their own values about conservation. Protecting or enhancing remnant woodland and corridors for birds, controlling weeds that limit both agricultural and conservation objectives or putting cattle into the reserve to reduce biomass are examples.

Collaborative effort between reserve managers and rural leaseholders is also crucial for effective bushfire management activities, coordinated weed control programs, and the rehabilitation of creek lines. Land Management Agreements (LMAs) between the ACT Government and rural lessees are vehicles for negotiating how lessees can



contribute to environmental outcomes. Rural neighbours of the reserve already formally agree to some of the actions mentioned. Under the *Nature Conservation Act 2014*, the ACT Conservator of Flora and Fauna can also issue conservation directions to the occupiers of land for the protection or conservation of native flora and fauna.

### 10.2.2 Management considerations

Many of the actions that need to be managed across reserve boundaries are not suited to management by regulation and therefore need to be approached through proactive relationship building and community behaviour management. Some urban residents do not have a good understanding of nature reserve or rural land issues and do not realise that their actions may have negative consequences. Sometimes other options are available for achieving what they want with less impact on the reserve (e.g. a different plant selection in gardens). In the rural section, to discourage the entry of people and passage of pests into neighbouring rural properties, replacements for old fences will be to a specification determined by the land manager.

Cooperation with neighbouring rural leaseholders is also important for regional fire protection. The Regional Fire Management Plans (Section 9.3.1) specify the goals for fire protection across the region and landholders meet together to develop collaborative implementation plans.

Neighbours have an expectation that the management actions in the reserve will not unreasonably detract from the ways in which they expect to be able to use their properties. Therefore it requires a reciprocal relationship for neighbours to work well together. The key is establishing the relationship early so that issues can be raised before they become serious and solutions can be devised in an atmosphere of mutual respect. It will be developed in conjunction with appropriate neighbourhood groups and based on the following principles:

- the right of neighbours to the quiet enjoyment of their land is recognised and respected
- the responsible management and stewardship of protected areas is recognised and respected
- generally accepted standards of good neighbourly behaviour will be practiced
- the practical resolution of management matters at a local level is priority.

The practice of ACT Government and the Rural Landholders Association meeting quarterly for sharing information and planning joint activities has been successful and will continue.

## 10.3 Communities

By sharing some of the responsibility for reserve outcomes with local residents, more can be achieved in terms of conservation and recreation goals. Active community contribution to reserve management is also important for giving a sense of ownership to residents, that is, their contribution to a place that affects them and their surroundings has been listened to and had an influence. They are then more likely to use community forces to regulate their members' behaviour in and nearby the reserve. Working with communities has been recognised as one of the four key dimensions of park management.

### 10.3.1 Community groups

Parkcare groups in and around Canberra, with the support of the ACT Government, park rangers and the catchment groups, have made substantial contributions to the improvement in condition of the parks and reserves in which they work. Understanding the motivations of people who do voluntary work for the environment is important because it helps target recruitment and shape the nature of volunteer activities. A study of environmental volunteering in urban Australia found that volunteers had six main motivations: contributing to community, social interaction, personal development learning about the environment, general ethic of care for the environment and attachment to a particular place.

Other community groups who engage in or organise environment activities across the ACT include Greening Australia Capital Region, Canberra Ornithologists Group, Friends of Grasslands, ACT Herpetological Association, ACT branch of the Geological Society of Australia and the Conservation Council ACT Region.

### 10.3.2 Interpretation

Interpretation signage will be used to educate visitors about protected areas and to create a greater understanding of the values within the reserve. Other educational tools may also be used to foster this understanding including Ranger guided visitor walks, and the use of social media.

### 10.3.3 School partnerships

Partnerships with schools can directly assist local conservation efforts, principally by getting children interested and informed. The students in turn become an influence and communication channel with other members of their families. The schools in the Molonglo Valley will be looking for activities that engage students in local issues. High school and college aged students can do activities like Waterwatch and Frogwatch, and participate in park care activities, or use the reserve as a focus for learning projects. For example, the Molonglo Catchment Group sponsored a project with community volunteers from the West Belconnen and Lower Molonglo districts to map the assets of the lower reaches, partially using GIS courses at Hawker College to encourage engagement with younger people.

### 10.3.4 Management considerations

The major management consideration is targeting and organising effort so that interactions with communities are productive but efficient. This requires a planned approach, and as much use of existing community groups and processes as possible. A communication and engagement plan will be developed, encompassing the following principles:

- the community and engagement plan be developed with local community input and draw on existing neighbourhood programs like the SLA Mingle program
- target audiences be defined that relate to incoming communities
- a program of communication and engagement activities be designed that is appropriate for those audiences. The program should also make good use of the capacity of new media to reach audiences and of new technologies to make interpretation material interesting and widely available
- a set of clear messages be used that is based on the plan and accompanied by visual brand developed for the reserve
- community partners with demonstrated experience may be used to deliver many of the engagement activities
- the community and engagement plan be staged to take into account the rate of urban development
- the effectiveness of the community and engagement plan be monitored and adjusted where necessary.

Some engagement activities that may be used for engaging the community include:

- ranger guided walks and ‘induction’ workshops for new residents
- partnering with an appropriate community group to organise the delivery of an agreed set of communication and engagement activities
- involving the community in a wide range of activities, including:
  - tree planting and weed control
  - visitor surveys (a good way for local residents to meet more locals)
  - mapping and monitoring (through ‘citizen science’), including Waterwatch and Frogwatch which are particularly suited to this riverine reserve, to older schoolchildren and to retirees
  - historic site conservation
  - interpretation and education programs
  - leading recreational walks and walks for school groups;
- exploring opportunities for funding community-based activities from government funding programs and local business sponsors
- supporting the establishment of a Parkcare group
- designing material to engage people’s interests and improve their understanding of the reserve e.g. video camera surveillance of raptor nests or kangaroos
- establishing demonstration sites in the reserve to provide living examples of why certain management actions are required.



# 10.4 Policies and actions

Neighbours	
Objective 20: Achieve productive working relationships with neighbours that contribute to maintaining reserve values.	
Policies	Actions
20.1 Establish and maintain good neighbour relationships.	20.1.1 Promote co-operation and exchange of information about the management of the reserve with neighbours. 20.1.2 Support the involvement of neighbours and their input in revegetation and other environmental activities within the reserve.
Community	
Objective 20: Achieve strong community support for the reserve and active contributions towards its management.	
Policies	Actions
21.1 A planned approach will be used to make good use of existing community mechanisms.	21.1.1 Develop and implement a communication and engagement plan on the basis of the objectives in the plan. 21.1.2 Develop MoUs with community groups and organisations for carrying out collaborative community engagement activities in the Molonglo Valley and the reserve.



Double-barred Finch  
*Taeniopygia bichenovii*



Smooth Flax Lily *Dianella longifolia*

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# APPENDIX 1. ACTIONS AGREED IN THE NES PLAN THAT MUST BE ADDRESSED IN THIS MANAGEMENT PLAN

The NES Plan includes actions that fall outside the boundaries of the reserve. For example, the total requirement for 234 hectares of Box-Gum Woodland to be protected includes an area (Patch GG) adjoining the National Arboretum and will be managed by the Arboretum. The actions listed here are only those that depend on this Management Plan for their achievement.

In cross-referencing to the NES Plan, only the following patches fall within the reserve: A, B, and O in Kama and Q, R, S, K, T and part of D (17.2 ha) mostly on the southwestern side of the river in the urban section. Their combined area is 245 hectares.

Conservation outcome	Agreement (beginning with action no.)
BGW (a) Impacts to Box-Gum Woodland will be limited to a maximum of 110 ha and a range of measures will be implemented to minimise this area of impact.	<p>3. Design the infrastructure that will occur in the river corridor to minimise impacts to Box-Gum Woodland.</p> <p>4. Develop, implement and independently monitor Construction Environmental Management Plans (CEMPs) to ensure that unforeseen direct or indirect impacts from construction activities within the development area and the river corridor are avoided.</p>
BGW (b) Three offset sites will be established within the strategic assessment area (Kama Nature Reserve, Molonglo River Park, Patch GG) that will provide for the long term protection of 234 ha of Box-Gum Woodland. The three offset sites will be adaptively managed to maintain and enhance the ecological condition of the Box-Gum Woodland that occurs there.	<p>5. Develop a management plan for the Kama Nature Reserve to provide for the maintenance and enhancement of the ecological condition of Box-Gum Woodland within the reserve (approximately 117 ha).</p> <p>6. Implement the management plan for the Kama Nature Reserve to provide for the maintenance and enhancement of the ecological condition of Box-Gum Woodland within the reserve.</p> <p>7. Establish a buffer outside the Kama Nature Reserve between the reserve and the proposed development area, and allow for appropriate uses consistent with nature conservation uses of the reserve. The buffer will be developed to ensure that fire management is undertaken outside of the Kama Nature Reserve and will provide protection against urban edge effects.</p> <p>9. Develop a management plan for the Molonglo River Park to provide for the maintenance and enhancement of the ecological condition of Box-Gum Woodland within the park (approximately 73 hectares).</p>
Improving and applying the knowledge about the management of Box-Gum Woodland.	<p>10. Implement the management plan for the Molonglo River Park to provide for the maintenance and enhancement of the ecological condition of Box-Gum Woodland within the park.</p>
NTG (a) No direct or indirect impacts to Natural Temperate Grassland.	<p>23. Establish and manage an off-site restoration project, as an indirect offset, for Box-Gum Woodland.</p>
NTG (b) Adaptive management of the Natural Temperate Grassland that occurs within the Kama Nature Reserve to maintain and enhance its ecological condition.	<p>24. Protection of the Natural Temperate Grassland within the Kama Nature Reserve.</p> <p>25. Develop a management plan for the Kama Nature Reserve to provide for the maintenance and enhancement of the ecological condition of Natural Temperate Grassland within the reserve.</p> <p>26. Implement the management plan for the Kama Nature Reserve to provide for the maintenance and enhancement of the ecological condition of Natural Temperate Grassland within the reserve.</p>
PTWL (a) Impacts to high and moderate quality PTWL habitat will be limited to a maximum of 27 ha and a range of measures will be implemented to minimise this area of impact.	<p>27. Same as 7.</p> <p>29. Amend the East Molonglo river corridor boundary in stages 2 and 3 respectively with a view to reducing impacts to high and moderate quality PTWL habitat. This process will ensure that connectivity within the river corridor is maintained.</p>



Conservation outcome	Agreement (beginning with action no.)
PTWL (b) Two offset sites will be established within the strategic assessment area (Kama Nature Reserve and the Molonglo River Park) that will provide for the long term protection of 66 ha of high and moderate quality PTWL habitat. These areas will be adaptively managed to maintain and enhance the ecological condition of the PTWL habitat that occurs there.	30. Design the infrastructure that will occur in the river corridor to minimise impacts to high and moderate quality PTWL habitat.
	31. Develop, implement and independently monitor Construction Environmental Management Plans (CEMPs) to ensure that unforeseen direct or indirect impacts from construction activities within the development area and the river corridor are avoided.
	32. Develop a management plan for the Kama Nature Reserve to provide for the maintenance and enhancement of the ecological condition of all PTWL habitat within the reserve (approximately 6 ha which includes 3.33 ha of high and moderate quality habitat).
	33. Implement the management plan for the Kama Nature Reserve to provide for the maintenance and enhancement of the ecological condition of all PTWL habitat within the reserve.
PTWL (c) Continued protection of 28.1 ha of high and moderate quality PTWL habitat within the Lower Molonglo Nature Reserve. These areas will be adaptively managed to maintain the ecological condition of the PTWL habitat that occurs there.	34. Same as 7.
	36. Develop a management plan for the Molonglo River Park to provide for the maintenance and enhancement of the ecological condition of high and moderate quality PTWL habitat within the park (approximately 62 ha).
	37. Establish a 20 metre buffer around high and moderate quality Pink-tailed Worm-lizard habitat (other than, for example the areas to be impacted by the bridge crossings and strategically placed walking tracks) within the East Molonglo river corridor. Manage these areas to ensure the maintenance of their conservation value. Management measures (as outlined in Section 3) will be incorporated into the management plan for the river corridor.
	38. Implement the management plan for the Molonglo River Park to provide for the maintenance and enhancement of the ecological condition of high and moderate quality PTWL habitat within the park.
	40. Continued implementation of the Management Plan for the Lower Molonglo Nature Reserve to provide for the maintenance of the ecological condition of the high and moderate quality PTWL habitat that occurs there (approximately 28.1 ha).



Also relevant are agreements:

NES Plan	Agreement
Page 10	Development of the “Molonglo River Park” Concept Plan as an offset site along the East Molonglo River. This Plan will establish management zones within the Park, specifically identifying areas to be designated for conservation as well as identifying recreation areas and resolving public access. The Plan will also be complementary to the management approaches developed for the area of the river corridor adjacent to Coombs as required in relation to EPBC referral 2009/5050.
Page 11	Development and implementation of a management plan for the river corridor with a focus on providing long-term outcomes for Box-Gum Woodland and the Pink-tailed Worm-lizard. This management plan will then inform a statutory Plan of Management for the East Molonglo River Corridor.
Page 11	Implementation of a number of research projects to improve the knowledge relating to the conservation of Pink-tailed Worm-lizard and Box-Gum Woodland.
Page 12	<p>Within the strategic assessment area fire management will be aimed at the protection of both built assets and MNES values. This will be achieved through the identification of appropriate asset protection zones and the application of hazard reduction techniques that will both:</p> <ul style="list-style-type: none"> <li>• ensure that the standards for fuel loads in the SBMP are met; and</li> <li>• protect MNES values through the use of sympathetic management techniques.</li> </ul>
Page 17	It is also important to note that under Division 3.3 of the <i>Nature Conservation Act 2014</i> , Pink-tailed Worm-lizard has been declared a vulnerable species and Natural Temperate Grassland and Box-Gum Woodland are declared endangered communities. The effect of these statutory declarations is that these species and communities need to be managed in accordance with a prescribed Action Plan, prepared by the Conservator for Flora and Fauna.
Page 20	“Ecological condition” for Box-Gum Woodland will be measured using a peer reviewed, repeatable and scientifically robust methodology for examining and comparing the condition of woodland and derived grassland patches over time.
Pages 41-43	<p>Develop an Adaptive Management Strategy to set out the framework for achieving the NES Plan’s commitments through monitoring, evaluation, experimental design, reporting, auditing and continuous improvement processes. The Strategy will inform the content and timing of specific management plans and actions to ensure a consistent, integrated and efficient application of adaptive management principles and practices to achieve long term conservation outcomes for MNES.</p> <p>The approved Adaptive Management Strategy will be submitted for approval by the Minister (Australian Government) or delegate.</p>

# APPENDIX 2. BASIC AREAL STATISTICS FOR THE RESERVE

Estimates based on the boundaries shown in Chapter 4 and calculated from the data used to provide the maps in this plan. Totals may not add due to rounding errors.

The perimeter of the reserve is 49 kilometers.

Attribute	Area (ha)	Proportion
<b>Whole of reserve</b>	<b>1280</b>	
Rural section	740	58%
Urban section	540	42%
<b>Vegetation communities (Figure 6.1)</b>		
Box Gum Grassy Woodland	196	15%
Mixed native & exotic grassland	483	38%
<i>Callitris endlicheri</i> Tableland Woodland	137	11%
<i>Casuarina cunninghamiana</i> Tableland Riparian Woodland (includes the river and aquatic vegetation)	224	18%
<i>Eucalyptus pauciflora</i> - <i>E. rubida</i> Tableland Woodland	69	5%
<i>E. dives</i> - <i>E. bridgesiana</i> Tableland Woodland	7	1%
<i>E. macrorhyncha</i> - <i>E. rossii</i> Tableland Forest	25	2%
Natural Temperate Grassland	45	4%
Remnant pines	70	5%
Tableland Shrubland	24	2%
<b>Total</b>	<b>1280</b>	<b>100%</b>
<b>Pink-tailed Worm-lizard habitat (found across several of the vegetation communities listed above) (Figure 6.1)</b>		
In rural section (excluding buffers)	177	14%
In urban section (including buffers)	145	11%
<b>Total</b>	<b>322</b>	<b>25%</b>
<b>Ecological management zones (Figure 7.2)</b>		
Threatened	467	37%
Dryland matrix	612	48%
River and riparian*	201	15%
<b>Total</b>	<b>1280</b>	

\* A small area of PTWL habitat is mapped in this zone and accounted for in the 'threatened' zone



# APPENDIX 3. ECOLOGICAL FIRE THRESHOLDS FOR VEGETATION COMMUNITIES THAT OCCUR IN THE RESERVE

Table 2-7 from Kitchin (2008)

Community	Fire thresholds (min – max fire interval in years)	Fire threshold guidelines
Forests		
River She-oak Dry Riparian Forest	25–100	A decline in biodiversity is likely if: 1) 2 or more consecutive fires occur with inter-fire intervals of <25 years, and 2) no high intensity fires occur within 50-100 years.
Black Cypress Pine – Brittle Gum Tall Dry Forest	No planned burning	No planned burning until recovery post 2003 fires is fully assessed and established.
Red Stringybark – Scribbly Gum Tall Dry Forest	10–50	A decline in biodiversity is likely if: 1) 3 or more consecutive fires occur with inter-fire intervals of <10 years, and 2) no moderate to high intensity fires occur within 50-100 years.
Woodlands		
Blakely’s Red Gum – Yellow Box Grassy Woodland	10–40 (possibly longer)	A decline in biodiversity is likely if: 1) 3 or more consecutive fires occur with inter-fire intervals of <10 years, and 2) no moderate to high intensity fires occur within 40-50 years.
Snow Gum Grassy Woodland	12–50	A decline in biodiversity is likely if: 1) 3 or more consecutive fires occur with inter-fire intervals of <12 years, and 2) no moderate to high intensity fires occur within 50-100 years
Apple Box – Broad-leaved Peppermint Shrubby Woodland	unknown	
Shrublands		
River Bottlebrush – Burgan Rocky Riparian Shrubland	10–30	A decline in biodiversity is likely if: 1) 3 or more consecutive fires occur with inter-fire intervals of <10 years, and 2) no high intensity fires occur within 30 – 40 years.
Grasslands		
Kangaroo Grass – Wallaby Grass – Spear Grass Tableland Dry Tussock Grassland	4–10	There is currently insufficient data to estimate the maximum interval but some evidence indicates it would be approximately 10 years.
Kangaroo Grass – Purple Wiregrass Dry Tussock Grassland	4–10	
River Tussock Tableland Wet Tussock Grassland	Unknown	
Riparian communities		
Tableland Aquatic Fringing Wetlands	No planned burning	



Urban edge  
at Wright



# APPENDIX 4. ABORIGINAL SITES IN THE URBAN SECTION OF THE RESERVE THAT HAVE MANAGEMENT REQUIREMENTS

Reproduced from Huys et al. (2013). References refer to the Huys et al. report.

Site Name	Site Type	Management Recommendation
MRC 14	Scarred tree	Salvage collect scar, and re-locate to conservation area.
MRC 15	Scarred tree	Conserve in-situ.
MRC 17	Artefact scatter	Conserve site in-situ.
MOL A1/1821	Artefact scatter	Site status is unknown. Requires relocation and management of finds. Site within BIOSIS (2012a/b) survey area.
MOL IF7	Isolated find	Site status is unknown. Requires relocation and management of finds. Most likely salvage collection and re-location of artefact prior to construction work commencing.
12B1	Artefact scatter	Within CHMA 2009b study area. Reported to be under several metres of fill. Seek de-classification.
12B3	Isolated find	Site status is unknown. Requires relocation and management of finds. Site within BIOSIS (2012a/b) survey area.
12B4	Isolated find	Site status is unknown. Requires relocation and management of finds. Site within BIOSIS (2012a/b) survey area.
1263	Artefact scatter	Requires relocation and management of finds. Within CHMA 2009b study area. Same sites as 6N1. Reported to have been destroyed. Seek de-classification.
1275	Isolated find	Site status is unknown. Requires relocation and management of finds. Site within BIOSIS (2012a/b) survey area.
1/2 3/6E 1	Isolated find	Site status is unknown. Requires relocation and management of finds. Site within BIOSIS (2012a/b) survey area.
1/5 2/6N 1	Artefact scatter	Within CHMA 2009b study area, however not re-located during that survey. Reported to have been destroyed. Seek de-classification.
Aboriginal cultural area	Special cultural area	Identified and recorded by Biosis (2013). Avoid impacts. See Biosis (2013 for details)
PAD 1 (CHMA 2013)	Potential Archaeological Deposit	Conserve site within Conservation Area.
PAD 5 (AASC 2006)	PAD – Medium Archaeological Sensitivity	Identified by AASC (2006). PAD within BIOSIS (2012a/b) survey area. Not test pitted. Further works required.

