Facing the challenges – positioning our nature reserves for the 21st century

Report on Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation

Part 1. Report

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Commissioner for Sustainability and the Environment

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The Investigation documents consist of:


Part 2. Appendices.


A separate Summary and Recommendations document is available.
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CONTENTS

Acknowledgements .................................................................................................................. i

1. Investigation context and process .......................................................................................... 1
   1.1 Terms of reference ............................................................................................................. 3
   1.2 Investigation process ......................................................................................................... 4
       1.2.1 Expert panel ................................................................................................................ 4
       1.2.2 Reports and papers .................................................................................................... 5
       1.2.3 Community engagement ............................................................................................ 6
       1.2.4 Information from Agencies ......................................................................................... 7
   1.3 Location of investigation nature reserves ......................................................................... 7

2. History .................................................................................................................................... 9
   2.1 Geological and climate legacy .......................................................................................... 11
   2.2 Human legacy .................................................................................................................. 12
       2.2.1 Aboriginal presence .................................................................................................... 12
       2.2.2 European settlement .................................................................................................. 12
       2.2.3 Urban development .................................................................................................... 14
   2.3 Our inheritance ................................................................................................................. 16

3. Community views and values ............................................................................................... 19
   3.1 Public submissions ............................................................................................................ 21
   3.2 Community forums .......................................................................................................... 24
   3.3 ACT Indigenous Elected Body ........................................................................................ 25
   3.4 Workshops with schools ................................................................................................... 25
   3.5 Bird forum ......................................................................................................................... 25
   3.6 User group survey ............................................................................................................. 26
   3.7 Discussion ......................................................................................................................... 30
       3.7.1 Parks Conservation and Lands Recreational Users Group ........................................... 30
       Recommendation 1.1. ......................................................................................................... 31
       3.7.2 Forum ......................................................................................................................... 31
Recommendation 1.2 ................................................................. 31
3.7.3 Community education and awareness .................................................. 32
Recommendation 1.3 (High Priority) .............................................................. 33
3.7.4 Signage ......................................................................................... 33
Recommendation 1.4 ..................................................................................... 34
3.7.5 Future generations.............................................................................. 34
Recommendation 1.5 ..................................................................................... 35

4. Addressing challenges on our nature reserves ............................................ 37
4.1 Assessment of nature reserves ................................................................. 44
4.2 Condition of nature reserves .................................................................. 45
4.3 Challenges ............................................................................................. 55
  4.3.1 Native vegetation clearance ................................................................. 57
  4.3.2 Grazing pressure and soil disturbance from herbivores ....................... 59
  4.3.2.1 Rabbits ....................................................................................... 62
  4.3.2.2 Kangaroos .................................................................................. 65
  4.3.2.3 Stock grazing .............................................................................. 67
  4.3.3 Weeds ............................................................................................. 70
  4.3.4 Erosion and bare ground ..................................................................... 73
  4.3.5 Fire ................................................................................................. 76
Recommendation 3.3 ..................................................................................... 79
  4.3.6 Visitor use ....................................................................................... 79
Recommendation 5.2 (High Priority) .............................................................. 82
  4.3.7 Infrastructure maintenance ................................................................. 82
4.4 Addressing challenges ........................................................................... 84
Recommendation 2.2 (High Priority) .............................................................. 89
  4.4.1 Nature reserve operational plans ......................................................... 89
Recommendation 3.1 (High Priority) .............................................................. 92
  4.4.2 Adaptive management and monitoring ................................................ 92
Recommendation 3.2 (High Priority) .............................................................. 94
Recommendation 4.5 ................................................................. 135
Recommendation 4.6 ................................................................. 141
Recommendation 4.7 ................................................................. 145

6.5 Research ............................................................................. 145
Recommendation 3.6 ................................................................. 149

7 Future funding ...................................................................... 151
7.1 Existing budgets .................................................................. 151
7.2 Increasing demands ............................................................ 154
7.3 Additional funding sources .................................................. 155
  7.3.1 Philanthropic donations .................................................. 156
    7.3.1.1 International examples .............................................. 156
    7.3.1.2 Australian examples ................................................. 156
    7.3.1.3 Capital Woodland and Wetlands Conservation Trust.... 157
  7.3.2 Levies ............................................................................. 160
    7.3.2.1 Australian examples ................................................. 160
    7.3.2.2 Additional funds for nature reserves ......................... 162
Recommendations 6.1 (High Priority), 6.2 (High Priority) and 6.3 ................. 164
  7.3.3 Funds from environmental offsets for development .............. 164
  7.3.4 Vegetation plantings on nature reserves as carbon offsets .... 165
Recommendation 4.8 ................................................................. 167

Annex A to Chapter 5 Legislation, strategies and plans ............................ 169
Tables

Table 1: Addressing the terms of reference.................................................................4
Table 2: Public submissions summary – grouped and ranked by theme......................21
Table 3: List of user groups who were contacted.....................................................27
Table 4: Characteristics of the nature reserves surveyed for the Canberra Nature Park investigation.................................................................39
Table 5: Summary of issues impacting the landscape function of the reserves and their overall condition .............................................................................................................47
Table 6: Licences and leases on nature reserves ........................................................69
Table 7: Proposed actions for nature reserves..........................................................86
Table 8: Comparison of population, nature/conservation reserve area and funding in Hobart City Council, Brisbane City Council and Canberra. ......................................152
Table 9: ACT Government funding committed for conservation programs. ..............154

Boxes

Box 1: Terms of reference..........................................................................................3
Box 2: Observations of some changes in ecosystem functions 1820-1909...............14
Box 3: Comment from a participant at the Belconnen community forum on 24 May 2010 .. 20
Box 4: Short term, medium term and longer term actions proposed from the user group survey ..........................................................................................................................30
Box 5: Landscape Functional Analysis......................................................................44
Box 6: Vision for Canberra Nature Park....................................................................81
Box 7: Biodiversity offsets established by the Commonwealth for developments in the ACT...........................................................................................................................138
Box 8: Community suggestions for expanding reserves – potential offset sites........142
Box 9: Lowland native grassland – potential offset sites............................................143
Box 10: Connectivity improvements – potential offset sites.......................................144
Box 11: Biodiversity and conservation research needs - systems and assessment........145
Box 12: Biodiversity and conservation research needs – specific species................147
Box 13: Research gaps on the impacts of climate on reserves ..................................148
Figures

Figure 1: Sites covered by Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation .......................................................... 8

Figure 2: Recovery of vegetation on Black Mountain after being widely cleared in the middle 1800s ................................................................. 10

Figure 3: Grazing Pressure, Mount Majura ........................................................................ 56

Figure 4: Weeds, Farrer Ridge ......................................................................................... 56

Figure 5: Erosion, Callum Brae ...................................................................................... 56

Figure 6: Bushfire Operations, Wanniassa Hills .............................................................. 56

Figure 7: Visitor Use, Farrer Ridge .................................................................................. 57

Figure 8: Visitor Use, Mount Taylor .................................................................................. 57

Figure 9: Maintenance of infrastructure, Mount Majura .................................................. 57

Figure 10: Encroachment, Mount Ainslie ........................................................................ 57

Figure 11: Leaky rock weir ............................................................................................. 76

Figure 12: Branch erosion trap ........................................................................................ 76

Figure 13: Erosion control, Mount Painter ....................................................................... 76

Figure 14: Erosion control, Mount Painter ....................................................................... 76

Figure 15: Nature Reserve Operational Plan ................................................................... 91

Figure 16: Connectivity ..................................................................................................... 126

Appendices are in a separate document Part 2. Appendices. However they are listed in Section 1.2.2 Reports and papers.
1. **INVESTIGATION CONTEXT AND PROCESS**

Canberra is renowned for being the Bush Capital because of its location in the 'bush'\(^1\). This title is also fitting because of the way in which the ‘bush’ is a dominant part of our urban landscape. It is a city where there are significant areas of bushland which are mainly, although not exclusively, protected as nature reserves on its hilltops and ridges as part of Canberra Nature Park. Although Molonglo Gorge Nature Reserve, Lower Molonglo Nature Reserve and Googong Foreshores are considered in this Investigation, the nature reserves\(^2\) in Canberra Nature Park are the main focus.

Our extensive network of nature reserves is connected by open spaces that provide us with the opportunity to live with nature and access an extensive network of recreation areas. As Canberra grows, this is a privilege which will likely increase in value, however, pressures from growth are likely to impact our nature reserves and extra management interventions are likely to be needed to afford them the required level of protection.

‘*Our reserves are very important to me*’ is a strong message given to this Investigation from members of the community and the ‘me’ includes a very diverse range of people such as residents, neighbours of nature reserves, environmentalists, ParkCarers, runners and walkers. Many demands are made of these nature reserves which have to be managed within the context of their natural environment as well as cultural and social values. For example, our nature reserves are valued for some aspect of being in nature – its flora, fauna and views, or other enjoyable aspects of being outdoors, especially away from traffic\(^3\). The uses that occur on our nature reserves bring a range of physical, mental, social and community health benefits.\(^4\) Social values include health benefits from exercise and being in the fresh air, aesthetic pleasure from being in or seeing ‘the bush’ and social interaction with other users.

Our nature reserves, together with our street and park trees, some of which are native species, form a major part of Canberra’s green infrastructure\(^5\) which provides essential ecosystem services which support our economic and social systems. The health benefits provided by our green infrastructure, particularly our nature reserves, are significant; having access to and using a healthy natural environment can have positive physical, social, mental and spiritual health outcomes.\(^6\) The role of the nature reserves in supporting physical activity has significant financial value, when it is considered that

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\(^2\) For this Report, the term nature reserve has been used to cover all 35 sites in this Investigation including Googong Foreshores.

\(^3\) Interaction Consulting Group, 2010, *Investigation into Canberra Nature Park (nature reserves); Molonglo River Corridor and Googong Foreshores; Community Consultation Forums Final Report*.


medical costs attributable to physical inactivity have been estimated at around $377 million per year in Australia.7

Recent research has found that natural environments offer low-cost preventative and remedial opportunities for public health. [Preventative] Good health initiatives are now understood to be crucial in controlling healthcare costs and governments are investing in programs to promote healthier lifestyles.8 While this is the case, managing our green infrastructure, including our nature reserves, presents significant management and funding challenges.

The importance and challenges of managing our nature reserves is reflected by the direction to me as the Commissioner for Sustainability and the Environment, from Mr Simon Corbell MLA, Minister for the Environment, Climate Change and Water, on 13 October 2009, that pursuant to section 12(1) (b) of the Commissioner for the Environment Act 1993, I undertake an investigation into the Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores (hereafter referred to as this Investigation).

The importance of our nature reserves is encapsulated in the following:

....their importance will only increase with time as the stresses of urbanisation, population growth, climate change and resource depletion impact on our societies. It is our responsibility to ensure the ongoing protection and good management of parks for present and future generations to enjoy and cherish.9

This Investigation in responding to the Terms of Reference and the many issues that have emerged has strived to find ways of facing the challenges confronting our nature reserves and identify ways of positioning them for the 21st century.

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1.1 Terms of reference

Eight terms of reference were established by Minister Corbell to guide this Investigation.

Box 1: Terms of reference

**Terms of reference**

An investigation will be undertaken into Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores that:

1. assesses the condition of the forests, woodlands and grassy woodlands in these areas, including the effects of grazing by stock and/or kangaroos, vertebrate, pests and weeds;
2. identifies actions to protect and enhance these areas, including land use or boundary changes while taking into account their purpose, values, and location and the status of indigenous species and communities protected in the nature reserve system;
3. reviews existing land management programs and practices for these areas and areas that adjoin them. This is to include but not be limited to agistment, leasing, culling arrangements, Land Management Agreements or plans of management which may apply;
4. identifies any urgent actions and longer-term changes that are needed to improve the management of these areas. This is to include identifying successful management measures that should be retained;
5. identifies knowledge gaps, research or survey needs, and compliance and monitoring requirements that may be necessary to support improved management programs and practices while taking into account the context of the areas and effects of climate variability;
6. identifies ways for ensuring effective communication and involvement of stakeholders, including Aboriginal people, whose actions potentially, indirectly or directly, affect these areas;
7. identifies potential biodiversity offset management actions or sites; and
8. identifies the evidence justifying the need for managing grazing pressure in the context of sound reserve management practices.

In undertaking the investigation, the Commissioner is to consult with all relevant experts and key stakeholders, including staff in TAMS and in the Department of the Environment, Climate Change, Energy and Water.

**Note:** The management of grassland nature reserves in Canberra Nature Park was recently reviewed as part of the Commissioner’s inquiry into Lowland Grasslands of the ACT and will not be included in this study.
This Investigation has followed those Terms of Reference and these have been addressed throughout this report. All the Terms of Reference have been addressed, as shown in Table 1.

Table 1: Addressing the terms of reference

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<td>Recommendations 2.2, 2.3</td>
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While all recommendations are considered important some have a high priority, these are bolded in the above table.

1.2 Investigation process

This Investigation has involved gathering and analysing information from numerous sources including public submissions, community forums, discussion with experts, information from government agencies and that gained from commissioning technical papers.

1.2.1 Expert panel

An Expert Panel comprised of members with expertise in natural resource management, ecology, flora, fauna and recreation was established to provide advice.

The members of the Expert Panel were:

- Mr Robert de Castella – Chief Executive Officer of SmartStart;

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10 During this Investigation, the names of some ACT Government agencies changed. The names used in this Report are those current at the time of publication, or current at the time when information was provided.
• Dr Lyn Hinds - Senior Principal Research Scientist, leading the Vertebrate Pest Group, Commonwealth Scientific and Industrial Research Organisation (CSIRO);
• Professor Tony Peacock – Chief Executive Officer of the Cooperative Research Centres Association of Australia with expertise in feral animals;
• Dr Sarah Ryan - Chair of the ACT Natural Resource Management Council, Deputy Chair of the National Working Group of Natural Resource Management Chairs and is a member of the University of Canberra Council with special responsibilities in environment and sustainability; and
• Dr David Shorthouse - Visiting Fellow at the Fenner School of Environment and Society at the Australian National University where he participates in an ecological research program on woodland recovery.

Members of the Expert Panel have provided invaluable advice and critique.

1.2.2 Reports and papers
Fourteen reports and papers were developed to assist the Investigation. Of these, eleven are technical papers which reflect the views of their authors and not the Commissioner.

• Analysis of Public Submissions for the Canberra Nature Park (nature reserve); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation by Mr Richard Reilly (Appendix A);
• Values and Uses of Canberra Nature Park – a survey of Canberra Nature Park user groups by Ms Barbara Chevalier and Ms Sue Hoffman (Appendix B);
• Funding options for the protection of the environment through enhanced management actions by Ms Lisa Miller (Appendix C);
• Managing Rabbits in Canberra Nature Park; A Report to the Commissioner for Sustainability and the Environment by Dr Kent Williams (Appendix D);
• Impacts of Climate on the Canberra Nature Park: Risks and Responses by Dr Bob Webb (Appendix E);
• Potential biodiversity offset actions and sites for the Australia Capital Territory by Dr Philip Gibbons (Appendix F);
• Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function by Ms Sarah Sharp (Appendix G);
• Should Goorooyarroo, Mulligans Flat, Mount Majura and Mount Ainslie become a National Park or remain as discrete Nature Reserves as part of Canberra Nature Park? by Mr Ian Pulsford (Appendix H);
• Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? by Mr Ian Pulsford (Appendix I);
• Legal Obligations of the ACT Government Regarding The Management of Nature Reserves by Professor Murray Raff (Appendix J); and
• History of Canberra Nature Park by Dr Sarah Ryan (Appendix K).

Three other papers present findings from forums:

• Research: Existing and Potential: Paper to inform Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores, compiled by the Office of the Commissioner for Sustainability and the Environment (Appendix L).
• Report of the Bird Forum by Beacon Hill Consulting (Appendix M); and
• Investigation into Canberra Nature Park (nature reserves); the Molonglo River Corridor (nature reserves) and Googong Foreshores; Community Consultation Forums by Interaction Consulting Group (Appendix N).

When time permitted, papers were released for public comment prior to this report being finalised. Comments received have been used to inform this Investigation where relevant.

1.2.3 Community engagement
Community views were sourced by:

• calling for public submissions;
• community forums; and
• individual meetings with the Commissioner and her staff.

Public submissions were invited on 26 October 2009 via a media release and public notice. The final date for submissions was 26 February 2010. Several groups requested extensions and these were granted. Submissions were received from 35 individuals or groups with the last submission received on 16 December 2010. The analysis of public submissions is presented in Chapter 3 Community views and values.

Three community forums were held in each of the catchments of Canberra:

• Kambah on 19 May 2010;
• Belconnen on 24 May 2010; and
• Ainslie on 26 May 2010.

The community forums were well attended by an average of 25 participants per session who engaged strongly with the issues presented. Findings from the forums are reported in Investigation into Canberra Nature Park (nature reserves); the Molonglo River Corridor (nature reserves) and Googong Foreshores; Community Consultation Forums by Interaction Consulting Group (Appendix N) and are discussed in Chapter 3 Community views and values.
The public submissions and community forums provided a rich and diverse collection of views, experiences and ideas.

1.2.4 Information from Agencies
Agencies provided information, when requested, and this has been referred to in this Investigation. The Territory and Municipal Services Directorate\textsuperscript{11} and the Conservator of Flora and Fauna were the main government bodies which provided information.

1.3 Location of investigation nature reserves
The Australian Capital Territory’s (ACT) nature conservation estate extends across 54 per cent of the Territory and makes an impressive contribution to national goals of establishing a comprehensive, adequate and representative national reserve system.\textsuperscript{12} This Investigation covers 8.1 per cent\textsuperscript{13} of the area of reserves\textsuperscript{14}, including 34 existing and one proposed, Kinlyside\textsuperscript{15} in the ACT, and Googong Foreshores located in New South Wales (NSW). The nature reserves covered by this Investigation are shown on Figure 1: Sites covered by the Investigation into Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores.

\textsuperscript{11} Formerly the Department of Territory and Municipal Services.
\textsuperscript{12} Manning, A. D., Shorthouse D. J., Stein, J. L. & Stein J., 2010, Ecological Connectivity for Climate Change in the ACT and surrounding region, Canberra, page 4.
\textsuperscript{13} Email from Mr Graeme Hirth GIS Officer, Department of Territory and Municipal Services to Mrs Narelle Sargent Office of the Commissioner for Sustainability and the Environment on 30 September 2010.
\textsuperscript{14} The Googong Foreshores is not included as it is in NSW.
\textsuperscript{15} Kinlyside was included as part of the investigation following a meeting between the Commissioner and Mr John Hibberd, Executive Director, ACT Branch Conservation Council on 9 December 2009.
Figure 1: Sites covered by Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation
2. **HISTORY**

The nature reserves which are the subject of this Investigation have ecosystems which have changed over time, even without human intervention. However, human intervention can often act as a catalyst or accelerate or initiate new change. Due to the proximity of our nature reserves to urban development, our daily actions affect them both directly and indirectly. The ability of ecosystems in the reserves to absorb human and non-human induced change will vary depending on their resilience. An understanding of the history of our nature reserves provides a context for considering:

...the nature of ecosystem change, and the dynamics that are already in place is important because they underpin what is possible to achieve with further intervention and thereby realistically shape our expectations about their future condition.

Black Mountain is an example of changes in an ecosystem as a result of human intervention, first through clearing and grazing and then through protection for restoration (Figure 2).

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Figure 2: Recovery of vegetation on Black Mountain after being widely cleared in the middle 1800s

The top and middle photos have been used with permission from the National Library of Australia (Pictorial Collection). The bottom photograph and the compilation are courtesy of Dr Sarah Ryan.\(^\text{18}\)

Our nature reserves have been left with combinations of the legacies of natural and human-induced events. These have been the:

- Geological and climate legacy 480 million years Before Present (BP) – 2010; and
- Human legacy;
  - Aboriginal presence 40,000 years BP – 2010
  - European settlement 1820-1910
  - Urban development 1911-2010.

This section presents a summary of this history and is based on a paper commissioned for this Investigation: History of Canberra Nature Park by Dr Sarah Ryan (Appendix K).

### 2.1 Geological and climate legacy

Our soils and topography are significant determinants of the features of our nature reserves and are the result of hundreds of millions of years of geological history. While there may be similarities between some nature reserves, there will always be subtle, and in some instances overt differences:

... Black Mountain is mostly Black Mountain sandstone, which was formed in the early Silurian from sandstone deposited in a fan on the sea floor, which was then uplifted and exposed as the surrounding softer plain eroded away. This is the only occurrence of this geology in the ACT. Other reserves on geologies formed from sediments include those of the Canberra Formation (e.g. Mulligan’s Flat) or the Pittman Formation (e.g. Molonglo Gorge). Other reserves have geologies based on volcanic activity and belonging to either the Laidlow Volcanic Suite (e.g. Mount Mugga Mugga, Tuggeranong Hill) or the Hawkins Volcanic Suite (e.g. Mount Ainslie, Mount Majura, Mount Painter).

Geological history has affected today’s flora and soils:

...while the trees on Black Mountain are similar to those on other wooded hills, it has a significantly richer shrub and herb flora than anywhere else in the ACT. The implication is that even before legacies of more recent land use are considered, what might be achievable in terms of conservation or rehabilitation on individual reserves needs to take into account the underlying characteristics of that place.

... long periods of weathering have produced soils that are relatively infertile with low organic matter and poor structure. On the upper slopes the soils are shallow and gravelly and prone to erosion. On lower slopes the soils are deeper, duplex soils, characterised by sandy topsoils overlying clayey reddish and yellowish, low fertility subsoils. The subsoils

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are very vulnerable to erosion if the topsoil is lost. Soils on the plains are deeper and more fertile\textsuperscript{21}.

Human intervention, exacerbated in recent times by its intensity and scale, has also had a significant effect on our nature reserves.

2.2 Human legacy

2.2.1 Aboriginal presence

Aboriginal presence in the region is considered to be at least 21,000 years old, based on dating of a rock shelter at Birrigai.\textsuperscript{22}

...The knowledge legacy of Aboriginal people is commonly thought of as belonging to a static and distant past but it is more dynamic and adaptive than that\textsuperscript{23} and can be an important contribution to understanding and managing landscape change.

...In terms of impacts on the ecology of the region, the use of patchy fire to stimulate fresh grass growth and attract grazing animals was probably the most significant but is not thought to have materially altered vegetation structure and composition\textsuperscript{24}. It possibly kept the grassy woodlands less wooded than they might otherwise have been, but the treeless nature of grasslands on the plains is more commonly attributed to extended periods of severe frost.\textsuperscript{25}

2.2.2 European settlement

The first written record of European sighting of the Limestone Plains is that in Charles Throsby Smith’s diary in 1820. Recordings such as these are the basis of our understanding of the landscape at the time of early European settlement.

...Accounts from early settlers in the region (e.g. Samuel Shumack\textsuperscript{26} and excerpts from his account in Box [2]) and photographs from the later 1800s ... document some of the changes that occurred and the impacts on ecosystem function were significant.\textsuperscript{27}

...These changes impacted on many ecosystem functions. Trees were felled to provide timber for housing and fencing, ringbarked to encourage more grass growth or cleared to enable land to be cultivated. The removal of trees altered nutrient cycles and diminished habitat and food supplies for birds and animals. Soil washed or blew away when laid bare in cultivation or as the result of the combined effects of drought, grazing and loss of grass cover. Bared grazing ground became compacted leading to reduced water infiltration, more runoff and erosion and reduced plant


growth. Grazing depended on native species in this period but the soil disturbance provided opportunities for agricultural weeds to become established and slowly the composition and structure of the native understorey changed. Loss of ground cover on slopes led to faster shedding of water and more erosive flows in creeks and rivers. Water quality was affected by increased sediments, uncontrolled stock access to water, lack of controls on human sewage, and on the Molonglo River, by the establishment of a mine which leached contaminants into the river at Captains Flat in 1874. Many willows were planted and these contributed to changes in river environments. A number of native wildlife threatened, or were perceived to threaten, crop and livestock production and were hunted and killed in large numbers.

This was a short relatively period of time but it left a significant legacy of altered landscape function, species loss and introduction of pests and weeds.

Box 2: Observations of some changes in ecosystem functions 1820-1909

**Observations of some changes in ecosystem functions 1820-1909.**

"we split thousands of posts and rails" [1867, p46]

"John Mayo had a contract ringbarking 7,000 acres at Belconnen" [1882, p 110]

"a huge dam was constructed near the Bandicoot Plain run" [1858, p32]

"the farmers had a hard time ploughing as the land was hard" [1865, p 46]

"No growth followed this rain as the rush of water had carried away the loose topsoil and the hot, dry winds did the rest. I usually commenced ploughing at Easter, but in this year the ground was too hard." [1882, p110]

"a series of thunderstorms passed over the locality, but not enough rain fell to lay the thick carpet of dust" [1865, p46]

'When I first saw Canberra [1856] there were less than a dozen willows on the river; a few years later they lined the bank from Duntroon to Yarralumla.'" [p12]

"my favourite pool ... had silted up. A flood in 1879 cleaned [it out] ... This silting process has been repeated several times since." [p 108]

A shooting expedition "shot 2,700 wallabies" [1876, p106]

"there was a good roll-up and more than 1,000 possums were shot" [1880, p152]

"with the introduction of strychnine ... the native and tiger cats were almost exterminated" [1870's, p 152]

"A plague of rabbits caused much injury to pasture and crops ... and in the season 1906-7 a great crusade was carried out against them." [p161].


2.2.3 Urban development

In 1911, Canberra was formally declared to be the site of the Capital of Australia. In 1912 Walter Burley Griffin won the design completion for the layout of Canberra. His design respected and embraced the natural features of the landscape:
... Lacking the cultural history, artefacts and monuments of Old World capitals, the Griffins’ Canberra would showcase nature instead. Griffin described the role of the natural features like this.

‘The peculiar advantages of Canberra lie principally in the following characteristics …

**MOUNTAIN RANGES.** Beautiful blue and snow-capped peaks of the Australian Alps … **LOCAL MOUNTS.** Ainslie, Black Mountain, Mugga Mugga, rising almost 700 feet (too lofty and too exposed for building purposes), afford objective points of prospect to terminate great garden and water vistas, with conspicuous positions for future commemorative monuments, and conversely offer points of outlook over a city arranged in an orderly way with references to them. … **HILLS AND SPURS.** Eminences rising to 200 feet furnish most appropriate public building sites to terminate main thoroughfares disposed with reference to them and often in apposition with the mountains also. …

**MOLONGLO RIVER AND FLOOD BASIN.** The considerable central flats are unavailable for building purposes, but eminently suitable for a waterway of the largest extent that would be consistent with a location in the heart of the city …. [bold added]’

The design intent was to keep Canberra’s hilltops and ridges free from buildings to serve as a landscape backdrop to the National Capital. This intent was captured in 1957 by the National Capital Development Commission’s policy to maintain the open character of the national capital and preserve its hilltops and ridges in a natural state. Identification of many of the city’s nature reserves occurred primarily because they were hills over approximately 625 metres in height and occurred within and surrounding Canberra, forming a backdrop for urban Canberra.

Initially, the establishment of nature reserves generally coincided with the establishment of nearby urban areas. In 1970, Black Mountain Nature Reserve was gazetted, adding nature conservation to the landscape goals of the hilltops and ridges. In 1976, the National Capital Development Commission adopted a policy for the National Capital Open Space System that would develop and link open spaces and ensure protection of natural settings for the city.

Since the gazettal of Mulligans Flat Nature Reserve in 1994, all areas added to Canberra Nature Park were to conserve their significant ecological values. Canberra Nature Park

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now protects areas of: hilltops and ridges, lowland woodland and natural grassland, which include habitat of threatened species and endangered ecological communities.\textsuperscript{36}

\section*{2.3 Our inheritance}
We have inherited a diverse range and a considerable number of nature reserves which offer many opportunities for Canberrans. However, these nature reserves are confronted by some significant management challenges, as a result of previous practices or lack of actions. These include:

- ...Removal of habitat. In the early days, Black Mountain was managed for firewood production and the absence of timber on the ground in other reserves suggests the taking of timber for this purpose was widespread. The result has been loss of shelter for native birds and animals and a decrease in decomposing material that supports invertebrates that in turn become food for birds.

- Removal of stone, sand and gravel for urban construction purposes, leaving disturbed quarry sites and alterations to creek and river courses.

- Construction of banks and dams in the hill reserves to protect suburbs from overland water flows and flooding. This has altered water flows, and introduced permanent water into places where it was previously ephemeral.

- ...increases in kangaroo populations and subsequent over-grazing and soil erosion.

- The creation of Lake Burley Griffin on the Molonglo River created the Jerrabomberra Wetlands, which is included in Canberra Nature Park.

- Use of reserves for urban infrastructure like rubbish tips, water supply reservoirs, telecommunication towers, electricity substations, underground cables and power lines, survey points, radar stations and aircraft warning lights. These have required vehicle access tracks which have disturbed the soil and exposed it to soil erosion and weed invasion.

- Fire protection measures to safeguard people and buildings require access roads and altered fire regimes, often on or around the edges of reserves.

- Predation by domestic dogs and cats has contributed to the decline [of some] native fauna, both on and outside the reserves, particularly birds and reptiles.

- Garden plants have escaped and some have become serious weeds. They displace native plants, compete for light and nutrients and few are good food sources for native fauna.

- Cars, motorbikes, bicycles, horses and walkers have created tracks which have facilitated soil erosion and weed dispersal.

- In reserves where grazing continued past the 1950s, the introduction of fertiliser and exotic grasses and legumes led to substantial changes in the composition of pasture.

Tall, warm season, perennial tussock grasses were replaced with short, cool season, perennial native or exotic grasses and herbs.\textsuperscript{37}

- For the Park as a whole, the continued urban development has led to loss of connectivity between reserves......\textsuperscript{38}

Positive legacies include:

- …A strong adherence to the Griffin vision for the city landscape. The National Capital Plan in Section 8.5.3, Policies for Hills, Ridges and Buffer Spaces, confirms “The inner hills will be protected as key symbolic and landscape elements in the National Capital Plan expressing the defined land, water and municipal axes and providing the dominant backdrop feature to the city”.

- The increase in institutional arrangements for controlling activities in the nature reserves. A number of the activities and impacts listed above have been curtailed and trajectories for improving condition in specific places can be identified. For example, the revegetation of Black Mountain [Figure 2], the oldest reserve in the Park, indicates what can be achieved given the will, re-setting of the human influences and the passage of time for ecological processes to work. Stabilisation of road cuttings and previously eroded gullies and streams with self-seeding native vegetation can be seen in this reserve and others.....

- An enormous growth in scientific understanding including biology, ecology, landscape processes, biodiversity conservation, pest management etc...has enabled a more evidence-based approach to managing the Nature Park.

- A heightened community awareness of environmental issues and a high use of, and identification with, reserves by local residents has led to strong community pride and concern for their future. Through the land care movement and park care groups, volunteers make substantial contributions to the care of their local reserves.\textsuperscript{39}

We are fortunate in having an extensive system of nature reserves which form part of our open space network; 54 per cent of the Territory’s land is protected in nature reserves and only 13 per cent is used for urban purposes, of which 20 per cent is open space such as urban parks.\textsuperscript{40}

...Indeed, Canberra is unique in that the natural setting has become the primary monument, especially the grey-green hills rising above the inland plains that were chosen for its site.\textsuperscript{41}


This open space network is an essential part of the City’s green infrastructure which provides many services. However, given the urban context of many of our nature reserves, protecting and managing the ecological and environmental attributes of them has been and always will be a challenge.

A measure of the effect of white settlement across the ACT could be that some species have become extinct and others are under threat of extinction. For example, three frog species, the Green and Golden Bell Frog (*Litoria aurea*), Tablelands Bell Frog (*Litoria castanea*) and Southern Bell Frog (*Litoria raniformis*) have become extinct. Many other species including the Brush-Tailed Rock Wallaby (*Petrogale penicillata*), Eastern Bettong (*Bettongia gaimardi*), Brolga (*Grus rubicundus*) and Bustard (*Ardeotis australis*) which were thought to have been present in the ACT, are no longer.42 Another 31 species including the Grassland Earless Dragon (*Tympanoctys pinguicolla*), Golden Sun Moth (*Synemon plana*) and Perunga Grasshopper (*Perunga ochracea*) and two ecosystems (Yellow Box/Red Gum Grassy Woodland and Natural Temperate Grassland) have been declared vulnerable to or endangered with extinction.43 The Grassland Earless Dragon (*Tympanoctys pinguicolla*) is considered to be on the verge of extinction within the ACT as its numbers are only a few hundred or less. Loss of habitat, prolonged drought and overgrazing by stock and kangaroos are all clearly implicated in the recent severe decline of this species.44 There are also concerns about several species of woodland birds including the Brown Treecreeper (*Climacteris picumnus*) and the Hooded Robin (*Melanodryas cucullata*).45 These species and others of concern could be a focus of the restoration programs mentioned in Section 4.4.4 Nature reserve restoration.

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42 Email from Dr Will Osborne, University of Canberra to Mrs Narelle Sargent Office of the Commissioner for Sustainability and the Environment 2 May 2011.  
44 Email from Dr Will Osborne, University of Canberra to Mrs Narelle Sargent Office of the Commissioner for Sustainability and the Environment 2 May 2011.  
45 Email from Dr Murray Evans, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment 2 November 2010.
3. **COMMUNITY VIEWS AND VALUES**

As outlined in *Section 1.2 Investigation process*, this Investigation sought community views by calling for public submissions, holding public forums, consulting with the ACT Indigenous Elected Body, undertaking workshops in schools, holding a Bird Forum and commissioning a survey of user groups.

Community members and user groups value our nature reserves for a range of reasons including:

- ‘being in nature’ - its native flora and fauna, green spaces, beauty, scenery and views;
- being outdoors - the ambience, variety and diversity; being peaceful and quiet away from traffic;
- the accessibility or proximity to the suburbs;
- the suitability of the terrain for activities like running; and
- enjoyment of activities such as running, walking, social gatherings.46

The sentiment expressed in Box 3 captures a feeling many community members.

Box 3: Comment from a participant at the Belconnen community forum on 24 May 2010

I’m a horse rider – and, by the end of this meeting, I will also be able to say I’m part of Landcare.

I moved from Melbourne to Canberra for the Canberra Nature Park. I can’t imagine another city that offers the lifestyle that Canberra does – and the CNP is a huge part of that. I go to work in a city and yet I come home through a Nature reserve.

I run, I walk, I ride my horse and I picnic in the CNP. It’s one of the most incredible multi-user facilities I’ve ever come across and central to my existence in Canberra. For the Canberra Nature Park to survive for decades into the future it cannot be the domain of environmentalists only.

As I ride my horse through the Park and connecting corridors, I meet a diverse representation of the vibrant ACT community. From bike riding families to serious mountain bike competitors, from walkers to bird watchers, from Sunday runners to marathon men, from picnic goers to horse riders, from children to their grandparents, from land care workers to Indigenous elders – we all want to see a sustainable and accessible future for the CNP. Being able to enjoy the surrounds of the CNP in all these forms engenders a sense of community and a sense of appreciation of our natural environment.

The time when community groups are pitted against each other over the CNP has passed. Polarised views are not sustainable if we want to see the future of the CNP be a good one. Horse riders, bike riders and other recreational users cannot expect unlimited access to environmentally sensitive areas and environmentalists cannot expect recreational users to be locked out.

Balances need to be made and involve consultation with all users of the CNP. After all, we want the same thing – to preserve the future of CNP and to be able to enjoy the diverse opportunities it offers.

The most common use of our nature reserves is walking which is followed by running and cycling. The range of other activities includes bird watching, horse riding and orienteering.

The importance of our nature reserves for their recreational and ecological values means that there are many different and often conflicting perceptions about the purpose and appropriate uses of the nature reserves. Accordingly expectations as to how nature reserves should be resourced, supported, managed and maintained are varied.

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Report on Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores

Park management and policy and planning were the subject of attention in submissions. However, submissions also highlighted urban planning and design, and funding/resourcing as issues.

3.1 Public submissions

Thirty five individuals/groups provided submissions which are presented in Part 3: Submissions. Submissions varied markedly in size and scope, ranging from single-page emails to submissions comprising more than 80 pages of text and images. Submissions were evaluated using qualitative data analysis coding theory49 undertaken by Mr Richard Reilly. The process and analysis of submissions by Mr Reilly is included in Appendix A. In all, 394 issues were identified and logged, coded and subsequently grouped into broad themes. These themes are shown in Table 2.

Table 2: Public submissions summary – grouped and ranked by theme50

<table>
<thead>
<tr>
<th>Themes</th>
<th>Issues Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park Management</td>
<td>166</td>
<td>44.1%</td>
</tr>
<tr>
<td>Policy / Planning</td>
<td>157</td>
<td>39.8%</td>
</tr>
<tr>
<td>Urban Planning Design</td>
<td>16</td>
<td>4.1%</td>
</tr>
<tr>
<td>Funding</td>
<td>12</td>
<td>3.0%</td>
</tr>
<tr>
<td>ParkCare</td>
<td>10</td>
<td>2.5%</td>
</tr>
<tr>
<td>CNP Investigation</td>
<td>9</td>
<td>2.3%</td>
</tr>
<tr>
<td>Research</td>
<td>7</td>
<td>1.8%</td>
</tr>
<tr>
<td>Park users</td>
<td>7</td>
<td>1.8%</td>
</tr>
<tr>
<td>Legislation</td>
<td>5</td>
<td>1.3%</td>
</tr>
<tr>
<td>Agency impacts</td>
<td>2</td>
<td>0.5%</td>
</tr>
<tr>
<td>Infrastructure impacts</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td>Land Management Agreements</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td>Leaseholder responsibilities</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>394</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Mr Reilly found that the majority (83.9 per cent) of issues raised in the submissions relate to Park Management (44.1 per cent) and Policy and Planning (39.8 per cent). In decreasing order of most often raised to least often raised, specific Park Management issues included:

- *...weed control* (eg problem of garden escapes into CNP [Canberra Nature Park]; woody weed invasion...CNP horses-riding spreads weeds in reserves...)
- *grazing pressures/impacts* (eg stock grazing impacts; rabbit grazing increases erosion risk; urgent need to reduce kangaroo and rabbit numbers on reserves...)

50 Reilly R., 2010, *Analysis of Public Submissions for the Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation*, page 2.
• Communication/community collaboration (eg PCL - stakeholder group communication could be improved and clarified; create partnerships with corporate/community groups....)

• ParkCare (eg ParkCare is not well supported by PCL; .... ParkCare work has resulted in significant decreases in woody weed infestation and substantial increases in some endangered plant species....)

• fire hazard reduction (eg fire buffer zones should be totally within developed land boundaries; ......need for regular review and research into vegetation response to fuel load reduction burns......)

• enforcement (eg all suburbs adjacent to reserves should have cat containment policies; unleashed dogs in reserves are a risk to native animals and reserve users...) .

• Parks Conservation and Lands (PCL) (eg encourage permanent long-term employment of Rangers; recommend more Parks Conservation and Lands resources for reserve management...)

• pest species control (eg kangaroos and rabbits are present in excessive numbers in places; ...an integrated rabbit-control program is required Canberra-wide to halt and reverse the decline of ecosystems....)

• high impact users (eg adopt a user-pays principal for high impact reserve users; provide separate off-reserve areas for high impact users.....)

• mowing/slashing practices (eg spread of pest plant species along mown/slashed road and track verges...)51

Other major concerns of respondents related to Policy and Planning matters, in decreasing order of most often raised to least often raised responses included:

• CNP reserves (eg Centenary of Canberra project proposal: suburban ridge walking track; ....Canberra Nature Park Management Plan is broad and general and fails to deal with operational priorities and specific site actions and issues....)

• reserve management plans (eg develop individual reserve management plans; less than a quarter of reserves have site-specific management plans; ....)

• reserve policy and planning (eg....there is too much emphasis on increasing the area of the conservation estate at the expense of achieving quality in the management; CNP must be protected in perpetuity and not exist at the whim of the planners...

• Land Management Agreements (LMAs) (LMA should be more transparent to allow monitoring and assessment of rural lease management; ...)

• offsets: (eg....offsets not favoured as they are subject to ‘horse-trading’ often leading to loss of biodiversity; if offsets are required, resources should be directed to enhancing management of existing reserves; .....)

51 Reilly R., 2010, Analysis of Public Submissions for the Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation, pages 2-4.
• **ParkCare**: (eg ......ParkCare groups should continue to be supported by the ACT Government as a highly cost effective way of achieving high conservation outcomes;...)

• **resourcing**: (eg successful reserve establishment has not been matched by park management funding: CNP recurrent funding could tap environmental levies on developers....)

• **CNP grazing impacts**: (eg use the Precautionary Principle with regard to Eastern Grey Kangaroo grazing;...)

• **infrastructure in reserves**: (eg on-park developments should be only located there if no other prudent and feasible sites are available;....... major infrastructure should be totally within the developed land boundaries....)

Although amounting to less than five per cent of the total issues evaluated here, the submissions also highlighted urban planning and design issues as being important toCanberrans including:

• **...urban planning**: (.....the most important factor contributing to ACT biodiversity conservation has been the proactive planning values in place since the beginnings of Canberra;.....)

• **amenity**: (eg evaluate nature reserves and open spaces in terms of well-being benefit to the community; CNP system is an invaluable asset to the city...).

• **habitat value**: (eg consideration should be given to tree selection for bird and animal habitat value; need for corridor connectivity with provision for large habitat trees on new estates....)

• **ecosystem services**: (eg need to incorporate support for ecosystem services within urban planning and design....)\(^{52}\)

Likewise, funding/resourcing issues consistently came through as a minor but common theme in many of the issues submitted as follows:

• **...CNP resourcing**: (eg need to allocate sufficient resources to manage reserves for optimal biodiversity value; urgent need for increased funding for reserves and their management...)

• **ParkCare**: (eg recognise extensive ParkCare contribution to CNP conservation/protection; lack of PCL support for ParkCare; develop collaboration between Parkcare, Landcare, Government and stakeholders;....)\(^{53}\)

A commonly expressed view in the submissions relates to the high value that individuals and groups place on the existence, accessibility and amenity of our reserves and open spaces in and around Canberra. While this is the case, it is also evident that

\(^{52}\) Reilly R., 2010, *Analysis of Public Submissions for the Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation*, page 5.

\(^{53}\) Reilly R., 2010, *Analysis of Public Submissions for the Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation*, pages 6.
there are many different and often conflicting perceptions about the purpose and appropriate uses of the nature reserves. Associated with this are various views and expectations as to how the nature reserves should be resourced, supported, managed and maintained. These issues are the subject of discussions and recommendations in Chapter 6 Strategically positioning our nature reserves and Chapter 7 Future funding.

### 3.2 Community forums

Members of the community were invited to community forums held in 2010 in each of the catchments in Canberra, on 19 May in Kambah, 24 May in Belconnen and 26 May in Ainslie. Attendance was strong with an average of 25 participants per session. Findings from the forums are detailed in *Investigation into Canberra Nature Park (nature reserves); the Molonglo River Corridor (nature reserves); and Googong Foreshores Community Consultation Forums May 2010 Final Report* by Interaction Consulting Group (Appendix N).

Forum participants were invited to discuss their ideas using the themes of: communication; connectivity between reserves; integration of uses and activities on reserves; key management issues on reserves; and resourcing. Ideas which emerged included:

- communication – publicity, education and information, improved signage to communicate recreation use policy, finding ways to get different users to meet and communicating with under 30’s.

- connectivity between reserves – maintain Walter Burley Griffin’s vision of a bush capital, protection of green spaces plus connectivity corridors to enhance biodiversity (flora and fauna) plus provide all recreational users with safe enjoyable passage between parks in a sustainable manner and integration of development and natural resource management.

- integration of uses and activities on reserves - integration of ParkCare and Landcare activities to support biodiversity and recreation activities; establish a User’s Group (for whole nature park); improve coordination and planning by creating a team of experts to coordinate work of rangers and volunteers and help train volunteers/rangers.

- key management issues on reserves - define reserve boundaries and incorporate other green spaces, connecting individual reserves and improving resources.

- resourcing - Government should put a higher priority on values of nature park so that funding matches multi-use concept for safe recreational areas; maintain integrity of reserves by ensuring supply of adequate resources for protection
and recreation; and sufficient on-ground actions in the reserves in a coordinated/integrated manner.54

3.3 ACT Indigenous Elected Body
The ACT Indigenous Elected Body was consulted. A key issue its members raised was the management of corridors and connectivity in new developments and they were concerned that some of the corridors and connectivity seem to be disappearing.55

3.4 Workshops with schools
Students from Year 9 Gold Creek Senior School and Year 3 St Anthony’s School participated in interactive exercises aimed at providing information from our youth in relation to the value of our nature reserves and trees. Following are some of the comments from the two workshops:

St Anthony’s Primary School

Teach children about the importance of trees

Lie down and look at the clouds

A good place to relax56

From Gold Creek Senior School

It is important to keep trees because we need some nature in the city, so it would be good to have some wildlife, nature in our parks and city to have fun

Parks would have to be healthy land to keep the animals healthy and the nature of the environment healthy too57

3.5 Bird forum
On 19 February 2010, approximately 30 scientists, researchers, government officers, and members of environment, wildlife and ornithological organisations attended a Bird Forum organised to provide information for both the Tree Investigation58 and this Investigation. The Report of the Bird Forum is included at Appendix M.

Five main areas for action were identified by participants at the Forum being:

- future timely planning at a landscape level—the need for a collaborative whole-of-government approach to planning, particularly in new suburbs, with

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54 Interaction Consulting Group, 2010, Investigation into Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores; Community Consultation Forums Final Report, pages 6-7.
55 Meeting held on 16 April 2010.
56 Workshop held on 7 April 2010.
57 Workshop held on 6 April 2010.
consideration of tree size when planning verges and the importance of under canopy vegetation for small birds;

- strategic connectivity — the need for further research into the anticipated connectivity networks and a map that identifies key links across the city;

- nest boxes and tree hollows — the need for nest boxes to be monitored, maintained and be species specific has reduced their effectiveness and use by the species of concern, therefore further research is required;

- community education and engagement — the need to recognise the diversity in communities when determining methods of engagement, with community care programs, ongoing community education through information and positive media stories, and engaging families in urban care programs through schools; and

- funding and resources — seeking opportunities to access non-government funding by establishing ‘round-up’ trusts whereby the community is offered the opportunity to donate the difference between the cost of an item to the round-up amount to the nearest dollar when paying bills, and an environmental levy.\(^{59}\)\(^{60}\)

### 3.6 User group survey

Sixteen user groups\(^{61}\) were surveyed between 11 to 24 August 2010 by Ms Barbara Chevalier and Ms Sue Hoffman.\(^{62}\) These groups included members of the Territory and Municipal Services Directorate ‘Parks Conservation and Lands Recreational Users Group’ and other groups as shown in Table 3.

A copy of *The Values and Uses of Canberra Nature Park - A survey of Canberra Nature Park user groups* by Ms Barbara Chevalier and Ms Sue Hoffman is at Appendix B.

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\(^{59}\) This is explored in Section 7.3 Additional funding sources.


\(^{61}\) The term ‘user group’ or ‘recreational user group’ is used as distinct from Parks Conservation and Lands Conservation and Wildlife Stakeholder Forum and ParkCare/Landcare/environmental groups, who were not part of the survey.

Table 3: List of user groups who were contacted\textsuperscript{63}

<table>
<thead>
<tr>
<th>Parks Conservation and Lands Recreational Users Group</th>
<th>Other groups identified as relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Cross Country Club Inc</td>
<td>Birds Australia</td>
</tr>
<tr>
<td>ACT Equestrian Association Inc</td>
<td>Canberra Ornithologists Group</td>
</tr>
<tr>
<td>ACT Veterans Athletic Club</td>
<td>Family Bushwalkers Inc</td>
</tr>
<tr>
<td>ACT Walking For Pleasure</td>
<td>Women's International Club</td>
</tr>
<tr>
<td>Australian Mountain Running Association</td>
<td>ACTOUT - ACT Outdoor Group</td>
</tr>
<tr>
<td>Canberra Bushwalking Club</td>
<td>Omnia Adventurers and Social Club</td>
</tr>
<tr>
<td>Canberra Off Road Cyclists</td>
<td></td>
</tr>
<tr>
<td>Capital Field Archers</td>
<td></td>
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<tr>
<td>National Parks Association of the ACT</td>
<td></td>
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<tr>
<td>Orienteering ACT</td>
<td></td>
</tr>
<tr>
<td>Scouts Australia - ACT Branch</td>
<td></td>
</tr>
<tr>
<td>Sri Chinmoy Marathon Team</td>
<td></td>
</tr>
</tbody>
</table>

From the survey it can be concluded that the main values that the community place on our nature reserves are:

- \textit{...Nature itself...: its flora and fauna, green spaces, beauty, scenery and views}
- \textit{Being outdoors...: the ambience, variety and diversity; being peaceful and quiet away from traffic}
- the \textit{accessibility or proximity}...to the suburbs
- the suitability of the \textit{terrain} for activities like running, and
- \textit{Enjoyment of the activities per se - running, walking, social.}\textsuperscript{64}

The survey found that:

- Walking was the most common use followed by running and cycling. Many other activities were also cited [including bird watching, horse riding and orienteering].
- What the groups most valued about CNP were many aspects of nature itself, being outdoors, and the proximity of the nature reserves to the suburbs.
- Almost every user group reported that they directly benefit the CNP’s care and maintenance and assist by monitoring and reporting problems to management.
- Most groups reported that there were no negative impacts from their groups’ usage on CNP.
- All but one group were positive in their evaluation of the communication channel between their group and the PCL [Parks Conservation and Lands Recreational] Users Group. Three groups were not aware of the PCL Users Group.
- Over half the user groups made positive assessments of the condition of the nature parks..
- Three groups made negative assessments of the condition of CNP.
- The majority of user groups were positive about the management of CNP. Five commented on how under-resourced the CNP is.
- Half the groups commented on things that were not working – which could be indirectly or were directly attributed to insufficient resources to manage the parks effectively...65

A number of suggestions for improving the management of the nature reserves were made including:

- greater promotion, research, education and public information;
- increased resourcing/staffing;
- improved management and maintenance;
- improved infrastructure such as paths and signage; and
- improved service such as a central contact point.66

The following key themes emerged across all user groups:

- ...CNP is highly valued by user groups who can be seen as extra ‘eyes and ears’ and, to some extent, invisible carers of the CNP

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• The PCL [Parks Conservation and Lands] Users Group could be broadened to include all the user groups
• The condition and management of CNP are held to be ‘not bad considering’ that CNP is under-resourced
• Issues of over-use: the challenge of finding a balance between conservation and recreation.67

While attention was focused on the importance of the nature reserves to the community, one submission aptly states the importance of the community to the nature reserves;

... the future of the Canberra nature reserves will depend as much on the community and their knowledge and engagement with the local environment as [it] will [on] action only on the part of bureaucratic organisations, and which are known to be resource depleted.68

Some of the suggested actions proposed from the user survey (refer to Box 4), and issues raised in public submissions are considered in the following discussion.

68 Submission 17 page 14.
Box 4: Short term, medium term and longer term actions proposed from the user group survey

1. **In the short term:**
   1.1 Implement electronic media to improve information for the public.
   1.2 PCL [Recreational] Users Group directly invites Canberra Ornithologists Group, Family Bushwalkers Inc, and Women’s International Club to join the group. Perhaps other user groups may be identified through the Conservation Council and/or www.climatechange.org.au.
   1.3 Engage the user groups more directly and more regularly, in contributing to the management of CNP. This can be done through the PCL Users Group, interagency meetings, and/or larger, annual stakeholders’ forums. In particular, engaging ‘the array of expertise’ of user groups would enhance the ‘in-kind’ help already being contributed to CNP, especially when management is under-resourced.
   1.4 Making CNP North and South’s access arrangements consistent: explore the possibility that CNP South gives registered users a master key for access gates, as CNP North does.

2. **In the medium term:**
   2.1 Develop and enable CNP’s research program and activities through:
   - encouraging research by park rangers
   - engaging Canberra’s universities to undertake research
   - engaging those with expertise in the user groups to contribute to research.

3. **In the longer term:**
   3.1 Infrastructure and management that depends on increased resourcing/staffing will require strong advocacy to those who can access increased funding. Arguments for increasing funding to CNP can be linked to:
   - Greater recognition by government of the important value and asset that the nature reserves represent to the community, and
   - The value to visitors to the ACT, and thus to investment in eco-tourism. ¹

¹ Email from Mr Stephen Hughes, Territory and Municipal Services Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 27 May 2011.

### 3.7 Discussion

#### 3.7.1 Parks Conservation and Lands Recreational Users Group
It is understood that the Territory and Municipal Services Directorate has a number of consultative forums, including the Recreational Users Forum, ParkCare Coordinators Group, Conservation and Wildlife Forum and the Rural Landholders Forum.⁶⁹ The issue of Departmental staff meeting with different groups and these groups not being given the opportunity to meet with each other was raised in our community engagement activities.

⁶⁹ Email from Mr Stephen Hughes, Territory and Municipal Services Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 27 May 2011.
The main forum whereby various groups might be able to regularly meet seems to be the Parks Conservation and Lands Recreational Users Group and as is evident from Table 3, it does not include all user groups. This group could be broadened to include for example, the Canberra Ornithologists Group, Capital Region Fishing Alliance, Family Bushwalkers Inc, Women’s International Club and Scouts and Aboriginal groups such as members from ACT Indigenous Elected Body and United Ngunnawal Elders Council. This would ensure that all groups are routinely engaged in discussing issues. If this is progressed the number of consultative groups could be reduced.

Recommendation 1

**Strengthen community awareness and involvement** by:

1.1 Expanding the membership of the Parks, Conservation and Lands Recreational Users Group and reducing the number of consultative groups.

3.7.2 **Forum**

In addition to expanding the Parks Conservation and Lands Recreational Users Group, a biennial forum seems appropriate given the issues on community engagement raised in submissions and discussions. Such a forum would also provide a mechanism for coordinating research, discussing monitoring and data collection and raising awareness. This forum should include community members and stakeholders across all nature reserves. While this would have direct benefits for the nature reserves, it would also benefit the community: ...Evidence suggests that when people get more involved in their communities, communities and social networks are strengthened.70

The Natural Resource Management Council because of its role and contacts could host the biennial forums however it would need to ensure that all user groups were involved.

Recommendation 1

**Strengthen community awareness and involvement** by:

1.2 Holding a biennial nature reserves forum with representation from all stakeholders that promotes:

- information exchange;
- community education and awareness; and
- planning.

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3.7.3 Community education and awareness

Education and awareness were raised in all our community engagement activities across a range of issues including; compliance, signage and permitted uses as captured in the following response to the user’s survey:

....It would be good to see more public awareness and appreciation of the values of the reserves in the Canberra landscape from both their biodiversity and public amenity perspectives.71

Health Parks, Healthy People provides overarching principles which we need to convey in regards to our nature reserves:

- ...Parks Conservation and Lands manages the ACT’s parks and open space system to... conserve biodiversity and support an enjoyable, healthy and sustainable lifestyle;

- Spending active recreation time in parks can lead to greater fitness, health and overall wellbeing;

- There are many physical, social, spiritual and mental benefits associated with using parks...72

During our community engagement activities concerns raised about users breaching nature reserve regulations included; dogs being off leashes, the need to contain cats, bike riders on non-designated tracks and BMX riders making tracks, mounds and jumps. In areas where there is significant use of pathways and dogs are walked, dog faeces are an issue. There is a need for a community education and awareness program to address these issues so that everyone’s enjoyment and the condition of the nature reserves are protected.

It may also be appropriate for such a community education and awareness program to include information on off-nature reserve actions to protect our nature reserves. For example, domestic cats are a significant predator of native wildlife. It has been estimated that cats kill approximately 99 000 native animals in the Canberra urban environment each year, including birds, mammals, reptiles and frogs73 and local ParkCare groups have reported that domestic cats do use the nature reserves.74

Providing information on this impact and promoting responsible cat ownership could be an effective way to increase knowledge within the community and also reduce impacts on vulnerable fauna in nature reserves. A public discussion of issues relating to domestic cats could also be linked to results of the 2011 ACT Government survey of community


74 Email from Ms Waltraud Pix, Friends of Mt Majura to Ms Joanna Temme, Office of the Commissioner for Sustainability and the Environment, 16 May 2011.
attitudes to responsible cat ownership, which are expected to be made available in mid-late 2011.75

Other benefits such as health should also be promoted as expressed in the following excerpt from a submission:

....quantify the value of nature reserves and open spaces to the well-being of Canberra residents. This would incorporate the psychological, physical and social benefits of fresh air, exercise, closeness to nature and the ParkCare and recreational activities that are opportunities presented through nature reserves.76

**Recommendation 1**

**Strengthen community awareness and involvement** by:

1.3 (High Priority) Developing and implementing a community education and awareness program promoting the ecological, health and social values and benefits, and appropriate uses of our nature reserves.

**3.7.4 Signage**

Responses to our community engagement activities indicate that existing reserve signage is considered to be inadequate. More signage is needed on most nature reserves to indicate the boundaries of the nature reserve and which activities are permitted on a nature reserve, including signage for trails showing where activities such as mountain biking and horse riding are permitted. There is also a need to have information on the history and ecology of the nature reserves. Some nature reserves do have interpretative information, for example, parts of Mount Ainslie Nature Reserve and some new nature reserves such as Goorooyarro Nature Reserve.

At the community forums and in public submissions a number of suggestions were made on ways to improve education and awareness, including:

- developing a ParkCare website;
- installing new ParkCare noticeboards at suitable access points to nature reserves;
- improving signage to communicate recreation use policy and to clearly indicate which activities are allowed in the nature reserve;
- clearly marking trails to indicate which activities are permitted on the trails such as walking, mountain bike riding and/or horse riding;
- publicity campaigns including electronic, print and radio; and

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75 ACT Government Media Release, 27 April 2011.  
76 Submission 8 page 3.
• guided walks.

One submission states that...

...Years ago rangers were resourced to provide guided walks into the reserves abutting suburbs. Reinstating such walks would be an investment in reserve protection.\(^{77}\)

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**Recommendation 1**

**Strengthen community awareness and involvement** by:

1.4 Improving on-nature reserve signage and information.

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3.7.5 **Future generations**

Our nature reserves are important for future generations and for developing children’s relationship to nature. On-going awareness and education is required to safeguard the future of nature reserves by instilling the ecological, health and social benefits and values of our nature reserves in our children.

...Studies of children in school yards with both green areas and manufactured play areas found that children engaged in more creative forms of play in the green areas. One of these studies found that a more natural schoolyard encouraged more fantasy and make believe in particular, which provided ways for boys and girls to play together in egalitarian ways.\(^{78}\)

...Camping in the garden, riding bikes through the woods, climbing trees, collecting butterflies, picking wildflowers...somewhere the pleasure of free-range childhood have been lost. And with the indoor habits of today’s children come other problems such as epidemic obesity, attention-deficit disorder, isolation and childhood depression.\(^{79}\)

The importance of involving children and young people in our nature reserves is captured in the following response to the user’s survey;

...This could include a more concerted effort to raise their profile particularly among the younger generations. For example, most bird watchers who value the reserves and their biodiversity fit the profile of the 40+ bracket. Many other residents that also appreciate these areas fit an older demographic. Recruiting a stronger community commitment by the younger generations to these sorts of areas is critical to their continuance and ongoing ecological health.\(^{80}\)

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\(^{77}\) Submission 16 page 4.


\(^{79}\) Louv, R., 2005 *Last Child in the Woods – Saving Our Children from Nature Deficit Disorder* Atlantic Books, Great Britain, back cover.

Potential ways to increase awareness and education in children and young people include incorporating education on our nature reserves into the Australian Sustainable School Initiative (AuSSI), and encouraging schools to adopt a nature reserve and promote activities aimed at protecting our nature reserves.

**Recommendation 1**

**Strengthen community awareness and involvement** by:

1.5 Integrating information on nature reserves into the Australian Sustainable School Initiative and encouraging schools to adopt a nature reserve.
4. **ADDRESSING CHALLENGES ON OUR NATURE RESERVES**

This Investigation considers the condition of 34 nature reserves and one proposed nature reserve, the majority of which form the Canberra Nature Park that is located within the urban areas of Canberra. Other sites considered in this Investigation but not within this urban area are Googong Foreshores, Lower Molonglo Nature Reserve and Molonglo Gorge Nature Reserve.

The condition of the forests, woodlands and grassy woodlands in the nature reserves including the effects of grazing by stock and/or kangaroos, vertebrate pests and weeds, was assessed and is reported in Ms Sarah Sharp’s *Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function* report (Appendix G). The aims of this report were to:

a. assess the condition of the nature reserves in an objective, quantitative and consistent way;

b. identify the level of landscape functioning in each nature reserve and identify impacts of threatening processes on the landscape function;

c. identify the nature reserves (or parts thereof) that require management actions as a matter of priority; and

d. provide a baseline data set against which future change in landscape function can be assessed.\(^{81}\)

Landscape function analysis was used to assess a site’s condition. This provides a rapid, consistent assessment of soil health and biophysical soil processes across sites that vary considerably. The condition assessments were:

- based primarily on the values of landscape functional indices measured at 207 locations in the nature reserves, quantitatively extrapolated across the nature reserve.

- used to provide an assessment of the condition of each of the nature reserves, classified as satisfactory condition, approaching critical condition or in critical condition.

- at a particular point in time and as such they can be considered a ‘snap-shot’. Repeated measurements will be required to determine whether landscape function is changing as a result of management interventions or continuation of current practices, or a drying climate.\(^{82}\)

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The work undertaken by Ms Sharp has been extensive and her comprehensive report, *Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function* is supported by detailed appendices which include site locations and photographs that allow for future assessments to be undertaken at the same sites. Mr David Tongway (CSIRO) the architect of the Landscape Functional Analysis technique provided guidance to Ms Sharp. Dr Sue McIntyre (CSIRO) reviewed the technique, before it was applied. Ms Sharp’s report has been peer reviewed by Dr David Shorthouse and Dr Denis Saunders.

Characteristics of the nature reserves surveyed for this Investigation are summarised in Table 4.
Table 4: Characteristics of the nature reserves surveyed for the Canberra Nature Park investigation

<table>
<thead>
<tr>
<th>Name of Nature Reserve</th>
<th>Area (ha)</th>
<th>Gazetted (incorporation into National Capital Open Space System)</th>
<th>Geology</th>
<th>Soil landscape groups</th>
<th>Threatened species and ecological communities</th>
<th>Other biodiversity values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Mountain</td>
<td>460</td>
<td>1979 (pre-1975)</td>
<td>Black Mtn Sandstone, State Circle Shale, Pittman Formation</td>
<td>Campbell, Burra, Winnunga, Queanbeyan and Luxor (with colluvium)</td>
<td>YB-RG Woodland birds PTWL</td>
<td>HCV forest Landscape connectivity</td>
</tr>
<tr>
<td>Bruce Ridge</td>
<td>94</td>
<td>1993 (1975 – 1980)</td>
<td>Pittman Formation, Acton Shale Member</td>
<td>Queanbeyan with minor Winnunga</td>
<td></td>
<td>HCV forest Minor landscape connectivity</td>
</tr>
<tr>
<td>Callum Brae</td>
<td>143</td>
<td>2008</td>
<td>Laidlow Volcanic Suite with limestone, Hawkins Volcanic Suite</td>
<td>Burra with minor Williamsdale</td>
<td>YB-RG Woodland birds Perunga*</td>
<td>HCV woodland Landscape connectivity</td>
</tr>
<tr>
<td>Dunlop Grasslands (woodland part only)</td>
<td>106</td>
<td>1997</td>
<td>Hawkins Volcanic Suite</td>
<td>Williamsdale</td>
<td>NTG YB-RG SLL</td>
<td>MCV woodland</td>
</tr>
</tbody>
</table>

83 Reserves that formed part of the National Capital Open Space System in 1993 at that time were gazetted as Nature Reserves (Canberra Nature Park). Dates for when they were incorporated into the open space system are available only as having occurred within a five-year time period (data supplied by TAMS, October 2010).

84 Significant proportion of the nature reserve is high quality Endangered Ecological Community and/or considered to be of very high importance for threatened species.

* Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
<table>
<thead>
<tr>
<th>Name of Nature Reserve</th>
<th>Area (ha)</th>
<th>Gazette (incorporation into National Capital Open Space System)&lt;sup&gt;85&lt;/sup&gt;</th>
<th>Geology</th>
<th>Soil landscape groups</th>
<th>Threatened species and ecological communities&lt;sup&gt;84&lt;/sup&gt;</th>
<th>Other biodiversity values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Googong Foreshores (Western Foreshores)</td>
<td>1948&lt;sup&gt;85&lt;/sup&gt; 1983</td>
<td>Cappanana Formation</td>
<td>Burra</td>
<td>YB-RG PTWL BW</td>
<td>MCV woodland, grassland Landscape connectivity</td>
<td></td>
</tr>
<tr>
<td>Goorooyarroo</td>
<td>703 2006</td>
<td>Hawkins Volcanic Suite, Canberra Formation</td>
<td>Williamsdale, Burra and Campbell</td>
<td>YB-RG Woodland birds GSM</td>
<td>HCV woodland Landscape connectivity</td>
<td></td>
</tr>
<tr>
<td>Gungaderra Grasslands (woodland only)</td>
<td>281 1993 (1980 – 1985)</td>
<td>Acton Shale Member, Pittman Formation</td>
<td>Queanbeyan and Winnunga</td>
<td>NTG YB-RG Declining birds SLL</td>
<td>HCV woodland Rare species Snow Gum woodland</td>
<td></td>
</tr>
<tr>
<td>Jerrabombera Wetlands</td>
<td>212 1990</td>
<td>Alluvium</td>
<td>Pialligo</td>
<td></td>
<td>Waterbirds</td>
<td></td>
</tr>
<tr>
<td>Kama</td>
<td>155 2008</td>
<td>Hawkins Volcanic Suite</td>
<td>Burra</td>
<td>NTG YB-RG Woodland birds</td>
<td>HCV woodland, grassland Landscape connectivity</td>
<td></td>
</tr>
<tr>
<td>Kinlyside</td>
<td>357 proposed</td>
<td>Hawkins Volcanic Suite, Alluvium</td>
<td>Burra and Ginninderra Creek</td>
<td>YB-RG Woodland birds</td>
<td>HCV woodland, grassland</td>
<td></td>
</tr>
</tbody>
</table>

<sup>84</sup> Area of Western Foreshores only.
<table>
<thead>
<tr>
<th>Name of Nature Reserve</th>
<th>Area (ha)</th>
<th>Gazetted (incorporation into National Capital Open Space System)(^\text{83})</th>
<th>Geology</th>
<th>Soil landscape groups</th>
<th>Threatened species and ecological communities(^\text{84})</th>
<th>Other biodiversity values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molonglo Gorge</td>
<td>994</td>
<td>1970</td>
<td>Pittman Formation</td>
<td>Foxlow with minor Queanbeyan and Macanally Mountain</td>
<td></td>
<td>HCV forest Landscape connectivity</td>
</tr>
<tr>
<td>Mt Ainslie</td>
<td>640</td>
<td>1993 (pre-1975)</td>
<td>Hawkins Volcanic Suite, Canberra Formation</td>
<td>Campbell, Burra and Luxor</td>
<td>YB-RG Woodland birds GBC <em>Arachnorhisch</em></td>
<td>HCV woodland, forest Rare plants Landscape connectivity</td>
</tr>
<tr>
<td>Mt Majura</td>
<td>481</td>
<td>1993 (pre-1975)</td>
<td>Hawkins Volcanic Suite, Canberra Formation</td>
<td>Campbell and Burra</td>
<td>YB-RG Woodland birds GBC <em>Arachnorhisch</em></td>
<td>HCV woodland, forest Rare plants Landscape connectivity</td>
</tr>
<tr>
<td>Mt Taylor</td>
<td>297</td>
<td>1993 (1975 – 1980)</td>
<td>Laidlow Volcanic Suite</td>
<td>Campbell, Burra with minor Luxor</td>
<td>SPP PTWL</td>
<td>MCV woodland Rare plants</td>
</tr>
<tr>
<td>Name of Nature Reserve</td>
<td>Area (ha)</td>
<td>Gazetted (incorporation into National Capital Open Space System)</td>
<td>Geology</td>
<td>Soil landscape groups</td>
<td>Threatened species and ecological communities</td>
<td>Other biodiversity values</td>
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</tr>
<tr>
<td>Mulligans Flat</td>
<td>791</td>
<td>1994</td>
<td>Canberra Formation with tuff; Canberra Formation with granitic porphyry intrusion (west Mulligans Flat)</td>
<td>Burra, Williamsdale, Franklin and minor Ginninderra Creek</td>
<td>YB-RG GSM Woodland birds*</td>
<td>Landscape connectivity</td>
</tr>
<tr>
<td>Percival Hill</td>
<td>79</td>
<td>2006</td>
<td>Black Mtn Sandstone with leucogrinite</td>
<td>Campbell</td>
<td></td>
<td>LCV woodland</td>
</tr>
<tr>
<td>Name of Nature Reserve</td>
<td>Area (ha)</td>
<td>Gazetted (incorporation into National Capital Open Space System)</td>
<td>Geology</td>
<td>Soil landscape groups</td>
<td>Threatened species and ecological communities</td>
<td>Other biodiversity values</td>
</tr>
<tr>
<td>------------------------</td>
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<td>---------------------------------------------------------------</td>
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<td>---------------------</td>
<td>-----------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>West Jerrabomberra (woodland part only)</td>
<td>272</td>
<td>2008</td>
<td>Laidlow Volcanic Suite (limestone), Granitic porphyry intrusion</td>
<td>Burra and Williamsdale</td>
<td>NTG YB-RG Woodland birds GED PTWL</td>
<td>HCV woodland Landscape connectivity</td>
</tr>
<tr>
<td><strong>Total area (ha)</strong></td>
<td><strong>13307</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend**

- NTG: Natural Temperate Grassland Endangered Ecological Community
- YB-RG: Yellow Box - Blakely's Red Gum Grassy Woodland Endangered Ecological Community
- BW: Button Wrinklewort, Rutidosis leptorrhynchoide (endangered)
- GBC: Glossy Black Cockatoo, Calyptorhynchus lathami (vulnerable)
- GED: Grassland Earless Dragon, Tympanocryptis pinguicolla (endangered)
- GSM: Golden Sun Moth, Synemon plana (endangered)
- SPP: Small Purple Pea, Swainsona recta (endangered)
- PG: Perunga Grasshopper, Perunga ochracea (vulnerable)
- PTWL: Pink-tailed Worm Lizard, Aprasia parapulchella (vulnerable)
- SLL: Striped Legless Lizard, Delma impar (vulnerable)
- HCV: High conservation value: high native plant diversity and structural integrity
- MCV: Moderate conservation value: moderate native plant diversity and structural integrity
- LCV: Low conservation value: low native plant diversity and structural integrity

(Personal communication between Dr Maxine Cooper, Commissioner with Ms Sarah Sharp on 21 April 2011).

Information for this table was sourced from the *Canberra Nature Park Management Plan* (Environment ACT 1999), Action Plans (Environment ACT 2004, Environment ACT 2006), Abell 2007 and Jenkins 2000 and data supplied by TAMS.\(^\text{86}\)

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4.1 Assessment of nature reserves

Callum Brae, Black Mountain, The Pinnacle, Urambi Hills, Mount Taylor and Mount Painter nature reserves were initially assessed from December 2009 to January 2010 as part of a pilot project because of their diverse characteristics, to ensure that the Landscape Function Analysis technique was an appropriate method for assessing the nature reserves. The Landscape Functional Analysis technique is explained in Box 5.

Box 5: Landscape Functional Analysis

**Landscape Functional Analysis:**

...provides a rapid assessment of soil health and biophysical soil processes across a widely variable set of sites that is repeatable and consistent. Landscape function affects many other condition values, including conservation values, but is not a direct measure of those values...

...Because the fundamental processes assessed by Landscape Function Analysis (erosion, deposition, infiltration, decomposition, dispersion) exist in all landscapes, the procedure can be used on a very wide range of landscape types and vegetation complexes, and the data used for a variety of land uses (Tongway and Hindley 2004). Landscape function analysis provides, therefore, a quantitative and practical means to compare the nature reserves in the ACT, which vary in landform, vegetation composition and structure and degree of disturbance.

...main objective is to determine whether sites are resilient to disturbances that are already occurring or not, and whether they may be at risk of further loss of function if disturbance levels remain or increase. The single assessment undertaken for this study is a snapshot of the landscape condition. It provides a baseline for future monitoring to assess whether the sites are becoming more or less resilient over time, and as a result of management intervention...


The remaining 29 nature reserves were subsequently assessed using the Landscape Functional Analysis technique between February and April 2010. The Lower Molonglo River Nature Reserve was not surveyed in detail due to time constraints, but was assessed by field observation. The grassland nature reserves at Crace, East Jerrabomberra and Mulanggari were not surveyed as they were assessed as part of the
Investigation into the ACT Lowland Native Grasslands and for West Jerrabomberra, Dunlop and Gungaderra nature reserves only the non-grassland areas were assessed. The condition assessments were undertaken in a variety of landscapes on the 34 nature reserves and one proposed nature reserve at 207 locations and then extrapolated across the nature reserves. In addition, disturbance factors that influence the condition of the nature reserves were identified during the surveys.

Landscape function condition was defined for each sample based on three assessments:

- the measured landscape function (using the Landscape Functional Analysis technique);
- bushland health; and
- site observations.

The criteria used to assess bushland health include: the sparseness of grass, bare ground, erosion, annual weeds, tree clearance, grazing, rabbit burrows, kangaroo camps, fire frequency and number of burns since January 2003.

It is important to remember that each nature reserve has different values in terms of nature conservation, cultural heritage, landscape, animal movement corridors, quality of water run-off, and benefits for human health and well-being. Management priorities for conservation, amenity and landscape objectives emerge from these values.

The findings from the field assessment were considered in relation to existing information held by ACT Government on biodiversity and conservation issues for each nature reserve. This has informed the recommended management priorities.

### 4.2 Condition of nature reserves

Nature reserves were classified as:

- satisfactory;
- approaching critical; or
- critical.

These classifications are based on Ms Sharp’s assessments, as discussed in the preceding section of this chapter. Although a nature reserve may be given an overall condition classification, it is recognised that the condition of some areas of the nature reserve may vary as summarised in Table 5. The condition of a nature reserve or parts of a nature reserve may change over time according to changing conditions or new pressures that may emerge, as discussed in Chapter 2 History. It is also likely that, without management
intervention, areas that are in a critical or approaching critical condition are unlikely to improve. Furthermore, nature reserves that are in satisfactory condition will need to be monitored and if needed management actions taken to prevent them deteriorating.

Assuming that the protection of nature reserves of high conservation value is a key objective it is therefore important to understand the conservation values of the various nature reserves. Nature reserves with high conservation values should be given management priority to address issues associated with their condition as these values may be eroded if factors that are adversely affecting their condition are not addressed.
Table 5: Summary of issues impacting the landscape function of the reserves and their overall condition

This table presents disturbance factors which have been assessed as having major or minor impacts, depending on the extent (widespread or localised) to which the factor is affecting landscape function. Potential impacts are those that may occur as a result of an expected increase in residential density adjacent to the reserve or an increase in the frequency of fire. Overall condition is based on the dominant condition of the nature reserve (more than 50% of the area). The proportion of the area within a reserve approaching critical (AC) or critical (C) condition is indicated. Details are available in Ms Sharp's *Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function* (Appendix G).

<table>
<thead>
<tr>
<th>Nature Reserve</th>
<th>Impacts of native vegetation clearance</th>
<th>Impacts of grazing pressure</th>
<th>Significant weed infestation</th>
<th>Erosion, bare soil</th>
<th>Impacts from fire events (operational burns or wildfire)</th>
<th>Visitor use impacts</th>
<th>Impacts of infrastructure maintenance</th>
<th>Overall condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aranda Bushland</td>
<td>Major (K), localised</td>
<td>Minor, localised</td>
<td>Minor, localised (gully, sheet erosion)</td>
<td>Minor, widespread</td>
<td></td>
<td></td>
<td></td>
<td>Satisfactory S: 95-99% AC: 1-5%</td>
</tr>
<tr>
<td>Black Mountain</td>
<td>Minor (K), localised</td>
<td></td>
<td>Major, localised</td>
<td>Minor, widespread</td>
<td>Minor, localised</td>
<td></td>
<td></td>
<td>Satisfactory S: 95-99% AC: 1-5%</td>
</tr>
<tr>
<td>Bruce Ridge</td>
<td></td>
<td></td>
<td>Minor, localised</td>
<td>Minor,</td>
<td></td>
<td></td>
<td></td>
<td>Satisfactory S: 90-95%</td>
</tr>
</tbody>
</table>


94 Where a reserve had more than one condition rating, the overall condition rating was deemed to that which related to more than 50% of the area of the reserve. Personal Communication Ms Sarah Sharp on 23 May 2011.

95 Only a part of the reserve is impacted by the issue (i.e. burn/wildfire), not the whole reserve. Impossible to give an area or proportion of the reserve as it varies, but indicates that the issue is not present across the entire reserve.
<table>
<thead>
<tr>
<th>Nature Reserve</th>
<th>Impacts of native vegetation clearance</th>
<th>Impacts of grazing pressure R: rabbits; K: kangaroos; D: domestic stock</th>
<th>Significant weed infestation</th>
<th>Erosion, bare soil</th>
<th>Impacts from fire events (operational burns or wildfire)</th>
<th>Visitor use impacts</th>
<th>Impacts of infrastructure maintenance</th>
<th>Overall condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Callum Brae</td>
<td>Major (K, R), widespread</td>
<td>Minor, widespread</td>
<td>Major, localised (gullies, bare soil)</td>
<td>Potential</td>
<td>S: satisfactory</td>
<td>AC: 5-10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooleman Ridge</td>
<td>Major, widespread (groundcover)</td>
<td>Minor (R), localised</td>
<td>Major, localised (tracks, bare soil)</td>
<td>Minor, localised; potentially major, localised</td>
<td>Satisfactory</td>
<td>S: 70-80% AC: 10-20% C: 5-10%</td>
<td></td>
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<tr>
<td>Dunlop (woodland)</td>
<td>Minor (K, R), localised</td>
<td>Minor, localised</td>
<td>Minor (bare soil)</td>
<td>Major, localised</td>
<td>Satisfactory</td>
<td>S: 100%</td>
<td></td>
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<tr>
<td>Farrer Ridge</td>
<td>Major (K), widespread</td>
<td>Minor, localised</td>
<td>Minor, localised</td>
<td>Major, localised</td>
<td>Satisfactory</td>
<td>S: 80-90% AC: 10-20% C: 1-5%</td>
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<tr>
<td>Googong Foreshores (west)</td>
<td>Major (K, R), widespread</td>
<td>Minor, widespread</td>
<td>Major, localised (gully)</td>
<td>Potential</td>
<td>Approaching critical</td>
<td>S: 30-40% AC: 50-60% C: 10-15%</td>
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<tr>
<td>Goorooyarroo</td>
<td>Major (K), widespread</td>
<td>Minor, localised</td>
<td>Minor, localised (gully)</td>
<td>Potential</td>
<td>Approaching critical</td>
<td>S: 40-50% AC: 50-60% C: 1-5%</td>
<td></td>
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<tr>
<td>Gossan Hill</td>
<td>Minor (R), localised</td>
<td>Minor, localised</td>
<td></td>
<td>Potential</td>
<td>Satisfactory</td>
<td>S: 100%</td>
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<tr>
<td>Gungaderra (woodland)</td>
<td>Major (K), localised</td>
<td>Minor, localised</td>
<td></td>
<td>Potential</td>
<td>Satisfactory</td>
<td>S: 65-75% AC: 25-35%</td>
<td></td>
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<tr>
<td>Isaacs Ridge</td>
<td>Major, localised (trees)</td>
<td>Major, widespread</td>
<td>Minor, localised (gully)</td>
<td>Potential</td>
<td>Approaching critical</td>
<td>S: 5-10% AC: 80-90%</td>
<td></td>
<td></td>
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<tr>
<td>Nature Reserve</td>
<td>Impacts of native vegetation clearance</td>
<td>Impacts of grazing pressure</td>
<td>Significant weed infestation</td>
<td>Erosion, bare soil</td>
<td>Impacts from fire events (operational burns or wildfire)</td>
<td>Visitor use impacts</td>
<td>Impacts of infrastructure maintenance</td>
<td>Overall condition</td>
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<td></td>
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<td>R: rabbits; K: kangaroos; D: domestic stock</td>
<td>sheet, bare soil</td>
<td>Minor, localised</td>
<td>Minor, localised</td>
<td>S: 100%</td>
<td>S: 100%</td>
<td>S: 100%</td>
</tr>
<tr>
<td>Jerrabomberra Wetlands</td>
<td>Minor (R), localised</td>
<td>Major, localised</td>
<td>Minor, localised; potentially major localised</td>
<td>Potential</td>
<td>Satisfactory</td>
<td>S: 70-80% AC: 20-30% C: 1-5%</td>
<td></td>
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<tr>
<td>Kama</td>
<td>Minor, localised (groundcover)</td>
<td>Major (K), localised</td>
<td>Major, localised (gully, sheet erosion)</td>
<td>Potential</td>
<td>Satisfactory</td>
<td>S: 90-95% AC: 5-10%</td>
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<tr>
<td>Kinlyside</td>
<td>Major (D, K, R), localised</td>
<td>Minor, localised</td>
<td>Major, localised</td>
<td>Potential</td>
<td>Satisfactory</td>
<td>S: 90-95% AC: 5-10%</td>
<td></td>
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<tr>
<td>Lower Molonglo River Corridor</td>
<td>Minor localised (R, fallow deer and wild goats)</td>
<td>Major, localised</td>
<td>Major, localised; potentially major, widespread</td>
<td>Potential</td>
<td>Satisfactory</td>
<td>S: 90-95% AC: 5-10%</td>
<td></td>
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<tr>
<td>McQuoids Hill</td>
<td>Major (K), widespread</td>
<td>Major, widespread</td>
<td>Major, widespread</td>
<td>Satisfactory</td>
<td>Approaching critical</td>
<td>S: 20-30% AC: 60-70% C: 10-15%</td>
<td></td>
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<tr>
<td>Molonglo Gorge</td>
<td>Minor, localised</td>
<td>Minor, localised</td>
<td>Minor, localised</td>
<td>Satisfactory</td>
<td>S: 80-90% AC: 10-20%</td>
<td></td>
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<tr>
<td>Mt Ainslie</td>
<td>Minor (R, K), widespread; Major (R, K), localised</td>
<td>Minor, localised</td>
<td>Minor, localised (sheet erosion) Major, localised</td>
<td>Satisfactory</td>
<td>S: 80-90% AC: 5-15%</td>
<td></td>
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<tr>
<td>Nature Reserve</td>
<td>Impacts of native vegetation clearance</td>
<td>Impacts of grazing pressure</td>
<td>Significant weed infestation</td>
<td>Erosion, bare soil</td>
<td>Impacts from fire events (operational burns or wildfire)</td>
<td>Visitor use impacts</td>
<td>Impacts of infrastructure maintenance</td>
<td>Overall condition</td>
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<tr>
<td>Mt Majura</td>
<td>Minor (R, K), widespread; Major (R, K), localised</td>
<td>Minor, localised</td>
<td>Major, localised</td>
<td>Major, localised</td>
<td>Satisfactory</td>
<td></td>
<td>S: 90-95% AC: 5-10%</td>
<td></td>
</tr>
<tr>
<td>Mt Mugga</td>
<td>Minor (R, K), widespread</td>
<td>Minor, localised</td>
<td>Major, localised (gully)</td>
<td>Minor, localised</td>
<td>Satisfactory</td>
<td></td>
<td>S: 90-95% AC: 1-5% C: 1-5%</td>
<td></td>
</tr>
<tr>
<td>Mugga</td>
<td>Major, widespread (trees, groundcover)</td>
<td>Major (R, K), widespread</td>
<td>Major, widespread</td>
<td>Major, widespread</td>
<td>Critical</td>
<td></td>
<td>S: 5-10% AC: 30-40% C: 50-60%</td>
<td></td>
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<tr>
<td>Mt Painter</td>
<td>Major (R, K), widespread</td>
<td>Major, widespread</td>
<td>Major, widespread</td>
<td>Major, widespread</td>
<td>Satisfactory</td>
<td></td>
<td>S: 70-80% AC: 10-20% C: 1-5%</td>
<td></td>
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<tr>
<td>Mt Pleasant</td>
<td>Major (R), widespread</td>
<td>Major, widespread</td>
<td>Major, localised (bare soil)</td>
<td>Minor, localised</td>
<td>Satisfactory</td>
<td></td>
<td>S: 90-95% AC: 1-5% C: 1-5%</td>
<td></td>
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<tr>
<td>Mt Taylor</td>
<td>Major (R, K), localised</td>
<td>Major, localised (tracks and sheet erosion)</td>
<td>Minor, widespread</td>
<td>Major, localised</td>
<td>Satisfactory</td>
<td></td>
<td>S: 30-40% AC: 60-70% C: 1-5%</td>
<td></td>
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<tr>
<td>Mulligans Flat</td>
<td>Major (K), widespread</td>
<td>Major, localised (deposition, sheet erosion)</td>
<td>Potential</td>
<td>Minor, localised*</td>
<td>Approaching critical</td>
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<tr>
<td>Nature Reserve</td>
<td>Impacts of native vegetation clearance</td>
<td>Impacts of grazing pressure</td>
<td>Significant weed infestation</td>
<td>Erosion, bare soil</td>
<td>Impacts from fire events (operational burns or wildfire)</td>
<td>Visitor use impacts</td>
<td>Impacts of infrastructure maintenance</td>
<td>Overall condition</td>
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<tr>
<td>Oakey Hill</td>
<td>Major, localised</td>
<td>Major, localised</td>
<td>Minor, widespread</td>
<td>Major, localised*</td>
<td>Satisfactory</td>
<td>S: 100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O’Connor Ridge</td>
<td>Major, localised</td>
<td>Minor, localised</td>
<td>Minor, localised</td>
<td>Satisfactory</td>
<td>S: 100%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Percival Hill</td>
<td>Minor, localised (bare ground)</td>
<td>Major, localised (sheet erosion, minor gully)</td>
<td>Minor (Major*), localised</td>
<td>Satisfactory</td>
<td>S: 100%</td>
<td></td>
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<tr>
<td>Red Hill</td>
<td>Minor (K, R), widespread</td>
<td>Major, localised</td>
<td>Major, localised (sheet erosion)</td>
<td>Major, localised</td>
<td>Approaching critical</td>
<td>S: 40-50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major, localised (trees, groundcover)</td>
<td>Major (R, K), localised (east)</td>
<td>West: minor, localised</td>
<td>Satisfactory</td>
<td>S: 70-80%</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>East: major, widespread</td>
<td>S: 70-80%</td>
<td>AC: 20-30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuggeranong Hill</td>
<td>Major*</td>
<td>Major (K, R), widespread</td>
<td>Minor, localised (sheet erosion)</td>
<td>Potentially major, localised</td>
<td>Satisfactory</td>
<td>S: 70-80%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: R: rabbits; K: kangaroos; D: domestic stock.
<table>
<thead>
<tr>
<th>Nature Reserve</th>
<th>Impacts of native vegetation clearance</th>
<th>Impacts of grazing pressure</th>
<th>Significant weed infestation</th>
<th>Erosion, bare soil</th>
<th>Impacts from fire events (operational burns or wildfire)</th>
<th>Visitor use impacts</th>
<th>Impacts of infrastructure maintenance</th>
<th>Overall condition*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>R: rabbits; K: kangaroos; D: domestic stock</td>
<td>Major, localised</td>
<td>Major, localised (gully, bare soil)</td>
<td>Minor, localised (widespread)</td>
<td></td>
<td></td>
<td>S: satisfactory AC: approaching critical C: critical</td>
</tr>
<tr>
<td>Urambi Hills</td>
<td>Major, localised (trees, groundcover)</td>
<td>Major (K, R), widespread</td>
<td>Major, localised</td>
<td></td>
<td>Minor, localised; potentially major, localised</td>
<td></td>
<td></td>
<td>S: 80-90% AC: 10-20% C: 1-5%</td>
</tr>
<tr>
<td>Wanniassa Hills</td>
<td>Minor (K), widespread</td>
<td>Minor, localised</td>
<td>Minor, localised (bare soil)</td>
<td></td>
<td>Major, localised</td>
<td></td>
<td></td>
<td>S: 70-80% AC: 10-20% C: 5-10%</td>
</tr>
<tr>
<td>West Jerrabomberra (woodland)</td>
<td>Major (K), widespread</td>
<td>Major, localised</td>
<td>Major, localised (bare soil)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S: 50-60% AC: 40-50% C: 1-5%</td>
</tr>
</tbody>
</table>

* Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
Information from Tables 4 and 5 illustrates that 28 nature reserves (80 per cent) were found to be in an overall satisfactory condition and of these 24 (69 per cent) are considered to have high conservation values, which includes presence of threatened species or endangered ecological communities\(^6\), high conservation value woodland or forest and/or landscape connectivity.

Nature reserves in satisfactory condition with high conservation values (HCV) are:

- Aranda Bushland (HCV forest, landscape connectivity);
- Black Mountain (HCV forest, Yellow Box-Red Gum grassy woodland*, woodland birds*, landscape connectivity);
- Bruce Ridge (HCV forest);
- Callum Brae (HCV Yellow Box-Red Gum grassy woodland*, woodland birds*, landscape connectivity);
- Cooleman Ridge (LCV woodland including Yellow Box-Red Gum grassy woodland*, Pink-tailed Worm Lizard*, landscape connectivity);
- Dunlop (woodland) (MCV Yellow Box-Red Gum grassy woodland*, Natural Temperate Grassland*, Striped Legless Lizard*);
- Farrer Ridge (HCV woodland including Yellow Box-Red Gum grassy woodland*, Pink-tailed Worm Lizard*, Small Purple Pea*, landscape connectivity);
- Gungaderra (woodland) (HCV woodland including Yellow Box-Red Gum grassy woodland*);
- Jerrabomberra Wetlands (waterbirds);
- Kama (HCV Yellow Box-Red Gum grassy woodland*, Natural Temperate Grassland*, woodland birds*, landscape connectivity);
- Kinlyside (HCV Yellow Box-Red Gum grassy woodland*, woodland birds*, landscape connectivity);
- Lower Molonglo River Corridor (HCV woodland including Yellow Box-Red Gum grassy woodland*, riparian vegetation associations, Pink-tailed Worm Lizard*, landscape connectivity);
- Molonglo Gorge (HCV forest, landscape connectivity);
- Mount Ainslie (HCV Yellow Box-Red Gum grassy woodland*, forest, woodland birds*, Glossy Black Cockatoo*, landscape connectivity);
- Mount Majura (HCV Yellow Box-Red Gum grassy woodland*, woodland birds*, Glossy Black Cockatoo*, landscape connectivity);

\(^6\) Indicated in text with *
• Mount Mugga Mugga (MCV woodland, woodland birds*, Pink-tailed Worm Lizard*, Perunga Grasshopper*, landscape connectivity);
• Mount Taylor (MCV woodland, Small Purple Pea*, Pink-tailed Worm Lizard*, landscape connectivity);
• O’Connor Ridge (HCV forest, minor Yellow Box-Red Gum grassy woodland*);
• Rob Roy (HCV forest, woodland birds*, landscape connectivity);
• The Pinnacle (HCV forest, woodland birds*, Pink-tailed Worm Lizard*, landscape connectivity);
• Tuggeranong Hill (HCV grassland (derived), minor Yellow Box-Red Gum grassy woodland*, woodland birds*, Pink-tailed Worm Lizard*, landscape connectivity);
• Urambi Hills (HCV woodland including minor Yellow Box-Red Gum grassy woodland*, Pink-tailed Worm Lizard*, landscape connectivity);
• Wanniassa Hill (HCV woodland including minor Yellow Box-Red Gum grassy woodland*, landscape connectivity); and
• West Jerrabomberra (Woodland) (HCV Yellow Box-Red Gum grassy woodland*, woodland birds*, Pink-tailed Worm Lizard*, landscape connectivity).

Nature reserves with lower conservation values in satisfactory condition are:

• Gossan Hill (MCV woodland);
• Mount Pleasant (minor LCV Yellow Box-Red Gum grassy woodland*);
• Oakey Hill (LCV woodland, minor Pink-tailed Worm Lizard*); and
• Percival Hill (LCV woodland);

The six nature reserves (17 per cent) where the majority of the reserve is approaching a critical condition are:

• Googong Foreshores (west) (MCV woodland, grassland, minor Yellow Box-Red Gum grassy woodland*, woodland birds*, Pink-tailed Worm Lizard*, Button Wrinklewort*, landscape connectivity);
• Goorooyarroo (HCV Yellow Box-Red Gum grassy woodland*, woodland birds*, Golden Sun Moth*, landscape connectivity);
• Isaacs Ridge (MCV Yellow Box-Red Gum grassy woodland*, woodland birds*, Pink-tailed Worm Lizard*, landscape connectivity);
• McQuoids Hill (MCV woodland, Pink-tailed Worm Lizard*);
• Mulligans Flat (HCV Yellow Box-Red Gum grassy woodland*, woodland birds*, Golden Sun Moth*, landscape connectivity); and
• Red Hill (HCV Yellow Box-Red Gum grassy woodland*, woodland birds*, Button Wrinklewort*, Pink-tailed Worm Lizard*, Perunga Grasshopper*, landscape connectivity).

None of these nature reserves are considered to have low conservation values.

Only Mount Painter Nature Reserve (landscape connectivity) was assessed to be in a critical condition. Six nature reserves (17 per cent) were assessed as approaching critical condition. The total area of nature reserves assessed as in a critical condition or approaching a critical condition is around 4 200 hectares (the equivalent of almost 6 000 football fields), which is 32 per cent of the total area of our Investigation. If Googong Foreshores is excluded, the area is around 2 270 hectares (or about 3 200 football fields). This is a large area that needs to be restored. A special restoration program is needed for those areas in critical condition or approaching a critical condition.

4.3 Challenges

The challenges that need to be addressed in protecting and managing our nature reserves are the disturbance factors observed as adversely affecting the condition of some nature reserves. These are:

1 Native vegetation clearance;
2 Grazing pressure and soil disturbance from herbivores;
3 Significant weed infestations;
4 Erosion and bare soil;
5 Impacts from fire events (operational burns and wildfires) and other bushfire operations;
6 Visitor use impacts; and
7 Impacts of maintenance of infrastructure within reserves.97

Table 5 provides information on which nature reserves are affected by the above disturbance factors and the degree of this affect.

Figures 3 to 9 illustrate disturbance factors listed above. Figure 10 is an example of an encroachment which can adversely affect a nature reserve.

**Figure 3: Grazing Pressure, Mount Majura**


**Figure 4: Weeds, Farrer Ridge**


**Figure 5: Erosion, Callum Brae**

A gully over two metres deep and actively eroding on Callum Brae Nature Reserve. In this gully the majority of the erosion is being caused by overland flow from the slopes, not from downstream flow. (Image: Sarah Sharp from Sharp, S, 2011, Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function, Report to the Commissioner for Sustainability and the Environment, Canberra, page 50)

**Figure 6: Bushfire Operations, Wanniassa Hills**

Wanniassa Hills 2007 showing weeds and soil disturbance after upgrade of fire trails. (Image: Julie Lindner, Submission 1, attachment- images on CD)
4.3.1 Native vegetation clearance

Much of the clearance of vegetation, especially woody plants, from what are now nature reserves occurred during the European settlement period of 1820-1910 (Section 2.2.2 European settlement). As presented in Table 5, the effects of clearing native vegetation were evident on the following nature reserves:

- Cooleman Ridge – widespread clearing of groundcover;
- Isaacs Ridge and Rob Roy - major localised clearing of trees;
- Mount Painter – extensive major clearing of tree and ground cover; and
- Red Hill and Urambi Hills – localised major clearing of tree and ground cover.
The Environment and Sustainability Directorate advised that they considered parts of Tuggeranong Hill to have probably been heavily cleared and have not revegetated.98

Ms Sharp reports that:

....Steep slopes in some reserves have been extensively cleared of trees.... For example on Mount Painter, there has been little or no natural regeneration of trees or shrubs on the cleared crest and slopes of the hills, resulting in loss of soil, loss of native perennial grasses, forbs and litter. Replanting in the resulting poorly functioning landscapes such as those on Mount Painter is considerably harder than in reserves where some remnant vegetation exists that can be added to. Mount Painter requires further revegetation works to be undertaken, and Isaacs Ridge (north), Red Hill, Rob Roy (east) and Urambi Hills also require re-establishment of woody vegetation on the steeper slopes.

....Extensive successful revegetation following establishment of nature reserves has occurred on Cooleman Ridge, Mount Taylor, Oakey Hill, Percival Hill and The Pinnacle.

......Jerrabomberra Wetlands contains no remnant vegetation. The major area is perennial Phalaris grassland, and the remainder contains plantings of shrubs and trees adjacent to the wetlands.99

It is understood that under current management arrangements replanting by the ACT Parks and Conservation Service100 is generally limited and that which does occur is normally part of a specific initiative with associated additional funding. Following are recent and proposed plantings by the Territory and Municipal Services Directorate:

- in the last five years two revegetation plantings were undertaken along Jerrabomberra Creek after willows were removed.
- 17 000 trees were planted on the western side of Narrabundah Hill in 2009, as part of a million trees program.
- ParkCare groups such as Friends of Mount Majura, Ainslie Weeders and Friends of Mount Painter have planted hundreds of trees in the past few years. The Department assists by providing staff support on the day and supplying materials and equipment.
- 6 000 Allocasuarina species plantings will be undertaken on Isaacs Ridge, Tuggeranong Hill and Wanniassa Hills in mid 2011. This is mostly funded through a three year budget initiative program totalling $70 000.
- during spring 2011 a revegetation planting will be undertaken along Jerrabomberra Creek following the removal of willows. This planting is downstream of the cycle track crossing whereas the previous plantings were

98 Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
100 Formerly Parks, Conservation and Lands.
upstream of the track. This planting is funding through a two year program totalling $60 000.

- Mount Painter Nature Reserve is to be revegetated with over 2000 trees, shrubs and forbs by the local ParkCare Group, staff and contractors, totalling $150 000.101

Given the condition of Mount Painter Nature Reserve, the proposed planting is particularly important. However, this planting will need to be supported by erosion, rabbit and kangaroo control otherwise plantings may not survive. Additional plantings could also occur on those nature reserves shown to be adversely affected by the removal of vegetation, as identified in Table 5. The localised clearing in Red Hill and Urambi Hills would be a second priority as these areas have a high conservation value. A major replanting initiative is required at Cooleman Ridge which has suffered from widespread clearing of herbaceous vegetation.

It is understood that ACT Parks and Conservation Service rangers collect native grass seeds and that in the 2010-11 financial year approximately $5000 worth of staff time was spent on this activity, particularly collecting *Themeda* species to rehabilitate degraded or disturbed areas across nature reserves.102

A revegetation program to address historical clearing of vegetation could be undertaken as a restoration program, refer to Recommendation 2.3 in Section 4.4.4 Nature reserve restoration.

4.3.2 Grazing pressure and soil disturbance from herbivores

Grazing pressure and soil disturbance from herbivores (kangaroos, rabbits, sheep, cattle, fallow deer and feral goats) can significantly affect the condition of a nature reserve as it:

... reduces grass cover, inhibits natural regeneration, exposes bare soil to rain splash and results in a reduction of litter (from grazing and removal of loose litter), which then results in less bioturbation in the soil. In addition rabbits physically disturb the soil, by digging and burrowing ... and kangaroos ... and domestic livestock disturb the soil by camping under trees. Overgrazing can put at risk other species that depend on the grassy ecosystems for habitat.103

The following case study shows the impact of overgrazing and one example of the benefits of controlling overgrazing.

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101 Emails from Mr Stephen Hughes, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 10 May 2011 and 27 May 2011.

102 Email from Mr Stephen Hughes, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment 10 May 2011.

As shown in Table 5, the adverse effects of grazing were evident on thirty nature reserves (85 per cent):

- Major widespread impacts of grazing by rabbits and kangaroos was evident on Callum Brae, Googong Foreshores, McQuoids Hill, Mount Painter, Mount Pleasant, Mulligans Flat, Tuggeranong Hill and Urambi Hills.
- Minor widespread impacts of grazing by rabbits and kangaroos was evident on Mount Ainslie, Mount Majura, Mount Mugga Mugga and Red Hill.
- Major localised impacts of grazing by rabbits and kangaroos was evident on Mount Ainslie, Mount Majura, Mount Taylor, Rob Roy and Urambi Hills.
- Major widespread impacts from rabbits only were evident on Mount Pleasant and The Pinnacle.
- Minor localised impacts from rabbits were evident on Coolamon Ridge, Gossan Hill and Jerrabomberra Wetlands.
- Major widespread impacts of grazing by kangaroos only were evident on Farrer Ridge, Gungaderra, Goorooyarroo, Isaacs Ridge, Kama, Mulligans Flat and West Jerrabomberra (woodland).
• Minor localised affects from kangaroos was evident on Black Mountain and Wanniassa Hills.

• Major widespread impacts from sheep, rabbits and kangaroos were evident at Kinlyside.

• Minor localised impacts from rabbits, fallow deer and wild goats were evident on the Lower Molonglo River Corridor.

• Only Bruce Ridge, Molonglo Gorge, Oakey Hill, O’Connor Ridge and Percival Hill nature reserves were not significantly affected by grazing pressure.

• On Mount Painter, the only nature reserve assessed as being overall in a critical condition, loss of vegetative cover leading to soil erosion is so severe that the ability of the land to recover after removal of grazing pressure is unlikely without significant intervention.  

While effectively managing overgrazing by kangaroos will have short and long term benefits, it is a challenge particularly given that most nature reserves are in urban environments. Overgrazing and soil disturbance by rabbits and kangaroos, either together or separately have impacts on 85 per cent of all nature reserves, they are discussed in more detail later.

Grazing by rabbits, kangaroos and stock have differing effects on native vegetation, for example, grazing by sheep is considered to be more destructive than by cattle and the selection by kangaroos is different to that of rabbits. In addition, the interactive effects of grazing by kangaroos, rabbits and/or stock, or grazing and burning also exacerbate the impacts of a single disturbance factor. As a principle, control of grazing by non-native animals needs to be undertaken prior to controlling the grazing of kangaroos where numbers result in overgrazing, adversely affecting a nature reserve. Kangaroos are a part of a nature reserve’s ecosystem and so their presence should be encouraged. Moderate grazing by kangaroos plays an important role in these ecosystems. In the absence of some form of herbage removal, the dominant grasses can become large and dense, out-competing other plant species and reducing the structural diversity that provides habitat for various plants and animals. Retaining kangaroo populations in nature reserves should be more than just encouraged; grazing by kangaroos (or herbage removal by some other method) is crucial for maintaining biodiversity. In the absence of kangaroos, mowing, burning or livestock grazing would need to be used. Grazing has the benefits of nutrient cycling and physical disturbance and kangaroos are the preferred grazer because, unlike livestock, they do not selectively graze the palatable forbs. The

References:


107 Department of Territory and Municipal Services, 2010, ACT Kangaroo Management Plan, Canberra, page 34-5.
issue is controlling their numbers and this is particularly difficult given the urban and peri-urban location of nature reserves.

Managing grazing pressures is captured in Recommendation 2.2 in Section 4.4 Addressing challenges.

4.3.2.1 Rabbits
Grazing pressure from rabbits was considered to be adversely affecting the condition of 19 nature reserves (54 per cent), refer to Table 5. Dr Kent Williams in his comprehensive report Managing Rabbits in Canberra Nature Park (Appendix D) highlights the significant challenges confronting the management of rabbits, particularly in Canberra Nature Park (CNP):

...The task of managing rabbits in the CNP has many impediments compared to most other Australian environments and places. CNPs are fragmented and numerous, relatively small (except GF) [Googong Foreshores], and surrounded by either rural land or suburban or urban development. This provides a large perimeter, relative to area, that is prone to invasion from land occupied by other landholders or jurisdictions. This disposition also complicates control operations, such as poisoning and warren-ripping, and exposes the treated areas to re-invasion by rabbits residing or sheltering in neighbouring land. The proximity of the CNP to urban and suburban environments and the presence of the public and their animals require numerous modifications to optimally cost-effective control procedures.108

...The CNPs generally comprise the steeper slopes and ridges with a smaller area of lower slopes. The upper slopes have skeletal soils that generally support shrubby woodland, while the lower slopes have deeper soils that support open grassy woodland. The hilltops and slopes are well drained and, in this respect, favourable to rabbits. On the other hand, soils mostly are thin, heavy, hard and stony and not favourable for digging burrows and warrens, except in accumulations of alluvium in lower slopes. Nevertheless, once dug, the warrens and burrows tend to retain their integrity and persist over time, especially among boulders. The rockiness and slope of the land creates difficulties for movement of equipment and machinery and effective control action, such as warren-ripping, and risks down-slope loss of soil, seed, and nutrients that may be disturbed by operations.109

...In the CNP, the combination of trees and shrubs adjacent to more open areas provides rabbits with a favourable mix of shelter and herbaceous food. That woodland structure probably derives from many factors including past and existing fire regimes.110

...Weeds, including woody weeds, are common in CNP areas infested by rabbits and offer protective cover as well as making warrens and burrow entrances difficult to find. Woody

Weeds also create difficulties for warren destruction and fumigation. Valued native trees also make warren ripping problematic for both access and avoiding damaging tree roots during ripping operations.\textsuperscript{111}

"Managing rabbits in the CNP therefore requires attention to these complications and, "to conserve the environment", mandates acceptance of lower cost-effectiveness (higher cost per level of reduction of rabbits) than is achievable in many other Australian landscapes."\textsuperscript{112}

There is community concern regarding the increasing numbers of rabbits in our nature reserves:

"...Rabbits are again a problem because they graze down to the roots of many plants and kill them. This characteristic, together with their burrowing, makes them an erosion agent on these highly erodible slopes."\textsuperscript{113}

"...Our observation, as ecologists, is that the quality and condition of all these vegetation communities is being diminished by insufficient control of grazing animals, in particular, eastern grey kangaroos, rabbits and hares."\textsuperscript{114}

While overall rabbit densities on nature reserves are not extreme, rabbits are abundant and widespread and degrade in both obvious and subtle means. Grazing, browsing and ringbarking activities of rabbits result in the removal of soil cover and soil disturbance. This results in a reduction in germination and growth of perennial species, provides habitat for invasive weeds and exposes the soil to erosion.\textsuperscript{115} The herbage biomass removed by rabbits may be insignificant compared to that removed by stock or kangaroos, but the effect of their digging and establishment of burrows may be considerable. Rabbits are selective grazers and have a strong preference for smaller and more succulent plants and plant parts, which are frequently native herbs, including lilies and orchids, thus targeting species not usually selected by kangaroos or stock.

\textsuperscript{113} Submission 3 page 2.
\textsuperscript{114} Submission 25 page 2.
\textsuperscript{115} Williams, K., 2011 \textit{Managing Rabbits in Canberra Nature Park}, A report to the Commissioner for Sustainability and the Environment, page 11.
Mount Painter Nature Reserve provides an example of where overgrazing by rabbits and kangaroos is adversely affecting the condition of its landscape.

**Case Study: Rabbit survey on Mount Painter Nature Reserve**

Friends of Mount Painter undertook a survey of rabbit burrows on 16 and 17 January 2010 and counted 295 burrows. The extreme impact of rabbits was demonstrated by the amount of bare ground, disturbed soil and severe grazing. Rabbits were having an extremely high impact on the steeper slopes. While rocky outcrops provide some habitat for perennial species establishment, many were also under-burrowed by rabbits, causing further erosion. Rabbits were controlled in autumn 2010, with a 94 per cent reduction in abundance.¹


Dr Williams emphasised the need for strategic management of rabbits over the long term. It is not possible to quickly address a rabbit problem as it is important to have primary and maintenance control activities. Primary control is the initial treatment, and as rabbits have a propensity to re-colonise treated areas, follow-up maintenance control is essential. Dr Williams found that as funds are limited, maintenance control is not being sustained.¹¹⁶ Friends of Mount Majura report that:

...Volunteers – and PCL [Parks Conservation and Lands] staff – have invested a significant amount of time to control rabbits at Mounts Ainslie/Majura. Recent weather conditions favour rabbit breeding and numbers are increasing. The lack of resources to perform effective Maintenance control means that our investment will be wasted; in a few years we will be back at the starting point.¹¹⁷

Rabbits are being controlled at Mulligans Flat Nature Reserve as part of an ACT Government initiative to establish a predatory protection enclosure and reintroduce locally extinct native animals. Dr Williams reports that:

...The feral animal-proof fence, established in 2009 at Mulligans Flat, excludes ... rabbits (a few remain), hares (some still present), dogs, foxes, and cats. Exclusion fences established within and as part of the Mulligans Flat – Goorooyarroo Woodland Experiment will allow also comparison between areas with high and low kangaroo grazing density. The intensive, designed, experimental study can be expected to yield much information on processes involved in degradation, recovery and restoration in CNP. Another important aspect of this program is the very extensive collaboration among ACT government researchers, and staff and students of ANU and other universities. The Sanctuary is an expensive long-term program and funding for it is distinct from the


¹¹⁷ Friends of Mt Majura Coordinator letter to the Commissioner, 8 April 2011.
general funding of CNP management, and the ultimate intention is to seek sponsorship funding. This commendable program was developed by PCL staff with support from the Chief Minister, the community, and University expertise."\(^{118}\)

Since Ms Sharp’s assessment of nature reserves and Dr Williams’ reporting that only six nature reserves have had strategic rabbit control,\(^{119}\) the Territory and Municipal Services Directorate, as part of a three year control program, have treated rabbit warrens on Aranda Bushland, Callum Brae, Goorooyarroo, Jerrabomberra Wetlands, Mount Ainslie, Mount Majura, Mount Painter, Mulligans Flat, Red Hill, The Pinnacle and West Jerrabomberra Grasslands nature reserves.\(^{120}\) The Territory and Municipal Services Directorate has a policy of monitoring rabbit abundance before and after control operations. This enables comparisons over time to identify long term trends and effectiveness of treatments and strategies, and enable rabbit management to adapt economically to changes and responses.\(^{121}\) Monitoring needs to be reported so that it can assessed to evaluate its effectiveness.

From his analysis of rabbit management on nature reserves, specifically undertaken for this Investigation, Dr Williams made twenty two recommendations covering four main areas:

- resourcing strategic rabbit control;
- managing resources for strategic rabbit control;
- research for strategic rabbit control;
- managing operations for strategic control.\(^{122}\)

Rabbit management is further discussed in section 5.2.3 ACT Rabbit Pest Animal Management Plan. It is the subject of Recommendation 4.3 which calls for the development and implementation of an ACT Rabbit Pest Management Plan.

**4.3.2.2 Kangaroos**

As evident from Table 5 and the material discussed in Section 4.3.2 Grazing pressure and soil disturbance from herbivores, kangaroos have adversely affected 24 reserves (69 per cent). However, it should be noted that Canberra, the bush capital, is extremely fortunate in having free ranging kangaroos within and on the margins of the city. The nature reserves are important in providing habitat for kangaroos and other native animals.\(^{123}\) Kangaroos are an important part of our nature reserves ecosystem.


\(^{120}\) Sharp, S., 2011 *Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function*, Report to the Commissioner for Sustainability and the Environment, page 47.


Submissions to this Investigation have called for kangaroo numbers to be reduced:

...measures to reduce the numbers of kangaroos on the reserve are urgently needed, and...this [must] be considered very soon.\(^{124}\)

...Many of our resident Eastern Grey kangaroo mobs were incinerated in the fences around the Reserve in 2003 bushfires, but numbers are again building up due in part to the excellent native grass regeneration over recent years. If kangaroo numbers build up as they have been allowed to do on nearby reserves, they will do the same sort of damage as is evident on Mt Taylor.\(^{125}\)

The following case study in highlights kangaroos on Mount Painter Nature Reserve.

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**Case Study: Kangaroos on Mount Painter Nature Reserve**

Counts by Parks Conservation and Lands in 2010 indicate that there were approximately 550 kangaroos present on the reserve. Many kangaroo tracks, with clear signs of frequent use by large numbers of animals, cross over the reserve, some causing erosion and loss of soil. Direct counts made in September 2009 by Parks Conservation and Lands estimated a population of 276 animals within the reserve, and a further 300 outside, mostly in the adjacent Horse Paddocks. It is assumed that these animals also utilise the reserve. A survey undertaken in sectors by Friends of Mount Painter estimated a population of 650 kangaroos. This equates to a range of 3 to 7 kangaroos per hectare utilising the reserve which is high.\(^1\)

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\(^1\) Personal communication between Mr Don Fletcher, Parks, Conservation with Mrs Narelle Sargent, 31 March 2010 and information from Submission 4.

There has been significant controversy regarding the appropriate management of kangaroos in the Canberra region, especially in relation to human culling through shooting. This and other kangaroo management issues are the subject of the ACT Kangaroo Management Plan.

...The goals of kangaroo management in the ACT are to:

- maintain populations of kangaroos as a significant part of the fauna of the “bush capital” and a component of the grassy ecosystems of the Territory
- manage and minimise the environmental, economic and social impacts of those kangaroo populations on other biota, grassy ecosystems, ACT residents and visitors.\(^{126}\)

This Plan is the ACT Government’s policy on kangaroo management. This Investigation has not reviewed this policy although it has considered the condition of nature reserves and therefore the effect on this by kangaroos.

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\(^{124}\) Submission 4 page 1.
\(^{125}\) Submission 3 page 2.
During this Investigation, a meeting was held with THINKK\textsuperscript{127}, a group focused on kangaroos, which stated that it had new information regarding the management of kangaroos and that this could affect policies in the ACT Kangaroo Management Plan. At the meeting this group was invited to provide information to the Investigation but it has not taken up this offer. THINKK were subsequently contacted to request this information but none was provided.

Since Ms Sharp’s assessment of the nature reserves the Territory and Municipal Services Directorate, as part of a three year control program, has reduced the kangaroo population by culling on Callum Brae, Goorooyarroo, Kama, Mount Painter, Mulligans Flat and West Jerrabomberra nature reserves.\textsuperscript{128} As part of this program, there was another cull in June 2011.

4.3.2.3 Stock grazing

Stock grazing may provide a useful tool for maintaining biodiversity values in some cases and may be used as a land management tool to control plant biomass.\textsuperscript{129} An advantage of this tool is the ease by which stock can be moved on and off sites, allowing a site to be rested or destocked, which in turn helps promote heterogeneity of vegetation structure and provides opportunities for regeneration of desired plants and control of undesired plants. However if used inappropriately stock grazing can adversely affect threatened species and ecological communities such as grasslands and other ecosystems and contribute to overgrazing and erosion.\textsuperscript{130} Controlled stock grazing may be the most appropriate way to reduce fire fuel loads on some nature reserves that have a relatively recent history of grazing as burning or slashing may be operationally difficult given the location of some nature reserves. Where appropriate, stock grazing is a good tool for mitigating the threat posed by bushfire in the ACT largely by increasing surface visibility which enable fires to be attacked directly rather than indirectly which increases fire size.\textsuperscript{131}

Grazing by cattle has been used to reduce fuel loads on Urambi Hills Nature Reserve.

\textsuperscript{127} A meeting between the Commissioner and staff and THINKK members was held on 14 October 2010. THINKK website is http://thinkkangaroos.uts.edu.au
\textsuperscript{128} Sharp, S., 2011 Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function, Report to the Commissioner for Sustainability and the Environment, page 47.
\textsuperscript{131} Email from Mr Stephen Hughes, Territory and Municipal Services Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment 18 July 2011.
At the time of assessment, grazing by stock for fire fuel management was impacting on the condition of parts of Kinlyside (proposed nature reserve) adjacent to the suburb of Casey. The assessment indicated that grazing resulted in the creation of bare ground and significantly reduced vegetation cover. Even though this area is not yet a nature reserve, it is appropriate that it is managed to retain its conservation values, whilst ensuring fire fuel loads are not excessive.

At present there are 11 grazing licences and 7 rural leases for agricultural purposes on nature reserves (Table 6). All rural leases contain a withdrawal clause over any area of public land, and some of these areas are public land because of a line on a map and the line does not reflect the fencelines.

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**Case Study: Urambi Hills Nature Reserve**

An example of stock grazing is on Urambi Hills Nature Reserve, located on the western edge of Canberra’s urban area, where the Department of Territory and Municipal Services used about 20 cattle to ‘crash’ graze the area for about 6 weeks from October to December. This was to reduce fire fuel loads in the outer asset protection zone under the ACT’s Bushfire Operations Plan. Strategic grazing reduces or removes bushfire fuels and ensures the remaining fuels are compacted. Bushfires will burn at a lower intensity in grazed areas and as such are more readily controlled. In addition to grazing, mechanical slashing is also used for the same purpose where this is possible.¹

¹ Personal Communication between Mr Simon Tozer, Department of Territory and Municipal Services with Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 10 February 2010.

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¹ Sharp, S., 2011, Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function, Report to the Commissioner for Sustainability and the Environment, Appendix 4 page 133.

¹ Under Section 283 of the Planning and Development Act 2007 all rural leases are subject to land management agreements that specify how the land is to be managed by the leaseholder.

¹ Email from Ms Helen McKeown, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 23 September 2010.
Table 6: Licences and leases on nature reserves

<table>
<thead>
<tr>
<th>Name of Nature Reserve</th>
<th>No of Licences (grazing)</th>
<th>No of leases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooleman Ridge</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Jerrabomberra Wetlands</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Kama</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kinlyside</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Molonglo Gorge</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Percival Hill</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rob Roy</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Urambi Hills</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

In the *Report on ACT Lowland Native Grassland Investigation* a number of recommendations were made regarding Land Management Agreements and compliance. In particular, recommendations 17 and 18 are relevant to this Investigation:

…Establish a formal monitoring, assessment and auditing process aimed at ensuring conditions in land management agreements achieve the desired ecological results; and

…Permit grazing under rural leases and licences, on lowland native grassland sites if it is part of a long-term conservation management strategy.

It is understood that a revised and simplified Land Management Agreement was notified on the legislation register on 8 June 2010 and that the Territory and Municipal Services Directorate is revising Land Management templates and is working with lessees to review lease agreements.

Grazing by stock is only used on nature reserves, if it is identified as part of the conservation strategy and fire fuel hazard reduction program under the following conditions:

- on nature reserves that have a recent history of grazing by stock;
- when grazing by the native herbivores alone is not adequate to reduce excessive herbage; and

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136 Email from Ms Helen McKeown, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 9 September 2010.
137 Email from Ms Helen McKeown, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 9 September 2010.
138 Land management agreements are mandatory under the *Planning and Development Act 2007* for granting rural leases, granting further rural leases, varying rural leases or consenting to transfer of a rural lease.
where it is consistent with principles that ensure the grazing is undertaken in some form of planned rotational pattern (to allow for natural regeneration) and maintains a vegetative ground cover of more than 80 per cent. \(^{142}\)

This practice, with these conditions, seems appropriate from an ecological perspective. If grazing by stock is required to meet ecological objectives such as weed control or fire fuel management it is understood that the Territory and Municipal Services Directorate manages this through short term agistment arrangements.

### 4.3.3 Weeds

As is evident in Table 5 and the material discussed in Section 4.3.2 Grazing pressure and soil disturbance from herbivores, weeds have adversely affected 28 nature reserves (80 per cent) as follows:\(^{143}\)

- Major, widespread herbaceous weed infestations were recorded on McQuoids Hill, Mount Painter, Mount Pleasant and Rob Roy (east).
- Major, but localised weed infestations were present on Cooleman Ridge, Jerrabomberra Wetlands, Lower Molonglo River Corridor, Oakey Hill, O’Connor Ridge, Red Hill, The Pinnacle, Tuggeranong Hill and Urambi Hills.
- Minor widespread herbaceous weed infestations were present on Callum Brae and Googong Foreshores (west).
- Minor localised infestations were present on: Aranda Bushland, Dunlop, Farrer Ridge, Goorooyarroo, Gungaderra, Isaacs Ridge, Kama, Kinlyside, Molonglo Gorge, Mount Ainslie, Mount Majura, Mount Mugga Mugga, Rob Roy (west) and Wanniassa.
- Introduced annual herbaceous weeds were common on all nature reserves, but tended to be dominant only where disturbance was severe or had been in the past (for example, as the result of extremely heavy grazing, ploughing or heavy herbicide treatments of other weeds).
- Only a few nature reserves contained significant numbers of woody weeds including Mount Pleasant, Oakey Hill (Cootamundra Wattle) and Rob Roy (east) (pine wildings).
- In eight nature reserves (23 per cent), the dominance of the groundlayer by introduced annual vegetation was of concern. A high density of annual weeds was present on much of Mount Painter and in parts of Coolamon Ridge, Kama, Lower Molonglo River Corridor, Mount Pleasant, Red Hill, The Pinnacle and Urambi Hills.

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\(^{142}\) Email from Mr Stephen Hughes, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 13 May 2011.

\(^{143}\) Sharp, S., 2011 Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function, Report to the Commissioner for Sustainability and the Environment, pages 40–43.
No major infestations of the most invasive grasses including Serrated Tussock and African Love Grass were encountered, although many nature reserves contained scattered individual plants or clumps, and in some nature reserves, moderately abundant populations. African Love Grass was present in most nature reserves in the south of Canberra, but in most nature reserves it was evident that control was occurring. Paterson’s Curse and St John’s Wort were widespread and abundant in almost all the nature reserves.

There is a wide range of land degradation issues resulting from weeds including; competition with native plants, harbouring animal pests such as rabbits, loss of pasture and increased fire hazard. Annual weeds, in particular Wild Oats, produce very large amounts of dead biomass in summer, which increases the fuel load and fire hazard at a critical time.\footnote{Sharp, S., 2011 \textit{Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function}, Report to the Commissioner for Sustainability and the Environment, page 62.}

While weeds can be problematic, they can sometimes play an important function in stabilising the soil, especially on degraded land, as illustrated in the following case study.

\begin{quote}
\textbf{Case Study: Weeds on Mount Painter Nature Reserve}

At the time of assessment of Mount Painter Nature Reserve, while weeds were of concern, the majority of the weeds were providing a functional service of holding the soil together, slowing overland water flow and providing some input to soil processes such as decomposition of litter into the soil. None of the species seen, with the exception of St John’s Wort, are aggressively invasive.

Removal of Saffron Thistle while rabbit and kangaroo populations are so high will increase grazing pressure on the remainder of the sparse native grasses that occur over all the reserve and, potentially, will cause further perennial plant loss and increase soil erosion. Some perennial weeds, in particular Horehound, are providing an important functional role, reducing movement of soil and water and litter.\footnote{Sharp, S., and Tongway, D., 2010, \textit{Assessment of the functional status of six Nature Reserves in Canberra Nature Park using Landscape Functional Analysis: report on a pilot study}, Report for the Office of the Commissioner for Sustainability and the Environment, page 35.}

A key aspect of weed control is to avoid management activities that facilitate the introduction or expansion of weeds, such as too frequent burning (refer to Section 4.3.5 \textit{Fire}), addition of nutrients, exposure of bare ground, soil disturbance and/or using machinery that has not been cleaned of seeds.

Generally, the aim of weed management is to reduce populations of the most invasive weeds, rather than all exotic species. For example, over past years, woody weeds have
been successfully eliminated from some nature reserves including: Mount Ainslie, Red Hill, Aranda Bushland and Callum Brae.\textsuperscript{145} In addition, small populations and new outbreaks of highly invasive weeds in and adjacent to nature reserves need to be controlled, to reduce the potential of weeds spreading onto nature reserves.

It is important that the management of weeds occur across all tenures as illustrated in the following case study:

\section*{Case Study: Aranda Bushland Nature Reserve}

Friends of Aranda Bushland have contributed many hours over the years to the removal of weeds such as St John’s Wort and Serrated Tussock from the bushland and the frost hollow near Glenloch Interchange. However Paterson’s Curse from the neighbouring rural lease is now invading Aranda Bushland, putting pay to all the volunteer work.\textsuperscript{1}

\begin{flushright}
\textsuperscript{1}Kelly, J. 2010, Weeds threaten our precious local flora and fauna, letter to the editor, Canberra Times 12 November 2010.
\end{flushright}

Management of weeds is guided by the \textit{ACT Weeds Strategy 2009-2019};

...which aims to reduce the impact of weeds on the environment, the economy, human health and amenity. It recognises that weed management is an integral component of sustainable management of natural resources and the environment, and that weed management requires an integrated, whole of community and government approach.\textsuperscript{146}

This strategy has built on the previous 1996 weeds strategy and under that strategy the following has occurred:

- Establishment of the ACT Weeds Working Group (WWG) as a source of expert advice on the design and implementation of weed management programs involving all major land managers in the ACT. Membership of this group consists of representatives from agencies responsible for land management in the Territory, including ACT Government, Commonwealth Government and representatives from the community. This group promotes coordinated approaches to weed control and success in this regard has been achieved.

- The introduction of the Pest Plants and Animals Act 2005 which provides for the declaration of pest plants, the preparation of pest plant management plans, the notification of a notifiable pest plant, and the creation of offences for the propagation of prohibited pest plants.

\begin{flushright}
\end{flushright}
• The preparation of pest plant management plans for the majority of species on the declared pest plant list.

• Regional coordination activities including coordination with the NSW State and Local Government to ensure the introduction of new weeds is minimised, and continued ACT representation on relevant regional forums such as the Southern Tablelands South East Region Noxious Weeds Committee.

• Early incorporation of weed control in management programs for new nature reserves (such as the Jerrabomberra Grasslands Reserve).

• Strategic prioritisation of weed control in terms of species (such as willows and Serrated Tussock) and by area (such as where particular conservation values warrant protection or where an area-based approach will achieve the best results).

• Mapping of the distribution and abundance of Chilean Needle Grass throughout ACT.

• Mapping and survey of weeds in many sites containing threatened ecological communities and areas of high values such as Namadgi National Park.

• Extension activities such as workshops for weed identification and vehicle and machinery hygiene.

• Weed Buster Week – an annual event since 1998, held to promote weeds awareness in the local community. Activities resulting from these events have been weed displays at Floriade and a Weed Swap program.

• Continued monitoring and evaluation of the ACT weed control program by the Weeds Working Group ensures that successes within the program are measured, and cost-effective, informed decisions are made for further enhancement of the program.147

Monitoring needs to be reported so that it can be peer reviewed to evaluate its effectiveness.

The management of weeds is an on-going management challenge and given the nature of weeds it is likely to need on-going funding support.

4.3.4 Erosion and bare ground
Erosion and bare ground is adversely affecting the condition of 28 nature reserves (80 per cent) as evident from Table 5:

• Aranda Bushland, Callum Brae, Cooleman Ridge, Farrer Ridge, Isaacs Ridge, Kinlyside, McQuoids Hill, Mount Ainslie, Mount Painter, Mount Pleasant, Mount Taylor, Mulligans Flat, Percival Hill, Red Hill, Rob Roy, The Pinnacle, Tuggeranong Hill, Urambi Hill, Wanniassa and West Jerrabomberra. In most cases the bare ground was the result of extremely high grazing pressure from

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kangaroos and digging activity by rabbits. However, extensive areas of bare soil on McQuoids Hill are probably due to the 2003 wildfire.  

- sheet erosion impacting on condition was evident on 11 nature reserves (31 per cent): Aranda Bushland, Isaacs Ridge, Kinlyside, Mount Ainslie, Mount Painter, Mount Taylor, Mulligans Flat, Red Hill, Rob Roy, The Pinnacle and Tuggeranong Hill.

- drainage lines showing signs of active gully erosion impacting on reserve condition was evident on nine nature reserves (26 per cent): Callum Brae, Gooroooyarroo, Isaacs Ridge, Kinlyside, Mount Painter, Mount Mugga Mugga, Red Hill and Urambi Hills. The most severe gullying was occurring on Callum Brae and Mount Painter.

- major erosion caused by walking or vehicle tracks was evident on Cooleman Ridge, Mount Ainslie, Mount Painter, Mount Taylor and The Pinnacles.

...Most soils in Canberra have a dispersive B horizon and any exposure of this results in extensive erosion and undercutting. This may occur where the ground layer vegetation is poorly controlling run-off speed and as a consequence of downstream flows or excessive over-bank flow of water from the surrounding land. A number of factors predispose our reserves to bare soils and hence erosion including: steep slopes, clearing of trees, dispersive soils, grazing pressure and disturbance including animal tracks and recreational uses. In addition, the recent long drought, with or without grazing pressure, left many areas with a sparsely vegetated ground layer and consequently a high percentage of bare ground. As a result of the rain in summer 2010 much of the loose litter that had accumulated between plants and on bare ground during the previous years of drought was washed away leaving bare ground exposed, even on only slightly sloping ground.

Managing erosion and reducing bare earth needs to be addressed on a site by site basis. Given the likely increase in the use of nature reserves it is important that access is guided so that use does not adversely affect the condition of a nature reserve or part of a nature reserve.

As evident from Figure 5, erosion can be significant and mitigation measures for the worst cases are likely to need to be managed as a special project requiring dedicated funding. However, given the nature of many of these erosion problems, ParkCare groups, if supplied with materials are likely to be able to assist in addressing many of the

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148 Email from Ms Sarah Sharp, consultant to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 11 January 2011.


150 www:iowa.stormwater.org sourced 301110: Erosion is a three-step process involving the detachment, transportation, and deposition of soil particles. There are many kinds of erosion, including sheet erosion, rill erosion, gully erosion, stream bank erosion, and wind erosion. Each of these types of erosion involves the detachment, transportation, and downstream/downwind deposition of sediment.

erosion problems. For example, they could construct leaky rock weirs and branch erosion traps as proposed by Ms Sharp for erosion mitigation. These techniques are illustrated in Figures 11 and 12.

...leaky rock weirs and branch erosion traps [be used]...to reduce the intensity of run-off. ...
[An advantage of]... branch erosion traps is that they also provide habitat for small animals such as birds, lizards and invertebrates, and protect growing vegetation from grazers. These techniques reduce the need to use more conventional measures such as graded swales that are themselves a cause of significant disturbance of soil.

Design and use of these techniques are presented in Appendix G.\textsuperscript{152}

...Branches add coarse woody litter to the environment which in turn provide habitat for a diversity of species, protection from water and soil loss, provides material for decomposition and development of an organic A0 horizon, and thus enhances landscape function. Consistent with the findings of Manning et al. (in press), consideration should be given to adding timber to woodlands and forests in reserves to enhance habitat and improve landscape function (including immature plantations). By placing them strategically in locations in the landscape where they can assist in reducing overland water flow, they will assist in reducing erosion and loss of other resources out of the landscape.\textsuperscript{153}


Extensive and extreme erosion could be addressed as a restoration program, refer to Recommendation 2.3 in Section 4.4.4 Nature reserve restoration.

4.3.5 Fire
Fire events including operational burns and wildfire, as presented in Table 5 have had:

- major impacts on the condition of five nature reserves (14 per cent) being: Black Mountain, Farrer Ridge, Lower Molonglo River Corridor, McQuoids Hill and Wanniassa Hills.

• residual impacts from the 2003 wildfire, with extensive loss of mature trees, although regeneration is occurring parts of Farrer Ridge, Lower Molonglo and McQuoids Hill reserves.154

The Environment and Sustainability Directorate advised that they also considered Red Hill Nature Reserve to have major impacts from fire.155

Houses or other buildings back directly onto 16 nature reserves (46 per cent): Aranda Bushland; Bruce Ridge; Cooleman Ridge; Farrer Ridge; Gossan Hill; Mount Ainslie; Mount Painter; Mount Pleasant; Mount Taylor; Oakey Hill; Percival Hill; Red Hill; The Pinnacle; Tuggeranong Hill; Urambi Hills; and Wanniassa Hills.

The Bushfire Operational Plan prepared in 2010 by the then Department of Territory and Municipal Services guides how and where fuel is managed on nature reserves.156 Managing fuels on and near nature reserves is likely to increase in importance given the predicted effects of climate change and climate variability with likely hotter and drier conditions in the ACT.157

The Strategic Bushfire Management Plan for the ACT sets out the strategies and the specific actions by which the ACT community and the ACT Government can better manage bushfires and reduce their consequences to life, property and the environment.158 This plan prescribes actions to be undertaken according to whether or not an area is in an Inner Asset Protection Zone; Outer Asset Protection Zones; Strategic Firefighting Advantage Zone or Landscape Fire Management Zone.159

To reduce fuel loads in asset protection zones on nature reserves, vegetation is removed by hand, mechanically slashed, burned or grazed by stock. While each of these options are considered for managing fuels in nature reserves, given the scale of works needed and accessibility issues, controlled burns160 are often the most effective management action. Controlled burns are designed to remove understorey and ground layer plants and litter, to reduce the potential for wildfire, both within a nature reserve, and for asset protection outside a nature reserve. While all options can achieve satisfactory ecological outcomes, undoubtedly the biota and landscape function within that affected zone will be compromised unless consideration is given to timing, intensity, frequency and duration of the actions.161

154 Email from Sarah Sharp, ecologist to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment 11 January 2011.
155 Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
156 AECOM, 2010, Human Settlement Vulnerability and Adaptive Capacity Assessment, Canberra page iii.
159 Controlled burns are also referred to as planned burns, hazard reduction burns, prescribed burns and operational burns.
The effects of fire are many and varied and can include reduction in shrub cover, reduction in total biomass of shrubby and herbaceous species, exposure of bare soil, invasion by alien species and stimulation of grass-seed production.162 This combination of effects provides suitable conditions for rabbits and kangaroos to concentrate their grazing on the sprouting and new plants. Therefore, controlling rabbits and kangaroos before undertaking controlled burns would seem a prudent precaution, although the task may be more easily achieved soon after burns, particularly for rabbits.163 In addition, bare ground resulting from the fire provides an optimal bed for establishment of weeds from seed store or from seeds spreading into the nature reserve.164 This illustrates the complexity of managing nature reserves. To prevent long term loss of landscape function, prior to a planned burn, it may be prudent to assess the condition of the area, and only progress if the area to be burned is in a satisfactory condition. The condition could also be assessed post-burning.

It is understood that:

...Since 2006, the Department of Territory and Municipal Services have had a program to increase the awareness of ecological burning and training for fire management staff on implementing low intensity and patchy prescribed burns. The Department of Territory and Municipal Services monitors the effects of some planned burns as identified in the Bushfire Operational Plan. In 2010-11 monitoring occurred in approximately 14 per cent of identified burn sites with the majority of these being in reserves outside urban areas such as Namadgi National Park. Due to high rainfall a high proportion of these burns did not occur so the post-fire monitoring will be carried over to the 2011-12 season. Monitoring of the 2003 wildfire plots has been undertaken every year to 2009. The monitoring is focused on surveying floristic composition and structure with some elements being used as a surrogate for potential fauna affects. The monitoring program is tailored to the limited resources that are available.165

It is estimated that about 10 per cent of controlled burns in nature reserves, are monitored.166 While it would be unnecessary to monitor all burn sites, a greater representation of sites in urban areas and monitoring of specific fauna indices would help better target burns on the nature reserves which are the subject of this Investigation. A target of monitoring about 40 per cent or more of all burns in reserves with high conservation values should be considered. In a shorter time period a target of around 20 per cent or more might be appropriate to secure a more representative sample.

165 Email from Dr Margaret Kitchin, Department of Territory and Municipal Services Department to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 2 May 2011.
166 Email from Ms Hannah Matthews, Environment and Sustainability Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment of 28 Jul 2011, 10.5 per cent of burns on nature reserves in this Investigation that were monitored.
Recommendation 3

**Better direct and inform the management of nature reserves** by:

3.3 Enhancing controlled burn monitoring that is part of the Strategic Bushfire Operations Plan from the current approximate 10 per cent to:

- around 40 per cent or more particularly in high conservation nature reserves over the longer term (5 to 10 years);
- around 20 per cent or more particularly in high conservation nature reserves in the short to medium term (2 to 5 years); and
- include indices of specific plants and animals.

As new nature reserves are established to protect the natural value of an area it is important to consider how best to accommodate fire management requirements at the early stage of planning.

It is understood that when new estates are planned, the width of the management zones (i.e. the outer and inner asset protection zones) are considered early in the process to afford protection from bushfires within proposed new nature reserves.\(^{167}\) The asset protection zone is located on a case by case basis, given that individual circumstances will vary from location to location.\(^{168}\)

**4.3.6 Visitor use**

Visitor use is affecting the condition of nine nature reserves (26 per cent) as evident from Table 5:

- major widespread effects were evident on Mount Pleasant;
- major localised effects were evident on Mount Ainslie, Mount Majura, Mount Taylor and The Pinnacle;
- minor widespread effects were evident on Aranda Bushland and Black Mountain; and
- minor localised effects were evident on Jerroomberra Wetlands and Mount Mugga Mugga.

The Environment and Sustainability Directorate advised that they also consider that Bruce Ridge Nature Reserve has major localised effects from visitor use.\(^{169}\)

\(^{167}\) Email Mr Neil Savery ACT Planning and Land Authority to Dr Maxine Cooper, Commissioner for Sustainability and the Environment on 5 May 2011.

\(^{168}\) Email Mr Neil Savery ACT Planning and Land Authority to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 15 May 2011.

\(^{169}\) Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
With respect to adverse user effects, Ms Sharp observed that:

... At the time of the surveys, levels of human visits and also observations of the impact of those visits varied widely between reserves. Some reserves, typically the more isolated ones and/or those that are also stocked, appeared to have low levels of visits, judging by the lack of trails or lack of wear on trails. The highest impacts were seen on Mount Ainslie, Mount Majura, Mount Pleasant and Mount Taylor and on tracks in the Pinnacle.

Track disturbance by vehicles, horses and humans ... [was] an infrequently observed problem along maintenance tracks, but especially evident in only a few reserves (The Pinnacle and the steep western track on Mount Painter), but is common on walking trails, especially on the steeper slopes.

In many reserves, tracks designated for walking only were being used by bike riders and, in some reserves, by trail bikes. Unofficial tracks were also being formed. Damage from this was evident in particular at Mount Taylor (mainly walkers and runners), Mount Majura (bikes), Aranda Bushland (possibly BMX bikes) and Mount Pleasant (mainly walkers and runners).

Dumped rubbish was observed in Mount Mugga Mugga adjacent to East O’Malley, Jerrabomberra Wetlands towards Kingston and Mount Pleasant. Extensions of residential gardens were observed in many of the reserves backing directly onto houses.170

Potential user effects on nature reserves need to be considered, especially as Canberra grows in population and therefore the use of our nature reserves increases. Ms Sharp states that:

...There is a potential for inappropriate recreational impacts to increase in currently relatively isolated reserves as residential areas encroach. These reserves include Callum Brae, Googong Foreshores, Goorooyarroo, Gungaderra, Kama, Kinlyside, the Lower Molonglo River Corridor and Mulligans Flat. These are all reserves with very high conservation values, and early planning is required to reduce impacts, particularly by providing alternative areas for more active recreation, including bike riding and open exercise areas for dogs. As new residents begin moving in, education is required to ensure they understand the need for protecting the reserves, to encourage responsible behaviour and to enlist their support in maintaining the values of the reserves.171

From information gained from the survey of user groups the diverse views on whether or not nature reserves are affected by users is illustrated in the following:

...Almost every user group reported that they directly benefit the CNP’s care and maintenance by clearing trails, tending plants and monitoring wildlife in various ways.

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Members raise awareness of the value of the parks, including to interstate and international visitors. Groups function as ‘eyes and ears on the ground’, by monitoring and reporting problems or damage to management. Some groups contribute financially through fees for events. Further contributions were collecting or publishing data about wildlife.

...Eleven groups reported that there were no negative impacts of their groups’ usage on CNP. Another group considered that on balance their impact is positive. Two of these groups contested perceptions that their groups’ usage has negative impacts (such as weeds spread through horse riding, and the impact of running and mountain bike events on formed fire trails). Two groups did identify negative impacts: the occasional need to use areas for pit stops where no toilets are accessible; and some damage to the environment by bushwalking (and how they minimise adverse long-term impacts).^{172}

However, there are adverse effects from visitor use and these need to be managed, as Ms Sharp aptly states:

...The nature reserves of the ACT are an extremely valuable asset for community wellbeing. Values include health promotion through exercise and being in the fresh air; aesthetic pleasure from being in or seeing ‘the bush’; and social interaction with other users. Therefore, recreational use is to be encouraged. However, impacts of inappropriate recreational use may be high in particular locations within reserves that are particularly vulnerable to damage. These include areas where slopes are steep, soils are degraded and exposed, vegetation is not well established and/or conservation values are high. The Canberra Nature Park Management Plan (Environment ACT 1999) promotes visitor use, and aims to provide and maintain access and facilities for users. The proviso, however, is that use is to be ‘in keeping with the settings of Canberra Nature Park’.^{173}

Box 6: Vision for Canberra Nature Park

The Vision for Canberra Nature Park is:

...An integrated, connected system of diverse nature reserves throughout urban Canberra managed to conserve native flora, fauna and habitat, and to provide opportunities for appreciation, recreation, education and research consistent with protecting the natural and cultural heritage, and the landscape values of the area.¹

Management plans for nature reserves including Canberra Nature Park Management Plan (1999), Lower Molonglo River Corridor Management Plan (2001), Jerrabomberra Wetlands Nature Reserve Plan of Management (2010) and Googong Foreshores Draft Plan of Management (2007) do offer guidance on visitor use. However, actually managing this use is a major challenge due to:

- limited community education and awareness of what are appropriate uses in nature reserves, including a lack of accessible on-site information on what is permitted in nature reserves, for example, few nature reserves have on-reserve maps or visitor information;
- few nature reserves having operational plans to guide routine activities such as managing visitor impacts;
- lack of capacity for enforcement by the Territory and Municipal Services Directorate, for example, dogs off leashes is common on all nature reserves;
- limited awareness of alternative sites for recreation activities that are inappropriate in nature reserves; and
- no over-arching ACT recreation strategy to guide people to areas off nature reserves for pursuing activities that are inappropriate on nature reserves. Without this people cannot be guided to areas where their desired activity can be undertaken.

The latter matter is the subject of Recommendation 5.1 which calls for the development and implementation of an ACT Recreation Strategy for Nature Reserves, refer to Section 5.2.5 Recreation strategy. However, in addition to this strategy there is a need for improving the provision and management of appropriate infrastructure. Given the growing pressures from recreation users, these are considered to be a high priority.

### Recommendation 5

**Integrate community health and well-being with nature reserve protection by:**

5.2 **(High Priority)** Improving the provision and management of appropriate recreation infrastructure in nature reserves.

### 4.3.7 Infrastructure maintenance

Infrastructure maintenance is affecting the condition of seven nature reserves (20 per cent) as evident from Table 5:

- major localised effects were evident on Farrer Ridge and Red Hill; and
- minor localised effects were evident on Black Mountain, Mount Ainslie, Mount Majura, Mount Pleasant and Mount Taylor.
The Environment and Sustainability Directorate also advise that they considered Cooleman Ridge, Oakey Hill and Red Hill nature reserves to have major localised effects from visitor use and Mulligans Flat Nature Reserve to have minor localised effects.\textsuperscript{174}

Infrastructure in nature reserves includes tracks for management, powerlines, water reservoirs, communication towers, sewer lines, gas pipelines and restaurants. All of which require protection and maintenance. Ms Sharp reports that:

\ldots in many, but not all, reserves, access tracks to water reservoirs have been sealed to reduce impacts on the reserve.\textsuperscript{175}

\ldots Damage caused by personnel and vehicles accessing infrastructure within the reserves was difficult to distinguish from damage caused by other means, but track damage or spread of weeds adjacent to powerlines was noted at Farrer Ridge, Mt Ainslie, Mt Majura and Mt Taylor. Areas adjacent to the lookouts within Red Hill and Mt Pleasant were particularly disturbed.\textsuperscript{176}

Infrastructure maintenance such as construction and maintenance of tracks, movement of machinery or vehicles in wet conditions, dumping of organic or inorganic material can affect the landscape function of our nature reserves.

The Department of Territory and Municipal Directorate is developing a draft Code of Sustainable Land Management which will codify all management activities undertaken on land managed by Parks and Conservation Service. This Code will require among other things, Works Plans to be developed for a range of activities.\textsuperscript{177}

In addition, a specific Territory and Municipal Services/ActewAGL Code of Practice has been developed which provide a set of practical guidelines and standards for co-operation between ActewAGL and Territory and Municipal Services, when they are conducting their respective works on Controlled Land (which includes nature reserves) to:

1. protect environmental values including water quality and flow, soil protection, flora and fauna conservation and cultural heritage values; and
2. protect, and maintain access to, ActewAGL Network Facilities on Controlled Land.\textsuperscript{178}

This Code of Practice which also requires Works Plans to be submitted prior to the commencement of works forms an essential part of the Activities Management Agreement for Controlled Land between the Conservator for Flora and Fauna and

\textsuperscript{174} Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
\textsuperscript{177} Email from Mr Stephen Hughes, Parks and Conservation Service to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 20 July 2011.
\textsuperscript{178} Email from Mr Stephen Hughes, Parks and Conservation Service to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 20 July 2011.
ActewAGL which has been established in accordance with the requirements of section 99(2) of the Nature Conservation Act 1980. The Act requires an Activities Management Agreement to...set out standards and conditions for avoiding or minimising and conflict with land management objectives for controlled land which might arise as a result of the agency’s (ActewAGL) activities.\textsuperscript{179}

Whilst the Code of Practice deals specifically with asset maintenance activities, activities controlled under the Code of Sustainable Land Management will include; construction such as access tracks, road works (including design, siting, construction and maintenance of roads and tracks) and vegetation management such as mowing and slashing. It is understood that the Code of Sustainable Land Management will also address ways to mitigate the impact of soil disturbance using best management practices.\textsuperscript{180}

Maintenance of the power line/electricity infrastructure on nature reserves is the responsibility of ActewAGL. The vegetation beneath power lines is pruned in accordance with a Works Plan approved by Parks and Conservation Service. Responsibility for access tracks in nature reserves is shared, depending on who is the dominant user of the tracks.\textsuperscript{181}

4.4 Addressing challenges
Given the current and potential disturbance factors and threatening processes that can affect a nature reserve it is desirable to ensure that nature reserves are in good condition so they have a greater resilience to respond to these. Ms Sharp’s assessments provide:

\begin{quote}
...the extent of loss ... that has occurred in much of Canberra Nature Park as a result of the interaction of multiple disturbance factors in the past. This study provides detailed information that can assist identification of what the threats to resilience are and where they occur. From this it is possible to identify areas within reserves that need management in order to improve resilience and mitigate against further loss...\textsuperscript{182}
\end{quote}

Table 7 identifies disturbance factors and priority actions for each nature reserve. These could vary according to potential changes on the nature reserves, however, as a guide Ms Sharp suggests that short-term actions be undertaken within two years and medium-term actions within five years. These are described in Ms Sharp’s Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function in Appendix G.

As previously mentioned, the condition of a nature reserve may vary over time depending on disturbance factors and local conditions; some nature reserves may

\textsuperscript{179} Email from Mr Stephen Hughes, Parks and Conservation Service to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 20 July 2011.


\textsuperscript{181} Email from Mr Stephen Hughes, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 10 May 2011.

\textsuperscript{182} Sharp S., 2011, Landscape function in Canberra Nature Park and impacts of threatening processes on landscape function, Report to the Commissioner for Sustainability and the Environment, page 60.
deteriorate while others may improve. While protecting the condition of nature reserves in good condition and with high ecological value is more cost-effective than trying to restore nature reserves, it is also important to take the opportunity to quickly prevent any nature reserve from deteriorating if it is approaching a critical condition. Too frequently, degraded areas are considered areas of little worth, without considering how they could be improved or the potential conservation value they could have. This is illustrated by Red Hill Nature Reserve.\(^{183}\)

**Case Study: Red Hill Nature Reserve**

In 1997 around 54% of the Red Hill woodland remnant was dominated by woody or herbaceous weeds. By 2005 that figure had dropped to around 14%, today woody weeds occupy less than 1% of the remnant area and herbaceous plants are dominant over less than 10% of the remnant. Action Plan No. 27 Woodlands for Wildlife mapped about 10% of the vegetation on Red Hill as substantially and severely modified, 10% as secondary grassland (moderately modified) 65% as moderately modified and 15% as partially modified. Today over 50% meets the criteria of being partially modified (high condition) and only around 5% would be classified as substantially or severely modified (low condition).

Over a 15 year time span a dozen threatened or rare plants have been monitored on Red Hill. Most have shown dramatic increases including a 300% increase in the number of the endangered Button Wrinklewort. Unfortunately the only clump of Native Mint (Mentha dementia) was slashed as part of fire control measures, and is just hanging on.\(^1\)

\(^1\) Submission 9 page 5.
<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Priority Management Action to address disturbance factors</th>
<th>Nature Reserves</th>
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<tbody>
<tr>
<td><strong>Short-term site management actions</strong></td>
<td>Reduce grazing pressure.</td>
<td>Aranda Bushland</td>
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<td>Farrer Ridge</td>
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<td>Googong Foreshores</td>
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<td>Gungaderra</td>
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<td>Isaacs Ridge</td>
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<td></td>
<td></td>
<td>McQuoids Hill</td>
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<tr>
<td><strong>Medium-term site management actions</strong></td>
<td>Control sheet and gully erosion (including using branch erosion traps, leaky rock weirs)</td>
<td>Callum Brae</td>
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<td></td>
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<td>McQuoids Hill</td>
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<td>Mount Mugga</td>
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<td>Mount Painter</td>
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<td>Mount Taylor</td>
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<td><strong>Control soil and gully erosion (branch erosion traps, leaky rock weirs) in second priority sites</strong></td>
<td>Callum Brae</td>
<td>Mount Painter</td>
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<td></td>
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<td>Goorooyarroo</td>
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<td>Jerrabomberra</td>
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<td>Wetlands</td>
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<td>Kama</td>
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<td>Mount Ainslie</td>
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<td>Mount Majura</td>
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<td><strong>Undertake priority weed control with follow-up revegetation where necessary</strong></td>
<td>Aranda Bushland</td>
<td>Kinlyside</td>
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<td>Cooleman Ridge</td>
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<td>Farrer Ridge</td>
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<td>Goorooyarroo</td>
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<td>Isaacs Ridge</td>
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<td><strong>Implement a revegetation program for steep slopes that were cleared and</strong></td>
<td>Coolemon Ridge</td>
<td>O’Connor Ridge</td>
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<td>Dunlop</td>
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<td>Wetlands</td>
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<td>Lower Molonglo River Corridor</td>
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<td>McQuoids Hill</td>
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<td>Molonglo Gorge</td>
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<td>Oakey Hill</td>
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<td>Isaacs Ridge (northwest)</td>
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<td>Mount Painter</td>
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<td>Time Frame</td>
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<td>areas dominated by introduced annuals when under previous management</td>
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<td>Medium-term management framework actions</td>
<td>Prepare and implement Nature Reserve Operational Plans, based on defined and clear ecological outcomes. Include a review of any existing operational plans.</td>
<td>All reserves</td>
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<td></td>
<td>Review bushfire operational plans including frequency and timing of hazard reduction burns and impacts of other bushfire operational actions where they are having a major impact landscape function</td>
<td>Black Mountain, Urambi Hills, Wanniassa Hills</td>
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<td></td>
<td>Review bushfire operational plans including implementation of bushfire mitigation measures for their potential to impact on landscape function</td>
<td>Cooleman Ridge, Kama, Kinlyside</td>
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<td>Provide information to and involve residents and reserve users in maintaining the integrity of reserves (including edges) in response to future development adjacent to reserves</td>
<td>Callum Brae, Googong Foreshores, Goorooyarroo, Gungaderra, Kama, Kinlyside, Lower Molonglo River Corridor, Mount Majura, Mulligans Flat</td>
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<td>Time Frame</td>
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<td>Involve residents or businesses in controlling invasive weeds where houses back directly onto reserves</td>
<td>Mount Taylor</td>
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<td></td>
<td>Aranda Bushland</td>
<td>Oakey Hill</td>
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<td>Bruce Ridge</td>
<td>Percival Hill</td>
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<td>Cooleman Ridge</td>
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<td>Wanniassa Hills</td>
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<td>Mount Pleasant</td>
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<td></td>
<td>Encourage and involve corporate and community users in maintaining natural assets and managing any impacts arising from their activities</td>
<td>Mount Taylor (on informal tracks used as fitness trails)</td>
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<td></td>
<td>All reserves: service providers</td>
<td>Mount</td>
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<td></td>
<td>Black Mountain</td>
<td>Lower Molonglo River Corridor</td>
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<td></td>
<td>Bruce Ridge (cyclists)</td>
<td>(potential cyclists)</td>
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<td>(Duntroon personnel)</td>
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<td></td>
<td>Monitor landscape function following hazard reduction burns, with particular emphasis on those areas that are burnt frequently</td>
<td>Black Mountain</td>
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<td>Black Mountain</td>
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<td>Cooleman Ridge</td>
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<td>Monitor landscape function on a rolling basis and following management interventions</td>
<td>All reserves</td>
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<td>Medium-term community engagement</td>
<td>Facilitate establishment of new Parkcare and/or Friends groups and support existing groups</td>
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<td>On-going monitoring</td>
<td>Monitor landscape function on a rolling basis and following management interventions</td>
<td>All reserves with priority given to reserves:</td>
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<td>• whose condition is critical or approaching critical condition</td>
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Recommendation 2

Improve the condition and resilience of our nature reserves by:

2.2 *(High Priority)* Giving priority to those routine management actions identified in this Investigation for each nature reserve (refer to Table 7) (These actions should be part of the Nature Reserve Operational Plans (Recommendation 3.1). However, implementation of actions should not be delayed pending the development of these plans).

4.4.1. **Nature reserve operational plans**

While specific actions for each nature reserve have been identified in Table 7, these will need to change over time to respond to changing conditions. Therefore it is proposed that a Nature Reserve Operational Plan (Plan) be developed for each nature reserve, incorporating the actions presented in Table 7 and be updated on an annual basis according to actions implemented and current site conditions. These plans need to reflect adaptive management approaches, as discussed in Section 4.4.2 *Adaptive management and monitoring*. Overarching guidance and strategies for these plans already exist in management plans and other policies. Plans similar to these were recommended in the *Report on ACT Lowland Native Grassland Investigation* for grassland sites. Since that time the Territory and Municipal Services Directorate have been preparing these plans for some nature reserves.

Ms Sharp in advocating the use of these Plans states:

.........*In order to prioritise management and identify critical actions all nature reserves should have a Nature Reserve Operational Plan that is based on long-term achievable outcomes and priorities for management that are specific to the particular reserve, and that contain annual work implementation programs that are regularly reviewed and updated. These would be consistent with the recommendation in Canberra Nature Park Management Plan (Environment ACT 1999), to ‘Develop a management strategy for each CNP reserve including identification of values, features and facilities, fire history, exotic species, specific management objectives, management zones, actions and priorities, and opportunities for volunteer participation’* ...

...*Operational plans prepared by TAMS already exist for several reserves ......Nature Reserve Operational Plans will provide the means to ensure that work on the ground is strategic and focussed, and that volunteers and land managers can work together more cohesively to achieve mutually understood and enunciated goals*...

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The plan should encourage co-operative participation by volunteers and reserve users, including leaseholders and agistees where relevant, and involvement of adjacent landholders in collaborative management programs.

Joint development of Nature Reserve Operational Plans will be particularly important in establishing a cooperative relationship between ACT government staff, volunteers and user groups. This will enable the strengths, priorities and interests of each group to be harnessed in support of the nature reserve which is used and valued by all groups.

The process of developing Nature Reserve Operational Plans will also provide a forum for information sharing and feedback between ACT Parks and Conservation Service and users and may encourage more user groups to become involved in on-reserve works, for example walking or running groups may have a particular interest in programs focussed on track maintenance.

An example of a Nature Reserve Operational Plan proposed by Ms Sharp is in her report (Appendix G). In addition to the information proposed by Ms Sharp, it would be useful for each plan to be supported by a map of the nature reserve showing its boundaries, main tracks, fire trails, entrances and areas for visitor uses. These were issues raised in submissions. For example, determining the boundary for Isaacs Ridge and Mount Mugga Mugga nature reserves proved to be difficult due to a lack of detailed, consistent and up-to-date maps. This makes it difficult for users to know which areas they should access and it also is problematic for land managers, including enforcing appropriate uses in nature reserves. Furthermore, given the need for research to affect land management practices and the opportunities for the community, especially ParkCare volunteers, to be engaged in monitoring, as discussed in Section 6.5 Research, research relevant to nature reserves could be listed on an attachment to the Plan for each nature reserve.

The Plan, although intended to cover the activities undertaken on a nature reserve over a year, should have actions covering three years to allow forward planning and continuity, cover all activities to be undertaken including those proposed to be undertaken by utility agencies. Government departments, utility agencies and local groups, especially ParkCare groups and user groups, need to be consulted during the development of these plans and offered the opportunity to be involved in their implementation. It is important that these plans be developed as soon as possible for all nature reserves to facilitate the integration of all on-nature reserve activities.

The relationship between Nature Reserve Operational Plans, legislation, policies and strategies, operational procedures, stakeholders, research, adaptive management (monitoring/review), nature reserve condition and the ultimate effect on the overall reserve system is shown in Figure 15.

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186 Submission 19 page 6.
Nature reserves approaching a critical condition or in a critical condition and those nature reserves with high ecological values (refer to Table 4) need to be given priority for the development of these Plans.
Recommendation 3

Better direct and inform the management of nature reserves by:

3.1 (High Priority) Preparing a Nature Reserve Operational Plan for each nature reserve which:
- guides all management actions on a nature reserve;
- presents the nature reserve’s key conservation and other values and its management goals;
- includes priority management and restoration actions (Recommendations 2.2 and 2.3), fire management actions and infrastructure and urban protection works;
- has a map of the nature reserve boundaries with recreation areas and tracks shown;
- has an attachment listing relevant research;
- has a monitoring program (guided by a comprehensive nature reserve monitoring strategy – Recommendation 3.2); and
- is prepared and implemented in collaboration with all relevant stakeholders including local groups (especially ParkCarers), utility agencies, and if relevant researchers.

4.4.2 Adaptive management and monitoring

Adaptive management was recommended in my Report on ACT Lowland Native Grassland Investigation to guide land management of grassland sites so that those in a good condition are maintained and those in a critical condition or approaching a critical condition can be restored. These principles apply to the nature reserves in this Investigation.

...Adaptive management allows for the testing of management practices on site to determine if they are achieving the desired outcome, and adapting them as required. It requires that clearly defined objectives be developed, based on current knowledge of the vegetation community, associated species and their responses to management. It is critical that management goals and on-ground management be subject to ongoing review based on analysis of monitoring results and reporting on management practices, then review of information and making changes as necessary.

...An adaptive management approach is designed to improve environmental management by learning from results. It uses management actions as the primary tool for learning about the system being managed. An adaptive management approach focuses on achieving field results through, among other things, regular site inspections and monitoring (this could include photographic recordings), using research findings to inform management practices, undertaking controlled and monitored experiments, such as, reintroducing targeted species (plants and animals).\(^{189}\)

A basic requirement for effective adaptive management is monitoring and nature reserves need to be subjected to:

...regular inspections and monitoring programs to ensure threats, such as weeds and overgrazing, are identified quickly enough to prevent damage to sites and before the threatening process reaches a critical stage. Therefore, an annual monitoring program, involving site inspections and photographic recordings, should be developed and maintained to support an adaptive management approach.\(^{190}\)

Ms Sharp advocates that:

...The nature reserves should be monitored as part of a long term program to identify changes in landscape condition as a result of managing threatening processes and to determine the direction (if any) of the landscape function trajectory. Monitoring will assist in determining whether long-term goals and desired outcomes for each reserve are being met. Such monitoring would not be required on an annual basis but could be undertaken on a five-year rolling program, as defined in the Nature Reserve Operational Plans.\(^{191}\)

...The locations of the [207] survey plots in this study [Ms Sharp’s field sites] have been identified by GPS and photographs, and so are re-locatable. These data provides a benchmark against which future changes can be compared. The monitoring program should prioritise those reserves or parts of reserves identified in [Table 3 of this report] as approaching critical or in critical condition and all areas within reserves that are subject to frequent operational burns ... Areas in reserves in satisfactory condition may not require on-going monitoring, or may only require occasional assessment to ensure landscape function is not being reduced.\(^{192}\)

The assessment of the 207 sites (GPS located) and provision of a report with detailed appendices and photographs for this Investigation cost in the vicinity of $70,000.\(^{193}\) The method used was designed to allow sites to be quickly assessed. It can now be used as a


\(^{193}\) This includes costs for a pilot study and peer review.
bench mark for future monitoring. It would be beneficial to undertake such an assessment every five or so years.

**Recommendation 3**

**Better direct and inform the management of nature reserves by:**

3.2 *(High Priority)* Developing and implementing a nature reserve monitoring strategy which includes:
- condition, ecological values, impacts of threatening processes and recreation use;
- bench-marking against information collected for this Investigation; and
- defined monitoring procedures – the Landscape Function Analysis technique used in this Investigation should be included.

### 4.4.3 ParkCare

We are fortunate in the ACT to have an active and engaged community with 38 per cent of the population (18 years and older) volunteering.\(^{194}\) During this Investigation, it became evident that ParkCare, ‘Friends of’ and other volunteer groups provide an enormous service in assisting in the management of our nature reserves. While 40 per cent (14) of the nature reserves covered by our Investigation have a dedicated ParkCare group, the figure is 32 per cent for all nature reserves.\(^{195}\) Each year these groups undertake many thousands of hours of volunteer work. Many members of these groups intimately know their nature reserve(s) and the threatening processes operating in them. These groups meet regularly to undertake management and conservation activities on their particular nature reserve including weeding, planting, and monitoring condition. Groups also provide informed advocacy for their nature reserves.\(^{196}\)

The dedication of these groups is demonstrated by the ‘Friends of The Pinnacle’

> ...is a group of volunteers with a common interest in protecting, enhancing and promoting the ecological values of The Pinnacle Nature Reserve. They released a Community Weed Management Plan for the Pinnacle Nature Reserve in May 2010. The weed problem was characterised during a weed survey in spring 2009. The draft Plan was released after taking on board comments from Parks, Conservation and Lands. The Weed Plan targets various weeds including African Love Grass, St John’s Wort, Briar

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\(^{195}\) Email from Ms Sally McIntosh, Department of Territory and Municipal Services to Mrs Narelle Sargent Office of the Commissioner for Sustainability and the Environment, 11 November 2011. There are 15 Parkcare Groups for the 47 nature reserves in Canberra.

Rose, thistles and exotic grasses. It prioritises weeds, paddocks, and control treatments, and estimates volunteer time to treat these weeds and avoid seed set. Volunteer effort is presently about 720 hours per year, which needs to increase to 1200 hours of field work, if the Friends of Pinnacle are to fully implement the Plan.\textsuperscript{197}

ParkCare is a government supported program that commenced in Canberra in 1989, coinciding with the National Landcare Program. The Territory and Municipal Services Directorate administers ParkCare and allocates resources annually through:

- a Community Programs Officer position, with an operational budget of $30,000 (in 2010/11);
- significant in-kind support (including training, materials and equipment) and advice provided from land management staff (managers, rangers, weed and pest officers and ecological research and planning staff); and
- additional funding is sometimes available on a project basis, for example for signage and brochures.\textsuperscript{198}

In addition, groups can apply for funding from various sources such as the ACT Government’s Environment Grants Program and Commonwealth’s Caring for Our Country (formerly the Natural Heritage Trust). Following is information on ACT Environment Grants to ParkCare groups:

...From 2005-06 to 2010-11, a total of $102,804 has been provided to 11 Park Care or related groups to undertake on-ground work or to promote the values of ACT parks and reserves:

- **2005-06**
  - Friends of Mt Majura Park Care Group (through the Molonglo Catchment Group), Rehabilitation of the Majura Dams, $12,489

- **2006-07**
  - Friends of Tidbinbilla, Seed Store for Tidbinbilla Nature Reserve, $2,380
  - Farrer Ridge Park Care Group (through the Southern ACT Catchment Group), Farrer Ridge Nature Park Erosion control Project, $4,724
  - Watson Community Association Inc, North Watson Woodland Regeneration, $8,370
  - Cooleman Ridge Park Care Group, Resurrection of Nature Trail on Cooleman Ridge, $4,565

- **2007-08**
  - Friends of Googong, Googong Foreshores Understorey Planting Project, $5,000

\textsuperscript{197} Pix, W., 2010, Friends of Pinnacle Newsletter, Issue 1 June 2010, Canberra.

\textsuperscript{198} Email from Ms Helen McKeown, Department of the Environment, Climate Change, Energy and Water to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 6 October 2010.
Report on Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores

2008-09
National Parks Association, Celebrating Namadgi National Park Publication, $15,000

2009-10
Belconnen Model Aero Club, Crace Grasslands Restoration Project, $10,500
Southern ACT Catchment Group, Scrivener Hill Lookout Rehabilitation, $6,375
Mount Majura Park Care Group, Explaining Change in the Mt Majura Nature Reserve, $3,455
Friends of the Aranda Bushland, Erosion Control in the Aranda Snow Gums, $2,225

2010-11
Conservation Volunteers Australia, Tidbinbilla A-Z, $5,131
Friends of the Pinnacle (through the Ginninderra Catchment Group), Restoring Native Grasses to the Understorey of the Pinnacle, $18,890
Belconnen Model Aero Club, Crace Grassland Restoration, $3,700

...Only 1 grant has been provided to a Park Care Group (through their overarching Catchment Group) from the Community Action Grants component of the Caring for our Country initiative as follows...2010-11 Ginninderra Catchment Group for the Friends of the Pinnacle: Beating the Exotic Grass Menace in Grassy Box-Gum Woodlands - $19,930.199

Volunteer participation in nature reserve management has a range of benefits as the following excerpt outlines:

...the benefits of ParkCare and urban landcare go beyond any calculated economic benefit. The social, psychological and health benefits of Park Care to participants in successful groups cannot be over-estimated. It is a way of connecting people with the landscape in meaningful, ongoing activity which is educational and enjoyable.200

Much of the work carried out on nature reserves by volunteers could not otherwise be achieved with existing ACT Parks and Conservation Service resources.201 This sentiment is echoed by the community as follows:

...The ACT Government does not have the resources to care appropriately for these reserves without community involvement.202

...The “Achilles heel” in the implementation of [the] biodiversity strategy for the ACT is the [in] ability to match the information gathering and planning effort with the appropriate level of management resources.203
A conservative estimate of the financial value of the work undertaken by ParkCare groups and volunteers can be arrived at as follows:

- number of hours of voluntary work undertaken in Canberra Nature Park, Molonglo River Corridor and Googong Foreshores in the 2009-2010 financial year was approximately 14,530 hours
- multiplied by an indicative payment rate of $25 per hour = $363,250.

This demonstrates that volunteering on our nature reserves is of significant financial value. Given that this work also has many non-financial benefits it is clear that programs such as ParkCare provide a worthwhile return on minimal government investment.

ParkCare groups value the support they receive from government, including training courses, however, as the following excerpt from a submission points out, a lack of follow-up work by government can reduce the effectiveness of the group’s actions:

...Mt Ainslie Weeders ParkCare group... were involved in GPS mapping of [rabbit] warrens in 2008/9 and 2009/10. We were extremely disappointed in the inadequate maintenance control in 2010. This, combined with the recent weather conditions, has contributed to increased rabbit numbers and continuing damage. Volunteers feel that their efforts have been wasted; valuable time and financial resources have been squandered; and the ACT government is not committed to protecting CNP.

The potential for expansion of volunteer programs is limited by current funding levels. The growing areas of demand and pressures for the Territory and Municipal Services Directorate with respect to managing the nature reserves include:

- satisfying the demand for providing support to Park Care groups and other community partnerships such as joint Govt/Community Bush Management Teams.
- The real limitation lies in ranger availability. Current responsibilities... [mean] that they can apply very limited time to volunteer activities.
- Alternative models, such as working with other volunteer groups such as Greening Australia and the establishment of Bush Management Teams may assist to resolve the issue of conflicting priorities and high workload for park rangers.

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204 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 27 April 2010, page 9.
205 Submission 4 page 5.
206 Submission 38 Page 1.
207 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 27 April 2010, page 10.
208 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 6.
209 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 5-6.
210 Email from Dr Jason Cummings, Chief Executive Officer, Green Australia Capital Region to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment 28 April 2011.
Numerous ParkCare groups are already monitoring the condition of their local nature reserve. This could be advanced into a valuable government-community partnership program whereby groups could undertake qualitative monitoring using photo points, counting rabbit warrens and rabbit numbers, recording weed distributions and assessing vegetation condition. For example, the ACT Herpetological Association’s submission indicated they would be able to assist in a government-community based reptile monitoring system\(^{211}\) and the Canberra Ornithological Group and Friends of Grasslands are already involved in monitoring projects.

Considering the multiple benefits of community involvement and volunteering for the nature reserves, these programs need continued support and deserve to be expanded where there is a willing community group. This could include encouraging the formation of new ParkCare groups for the 32 nature reserves\(^{212}\) (or 68 per cent) that do not currently have a dedicated volunteer group. Other programs such as Greening Australia’s “adopt a patch” and programs for local schools and community groups which are in close proximity to a nature reserve can contribute to this community effort.

**Recommendation 1**

**Strengthen community awareness and involvement** by:

1.6 Enhancing support for and encouraging the formation of new ParkCare groups so that the majority of nature reserves are supported by such a group (currently 32 per cent of nature reserves have a ParkCare group).

During our Investigation, lack of communication and coordination of ParkCare activities with programs undertaken by the Territory and Municipal Services Directorate and a lack of support for ParkCare groups were raised as issues. The proposed Nature Reserve Operational Plans as discussed in Section 4.4.1 *Nature reserve operational plans* which are the subject of Recommendation 3.1 are likely to address this coordination issue.

**4.4.4 Nature reserve restoration**

The condition assessment carried out for this Investigation (Tables 4 and 5 above) found that 28 nature reserves (80 per cent) were in an overall satisfactory condition and of these twenty four (69 per cent) were considered to have high conservation values. There were six nature reserves (17 per cent) where the majority of the nature reserve was approaching a critical condition. One reserve (3 per cent), Mount Painter, (important for

\(^{211}\) Submission 24 page 1.

\(^{212}\) This is for all 47 nature reserves in Canberra.
landscape connectivity) was assessed to be in a critical condition (refer to Tables 4 and 5).\textsuperscript{213}

A restoration\textsuperscript{214} program is needed to improve the condition of nature reserves approaching critical condition or in critical condition and to also address some localised issues in those nature reserves in satisfactory condition. For example Callum Brae Nature Reserve was assessed to be in an overall satisfactory condition, however 10-20 per cent of it is approaching critical condition and 5-10 per cent is in critical condition. Erosion (gullies, bare soil) was identified as having a major, localised impact on this nature reserve.\textsuperscript{215} As shown in Figure 5 Callum Brae Nature Reserve contains erosion gullies over two metres deep, indicating the need for localised restoration actions to prevent deterioration of the condition of this nature reserve.

Any restoration program will need to be supported by routine management actions to ensure that its benefits are realised. A restoration program needs to address the impacts from historical land use practices such as tree clearing, stock grazing, soil erosion and encroachments onto nature reserves, such issues are unlikely to be addressed as part of routine management actions.

The opportunity exists to enhance the condition of our nature reserves and to restore species which have been lost. As mentioned in Section 2.3 \textit{Our inheritance} and in Section 4.2 \textit{Condition of nature reserves}, many species and some ecological communities within our nature reserves are under threat. Currently, there are 33 species and communities that have been declared vulnerable or endangered in the ACT under the \textit{Nature Conservation Act 1980}.\textsuperscript{216} For example, our lowland woodlands, which are of national significance, are amongst the biggest, best connected and most botanically diverse examples of their type.\textsuperscript{217} However, along with the whole of the ACT, these woodlands have suffered local species extinctions and declines. Further loss and fragmentation from urban expansion, over grazing, weed invasion, changed fire regimes and climate change are threatening processes to these lowland woodlands and indeed our nature reserves.\textsuperscript{218} Cats and foxes are the major predators of woodland wildlife, while competition for hollows by introduced species such as Indian Myna and European Honey Bee are also of concern.\textsuperscript{219}

\begin{footnotes}
\item[214] Restoration ... returning existing habitats to a known past state or to an approximation of the natural condition by repairing degradation, by removing introduced species or by reinstatement from Australian Natural Heritage Charter, 2nd Ed. 2002, in Department of Territory and Municipal Services, 2004, \textit{ACT Woodland Conservation Strategy}, page 87.
\item[217] Department of Territory and Municipal Services 2010 \textit{ACT Woodland Restoration Implementation Plan} page 1.
\item[218] Department of Territory and Municipal Services 2010 \textit{ACT Woodland Restoration Implementation Plan} page 1.
\item[219] Department of Territory and Municipal Services 2010 \textit{ACT Woodland Restoration Implementation Plan} page 4.
\end{footnotes}
Restoration actions can effectively improve and enhance the ecological values of nature reserves and support increases in the population of threatened species as shown by the supported regeneration of the endangered Button Wrinklewort (*Rutidosis leptorrhynchoides*) on Red Hill Nature Reserve.

...In 1984 there were 1475 Button Wrinklewort plants on Red Hill. The sites in which it occurred were heavily invaded with Firethorn, Cotoneaster and Cootamundra wattle. With removal of these weeds and control of weed regrowth, including herbaceous weeds such as Verbascum and Saffron Thistle the numbers of Button Wrinklewort steadily rose to a high of 5,700 plants in 2004 (a 386% increase). The population declined somewhat during the recent drought years but is now back to 5,500.

It is envisaged that implementing a restoration program would involve a range of activities generally above the level of ongoing nature reserve management undertaken by Parks, Conservation and Lands. It is expected that additional resourcing including people with specific restoration skills will be required to implement a restoration project. This is acknowledged by the community, as shown by the following excerpts from submissions:

...TAMS park rangers are unquestionably dedicated but the service has a general lack of the highly skilled ‘hand-on’ practical experience required to undertake ecological and bushland management, allied to general lack of funding. This fundamentally undermines the ability of TAMS to effectively manage the nature reserve system in a long-term, sustainable manner.

...TAMS staff lack the resources and, at times, the specific expertise needed to completely restore such areas to a reasonable condition. Restoration of the Conder sites after BMX-related damage has not been well done and, if such damage continues to occur, a different approach is needed. Usually TAMS uses a large machine and, for the most part, spreads the dirt around the site until it is more or less level. Additional damage to the site occurs because the machines are too big and awkward for the job....

It seems that a specialised team would need to be developed as required and when funds became available to work closely with Parks, Conservation and Lands staff and ParkCare groups to implement restoration programs. An intensive effort on particular sites could then be managed by Parks, Conservation and Lands in cooperation with the local ParkCare group.

Restoration programs have been implemented in various ways, some by permanent Bushland Management Teams, others using groups formed to address a specific issue or work on a specific site as has occurred using Greening Australia ‘Green Teams’ and Australian Trust for Conservation Volunteers.

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220 Email from Dr Michael Mulvaney, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 5 May 2010
221 Submission 13 page 2.
222 Submission 10 pages 4-5.
Hobart is an example of where permanent Bushland Management Teams are used. These teams however, perform duties that are similar to those undertaken by staff in Parks, Conservation and Lands. They also do undertake specific restoration programs and have specialist staff dedicated to this activity.

Mr Adam Muyt, Acting Manager, Bushland and Reserves, Hobart City Council, met with the Commissioner and staff and provided details about Hobart’s Bushland Management Teams. The aim of these teams is to:

- involve local communities in practical activities to protect and restore bushland and bushland values;
- promote bushland values within the community; and
- engender a spirit of community cooperation and involvement in bushland management matters.223

A Bushland Management Team was considered in the ACT for woodland restoration. It was to consist of one park ranger and a contracted non-government organisation, such as Greening Australia. If created it was proposed that it would

...manage the project funding and contracts, actively engage and educate the community...work closely with rangers-in-charge of environmental weed and vertebrate pest control...they would work as a team with the current Parkcare Community Programs Officer...224

Although partial funding of $250 000 per year for four years was allocated for woodland restoration in the 2011-12 budget, the creation of Bushland Management Teams remains unfunded at this time.225 The Territory and Municipal Services Directorate identified the establishment of joint Govt/Community Bush Management teams ... with the technical skills in bush regeneration and rehabilitation as a priority to progress if funds became available.226

Another example of bushland regeneration by volunteer-based teams is the Green Teams established by Greening Australia, which

...conducts a number of programs that engage volunteers in bush regeneration activities; including the “Green Team” and “Adopt a Patch” which could be extended onto our nature reserves. The Green Team, which is supported by the ACT Nature Resource Management Council, are volunteers who carry out bush regeneration primarily on rural lands in the ACT. In 2010 the Green Team ventured out 33 times, volunteered 1,112 hours, planted 7,105 seedlings, propagated 15,750 seeds, and removed 1,411 pines. This

223 Personal communication between Mr Adam Muyt, Acting Manager, Bushland and Reserves Hobart City Council at a meeting with Dr Maxine Cooper and Mrs Narelle Sargent on 21 February 2011.
224 Department of Territory and Municipal Services, 2011, ACT Woodland Restoration Implementation Plan, internal paper, page 21.
225 Email from Dr Michael Mulvaney, Department of Territory and Municipal Services to Ms Joanna Temme, Office of the Commissioner for Sustainability and the Environment, 6 June 2011.
226 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 6.
highly effective model could be replicated on our nature reserves. Some limitations to this occurring include developing better coordination with the existing ParkCare program and rangers.\textsuperscript{227}

Also, the Conservation Volunteers for Australia...is a national, not-for-profit community based organisation that is dedicated to involving the community in practical conservation natural resource management programs. CVA works in partnership with Catchment Management Authorities, Local Councils, community groups, conservation agencies, tourism organisations and operators, State Governments and Departments, the Federal Government, NGOs and individual land owners.\textsuperscript{228}

Their mission is...To attract and manage volunteers to participate in projects that protect or enhance our environment and heritage.

Accordingly there are many models for delivering a restoration program. Regardless of which model is adopted, this Investigation has found that there is a need for a significant restoration program that gives priority to:

- restoring the condition of nature reserves that are overall approaching critical or in a critical condition (20 per cent) that covers an area of about 4 200 hectares
- restoring localised areas assessed as approaching critical or in a critical condition on nature reserves in an overall satisfactory condition, especially those with high ecological values
- protecting and enhancing the ecological values of all nature reserves.

\textsuperscript{227} Email from Dr Jason Cummings, Chief Executive Officer, Green Australia Capital Region to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment 28 April 2011.

Recommendation 2

Improve the condition and resilience of our nature reserves by:

2.3 (High Priority) Implementing a nature reserve restoration program which would be additional to routine management actions with priority given to:

- restoring the condition of those nature reserves that are overall approaching or in critical condition (20 per cent) (refer to Table 5);
- restoring localised areas that are approaching or in critical condition on nature reserves in an overall satisfactory condition, especially those with high ecological values (refer to Table 5); and
- protecting and enhancing the ecological values of all nature reserves.

(These actions should be part of the Nature Reserve Operational Plans (Recommendation 3.1). However, implementation of actions should not be delayed pending the development of these plans).

4.4.5 Departmental considerations

The Territory and Municipal Services Directorate when requested to identify enhanced management actions if additional funding were available, indicated that their priorities would be:

- Establishment of joint Govt/Community Bush Management teams supported by specialist rangers with the technical skills in bush regeneration and rehabilitation
- Development of a Pest Management Plan for Rabbits: $125K.
- Development of Pest Plant Management Plans as required under the Pest Plant and Animals Act 2005: $20K per plan
- $200K per annum for an enhanced sustained rabbit control program targeting both new areas and follow up rabbit control in previously treated sites.
- $1.0M for environmental weed control program with focus of weeds of national significance such as African Love Grass, Serrated Tussock, Chilean Needlegrass, St John’s Wort and Blackberry.
- More resources for fire fuel management monitoring. At present LMP is only able to monitor a small number of sites that are subject to prescribed burning. Monitoring of each site is undertaken for 5 years. No monitoring of grazing or slashing undertaken for fire fuel reduction occurs due to resource constraints. An additional $150 k per year would enable a more extensive and scientifically robust monitoring program related to fire fuel management.
- Improved vegetation mapping: Currently the ACT does not have a vegetation communities’ map that is based on scientific data. The cost of data collection, analysis and spatial mapping would be approximately $110 k.\(^{229}\)

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\(^{229}\) Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011. Funding was recently provided for
Woodland restoration including management of grazing pressures by kangaroos and rabbits, reinstatement of missing habitat structures e.g. dead wood, encouraging natural regeneration and implementation of native species planting is a priority. Approximately $1 million per year initially would initiate a program that includes community engagement (including the establishment of joint Govt/Community Bush Management teams supported by specialist rangers with the technical skills in bush regeneration and rehabilitation) that would enable the improvement of several hundred hectares of woodland.\footnote{230}

These priorities align with many of the areas identified in this Investigation.

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\footnote{230}{Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 6.}
5. MANAGEMENT FRAMEWORK

An understanding of legislation and policy arrangements relevant to our nature reserves is important as it is this framework that guides what can and should occur on nature reserves. The legislation and policies which affect our nature reserves that are considered to need amending to better protect our nature reserves are discussed in this chapter. An outline of all key legislation and policies considered in this Investigation is provided in Annex A to Chapter 5 Legislation, strategies and plans.

Commonwealth legislation takes precedence over State or Territory legislation unless the State or Territory legislation is capable of operating concurrently with Commonwealth legislation.

International agreements also have a role in the management of nature reserves. Jerrabomberra Wetland Nature Reserve is visited by a number of migratory birds which are protected under several international agreements. For further information refer to Annex A to Chapter 5 Section 4 International agreements – Jerrabomberra Wetlands Nature Reserve.

The two key pieces of legislation relevant to the discussion in this chapter are:

- Planning and Development Act 2007 which is administered by the ACT Planning and Land Authority; and
- Nature Conservation Act 1980 which is administered by the Department of the Environment, Climate Change, Energy and Water.231

5.1 Legislative amendments

In the Report on the ACT Lowland Native Grassland Investigation 2009232, the issue was canvassed regarding whether the Planning and Development Act 2007 is the appropriate vehicle for directing management planning of nature conservation areas. It may be more appropriate for this, and other land management issues associated with nature conservation, such as leases and licences, to be enshrined in nature conservation legislation. This was the subject of a recommendation in the Report on the ACT Lowland Native Grassland Investigation:

Streamline ACT Government planning and nature conservation legislation to ensure all land management matters in conservation areas are covered by the Nature Conservation Act 1980.233

It is understood that this recommendation is being considered in the current review of the Nature Conservation Act 1980.

231 Administrative Arrangements 2010 (No 1).
Terms of Reference 7 specifically requires that biodiversity offsets be considered in this Investigation. In the Report on the ACT Lowland Native Grassland Investigation, I recommended, amongst other things, that offsets be investigated as part of the review of the Nature Conservation Act 1980.\textsuperscript{234} It is understood that this is happening.\textsuperscript{235}

Environmental offsets for development (biodiversity offsets) are considered in section Section 6.4 Environmental offsets for development.

Compliance and managing encroachments are issues. The Nature Conservation Act 1980 defines offences relating to protected species and reserved areas. For example offences under the Act include dumping rubbish or erecting structures in reserves, unauthorised fires and vehicle access and taking of native plants without a license.\textsuperscript{236} Information on compliance was presented in the Government’s Discussion Paper; Review of the Nature Conservation Act 1980\textsuperscript{237}

...Since 2000, over 1500 potential offences under the NC Act [Nature Conservation Act] have been reported. Of these, 354 were investigated resulting in 10 infringement notices and two prosecutions. The lack of prosecutions and fines may indicate general community compliance with the NC Act, and prosecution arguably has been regarded as a last resort. However, it is possible the enforcement provisions are viewed as inadequate and the low level of prosecutions is undermining the ability of the NC Act’s objects to be satisfactorily fulfilled. The key issues of the review of the enforcement provisions of the NC Act are:

- potential use of a tiered approach where the level of investigation and penalty is tailored to the level of offence;
- whether the penalties are sufficient to act as a serious deterrent when economic gain is a factor in a breach;
- that there is a limited use of strict liability offences under the NC Act; and
- that powers of seizure, search and entry could be improved.

The options for dealing with offences under the NC Act include:

- the issuing of infringement notices under the Magistrates Court (Nature Conservation Infringement Notices) Regulation 2005 and
- criminal prosecutions.


\textsuperscript{235} Personal communication between Ms Kathryn Tracy, Department of Environment, Climate Change, Energy and Water at meeting with Dr Maxine Cooper and Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 9 May 2011.

\textsuperscript{236} Nature Conservation Act 1980 s.51, s.66 and s.67.

The NC Act also provides for the Conservator, or someone to whom the court grants standing, to apply to the Supreme Court for injunction orders when it is believed necessary to restrain a person from contravening the NC Act.\footnote{238} These options are cumbersome and time consuming which is an impediment to enforcement. Furthermore, under the\ Nature Conservation Act 1980 \actions are taken under criminal proceedings and penalties are small.

\ldots Criminal penalties are punitive by nature and, in the case of the NC Act, use fines or imprisonment rather than civil remedies such as damages or restitution. The burden of proof is, appropriately, greater in criminal matters.

The burden of proof in civil cases need only balance the probabilities in favour of an accused’s guilt, whereas in criminal matters the prosecution is require to prove the defendant’s guilt beyond a reasonable doubt.\footnote{239}

This Investigation has been advised that recent encroachments have been resolved by negotiation with lessees or removal by the Territory and Municipal Services Directorate, and that around 20 years ago an effort was made to address all historic encroachments \textit{but the program was abandoned as a result of the strong negative public reaction.}\footnote{240} While this is the case it is important that these historic encroachments are addressed as it is socially unjust that some members of the community receive free use of public land, and from a nature conservation perspective, these encroachments may create conditions favourable for weeds, feral animals and restrict fire management activities. Removal of encroachments should be at the ‘encroachers’ or users expense and penalties including fines commensurate with the duration of the encroachment imposed. Given the need to address historical encroachments, it would seem appropriate that special legal powers are introduced to assist enforcement.

It would be appropriate for a 3 month moratorium combined with an education and awareness campaign to remove encroachments to preceed any legal action. When the moratorium expires, enforcement and penalties should be applied for breaches. Encroachments should be removed at the encroacher’s or user’s expense.

In amending the\ Nature Conservation Act 1980, responding to climate change and creating and protecting corridors are two issues that need consideration, these are discussed in Section 6.1 Impacts of climate change and need for connectivity and Section 6.2 Our reserves and connectivity. However, as amendments to the\ Nature Conservation Act 1980 are discussed in this section, Recommendation 4.1 covers these issues.

\begin{footnotes}


\footnote{240}{Letter from Mr Gary Byles, Department of Territory and Municipal Services, to Dr Maxine Cooper, Commissioner for Sustainability and the Environment 4 April 2011, page 10.}
\end{footnotes}
Recommendation 4

Strengthen the management framework and strategically position our nature reserves by:

4.1 Amending the Nature Conservation Act 1980 to:
- improve enforcement options;
- increase penalties;
- include powers to ensure historical encroachments onto nature reserves are removed at an encroacher’s or user’s expense; and
- include relevant climate change and connectivity matters (including those raised in Impacts of Climate on the Canberra Nature Park: Risks and responses by Dr Bob Webb - Appendix E and Ecological Connectivity for Climate Change in the ACT and surrounding region by Manning et al.).

5.2 Policy reviews and new policies

5.2.1 Canberra Nature Park Management Plan 1999
The Planning and Development Act 2007 is the main legislation governing the management of our reserves and requires the preparation of plans of management for all areas of public land. The Act sets out the process for reviewing plans of management and provides that the custodian of land must review the plan of management at least once every 10 years and then if satisfied that the plan is no longer appropriate prepare a draft variation.

The 10 year review of the Canberra Nature Park Management Plan was due by 20 July 2009. This review, including an evaluation of the plan of management objectives, has not occurred. A review which was proposed to commence in 2010-11 dependent on availability of funding and resource has not occurred.

Since the gazetral of the Canberra Nature Park Management Plan 1999, a significant number of reserves have been added to Canberra Nature Park including: Callum Brae, Kama, Gungaderra Grasslands, Goorooyarroo, West Jerrabomberra Grasslands and Percival Hill nature reserves.

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241 Planning and Development Act 2007 s.320.
242 Planning and Development Act 2007 s.333 defines custodian for an area of land as an administrative unit or other entity with administrative responsibility for land in the ACT that is unleased land, public land or both. In most cases the custodian of the public land zoned as a nature reserve is the Department of Territory and Municipal Services.
243 Planning and Development Act 2007 s.332 (2.)
244 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment 27 April 2010, page 2.
245 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment 27 April 2010, page 2.
When the review of the Canberra Nature Park Management Plan 1999 occurs, it will be important to ensure that potential impacts of climate change and climate variability that are likely to affect reserves are recognised. This would align with recommendation 1 in the paper *Impacts of Climate on the Canberra Nature Park: Risks and Responses* February 2011 by Dr Bob Webb (Appendix E):

...stated values and outcomes for the Nature Reserves be reviewed for consistency and completeness, to provide an agreed basis for future risk, strategy and performance assessment, including for the impacts of climate variability and change. The outcomes summarized and used in this report provide one input to such a review.246

This Investigation has focused on some issues that need to be addressed in a review of the Canberra Nature Park Management Plan 1999, it is beyond the terms of reference of this Investigation to consider all issues. In the *Report on ACT Lowland Native Grassland Investigation* I made a recommendation regarding incorporating Action Plan No 28 - ACT Lowland Native Grassland Conservation Strategy into this Management Plan.247

Three action plans which are important in guiding actions to protect all our reserves:

- Action Plan No. 27 - ACT Lowland Woodland Conservation Strategy;248
- Action Plan No. 28 - ACT Lowland Native Grassland Conservation Strategy;249
and
- Action Plan. No 29 - ACT Aquatic Species and Riparian Zone Conservation Strategy.250

These action plans are important as our reserves protect many of the ACT’s vulnerable and endangered species and communities, and they provide guidance on how to afford protection. Part 3 of the *Nature Conservation Act 1980* makes provision for the Conservator to prepare action plans for each species, ecological community or process declared to be vulnerable or endangered.251

These action plans need to be formally incorporated into the Canberra Nature Park Management Plan when it is reviewed. It is understood that for recent plans of management, namely those for Jerrabomberra Wetlands and Googong Foreshores this has been done.

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251 Action Plans are disallowable instruments *Nature Conservation Act 1980* Part 3 Division 3.4 s.42 (3).
Recommendation 4

Strengthen the management framework and strategically position our nature reserves by:

4.2 Reviewing the Canberra Nature Park Management Plan 1999 as mandated under the Planning and Development Act 2007 and in so doing include:

- nature reserves added to the reserve system since 1999;
- addresses categorising nature reserves (recommendation 3.4);
- polices to address current issues and those developed since 1999, particularly;
  - Action Plan No. 27 - ACT Lowland Woodland Conservation Strategy;
  - Action Plan No. 28 - ACT Lowland Native Grassland Conservation Strategy;
  - Action Plan No 29 - ACT Aquatic Species and Riparian Zone Conservation Strategy; and
- consideration of climate change (including Impacts of Climate on the Canberra Nature Park: Risks and responses by Dr Bob Webb - Appendix E) and connectivity (including Ecological Connectivity for Climate Change in the ACT and surrounding region by Manning et al.).

The Canberra Nature Park Management Plan 1999 Action List Priorities included:

- preparation of an Implementation Plan within 12 months of the release of the Management Plan; and
- the development of a management strategy for each reserve including identification of values, features and facilities, fire history, exotic species, specific management objectives, management zones, actions and priorities, and opportunities for volunteer participation.252

Neither of these has been developed.253 However, consultation with staff in the Territory and Municipal Services Directorate, experts and ParkCare members, suggest that the proposed Nature Reserve Operational Plans (discussed in Section 4.4.1) are a preferable alternative to the Implementation Plan and the Management Strategy mandated in the Canberra Nature Plan of Management 1999.

253 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment 27 April 2010, page 1.
5.2.2 Other Management Plans
Plans of Management exist for Lower Molonglo River Corridor (2001), Googong Foreshores (currently under review) and Jerrabomberra Wetlands Nature Reserve (2010). These are further discussed in Annex A Section 2.2 Plans of management.

This issue of whether Goorooyarroo, Mulligans Flat, Mount Majura and Mount Ainslie nature reserves should become a National Park or remain as discrete nature reserves as part of Canberra Nature Park is considered in Section 6.3 Classification of nature reserves. If these nature reserves were to become a National Park it may be appropriate for a Management Plan to be developed to particularly guide how it can best be protected given its location on the border between the ACT and NSW or the revised Canberra Nature Park Plan of Management could have a specific section on these areas.

5.2.3 ACT Rabbit Pest Animal Management Plan
The Pest Plants and Animals Act 2005 provides the primary statutory basis for rabbit management and weed control in and around our nature reserves.

As discussed in section 4.3.2.1 Rabbits, Dr Kent Williams in his paper Managing Rabbits in Canberra Nature Park (Appendix D) has made recommendations to improve the management of rabbits and apart from those related to enhanced resourcing these could be best addressed as part of an ACT Rabbit Pest Management Plan. The ACT currently does not have such a plan.

The rabbit is a declared pest in the ACT (Pest Plants and Animals (Pest Animals) Declaration 2005 (No 1)). Landholders may be obliged to suppress rabbits on their land if the Chief Executive of the Department of Territory and Municipal Services so directs and issues to them a written Pest Management Direction (Pest Plants and Animals ACT 2005). However, the Pest Management Direction must be consistent with the pest management plan for the rabbit; presently there is no such plan and Pest Management Directions cannot be issued to landholders to deal with rabbit infestations including those on land adjoining CNP [Canberra Nature Park]. The ACT Government (ACT Parks, Conservation and Lands) is the landholder of CNP. Consequently, any suppression of rabbits in the CNP, and other lands in the ACT, is undertaken for reasons other than legal.

While the ACT is developing a draft Pest Animal Strategy which will provide a framework for considering the management of all pest animals and native animals, it is understood that it will not provide the detailed management information that has been suggested by Dr Williams. Furthermore, rabbits need to be managed across tenures, as Dr Williams’ notes:

...While the CNPs adjoin other landholdings (NCA [National Capital Authority] jurisdiction, the Australian War Memorial, property of the Defence Department,
Actewagl [sic] service land, rural and urban leases, NSW rural properties), the ACT Government is politically and morally obliged to suppress rabbits in the CNP, although some adjoining properties contain substantial populations of rabbits that compromise efforts in the CNP. This obligation applies irrespective of any demonstration of the impact of the rabbit in the CNP or any demonstration of the benefit of rabbit suppression in the CNP.\textsuperscript{256}

Given this and the issues raised by Dr Williams, an ACT Rabbit Pest Animal Management Plan is recommended. It is not considered necessary to develop a strategy for all other pest animals as many of these are not as abundant or as problematic in urban areas as the rabbit. Management of other past animals could be guided by in-house operational procedures. However, the management of all pest animals (feral and native) on each reserve needs to be part of a nature reserve operational plan, discussed in Section 4.4.1. Nature reserve operational plans.

An ACT Rabbit Pest Management Plan is likely to be a policy-operational document and given that the government officers who guide natural resource management policy are in a separate directorate from those who manage reserves, it may be appropriate for this plan to be a cooperative effort between the two directorates.

**Recommendation 4**

**Strengthen the management framework and strategically position our nature reserves by:**

4.3 (High Priority) Developing and implementing an ACT Rabbit Pest Management Plan. This plan should address the recommendations in *Managing Rabbits in Canberra Nature Park* by Dr Kent Williams (Appendix D).

### 5.2.4 Code of Sustainable Land Management

The Territory and Municipal Services Directorate undertake a range of management activities and operations using its own staff, contractors and volunteers\textsuperscript{257} and to guide all land management operations the Department is developing a Code of Sustainable Land Management. This Code presents values and guiding principles and underpins all operations carried out, including those across the reserves.\textsuperscript{258}

The Code requires the preparation of Works Plans\textsuperscript{259} for a number of activities including chemical use, vegetation management (including works involving fuel reduction and fuel reduction grazing) and work involving the culling or movement of native


\textsuperscript{259} Work Plans as referred to in the Code include project Briefs and Burns Plans.
animals.\textsuperscript{260} It is supported by a range of operational manuals which are the basis for the required detailed Works Plans.

As mentioned in section 4.3.7 \textit{Infrastructure maintenance}, the condition of some areas in reserves is being adversely affected by infrastructure activities. Given the current and potential adverse impacts of such activities it is important that this Code be finalised, adopted and implemented.

\textbf{Recommendation 4}

\textbf{Strengthen the management framework and strategically position our nature reserves by:}

\begin{itemize}
  \item 4.4 Finalising and implementing the Code of Sustainable Land Management and address infrastructure construction and maintenance.
\end{itemize}

\textbf{5.2.5 Recreation strategy}

Our nature reserves are highly valued by our community and play a significant role in providing natural settings close to our homes for a diverse range of recreational experiences, uses and activities. With a forecast increase in population of 80 000 over the next 20 years, more people are likely to use our nature reserves thereby increasing the pressure on them.\textsuperscript{261}

Research shows that the built environment can have a significant impact on a person’s level of physical activity. Good design and people-friendly spaces and places can promote active lifestyles by encouraging walking, cycling, public transport and active recreation.\textsuperscript{262}

While visitor numbers for our nature reserves is not available, from observations\textsuperscript{263}, visitor numbers in some nature reserves have significantly increased. Some nature reserves are highly patronised including Mount Ainslie, Black Mountain, Mount Majura and Mount Taylor. For example, Mount Taylor Nature Reserve has an estimated annual visitation of over 10 000.\textsuperscript{264} It is likely that other nature reserves have a much higher usage as, for example, Mount Ainslie is often used by organisations or groups for physical training exercises. A comment overheard from a community member who uses Mount Ainslie, captured their idea of the health value of our nature reserves

\[\ldots\text{our reserves probably do more good for peoples' health than our two hospitals.}\textsuperscript{265}\]
Nationally, the ACT has the highest sport and physical recreation participation rates with 53.8 per cent of the adult population undertaking physical activity at least three times per week compared with the national average of 47.4 per cent. The participation rates for walking, cycling (including mountain bike riding) running and bush walking were 41.8 per cent, 16.8 per cent, 11.1 per cent and 7.2 per cent respectively, representing the first, third, fifth and sixth most popular activities in the ACT.\(^\text{266}\) The majority of this activity occurs in our open spaces and nature reserves.

The scale and demographics of anticipated growth in the Canberra population means that there is a need for a broad range of recreation opportunities from the more remote settings with opportunities for adventure activities, through to developed sites with opportunities for more passive recreation and a range of facilities, including facilities for people with a disability. Planning needs to ensure that this range of opportunities is provided in the most appropriate areas both in terms of protection of reserve values and geographic development of Canberra.\(^\text{267}\)

In particular, there is a need to identify the appropriate recreational activities for each nature reserve consistent with the vision for Canberra Nature Park (Box 6) and the management objectives \(\ldots\text{to conserve the natural environment and to provide for public use of the area for recreation, education and research.}\(^\text{268}\) Where there is any inconsistency between these objectives, recreational opportunities are secondary to conserving the natural environment.

A gap identified during this Investigation is the lack of an overall Recreation Strategy for our nature reserves. Such a strategy would further articulate the directions provided by the National Capital Open Space System (NCOSS), which is discussed in Annexure 5 Section 1.1.3 National Capital Open Space System. Within NCOSS there are...

\[\ldots\text{conservation spaces protecting the natural and cultural heritage of the ACT and consist generally of national park, heritage and wilderness areas, and nature parks and reserves.}\]\(^\text{269}\)

It could also incorporate the Canberra Centenary walking and cycling trial (Centenary Trail).\(^\text{270}\)

\textit{A Strategic Plan for Sport and Active Recreation in the ACT & Region 2011-2020} has recently been released which\(\ldots\text{provides a blueprint upon which sport and recreation will be nurtured and promoted over the period 2011-2020.}\(^\text{271}\) It appears that this plan was developed without
explicit consideration of recreation in nature reserves\textsuperscript{272}. Fortunately, this Plan does provide a broad context for recreation activities on nature reserves.

The Vision in this Plan is:

\textit{...Sport and active recreation in the Canberra region enables an enriched active national capital. It is supported through a united system that connects and promotes the economic and social value of sport and recreation to the health and well being of the community.}\textsuperscript{273}

This Vision is supported by a strategic framework, priorities and goals many of which could apply to recreation activities on nature reserves. For example, the goals presented in this plan are:

- To increase participation in competitive, non-competitive and social sport and active recreation activities at all levels
- To provide opportunities for achieving excellence in sporting performance
- To ensure access to quality and sustainable infrastructure for the delivery of these activities.\textsuperscript{274}

This Investigation found that there is a lack of data regarding recreation activities on nature reserves, and that there is a need to enhance recreation facilities in our reserves; accordingly the following Strategic Initiatives in this plan are particularly supported:

\textit{...1.1 Develop user friendly templates for regular data collection to ensure planning is supported by research based decision-making}\textsuperscript{275}

\textit{...7.1 Develop a long term strategic facilities and resources plan…}\textsuperscript{276}

In 2004, the then Department of Urban Services commissioned an \textit{Interim Recreational Strategy for the Natural Areas of the ACT.}\textsuperscript{277} This was a five-year Recreation Strategy that provided a strategic approach to the provision of recreational facilities and opportunities for the Territory’s non-urban natural areas (ACT Government lands managed by the then Environment ACT and ACT Forests). This strategy identified a number of guiding principles, which remain relevant including:

- conservation of natural and cultural values;
- importance of natural areas for recreational activities for the ACT community;
- integrated planning;
- economic evaluation;

\textsuperscript{272} Those agencies who manage the nature reserves such as Parks Conservation and Lands were not listed as a stakeholder nor do the acknowledgements suggest inclusion of nature reserve recreationists.


\textsuperscript{276} ACT Government, 2011, \textit{A Strategic Plan for Sport and Active Recreation in the ACT & Region 2011-2020}, page 16.

\textsuperscript{277} Mackay, J., 2004 \textit{Interim Recreation Strategy for the Natural Areas of the ACT}, Prepared for Environment ACT, page 43.
• use of appropriate land;
• consultation with user groups; and
• provision based on identified needs and demand.\textsuperscript{278}

The majority of the goals and objectives in this Strategy are still applicable:

• \textit{To provide strategic direction for the range of recreational opportunities appropriate to the ACT’s natural areas}....
• \textit{To ensure protection of areas of high natural, cultural or economic significance from inappropriate use or development}
• \textit{To ensure an appropriate balance of recreation opportunities is provided across a range of areas}
• \textit{To provide a tool for land managers to better provide for recreation use whilst protecting the natural and cultural values of the protected areas; and}
• \textit{To provide an opportunity for the wants and needs of conservation, recreation and other stakeholders to be included}....\textsuperscript{279}

Reasons for this strategy not being finalised are not known however a recreation strategy for our nature reserves is required to integrate community health and well-being with nature reserve protection. Such a strategy would support \textit{A Strategic Plan for Sport and Active Recreation in the ACT \& Region 2011-2020}.

A recreation strategy for nature reserves would need to specify appropriate recreational uses and guide their location. It should also include a facilities and infrastructure plan so that activities are supported and promoted with appropriate resources. As stated in Section 4.3.6 Visitor use, tracks can adversely affect nature reserves; accordingly, the strategy would need to specifically address this topic. To ensure tracks are appropriately used it is important to have signage to guide users. Guidance on appropriate signage could be given in the nature reserve recreation strategy. It would need to be integrated with any other signage used reserves and any community education and awareness program which is the subject of Recommendation 1.3.

While there is limited data on recreation uses in nature reserves, it is frequently reported that there is a steady increase in the number of people using these reserves. Given this and the increasing population, it can be expected that this trend will continue. Accordingly developing an ACT Nature Reserve Recreation Strategy is considered to be a high priority.

Recommendation 5

Integrate community health and well-being with nature reserve protection by:

5.1 (High Priority) Developing and implementing an ACT Nature Reserve Recreation Strategy which:

- identifies the appropriate balance and mix of recreational opportunities for each nature reserve;
- directs recreational activities to appropriate locations and encourages users to respect the environment and each other;
- incorporates the Centenary Trail where appropriate;
- specifically address track planning and management;
- guides infrastructure development;
- is developed in consultation with the community, in particular, reserve user groups and ParkCare groups; and
- aligns with the ACT Government’s Strategic Plan for Sport and Active Recreation in the ACT & Region 2011-2020.
6. STRATEGICALLY POSITIONING OUR NATURE RESERVES

This chapter addresses the impacts of climate change and need for connectivity; our reserves and connectivity, classification of reserves, environmental offsets for development and research. To assist in understanding these issues a number of papers were commissioned for this Investigation. These papers reflect the views of their authors and not the Commissioner. The papers, in order of discussion in this chapter are:

- **Impacts of Climate on the Canberra Nature Park: Risks and Responses** by Dr Bob Webb (Appendix E);
- **Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories?** by Mr Ian Pulsford (Appendix I);
- **Should Goorooyarroo, Mulligans Flat, Mount Majura and Mount Ainslie become a National Park or remain as discrete Nature Reserves as part of Canberra Nature Park?** by Mr Ian Pulsford (Appendix H);
- **Potential biodiversity offset actions and sites for the Australia Capital Territory** by Dr Philip Gibbons (Appendix F);
- **Legal Obligations of the ACT Government Regarding The Management of Nature Reserves** by Professor Murray Raff (Appendix J); and
- **Research: Existing and Potential, Paper to inform Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation** (Appendix L).

The report, *Ecological Connectivity for Climate Change in the ACT and surrounding region* by Adrian D. Manning, David J. Shorthouse, Janet L. Stein and John A. Stein, commissioned by the ACT Government to address Action 34 of *The ACT Climate Change Strategy 2007-2011* has also informed this Investigation.

Our reserves are important for connectivity by allowing the movement of animals from reserve to reserve, the provision of recreation trails and provision of service corridors, and the landscape setting it provides in our city.

For the purpose of this Investigation the definitions used by Manning et al. in the paper *Ecological Connectivity for Climate Change in the ACT and surrounding region* are adopted:

**Habitat connectivity** – the connectedness of patches of habitat suitable for a given individual species;

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**Landscape connectivity** – the human perception of physical connectedness of vegetation cover in a landscape; and

**Ecological connectivity** – the connectedness of ecological process at multiple scales.\textsuperscript{281}

To some extent the challenges faced by our reserves have been becoming apparent over the past 10 - 20 years, and successive ACT Governments have responded by amending legislation (for example the *Nature Conservation Act 1980* to recognise threatened species and the *Pest Plants and Animals Act 2005* to provide for control strategies), preparing new plans and policies (for example Action Plans for threatened species and control plans for pest species, Canberra Nature Park Plan of Management), and supporting research partnerships that build knowledge about how best to manage our natural resources (for example in partnerships with the Australia National University on woodland recovery and with University of Canberra on grassland ecosystems).

As Canberra has expanded and new suburbs and infrastructure such as major roads, and service corridors are built, a significant consequence is fragmentation of habitat at many scales.\textsuperscript{282} Fragmentation, modification and/or destruction of habitat are increasingly recognised as having potential for adverse impacts on biodiversity and the integrity of protected areas.

Establishing new reserves to protect the best remaining areas of natural habitat best describes the approach taken by all ACT administrations over many years, starting with the hills and ridges surrounding our major towns and more recently focusing on areas containing endangered ecological communities such as Natural Temperate Grasslands and Yellow Box – Red Gum Grassy Woodlands. However, the assumption implied by this approach, that native plants and animals are able to move between patches of habitat (habitat connectivity) is under legitimate challenge as our reserves become isolated islands in a sea of urban development, while roads and other infrastructure prevent previously available opportunities for fauna to move from one reserve to another.

Another dimension is the impact of climate change that is forcing species to *shift their ranges* …and alter *other key biological functions such as commencement of breeding*.\textsuperscript{283} However the interaction of continued urban development and its impacts with the effects of climate change can be expected to present the managers of our reserves and the planners of the National Capital with challenges not previously encountered or envisaged when our reserves were established.


New understanding about these challenges and the related natural environmental management and planning issues is needed. In some cases there is a need to generate new knowledge through research. In others, there is a need to access existing experience and knowledge and apply it, where appropriate, to our reserves and the way Canberra and the surrounding region is planned.

6.1 Impacts of climate change and connectivity

Dr Bob Webb in his report *Impacts of Climate on the Canberra Nature Park: Risks and Responses* (Appendix E) identifies likely climate directions for Canberra. In summary, these are:

- the strong likelihood of mean temperatures continuing to increase, along with more frequent and severe heatwaves for the ACT and region;
- a high probability of changes in long term rainfall patterns (e.g. a continuation of significantly lower autumn rainfall), and an increase in rainfall intensity with more extreme rainfall events;
- increased evaporation, leading to reduced runoff and stream flows; and
- more frequent and severe drought periods, changing bushfire regimes, and flood events.\(^{284}\)

These changes combined with existing disturbance factors such as grazing, weeds and physical disturbances (discussed in Chapter 4 Addressing challenges on our reserves) have a mutually reinforcing impact on our reserves.\(^{285}\) Climate change may also allow new or existing weed species and feral animals to flourish, resulting in increased threats to native species both on and out of reserves\(^{286}\) or, as Dr Webb describes it our nature reserves are faced with a:

...multiple ‘climate whammy’ from the increased loss of habitat, the threat from invasive species more resilient to climate, and the increased risk from changing bushfire frequency and intensity and prescribed burning; all in addition to the direct climate physiological impact on local species.\(^{287}\)

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Dr Webb also suggests that:

…To the extent that … threats continue to increase, there is also a significant risk to public use values of the Reserves … accentuated by the potential for greater usage restrictions with growing tension between conflicting objectives.\(^{288}\)

In managing our nature reserves in response to changes in climate we need to consider the whole system, adopt adaptive management practices as discussed in Section 4.4.2 Adaptive management and monitoring and the precautionary principle\(^{289}\) and enhance the resilience of our reserves. With respect to actions needed to address some of the challenges presented by climate change, Dr Webb states that:

...The good news on adaptation is that most potential responses will mitigate both climate and non-climate threats. Furthermore many can be progressed with some confidence that they will have value notwithstanding the uncertainties in both absolute climate projections and the extent of specific impacts. The main challenges are to better understand areas of potential conflict between competing values, to choose investment priorities in the context of limited resources, and to have effective research and monitoring, and adaptive management processes that respond to new information as it becomes available.\(^{290}\)

Key strategies identified by Dr Webb to address climate and non-climate pressures and disturbances and to guide actions on our reserves are:

- Maintaining and enhancing fundamental ecosystems processes and services, including improvement in landscape function, vegetation and habitats, through facilitating natural regeneration (e.g. by removal of stressors) and active restoration (e.g. revegetation and land erosion mitigation)
- Enhancing the resilience of ecosystems and species through maintaining diversified habitats and refugia and improving connectivity on a ‘whole of landscape’ basis
- Facilitating ecosystems and species development in dynamic, novel and often unpredictable ways - aiming to maintain the status quo is not an adequate response
- Land use planning and fire management that balances human and natural assets protection, backed up by progressive monitoring and learning
- Effective and integrated governance and adaptive management approaches for the reserves, backed up by greater understanding of community values and enhanced community communication and engagement, underpinned by restated values and


\(^{289}\) The precautionary principle - if there is a threat of serious or irreversible environmental damage, a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation, Office of the Commissioner for Sustainability and the Environment 2009, Report on the Expanded Role of the Office of the Commissioner for Sustainability and the Environment, unpublished, page 12.

objectives for the Reserves more appropriate to a changing and to some extent unpredictable environment.291

While these principles and strategies are consistent with many of the issues that are discussed in this report and might be adopted as general guidelines for management and planning of our reserves into the foreseeable future, with respect to connectivity, it has been argued that it has emerged as the most favoured option for conservation in the face of climate change.292 Hodgson et al.

...argue that the importance of connectivity is being over emphasised; quantifying the benefits of connectivity per se is plagued with uncertainty

...Strategies that we expect to remain robust in the face of climate change include maintaining and increasing the area of high quality habitats, prioritizing areas that have high environmental heterogeneity and controlling other anthropocentric threatening processes 293

Although Hodgson et al question the emphasis given to connectivity as a response to climate change, their suggestions are one way of enhancing the resilience of our conservation estate. Furthermore, there are other reasons apart from climate change for protecting connectivity as discussed in Section 6.2 Our reserves and connectivity.

One of Dr Webb’s recommendations that needs to be emphasised is:

....Do not wait for improved climate and impact information before taking further action that will enhance the resilience of the Nature Reserves.294

Many of Dr Webb’s other detailed findings and recommendations to assist in better preparing for potential climate changes are best considered when legislation and policies are reviewed. Therefore it is appropriate for his work to be considered in the Government’s current review of the Nature Conservation Act 1980 and the ACT’s Nature Conservation Strategy as per Recommendation 4.1 in Section 5.1 Legislative amendments and in any reviews of the Canberra Nature Park Management Plan 1999 as per Recommendation 4.2 in Section 5.1.1 – Review Canberra Nature Park Management Plan 1999.

**Recommendation 2**

**Improve the condition and resilience of our nature reserves** by:

2.1 *(High Priority)* Taking action now as warned ... *Do not wait for improved climate and impact information before taking further actions that will enhance the resilience of the Nature Reserves.*

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**6.2 Our reserves and connectivity**

Corridors are particularly important in Canberra because of the fragmentation of our reserves. For example, the 33296 reserves and one proposed reserve considered in this Investigation total 11 359 hectares out of the 75 166 hectares in the Canberra urban area, range in size from 47 hectares to 994 hectares and span a maximum distance of approximately 45 kilometres north-south and 30 kilometres east-west.

This Investigation acknowledges that habitat connectivity is increasingly being recognised as a key element in planning and management for wildlife conservation and that landscape connectivity is a key aesthetic element in the planning of Canberra. Retaining or enhancing connectivity across the ACT/NSW border to link reserves with protected areas in NSW is also an important consideration as urban areas expand in the region. Examples of cross-border connectivity include reserves such as Mulligans Flat and Goorooyarroo in Gungahlin, grassland reserves in Jerrabomberra and Queanbeyan and reserves that include major stretches of the ACT’s rivers.

Corridors are also regarded by many in the community as being particularly important in affording a higher level of protection to the ecological systems in Canberra’s reserves:

> … Contemporary science indicates that the reserve system needs to be managed as part of a “bigger picture” or whole landscape system and not as discrete “islands”.

> It is essential that the reserve system … is managed as an integral part of ecosystems that extend across … land tenures.

Improved planning and strategic mapping of important habitats as a response to increased fragmentation of and separation of our reserves were identified as priority actions by community representatives attending a Bird Forum held in February 2010 to

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296 Excludes Googong Foreshores as it is located in NSW.

297 Email from Mr Graeme Hirth, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 9 June 2011.


inform this Investigation (Report of the Bird Forum by Beacon Hill Consulting Appendix M).

The Bird Forum highlighted the importance of reserves and urban trees in contributing to strategic connectivity:

...reserves are the main source of trees and urban trees provide the connectivity.

Two connectivity priorities raised at the Bird Forum were:

- connecting people with nature as a priority to maintain the unique “Bush Capital” image of Canberra in both new and existing urban areas; and
- developing a positive vision for Canberra that both builds on the “Bush Capital” image and creates a community-owned value for landscape connection.

An innovative and seemingly fundamental proposal which seeks to improve connectivity for the woodland reserves in Gungahlin is for the creation of a connected and productive landscape for the ‘Greater Goorooyarroo’.

[Greater Goorooyarroo] would be the largest landscape of connected and restored box-gum woodlands in Australia and one that exemplifies how innovative “cross-border”, “cross-tenure” and “cross-disciplinary” approaches can be employed to build a shared landscape vision and progressively harness diverse knowledge, expertise and community capacities to achieving win-win production and conservation goals.

Results from modelling by Manning et al. indicates several locations (including some reserves) where high priority should be given to maintaining or improving connectivity. These include:

- Black Mountain to Belconnen Hills and the lower Molonglo River;
- Callum Brae/Jerrabomberra to NSW (via Hume);
- Hall to Mulligans Flat and Goorooyarroo nature reserves and then with Mt Ainslie and Mt Majura nature reserves and the Majura Valley (including land occupied by the Department of Defence);
- Mulligans Flat and Goorooyarroo nature reserves to NSW (Greater Goorooyarroo);
- East Jerrabomberra nature reserve to Queanbeyan nature reserve (NSW) (across railway line and Lanyon Drive);

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302 Greater Goorooyarroo is defined as generally the land in ACT and NSW that lies between the Federal and Barton Highways and includes the land from Goorooyarroo and Mulligans Flat to Kinlyside (Hall) nature reserves in the ACT and extends to Nanima Road as the approximate northern boundary in NSW.
• Strengthening the links between Mulligans Flat and Goorooyarroo nature reserves with the Majura hills and adjacent NSW land to their north (Greater Goorooyarroo) needs consideration before woodland habitat areas become more isolated and/or fragmented.

Building on the work by Manning et al\textsuperscript{305} a particularly important connectivity analysis is being commissioned by the Environment and Sustainable Development Directorate.\textsuperscript{306} This analysis expects to determine:

...key areas for wildlife movement and viability across the whole region. [The analysis]...combines measures of habitat quality, how closely suitable habitat patches are located to each other and the difficulty that wildlife have in crossing between habitat patches.\textsuperscript{307}

Figure 16: Connectivity\textsuperscript{308}

The analysis is expected to:

• develop and deliver an ecosystem connectivity map for the ACT and surrounding area;
• provide the means where the relative connectivity value of a particular site can be assessed prior and following clearance or restoration activities;
• identify priority areas for restoration activities, including woodland restoration [for which $1 million (over 4 years) has been allocated in the 2011/12 budget, refer to Table 8 in Section 7.1 Existing budgets];
• provide the means by which connectivity value can be identified and incorporated into a biodiversity layer being produced as part of the Canberra Spatial Plan Evaluation;

\textsuperscript{306} Email from Ms Sharon Lane, Environment and Sustainable Development Directorate formerly Parks Conservation and Lands in the Department of Territory and Municipal Services to Dr Maxine Cooper on 23 May 2011.
\textsuperscript{307} Email from Ms Sharon Lane, Environment and Sustainable Development Directorate formerly Parks Conservation and Lands in the Department of Territory and Municipal Services to Dr Maxine Cooper on 23 May 2011.
\textsuperscript{308} Email from Ms Sharon Lane, Environment and Sustainable Development Directorate formerly Parks Conservation and Lands in the Department of Territory and Municipal Services to Dr Maxine Cooper on 23 May 2011.
• assist in identifying those parts of the ACT that are of greatest importance to the ability of ACT’s wildlife to adapt to expected climate change impacts; and

• be useful in the consideration of biodiversity offsets.  

This analysis is timely and will provide opportunities to guide planning through to restoration efforts. It will also be critical to ensure that existing corridors that link our reserves are not ignored, as ultimately protection of these links supports protection for the reserves and assists in building resilience in the face of predicted climate change.

It would seem appropriate that an independent group with the appropriate range of scientific, ecological and conservation knowledge provide strategic advice and monitor changes that affect habitat connectivity. Particularly given:

• the importance of habitat connectivity for the conservation of our ecological communities in our reserves;

• the importance of ensuring that our native plants and animals are able to access suitable habitats;

• the limited scientific information available; and

• the fact that Canberra is a developing city.

The ACT Government has available to it advice from suitably qualified bodies such as the Flora and Fauna Committee310, the Natural Resource Management Council311 and the Natural Resource Management Advisory Committee312 and members could provide assessments of progress in ensuring connectivity is properly addressed.

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309 Email from Ms Sharon Lane, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner, Office of the Commissioner for Sustainability and the Environment 23 May 2011.

310 The Flora and Fauna Committee is a statutory committee established under the Nature Conservation Act 1980, part 2 division 2.2 section 13 (page 7). Its functions are to provide advice to the Minister in relation to nature conservation.

311 The ACT Government established the ACT NRM Council as a non-statutory advisory committee to the Minister for the Environment, Climate Change, Energy and Water in 2006. The ACT NRM Council works with the ACT and Australian governments to deliver national natural resource management funding programs in the ACT, from www.nrmcouncil.org.au, home page accessed on 26 May 2011.

312 The ACT Government established the ACT Natural Resource Management Advisory Committee in 2006 as a non-statutory committee to the Minister for the Environment, Climate Change, Energy and Water in 2006. The ACT NRM Advisory Committee provides advice on natural resource management issues in the ACT and surrounding region from, ACT Natural Management Plan 2004 -2014 page 73.
Recommendation 2

Improve the condition and resilience of our nature reserves by:

2.4 (High Priority) Strengthening connectivity between nature reserves with on-ground actions being guided by independent strategic and scientific ecological advice and monitored by one of the existing advisory committees (such as Flora and Fauna Committee, Natural Resource Management Advisory Committee or Natural Resource Management Council).

6.3 Classification of nature reserves

As mentioned in Chapter 2 History, many of Canberra’s reserves were initially created because they were valued for their landscape amenity and consequently the hills and ridges over approximately 625 metres above sea level were not developed. There were also constraints for water supply above a certain height. It was not until the gazettal of Mulligans Flat Nature Reserve in 1994, that areas were added to Canberra Nature Park in order to conserve their significant ecological values. As a consequence of this history, the reserves of the Canberra Nature Park vary in their ecological values as illustrated in Table 4 in Chapter 4. Addressing challenges on our nature reserves.

Notwithstanding this variation in natural values the management objectives of all nature reserves are set out in legislation as:

1) to conserve the natural environment and,

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

The former is the primary objective and the latter is the secondary objective (more detailed information is provided in Annex A. Section 2.1 Planning and Development Act 2007 and Section 2.2.1 Canberra Nature Park).

Superimposed on the various natural values of the reserves are a range of recreational and other uses, with some of the most intense usage occurring in reserves with a high conservation value. For example Mount Ainslie (high conservation value), Mount Majura (high conservation value) and Mount Taylor (medium conservation value) nature reserves have a high usage which may sometimes compromise the conservation values of the reserve (Refer to Section 5.2.5 Recreation strategy).

314 Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
316 Planning and Development Act 2007 schedule 3.
The very location of the components of the CNP [Canberra Nature Park] throughout and near to Canberra’s suburbs means that many of the units are subject to high visitation numbers. The components of the CNP provide opportunities for a wide range of recreational activities, not all of which are appropriate or sustainable.\textsuperscript{317}

...With the Canberra population still growing, more and more Canberrans are seeking recreational opportunities within natural areas and green strips, and there has been a noticeable increase in numbers of people using some reserves.\textsuperscript{318}

While the need for a recreation strategy for the ACT has been identified and preparation of one is the subject of Recommendation 5.1 in Section 5.2.5 Recreation strategy, its application for all reserves must be guided by the natural values of the reserves lest the primary objective for them be compromised.

In order to clarify whether the ACT practice of naming the majority of our protected areas as nature reserves reflects the conservation values implicit in the term nature reserve and current international standards, an examination of the relevant criteria was commissioned. Mr Ian Pulsford was commissioned to prepare a paper on Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? (Appendix I).\textsuperscript{319} This paper compares the management objectives of the reserves which are the subject of this Investigation with the International Union for Conservation of Nature (IUCN)\textsuperscript{320} globally accepted best practice guidelines for classification and management of protected areas.

...The guidelines provide a tool for planning protected area systems and wider bioregional or eco regional conservation planning. These guidelines aim to provide a common language to reduce confusion and enable valid comparison to be made and management performance measured and compared with internationally accepted best practice.\textsuperscript{321}

IUCN identifies six categories of protected area management based on eight primary management objectives (Science, Wilderness, Biodiversity protection, Environmental services, Natural/cultural features, Tourism and recreation, Education, Sustainable use and Cultural attributes), all of which, except, perhaps Wilderness, are relevant to the reserves that are the subject of this Investigation.

\textsuperscript{317} Submission 20 page 2.
\textsuperscript{318} Submission 27 page 1.
\textsuperscript{319} Pulsford, I., 2011, Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? Advice for the ACT Office of the Commissioner for Sustainability and the Environment.
\textsuperscript{320} IUCN is the world’s oldest and largest global environmental network - a democratic membership union with more than 1,000 government and NGO member organisations, and almost 11,000 volunteer scientists in more than 160 countries from www.iucn.org/about/ accessed on 30 May 2011.
\textsuperscript{321} Pulsford, I., 2011, Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? Advice for the ACT Office of the Commissioner for Sustainability and the Environment, page 1.
Mr Pulsford concludes that only three IUCN protected area management categories are appropriate for further consideration in relation to the classification of Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores. These categories and Mr Pulsford’s comments on their relevance are:

**Category Ia – Strict Nature Reserve**

Currently there are no reserves in the Canberra Nature Park Reserves (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores, whose primary and secondary management objectives align sufficiently for them to be classified under this management category. However there are some reserves whose values and condition may warrant consideration for classification under this category.322

**Category II – National Park**

Management objectives of Canberra Nature Park Reserves (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores currently align quite well with the management objectives for IUCN Category II: National Park, and much better than they do with Category Ia Strict Nature Reserve...... In the ACT there does not appear to be any legal requirement for a plan of management for a nature reserve to be any different to that, which may apply, to a national park, other than any additional requirements that may be specified by the Conservator of Flora and Fauna.

These reserves are all much smaller than the IUCN guidelines suggest for this category. However, there are many small national parks in other Australian jurisdictions.323

**Category IV – Species/Habitat Management Area**

This category makes provision for protection of remnant patches of habitat of threatened species and is a part of a broader landscape conservation objective, whilst making provision for recreation. Many individual reserves in Canberra Nature Park are highly suited for classification under this category.

This category is not a well-known reserve classification for the general public and does not have the public understanding and iconic status of nature reserve or national park. 324

The advantages and disadvantages of classifying nature reserves based on the IUCN categories as assessed by Mr Pulsford are at pages 14-15 of his report (Appendix I). They could be usefully drawn upon in the Government’s current reviews of the Nature Conservation Act 1980 (ACT) and the ACT Nature Conservation Strategy as they help to

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322 Pulsford, I., 2011, Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? Advice for the ACT Office of the Commissioner for Sustainability and the Environment, page 13.
323 Pulsford, I., 2011, Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? Advice for the ACT Office of the Commissioner for Sustainability and the Environment, page 14.
324 Pulsford, I., 2011, Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? Advice for the ACT Office of the Commissioner for Sustainability and the Environment, page 14.
inform terminology, relative priorities for management and strategic allocation of budgets.

Some of Mr Pulsford’s recommendations are relevant to other themes emerging from this Investigation, namely:

- Note that there is no difference, between the primary management objectives of a nature reserve or national park as specified in schedule 3 of the ACT Planning and Development Act 2007.
- Note that the management objectives for a nature reserve in the ACT do not meet the IUCN’s definition or management objectives for Category Ia - Strict Nature Reserve.
- Note that at the very least this investigation [that is, reclassification of reserves against the IUCN protected area categories] should be included as part of the need to have operational plans drawn up and implemented for all reserves.325

A submission called for:

A New National Park.....The CNP [Canberra Nature Park] plays a significant role in protecting areas of Yellow Box - Red Gum grassy woodland, a nationally threatened ecosystem. In the north the key reserves for this role are Mulligans Flat, Goorooyarroo, Mt Majura and Mt Ainslie and, in the south Red Hill, Mt Mugga Mugga and Callum Brae. The national importance of this ecosystem would suggest that a higher level of environmental recognition should be provided.

The creation of a single national park would emphasise the concern that the ACT has for this endangered ecosystem. The single reserve would be one of Australia’s most urban national parks and would help build on the extensive environmental community engagements that is already occurring in Canberra and, in particular, the newer northern suburbs.

...the words ‘national park’ describe for many members of the public the epitome of a conservation reserve. …326

To inform this Investigation on the proposal for a new national park, Mr Ian Pulsford was commissioned to prepare the paper Should Goorooyarroo, Mulligans Flat, Mount Majura and Mount Ainslie become a National Park or remain as discrete Nature Reserves as part of Canberra Nature Park (Appendix H).

Mr Pulsford’s analysis of the advantages and disadvantages of amalgamating Mulligans Flat, Goorooyarroo, Mount Ainslie and Mount Majura reserves as a national park are at pages 9-11 of his report (Appendix H). He concluded, amongst other things that:

...In spite of past history of disturbance and installation of some significant urban infrastructure, the amalgamated reserve appears to still meet the national park

325 Pulsford, I., 2011, Should Canberra Nature Park (nature reserves), Molonglo River Corridor (nature reserves) and Googong Foreshores be re-classified based on IUCN categories? Advice for the ACT Office of the Commissioner for Sustainability and the Environment, page 15.
326 Submission 20 page 5.
management category requirements under ACT legislation and IUCN’s [International Union for Conservation of Nature] global guidelines for management objective for Category II: National Park. It fits this management category better than, IUCN Category Ia: Strict Nature Reserve....

...Current best practice and understanding requires that woodland ecosystems need active management beyond the usual treatment of fencing, removal of stock pest and weed control and need to be actively managed at a landscape or ecosystem scale. Any new amalgamated national park needs to be managed as part of a whole of landscape approach if the reserves are to be viable for some species in the long term.327

Mr Pulsford noted in his recommendations that if a second national park in the ACT is established there needs to be a guarantee from the ACT Government that the reserves not included are not neglected and starved of resources; and that the community cannot afford for this proposal to be at the expense of reduced conservation management of other important reserves.328

In the State of the Environment Report 2007/08 Conserving Biodiversity Issues Paper329 it was recommended that Goorooyarroo and Mulligans Flat nature reserves (Yellow Box-Red Gum Grassy Woodlands) be considered for designation as a national park because of the importance of the ecosystem that is being protected in these reserves. In the Report on ACT Lowland Native Grassland Investigation recommendation 23 was:

...Plan a Majura Valley Reserve to protect Natural Temperate Grassland and its supporting species, particularly the Grassland Earless Dragon, by defining the boundaries of this proposed reserve in the near future... 330

Having considered the advantages and disadvantages of creating a northern national park consisting of Mulligans Flat, Goorooyarroo, Mount Ainslie and Mount Majura nature reserves, it is appropriate that consideration of this idea be pursued. However, this is best done within the context of an overall review of the classification of all nature reserves in the ACT including those not considered in this Investigation, using the International Union for Conservation of Nature categories. Furthermore, in considering which nature reserves might be included in a northern national park, future likely nature reserves and nature reserves other than Mulligans Flat, Goorooyarroo, Mount Ainslie and Mount Majura need to be considered. For example, it may be appropriate to include the proposed Majura Valley Reserve in the northern national park. Lands in NSW could also be considered. It is also important that those nature reserves that are not included in

328 Pulsford, I., 2011, Should Goorooyarroo, Mulligans Flat, Mount Majura and Mount Ainslie become a National Park or remain as discrete Nature Reserves as part of Canberra Nature Park?, Advice for the ACT Office of the Commissioner for Sustainability and the Environment, page12.
a northern national park do not become relegated to second-rate status or be allowed to
decline, particularly because a new national park may attract an increased proportion of
available funding. The other nature reserves will continue to play a key role in providing
habitat for native plants and animals, maintaining connectivity and for pest plant and
animal control – in effect directly supporting the effectiveness of the proposed new
national park.

If the nature reserves are not categorised to address Recommendation 3.4, this should
not constrain a northern national park being considered to emphasise amongst other
things the importance of ecological communities such as the Yellow Box-Red Gum
Grassy Woodlands and Natural Temperate Grassland, both of which are listed as
endangered ecological communities under the Nature Conservation Act 1980 (ACT) and
the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth). The
establishment of a northern national park will need to be informed by several analyses
and address issues such as initial boundaries, governance arrangements, funding
implications etc. Therefore it is suggested that a public discussion paper on the creation
of a northern national park be developed as stated in Recommendation 3.5.

If reserves are classified into International Union for Conservation of Nature categories,
the categories of public land and associated management objectives defined under the
ACT Planning and Development Act 2007 may need to be amended. The Nature
Conservation Act 1980 and plans of management may also need amending.

**Recommendation 3**

**Better direct and inform the management of nature reserves** by:

3.4 Categorising nature reserves to:
   - define the goals and objectives for each nature reserve using criteria that
     include their environmental, recreational, health and cultural values and
draw upon the protected area categories adopted by the International
Union for Conservation of Nature. These goals and objectives should then
be used to inform and guide the priorities in each Nature Reserve
Operational Plan (Recommendation 3.1); and
   - guide decisions regarding a northern ACT national park, especially its
boundaries.

3.5 Advance the consideration of a northern ACT national park via a discussion
paper which details areas for inclusion, management structure, costs and
funding etc. If Recommendation 3.4 is not pursued this paper should be
progressed based on existing information.
6.4 Environmental offsets for development

To assist this Investigation to consider potential biodiversity offset management actions and sites, two papers were commissioned:

- Potential biodiversity offset actions and sites for the Australia Capital Territory by Dr Philip Gibbons (Appendix F); and
- Legal Obligations of the ACT Government Regarding The Management of Nature Reserves by Professor Murray Raff (Appendix J).

This Investigation has only considered the matters required under the Terms of Reference and not broader biodiversity offset policy issues. As mentioned in Section 5.1 Legislative amendments, the Environment and Sustainable Development Directorate is developing a draft ACT biodiversity offset policy as part of the review of the Nature Conservation Act 1980.

Some community members expressed their views regarding biodiversity offsets:

...If the process of biodiversity offset means that one area of land and its species will be sacrificed for development in order to ‘save’ another area - do we have the right to do this before there has been a detailed discussion on the future size, expansion, population and growth of Canberra involving all stakeholders and all disciplines?

...there should be no development that impacts on vulnerable or endangered species habitat or ecosystem communities, and consequently no need for biodiversity offsets. However, recognizing the reality of the current situation where offsets are mandated by government, our view is that offsets should be aimed at “net gain” (rather than maintenance of the status quo), and that they must be supplementary and not substituting for already existing commitments, e.g. they should not replace existing government funding to maintain reserves.

Offsets are a mechanism to compensate for the adverse environmental impacts of a development on a site, by enhancing the environmental values of another site. Biodiversity or environmental offsets are generally understood to be actions taken by developers to compensate for the adverse environmental impacts of a particular development. In this regard it seems that a better term for them would be environmental offsets for development. However, offsets should only be considered as a last resort.

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331 Term of Reference 7 specifically requires this Investigation to consider these issues, refer to Section 1.1 Box 1: Terms of reference.
333 Submission 8 page 4.
334 Submission 36 page 1.
Recommendation 4

Strengthen the management framework and strategically position our nature reserves by:

4.5 Using the term Environmental Offsets for Development to replace the term Biodiversity Offsets.

The Australian Government defines environmental offsets as:

...actions taken outside a development site that compensate for the impacts of that development - including direct, indirect or consequential impacts.\(^{337}\)

A scheme for biodiversity offsets under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) currently exists along with a number of state based schemes including NSW (biobanking\(^ {338}\)) and Victoria (Vegetation Gain Approach\(^ {339}\)).

The objectives of offsets are to:

...provide an opportunity to achieve long-term conservation outcomes whilst providing flexibility for proponents seeking to undertake development which will have environmental impacts and

...provide compensation for those impacts which cannot be adequately reduced through avoidance and mitigation.\(^ {340}\)

It is important that offsets deliver a tangible conservation benefit:

...The Australian Government aims to ensure that offsets deliver a conservation outcome that would not otherwise be achieved. For example, funding open ended research programs which deliver little or no on-ground benefit for the matter impacted are not considered to deliver a conservation outcome. Also, the purchase of existing unprotected habitat only provides a real conservation outcome if that habitat becomes protected in perpetuity and actively managed for long term conservation purposes.\(^ {341}\)

Dr Gibbons in his paper Potential biodiversity offset actions and sites for the Australia Capital Territory (Appendix F) argues that offset actions

...should be additional to the duty of care that a manager has to a site.... In this advice I [Dr Gibbons] considered the statutory duty of care only... However, not all legislation,
action statements, management plans... or other policy documents made under legislation in the ACT are specific enough to determine the exact level of activity that is expected of a land manager... The level of activity must be explicitly defined before offset management actions can be determined for a site.342

It appears that in using the concept of duty of care Dr Gibbons has focused on actions that should be undertaken to protect a reserve’s environmental values whereas duty of care is more commonly used in relation to taking actions to prevent harm, for example:

...the civic responsibility of each and every individual to take all reasonable and practical steps in undertaking their activities to prevent harm to another person or property of another.343

Professor Murray Raff’s paper includes a discussion of this issue and in so doing emphasises a point also made by Dr Gibbons:

...for the purpose of evaluating suitability of sites for biodiversity offset management, a line is to be drawn between –

• actions in pursuit of the duty of care that a manager has to a site, and
• actions that are additional.344

Professor Raff considered duty of care from the perspectives of statutory and common law. In discussion of common law duty of care the terms ‘stewardship’ and responsible ‘proprietorship’ are also frequently used.345 With respect to ‘stewardship’, Professor Raff states that it ‘is about the responsibilities that we have to use what we own appropriately’346 and he discusses trespass, nuisance, negligence and occupiers’ liability in this regard. It seems that common law is more focused on preventing adverse action rather than taking actions to improve a situation.

Professor Raff identified the responsibilities of the ACT Government set out in five ACT laws and one Commonwealth law with respect to its duty of care for nature reserves (Appendix J pages 6-11). It seems that for the most part, duty of care can be fulfilled by preventing or controlling an action as opposed to taking action to improve a situation. However, the prevention of adverse impacts is not merely passive in legal conception. Depending on the circumstances, including the qualities of the land in question, positive action may be required, such as the management of fire risks. Positive action to improve a situation would be required to provide protection for listed species under the Nature

343 Greiner, R., Patterson, L. and Miller, O. 2007, Explaining the concept of “Environmental Duty of Care” in the context of the Northern Gulf region (Queensland) – Discussion Paper, Queensland, page 1.
Conservation Act 1980 (ACT) and the Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth).

From the information considered it is only possible to define a limited number of actions that a land manager must pursue to meet a legislative duty of care, and most of these are preventative rather than being restorative as is generally required for achieving biodiversity offsets. Given this, using duty of care as a criterion for identifying offset actions is limited, therefore principles to guide what actions could be implemented are proposed. Dr Gibbons’ emphasis on offsets needing to be in addition to routine management actions is strongly supported.

Other offset criteria proposed by Dr Gibbons included actions that:

- are likely to be beneficial to the biota most affected by development in the ACT
- deliver in-kind outcomes (i.e. improvements that are broadly equivalent to impacts)
- are most likely to achieve timely and certain conservation gain...347

The Commonwealth indicates that actions which can be considered as environmental offsets include both direct and indirect actions as follows:

Direct offsets are aimed at on-ground maintenance and improvement of habitat or landscape values. They may include:

- long-term protection of existing habitat – including through the acquisition and inclusion of land in the conservation estate, and covenanting arrangements on private land;
- restoration or rehabilitation of existing degraded habitat; or
- re-establishing habitat.

Indirect offsets are the range of other actions that improve knowledge, understanding and management leading to improved conservation outcomes. They may include:

- implementation of recovery plan actions – including surveys;
- contributions to relevant research or education programs;
- removal of threatening processes;
- contributions to appropriate trust funds or banking schemes that can deliver direct offsets through a consolidation of funds and investment in priority areas; or
- on-going management activities such as monitoring, maintenance, preparation and implementation of management plans etc.348

The ACT Government has already been establishing with the Commonwealth biodiversity offsets associated with developments in the ACT. Examples of some of the biodiversity offsets established by the Commonwealth for developments in the ACT are in Box 7.

Box 7: Biodiversity offsets established by the Commonwealth for developments in the ACT

- **ACTEW transmission line (EPBC 2008/4621)** - The transmission line will fragment an 18ha patch of the Box Gum woodland ecological community and will result in the loss of 70 trees within a 45m easement. An offset of 18ha of high quality Box Gum Woodland was secured adjacent to the Gigerline Nature Reserve in the Murrumbidgee River Corridor.

- **Transgrid substation (EPBC 2009/4805)** - The substation project is related to EPBC 2008/4621 above. It involved the loss of 5.8ha of Box Gum Woodland, and the securing of 20ha of Box Gum Woodland in the same location as the above project.

- **Murrumbidgee to Googong Pipeline (EPBC 2009/5156)** - Loss of 5ha of fragmented patches of Box Gum Woodland, about 2ha of Natural Temperate Grassland and other threatened species. The 92ha offset area includes 70ha of high quality Box Gum Woodland adjacent to the above offsets (EPBC 2008/4621 and EPBC 2009/4805).

- **Clarrie-Hermes Drive (EPBC 2009/5156)** - Originally involved a loss of 5ha of Box Gum Woodland but subsequently (sic) significantly reduced to 1.6ha. The outcome involves funding $190,000 in research for rehabilitation of Box Gum Woodland and $50,000 in actual rehabilitation of a degraded part of the Kama Nature Reserve within the Mologlo (sic) precinct as part of that research (19ha to be rehabilitated in the northern boundary and 12ha at the eastern boundary). The amount of money required for the offset was calculated on the cost to purchasing a 15ha land offset at Hall.

- **Kings Highway, ACT (2010/5501)** - Loss of 2.6ha and the fragmentation of 42ha of Box Gum Woodland. The outcome requires the payment of $55,000 to complete a connectivity analysis for existing nature reserves within the ACT, and $145,000 to be spent on the ground restoration of areas of Box Gum Woodland identified in the study. The later rehabilitation activities will improve the ecological value of at least 50ha of Box Gum Woodland.¹

¹ Email from Mr Chris Murphy, Department of Sustainability, Environment, Water, Population and Communities to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 23 February 2011.
In defining offset criteria, it is important to consider the context in which these are being applied. The ACT...

...is unique in having a leasehold system of land tenure which gives the government ownership of land and therefore substantial control over land use, land allocation and the timing of release of land for development. Had the leasehold system not been adopted when Canberra was established, the significant biodiversity of the ACT is unlikely to exist as it does today. If the land had remained in freehold title it is very likely that large areas of the ACT would be indistinguishable from the surrounding Southern Tablelands of New South Wales, where intensive grazing has resulted in the loss of most of the native temperate grassland and yellow box – red gum woodland…349

Given that the ACT has a history of protecting areas of high conservation value in advance of urban developments, it has been argued that in these cases the protected areas should be considered an offset when surrounding lands are developed350.

It is important in developing an offset policy that perverse results are avoided, for example, areas of high environmental value may not be protected early in the strategic planning stages so that they are available as an offset when development occurs. Early protection of areas with high ecological values provides certainty for the environment and future developments, and it is also sound land use planning practice. These types of issues need to be addressed in the offset policy currently being developed by the Environment and Sustainable Development Directorate.

In order to address Terms of Reference 7, it is proposed that the following criteria be adopted when determining environmental offsets for development:

- **net environmental gain** to the ecological communities or species most affected by the development in the ACT i.e. seeking potential long term overall improvement in the environment.
- **additional actions** are undertaken, that is, actions above those normally implemented or funded on a regular basis.
- **timely and certain environmental gains** are achieved.
- **monitoring and adaptive management** is applicable to all land management actions at all offset sites.
- **independent decision making in the use of funds.**
- **transparency in decision-making.**
- **flexibility** to ensure the application of the above principles.

Flexibility is needed to ensure perverse outcomes are avoided and given this transparency in the decision-making process is critical. Transparency is also important to ensure that funds for offsets do not replace funding normally allocated for managing

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reserves. To achieve independent allocation of funds consideration needs to be given to whether a new body should be established for this task or whether an existing advisory body has the appropriate capacity for this responsibility, or could have with appropriately amended terms of reference.

Providing the above criteria are met, then environmental offsets for development on reserves (and for off reserve actions that benefit the reserves) could take many forms. However, there must be a strong and clear emphasis on fostering “additional” actions particularly those recommended in management plans, action plans and the Natural Resource Management Strategy\textsuperscript{351} that have not been progressed.

A simple, practical but effective approach to allocating offsets is needed. The ACT has a very different context from other jurisdictions and therefore the complex administrative arrangements associated with offsets in other jurisdictions should be avoided. Furthermore, often offsets focus on having land substituted for land and while this may be appropriate in some cases, in the ACT we have an established and extensive reserve system that can be enhanced by improving:

...existing habitat and/or restore fauna populations within existing reserves, rather than simplistic demand for further, often lower quality areas into new reserves. Indirect offsets such as surveys, research, control of weeds or feral animals or threatening processes, other ongoing management activities, and financial contributions to trust funds to support the above actions, can all be considered legitimate forms of offsets under the EPBC [Environment Protection and Biodiversity Conservation] Act draft policy...\textsuperscript{352}

\textsuperscript{351} Natural Resource Management Council, 2009, \textit{Plan for Managing the Natural Resources of the ACT, Bush Capital Legacy, Canberra.}

Recommendation 4

Strengthen the management framework and strategically position our nature reserves by:

4.6 Guiding Environmental Offsets for Development on nature reserves (and lands affecting reserves including areas of connectivity) using the following principles:

- **net environmental gain** to the ecological communities or species most affected by the development in the ACT i.e. seeking potential long term overall improvement in the environment;

- **additional actions** are undertaken, that is, actions above those normally implemented or funded on a regular basis;

- **timely and certain environmental gains** are achieved;

- **monitoring and adaptive management** is applicable to all land management actions at all offset sites;

- **independent decision-making in the use of funds**;

- **transparency in decision-making**; and

- **flexibility** to ensure the application of the above principles.

Terms of Reference 7 requested that potential biodiversity offset management actions or sites are identified. It was beyond the scope of this Investigation to undertake the needed assessment to determine all such areas in the ACT. However, information is available from community submissions, the work undertaken in the Report on the ACT Lowland Native Grassland Investigation\(^353\) and from the report by Manning et al.\(^354\).

Submissions have suggested both landuse changes to create reserves and expanding existing reserves as shown in Box 8.

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Box 8: Community suggestions for expanding reserves – potential offset sites

- Aranda Woodland & Aranda Grassland (Glenloch Blocks 1550 & 1549 Belconnen);
- Aranda Snow Gums (Block 1399 or 1623, add closed road reserve within fence);
- Glenloch Interchange Grasslands & Pryor’s Snow Gums (endangered grassland B 11);
- Yarramundi Reach Grasslands (endangered under Action Plan 28, NCA land)
- Kama Woodland (in Molonglo development);
- Red Hill extension (open space no longer wanted for golfing by Federal Golf Club); and
- Stirling Ridge (targeted April 1989 by govt and recently by Conservation Council).
- Majura horse holding paddocks – change of landuse from special purpose reserve to nature reserve to formally protect the conservation values of Yellow Box - Red Gum grassy woodland within the paddocks.¹
- Expanding Red Hill Nature reserve to include woodlands with high conservation value that is contiguous with the Red Hill remnant should be added to the Red Hill Nature Park including Open Space in north-west Hughes, public land between Rusden Street and Hindmarsh Avenue and about 17ha of wooded land that occupies the north, north-western and eastern portions of the Federal Golf Course concessional lease.²
- Combining and extending Mount Mugga Mugga and Isaacs Ridge nature reserves to include all the Inner Hills part of the area plus Scrivener Hill and the border of Mugga Lane in Block 2110.³
- Expanding The Pinnacle Nature Reserve to include a triangular paddock on Kama and the area known as Bottom Pinnacle.⁴

¹ Submission 29 page 11.
² Submission 22 page 3.
³ Submission 9 page 8.
⁴ Submission 19 page 7.
⁵ Submission 30 page 3.

The Report on the ACT Lowland Native Grassland Investigation recommended that areas be considered for inclusion into reserves and if this occurs they could be considered as offsets are shown in Box 9.
Box 9: Lowland native grassland – potential offset sites

- Planning a Majura Valley reserve which would include part of the Majura Training Area and potentially parts of the Air Services Beacon and ‘Malcolm Vale’
- Expanding Mount Ainslie Nature Reserve to include areas of lowland native grassland in Campbell Park and Majura West
- Expanding Aranda Bushland and Black Mountain reserve by including areas of lowland native grassland in Caswell Drive and Glenloch Interchange


The report by Manning et al.\(^{355}\) listed several areas where connectivity is likely to be improved through land acquisition, strategic establishment of ‘biodiversity corridors’ and restoration projects shown in Box 10. Also in this box the potential of expanding Mulligans Flat and Goorooyarroo nature reserves (to include Throsby) and connecting with Mount Majura nature reserve is suggested. This area was considered in Mr Pulsford’s paper on Should Goorooyarroo, Mulligans Flat, Mount Majura and Mount Ainslie become a National Park or remain as discrete Nature Reserves as part of Canberra Nature Park.

\(^{355}\) Manning, A.D., Shorthouse D. J., Stein, J.l., and Stein J., 2010, Ecological Connectivity for Climate Change in the ACT and surrounding region, Canberra, page 5.
Box 10: Connectivity improvements – potential offset sites

- Black Mountain to Belconnen Hills and the lower Molonglo River;
- Callum Brae/Jerrabomberra to NSW (via Hume);
- Hall to Mulligans Flat/Goorooyarroo Nature Reserves and then with Ainslie/Majura and Majura Valley (including land occupied by the Department of Defence);
- Mulligans Flat/Goorooyarroo to NSW (Greater Goorooyarroo);
- East Jerrabomberra Nature Reserve to Letchworth Nature Reserve (NSW) (across railway line and Lanyon Drive);
- Strengthening the links between Mulligans Flat and Goorooyarroo with Majura hills and adjacent NSW land to their north (Greater Goorooyarroo) needs consideration before woodland habitat areas become more isolated and/or fragmented;
- Strengthening the links between Naas/Tharwa and nearby land to the east in NSW needs consideration before these areas become more isolated;
- Strengthening the links between the Tinderry Range and woodland habitat to the north and northeast of Lake George needs consideration before these areas become more fragmented;\(^1\)
- Expanding Mulligans Flat and Goorooyarroo nature reserves (to include Throsby).

\(^1\) Manning, A.D., Shorthouse D. J., Stein, J.I., and Stein J., 2010, Ecological Connectivity for Climate Change in the ACT and surrounding region, Canberra, page 5.

Some examples of potential offset actions were suggested in submissions and included:

- Small-scale fencing to protect threatened species by excluding or greatly reducing predators (e.g. European Red Fox *Vulpes vulpes*) and abundant herbivores (e.g. Eastern Grey Kangaroo *Macropus giganteus*, European Rabbit *Oryctolagus cuniculus*);
- Import coarse woody debris from appropriate sites (e.g. impact sites) to enhance recovery of habitat;
- Relocate bush rock from appropriate sites (e.g. impact sites) to restore habitat in areas where it has been depleted;
- Create or re-create wetland habitat;
- Address significant erosion problems, encroachments and historical vegetation clearing;
- Undertake re-vegetation by planting and/or direct seeding of indigenous plant species;\(^{356}\)

\(^{356}\) Email from Mr Stephen Hughes, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 10 May 2011.
- Control of domestic animals such as dogs and horses on reserves, cats in adjoining areas as above;
- Reinforce or create new connectivity areas (Section 6.2 Our Reserves and Connectivity); and
- Support research targeted at threatened species recovery or other high priority conservation outcome (Section 6.5 Research).

**Recommendation 4**

**Strengthen the management framework and strategically position our nature reserves by:**

4.7 Assessing areas identified in this Investigation (Boxes 8, 9 and 10) as having potential for Environmental Offsets for Development.

### 6.5 Research

Comprehensive, documented information about what research is being undertaken on reserves or about issues that affect reserves was not readily available for this Investigation. Many researchers and organisations were consulted and based on this, a Paper was compiled to identify current projects and research gaps with respect to biodiversity and conservation in Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation Research: Existing and Future (Appendix L).

This consultation revealed a range of biodiversity and conservation research projects being undertaken on issues that affect our nature reserves, including a major research partnership between the Australian National University and ACT Government supported by the Australian Research Council: *Innovative enhancement and management of threatened temperate woodlands for improved biodiversity conservation* to more modest studies on species such as the Grassland Earless Dragon and the Eastern Grey Kangaroo.\(^{357}\) CSIRO is involved in this project but was not one of the original partners.\(^{358}\)

Much of the research is located in the newer reserves and on species that are threatened or over abundant. The research needs identified during this Investigation are presented in Boxes 11-13.

**Box 11: Biodiversity and conservation research needs - systems and assessment**

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\(^{358}\) Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
Research is needed on the following:

- **Institutionalising adaptive management** - a research program that pilots operational adaptive management for Canberra Nature Park with the aim of making park management more cost-effective. That is, a system that requires some very simple indicators to be measured for each project, preferably within the existing financial management and reporting system used by the Department of Territory and Municipal Services. As an example, the cost of every weed control program would be recorded separately (e.g. by nature reserve), the methods of control used (e.g. glyphosate) and the date undertaken......

- **Restoring the understorey** - there is a need to identify operationally feasible ways of restoring weedy understoreys in natural temperate grasslands and box gum grassy woodlands.

- **Reducing impacts in reserves at urban boundaries** - with an expanding urban footprint there is more urban development closer to the Canberra Nature Reserve. There are several important research questions that should be addressed that include:
  - how to design suburban gardens to reduce populations of hyper-aggressive bird species and invasive plant species
  - fire management at the urban-park interface
  - minimising landholder impacts in reserves (e.g. firewood collection, light, noise and encroachment)

- **Measuring Planning success** - environmental considerations affect many planning decisions however the environmental successes or otherwise have not been evaluated. Research on this issue would be timely.

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Box 12: Biodiversity and conservation research needs – specific species

Research is needed on the following:

- **Grassland Earless Dragon** - a project which investigates what is causing the decline in numbers of Grassland Earless Dragon.
- **Pink-tailed Worm-lizard** - Aprasia parapulchella - impacts of development along the Molonglo River Corridor and relationship with other impacts such as fire, weeds, rock removal etc.
- **Golden Sun Moth** - habitat relationship with Chilean Needle Grass and converting these areas to grasslands
- **Little Eagle** - a project to investigate habitat and conserving habitat for the little eagle
- **Germination and seed banks** - a project on germination cubes and seed bank storages eg with the Botanic Gardens for particularly rare species in the ACT (seed bank insurance policy)
- **Addressing Emerging Threats** - a project or projects identifying potential impacts on biodiversity in CNP such as European wasp, Myrtle rust, feral deer.

Researchers,\(^{359}\) invited to a meeting with the Commissioner and staff, contributed to identifying the biodiversity and conservation research issues in Boxes 11 and 12 and reported in *Research: Existing and Potential, Paper to inform Canberra Nature Park (nature reserves); Molonglo River Corridor (nature reserves) and Googong Foreshores Investigation* (Appendix L), indicated that:

- Research could be better coordinated and lessons shared amongst researchers and natural resource managers to promote evidence-based management of our reserves;
- Research partnerships with universities and qualified members of the community need to be encouraged;
- Priorities for research need to be better guided including coordination with relevant strategies and plans, for example the Natural Resource Management Strategy and action plans for threatened species; and
- Monitoring is a key part of natural resource management and should be included in the design and execution of projects in order to encourage land managers to adopt adaptive (or learning) management practices.

\(^{359}\) Participants at the meeting were: Dr Lyn Hinds, Dr David Shorthouse, Professor Tony Peacock, Dr Brian Cook, Dr Adrian Manning, Dr Margaret Kitchin, Dr Jason Cummings, Dr Will Osborne, Dr Sarah Ryan and Dr Phil Gibbons.
Research gaps in relation to the impacts of climate on reserves were identified by Dr Webb in the paper *Impacts of Climate on Canberra Nature Park: Risks and Responses (Appendix E)* and are summarised in Box 13.

Box 13: Research gaps on the impacts of climate on reserves

Research is needed on the following:

- The underlying regional climate drivers, especially for past and future rainfall, and related projections at a finer spatial scale
- The potential impact of climate on fire regimes in the context of ecosystems typical of the Nature Reserves (e.g. grassy woodlands)
- Differential impacts of climate change on specific ecosystems (soils, vegetation, key species), recognising the many interdependencies within ecosystems, their dynamic evolution under climate change, and the potential for tipping points to emerge
- Potential climate change impacts on local riverine and riparian ecosystems (e.g. Googong Foreshores and the Molonglo River Corridor)
- The interdependencies of the Nature Reserves with the surrounding NSW landscapes
- Weightings placed by the community on the various and sometimes competing values ascribed to the Nature Reserves - climate change is likely to exacerbate tensions between some of those values.
- The relative priorities and cost-effectiveness of the many potential response options to climate change (and other drivers)
- Adaptive management response options to climate uncertainty, including
  - testing robustness and resilience of proposals to a range of scenarios;
  - adaptive institutions, planning systems, rules and people
  - regional governance options including respective roles of institutions and the community
  - developing a small number of agreed and relevant key performance indicators supporting overall outcomes
- How to best influence community, private sector and political support, and decision making; including education and youth, and media.


Canberra is richly supplied with specialist groups and experienced individuals with expertise that can be harnessed for the benefit of our nature reserves. Community members and groups have indicated a desire to become more involved in research related to nature reserves and some are already engaged in projects:
Some ParkCare groups have been conducting informal assessments of “their” reserves for up to twenty years. These groups could contribute significantly to any formal assessment of the reserves.\textsuperscript{360}

ParkCare groups have an incredible array of expertise, many retired scientists, soil scientists, librarians, geologists, biologists, ecologists, economists etc. With suitable encouragement I am sure they could contribute much more than simply weeding and seeding. A program is needed to encourage their involvement.\textsuperscript{361}

The potential for community research partnerships should be explored further at the nature reserves forum proposed in Recommendation 1.2 in Section 3.7.2 Forum. The role of the Natural Resource Management Council in developing community partnerships is recognised and should be continued through its responsibilities for the Natural Resource Management Strategy.\textsuperscript{362} To ensure that research affecting or required for the management of reserves is better known appropriate research information should be appended to the proposed Nature Reserve Operational Plans which are the subject of Recommendation 3.1 in Section 4.4.1 Nature reserve operational plans.

**Recommendation 3**

**Better direct and inform the management of nature reserves** by:

3.6 Fostering research as a means of informing nature reserve management strategies and practices by:

- encouraging research partnerships with universities and qualified members of the community with direct funding, in-kind contributions and support for funding proposals;

- improving opportunities for staff to access research findings and to adopt evidence-based management practices on our nature reserves (Recommendation 3.1);

- ensuring research priorities are coordinated with relevant strategies and plans, for example the ACT Natural Resource Management Plan (Bush Capital Legacy) and action plans for threatened species and ecological communities; and

- monitoring being a key part of natural resource management and included in the design and execution of projects in order to encourage land managers to adopt adaptive (or learning) management practices (Recommendations 3.2 and 3.3).

\textsuperscript{360} Submission 6 page 2.


7 Future funding

This Investigation has found that not all the challenges currently confronting our reserves are being addressed and that there are many opportunities to undertake enhanced management actions to increase protection and restoration actions which would improve the resilience of reserves. Additional funds would allow these challenges to be better addressed and opportunities realised. This chapter considers funding and in so doing presents information on the existing budget for managing the reserves and examines sources of additional funds.

7.1 Existing budgets

In 2010-11, the ACT Government’s budget for the environment was $40,805,225 which is just over 1 per cent of the ACT Government’s total budget. Of this $15,882,225 was allocated to the (former) Department of Territory and Municipal Services and $24,923,000 was allocated to the (former) Department of the Environment, Climate Change, Energy and Water for expenditure on environmental matters. From this total budget, management of Canberra Nature Park was allocated approximately $8 million (or approximately 20 per cent of what can be considered the environmental budget or about 0.2 per cent of the ACT Government budget). The $8 million includes $565,000 for the Urban Wildlife Program (aimed at protecting and managing native wildlife in the urban areas) and approximately $4 million for implementing the Bushfire Operations Plan on reserves. Funding of approximately $530,000 for Googong Foreshores, Lower Molonglo Nature Reserve and Molonglo Gorge Nature Reserve is not included in this figure.

A major challenge for managing lands in Canberra is the large area of nature reserves. A comparison of population, nature/conservation reserves (hectares), funding in Hobart City Council, Brisbane City Council and Canberra is presented in Table 8. As mentioned in Section 1 Investigation Context and Process, while a comparison is informative it is also problematic. Accordingly, this comparison needs to be used as an indicator of difference.

363 Email form Sarah Black, Economics Branch, Treasury Directorate, to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 22 June 2011: ACT Government Budget Expenditure for 2010-11 was $3.862 billion, of which TAMS actual budget expenditure in 2011-12 was $526.596 million (page 90 of BP4, Budget Estimates) and DECCW’s (Sustainable Development Directorate) actual budget expenditure was $87.67 million (page 307 of BP4). These figures are from the 2011-12 ACT Budget.

364 Email from Sarah Black, Treasury Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 1 June 2011.


366 Email from Mr Stephen Hughes, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 9 June 2011. The budget includes $2,812,500 for Canberra Nature Park; $757,500 for Mulligan’s Flat Nature Reserve; $231,380 for Jerrabomberra Wetlands; and $565,000 for the urban wildlife program, totalling $4,366,380.

367 While this program is not directly spent on the reserves it is important in supporting activities that are unlikely to exist if it were not for the reserves.

368 Approximate figure based on estimated area of reserves in the Canberra urban area as a per centage of total area covered by the Bushfire Operations Plan. Includes funding for staff and equipment as well as physical works on reserves. Emails from Mr Neil Cooper, Department of Territory and Municipal Services to Mrs Narelle Sargent and Ms Joanna Temme Office of the Commissioner for Sustainability and the Environment, 6 June 2011 and 17 June 2011.

369 Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 1.
and not as a precise measure. It was not possible to secure data for the same years, Brisbane data is for 2009-10\textsuperscript{370} and Hobart and Canberra data is for 2010-11.

Table 8: Comparison of population, nature/conservation reserve area and funding in Hobart City Council, Brisbane City Council and Canberra

<table>
<thead>
<tr>
<th></th>
<th>Hobart\textsuperscript{371}</th>
<th>Brisbane</th>
<th>Canberra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident population(^{\text{approx}}) 2009-10 figures</td>
<td>49 887\textsuperscript{372}</td>
<td>1 052 458\textsuperscript{373}</td>
<td>352 200\textsuperscript{374}</td>
</tr>
<tr>
<td>Nature/conservation reserve (hectares)</td>
<td>2 966\textsuperscript{375}</td>
<td>7 786\textsuperscript{376}</td>
<td>12 008\textsuperscript{377} (a)</td>
</tr>
<tr>
<td>Nature/conservation reserve area per person (square metres)</td>
<td>594</td>
<td>73</td>
<td>340</td>
</tr>
<tr>
<td>Annual Funding for nature/conservation reserves (millions)</td>
<td>$2.98\textsuperscript{378} (b) ($2.6 approx excluding bushfire management)</td>
<td>$6.15\textsuperscript{379} (c) (data not available to exclude bushfire management)</td>
<td>$8.00\textsuperscript{380} (d) ($4 approx excluding bushfire management)</td>
</tr>
<tr>
<td>Bushland Preservation Levy or equivalent (millions)</td>
<td>Not applicable</td>
<td>$19.2</td>
<td>Not applicable</td>
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<tr>
<td>Approx funding per hectare of nature/conservation reserve excluding levy funds</td>
<td>$1 005 ($884 excluding bushfire management)</td>
<td>$790 (data not available to exclude bushfire management)</td>
<td>$666 ($364 excluding bushfire management)</td>
</tr>
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</table>

Notes:
(a) Excludes Namadgi National Park, Tidbinbilla Nature Reserve and Googong Foreshores.
(b) Figure for 2010-11, includes $2.05 million for operational works and $0.93 million for strategic/project works. Includes approximately $360 000 for Bushfire Management on reserves. Funding sourced from general revenue, Hobart City Council does not currently have a dedicated environmental levy.

\textsuperscript{370} Personal communication from Ms Margaret Barrett, Brisbane City Council with Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment confirming that the 2010-11 budget estimate and funding per hectare of nature reserves is comparable to the 2009-10 budget on 15 June 2011.
\textsuperscript{371} Hobart City Council local government area, not Greater Hobart.
\textsuperscript{375} Email from Mr Adam Muyt, Hobart City Council, to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 4 February 2011.
\textsuperscript{376} Email from Ms Margaret Barrett, Brisbane City Council, to Ms Joanna Temme, Office of the Commissioner for Sustainability and the Environment, 1 June 2011.
\textsuperscript{377} Email from Mr Graeme Hirth, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 9 June 2011.
\textsuperscript{378} Emails from Mr Neil Cooper, Department of Territory and Municipal Services to Mrs Narelle Sargent and Ms Joanna Temme Office of the Commissioner for Sustainability and the Environment, 6 June 2011 and 17 June 2011. Refer to note (d).
(c) Figure for 2009-10, includes recurrent and capital funding, however value of capital works in 2009-10 was zero. Figure includes management and maintenance of the conservation estate and bushfire management but excludes funding for acquisition of lands for the conservation estate, which currently is separately funded by the Bushland Preservation Levy. Expenditure from the Bushland Preservation Levy in 2009-10 was $19 163 000.\textsuperscript{381} An estimate of funds raised from the levy in 2010-11 is $21 383 000. From 2006-2011 funds from the levy have been allocated wholly to acquisition of land for the conservation estate (including costs associated with acquisition such as contracts, negotiations, etc) and were not used for other conservation activities (for example revegetation, community programs etc). The allocation of levy funds may change in the 2011-12 budget, however allocation of funds from the Bushland Preservation Levy will continue to prioritise acquisition of land for the conservation estate.\textsuperscript{382}

(d) Figure for 2010-11, includes $2,812,500 for Canberra Nature Park; $757,500 for Mulligan’s Flat Nature Reserve; $231,380 for Jerrabomberra Wetlands; and $565,000 for the urban wildlife program, totalling $4,366,380. Includes approximately $4 million for Bushfire Management on reserves (Approximate figure based on estimated area of reserves in the Canberra urban area as a percentage of total area covered by the Bushfire Operations Plan, includes staff and equipment as well as physical works on reserves.) Total excludes $270,000 capital funding for Infrastructure Improvements at Jerrabomberra Wetlands.

While overall more funds are invested in nature reserves in the ACT, we have four times the area of reserves to manage than Hobart and only around a third of the population (and therefore far smaller rate base) than Brisbane with around 50 per cent of our funds spent on our reserves being for bushfire management. Accordingly, there are fewer funds available per hectare for conservation and visitor programs in the ACT.

The current $364 (excluding fire management costs) per hectare of nature reserve funding is below that which the Territory and Municipal Services Directorate considers necessary to effectively manage a reserve... the maintenance cost per ha [hectare] for a reserve once established is estimated at $850. These costs do not include the costs of implementing the Bushfire Operational Plan. The Department has stated that it costs ...$3450 per ha per year for three years to establish a new reserve if it is in reasonable condition. This cost nearly doubles to $6700 per ha per year for three years if the land is in poor condition.\textsuperscript{383}

Community members recognise that the level of resources allocated to reserves is problematic:

...Governments are to be applauded for increasing the areas covered by the ACT reserve system and for having other reserves in the proposed category. However, it would seem that this progress has usually been accompanied by inadequate increases in funding.\textsuperscript{384}

Additional resources have been committed to managing the reserves, the Territory and Municipal Services Directorate advises that

...Ranger numbers have increased over the last three years with the addition of one ranger to specifically focus on the management of new grassland reserves and one ranger for the...
Mulligans Flat Woodland Sanctuary. A field officer position and a Sanctuary Co-ordinator have also been funded over the last three years for Mulligans Flat NR. A further ranger position, for Jerrabomberra Wetlands, will be funded from 11/12 [2011-12] onwards.\textsuperscript{385}

Currently there are 17 rangers allocated to managing reserves including those covered by this Investigation: 7 for the North Canberra District (including Mulligan’s Flat Woodland Sanctuary); 7 for the South Canberra District (including Jerrabomberra Wetlands) and 3 for Googong.\textsuperscript{386}

In addition, supplementary funds have been allocated for specific projects for a limited time. For example, for 2011-12 the ACT Government has committed additional funds for conservation programs including:\textsuperscript{387}

Table 9: ACT Government funding committed for conservation programs

<table>
<thead>
<tr>
<th>Project</th>
<th>2011-12 $’000</th>
<th>2012-13 $’000</th>
<th>2013-14 $’000</th>
<th>2014-15 $’000</th>
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<tr>
<td>Rabbit Control in Nature Reserves</td>
<td>200</td>
<td>154</td>
<td>158</td>
<td>0</td>
</tr>
<tr>
<td>Pest Plant Management</td>
<td>500</td>
<td>492</td>
<td>405</td>
<td>372</td>
</tr>
<tr>
<td>Woodland Restoration</td>
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<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Conservation Measures for Threatened Species and Communities</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

While these funds will help address some of the management challenges, additional funds are needed to implement actions emerging from this Investigation and to address matters that would be progressed by the Territory and Municipal Services Directorate if funds became available. The Department has indicated that additional funds would be used to fund activities\textsuperscript{388} such as the development of a Pest Management Plan for rabbits ($125k), enhanced rabbit control ($200k per year) and woodland restoration, including Bushland Management Teams ($1 million per annum). Further information on projects is presented in Section 4.4.5 Departmental Considerations.

7.2 Increasing demands

Increased demand for services compound the Territory and Municipal Services Directorate’s ability to deliver the full range of on-ground actions that would afford long term protection for our reserves. It does not always receive on-going additional funds

\textsuperscript{385} Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 4.
\textsuperscript{386} Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 4.
\textsuperscript{388} Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 6.
when new reserves are created or if urban areas are developed adjacent to existing reserves, although such a mechanism would be effective in providing for the demands of a growing city. Current resourcing levels do not allow all existing management challenges to be addressed or enhanced management actions implemented to increase the resilience of our reserves in the face of future challenges. This situation is normal for many local governments and some of these have secured additional funding through environmental levies, as discussed in Section 7.3 Additional funding sources.

According to the Territory and Municipal Services Directorate, demands on its resources have increased due to:

- Satisfying the demand for providing support to Park Care groups and other community partnerships such as joint Govt/Community Bush Management Teams;
- Managing visitor use impacts particularly the increasing demand for access to CNP for mountain bike and equestrian use and events;
- Providing sustained annual follow up rabbit and environmental weed control programs;
- Provision of comments and input into urban planning processes where nature reserves interface with urban development;
- Requirement for more and better conservation planning;
- Requirement for bushfire mitigation and provision of advice and monitoring in relation to impacts on biodiversity in relation to fire;
- Requirement for monitoring the impacts of urban development and urban edge effects on conservation areas;
- Requirement for ecological and conservation advice in relation to urban development and land management particularly in relation to threatened species and ecological communities;
- Requirement for kangaroo population monitoring and management;
- Requirement for improved knowledge of populations of threatened species and the condition and extent of vegetation communities.\(^\text{389}\)

### 7.3 Additional funding sources

Philanthropic donations, round-up funds, levies and funds from climate change initiatives have been considered by this Investigation as potential sources for securing additional funds.

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\(^{389}\) Letter from Mr Gary Byles, Department of Territory and Municipal Services to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 21 April 2011, page 7.
7.3.1 Philanthropic donations

7.3.1.1 International examples
The use of philanthropic funding for public nature reserves does occur in other countries. An example of this is the Western Pennsylvania Conservancy in the United States of America which started in 1932. This non-government body successfully funds and manages large areas of publically accessible land for conservation and recreation.

The Conservancy has been acquiring land for conservation since the 1940s with some of its properties being transferred to public ownership as part of the State and National reserve systems, while others remain owned and managed by the Conservancy. The group currently owns and manages approximately 4,500 hectares of publically accessible reserves, including both natural areas and urban parks, in addition to supporting conservation covenants on private properties.390

All reserves owned by the Conservancy are publicly accessible at no charge, however the group also owns the historic Frank Lloyd Wright designed property ‘Fallingwater’, which generates significant income from admission fees. It appears that these fees subsidise the management of its lands.

In 2009 the Conservancy had a total income of $US16.8 million. This includes 33 per cent from donations (from charitable foundations, business and individuals), 33 per cent from ‘Fallingwater’ and other earned income; 19 per cent from government; and 15 per cent from investment returns.391

7.3.1.2 Australian examples
Some not-for-profit organisations are active in protecting ecologically valuable lands throughout Australia. Of relevance to this Investigation are those organisations that acquire valuable properties from private owners and then directly manage them for conservation purposes. For example, the Australian Wildlife Conservancy currently owns and manages for conservation approximately 2.5 million hectares across Australia.392 Bush Heritage is a similar organisation which currently owns approximately 947,000 hectares.393 Both of these organisations are funded primarily through private donations and sponsorship. In 2009-10 Bush Heritage received approximately one per cent of its funding from government grants, while the Australian Wildlife Conservancy received approximately ten per cent from government grants.394 This

shows that the Australian community is willing to donate significant amounts of money for nature conservation programs.

Other groups such as the Nature Conservation Trust of NSW and the Trust For Nature (Victoria) manage lands for conservation primarily through financial and other support for legally binding conservation covenants on private land.

The areas owned and managed by non-government groups remain private land, and as such there is no automatic right of public access to the sites. Some properties can be visited by arrangement, and generally a fee is payable. Therefore, as a model they are of limited relevance to our nature reserves, which provide for public access, recreation and conservation.

The tradition of non-government support for public reserves through volunteer labour or in-kind donations (for example by Landcare/ParkCare groups and state-based National Parks Associations) is well established in Australia. However there appears to be few, if any, examples of significant financial philanthropic support for public reserves in Australia. The paper *Funding options for the protection of the environment through enhanced management actions* (Appendix C) cites a successful example of Australian philanthropy where the land for the purpose of establishing the Wollongong botanical gardens was donated.396

At the Bird Forum, a ‘round-up fund’ was suggested. This is a way for community members to make small donations to an environmental fund while shopping for items such as groceries. Community members donate the difference between what they pay for an item and the nearest dollar, for example if their purchases cost $42.60 then it is rounded-up to $43.00 with forty cents being donated to the fund.397 While this idea might be worth pursuing like all voluntary schemes, funding from it cannot be guaranteed and while there may be an initial high degree of support this might decline in the longer term.

### 7.3.1.3 Capital Woodland and Wetlands Conservation Trust

The Capital Woodland and Wetlands Conservation Trust, currently being established by the ACT Government is an example of a new approach in the ACT to accessing private sector and community funding for projects located on public land, over and above normal Government funded operations.

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This Trust is being established to support projects on Jerrabomberra Wetlands Nature Reserve and Mulligans Flat Woodland Sanctuary and it is understood that it will be managed by an Incorporated Association, with advice from the two Boards of Management established in 2010 for each reserve. The Boards are particularly important in providing independent advice and transparency in directing funds that are a combination of public and private specifically aimed at achieving an environmental gain.

The Trust is scheduled to receive the first of two $1 million instalments from the Land Development Agency before 30 June 2012. The Trust is expected to source additional private sector donations.

Although the Trust is still being developed indications are that:

...Appointments to the IA [Incorporated Association] ... may be up to seven members appointed for the purpose of managing the trust funds for these two reserves. In appointing the members... [Consideration will be given to]... the skills each member might bring to the job including financial management, entrepreneurial skills, environmental management and philanthropic experience. The two Boards advise the IA [Incorporated Association] on initiatives they consider to be worthy of support by the Trust. It is envisaged the members would use their networks to encourage private support for the Trust.

The Trust is intended to supplement, rather than replace annual ongoing government support for Jerrabomberra Wetlands Nature Reserve and Mulligans Flat Woodland Sanctuary. The objectives of the Trust are:

- To provide support for research, education, recreation and tourism activities related to woodland recovery and wetland conservation;
- To enlist and encourage corporate and community support for wetland and woodland conservation management;

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398 The members of Jerrabomberra Wetlands Nature Reserve Board are: Mr Warren Nicholls (chair); Associate Professor Mark Lintermans; Mr John Hibberd; Ms Christine Ellis ;Mr Chris Davey; Professor Richard Norris; South District, Parks and Conservation (currently Mr Peter Galvin); one position vacant
The members of the Mulligan’s Flat Woodland Sanctuary Board are: Professor Tony Peacock (chair); Dr David Shorthouse; Dr Adrian Manning; Dr Barry Richardson; Professor David Lindenmeyer; Dr Jenny Andrew; Ms Jenny Bounds; Chair of the Species Management Panel (currently Ms Sharon Lane); North District, Parks and Conservation (currently Mr Stuart Jeffress).

399 Email from Mr Daniel Iglesias, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 18 May 2011.
400 Email from Mr Daniel Iglesias, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 19 July 2011.
401 Email from Mr Daniel Iglesias, Department of Territory and Municipal Services to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 18 May 2011.
• To support management of secure wildlife sanctuaries free of exotic predators so that the reserves can support a diversity of wetland birds and the recovery of locally extinct woodland fauna respectively; and

• To ensure clear governance and probity accountabilities in the application of government and private funds.\(^{402}\)

It is envisaged that Trust funding will be used for projects such as:

• recovery of woodland or wetland ecosystem function in the reserves, including reintroduction of locally extinct animals;

• practical initiatives to restore habitat; and

• education initiatives e.g. visitor facilities, educational materials.\(^{403}\)

The paper *Funding options for the protection of the environment through enhanced management actions* (Appendix C) makes the following observations about philanthropic programs:

...To encourage philanthropy the giver needs to know the receiver will value the donation. It is worthwhile to establish a philanthropic strategic action plan that identifies what type of philanthropy is sought and how it can be supported by the organisation and articulated to the community.\(^{404}\)

To ensure the success of the Trust it will be important to engage and attract support from the community and visitors as well as the corporate sector. The membership schemes used by the Western Pennsylvania Conservancy are an example of this approach. It is similar to the membership schemes widely used by Australian arts and cultural organisations whereby individuals can pay a membership to the organisation at a range of levels. The Western Pennsylvania Conservancy offers membership levels from ‘Ally’ at $25 per year to ‘Leadership circle’ at $1000 per year, with members gaining benefits such as access to special events.\(^{405}\)

The Capital Woodland and Wetlands Conservation Trust is an innovative approach to reserve funding. It will be interesting to observe the success of the Trust model, as the tradition of private philanthropy funding public nature reserves is not yet well established in Australia as is the case in the United States of America, as noted for the Western Pennsylvania Conservancy (discussed in *Section 7.3.1.1 International examples*). However, given the characteristics of ACT residents; a high level of concern for the

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\(^{403}\) Email from Mr Daniel Iglesias, Department of Territory and Municipal Services to Ms Joanna Temme, Office of the Commissioner for Sustainability and the Environment, 23 May 2011.


environment, participation in community activities and a relatively high disposable income, this may be a place where a Trust might attract private donations. This Trust is further mentioned in Section 7.3.2.2 Additional funds for nature reserves.

### 7.3.2 Levies

#### 7.3.2.1 Australian examples
To assist this Investigation, Ms Lisa Miller was commissioned to prepare the paper *Funding Options for the Protection of the Environment through Enhanced Management Actions* (Appendix C). The paper discusses a range of ways local governments have sourced additional environmental funding, in particular the use of environmental / sustainability levies in 18 local government areas in Australia.

In NSW the process of raising additional funds by charging additional rates as an environment levy requires councils to apply to the State Government to set a special rate that meets specified criteria, including that the rate has a specific purpose and it is in place for a limited time. A majority of NSW councils have used this mechanism to raise rates for environmental initiatives.406

Brisbane City Council has two environmental levies; the Environmental Management and Compliance Levy, which is collected to protect waterways and manage and remediate landfills, and the Bushland Preservation Levy. In 2010-11, the Environmental Management and Compliance Levy, charged at a differential rate based on zoning, was $22.76 for most home owners and the Bushland Preservation Levy was $49.80. All properties that are charged general rates pay this levy as part of their rates account.407

This Bushland Preservation Levy was adopted in 1991 on the grounds that:

...all rateable land [sic] in the City has benefited or will benefit from – the acquisition and protection of natural bushland or other areas in the City and the provision of facilities for public access to those areas and the protection of other natural bushland areas in the City whether privately owned or otherwise and the preservation, restoration, rehabilitation, management and enhancement of the City’s environment ... undertaken or proposed to be undertaken by the Council....408

The funds raised by this levy are used for the: protection and enhancement of the natural environment [and] creation of a world-class natural area network for Brisbane.409

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Bushland Preservation Levy, through supporting the Bushland Acquisition Program, has facilitated the acquisition of valuable environmental lands that supports significant ecosystems, plants and animals. This land is managed as conservation reserves in a manner similar to reserves in Canberra, most of which are accessible to the public. Over 2500 hectares have been protected since the program started in 1991. Between 2008 and 2012 Brisbane City Council has a target to secure an extra 500 hectares of bushland.\textsuperscript{410}

Introducing an environmental levy may be challenging but as stated by Ms Miller...

\ldots all of the cases discussed through local Councils or Departments of local government proved popular in the long term with residents. Once residents ‘see’ the benefits this often aligns with their environmental values.\textsuperscript{411}

Ms Miller identifies the following as attributes for a successful levy:

\begin{itemize}
  \item a clear vision and measurable objectives;
  \item political support;
  \item transparency both in how money is spent and what it achieves;
  \item diversity of funding to enable leveraging;
  \item charismatic leaders;
  \item a ‘sunset’ clause to allow review and reconsideration.\textsuperscript{412}
\end{itemize}

An advantage of an environmental levy over sources such as philanthropy or grants is that it provides a guaranteed base level of funding, which can be used to attract and leverage additional funding from other sources. In addition ...Many organisations have identified that ‘seed’ funding from the environment levy is often, in the end, small in comparison to, say, the in-kind value they received for the whole project from the private or government sector.\textsuperscript{413}

It is important to note that to effectively leverage funds in this way...

\ldots the role of project managers in implementing programs needs to encompass not just the technical skills to deliver the project but the relationships, knowledge and networks to continue to recognise the leverage opportunities and the value adding that may attract additional funds from the private and government sector.\textsuperscript{414}

Environmental levies are usually limited in time to achieve a specific result.

7.3.2.2 Additional funds for nature reserves

This Investigation has considered several sources of additional funding for enhanced management to increase the protection and restoration of our nature reserves.

Levies are currently used to fund some activities in the ACT\textsuperscript{415} and most are charged for a specific activity, for example:

\begin{quote}
...There is one major existing levy that applies directly to all rateable properties in the ACT – the Fire and Emergency Services Levy, which is charged on all rateable properties in ACT to partly cover the cost of providing fire and emergency services. In 2010-11 the Residential and Rural Fixed Charge for this levy was $98.20.\textsuperscript{416}
\end{quote}

An estimate of the funding that could be generated annually in the ACT by a levy such as the Bushland Preservation Levy adopted in Brisbane, at $49.80 in 2010-11 (half the ACT’s Fire and Emergency Services levy) would be about $6.5 million per year.\textsuperscript{417} An environment levy (paid by all households and businesses) would be one way to provide additional funding for initiatives to support actions for enhanced management to increase protection and restoration of our nature reserves.

Ms Miller’s paper, Funding Options for the Protection of the Environment through Enhanced Management Actions (Appendix C) was released for public comment on 17 March 2011 by our Office. Community debate on the topic was strong and is reflected in some of the comments below:

\begin{quote}
...The last thing Canberra needs is a levy...on mortgage stressed home owners to fund cushy jobs for the enviro-zealots...\textsuperscript{418}

...I fully support ... an environmental levy to help maintain Canberra Nature Park. It was disappointing to hear the kneejerk reactions from ABC radio listeners this morning. Most Canberrans will be able to afford a modest levy...\textsuperscript{419}

...I fully support...an environmental levy to improve the management of Canberra Nature Park.....Our 'bush' is a resource that benefits everyone of us and it is only fitting that we should all contribute and work in partnership with the Government to protect and enhance it...\textsuperscript{420}
\end{quote}

\textsuperscript{415}Levies and taxes administered by the ACT Revenue Office include: Ambulance levy, City marketing and improvements levy; Fire and emergency services levy; Utilities (network facilities) levy and Energy industry levy. www.revenue.act.gov.au/other_levies_and_taxes accessed on 6 June 2011.


\textsuperscript{417}This is based on Canberra having 131,375 dwelling, it is recognised that there is likely to be adjustments based on special circumstances so this figure may not be realised.

\textsuperscript{418}Macafee, G., 2011, Out of their tree, Canberra Times, 24 March 2011 page 18.

\textsuperscript{419}Email from community member, 23 March 2011.

\textsuperscript{420}Hibberd, J., 2011, Bush levy useful, Canberra Times, 28 March 2011.
As Ms Miller discusses in her paper, although there may be some initial disquiet the community accepts the levy, because … "Once resident’s ‘see’ the benefits this often aligns with their environmental values."  

A levy has a greater degree of certainty with respect to funds generated compared to public donations which are less reliable on a year-to-year basis. However, as indicated by the release of Ms Miller’s paper there is likely to be some community disquiet. Another way to raise funds would be to have a voluntary ‘round up fund’ as discussed in Section 7.3.1.2 Australian examples or to expand the existing Trust discussed in 7.3.1.3 Capital Woodland and Wetlands Conservation Trust.

It seems that the attributes of success for using levy funds as captured in Section 7.3.2.1 Australian levies are equally applicable to funds secured on a voluntary basis. The following principles are therefore suggested for guiding the management of additional funds specifically sourced for enhancing nature reserves:

- Expenditure must be on specific and defined projects aimed at long term overall improvement in the environment.
- Projects are defined and publicly reported prior to commencement or expenditure.
- Additional actions above those normally funded on a regular basis.
- Independent and transparent allocation of funds.
- Monitoring, assessment and auditing of results and expenditure.
- Public Reporting of result and expenditure.

If additional funds are sourced, those projects funded by these should be identified as being part of Nature Reserve Operational Plans (Recommendation 3.1) but demarcated as being funded separately from the normal ACT Government budget allocated for the nature reserves. If additional funds are secured they could be invested in:

- special restoration projects to improve the condition of nature reserves and enhance their ecological values (Recommendation 2.3)
- supporting community awareness and involvement programs such as increasing the support to, and number of ParkCare groups, undertaking community awareness programs (Recommendations 1.2, 1.3, 1.4, 1.5)
- improving connectivity (Recommendation 2.4)
- enhanced monitoring and research (Recommendation 3.2 and 3.6)
- improving the provision and management of appropriate recreation infrastructure in nature reserves and development of an ACT Nature Reserve Recreation Strategy (Recommendations 5.1 and 5.2)

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At present, as mentioned in Section 7.3.1.3 Capital Woodland and Wetlands Conservation Trust, the ACT Government is establishing a Trust which in the longer term is proposed to be supported by private sector donations in addition to the initial Government funds. Accordingly, a model for sourcing new funding is being established. It is therefore appropriate to monitor the effectiveness of this model in securing donations to guide strategies for sourcing additional funds. Therefore a high priority needs to be given to establishing the Trust. However, it would also be prudent to explore other avenues of funding as the Trust is only for projects in two reserves. This could include considering a ‘round up fund’ whereby community members make small donations to an environment fund while shopping for items and donate the difference between what they pay for an item and the nearest dollar. It could also include considering an environment levy.

Regardless of funding sources, there is a need for an additional investment in our reserves to address existing issues and undertake restoration projects to provide a higher level of protection for them.

**Recommendation 6**

**Increase the protection and restoration of our nature reserves by sourcing new funding** by:

6.1 **(High Priority)** Establishing the Capital Woodland and Wetland Conservation Trust and monitor its effectiveness in sourcing additional funds.

6.2 **(High Priority)** Identifying new sources of funding.

6.3 Guiding the management of additional non-government funds using the following principles:

- *expenditure must be on specific and defined projects* aimed at long term overall improvement in the environment;
- *projects are defined and publicly reported prior to commencement or expenditure*;
- *additional actions* above those normally funded on a regular basis;
- *independent and transparent allocation of funds*;
- *monitoring, assessment and auditing of results and expenditure*; and
- *public reporting* of result and expenditure.

### 7.3.3 Funds from environmental offsets for development

As discussed in Section 6.4 Environmental offsets for development, environmental offsets for development are a mechanism to ‘compensate’ for the negative environmental impacts of a development on a particular site, by enhancing the environmental values of another site. Therefore they are a form of compensation to the environment as a result of a desire
to allow a development to proceed. Accordingly they are not really a supplementary funding source.

7.3.4 Vegetation plantings on nature reserves as carbon offsets

As mentioned previously in this Report, some of our nature reserves require revegetation\textsuperscript{422} programs to address historical clearings (Recommendation 2.2). Therefore the issue of whether or not it is possible for these plantings to qualify as a form of carbon offsets, that is, plantings which are tradeable ‘sinks’ of greenhouse gasses, was explored. However, if they were to qualify, a key principle for such plantings would be that they must be ecologically appropriate.

To qualify as carbon offsets revegetation plantings would need to meet the criteria of the National Carbon Offset Standard being:

- additional to that which would normally occur
- permanent
- measureable for their carbon sequestration contribution
- transparent and reported publicly
- independently audited
- registered \textsuperscript{423}

To be counted towards Australia’s mandatory greenhouse gas reduction target under the Kyoto protocol, plantings must also meet criteria under the Marrakesh Accord, which includes standards for minimum forest size and canopy cover\textsuperscript{424}.

While data on the specific contribution of reserves to carbon uptake and storage in the ACT is not available, the ACT total urban estate\textsuperscript{425} was estimated to sequester 98,000 tonnes of carbon between 2008 and 2015, giving an average annual sequestration of 14,000 tonnes (0.6 t/ha).\textsuperscript{426} Sequestration of 14,000 tonnes of carbon each year is roughly equivalent to 4,192 passenger cars being taken off Australia’s roads each year.\textsuperscript{427}

\textsuperscript{422} Revegetation’ can include both trees and other plants. Under Australia’s Kyoto Protocol commitment only planting of trees (‘afforestation’ or ‘reafforestation’) is eligible as a carbon offset activity, while other frameworks, such as the National Carbon Offset Standard include ‘revegetation’ as an eligible activity. Email from Mr Simon French, Environment and Sustainable Development Directorate to Ms Joanna Temme, Office of the Commissioner for Sustainability and the Environment, 20 June 2011.

\textsuperscript{423} Miller, L., 2010, The benefits and draw backs of considering funding for urban tree programs separately to climate change initiatives, Report to the Office of the Commissioner for Sustainability and the Environment, page 3.


\textsuperscript{425} This included streets and parks and reserves within the urban area and excluded residential or other gardens.


Existing carbon offset schemes are based on the trading of ‘abatement certificates’. ‘Abatement’ refers to a reduction in the amount or intensity of greenhouse gas emissions as a result of actions taken by a company or individual.\textsuperscript{428} Abatement can include carbon sequestration activities such as managing forests so as to capture and retain carbon from the atmosphere.\textsuperscript{429} ‘Abatement Certificates’ are used to make these reductions tradeable. For example the NSW Greenhouse Gas Abatement Certificates (NGACs) \textit{...are created through activities that reduce or offset emissions. Each certificate...represents 1 tonne of carbon dioxide equivalent emissions reduction or sequestration}.\textsuperscript{430}

It is envisaged that plantings on reserves could generate abatement certificates under existing schemes such as the ACT Greenhouse Gas Reduction Scheme, the NSW Greenhouse Gas Reduction Scheme and future schemes such as the proposed Carbon Farming Initiative\textsuperscript{431} or other programs associated with a future federal carbon tax. While the ACT Greenhouse Gas Reduction Scheme is currently legislated to remain in force until 2020\textsuperscript{432}, it is acknowledged that the scheme may be reviewed before this date in the context of new initiatives and national policy on climate change.

Proposals for carbon offset plantings must be carefully evaluated in case perverse outcomes are the end result. Such outcomes might include increased bushfire fuel loads in dangerous locations, changing the nature of significant ecological communities (for example planting trees in natural grasslands or changing naturally open woodland into a dense forest community) or altering the drainage characteristics of a site. In general sites that are known to have been cleared of trees could be considered as priority areas for new plantings, although these may more likely be found on rural land rather than in many nature reserves.

It is understood that a draft of Action Plan 2 under the ACT Climate Change Strategy ‘Weathering the Change’ is expected to be released for public comment in 2011, and that this will include consideration of carbon sequestration opportunities in the ACT.\textsuperscript{433} It seems appropriate for this document to consider the feasibility of appropriate plantings on reserves being used to generate carbon offsets under existing and future carbon offset schemes.


\textsuperscript{433} Email from Mr Paul Sutton, Environment and Sustainable Development Directorate to Ms Joanna Temme, Office of the Commissioner for Sustainability and the Environment, 14 June 2011.
**Recommendation 4**

*Strengthen the management framework and strategically position our nature reserves by:*

4.8 Ensuring that any plantings in nature reserves intended as carbon offsets are carefully considered as to their ecological appropriateness in the development of Action Plan 2 under the ACT Climate Change Strategy ‘Weathering the Change’.
ANNEX A TO CHAPTER 5 LEGISLATION, STRATEGIES AND PLANS

This annex provides detailed information on legislation, policies and strategies considered in this Investigation, some of which are discussed in Chapter 5 Management Framework. It contains the following sections:

SECTIONS

1 Commonwealth legislation

1.1 Australian Capital Territory (Planning and Land Management) Act 1988

1.1.1 The National Capital Authority

1.1.2 The National Capital Plan

1.1.3 National Capital Open Space System

1.2 Environment Protection and Biodiversity Conservation Act 1999

1.2.1 National Heritage System

1.3 Canberra Water Supply (Googong Dam) Act 1974

2 ACT legislation

2.1 Planning and Development Act 2007

2.2 Plans of management

2.2.1 Canberra Nature Park

2.2.2 Lower Molonglo River Corridor

2.2.3 Googong Foreshores

2.2.4 Jerrabomberra Wetlands

2.3 Nature Conservation Act 1980

2.3.1 Role of the Conservator of Flora and Fauna

2.4 Heritage Act 2004

2.5 Human Rights Act 2004

2.6 Animal Welfare Act 1992

2.7 Pest Plants and Animals Act 2005

2.8 Domestic Animals Act 2000
2.9 Fisheries Act 2000 ................................................................. 184
2.10 Emergencies Act 2004 ............................................................ 184
   2.10.1 Declaration of Bushfire Abatement Zones ....................... 184
   2.10.2 Directions from the Fire Commissioner ......................... 184
2.11 Lakes Act 1976 ................................................................. 185
2.12 Environment Protection Act 1997 .................................... 185
2.13 Water Resources Act 2007 .............................................. 185
2.14 Other ACT legislation ..................................................... 185
3 NSW legislation .................................................................. 186
   3.1 Googong Dam Catchment Area Act 1975 ......................... 186
   3.2 Other NSW legislation .................................................... 187
5 Strategies and plans ............................................................ 188
   5.1.1 The ACT Climate Change Strategy .................................. 188
   5.1.2 ACT Kangaroo Management Plan .................................. 189
   5.1.3 ACT Nature Conservation Strategy ................................. 189
   5.1.4 ACT Vertebrate Pest Management Strategy ..................... 189
   5.1.5 ACT Weeds Strategy .................................................... 189
   5.1.6 Strategic Bushfire Management Plan .............................. 189
   5.1.7 Bush Capital Legacy ..................................................... 190
   5.1.8 The Canberra Plan ....................................................... 190
   5.1.9 Think water, act water ................................................. 190
1 COMMONWEALTH LEGISLATION

1.1 Australian Capital Territory (Planning and Land Management) Act 1988

The Australian Capital Territory Planning and Land Management Act 1988 establishes a planning framework for the ACT, involving considerations of national capital significance (National Capital Plan) and planning for the needs of ACT residents (Territory Plan).

This Act provides for two categories of land in the ACT:

- National Land, which the Commonwealth is responsible for leasing and managing, in accordance with the National Capital Plan; and
- Territory Land, which the Territory is responsible for the leasing and management of, in accordance with the Territory Plan.\(^{434}\)

Some Territory Land may be within designated areas (for example Black Mountain, Mount Ainslie, O'Connor Ridge and Red Hill nature reserves). These overlapping areas are managed by the Territory in accordance with the National Capital Plan and any works in these areas require the approval of the National Capital Authority under the Planning and Land Management Act 1988.\(^{435}\)

The Australian Capital Territory Planning and Land Management Act 1988 established the National Capital Planning Authority (now the National Capital Authority) as a Commonwealth Government agency with a number of functions including to prepare and administer a National Capital Plan.\(^{436}\)

The Act also requires that there shall be a Territory Plan prepared by a Territory planning authority responsible to the ACT Legislative Assembly.\(^{437}\) The Act requires that the Territory Plan shall not be inconsistent with the National Capital Plan.\(^{438}\)

1.1.1 The National Capital Authority

The National Capital Authority is established under the Australian Capital Territory Planning and Land Management Act 1988.\(^{439}\) The Act sets out the functions of the National Capital Authority including planning responsibilities which require the Authority to:

- prepare and administer (which includes determining development applications) the National Capital Plan; and

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\(^{435}\) Australian Capital Territory Planning and Land Management Act 1988, s.12.
\(^{436}\) ibid, s.6.
\(^{437}\) ibid, s.25.
\(^{438}\) ibid, s.26.
\(^{439}\) ibid, s.5.
keep the Plan under constant review and to propose amendments to it when necessary.\footnote{Planning and Land Management Act 1988, s.6.}

\subsection*{1.1.2 \textbf{The National Capital Plan}}

The \textit{National Capital Plan} (2003) is the overarching strategic plan for Canberra and the Territory, it provides detailed planning policies and guidelines for designated areas and ensures that \textit{Canberra and the Territory are planned and developed in accordance with their national significance}.\footnote{Ibid, s.9.} The key matters of national significance include:

\begin{itemize}
  \item the pre-eminence of the role of the Territory and Canberra as the national capital;
  \item preservation and enhancement of the landscape features which give the National Capital its character and setting;
  \item respect for the key elements of Walter Burley Griffin's formally adopted plan for Canberra;
  \item creation, preservation and enhancement of fitting sites, approaches and backdrops for national institutions and ceremonies as well as National Capital uses;
  \item the development of a city which both respects environmental values and reflects national concerns with the sustainability of Australia's urban area; and
  \item recognition of the value of the unique purpose, setting, character and symbolism of Australia's national capital.\footnote{National Capital Authority, 2008 \textit{National Capital Plan}, page 5.}
\end{itemize}

Any ACT Government proposed development or remediation work within designated areas is subject to approval by the National Capital Authority.\footnote{Planning and Land Management Act 1988, s.12.} The National Capital Authority also administers and maintains the \textit{National Estate}, consisting of Commonwealth property assets within the ACT.

\subsection*{1.1.3 \textbf{National Capital Open Space System}}

The importance of the natural setting of the national capital has been recognised in the creation and formal adoption of the concept of the \textit{National Capital Open Space System (NCOSS)}. This is a policy framework intended to protect the nationally significant open spaces including the visual backdrops and landscape settings for the national capital, reflecting Walter Burley’s Griffin’s design intent (refer to \textit{Chapter 2 History}).\footnote{National Capital Authority, 2008 National Capital Plan, National Capital Open Space System. page 110.} Four different types of open space within the NCOSS protect the character of the national capital as well as the environmental quality of present and future water catchments, river systems, and important ecological and heritage areas from the increasing pressure of Canberra’s growth. These areas are:
• the symbolic spaces providing unique and monumental landscapes necessary in the national capital;
• conservation spaces protecting the natural and cultural heritage of the ACT including national parks, heritage and wilderness areas, and nature parks and reserves;
• living space including the network of regional and metropolitan parks; and
• the interlinking spaces consisting of urban land and open space that physically join and visually unite the city and countryside.\textsuperscript{445}

The National Capital Authority is currently undertaking a strategic review of the role and function of NCOSS.\textsuperscript{446} This review is focusing on: (i) the relationship between NCOSS and sustainability, density, community value, demographic change and the form and function of the landscape setting of the national capital; (ii) the impact on the near and distant views and vistas taking into account the planting and development of the landscape setting of the National Capital over the past 100 years and; (iii) any relevant economic factors related to NCOSS (such as impact on land value and projected demand for land).\textsuperscript{447}

\subsection*{1.2 Environment Protection and Biodiversity Conservation Act 1999}

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is the primary Commonwealth legislation for environment protection. It provides a legal framework for protection and management, nationally of important flora, fauna, ecological communities and heritage places defined in the Act as matters of national environmental significance.

Any proposed action which has, will have or is likely to have a significant impact on a matter of national environmental significance, which includes threatened species and communities, migratory species and national heritage places listed under this Act will require approval from the (Commonwealth) Environment Minister if it is not subject to certain exceptions.\textsuperscript{448} Exceptions include actions taken in accordance with an accredited assessment process or authorisation process.

The Act provides for environmental impact assessment to be carried out under state or territory law and be accredited under the Environment Protection and Biodiversity Conservation Act 1999. The aim of this is to reduce duplication of environmental assessment and regulation. Subsection 47(1) of this Act provides that a bilateral agreement may declare that actions need not be assessed under the Act if the actions

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{445} National Capital Authority, 2008, \textit{National Capital Plan, National Capital Open Space System}, pages 110.
\item \textsuperscript{446} Personal communication between Mr Graham Sandeman, National Capital Authority and Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment, 27 May 2011.
\item \textsuperscript{447} Letter from Mr Gary Rake, National Capital Authority, to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 5 May 2010, page 1.
\item \textsuperscript{448} Environment Protection and Biodiversity Conservation Act 1999 (Cwlth), Part 3.
\end{itemize}
\end{footnotesize}
have been ‘assessed in a specified manner’. The ACT has a bilateral assessment agreement with the Commonwealth that provides for assessment under the Planning and Development Act 2007 (ACT) of actions which are assessed by the preparation of an Environmental Impact Statement (EIS) with or without an associated inquiry panel report under the Planning and Development Act 2007 (ACT) and the Planning and Development Regulations 2008 (ACT).

1.2.1 National Heritage System

The National Heritage System, which operates under the Environment Protection and Biodiversity Conservation Act 1999, is a framework for listing and protecting natural and cultural heritage places across Australia. In line with a 1997 intra-governmental agreement, the Australian Government focuses on protecting heritage places of outstanding significance to the nation or places the Australian Government owns or manages. The Commonwealth Heritage List, implemented in 2004, is an important mechanism for protecting heritage places.

On 1 January 2004, a new national heritage system was established under the Environment Protection and Biodiversity Conservation Act 1999. Under the Act and following amendments to the Australian Heritage Council Act 2003, the Register of the National Estate was ‘frozen’ on 19 February 2007 and will cease to have a statutory basis from February 2012, but will remain as a publically available archive. This transition period is to allow time to transfer places to other local, state, territory and Australian Government registers.

Jerrabomberra Wetlands Nature Park and Callum Brae Nature Park are annotated as Indicative Place on the Register of the National Estate. This means that the place was nominated to the register but an assessment and decision on whether it should be entered in the register was not made. The ACT Heritage Register will be the only statutory heritage registration for the wetlands from February 2012.

1.3 Canberra Water Supply (Googong Dam) Act 1974

The Googong Foreshores is on Commonwealth land within NSW. NSW laws apply where they are applicable, and where capable of acting concurrently with Canberra Water Supply (Googong Dam) Act 1974 (Cwlth).\(^{449}\)

NSW laws that operate in the area cannot impede or restrict the ACT carrying out its functions under this Act. The ACT has no general power to legislate in relation to the Googong Foreshore however it can legislate in relation to how it will exercise its powers and perform its functions and duties under the Canberra Water Supply (Googong Dam) Act.

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\(^{449}\) Canberra Water Supply (Googong Dam) Act 1974, s.27.
1974. The ACT government is responsible for managing the surface water of the Googong Dam under the Water Resources Act 2007 (ACT).

Due to the unusual legal status of the Googong Foreshores, there is no specific statutory requirement or basis for the preparation of a management plan. However, a management plan provides the most effective means to set out how the foreshores will be managed in relation to the ACT Executive’s duty of environmental protection prescribed in the Canberra Water Supply (Googong Dam) Act 1974.

Section 6 of the Act states:

> It is the duty of the Executive to ensure that the effect on the environment of anything done or proposed to be done in the performance of its functions or the exercise of its powers under this Act is fully considered and that all reasonably practicable measures are taken for the protection of the environment, including measures by way of the making of appropriate provisions in agreements entered into by the Executive on behalf of the Territory.

The Act also makes provision for the making of regulations in particular for the protection of flora and fauna in that area.

Details of the Googong Foreshores Plan of Management are provided in Section 2.2.3.

## 2 ACT LEGISLATION

### 2.1 Planning and Development Act 2007

The Planning and Development Act 2007 establishes the ACT Planning and Land Authority and its functions including to:

- prepare and administer the Territory Plan;
- grant, administer, vary and end leases on behalf of the Executive; and
- grant licences over unleased Territory Land.

The Territory Plan sets out the strategic directions, planning principles, planning policies, and controls and codes for all land use zones for the ACT. The Act prevents the Territory, or a territory authority from doing anything inconsistent with the Territory Plan or the National Capital Plan. The objective of the territory plan is to ensure, in a manner not inconsistent with the national capital plan, the planning and development of

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450 Canberra Water Supply (Googong Dam) Act 1974, s.6A.
451 Water Resources Act 2007 (ACT), s.7A(b).
452 Canberra Water Supply (Googong Dam) Act 1974, s.28.
453 Planning and Development Act 2007, Chapter 3.
454 Planning and Development Act 2007, s.50 and s.11(2) Australia Capital Territory Planning and Land Management Act 1988 (Commonwealth).
the ACT provide the people of the ACT with an attractive, safe and efficient environment in which to live, work and have their recreation.\footnote{Planning and Development Act 2007, s.50 and s.11(2) Australia Capital Territory Planning and Land Management Act 1988 (Commonwealth), s. 48.}

The Planning and Development Act 2007 is the main legislation governing the management of the Canberra Nature Park. The Act provides for the identification of Public Land and defines management objectives for categories of Public Land.\footnote{Ibid, s 314, 317.} Canberra Nature Park generally consists of public land reserved for the purposes of Nature Reserve.\footnote{Note that the reserves also include some areas with other land use zoning.}

Under the Act, an area of public land must be managed in accordance with:

a. the management objectives that apply to the area; and

b. a plan of management for the area.\footnote{Planning and Development Act 2007, S. 319.}

The custodian for an area of public land must prepare a draft plan of management for the area that sets out how management objectives prescribed in the Act are to be pursued.\footnote{Ibid, s. 319(b), 320 and Schedule 3.} A plan of management must include a description of the area of public land to which it applies and how the management objectives for the area are to be implemented or promoted in the area.\footnote{Ibid, s. 319.} The (final) plan of management is a statutory document, established under the Act, which is subject to disallowance by the ACT Legislative Assembly.\footnote{Ibid, s. 330.} The custodian of an area of public land must review the plan of management at least once every ten years.\footnote{Ibid, s. 332.}

The Act provides details about the lease and licence system for lands in the ACT. Leases generally offer a long term arrangement whereas licences are temporary. The ACT Planning and Land Authority is responsible for the policy and overall administration and enforcement of the Territory’s lease and licence system.\footnote{Ibid, Chapter 9.}

\section*{2.2 Plans of management}

Plans of management are prepared under the Planning and Development Act 2007.\footnote{Ibid, Part 10.4.} From a statutory perspective, the primary purpose of a management plan is to meet the requirements of the Planning and Development Act 2007 (Part 10.3) that an area of public land must be managed in accordance with both the management objectives applying to the area (Schedule 3 of the Act or any determined by the Conservator of Flora and Fauna) and a management plan prepared by the ‘custodian’ of the land.\footnote{Planning and Development Act 2007, s.333.} The
'custodian' is the administrative unit or other entity with administrative responsibility for the land.

From a management and operational perspective, a management plan outlines what is important about the area to which the plan applies (its values), what is hoped to be achieved in the management of the area (objectives), and the means by which the objectives will be attained (policies and actions). A management plan is intended to provide direction and guidance to the custodian of the land, management staff, volunteers, visitors, proponents of particular activities and uses, neighbours, and others with an interest in the area. Many aspects of management require more detailed prescriptions and operational procedures than can be included in a management plan. These may be captured in a nature reserve operational plan, as discussed in Section 4.4.1 Nature reserve operational plan.

The Planning and Development Act 2007 sets out the process for reviewing plans of management and provides that the custodian of land must review the plan of management once every 10 years and then if satisfied that the plan is no longer appropriate prepare a draft variation.

2.2.1 Canberra Nature Park
Canberra Nature Park Management Plan 1999 was prepared in accordance with section 197 of the Land (Planning and Environment) Act 1991 (ACT) and is applicable to all of the 26 nature reserves which existed at the time of its publication.

The vision for Canberra Nature Park is an:

integrated, connected system of diverse nature reserves throughout urban Canberra managed to conserve native flora, fauna and habitat, and to provide opportunities for appreciation, recreation, education and research consistent with protecting the natural and cultural heritage, and landscape values of the area.

The overall objectives for managing Canberra Nature Park are to:

a. conserve and improve native plant and animal communities and maintain biodiversity and ecological processes;

b. conserve feature of cultural, geological, geomorphological and landscape significance;

c. protect CNP and adjacent areas;

466 Planning and Development Act 2007, s. 332.
467 Ibid, s. 333 defines custodian as an administrative unit or other entity with administrative responsibility for land in the ACT that is unleased land, public land or both. In most cases the custodian of the public land zoned as a nature reserve is TAMS Parks, Conservation and Lands (PCL).
468 Ibid, s. 332 (2).
d. ensure appropriate practices;

e. provide and promote a range of opportunities for raising awareness, appreciation and understanding;

f. provide and promote appropriate recreation and tourism opportunities; and

g. preserve sites and biodiversity elements of scientific significance.

The reserves have a range of values supporting the multi-use nature of Canberra Nature Park as shown in Table 1.

**Table 1: Canberra Nature Park - range of values**

<table>
<thead>
<tr>
<th>Value</th>
<th>Example(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological/Nature Conservation</td>
<td>• management of flora and fauna to provide for biological diversity, control of undesirable species, protection of sensitive populations, communities and ecosystems</td>
</tr>
</tbody>
</table>
| Scientific Research       | • vegetation and wildlife management, flora and fauna conservation, geomorphology, soil and water science, anthropology, archaeology  
                           |   • vegetation and biotic response to fire  
                           |   • evidence of slope deposits of past climate change  
                           |   • unusually rich flora in some units |
| Landscape                 | • aesthetic backdrop to city centre and suburban fringe                   |
| Educational               | • formal and informal school excursions  
                           |   • opportunity for natural appreciation, natural/cultural history based instruction, town planning, water quality preservation and physical fitness activities |
| Cultural appreciation     | • Aboriginal history – formal and informal interpretation  
                           |   • European history, pastoralist landuse |
| Recreational              | • passive enjoyment, walking, bird-watching, picnicking, sightseeing  
                           |   • bike riding, orienteering, horse riding, (identified areas only)  
                           |   • dog-walking (identified areas only) |

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2.2.2 Lower Molonglo River Corridor
The vision for the Lower Molonglo River Corridor is that the natural environment within the Corridor be protected and enhanced as an ecologically viable and sustainable system with opportunities for research and low-impact recreational activity.472

The overall objectives to achieve this vision are to:

• conserve and protect the diversity of terrestrial, riparian and aquatic ecosystems and habitats;
• conserve and enhance habitat links to adjacent corridors;
• conserve natural land forms and the river valley's scenery;
• conserve sites of cultural significance;
• provide for low-impact recreational opportunities appropriate to the conservation values of the Corridor; and
• provide appropriate environmental education and scientific research opportunities.473

2.2.3 Googong Foreshores
The vision for Googong Foreshores is an attractive and biologically diverse area that provides a source for high quality potable water, protects natural and cultural heritage, and is valued for its recreational opportunities.474

The primary purpose of the reservoir is the supply of potable water to the Australian Capital Territory and Queanbeyan. Secondary, but important values of the area are recreation, biodiversity and cultural heritage. Recreation, in particular, must be managed to ensure compatibility with the main water supply purpose.475 An updated and finalised Plan of Management for Googong Foreshores is expected to be complete in 2011.

2.2.4 Jerrabomberra Wetlands
The vision for the Jerrabomberra Wetlands is a species-rich urban wetland that provides an important refuge for migratory and other birds and is a place where people can enjoy and learn about the special characteristics of wetlands and the birdlife within them.476

2.3 Nature Conservation Act 1980
The Nature Conservation Act 1980 provides for the protection and conservation of native plants and animals, declaration of threatened species and ecological communities, and

473 ibid.
475 ibid.
gives authority for the Conservator of Flora and Fauna to exercise certain powers designed to protect public land reserved for conservation of the natural environment, such as nature reserves.

This Act is administered by the Department of the Environment, Climate Change, Energy and Water under the current Administrative Arrangements. The key decision maker under the Act is the Conservator of Flora and Fauna.

Part 2 of the Act establishes the role of Conservator of Flora and Fauna. It also establishes the Flora and Fauna Committee with the functions of:

• providing advice to the responsible Minister in relation to nature conservation; and
• exercising such powers as are provided for under the Act.

Section 38 of the Act provides for the declaration of a species or ecological community or a threatening process, by the Minister for the Environment, based on advice from and recommendations made by the ACT Flora and Fauna Committee, with respect to:

• vulnerable or endangered species;
• an endangered ecological community; and
• a threatening process.

A declaration under this section is a disallowable instrument, which must be considered in making certain decisions. For example if a development proposal will have a significant adverse environmental impact on a vulnerable species an environmental impact statement must be prepared, subject to certain exceptions.

Part 3 of the Act makes provision for the Conservator to prepare action plans for species, communities declared to be threatened with extinction or processes that may be threatening. Once declared, the Conservator is obligated under the Act to prepare an action plan that sets out proposals to ensure, as far as is practicable, the identification, protection and survival of the species, or the ecological community or proposals to minimise the effect of any process which threatens any species or ecological community. Two endangered ecological communities occurring within the ACT’s nature reserves are:

• Natural Temperate Grassland; and
• Yellow Box/Red Gum Grassy Woodland.

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2.3.1 Role of the Conservator of Flora and Fauna
The ACT is unique in having a Conservator of Flora and Fauna whose powers can be used to afford extra protection to specific sites or species. The Conservator considers draft variations to the Territory Plan and provides comment on the ecological impacts of the proposed changes. The Conservator may also recommend to the ACT Planning and Land Authority that the Plan be varied to declare areas as public land and the purposes for which they are reserved e.g. nature reserve. This provision has been used to implement the outcomes of Action Plan No 27 ACT Lowland Woodland Conservation Strategy and Action Plan No 28 ACT Lowland Native Grassland Conservation Strategy and has resulted in the reservation of areas such as Jerrabomberra Valley East and West, Callum Brae and Goorooyarroo as nature reserves.

Section 60 of the Act empowers the Conservator of Flora and Fauna to issue directions to the occupier of land for protection or conservation of native animals, native plants and native timber. To date no Conservator’s Directions have been issued on nature reserves.

The Plans of Management for Canberra Nature Park and Lower Molonglo River Corridor were prepared under the Land (Planning and Environment) Act 1991 (now repealed) by the Conservator. Since the enactment of the Planning and Development Act 2007, the custodian of the land is the body responsible for the preparation of Plans of Management. However all draft plans must be referred to the Conservator for comment. Plans of Management must detail how the reserved areas are to be managed in accordance with the management objectives for the areas, as provided for in the Planning and Development Act 2007. For example, a nature reserve must be managed to conserve the natural environment; and to provide for public use of the area for recreation, education and research, with the first objective being the primary objective. The Conservator may also determine additional management objectives for an area if required.

The Nature Conservation Act 1980 allows the Conservator to temporarily restrict access and activities within reserved areas and to close reserves to compensate for transient events, for example, in times of extreme weather or when management activities may pose a danger to the public.

Some activities, such as the taking of plants and animals and the collection of seeds, are closely monitored and require a licence under the Nature Conservation Act 1980. Any
requirement for specific licence conditions to protect the reserves and technical expertise is sought from Parks, Conservation and Lands prior to the issue of any licence.486

No lease or licence can be issued under the provisions of the *Planning and Development Act 2007* over an area of public land except with the Conservator’s agreement or recommendation.487

As the Googong Foreshores is located in NSW, the Conservator has no statutory role and the provisions of the *Nature Conservation Act 1980* do not apply.

### 2.4 Heritage Act 2004

The *Heritage Act 2004* establishes a system for the recognition, registration and conservation of natural and cultural heritage places and objects in the ACT, including Aboriginal places and objects. A list of these places and objects is maintained on a Heritage Register. Under the *Heritage Act 2004* natural places, such as ecological communities, can be protected and conserved using heritage agreements, heritage orders, heritage directions, conservation management plans and guidelines.

Where development affects the heritage significance of heritage registered places or objects, controls become applicable under provisions of the *Planning and Development Act 2007* (ACT). Sometimes there is an opportunity to include clearance controls in land occupancy conditions (such as licences, leases or land management agreement).488

### 2.5 Human Rights Act 2004

The *Human Rights Act 2004* is an Act to respect, protect and promote human rights. It protects civil and political rights and does not currently provide direct protection for environment related matters. However, under Part 5A of the Act, public authorities (broadly defined to include government agencies and entities carrying out a function of government) are required to act in a way that is consistent with human rights, and must take relevant human rights into account in decision making.489

Although human rights belong to all individuals, they have special significance for Indigenous people and individuals for whom the issue of rights protection has great and continuing importance.490 Therefore, the right to enjoy culture may require access to environmental sites of cultural significance and consultation regarding the management of these sites.

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486 Letter from Mr David Papps, Conservator of Flora and Fauna to Dr Maxine Cooper, Commissioner for Sustainability and the Environment on 24 February 2010, page 4.

487 *Planning and Development Act 2007*, ss.303(1), 335, 337.


489 *Human Rights Act 2004* s.40B.

The Justice and Community Safety Directorate is currently undertaking a project with the Australian National University exploring the inclusion of economic, social and cultural factors in the Human Rights Act.491

2.6 Animal Welfare Act 1992
The Animal Welfare Act 1992 is an Act for promoting animal welfare and related purposes. This Act has relevance to this investigation in terms of all animals including kangaroos and rabbits, which may need to be reduced in numbers on some sites to ensure survival of endangered ecosystems and other animals.

2.7 Pest Plants and Animals Act 2005
The main objects of the Pest Plants and Animals Act 2005 are to protect the land and aquatic resources in the ACT from threats from pest plants and animals, to promote a strategic and sustainable approach to pest management, to identify pest plants and animals, and to manage pest plants and animals.492 The Act provides for the declaration of pest plants and animals and the preparation of management plans.493 Many of the weed species found on our nature reserves are declared pest plants in the ACT.

The rabbit is a declared pest in the ACT (Pest Plants and Animals (Pest Animals) Declaration 2005 (No 1)). Landholders may be obliged to suppress rabbits on their land if the Chief Executive so directs and issues to them a written Pest Management Direction.494 However, the Pest Management Direction must be consistent with the pest management plan and presently there is no such plan for the rabbit.495 Therefore, Pest Management Directions cannot currently be issued to landholders to deal with rabbit infestations. The Territory and Municipal Services Directorate administers this Act.

2.8 Domestic Animals Act 2000
The Domestic Animals Act 2000 allows the Minister to declare areas to be exercise areas496 or areas where dogs are prohibited.497 The Domestic Animals (Dog Control Areas) Declaration 2005 (No 1) made in exercise of these powers determines dog exercise areas, as described by a published map:

- Section 42 provide for standing prohibited areas, where dogs may not be taken, generally for the protection of children and people participating in sport; and
- Section 43 outlines a permit system;
- Sections 44 and 45 provide for the restraint of dogs generally, including in public places; and

491 Email from Mr Sean Costello, Human Right Commission to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment 1 September 2010.
492 Pest Plants and Animals Act 2005, s.3.
493 Pest Plants and Animals Act 2005, Parts 2 and 3.
494 Pest Plants and Animals Act 2005, s.25.
495 Pest Plants and Animals Act 2005, s.25(4).
496 Domestic Animals Act 2000, s.40.
497 Domestic Animals Act 2000, s.41.
• Section 46 requires the removal of dog faeces.

This Act under section 81, allows the Minister to declare a cat containment area for wildlife conservation purposes.

### 2.9 Fisheries Act 2000

The *Fisheries Act 2000* provides for the conservation of native fish species and their habitats, the sustainable management of fisheries, and regulates fishing in the ACT. Provisions of the Act cover fishers in waters of nature reserves such as Molonglo Reach in the Jerrabomberra Wetlands Nature Reserve.

### 2.10 Emergencies Act 2004

The *Emergencies Act 2004* has objects that include protecting and preserving life, property and the environment and providing for effective emergency management. The Act has pre-eminence over other ACT legislation in a declared emergency. Environment related Territory legislation\(^{498}\) generally includes a clause stating that this Act does not apply to the exercise or purported exercise by a relevant person of a function under the *Emergencies Act 2004* for the purpose of protecting life or property, or controlling, extinguishing, or preventing the spread of a fire.

The powers of the chief officer of an emergency service may, for the protection or preservation of life, property or the environment remove or destroy an animal, a substance or vegetation.

The Act provides the primary statutory basis for fire management in the ACT and requires the preparation of a Strategic Bushfire Management Plan for the ACT.\(^{499}\)

#### 2.10.1 Declaration of Bushfire Abatement Zones

The Fire Commissioner must consult with the Conservator prior to declaring an area to be a bush fire abatement zone.\(^{500}\) Declaration of such an area means that it will be subject to operational planning and fire preparedness measures.\(^{501}\) Opinion about declaration of an area as a bushfire abatement zone considers what conservation values are present, how they could be affected by fire preparedness activities, and how these impacts could be minimised. Technical advice is sought from Parks, Conservation and Lands, Research and Planning.\(^{502}\)

#### 2.10.2 Directions from the Fire Commissioner

Unless there are urgent circumstances, the Fire Commissioner must consult with the Conservator, prior to giving a direction to a land owner to comply with a bushfire

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\(^{498}\) Clauses on Relationship with Emergencies Act 2004, are included in relevant acts including the *Nature Conservation Act 1980* (s.5) and the *Environment Protection Act 1997* (s.6)\n
\(^{499}\) Emergencies Act 2004, s.72,\n
\(^{500}\) Emergencies Act 2004, s.71,\n
\(^{501}\) Emergencies Act 2004, ss.29(3)(d), 78,\n
\(^{502}\) Letter from Mr David Papps Conservator Flora and Fauna, to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 24 February 2010, page 4.
management requirement, or a bushfire operational plan. The Conservator’s advice would consider what conservation values are present, how they could be affected by the requirement or plan, and how these impacts could be minimised. Technical advice would be sought from Conservation, Planning and Research in the Environment and Sustainable Development Directorate.

### 2.11 Lakes Act 1976

The Lakes Act 1976 provides for the management of the Territory’s lakes and regulates the activities which may be engaged in upon the lakes. Molonglo Reach is declared a lake under the Act to ensure that activities which occur on the water can be managed. Other urban lakes such as Lake Ginninderra and Lake Tuggeranong are also regulated by this Act. However the Commonwealth has control of Lake Burley Griffin which is classified as National Land under the Lakes Ordinance 1976 which continues to have effect in relation to National Land under the National Land Ordinance 1989 (Cwlth).

### 2.12 Environment Protection Act 1997

The main purpose of the Environment Protection Act 1997 is to provide protection for the environment from pollution, and other forms of environmental harm such as sedimentation and erosion. The Act and Environment Protection Regulation 2005 set water quality standards and the Act establishes the Environment Protection Authority. The Act is important in relation to protecting the waters of the nature reserves from pollution.

### 2.13 Water Resources Act 2007

The Water Resources Act 2007 provides for the sustainable use and management of ACT water resources, the protection of aquatic ecosystems and aquifers from damage and, where practicable, reversal of past damage. The ACT environmental flow guidelines for streams are established under the Act. In addition the ACT Government has released the ACT water resources strategy Think water, act water Section 5.1.9.

### 2.14 Other ACT legislation

The following legislation is of particular relevance:

- **Crimes Act 1900**;
- **Firearms Act 1996**;
- **Litter Act 2004**;

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503 Emergencies Act 2004, s.82.
504 Letter from Mr David Papps Conservator Flora and Fauna, to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 24 February 2010, Page 4.
505 National Land Ordinance 1989 (Cwlth), s.5(5).
506 Environment Protection Act 1997, s.11.
507 Water Resources Act 2007, s.12.
508 Water Resources Act 2007, s.12.
• Animal Diseases Act 2005;
• Public Health Act 1997;
• Roads and Public Places Act 1937;
• Stock Act 2005;
• Trespass on Territory Land Act 1932; and
• Hawkers Act 2003.

3 NSW LEGISLATION

To the extent that any other legislation which appears to apply to the Googong Dam Area is not capable of operating concurrently with Commonwealth legislation, that other legislation has no operation. ACT legislation has only minimal operation in the Googong Dam Area.

The application of particular legislation in respect of the Googong Dam Area may be complex and, if there is any doubt about its application, legal advice should be sought.

All New South Wales legislation510, unless inconsistent with Commonwealth legislation, applies to the Googong Dam Area including the Googong Foreshores. On a day-to-day basis, this legislation effectively provides the main legislative framework for the area and the activities that occur there.

3.1 Googong Dam Catchment Area Act 1975

Following the passage of the Canberra Water Supply (Googong Dam) Act 1974 (Cwlth), New South Wales enacted the Googong Dam Catchment Area Act 1975 providing for the declaration of a catchment area for the dam and for the making of regulations for catchment protection.

From the perspective of managing the Googong Foreshores, as well as the larger catchment, the most important legislation is that referring to land management, catchment management, water quality, pollution, planning, local government, threatened species and ecological communities, fisheries and waterways.

The Googong Dam Area is a declared Wildlife Refuge under the National Parks and Wildlife Act 1974. Creating a Wildlife Refuge is voluntary. They are created by the Governor by proclamation in the NSW Government Gazette and are managed by the NSW Office of Environment and Heritage within the Department of Premier and Cabinet.

510 NSW legislation is only explored if relevant to the Terms of Reference/scope of this Investigation.
3.2 Other NSW legislation
The following legislation is of particular relevance:

- Catchment Management Authorities Act 2003;
- Crown Lands Act 1989;
- Dams Safety Act 1978;
- Environmental Planning and Assessment Act 1979;
- Fisheries Management Act 1994;
- Heritage Act 1977;
- Local Government Act 1993;
- Marine Safety Act 1998;
- National Parks and Wildlife Act 1974;
- Noxious Weeds Act 1993;
- Pesticides Act 1999;
- Protection of the Environment Operations Act 1997;
- Public Health Act 2010;
- Rural Fires Act 1997;
- Rural Lands Protection Act 1998; and

4 INTERNATIONAL AGREEMENTS – JERRABOMBERRA WETLANDS NATURE RESERVE

Australia is a signatory to bilateral agreements with the governments of Japan, China and the Republic of Korea for the protection of migratory birds. Species protected under these agreements use the wetlands on a seasonal basis. In undertaking any development or management activities within the nature reserve or on adjoining land or water these Agreements must be considered. The presence of these listed species potentially invokes the provisions of the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth).511

5 STRATEGIES AND PLANS

Action Plans

As mentioned previously, our nature reserves protect many of the ACT’s vulnerable and endangered species and communities. Part 3 of the *Nature Conservation Act 1980* makes provision for the Conservator to prepare action plans for each species, ecological community or process declared to be vulnerable or endangered.512

The relevant Action Plans for this Investigation are:

**Action Plan No. 27 - ACT Lowland Woodland Conservation Strategy**513

This strategy is focused on the protection of the remaining lowland grassy woodlands. The strategy is also the statutory Action Plan for eleven fauna and flora species declared threatened under the *Nature Conservation Act*.514

**Action Plan No. 28 - ACT Lowland Native Grassland Conservation Strategy**515

This Strategy seeks to maintain and improve the natural integrity of the remaining lowland native grassland ecosystems. The strategy also supersedes seven separate Action Plans for ecological communities and species declared threatened under the *Nature Conservation Act*.516

**Action Plan No. 29 - ACT Aquatic Species and Riparian Zone Conservation Strategy**517

This strategy is focused on the protection and management of the rivers and riparian areas in the ACT that support threatened species and ecological communities. The strategy is also the statutory Action Plan for six fauna and flora species declared threatened under the *Nature Conservation Act*.518

5.1.1 The ACT Climate Change Strategy

This provides an overview of climate change science, the predicted impacts on the ACT, and the ACT Government’s vision and direction for responding to climate change. The ACT Climate Change Strategy is currently being updated by the Environment and Sustainable Development Directorate. The Directorate is currently preparing Action Plan 2 for public consultation in 2011.519

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512 Action Plans are disallowable instruments *Nature Conservation Act 1980* Part 3 Division 3.4 Section 42 (3).
514 *ibid*, pages 1-2.
516 *ibid*, pages 1-2.
518 *ibid*, pages 1-2.
519 Personal communication from Ms Ann Lyons Wright, Department of the Environment, Climate Change, Energy and Water with Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 9 May 2011.
5.1.2 ACT Kangaroo Management Plan
The ACT Government’s key policy document for kangaroo management is the ACT Kangaroo Management Plan 2010, which articulates two goals for kangaroo management in the ACT:

- maintain populations of kangaroos as a significant part of the fauna of the “bush capital” and a component of the grassy ecosystems of the territory
- manage and minimise the environmental, economic and social impacts of those kangaroo populations on other biota, grassy ecosystems, ACT residents and visitors.  

5.1.3 ACT Nature Conservation Strategy
The ACT Nature Conservation Strategy establishes a policy framework for the conservation of biodiversity in the ACT and is prepared under the provisions of the Nature Conservation Act 1980. A review of the strategy is currently being undertaken by the Environment and Sustainable Development Directorate.

5.1.4 ACT Vertebrate Pest Management Strategy
The ACT Vertebrate Pest Management Strategy has been reviewed by the Environment and Sustainable Development Directorate. The draft act Pest Animals Management Strategy has been prepared and it is understood, will be released for public consultation in the near future.

5.1.5 ACT Weeds Strategy
This strategy aims to reduce the impact of weeds on the environment, the economy, human health and amenity. It recognises that weed management is an integral component of sustainable management of natural resources and the environment.

5.1.6 Strategic Bushfire Management Plan
The Strategic Bushfire Management Plan identifies bushfire management zones which guide prevention and preparedness activities to achieve more effective management of bushfires, by both the ACT Government and broader community.

The Strategic Bushfire Management Plan requires the Territory and Municipal Services Directorate, as the land manager, to prepare Bushfire Operational Plans that detail fuel management in the Inner and Outer Asset Protection Zones to meet the standards identified in this Plan at least every two years.

520 Department of Territory and Municipal Services, 2010, ACT Kangaroo Management Plan, Canberra, page 74.
522 Personal communication from Ms Kathryn Tracy, Department of the Environment, Climate Change, Energy and Water with Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 5 May 2010.
523 Email from Ms Heather Tomlinson, Environment and Sustainable Development Directorate to Mrs Narelle Sargent, Office of the Commissioner for Sustainability and the Environment on 22 July 2011.
5.1.7  **Bush Capital Legacy**
This plan, prepared by the ACT Natural Resource Management Council, contains sixteen targets to guide natural resource investment in the ACT. These are based on issues of concern under the categories of community, land, water and biodiversity.\(^{527}\)

5.1.8  **The Canberra Plan**
Planning policy documents such as *The Canberra Plan* complement the Territory Plan through provision of planning policy objectives and guidelines over the medium term. Strategic planning policy documents in the ACT are currently under review but broadly, *The Canberra Plan* is made up of multiple documents including:

- Capital Development (the economic white paper)
- The Canberra Social Plan
- The Canberra Spatial Plan
- Weathering the Change (Action Plans relating to climate change)
- Transport for Canberra (Action Plan for sustainable transport)

*The Canberra Spatial Plan* provides strategic directions for the development of Canberra over the next 30 years and beyond, and is regularly reviewed to allow adaptive response to changed conditions. The *Spatial Plan* contains key principles to guide the future growth of Canberra. Protection of the natural environment is one of these key principles. The plan states that future residential development will ensure that areas with significant biodiversity values will be protected from development.\(^{528}\)

The Canberra Plan is normally updated every four years and is currently under review for re-release in 2011. The *Spatial Plan* does not replace the *Territory Plan*, but informs changes to both the *Territory Plan* and the *National Capital Plan*.

5.1.9  **Think water, act water**
This is the ACT water resource management strategy, which aims to ensure that the ACT has a long-term adequate and secure water supply. Objectives and actions related to the management of Jerrabomberra Wetlands, including those covering catchment management, riparian zone management, and water sensitive urban design, are included in the Implementation Plan in *Think water, act water*.\(^{529}\)

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