Nature on the Doorstep: Social Perspectives of Urban Nature Reserves

Volume I. Thesis

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A thesis submitted for the degree of Doctor of Philosophy of

The Australian National University.

July 2020

Declaration of Originality

I hereby declare that this submission is my own work and, to the best of my knowledge, it contains no materials previously published or written by another person, or substantial proportions of material that have been accepted for the award of any other degree or diploma at this or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at this university or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception in style, presentation and linguistic expression is acknowledged.

Signed: Kathryn Eyles

Date: 26 July 2020

Acknowledgements

'nothing is so fatiguing as the eternal hanging on of an uncompleted task'

This research was conducted on the unceded lands of the Ngunawal and Ngambri people. I pay my respects to their Elders past, present and emerging and to their continuing culture which enriches our lives and shows us how to live respectfully with each other and nature.

I gratefully acknowledge the support of my supervisory panel, Professor Adrian Manning, Dr Robert Dyball and Rob Thorman and, particularly, my Chair and Principal Supervisor Emeritus Professor Stephen Dovers, whose patience and guidance have been invaluable.

I express my appreciation of the contribution of the many residents, volunteers, decision-makers and practitioners who willingly participated in this research. To all my Fenner School colleagues with whom I shared rooms, good counsel and company, thank you.

Capstone Editing provided copyediting and proofreading services, according to the guidelines laid out in the university-endorsed national 'Guidelines for Editing Research Theses'.

I acknowledge the PhD Scholarship funding support of the former ACT Land Development Agency (LDA) and the mapping provided by Daniel Santosuosso of the LDA.

Loving thanks to my family, Matthew and Lillian, and dachshunds 'Coco' and 'George'. The cover photo of Lillian tree planting on Mt Taylor was taken by Ross Osborne.

Sadly, this research coincided with life-changing family illnesses and the loss of my mother, whose gift of a free-range nature-rich childhood and the example she set as a social and environmental volunteer inspired my own curiosity and community contributions.

This thesis is dedicated to the memory of Rosemary Gladys Hammersley Eyles.

Abstract

Global urbanisation presents the challenge of how to conserve remnant biodiversity in cities and maintain human connection with nature. Nature contact is beneficial for physical and mental health as well as for quality of life and social connectedness. As urban densities increase, there are less opportunities to retain nature within gardens and streets; thus, nature will be experienced within urban open spaces and protected areas.

Nature invokes a range of social realities depending on individual experience. Canberra, a planned city, co-produced by humans and nature, defies binary notions about the separation of nature and city, providing an ideal setting for social research. Using place-based case studies, this qualitative research uses ethnographic methods to explore how nature is experienced in urban nature reserves, drawing on perspectives of neighbours and users, reserve managers (including volunteers), and practitioners planning and developing urban estates near reserves. These case studies are supported by two topical case studies of how societal discourse and norms influence nature connection and two interstate studies that explore alternative models to manage biodiverse urban nature reserves and neighbour relationships.

This research found that nature reserves in Canberra are important social spaces, satisfying a range of human needs by providing valued everyday nature contact and fostering social bonds and cohesion. Regular users and nearby neighbours are strongly place-attached to their nature reserves, as are ParkCare stewards. This meaning and belonging are expressed in many ways, ranging from human memorials, photographs and stories of daily nature experience to boundary maintenance and ecological restoration.

This raised questions about how to best manage these spaces for their multiple values and social practices. If viewed only through an ecological lens, this creates a value hierarchy and imposes management rules that are often at odds with the everyday reality of users and beneficial societal outcomes. Promoting the benefits of 'being in nature' also conflicts with a heightened sense of risk, often framed and communicated by popular media, and with changing social norms around parenting and childhood, which affect children's freedom and nature contact.

Ecosystem loss has elevated biodiversity conservation especially in urban regions. However managing nature reserves as bounded ecological units creates challenges for whole of landscape connectivity and effective management of biodiversity threats. This also excludes social knowledge about these places in reserve planning processes. Epistemic authority rests in scientific and administrative knowledge at the expense of other domains—the finely-grained place meanings and community knowledge that evolved through long-term social associations with these reserves. Canberra's Parkcare stewards and urban fire volunteers provide critical capacity for management and need greater legitimacy within management agencies. Their supportive potential is evident in long-term collaborations elsewhere where management of nature reserves, devolved to community organisations, leads to imaginative local programs.

A comparison of different management responses in the case studies provides evidence of social coexistence where adjacent suburbs have been sympathetically designed for co-habitation with neighbouring reserves. With early education and visible active management, respectful stewardship behaviours are evolving alongside conservation goals, suggesting that bounded management can work in well-resourced reserves. In older reserves, management should be reframed to recognise their rich social connectivity and expand partnerships. Community organisations are uniquely placed to build alliances across key sectors and networks (e.g., Indigenous, health, education and multicultural) and leverage local place attachment to collectively increase societal capacity to manage conservation values.

Writing people 'into' not 'out of' urban nature reserves recognises these social realities and the management legacies underlying their creation and resource constraints. These experiences from nature-rich Canberra will resonate with those of other cities wrestling with the challenge of managing both people and biodiversity in a way that respects the needs and interests of both.

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Abbreviations

ABS	Australian Bureau of Statistics
ACF	Australian Conservation Foundation
ACT	Australian Capital Territory
ACTFR	Australian Capital Territory Fire and Rescue
ACTG	Australian Capital Territory Government
ACTPLA	Australian Capital Territory Planning and Land Authority
AGPS	Australian Government Publishing Service
APZ	Asset protection zone
BoB	Bush on the Boundary
BPA	Bushfire-prone area
CALD	Culturally and linguistically diverse
CCACTR	Conservation Council of the ACT and region
CIC	Canberra Investment Corporation
C of A	Commonwealth of Australia
COG	Canberra Ornithologists Group
CNP	Canberra Nature Park
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CT	The Canberra Times
CFU	Community Fire Unit
DCT	Department of the Capital Territory (Commonwealth)

DTLG   Department of Territories and Local Government (Commonwealth)

EIS   Environmental Impact Statement

EPBC   Environment Protection and Biodiversity Conservation (Act) (Commonwealth)

EPSDD   Environment Planning and Sustainability Development Directorate

ESA   Emergency Services Agency (ACT)

FCC   Federal Capital Commission

FCT   Federal Capital Territory

GIS   Geographic Information System

GCG   Ginninderra Catchment Group

IUCN   International Union of Conservation and Nature

LDA   Land Development Agency

MCMC   Merri Creek Management Committee

MFWS   Mulligans Flat Woodland Sanctuary

MWS   Maroochy Wetlands Sanctuary

MWSSG   Maroochy Wetlands Sanctuary Support Group

NAA   National Archives of Australia

NCA   National Capital Authority

NCDC   National Capital Development Commission

NCPA   National Capital Planning Authority

NCOSS   National Capital Open Space System

NLA   National Library of Australia

NPWS   National Parks and Wildlife Service (of NSW)

NSW   New South Wales

NSW RFS   Rural Fire Service (of NSW)

PCS   Parks and Conservation Service (of the ACT)

PWS   Tasmania Parks and Wildlife Service

QLD   Queensland

RFS   Rural Fire Service (of ACT)

SACTCG   Southern ACT Catchment Group

SBMP   Strategic Bushfire Management Plan

SCC   Sunshine Coast Council

SMH   The Sydney Morning Herald

TAMS   Territory and Municipal Services

TCCS   Transport Canberra and City Services

TL   Territory Lease

WSUD   Water Sensitive Urban Design

WA   Western Australia

WPC   World Parks Congress

WWF   World Wildlife Fund

WWT   Woodlands and Wetlands Trust

Chapter 1: Introduction, Research Design and Methods

1.1 Chapter overview

The first part of this chapter introduces the research context and problem, describing the profound social change arising from global urbanisation and the potential effects on protected areas and reserves in urban cities and regions—Australia, in particular. Imperatives to connect urban people with nature for health, well-being and affinity reasons highlight the potential role for nature reserves to provide access and connection to nature in cities. The research problem is situated in current planning frameworks and urban nature reserve management, which separate nature reserves from their neighbours and social context. The second part of the chapter describes the research design and adaptive approach, and also introduces the orienting concepts used to guide the inquiry process. It explains how multiple case studies are used to explore both topical issues and nature reserve place and management relationships. It also reflects on the choice of Canberra as the 'macro' case setting and the selection of cases elsewhere. It then describes the qualitative methods, iterative data collection and analysis process as well as the challenges and opportunities that arose during the research process.

1.2 Research origins

The idea for social research about urban protected areas emanated from informal conversations between landscape ecologists and their government partners, who were involved in the Mulligans Flat Goorooyarroo Woodland Experiment, a long-term ecological research project on the northern edge of urban Canberra (see Chapter 5). At the time, the land use and social setting around Mulligans Flat was changing and questions were posed about how people might 'relate to such a world-class effort in conservation and active research right on their suburban doorstep, whether Canberrans and nature can co-exist when we get serious and scientific about conservation in an urban setting?' (Dovers 2010: 8).

In 2010, the Australian Capital Territory (ACT) Government funded a research scholarship to investigate the 'social perspectives of residents in suburbs adjoining nature reserves and to identify opportunities to foster beneficial relationships and community engagement' (Stanhope 2010): a scholarship that I was awarded. While the initial idea originated at in an urbanising landscape around Mulligans Flat, I had the freedom to introduce new ideas and concepts for exploration, frame research questions and design the research (see Section 1.6). The research

context and problem broadly remain focused on how human relationships and important conservation areas are managed in urban settings.

1.3 Research context

It is currently the 'century of the city' (Butler and Spencer 2010). Global social changes mean that more people now live in cities with over 70% of the world's population projected to be urban dwellers by 2050 (UN 2015, 2014). Australia is highly urbanised; almost 80% of Australians live in the 20 largest cities of 80,000 people or more (Commonwealth of Australia [C of A] 2015). Under the medium scenario, Australia's population will grow to 28.7 million by 2027 and 42.6 million by 2066. [1] Approximately 70% of this growth to 2027 will be in the capital cities and all capital cities are projected to grow more than the rest of their states or territories. Australia's national capital, Canberra, is part of this growth phenomenon. The current population of 412,000 [2] is projected to increase by an average of 0.8−1.7% per year to 2066, almost doubling to 775,000 by 2066 (under the medium growth scenario). Under all growth scenarios, Canberra's population is expected to grow faster than that of Australia as a whole (ABS 2018) and it will be housed in the urban and future urban areas of the territory (ACTG 2018b).

Most of the new development in Australian cities is in the form of greenfield estates at urban edges and apartments in city centres (C of A 2015). Greenfield development in particular poses a significant threat to remnant biodiversity and urban protected areas. This is because Australian cities are disproportionately important for biodiversity conservation and contain the last remnants of nationally important grassland and woodland ecosystems and critical habitat for many threatened wildlife species (Soanes and Lentini 2019; McDonnell 2007; Williams et al. 2005). Most cities are located in regions of high biodiversity (Cincotta et al. 2000) and global research shows that urban regions support three times more threatened species per unit-area than non-urban regions (Ives et al. 2016). Australian cities have been found to be critically important for a suite of urban-restricted threatened species (Soanes and Lentini 2019). The city of Canberra is a case in point, with new urban edge development in Gungahlin, Belconnen and

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[1] Medium assumptions of fertility, life expectancy, overseas and interstate migration flows—3220.0 Population Projections, Australia, 2017 (base)—2066 (ABS 2018).

[2] Ibid; Australian Capital Territory's population as at 30 June 2017.

the Molonglo Valley coinciding with valuable remnant grassy woodlands and nationally threatened fauna within and outside nature reserves (Thistleton 2014a, 2013a; Doherty 2011c).

Urbanisation transforms habitat and leads to loss of habitat and species through fragmentation (Hahs et al. 2009) and is a major cause of biodiversity loss (Forman 2014; McDonald et al. 2008; McKinney 2006). This global phenomenon will place unprecedented pressure on protected areas within city regions (Trzyna 2007). These protected areas have important social values. They protect biodiversity, provide ecological services (e.g., clean water) and contribute to health and well-being, tourism and cultural heritage. They also provide buffering capacity against climate change and natural disasters (Stolton and Dudley 2010; McDonald 2009; Connor 2003). A global study revealed that as urbanisation increases, the distance between protected areas and the nearest urban areas is decreasing over time (McDonald et al. 2009). Urban effects on protected areas range from global to local, with two-thirds of effects occurring within 50 km of an urban area—and most occurring much closer (McDonald et al. 2008).

The effects of urbanisation on biodiversity are not well understood (Bohnet and Pert 2010; Alberti 2005; White et al. 2005). There are gaps in current understanding about species requirements and development effects (Gordon et al. 2009; Buxton et al. 2006) and research is needed across multiple ecological levels and for multiple species (McDonnell 2007; Garden et al. 2006). There are few long-term ecological studies in urban areas and limited monitoring of the urban biodiversity interventions that are being implemented in new urban estates (Eyles 2015; Taylor and Ives 2009). However, the 'spatial' coincidence of biodiversity in urban regions provides an opportunity to frame new ecological research to address knowledge gaps about conservation and restoration in urban landscapes (McDonnell 2015; McDonnell and Hahs 2013; Shorthouse et al. 2012, Schwarz 2006).

Simultaneously, as urban development places pressure on biodiversity, there is growing evidence about the benefits of access to nature for human well-being in urban environments (Shanahan et al. 2015a, b; Beatley 2011; Chiesura 2004), and global policy initiatives to promote urban trees (Fleming 2016) and facilitate access to green space. [3] Under the tagline 'Healthy Parks Healthy People', park agencies are promoting the social and health benefits of nature connection (Parks Victoria 2015; Trzyna 2014). The direct experience of nature builds attachment to local environments (Luck et al. 2011) and provides multiple health benefits

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[3] See s 14c, UN Habitat New Urban Agenda http://habitat3.org/the-new-urban-agenda/ and Goal 11 Sustainable Development Goals https://www.un.org/sustainabledevelopment/cities/.

(Davern et al. 2017; WHO 2016; Carter 2009; Maller et.al 2006, 2002; Maas et al. 2006). Restorative and well-being benefits have been demonstrated from exercising in nature (Bratman et al. 2015, Carrus et al. 2015; Barton et al. 2012; Fuller et al.2007), from environmental volunteering (Townsend 2006) and wildlife gardening (Mumaw et al. 2017).

With more people now living in urban environments, there is also concern about how the loss of everyday contact with nature will affect both these health benefits and the development of an affinity for nature (Soga and Gaston 2016). The disconnection of children from the natural environment is considered particularly harmful (Broom 2017; Monbiot 2012; Louv 2005). Nature exposure in childhood, along with having adult role models engaged in nature, can seed interest in nature and its conservation (Chawla and Flanders Cushing 2007). Positive health outcomes for children and the acquisition of positive feelings about nature are best achieved through frequent hands-on free play and less-structured outdoor engagements (Gill 2014; Greater London Authority 2011 a, b; Maller et al. 2009). However, these health and affinity goals are challenged by a significant generational shift in how children spend their free time and social norms around parenting and childhood (Rosin 2014; Wyver et al. 2010; Gill 2007) Negative and frightening narratives about living with nature represented in the popular media, whether about wildlife encounters or threats of bushfire (Eyles 2015; Steven 2005) can create fears and uncertainty about being in nature, particularly for people from diverse cultural backgrounds (Thomas 2002).

While often framed in terms of threats by the media and scientists (Eyles 2015; Schwarz 2006), the 'spatial' coincidence of biodiversity in urban regions presents opportunities to engage urban communities in care activities that allow them to participate and do something worthwhile in the places where they live (Mumaw 2017; Schwartz et al. 2009; Miller and Hobbs 2002). A recent survey found that most Australians (82%) are worried about future generations growing up with less access to nature and 70% would like more national parks and nature reserves (Davies 2018; Freeman 2018).

Urban nature reserves have a significant role to play in providing everyday access to nature in cities (Maller et al. 2006)—particularly in Australia, as increasing densities in the newer suburbs, lot sizes and large houses mean smaller private gardens and backyards (Gardner 2017; Shushinsky et al. 2013; Hall 2007) and less space to attract and encounter wildlife around the home. This phenomenon is not limited to new suburbs and the redevelopment of older suburbs has seen larger houses built with significantly greater lot coverage and less private open space

(MacKenzie 2011, 2009) as well as the loss of vegetation from urban lot amalgamation, dual occupancy and apartments (Amati et al. 2017; Moore 2011).

The global conservation science community has recently recognised the importance of urban nature reserves as a means of engaging urban people and building social constituencies for nature conservation (IUCN 2016, Trzyna 2014). Cities with political power, wealth and donors are becoming critical as the world urbanises and national governments provide insufficient resources for nature conservation. This funding crisis is undermining the effectiveness of global protected area networks and creating new imperatives to reframe management to encourage community and shared responsibility for biodiversity (Watson et al. 2014). In particular, this includes recognition of the value, capacity and knowledge of the local stewardship networks in urban cities (Rainbird et al. 2012; Hansen 2007; Bush et al. 2003).

1.4 The research problem and need for research

These interlinked social and ecological imperatives present a unique set of challenges for managers who are charged with protecting biodiversity in urban nature reserves while simultaneously providing improved access for urban dwellers. The following questions explore whether managers have the right tools and knowledge to meet these challenges in a rapidly urbanising world.

1.4.1 Is planning and management practice fit for purpose?

While urban nature reserves have multiple social values, their governance and the mandate of park agencies remain firmly situated in the domain of the natural sciences (Beissinger et al. 2017; Thomas 2001). This means that planning practice has been slow to adapt to these social imperatives. Most urban nature reserves are managed as 'bounded' ecological units, focused on their biodiversity values, without reference to their neighbouring communities and experiential value for people (Gill et al. 2009; Gurran 2005). This bounded focus separates and excludes local people and their experiences, even though they are often the most connected with these natural places (Hirschnitz-Garbers and Stoll-Kleeman 2011). This is a lost opportunity, as the support of local communities is integral to the success of nature reserves (Nastran 2015) and human well-being is recognised as an important motivation for conservation of urban biodiversity (Dearborn and Kark 2010). Some cities are recognising and using biodiversity as a policymaking tool integral to urban wellbeing (de Jong 2017).

Involving local communities also requires a richer and more regular form of engagement than is currently practiced in most Australian park agencies. While skilled in the natural sciences, park managers are often uncertain about how to apply information on social values to their management (Miller and McKee 2001). People living around reserves are also often seen through a lens of impact (Gill et al. 2009; Waitt et al. 2009) and consultation processes target groups who share the same value orientation as the managers; these 'in-the-know' groups often dominate public discourse about values and access. For example, research about Canberra's urban nature reserves has drawn on the views of established conservation and outdoor recreation groups (NCA 2014; OCSE 2011a, b; ACTG 2010; Chevalier and Hoffman 2010), many of whom were specifically targeted to contribute and/or who are more familiar with the processes and forms for input.

There are also many practical benefits of engaging neighbours and other land managers in proximity of urban nature reserves. Bounded management makes it difficult to control threats to biodiversity within the nature reserve and many urban-restricted threatened species occur outside reserves (Soanes and Lentini 2019). Effective control and management of invasive weeds and animals, bushfire risks and mobile native wildlife require an integrated approach across the urban matrix, land tenure and different land uses (Buxton et al. 2006; Fallding 2004). This must be supported by active engagement and cooperation with adjoining land managers and neighbouring communities (Hansen and DeFries 2007; Trzyna 2005a, b; Crofts 2004).

This cooperation requires adjacent urban land managers/owners to examine sympathetic ways of living in, managing and/or developing land adjacent to and upstream of nature reserves (Keane and Davies 2015). For adjacent new urban development, this means adopting a bio-sensitive approach to suburb design and infrastructure to minimise edge and downstream effects on reserve biodiversity, buffering, retaining and connecting habitat (Garrard et al. 2018a, b; Ikin et al. 2015; Hostetler et al. 2011). It also means designing new suburbs to facilitate nature connection and well-being as well as the potential for future local stewardship with nature reserves (Ikin et al. 2015). The value of these approaches must be evaluated to demonstrate how they reduce impacts on adjacent nature reserves and to measure the ecological effectiveness of green infrastructure (e.g., water-sensitive design and habitat plantings) (Hostetler 2019; Hostetler et al. 2011). Evaluation could also be expected to facilitate take-up, but there is very little post-construction research and monitoring (Hostetler et al. 2011) and only a few studies have examined the experience of urban practitioners working at this interface and barriers to innovative practice (Grose 2010a, b).

1.4.2 What is known about the social relations of urban nature reserves?

There is significant research focused on urban open space and park visitation, health, physical activity and preference surveys (see Chapter 2) but only a small body of Australian research concerns urban residents living next to nature reserves and bushland (see Barnett et al. 2005; Head and Muir 2007; Gill et al. 2009; Dickinson et al. 2017). As a result, there is limited place- or reserve-specific knowledge about how local people and neighbours engage with nature reserves and how connections are made (or not). There are even fewer studies considering the experience of nature reserve managers and their relationships with park users and neighbours (Larsen et al. 2006; Thomas 2001; NPWS 1997). Various authors identify the importance of regular communication and engagement with local communities in management (Dovers et al. 2015; Ives and Kendal 2014) particularly to build opportunities for stewardship and partnerships with local communities (Brown 2001; Brownlie 1991). For example, a study about wildlife gardening in Melbourne found this practice helps residents to develop stewardship values and behaviours (Mumaw 2017).

There is significant potential for expanding urban stewardship of nature reserves in Australia's cities, given community concern about the loss of nature (Freeman 2018). Although the practice of urban bushland restoration originated in Sydney (Bradley 1971, 1988), there is only a small body of literature about urban residents maintaining nature reserves and their partnerships with agencies (Jones and Jones 2009; Abell 2005; Reidy et al. 2005; Bush et al. 2003; Brown 2001; Brownlie 1991).

Urban stewardship also has a different motivational, place and social context from rural settings because volunteers work on public rather than private land and tend towards an altruistic and local site-specific focus (Davison 2005). Davison (2005: 4) noted that 'the place of urban landcare in environmental social movements in Australia remains almost entirely undocumented in both the (rural-oriented) landcare literature…and in analysis of Australian environmentalism'. This suggests that the value of this stewardship needs more research and explanation (see Rainbird et al. 2012).

1.5 Research scope, relevance and questions

This analysis suggests that urban reserve managers who engage and collaborate with local communities and adjacent land managers and understand this social context, will be better placed to manage nature reserves in way that benefits community health and nature connection.

This provides the foundation for the research proposition and framing the research questions to guide the thesis inquiry.

The research proposition is:

Ecological management of urban nature reserves is more effective when coupled with a richer understanding of their social relations and place context.

Research questions:

1) How do urban neighbours and users experience and connect with nature reserves, and what might influence their relations, engagement and motivations to care?

2) What are the experiences of practitioners who plan for, develop near and manage urban reserves—and what knowledge domains do they draw on?

3) What do these relational perspectives mean for the management of urban nature reserves, their biodiversity and human relationships in urban settings?

Qualitative research is used to address the research problem with case studies of nature reserves used to guide analysis and explanations of the research questions (see section 1.6). An ethnographic approach is proposed using interpretive oral and observational methods to elicit and analyse narratives (stories and histories) that people recount about their experiences in the nature reserves (Kruger and Williams 2007). This situates people as active participants, deriving their values and meaning from this experience (see Bruns and Green 2001: 125).

By describing lived experience and relationships with nature reserves, it allows for insights into how we might improve their management. This 'experiential' lens also allows nature reserves to be viewed 'relationally' in terms of social and ecological associations rather than the binary nature−human separations (Head 2008) implicit in their current planning and management frameworks. The intention is to explore social meaning and practices, focusing on place associations and relations, socially constructed through experience as people interact with nature reserves (and each other) and develop connections.

The findings from this research will be specific and generalisable. Particular findings about social relations in the context of each nature reserve will be of special interest to the ACT. Having insight and understanding about this social context is an important tool for conservation managers and opens opportunities for community partnership. Generalisable findings must be understood as context dependent and presented as theories that might be tested in other contexts. It is expected that these findings may be useful for policy and practice elsewhere in

urban nature reserves, biodiversity planning and management, and collaborative community engagement and stewardship programs. The case study approach and the suite of qualitative research methods used to explore these questions is described below, and the specific methods used in each case study are described with the results in Chapters 4−8 and Appendix 16.

1.6 Research strategy and methods

This qualitative research falls broadly within the discipline of human ecology, which explores the relations between people and their environments (Glaeser 1995), and the domain of human geography (Hay 2010), which explores the dimensions of human experience of place and landscape (see Cresswell 2004; Tuan 1974, 1979).

Qualitative research is defined as:

> a situated activity that locates the observer in the world. It consists of a set of interpretive material practices that makes the world visible. These practices…turn the world into a series of representations including fieldnotes, interviews, conversations, photographs, recordings and memos to the self. At this level qualitative research involves an interpretive, naturalistic, approach to the world. This means that qualitative researchers study things in their natural settings, attempting to makes sense of, or to interpret, phenomena in terms of the meanings people bring to them (Denzin and Lincoln 2000: 3).

This research takes an adaptive theory approach (Layder 2013, 2009, 1998) and uses case study as the research strategy, organising method and primary method of inquiry. Case study inquiry is a 'powerful method to understand the…practical aspects of a [social] phenomenon or place, and develop theory, producing 'deep concrete explanations…that are attentive of the contextual influences' (Baxter 2010: 95). Yin (2009: 8) stated that a 'case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used', and relying on 'multiple sources of evidence with the data needing to converge in a triangulating fashion' (Yin 2009: 19).

Importantly, case study design can be modified to respond to 'new information or discovery during data collection' (Yin 2009: 62), which is anticipated with the 'adaptive' approach. This means that 'social research is understood as a continuously unfolding process…[where] the various phases of research activity merge into one another as an adaptive response to changes in research circumstances' (Layder 2013: 12).

The research design is built around multiple place-based cases to explore different experiential contexts in nature reserves with at least two place-cases for each context (see Table 1.1). This allows for theorising within each case and between cases and ensures that context is built into the analysis. The use of multiple cases can also distil recurring themes or features (Fischler 2000), provide a broader basis for exploring concepts and produce more compelling and robust evidence and explanations (see Baxter 2010; Yin 2009). Importantly, no case is representative of all cases but some common findings and cross-case comparisons that may be transferable to other urban settings and contexts are anticipated.

Table 1.1 Overview: Multiple Case Design

Experiential Context	Inquiry Scope	Canberra Place-based Cases (unit of analysis) [*Additional unit of analysis within place*]	Interstate Place-based Cases
Living	*Neighbours and users experience* *Social networks* *User practices* *Neighbour/user expectations*	Mt Taylor Nature Reserve Mulligans Flat Nature Reserve [*ParkCare*]	
Developing	*Practitioner experience* *Edge treatment* *Knowledge domains* *Novel practice network* *New neighbour relations*	Mulligans Flat Nature Reserve Molonglo River Nature Reserve [*Bush on the Boundary Group*]	
Managing	*Manager experience* *Knowledge domains* *Neighbour relations* *Community education* *Partnership programs*	Mt Taylor Nature Reserve Mulligans Flat Nature Reserve [*Volunteer Programs ParkCare and Community Fire Groups*]	Ngarri-djarrang (Central Creek) Grassland Reserve (VIC) Maroochy Wetlands Sanctuary (QLD)

Place-based case studies are used to distil the experiences of people who live near and use nature reserves, practitioners working near them and those managing reserves. Additional case

studies focusing on community engagement programs and groups are embedded in the place-based case studies.

To support place-based case studies, two case studies are used to explore factors that may influence people's experience of nature, including how the media frames nature and changing social norms around childhood and parenting. The media study uses content analysis to describe how nature is reported and represented in print media (see Chapter 3). The childhood case study uses the recollections over 60 study informants about their childhood nature experience (see Chapter 4). The literature and research methods used are described within those two studies. Two interstate case studies were conducted to explore alternative ways to manage nature reserves situated within urban communities (Appendix 16).

1.7 Case study locations

1.7.1 Canberra as the macro research setting

The broad geographic or macro unit for analysis is Australia's national capital, Canberra, in the ACT (See Figure 1.1). The ACT is administratively different: akin to a large municipal local government, but unique in also being the national capital and Commonwealth seat of government. Purposefully designed within its natural landscape, Canberra provides an ideal setting for this exploratory research. Unlike most Australian (and other cities), Canberra's bushland and open space is universally accessible and equitably spread across the city. This design is of significant research interest, especially as other cities strive to re-integrate nature and are retro-fitting greening to address climate change (Butt et al. 2018; O'Sullivan 2018) and enable human connection.

Figure 1.1 Location of Canberra in the ACT, Australia

Source: ACT Government

It might be assumed that, with plentiful public nature, Canberra is already a place of connected geographies, both physical and human. However, while this expansive nature is often touted as the most-loved aspect of Canberra (Jose 2010), there are no qualitative studies about how neighbours and park users experience and build connections with urban nature reserves, nor any focused on the practitioners with planning and management responsibilities for this natural landscape. A summary of the elements that make Canberra an interesting research setting are described in Table 1.2.

Table 1.2 Canberra's value as a socio-ecological research setting

Research Interest	Commentary
Nature unlimited	The ACT protects more of its natural assets than any other Australian state or territory. More than 70% of the Territory's 236,000 ha is reserved in protected areas and the nature trail network extends for approximately 3,500 km across the natural areas of the ACT (ACTG 2018b: 5). Within urban Canberra, there are another 6,600 ha of public open space including urban parks, sportsgrounds and semi-natural urban open space. (ACTG 2018b: 1). The national loss of lowland grassy woodland ecosystems and the wildlife and plants dependent on these systems means Canberra's urban reserve network has assumed greater nature conservation significance (ACTG 2004b). Like other urban regions, Canberra is disproportionately important

	for the conservation of many threatened species (Soanes and Lentini 2019; Ives et al. 2016).
City designed in a landscape for people	No other global city has used the natural landscape in such a systematic way to define its urban form and structure (ACTPLA 2009). First articulated in Griffin's 1912 plan, this sympathetic design response has been expressed in successive phases of city planning and development (NCDC 1970, 1976, 1984b). Canberra is one of only a handful of 'planned' capital cities (Aitken 2011). As it is called the 'Garden City, Canberrans live surrounded by nature' (Reid 2002: 322); this visual amenity and beneficial human access was the rationale for natural landscape protection (Seddon 1977).
Many urban neighbours and stewards	Canberra's unique urban structure means that most residents are within walking distance of a network of almost 40 nature reserves (known as Canberra Nature Park) woven through the suburbs. Almost 50% of the population lives within 500 metres, and 25% within 100 metres, of a reserve (ACTG 2019c).The sheer volume of urban neighbours adds a unique dimension, given growing interest in the beneficial aspects of nature connection for human health and well-being (Maller et al. 2006). Canberra has a long-running Parkcare partnership program that has affected transformational ecological change in many ACT reserves (Rainbird et al. 2012). These care volunteers hold a rich store of local knowledge and capacity for on-ground ecological recovery and management (Towell 2011b).
Place of experiment	Canberra has long been recognised as a laboratory of planning and urban design (MCU 2011) and 'from time to time [has] been used as a convenient laboratory in which to try out social innovations' (Linge 1975:65). Most recently, Canberra has realised its potential as a 'natural science laboratory' (Seddon 1977: 31), with the Mulligans Flat Goorooyarroo Woodlands experiment long-term research project (Shorthouse et al. 2012), novel grassy woodland restoration in the Molonglo Valley (ABC News 2016; Sibthorpe 2016) as well as landscape-scale woodland restoration across the urban matrix, involving care groups and linking reserves (ACTG 2018f; 2010).

Urban growth pressures	Like other Australian cities, Canberra faces challenges related to land and housing affordability, water scarcity, bushfire risk and biodiversity conservation (ACTG 2016a). Canberra is Australia's eighth-largest city and its largest inland city (MCU 2010a), with 406,403 people recorded at the 2016 Census (ABS 2016a). It is also one of the Australia's fastest growing cities (O'Mallon and McIlroy 2017). With an expanding urban residential edge and densification of established suburbs, this growth is considered a potential threat to Canberra's natural landscape. [4]

1.7.2 Place-based case studies

Within Canberra, nature reserve units were selected as the subject of analysis guided by potential for '*information-rich cases*—cases from which you can learn a great deal about the focus of the inquiry' Patton (2015: 308) and that provide a basis for comparison (Barnett 2010).

Three urban edge nature reserves were selected for the place-based case studies (see Table 1.3 and Figure 1.2). The criteria for the selection were that the reserve:

- be adjacent to residential suburbs
- have different land use histories and age of neighbouring suburbs/community
- have a community stewardship group, or potential for the same.

My local knowledge of the nature reserves and community and management frameworks provided a level of confidence that the selected sites would assist the inquiry and allow for both comparisons and accessibility for the research. By capturing different reserve management contexts, adjacent urban development and maturity and neighbouring communities, the settings maximise the relevance of the research to the ACT context, while also ensuring its relevance to wider research and management contexts elsewhere (see Table 1.3). The physical setting and social history of Canberra and descriptions of the Canberra place-based case study sites are provided in Chapter 5.

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[4] See Beeby 2011e, quoting Professor Ken Taylor, who stated that insensitive planning is 'squandering Canberra's sense of identity as a city in the landscape' and 'in danger of 'becoming a greatly diminished city' if the spacious vistas, open spaces and view lines to surrounding mountains is jettisoned in favour of "production line development" '.

Table 1.3 Broad Scope of Canberra Case Studies

Place	*Mt Taylor Nature Reserve*	*Mulligans Flat Woodland Sanctuary*	*Molonglo River Nature Reserve*
Urban setting **Region** **Age** **Edge suburbs**	Established Woden Valley Since 1967 Chifley Pearce Torrens	New Gungahlin Since 2007 Forde and Bonner	Urbanising Molonglo Valley Since 2012 Wright and Coombs
Conservation values	Important habitat for nationally threatened species	Nationally threatened woodland ecosystems Woodland restoration research experiment	Nationally threatened woodland ecosystems Habitat for nationally threatened species
Condition	Variable: degraded northern east and west slopes; Limited management of erosion and weeds (mainly ParkCare)	Good condition; actively managed: erosion and invasive plants; No invasive animals	Variable condition: degraded riparian zone and river corridor under active restoration
Buffer zone	No: urban backyards along boundary and asset protection zone wholly in reserve	Yes: edge road and inner asset protection zone in suburbs	Yes: edge road and inner asset protection zone in suburbs
Fire impacts 2003	Yes: entire reserve burnt and asset damage along urban edge	No	Yes: entire region burnt and loss of forestry and recreation
Management status and partnerships	Nature Reserve (1993) Parks Agency Mt Taylor ParkCare Group (est. 1989).	Nature Reserve (1995) Parks Agency partnership with Conservation Trust Friends group (est. 2012).	Nature Reserve (2000) and Special Purpose reserve (sludge ponds) Parks Agency
Neighbours	Families, older couples and singles	Young family households	Young single and family households
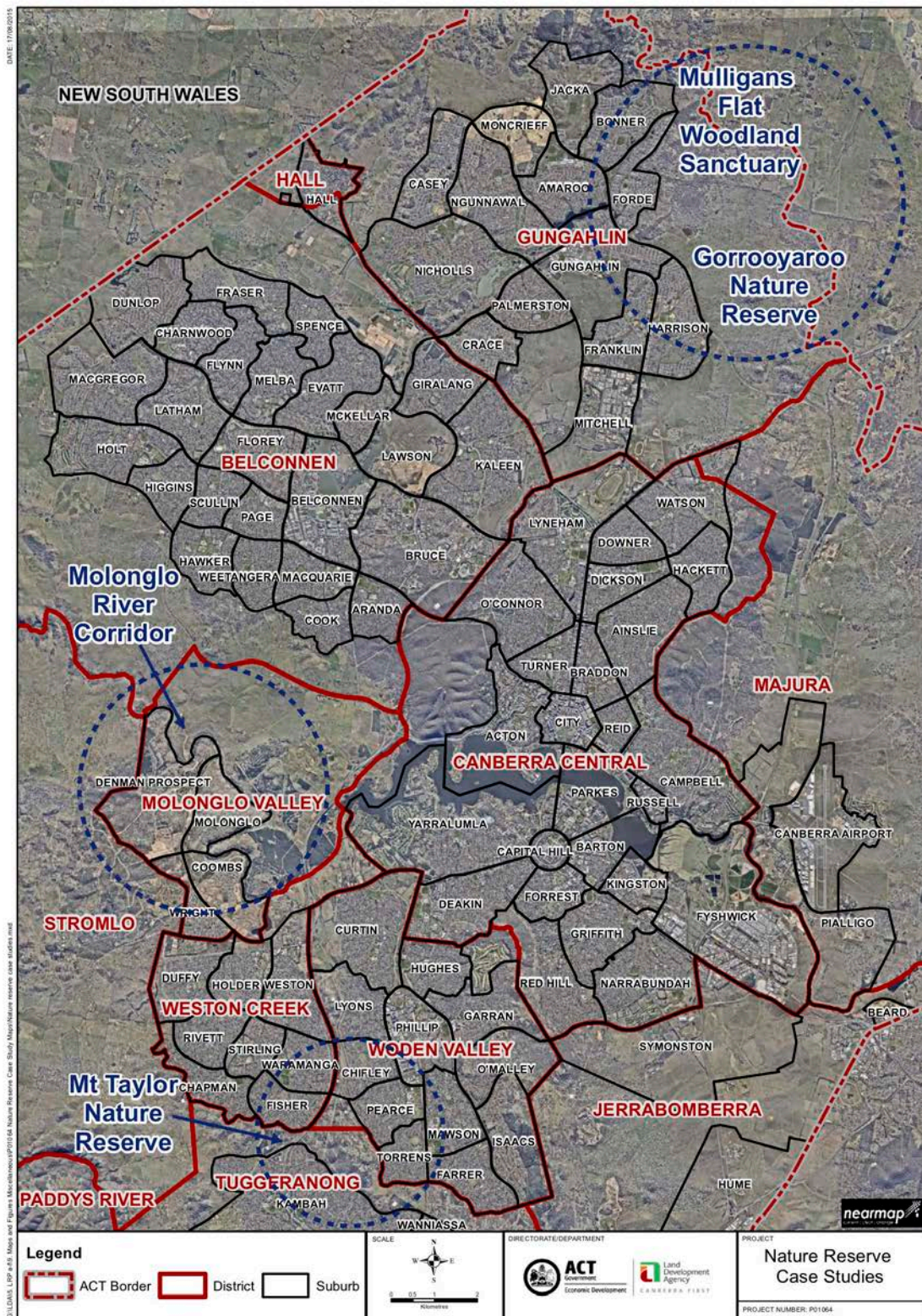
Figure 1.2 Location of place-based studies in the ACT

Source: LDA

1.7.3 Interstate case studies

Outside Canberra, the selection of place-based case studies focused on urban nature reserves with a history of community involvement, good neighbour relations and collaborative partnership as the foundation of their management. The research interest was to explore alternative ways of managing nature reserves in urban settings and to identify success factors in neighbour relations that could potentially provide insights for ACT urban nature reserves. The case studies are:

- Ngarri-djarrang, Central Creek Grassland, Reservoir, Melbourne, Victoria (Merri Creek Management Committee for Darebin City Council)
- Maroochy Wetlands Sanctuary, Bli, Bli, Queensland (Maroochy Wetlands Sanctuary Support Group and Sunshine Coast Regional Council).

The methods used to conduct the interstate case studies involved documentary analysis, semi-structured interviews and a focus group with the Maroochy Wetlands Sanctuary Support Group, all of which are described in more detail in Appendix 16 and 17.

1.8 Research process

1.8.1 Human Ethics Protocol, variations and reflexivity

Approval of the Human Ethics Protocol for the research project was granted in July 2011 (ANU Ref: 2011/362 Social perspectives of nature reserves and developing urban areas). Copies of the Research Information Sheet, Indicative Informant Invitation letter/s and Consent form are in Appendix 1.

During the course of the research, a number of opportunities arose to build new groups and related projects into the research. The intention was to conduct the research in a flexible and iterative way (the adaptive approach) and to draw on emerging events and projects. This possibility had been flagged in the research protocol. Two variations to the Human Ethics Protocol were granted to add group settings for participant observation, including a new ParkCare (Friends) group at the Mulligans Flat in 2013 and the Canberra Ornithologists Group (COG) Gang-gang Cockatoo Citizen Science Survey in 2014.

As a locally-based and socially engaged researcher, I was aware of the importance of reflexivity in how the research was designed and conducted to avoid unintended influences on the research participants and processes (Schon 1983). The ethnographic style of this research also has an

additional level of complexity because in the local place-based cases, many of the informants and the audience for the research are 'often intermingled and mutually dependent' (see Winchester and Rofe 2010: 22). Part of this reflective practice is being aware of my own epistemological knowledge base and acknowledging that this research is motivated by my personal experience, drawing on my professional work and practice as an environmental planner, a community-based facilitator and volunteering—as well as life experience as a child, an adult and a parent. For each case study, I reflect about how my life and work experience has motivated the research interest.

1.8.2 Data collection and methods

Yin (2009: 101) noted that the strength of case study data collection is the opportunity to use many data sources, identifying 'six sources of evidence' that are commonly used: documentation, archival records, interviews, direct observation, participant observation and physical artefacts. The qualitative methods and evidence (data) yielded are shown in Table 1.4 and each method is briefly discussed.

The combination of methods yielded data richness and depth, capturing different insights and experiential dimensions, and allowed for triangulation of the data (Creswell 2013) and opportunities for cross-checking (Layder 2013). This interactive, ongoing dialogue between methods allowed observations to act as both a check on interview data and document analysis and the interviews act as a check on the accuracy of my observations (Layder 2013). Some quantitative data was also generated with direct observation, providing some counts about reserve users (see Chapter 6) and the census statistics used to produce a picture of the local communities living near nature reserves (Chapter 5, Appendix 7). Narrative is used to mix the experiential data provided by informants with this numerical data in analytical explanations from the case studies.

Table 1.4 Research Data Summary

Methods	Data Description	Scope
Semi-structured interviews	Personal narratives about experience, knowledge, motivations and practice of reserve users, neighbours, volunteers, park managers, community facilitators developers and practitioners	Local residents: 22 Practitioners: 18 Policy/decision-makers: 12 Reserve managers: 20 Researchers/educators: 3
Focus groups	Shared narratives about practitioner and volunteer experiences, knowledge, motivations and practice	Urban development: 1 Governance: 2 Volunteer programs: 1
Participant observation	Observation of relationships, communication, knowledge, motivations and practice in group Engagement activities Social media pages and posts	BoB meetings: 28 ParkCare meets: 30 CFU meetings: 10 CFU training events: 12 Engagement activities: 15 Facebook pages: 2
Direct observation	Diarised observations of reserve users, interactions, physical artefacts and evidence left by reserve users and traces	3 years + observations Mt Taylor Nature reserve Activity and artefacts recorded by photograph
Document analysis	Review of policies, management plans, reviews, technical reports and print media Content analysis Census 2016 publications	6 case studies 195 articles in the Sydney Morning Herald and Canberra Times (2011 to 2013) Community profiles
Archival research	Land-use history of nature reserves History of ParkCare program	Leasehold and program files held by ACT Archives NLA Trove media collection

Notes: BoB – Bush on the Boundary; CFU – Community Fire Unit; NLA – National Library of Australia

1.8.2.1 Semi-structured interviews

Semi-structured interviews are the primary data collection method used in this study. This oral method was used to "discover" information or knowledge about a person's feelings, behaviour, attitudes, experiences and so on' (Layer 2013: 83) with the nature reserve. Winchester and Rofe, (2010: 9) observed that 'individuals experience the same places differently' and oral methods allow them to 'speak in their own voice about meanings and experiences'.

Qualitative samples 'are usually small in size' (Ritchie et al. 2003: 83) because the focus is on 'meanings' not 'representativeness' (Bradshaw and Stratford 2010: 76). Here, 'purposive' sampling was used to ensure that the sample captured the key 'constituencies' that had direct experience and relationships with the place (Ritchie et al. 2003). The sampling process was assisted by the selection of 'information-rich' cases that would generate meaningful insights from the participants (Patton 2015: 265).

Before formal data collection, I met with senior managers of the ACT Parks and Conservation Service to discuss the research design and to seek their support to interview a cohort of Parks staff working in the nature reserves. Indicative interview questions were also piloted with a small group of informants in the second half of 2011 and the schedule was adjusted. To assist recruitment of local people living near nature reserves, flyers were developed for distribution at community events (see Appendix 2) and short articles were written for the Forde Neighbourhood Watch and the Molonglo Mingle newsletters

Over a four-year period from late-2011 to 2015, 75 interviews were completed with the following broad 'constituent' groups:

- residents (n = 22), including 9 volunteers in ParkCare and Community Fire units
- practitioners (n = 18) developers, consultants, planners, ecologists
- policy and decision makers (n = 12), ACT ministers, agency/policy managers, board members
- nature reserve managers (n = 20), park rangers, fire managers, open space managers, and community/non-government organisations
- researchers and educators (n = 3), scientists, naturalists, and teachers.

Informants were contacted by email (most after an initial conversation about their participation) that included an introductory cover letter inviting their participation and copies of the Research Information Sheet and Consent Form (see Appendix 1). Each interview was held face-to-face

and commenced with an overview of the research to situate the interviewee's participation and perspectives in the research. Informants were asked to sign the Consent Form (if not already signed) and reminded that they could withdraw at any time. They were also advised about confidentiality and anonymity and their permission was obtained for the interview to be recorded (audio only) and then transcribed. This allowed me to focus on managing the conduct of the interview rather than note-taking and to ensure I had a record as 'fully and fairly as possible of the interviewee's perspective' (Patton 2015:471).

To open the interview, basic demographic data were collected from each informant (see Appendix 3) and a 'warm up' question was asked to generate useful data for one of the topical case studies (see Chapter 4). Three broad suites of questions were developed to guide the interviews and were based on the different inquiry contexts and informant groups (see Appendix 4). The format was relaxed and kept flexible so that interesting stories could be explored as they emerged. Maps of the reserve/s and other contextual information were used if needed. Interviews were conducted with the knowledge that people's experiences of place can be multi-dimensional; for example, most informants live near nature reserves and care volunteers are also involved in management.

As this research sought to elicit meanings and experiential perspectives within the informant groups and in context, interviews ceased when no new information or perspectives were appearing in the data for that group and the 'saturation' point had been reached (Layder 2013: 126; Ritchie et al. 2003).

1.8.2.2 Focus groups

Focus groups are a useful tool for exploring the process of knowledge production that emerges during the process of group interaction and shared discussion, highlighting the collective rather than the individual nature of knowledge (Cameron 2010). Other advantages are 'cost effective data collection' for a single researcher, 'diverse perspectives', enhanced data quality from interactions, unfolding 'analysis' during the group and social interaction that is 'enjoyable to participants' (Patton 2015: 478).

Two focus groups were used to build on themes emerging from the primary data (semi-structured interviews) that might have benefitted from exploration in a group setting. Focus groups were conducted with officials from the ACT Government's (then) Land Development Agency (funding the research) and Bush on the Boundary Group participants (Chapter 7).

Participants were invited on the basis of their professional experience and place knowledge (Cameron 2010), with both groups focused on 'developing' on the urban edge near nature reserves (see Table 1.1) and the knowledge domains operating in land use planning and development (see Brown 2008) and nature reserve planning frameworks. A professional facilitator was employed to conduct focus groups so that I could observe the interactions between participants and listen to their collective insights and knowledge. The focused conversation or discussion method was used to guide the focus group discussion (Institute of Cultural Affairs 2011). More information is provided about the way this method was used in Chapter 7. A focus group was also used as the primary means of data collection for one of the interstate case studies and I facilitated this group in the place setting (Appendices 16 and 17).

1.8.2.3 Direct observation

Observation has been widely used in public life studies in urban spaces (e.g., town squares and streets) to understand how people use communal spaces and the way that these spaces support social connections between people (Gehl and Svarre 2013). Since this research took place 'in the natural setting of the case', it created the opportunity for direct observations, and another 'source of evidence' (Yin 2009: 109).

The intention was to focus on the social activity of nature reserve users and their practices. This contrasts with the approach often used by park planners who catalogue the physical features and elements of the reserve with tools like landscape classification systems (Foxlee 2018). In this way, direct observation draws in elements of behaviour observation (Lynch 1977) and thus, one observes what people do and how they behave in the reserve. One is able to note the people who use and, through absence, do not use the place and the 'affordances' of how the space supports (or otherwise) their use (see Gibson 2000). In this way, one may also 'test the conditions by observing and experiencing them firsthand' and also understand 'which elements interact and which do not' in the place (Gehl and Svarre 2013: 30).

The use of this method in the 'living' case study of Mt Taylor provided a basis for 'typology building' about reserve users (Layder 1998: 73) and the data analysis offered an opportunity to build an emerging concept (nature disconnection – section 1.10.7) into group participant observation project/s and pilot engagement activities in the Mulligans Flat case study (see Section 6.5).

People can also be observed indirectly by the traces they leave behind (Gehl and Svarre 2013). This provided a significant source of additional data during direct observation of trampling, desire lines (paths formed by people), cultural artefacts (e.g., memorial plaques, rock cairns) and physical evidence showing illegal and anti-social behaviours. These all proved to be important indicators of how the reserves are used and valued (or not); see Appendix 8.

A reserve diary and photographs were used to record human activity. Different routes were walked on different days of the week and at various times to capture as much social diversity as possible. More information about how this method was used is provided in Chapter 6.

1.8.2.4 Participant observation and the researcher's stance

Participant observation is a 'special mode of observation in which you are not merely a passive observer. Instead you may assume a variety of roles within a case study situation and may actually participate in the events being studied' (Yin 2009: 111). During the course of the research, I was engaged in a variety of policy and community program networks, as listed below. Some served as group settings for participant observation (shown in **bold** and described in Table 1.5), whereas others provided the opportunity to get updates and insights about policy initiatives and community programs. The networks included:

- ACT 2014 ParkCare Forum Steering Committee
- ACTFR CFU Consultative Committee and Team Leaders
- ACT ParkCare and Landcare Coordinators Group
- **Bush on the Boundary (BoB) Groups—Gungahlin and Molonglo**
- **COG Citizen Science Gang-gang Survey Project**
- Cat Containment Coordination/Responsible Cat Ownership Steering Committee
- **Chifley Community Fire Unit (CFU)**
- **Friends of Mulligans Flat Woodland Sanctuary**
- Ginninderra Catchment Group
- Landcare ACT Interim Steering Group
- **Mt Taylor ParkCare Group**

Table 1.5 Participant Observation Group Settings

Group Setting	Description	Research Interest
Mt Taylor ParkCare Group	Established volunteer group (1989) under ParkCare program; one of 15 groups in Canberra Nature Park Care activities: weed and erosion control, monitoring and walks; Frogwatch Census	Agency support and partnerships Value of stewardship Learning and knowledge transfer Volunteer motivations Social media impact
Bush on Boundary (BoB) Groups	Community-driven cross-sector forum for information exchange about development adjoining case study sites at two locations: Gungahlin and Molonglo Valley	Knowledge exchange and transfer: disciplinary and community Community education programs Biodiversity design interventions and edge treatments
Chifley Community Fire Unit (CFU 43)	Volunteer group within the Community Fire Unit Program: one of 50 groups on Canberra's urban edge involved in community preparedness activities for bushfire	Agency support and partnerships Community awareness Household preparedness Volunteer motivations Social media impact
Friends of Mulligans Flat ParkCare Group	New volunteer Group under Woodlands and Wetlands Trust and ParkCare program (est. 2012) Care activities: weed and erosion control, monitoring and walks, Frogwatch Census	Value of community stewardship Transfer of science knowledge Community-based partnerships Community engagement Social media impact
Canberra Ornithologists Group (COG)	Conservation based community group focused on citizen science and reporting on conservation status and maintenance of long-term data sets	Value of citizen science Volunteer motivations Community engagement project

The places, local communities and group settings in this study are dynamic and change over time. Participant observation enabled the initiation of a number of specific projects within the group settings as opportunities arose (see Table 1.6). This took many roles, from experimental community engagement activities within groups to managing social media pages. It also afforded scope to observe projects, programs and group dynamics over time, with field notes

used to diarise and record observations and reflections. Variations to the ethics protocol were approved where required (see Section 1.8.1).

Table 1.6 Summary of Researcher-initiated Projects in Group Settings

Group Setting	Role in Group and Projects
Mt Taylor ParkCare Group	Member of Group Initiated group participation in monitoring threatened species: Mt Taylor Presence and habitat quality survey: Pink-tailed worm lizard (*Aprasia parapulchella*) (see Osborne and Wong 2012) and Small purple-pea (*Swainsona recta*) Creation of and posting on the Mt Taylor Nature Reserve Facebook page (https://www.facebook.com/MtTaylornaturereserve)
Bush on Boundary (BoB) Groups	Member of Group Prepared Achievements Flyer for BoB (Appendix 12) BoB representative on Community Reference Group for development of the draft Molonglo River Reserve Plan of Management.
Chifley Community Fire Unit (CFU 43)	Deputy Team Leader in group Coordinated the annual Bushfire Awareness BBQ at Chifley Shops for CFU Saturday (start of fire season: 2013−2016 and ongoing) Neighbourhood doorknock Fire Ecologist edge boundary walk CFU Team Leaders meetings Creation of and posting on the ACT CFU Facebook page (https://www.facebook.com/actcommunityfireunits/)
Friends of Mulligans Flat ParkCare Group	Convenor of Group for three years (2013−2015) Initiated and piloted new engagement activities: Science in the Sanctuary Community Forum (2013−2016); children/family focused activities (night walks; art competition; Bettong Buddies newsletter; hike and bike); volunteer-led bird walks and wildflower walk. Friends member Mulligans Management and Education and Outreach Committee meetings Posts Mulligans Flat Facebook page (https://facebook.com/MulligansFlat/)

ParkCare Coordinators Group	As Convenor of Mulligans Friends, observed quarterly Convenors meetings and participated in volunteer training and information events Member of Steering committee for 2014 ParkCare and Landcare Forum 'Reflect. Explore and Inspire' celebrating 25 years of volunteering. Led workshop about volunteer motivations and knowledge at 2014 Forum
Canberra Ornithologists Group (COG)	Community Engagement Coordinator for COG Citizen Science Gang-gang Survey, including: media liaison, communication and event design (launch, presentations, student art competition and exhibition and evaluation survey). Related activities: O'Connor Scouts and Discovery walk Lyneham Pre-school (See Eyles and Davey 2016)

Yin (2009: 12) notes that while this type of observation 'provides certain unusual opportunities for collecting data, it also involves major problems', specifically, the 'potential biases produced' and 'having to assume advocacy roles and becoming a supporter of the group being studied'.

Prior to the research, I was a volunteer member of the Mt Taylor ParkCare Group and recognised the unique opportunities through this existing relationship. As I was already an actor in this key group, I chose to take an 'active, involved role' in participant observation to increase my own understanding and pursue 'the opportunity to generate insights…from being close, or on the inside' (Patton 2015: 59). I took a stance described as 'empathetic neutrality' in both interviews and group participation. This involved 'understanding a person's situation and perspectives without judging the person and communicating that understanding with authenticity to build rapport, trust and openness' (Patton 2015: 57).

Multiple methods and sources of evidence (semi-structured interviews and focus groups, documentary and archival analysis), cross-checking and 'triangulation' were also used to support analyses and explanations. This counters perceptions of bias and/or co-option inside the group and enhances the rigour, credibility and 'quality' of the overall research (Patton 2015: 663; Bradshaw and Statford 2010: 77).

Additional information about how participant observation was used in the case studies is provided in Chapters 6, 7 and 8. I also attended public meetings and community events that yielded valuable information and some where I presented this research (see Appendix 5).

1.8.2.5 Archival research and documentary analysis

Published documents, records and archives provide a rich source of information about organisations, programs (Patton 2015) and places. For this study, archival research was conducted using territory lease (TL) files for the land that became the Mt Taylor and Mulligans Flat nature reserves. The Commonwealth Government's Federal Capital Commission (FCC) created a TL file for every block of land leased within the Territory. The ACT Archives provided access to the TL files as well as program and planning files. These lease files and digitised media articles from the National Library of Australia's *Trove* platform provided quality records and insights into how these lands were managed and viewed over time (see Chapters 5 and 6).

Other published documents (management plans, planning and environmental reports, public inquiries, meeting minutes, etc.) were analysed to track Canberra's social and environmental history and describe the policy setting as well as the individual case settings (see Chapter 5). Descriptions of the communities living around each nature reserve were compiled by analysing the Census of Population and Housing (Census) data (See Appendix 7). These demographic measures are important to complement the social insights identified using qualitative ethnographic methods.

1.9 Adaptive theory approach and data analysis

Adaptive theory 'combines the use of pre-existing theory and theory generated from data analysis in the formulation and actual conduct of empirical research' (Layder 1998: 1) (see Figure 1.3). This recognises that 'theorising is a continuous process' and that 'theory shapes and is shaped by the data, is capable of adjusting to, or being altered, or modified to accommodate the analysis and interpretation of data which is being collected in an ongoing fashion' (Layder 1998: 150). It also allows the researcher to 'use many sources of qualitative data, methods and strategies…to produce a dense and comprehensive coverage…the denser the data, the surer the validity of the findings and the stronger the evidence on which to base explanations' (Layder 2013: 91).

In this research, theorising began with the literature search and review (see Chapter 2), which also allowed demonstration of how this topic is surrounded by literature from many 'adjacent areas' (Layder 1998: 105). This review informed decisions about the problem focus, research

proposition and questions (see Section 1.5) as well as the relevant preliminary 'orienting concepts' to guide data collection and analysis (See Layder 2013: 134, 1998: 108).

Importantly for this experiential research, the adaptive approach recognises 'the utility and value' of ideas drawn from a 'diversity of sources', including general literature, books, reports and media (Layder 2013: 137). Media reporting was explored as a topical case study using content analysis to describe how the media frames narratives about urban nature (see Chapter 3). The principle of 'serendipity' (Layder 1998: 106) also played a part during this research. Chance encounters and conversations led to new informants and perspectives, particularly during direct observation on Mt Taylor (see Section 6.4.1.6 and Table 6.2) and also during community meetings and conversations at local shops.

The adaptive approach proceeds on the basis that 'data analysis consists of the continual assessment of the fit and relevance of orienting concepts in relation to the emerging data' whether observational, transcripts or documentary materials (Layder 2013: 139). This leads to either 'modifying elaborating or extending existing "orienting" concepts or if these concepts have low explanatory value, analysis should be adjusted with a view to searching for emergent concepts' (Layder 2013: 139). Figure 1.3 illustrates how the adaptive approach unfolded during the research process.
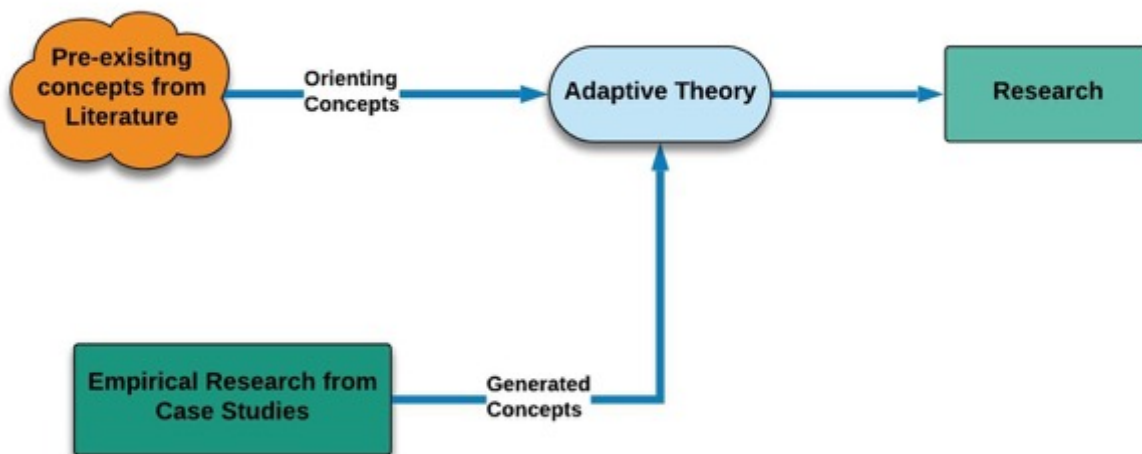
Figure 1.3 Adaptive theory: connecting theory and empirical data

1.10 Orienting concepts for adaptive theory

The adaptive approach uses 'orienting concepts' to help order and analyse qualitative data, and while some may not 'fit', others will be 'relevant' or can be 'modified' for the emerging data and new concepts may be revealed (Layder 2013: 138). A suite of concepts, presented as short

vignettes below, have been used to guide data analysis and explanation. They were identified in the course of literature review and the iterative research process and include: topophilia/biophilia; boundaries; place and experience; social learning in communities of practice; management of common resources; knowledge cultures; nature disconnection; and care and stewardship. The multiple-place focus in this research helps to explain the concepts in different place contexts.

1.10.1 Topophilia and biophilia

Innate bonds with natural places have been theorised as 'topophilia and with nature as 'biophilia'. The concept of topophilia, is described by human geographer Yi-Fu Tuan (1974: 4) as the 'affective bonds that bind people and place, [a] person's mental, emotional, and cognitive ties to a place'. It can encompass aesthetic appreciation and visual enjoyment of nature which 'varies in kind and intensity', physical contact and mingling 'of physical sensations', health and well-being and familiarity and attachment (Tuan 1974: 93−100). Tuan (1977) posited that space and place are basic components of the lived world. People are oriented in place, space and time. It is a two-way relationship with the environment and elements of Tuan's ideas are found in the biophilia hypothesis (Wilson 2003, Kellert 1993).

Biophilia is defined as 'the innate tendency to focus upon life and lifelike forms and in some instances to affiliate with them emotionally' (Wilson 2003: 134). This biological affiliation has been described as a 'complex of weak genetic tendencies to value nature that are instrumental in human physical material emotional, intellectual and moral wellbeing'. These values 'reflect the richness of human reliance on the natural world' that may extend beyond self-interest to an 'ethic of concern for the natural environment' (Kellert 2005: 50). Biophilic values encompass utilitarian, dominstic, naturalistic, scientific, aesthetic, humanist, symbolic, negativistic and moralistic values that are influenced and moderated by culture, learning and experience (Kellert 1997). In relation to children, a developmental model has been proposed for the process by which place attachment emerges from childhood place experiences (Morgan 2010). Similarly, theories about the staged acquisition of biophilia have been related to childhood mental development (Wilson 2003).

The 'philia' concepts can be used to frame how neighbours, users and small groups of volunteers experience local nature reserves and the sensory-type narratives used to describe their experiences and connections with those places (see Chapter 6). They may also figure in the personal stories about childhood nature experiences, as described in Chapter 4.

1.10.2 Management of the commons

The theory concerning the value of self-organising and self-governing forms of collective action management of common-pool natural resources recognises that neither centralised (government) ownership, regulatory approaches or privatisation of resources are free from failures that can lead to their degradation (Ostrom 1990).

Ostrom et al. (1999: 278) observed that 'successful management involves resources that are effectively managed by small to relatively large groups which involve nested institutions at varying scales. These resources continue to be important as sources for sustained biodiversity and well-being'. Within these groups, rules and norms have evolved that define 'proper' behaviour; they are expressed as design principles and characterise the institutions associated with successful management of the resource system (Ostrom 1990). These design principles 'should contribute to an understanding of the factors that can enhance or detract from the capabilities of individuals to organise collective action relating to providing local public goods (Ostrom 1990: 27). This means that almost any group whose members must work together to achieve a common goal should benefit from the same principles that provide a practical framework for improving the efficacy of groups (Wilson 2016).

The ability of users and groups to self-organise also depends on the broader social context. Here, governments or other broker organisations can assist by assembling users, providing informational and technical support for management and legitimising their activities (Ostrom et al. 1999). There are benefits to agencies that include the 'acquisition' of resource information and reduced 'monitoring and enforcement costs' (Ostrom 1990: 216). The availability of web-based technologies and apps for resource mapping and monitoring is adding new dimensions to the coordination of groups of citizens undertaking species surveys and resource monitoring activities across larger scales (Eyles and Davey 2016).

The commons concept is useful to explore how small groups of volunteers nested under a bigger partnership of institutions at regional and territory scales largely self-organise to act as stewards in local nature reserves and also citizen scientists monitoring wildlife (see Chapter 7). This is an interesting dimension, given the 'public' rather than private good and economic value of these natural resources.

1.10.3 Place

Yi Fu Tuan first described place as 'the centre of meaning constructed by experience' (Tuan 1975: 151−152), with experience, 'a cover-all term for the various modes through which a person knows and constructs a reality' (Tuan 1977: 8).

Tuan observed that 'experience takes time (and that) sense of place is rarely acquired in passing. To know a place well requires long residence and deep involvement' (Tuan 1975: 164). The concept and feeling described as 'sense of place' is not 'intrinsic to the physical setting, but resides in human interpretations of the setting' and 'the meaning or importance constructed by experience with it' (Stedman 2003a: 672, 2003b: 822). It is an intermediate link between the place's physical properties and strength of emotional attachment or bonds with the place (Stedman 2003b).

The context of place has evolved from the focus on the home and neighbourhood (Manzo and Perkins 2006) to capture a 'meeting place, a (meaningful) location with interactive potential' that reflects the spaces of a globalised world (Lewicka 2011: 209−211) and, attachments to specific natural landscapes (Kaltenborn and Bjerek 2002; Jorgensen and Stedman 2001, 2006; Williams et al. 1992). Place attachment, an affective bond between people and places (Altman and Low 1992), is another way to describe and understand the meanings and connections that people form with nature reserves (Lin and Lockwood 2013). Importantly, people expressing a strong sense of place and attachment to natural places have been found to more interested and willing to address environmental issues (Kaltenborn 1998), engage in pro-environmental protection behaviours (Scannell and Gifford 2010) and advocate for local places needing care (Stedman 2003a).

Attachment to 'physical' places and the development of 'affective bonds with nature' is possibly faster 'than the social dimension' where it takes longer to create a network of stable relationships (Lewicka 2011: 215). The attachment to places developed during childhood is particularly significant, with Louise Chawla's seminal research (1992) arguing 'that the strong affects experienced during adult remembrance of childhood place experience' mean that 'our places of origin shape us whether we like it or not' and 'this backward glance is an important dimension of attachment' (cited in Morgan 2010: 12).

When considering possible pathways to environmental care based on attachment, we also need to understand how attachment occurs and the relationship to the physical nature of place,

including 'which places have the highest attachment potential and through which processes the attachment is achieved' (Lewicka 2011: 223). An example is the relationship between emotional bonds and attachment processes and features of places identified in aesthetics and landscape preference studies (see Kaplan 1984). This includes the 'intangibles'—physical features that make the place easy to become attached to (Kaplan 1984: 131) and functional aspects like 'mapability and legibility; scale, enclosure and spatial diversity of the setting; as well and the degree to which the setting can support personal goals and plans' (Lewicka 2011: 218). These functionally significant features of places, also termed affordances (see Heft 2010), can support the quality of the place experience for an individual.

Place, sense of place and attachment will be explored in this research through an examination of how people describe their experiences in local nature reserves, their favourite places and social bonds, as well as how managers might factor in these place attachments (see Chapters 6 and 8). The role of childhood exposure to natural places and place attachment will be examined by drawing on the adult memories of research informants, their descriptions of their favourite places and the identification of pathways to environmental affinity and action (see Chapter 4).

1.10.4 'Community of practice' social learning

A 'community of practice' is a social learning theory that was developed to understand how individuals learn, acquire skills and transfer knowledge through the formation of groups that interact around a mutual interest, common subject or problem (Krasny et al. 2017; Wenger et al. 2002; Wenger 1998) Wenger and Wenger-Traynor (2015: 1) described a community of practice as 'a place where people with a common interest or concern engage or become members, agree on and pursue a particular enterprise (like community conservation) and cultivate a common repertoire'.

The social learning occurs as individuals participate in groups associated with a specific physical, historical, and cultural context, often in an apprenticeship manner around a common interest or concern (Lave and Wenger 1991). Importantly, a community of practice relies on consistent membership and participation in a community focused on a common enterprise, exhibiting a shared culture with multiple entry points for new members (Krasny et al. 2017).

This concept is explored by an examination of how a diverse group of community, government and private sector practitioners came together to pursue mutual interests in enabling more bio-sensitive development of new suburbs near nature reserves (see Chapter 7). It also poses the

potential value of bringing together different knowledge domains to engage locally-based stewardship groups to manage nature and bushfire risks (see Chapter 8).

1.10.5 Knowledge domains, collective thinking and action

The concept of knowledge cultures has been explored in land-use planning, local sustainability policy and national park management (see Brown 2001, 2008; Thomas 2001; Hillier 1998). These studies show how certain knowledge sets become embedded in these practice contexts, privileging one form of knowledge and excluding valuable knowledge from decision-making.

The knowledge cultures categorised by Brown (2008) encompass: Individual knowledge-personal lived experience and identity; Local knowledge- the shared lived experience of people and place; Specialised knowledge- the natural sciences, environment planning, finance, engineering professions, Strategic knowledge- administrative government policy legislation, management plans; and, Holistic knowledge- shared vision, purpose, focus'. To assist an understanding of how these cultures might be explained in a real-life situation, Brown (2001: 70), wrote:

> Each grouping is a construction of knowledge in its own right, not merely a subset of anyone of the others, each is offered separately as a complete explanation of events. How different these explanations can be is apparent if one thinks of a real place. Consider how a degraded water catchment would be experienced by the farmer who is struggling to make a living there, the hydrologist from CSIRO, the Council's environmental planner, the Council's social planner, the Regional Development Association, with the Integrated Catchment Management Committee trying to guarantee a sustainable future.

Seeing the knowledge cultures as a 'nested' and/or 'networked' system (Brown 2008: 37, 42) creates pathways to integrate the different ways of knowing places in decision-making and management. This collective thinking supports more effective practice, which is critical to managing complex urban socio-ecological systems.

The concept is explored by examining how these knowledge cultures function in the lived experiences of neighbours, reserve users and community volunteers (see Chapter 6) and in professional practice in urban planning and development adjacent to nature reserves and reserve management (see Chapters 7) and 8). The potential for collective learning and knowledge sharing is explored through a case study of the cross-sectoral Bush on the Boundary (BoB) groups and the ParkCare program, a partnership to manage ACT nature reserves.

1.10.6 Boundaries, edges, buffers

The concept of boundaries can encompass natural boundaries, formed and shaped by natural processes like the physical boundary of a river, and human-made boundaries set for a range of social and cultural purposes. Head and Muir (2007: 132) observed that 'humans construct variable boundaries around parts of the nonhuman world [which} … have material consequences for what is allowed to belong'. Further 'according to how we think of nature, we might want to put a fence around it, [and] create a bureaucracy to look after it…' (Head and Muir 2007: 8). For example, the creation of a protected area implies 'defining a portion of space and therefore defining a boundary, or a series of boundaries, separating it from the surrounding landscape' (Fall 2003: 82). The natural and the social sciences approach boundary definition in different ways and both influence how protected areas are created. Ecological and biogeographic regions define boundaries as physical limits inscribed in the landscape, whereas the social science perspective considers boundaries a predominantly social phenomenon relating to human organisation of space (Fall 2003).

Buffers are defined as, 'a zone, peripheral to a national park or equivalent reserve where restrictions are placed upon resource use or special development measures are undertaken to enhance the conservation values of the area' (Sayer, 1991: 2). Buffers might be considered extensions of protected areas that filter and protect discrete areas (e.g., from invasive weeds) or as a means of integrating them with the adjacent peopled landscape or otherwise, which is often mediated by social perceptions about 'belonging' and 'ecology' (Head and Muir 2007: 162).

A number of terms have been used to describe the buffers and edges adjacent to nature reserves and these vary with the local context. Terms like 'conservation frontier' (Gurran 2005), 'transition area' (Fallding et al. 2001) and 'peri urban' (Buxton et al. 2006) are used to describe the urban−nature and rural interfaces in Australia. In the United States (US), the term 'wildland urban interface' is used (Pyne 2009). It is these dynamic transitional spaces—the boundary and edge areas—that are the focus of much management attention and human impact (McLoughlin 1997). For example, managing fire risk at the urban edge is achieved through an intensively managed zone for 'asset protection' where fuel is reduced (ACTG 2014; Gill and Scott, 2009).

Boundaries, edges and buffers are explored by examining how they might be perceived and constructed by people using and living next to nature reserves (see Chapter 6). They are applied

as a planning tool by the people designing new communities adjacent to nature reserves and those managing these places (see Chapters 7 and 8).

1.10.7 Extinction of experience and nature disconnection

The 'extinction of experience' concept was first used to describe the loss of natural diversity resulting from urbanisation and leading to human alienation from nature, disaffection and ongoing degradation of habitats (Pyle 1993, 2003). A related phenomenon, 'environmental generational amnesia', describes how, as each generation's experience of nature diminishes, their construction of what is environmentally-normal is based on the natural world they encounter, shifting societal baselines about healthy nature (Kahn and Weiss 2017). The loss of interaction with nature diminishes both the opportunity for people to enjoy the health and well-being benefits of being in nature and the chance to develop positive emotions about and affinity for nature (Soga and Gaston 2016). A review of studies of life experience and environmental sensitivity showed that contact with nature is one of the most significant influences in developing this affinity (Chawla 1998).

The term 'nature-deficit' disorder was coined to describe the psychological, physical and cognitive effects of human disconnection from nature, particularly in children (Louv 2005). The premise is that children's connection with nature and environmental literacy should be fundamental elements of their cognitive development, as well as their psychological and physical health. Thus, it should be built into urban planning and design, education and healthcare approaches (Louv 2012).

Here, the premise of disconnection with nature is explored by observing which people visit nature reserves (and those who don't) as well as the management rules that might discourage people using nature reserves, especially children. The population health context is considered, as well as how adult informants describe their own childhood nature experiences and those of their children and grandchildren (see Chapter 4).

1.10.8 Care ethic and stewardship

Wilson (2003: 131) defined the 'conservation ethic' as 'that which aims to pass onto future generations the best part of the nonhuman world. To know this world is to gain a proprietary attachment to it. To know it well is to love and take responsibility for it'. This ethic is active in the global movement of diverse citizen-led environmental action groups that are focused on justice, care and education (Hawken 2008). Urban communities are now being viewed as the

critical players to 'transition to a new social model' based on the 'values of care, repair and renewal', and 'supported by strong civic and public structures' (Gleeson 2010: 11, 89).

The concept of care drives many local people and communities to become stewards of their natural places (Gobster et al. 2007). Nassauer (2011: 321) proposed that 'stewardship is a particular type of care, invoking broad scales of time and space, and connoting care of something that ultimately belongs to others rather than only to oneself'. It can include 'elements of direct action, self-help, and often education and community capacity building. Urban practices like wildlife gardening have been found to foster stewardship (Mumaw 2017).

Ideologically, it is less rooted in oppositional social movements and more in accessing the rights to space through collaborative, community-based resource management' (Svendsen and Campbell 2008:1). The value, diversity and capacity of urban care groups is often hidden because of the wider coverage of the oppositional organisations (Hawken 2008).

These local care practices, centred on sustainability and interdependence of living things, link the ethics of sustainability with the ethics of care, where 'personal agencies of everyday care are inseparable from their collective ecological significance' (Puig de la Bellacasa 2010: 162). The obligation to care is also historically situated as local people seek to recover ecological systems degraded by human activity. Puig de la Bellacasa (2010: 166-167), observes that 'care is embedded in the practices that maintain the webs of relationality that we form with our environment' and argues on this basis, such 'caring' cannot be reduced to 'stewardship' where humans are in charge as 'such conceptions also separate a human subject from a natural object of caring'). The relational concepts of care are most evident in the interconnected and dependent relationships of Australia's Aboriginal people with their country (Rose 1996).

These concepts of care will be explored by examining the place relations, practices and agency of local volunteers in nature reserves as well as their motivations, knowledge and interests. This work also considers the stories of ecological recovery that are entangled with the social relations of these places (see Chapter 8).

1.11 Thesis outline

The length of the thesis is significantly enlarged by the inclusion of images, case study-specific empirical and documentary data, and appendices. This material is included to reflect the emphasis of place and lived experiences, and to indicate the richness of such material available

for research of this kind. All photographs were taken by the researcher unless otherwise acknowledged.

Chapter 2 explores the ecological and social dimensions of nature in cities, focusing on 'areas' protected for conservation: urban national parks and nature reserves. Three main themes are adopted to explore the literature about urban protected areas: 'Living'—how local people and neighbours experience urban nature reserves, the social settings and relationships to nature connection, care and stewardship as well as residential edge effects; 'Developing'—how new suburbs are planned and developed next to nature reserves, the decision-making frameworks, professional practice and knowledge, and practitioner perspectives; and 'Managing'—how urban nature reserves are managed, professional practice and knowledge, manager and volunteer perspectives, engagement and neighbour programs and urban volunteering in parks and motivations. This thematic review reveals gaps where research focused on social relations in and around urban protected areas could contribute insights and explanations to assist management of nature reserves in cities.

Chapter 3 is the first of two 'topic'-based case studies that explore wider societal influences that affect nature experience in urban areas. This chapter builds on a peer-reviewed paper presented at the 6th State of Australian Cities Conference held in Sydney, 26−29 November 2013, (Eyles 2013). Drawing on a content analysis of almost 200 print media articles published between 2011 and 2013 in Sydney and Canberra, it examines how the media frames and represents nature and how this might influence urban people's engagement with nature. A 'Postscript' provides an update on the rapidly changing media landscape, especially the growth of digital media since the 2013 content analysis. It also describes action research using community Facebook pages and posits how social mediums might be used to communicate with urban residents about nearby nature reserves and engagement opportunities.

Chapter 4 presents the second 'topic'-based case study, a short exploration of childhood connection and exposure to nature. It introduces some of the societal changes that affect childhood experience, including norms around children's play and mobility, and their effects on physical health, freedom and experience of local spaces and nature. The value of childhood exposure is explored using a small experiential case study, drawing on semi-structured interviews with 60 (adult) research informants, about their childhood experiences in nature and reflections on how they influenced their adult lives and environmental affinities. These experiences are contrasted with those of their children and, in some cases, their grandchildren.

The chapter then considers what this might mean about children's access to nature more widely and engagement in local nature reserves.

Chapter 5 describes the social and environmental history of Canberra to provide an understanding of the macro setting for the place-based case studies. It tracks the planning and policy decisions that created the unique urban structure and the conceptual iterations of the natural landscape maintained through various stages of city development. The chapter traces the origins of Canberra's urban nature reserves, as part of the symbolic landscape setting of the national capital, and shows how their values have changed over time. Drawing on archival documents, it touches on the legacy of past land use and management prior to the creation of the nature reserves and considers the social relationships and networks that have ensued. A social profile of the residential suburbs adjoining the place-based case study sites is presented to describe the communities living near the nature reserves.

Chapter 6 builds on a peer-reviewed paper presented at the 8th State of Australian Cities Conference held in Adelaide, 28−30 November 2017, (Eyles 2017). It examines how nature is experienced in urban edge settings using place-based case studies of Mt Taylor Nature reserve and the Mulligans Flat Woodland Sanctuary. Drawing on semi-structured interviews with neighbours and reserve users, direct observation of reserve users, ParkCare group participation and pilot engagement activities, the chapter presents insights into how people experience each nature reserve and considers their perspectives on its care and management. The chapter closes with an exploration of what these local social attachments might mean for management of urban reserves, drawing on the concepts of place attachment and social capital, and presents ideas to facilitate childhood connection.

Chapter 7 builds on a peer-reviewed paper presented at the 7th State of Australian Cities Conference held on the Gold Coast, 9−11 December 2015, (Eyles 2015). It examines how the new residential suburb of Forde (next to the Mulligans Flat nature reserve) and the new suburbs of Wright and Coombs (next to the Molonglo River nature reserve) were planned and developed, drawing on focus groups and semi-structured interviews with a diverse suite of practitioners. It presents practitioner insights into the challenges of working next to nature reserves, their willingness to experiment with bio-sensitive development measures, perceived barriers to innovative practice and views about the role of developers to seed community engagement and stewardship. An embedded case study of the BoB forums at Gungahlin and Molonglo documents how this boundary organisation bridged disciplinary cultures to share

local knowledge and considers its potential as a model for knowledge transfer and improved urban development practice near nature reserves.

Chapter 8 examines how urban nature reserves are managed using place-based case studies of Mt Taylor Nature reserve and the Mulligans Flat Woodland Sanctuary. It draws on focus groups and semi-structured interviews with land managers and their advisors, community-based conservation managers who work in reserves and ParkCare volunteers. The challenges and management structures of each reserve are contrasted, drawing on these managers' perspectives and experience. The complexities of managing bushfire risks and the role of volunteer programs in assisting both bushfire and reserve management are explored in the second half of the chapter. The diversity of volunteers' experiences and motivations is considered through data from interviews with ParkCare and Community Fire Unit (CFU) volunteers and participant observation. This surfaces the potential for more collective learning, drawing on local knowledge and greater collaboration in nature reserve management.

Chapter 9 revisits the research proposition and questions, distilling the key learnings and insights from the case studies and building on current understandings in literature and management practice. The chapter concludes by presenting ideas to re-frame management in a way likely to be benefit both urban people and conservation for consideration by planning practitioners and nature reserve managers. These relate to the ACT, the primary setting for the research, but could be used as reference point and resource for managers in other urban settings with similar challenges.

Chapter 2: Ecological and Social Dimensions of urban nature reserves

2.1 Chapter Overview

This chapter explores the ecological and social dimensions of people's relations with nature in cities, focusing on places protected for nature conservation: national parks and nature reserves in urban areas. It draws on published policy, research, technical documents and academic journals from the disciplinary domains of urban planning, ecology, environmental and natural resource management, social science, recreation and public health. Literature and studies about the city of Canberra, the macro case study setting, are included. The synthesis of literature is ordered under three key themes relevant to this research project: 'Living'—how local people and neighbours experience urban nature reserves, the social settings and relationships, benefits of nature connection, care and stewardship; 'Developing'—how urban suburbs next to nature reserves are planned and developed, the decision-making framework, planning practice and knowledge disciplinary domains that prevail; and 'Managing'—how nature reserves are managed, the differences with urban reserves, planning practice, knowledge and disciplinary domains, neighbour relations and ecological stewardship in urban settings. The place associations and social relations that are drawn from this diverse literature are rarely viewed together, highlighting the value of undertaking qualitative research (see section 1.5 and 1.6). The chapter closes by identifying the knowledge gaps and opportunities to build useful qualitative research that will expand and contribute to new ways of understanding people's social relations with urban nature reserves.

2.2 Theme 1: Living with nature

2.2.1 Historical and contemporary relationships with nature in cities

Many Australian cities have long histories of co-habitation with wildlife and bushland, both within and on the suburban edge. James Woodford (2004: iii) observed that every 'Australian city has a wildlife underworld. A pumping, thumping ecosystem that exists in spite of and because of us'.

Australia's most populous capital city, Sydney, is framed by nature—in the south, by Australia's oldest national park, Royal National Park (Moseley 2012); in the inner- and south-west, by its rivers; in the outer north, by Ku-ring-gui National Park; in the west, by the Blue

Mountains and in the east, by harbour foreshores (Keane and Davies 2015, Karskens 2009). To Sydney's immediate north, Brisbane Water and Bouddi National parks fringe the Central Coast, while to the south, the Illawarra Escarpment, Dharawal and other National Parks encircle Wollongong. Other Australian cities are similarly framed, with Queensland's Gold and Sunshine Coast regions characterised by their spectacular hinterland national parks and protected sand islands to the east. Indeed, the Gold Coast's national parks are described as the 'Green behind the Gold' (Low Choy 2007).

Canberra is perhaps the most unique of all capital cities, purposefully designed with the natural landscape for the benefit of all people (Reid 2002). It was planned with an aesthetic identity that would resound with all Australians and a visually and accessible landscape for the people who live in the national capital. See Chapter 5 for a detailed exploration of Canberra's natural landscape, which provides the macro setting for this place-based case study research.

Urban residents are at the heart of much history around conservation of bushland in Australia's cities and beyond (Robin 1994). Before the environmental battles over Australia's iconic rainforest and wilderness sites in the 1980s and the much lauded rural landcare movement (see Youl et al. 2008; Mues et al. 1998; Campbell 1994), urban residents were advocating to protecting their 'local patch of bush'.

The first 'green ban' was placed on a section of Sydney's foreshore bushland, Kelly's Bush at Hunters Hill, along the lower reaches of the Parramatta River (Burgmann and Burgmann 1998; Manning and Hardman 1975). This bushland was earmarked for housing and 13 local residents, all women, spearheaded a campaign to protect the bushland, partnering with unlikely allies, Union organiser Jack Mundey and the Builders Labourers Federation (See Figures 2.1−2.3). The so-called 'Kelly's Bush Battlers' fought to save this bushland for over 13 years until its protection in 1983 (Pitt 2011). It 'marked the birth of urban environmentalism' (Stephens 2007) and remains the only remaining substantial area of natural bushland on the lower Parramatta River. [5]

Local residents also fought for protection of the Georges River National Park in Sydney (Goodal et al. 2005) and the realisation of a promised reserve for the Wolli Creek bushland remnants in southern Sydney (Munro 2010). Canberra has its own urban conservation stories,

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[5] https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045753

with local people leading the protection of Mulligans Flat in 1994 (see Chapter 5). In Melbourne, community groups campaigned to save the Dandenong Ranges (Boyd 2010), Beaumaris coastal heath vegetation (Robin 1994) and remnant patches along Merri Creek (Bainbridge 2009). On the Sunshine Coast, locals saved a large area of wetland on the Maroochy River in the 1970s from a canal development (see Appendix 16). There are similar histories in many US cities, with local people critical to protection of green spaces (Harnik 2010) and leading their restoration (Friederichi 2006; Gobster 2001; Gobster and Hull 2000).

Figure 2.1 Kelly's Bush foreshore
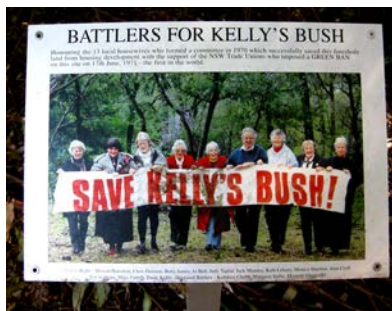
Figure 2.2 The 'Battlers'

Figure 2.3 Kelly's Bush view

Figures 2.1−2.3 Kelly's Bush and the Kelly Battlers with Jack Mundey

Source: Hunters Hill Council; Kalajzich 1996: Friends of Kelly's Bush

These remnant natural areas in Australian cities continue to be maintained by their neighbours; these enduring long-term social associations are critical to their restoration, protection and management (Reidy et al. 2005; Bush et al. 2003; Brown 2001). Urban neighbours have been active in the restoration of Sydney's Lane Cove National Park (Reidy et al. 2005; Brown 2001), and urban bushland in Ku-ring-gai in Sydney (Jones and Jones 2009; Abell 2005) and along Merri Creek in Melbourne (Bainbridge 2009; Bush et al. 2003). In the ACT, ParkCare groups have cared for urban nature reserves in Canberra Nature Park for almost thirty years (Rainbird et al. 2012; Brownlie 1991). Local people also cared for what was orphan bushland (Safstrom

and O'Byrne 2001) in the Wolli Creek catchment in Sydney prior to its transfer to public ownership (see Figure 2.4); they remain its primary carers. [6]

Figure 2.4 Residents lobbying to save urban bushland, Wolli Creek, Sydney

Source: SMH (Munro 2010)

Davison (2005) described this engagement as 'emergent performances of suburban nature'. The physical practice of 'caring' for urban bushland began in the 1970s with the pioneering bush regeneration work of the Bradley sisters at Mosman, Sydney (Bradley 1988, 1971). This practice seeded a Sydney-wide urban bushland regeneration program in the 1980s (led by Joan Bradley) under the auspice of the National Trust of Australia NSW. [7] The techniques were integrated into vocational training for bush regeneration (Buchanan 1989) and remain the basis of bushland management practice in local government and park agencies working in collaboration with local communities (Perkins and McDonald 2012; Reidy et al. 2005). Importantly, this history reveals that local people were active in bushland protection and management well before formal policy was enacted to recognise the ecological values of urban

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[6] http://www.wollicreek.org.au

[7] http://www.nationaltrust.org.au/services/bushlandmanagement/history

bushland. [8] Another defining feature is how local volunteers helped create and evolve partnership models and on-ground restoration practice with management agencies. This is explored in Chapter 8 for Canberra's ParkCare program and in Appendix 16 for the Central Creek Grasslands in Victoria and the Maroochy Wetlands Sanctuary QLD.

Local people are involved in wildlife surveys in urban landscapes (Eyles and Davey 2016; Le Lievre 2016; Wolcott et al. 2008; Fitzgibbon et al. 2006; Lunney et al. 2000). Annual citizen science surveys like Birdlife Australia's 'Aussie Backyard Bird Count' [9] are growing in popularity and providing important trend data from urban backyards about iconic bird species (e.g., the kookaburra, which would otherwise not be sampled) (Herman 2017). In the ACT, the annual Frogwatch Census carried out by urban volunteers has produced a long-term dataset about the abundance and distribution of local frogs that has enabled important new citizen-led research about the effects of climate change on frogs (Beudel 2018; Ritchie et al. 2016). These long-term social associations between neighbours and nature reserves and species-focused citizen scientists show the variety of ways humans are entangled with natural spaces and wildlife in the city (Kight 2012; Davison and Ridder 2006).

2.2.2 Engagement of urban people with nature reserves in cities

Despite the examples above, the most significant literature is focused on the users of urban parks and green open spaces, including health benefits, physical attributes and activity surveys (see Davern et al. 2017; Frances et al. 2012; de Vries 2010; Heft 2010; Sugiyama et al. 2008; Giles-Corti et al. 2005; SUPER Group 2002) with less that focuses on people using nature reserves in urban areas. Even where such literature exists, it tends towards generic reserve visitor surveys [10] (DEWNR 2017; Roy Morgan Research 2017b; Newspoll 2012; Ramsay 1997) rather than in-depth qualitative studies.

Management planning processes for nature reserves are often used to garner people's views about why they visit reserves. As part of the public consultation process for the Canberra Nature Park management plan in the late 1990s, respondents identified 'walking' as their favourite activity and convenience, tranquillity, solitude and privacy as motivations (EACT

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[8] State Environmental Planning Policy No. 19 - Bushland in Urban Areas https://www.legislation.nsw.gov.au/#/view/EPI/1986/014.

[9] The Aussie Backyard Bird Count is in its seventh year in 2020; see: https://aussiebirdcount.org.au.

[10] https://www.environment.nsw.gov.au/research-and-publications/our-science-and-research/our-research/social-and-economic/social/domestic-visitation.

1999). However, more recent studies about Canberra's nature reserves have drawn primarily on the views of the established and organised recreation and conservation 'user' groups and a core group of environmentally active individuals. Thus, the values and experiences of everyday users and reserve neighbours are not well represented in these studies (NCA 2014; OCSEa, b; Jose 2010; Chevalier and Hoffman 2010). [11]

This situation is not unique to Canberra; only a small body of Australian research considers the perspectives of urban residents living near nature reserves. These studies found that people value living near the bush and enjoy interactions with urban wildlife (Gill et al. 2009; Fitzgibbon et al. 2006; Barnett et al. 2005). They did not need to have an understanding of the specifics of the local biodiversity to value and appreciate the environmental significance of the bushland and act in ways that were sympathetic. In Gill et al,'s study of the Croom protected bushland south of Wollongong in New South Wales (NSW), local residents and users were interviewed about how they felt about the bushland, how they used the bushland and how it was managed. Users valued the bushland for 'the experiences of nature', expressed through 'certain emotions, aesthetics and experiences'. They also appreciated the presence of wildlife and saw the value of having the space in an urban area, with many observing the changes in the bushland and species. Some observations were 'relatively casual' noticing species while walking and some, more 'detailed, embodying a desire to learn more about the bushland' and its wildlife including spiders and migratory birds (Gill et al. 2009: 189−190). They also saw the bushland as a 'social space' and enjoyed seeing other people engaging with the bushland. Users' perspectives were contrasted with those of bushland managers, expressed in the policies in the management plan. The plan positioned human visitors as 'intrusions' and 'targets for management interventions and education', suggesting managers do not understand the 'strong associative links' local people have with the bushland that 'embody support' for protection, albeit differently expressed in 'experiential aesthetic and emotive terms' (Gill et al. 2009: 191−192).

A recent study of Perth greenspace and bushland users found that non-material benefits, including the opportunity for recreation, relaxation and social contact, featured most strongly

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[11] The term 'users' in the literature describes people who use parks and nature reserves. This commonly understood term is adopted in this thesis, while recognising its limitations for describing 'social relations'.

in descriptions of their nature experiences (Dickinson et al. 2017). Users who were environmental volunteers also described the experience of 'discovery', learning about nature and teaching; they also had more awareness of the heritage of the place. The opportunity to 'escape' was common across all users and many of their favourite places coincided with spaces that related to their expressed values like exercising, social contact or the natural areas. The study found that there is a complex interplay between the biophysical attributes of the space, the values held by individuals, memories and perceptions, all influencing user experiences and benefits and their connection with nature. The inter-relationships between physical attributes and social relations in creating place meaning and value have been identified in other studies of people engaging with nature (see Stedman 2003a; Eisenhauer et al. 2000), as have the frequent visitation of local favourite places (Bijker and Sijtsima 2017) and the importance of non-material and experiential factors (Bieling et al. 2014).

Head and Muir (2007, 2006a, b) explored how urban people think about nature using urban backyards as a lens in the cities of Sydney and Wollongong in NSW and the town of Alice Springs in the Northern Territory. [12] They found differing perceptions of nature with non-gardeners viewing nature as 'spatially distant from the backyard'—such as the 'wilderness or bush'. The non-gardeners associated backyards with 'neatness and order' as part of the built environment, a form of 'manipulated nature' that was 'different to pristine nature' (Head and Muir 2007: 87). Those more actively engaged with their gardens, expressed connectedness to nature through their backyards and considered nature an active and resilient participant, even in highly humanised landscapes of the city (Head and Muir 2007: 88). People whose backyards shared a boundary with bushland had higher levels of connection and engagement with that bushland. They had predispositions towards native plants and were more likely to have open boundaries to the bushland and enjoy practices like bird watching. Some also engaged in stewardship of the adjoining bushland through mostly (non-group) practices like weeding and observing; others went further, actively restoring bushland. Others also engaged in protective-type practices like litter removal, mowing and pruning and kept a watchful eye over human behaviours in the bushland (Head and Muir 2006b). Head and Muir posited that the passion and insights of nature that people accrue through their interactions in suburban backyards, can potentially be harnessed in the 'necessary shifts towards more sustainable cities' (Head and Muir 2007: 154). Their research also suggests that for many people, the remnant nature in cities

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[12] Wollongong is a city of about 300,000 people, 85 kilometres south of Sydney on the Pacific coast and Alice Springs a central Australian desert town of 26,000 people, when the research was undertaken.

is not necessarily perceived in the same way as the nature protected in more remote regions and national parks.

2.2.3 Place attachment and connectedness to nature reserves

Given the paucity of Australian studies, international studies can provide insights into local people's experience of nature reserves; here, the concept of 'place' is useful to understand this experiential dimension (Lin and Lockwood 2013). A comprehensive study of local users of natural areas in urban Michigan, US, explored place attachment, preferences, environmental knowledge and attitudes towards management related to that place attachment (Ryan 2007, 2000). Study participants were categorised according to their relationship with the reserve as either 'active' (recreational walking and biking), 'passive' (viewing by nearby neighbours) or 'conceptual' (restoration volunteering and also management staff drawing on their disciplinary knowledge and expertise). Users were mostly strongly attached to particular features like large trees and a wooded riverside. This attachment was revealed as 'favourite' places that users were eager to show others and, in some cases, a willingness to actively protect these areas. Attachment is also multi-dimensional, from neighbours enjoying the view and people engaged in active recreation to those involved in management or with a 'larger goal' of restoring degraded habitat (Ryan 2000: 213).

Ryan's Michigan study found that passive and active users had place-specific attachments that influenced their views of management. Passive users liked traditional interventions like mowing, cleared paths and attractive plantings. They preferred the more refined landscapes and developed areas and expressed fear of the wilder places. Volunteers wanted to minimise management and remove exotics to let nature take its course and felt comfortable in the wilder areas of the reserve. The study found people could be both place and conceptually attached. The conceptually attached users were also environmental advocates for natural places where they had no personal experience; and this type of attachment (rather than place specificity) has been found in other studies of adults who are strongly nature-connected (Colleony et al. 2017).

Being near and having access to nature for recreation is an important aspect of place attachment. A study of users of a Swedish Biosphere reserve found that participating in recreational activities was a key factor in the development of place attachment (Beery and Johnsson 2017). Proximity is also important, as those sites closer to the home are used more regularly. Users were motivated to relax in the reserve to 'be near nature' (Beery and Johnsson 2017: 61). Reserve managers have recognised these motivations by presenting distinctive

biodiversity at the popular sites. The distinctiveness of a place was recognised as a factor in attachment by other studies (Twigger-Ross and Uzzell 1996) and some found that recreational place attachment was greater for locals than for non-residents/visitors (Bonaiuto et al. 2002; Kaltenborn and Williams 2002).

A United Kingdom (UK) woodlands study found that people prefer to walk in local spaces minutes from home, suggesting an ideal home range location of 100−400 m. Open structure woodlands were preferred, with shape and size also important to provide enough space and exploration potential for a decent walk, experience and break (Coles and Bussey 2000). The same study found that the woodland managers often discounted some places valued by local residents and did not prioritise their management. A Canadian study found the most valued natural places were those where nearby residents could exercise certain control to manage them according to their own representation of what was desirable (Voulignay et al. 2009). The importance of maintenance and landscaping was a key component of that representation. People also appreciated the ephemeral and seasonal phenomena that 'slightly and temporarily modify landscape components' both for the 'impression of novelty and renewal they provided to residents' (Voulignay et al. 2009: 898).

Another critical finding of Ryan's Michigan study was the effect of frequent experience in urban natural areas. The more people recreated or volunteered, the more attached they were to the place, suggesting that 'attachment is built through experience' (Ryan 2000: 212). This builds on earlier work by Yi-Fu Tuan concerning the intensity generated by repeated place experience, whereby places acquire meaning through the 'steady accretion of sentiment' and experience (Tuan 1974: 33). Spaces become places as they become imbued with meaning through lived experience: 'what begins as an undifferentiated space becomes place when we endow it with value' (Tuan, 1977: 6).

The importance of meaning was further explored in a UK study that examined urban people's pathways to nature connectedness, structured around biophilic values (Lumber at al. 2017). Nature engagement and interactive activities that involved contact, emotion, compassion, meaning and beauty were found to facilitate connectedness whereas just walking in a natural setting and environmental education programs focused on knowledge and identification-based activities did not. This work suggested the traditional 'knowledge' pathways to connect urban people with nature should include activities that involve 'contact, meaning, emotional attachment, or compassionate relationships with nature that include engaging with beauty' (Lumber et al. 2017: 21). These findings are supported by research about environmental

education programs where art is used to build awareness of environmental issues and create meaningful experiences for students. Through art, 'children can learn about nature in a fun, stimulating, and hands-on way' (Song 2008: 19) that facilitates connectedness with nature (Song 2012). An appreciation of beauty was also important to children forging an emotional bond with nature and environmental education programs should include direct hands-on experience, place-based learning and action-oriented inquiry (Song 2012, 2008).

An Australian nature experiment reinforced these ideas. A group of 16 ethnically diverse school children were taken on a four-hour bushwalk in the Wolli Creek Valley in Sydney. Although residents of the area, most children had never been into the Valley and ten had never been in the Australian bush (Wheatley 2008). The bushwalk seeded a book project, *Going Bush*—a co-creation using the children's art and stories from the valley (Wheatley and Searle 2007). The children were taken on a second walk for a photoshoot and displayed less fear and more excitement about being in the bush with the prospect 'they will talk up their experience to their families and neighbours and will even take them into the bush' (Wheatley 2008: 96).

These examples align with research findings about building children's bonds with nature through unstructured engagements, creative activities, play-acting and repeated experiences in place (see Gill 2014; Sobel 2008). This pathway was further reinforced in a US study that evaluated a program designed to facilitate young people's connection with nature through a variety of activities like outdoor hiking and creative arts. The nature focused 'Creative Art Contest' activity increased young people's implicit connectedness with nature, whereas the outdoor 'Natural Treasure Adventure' and the 'Virtual Hike' activities did not (Bruni et al. 2015: 15).

2.2.4 Studies of urban landscape preference

Another way of understanding social relations with nature is through the study of human perceptions of landscapes and vegetation. Most of these studies were conducted in the northern hemisphere (Kaplan and Kaplan 1989), and while significantly different landscapes, there are similarities with Australian research (Williams and Cary 2002) on native vegetation preferences.

A Melbourne study surveying urban and rural residents found that both groups preferred more open woodland with a lightly textured understorey over non-eucalypt vegetation like oak woodlands and grasslands (Williams and Cary 2002). Open woodland was preferred over dense

vegetation especially by urban residents who were also more likely to describe vegetation in relation to their use (e.g., for recreational walking). A perceived association between biologically diverse landscapes and wildlife habitat appears important for urban communities. Urban residents with pro-environment attitudes were more likely to prefer undisturbed ecosystems. The symbolic value of landscape and perceptions of a landscape as 'typically Australia' enhances urban preference. This is particularly true for Canberra, which is colloquially known as the 'bush capital'. The Melbourne research revealed that natural landscapes are valued and assessed in different ways by various sectors of the population and managers must respond to these different 'value orientations' and examine opportunities to adjust their management accordingly.

Additionally, the study found that native grassland landscapes have seen less literature and landscape preference research. Drawing on theories of preference, the authors suggested approaches to enhance appreciation of grasslands by urban communities, including mowing paths and edges, installing attractive fences and shelters providing 'signs of care' (see also Nassauer 2011). With such treatments, grasslands are viewed as valued open space rather than unloved vacant land (Cary and Williams 2000). These ideas are important for Canberra where there are large urban grassland nature reserves in Gungahlin adjoining urban suburbs. To date, these have no infrastructure to promote access and build appreciation by urban neighbours. The application of some of these ideas was observed in grassland reserves in north-western Melbourne, along with interpretative signage that links these grassy ecosystems with their role for wildlife habitat; [13] see Figures 2.5−2.7 for the Craigieburn Grassland [14] and Figures 2.7−2.9 for the Sunbury Evans St Grassland. [15]

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[13] Field trip for Myer Urban Grasslands Forum Melbourne 6-7 November 2013

[14] https://www.mcmc.org.au/parkland-manageme nt/parkland-management-news/247-craigieburn-grasslands-2

[15] https://grasslands.ecolinc.vic.edu.au/grassland/evans-street-wildflower-grassland

Figure 2.5 Craigieburn Grassland: seating, mown edges and a wide pathway

Figure 2.6 Craigieburn Grassland: grassland fauna signage

Figure 2.7 Evans St Grassland: grassland fauna signage

Figures 2.8 Evans St Grasslands: attractive edge fencing and gravel pathway

2.2.5 Health, well-being and nature reserves

There is growing focus on the value of urban nature for societal health and well-being (Shanahan et al. 2017a, b; Beatley 2011) and this is the most widely researched subject about our human relations with nature. The 'Healthy Parks Healthy People' initiative was adopted in Victoria to encourage people to connect with parks and enable new partnerships with the health community (Maller et al. 2009; Senior and Townsend 2005). Human well-being is promoted as a key motivation to conserve urban biodiversity (Dearborn and Kark 2010) and scientists are exploring how the human−nature connection might provide pathways for nature conservation in cities (Ives et al. 2017; Zylstra et al. 2014). A French study found Parisian park users—although not botanically literate—valued native plant diversity because of its beauty and effect on their sense of well-being; this naturalness supported their motivation to pursue nature restoration in the city (Muratet et al. 2015).

Direct experience of nature builds attachment to local reserves and appreciation of biodiversity (Dickinson et al. 2017; Luck et al. 2011; Ryan 2005, 2000). Access to natural spaces provides multiple health benefits (Davern et al. 2017; WHO 2016; Carter 2009; Maller 2006; Maas et al. 2006), including regular social contact (Maas et al. 2009). Restorative benefits have been demonstrated from exercising (Bratman et al. 2015; Carrus et al. 2015; Barton et al. 2012) and environmental volunteering in natural spaces (Townsend 2006, Ryan 2000). Even the visible presence of nearby nature (e.g., vegetation and abundant birdlife) in urban settings is associated with better mental health (Cox et al. 2017; Shanahan et al. 2015).

As more people live in cities, there is concern about loss of everyday contact with nature, for both health reasons and a loss of affinity for nature (Soga and Gaston 2016; Trzyna 2014). The disconnection of children is viewed as particularly harmful (Broom 2017; Monbiot 2012; Louv 2007). A US study of adult visitation to Minnesota state parks found that adults that had participated in nature-based activities as a child were more motivated to choose these activities in adulthood (Asah et al. 2012); their childhood experiences strongly influence their frequency of visits and nature connectedness as adults (Colleony et al. 2017). Childhood nature engagement has been described as an important 'nature-accumulation process' that influences their pro-environment behaviours and attitudes as adults (see Thompson et al. 2008, Chawla 2015, 1999, 1998, Chawla and Derr 2012). A UK literature review and Australian research suggest that children's health outcomes and positive feelings about nature are best achieved through hands-on free play and less structured outdoor engagements in nature (Gill 2014; Greater London Authority 2011a, b; Maller 2009; Sobel 2008). A review of literature relating

to children's physical activity, access to nature and outdoor environments is provided in the topical case study of childhood nature experience in Chapter 4.

There is extensive research exploring how the design and attributes of outdoor and natural spaces can facilitate physical activity and benefit health and well-being. The concepts encompass environmental 'affordances' (Gibson 2000, Heft 2010)—the 'cue' the environment offers an individual in terms of perception and behaviour (Ward Thompson 2013: 81). For urban nature reserves, these could be clear natural pathways or ledges that enable sitting and viewing; with these features built into park infrastructure to support people's physical and emotional experiences and activities. Such initiatives can recognise the aesthetic qualities of nature reserves and their associated restorative roles (Kaplan 1995; Kaplan and Kaplan 1989) and consider that much sense-making in nature happens via stimuli perceived in the bush within 2−3 m of the walking track (see Steven 2005).

Linked to the aesthetic and affordance concepts is the idea of 'environmental support' (Sugiyama and Ward Thompson 2008). Here, aspects of the space make it easy for people engage in exercise, particularly older people. In urban nature reserves, this might mean shady, safe, easily navigable trails, convenient car parking and good signage. Women in particular have been found to enjoy exercise in visually pleasing park environments that offer therapeutic or spiritual scenic experiences (Krenichyn 2004, 2006) and present less safety concerns (e.g., traffic and unwelcome remarks). There are also temporal dimensions to how people use natural spaces. They prefer places closer to home to experience nature during the week to 'relax and get distraction[s] from city life' and visit larger reserves with more facilities (e.g., for picnicking) for socialising on weekends (Bertram et al. 2017: 13). This temporal effect was evident in a study of people using the Royal and Blue Mountains national parks in outer Sydney. Of 371 surveyed visitors, 72% were walkers, 9.2% were runners and 8.6% hikers/bushwalkers. The runners lived closer and were the most frequent users with 88% running once per week (usually following the same trail), compared to 31.6% of walkers and 27.9% of hikers. Over half of the hikers and walkers visited these large parks only a few times a year. Motivations to visit (from most stated) were, being outdoors experiencing nature, exercising, sightseeing, being active, seeing flora and fauna, relaxing, maintaining health and, pursuing peace-of-mind tranquillity (Wolf and Wohlfart 2014). Health and exercise motivations were strongest among the runners and gaining endurance was important to the hikers. For hikers and walkers, physical exercise was secondary to the experience of being in

nature, socialising and sightseeing. All groups reported improved well-being, with women experiencing greater levels than males.

Hartig (2003, 2007) highlighted the connections between the restorative health effects of pleasing natural environments and physical activity. Bowler et al. (2010) showed the emotional benefits of physical activity in a natural environment with longer and more regular walking. A review by De Vries (2010) found that the strongest benefits of nature in urban settings were for mental health and social contact, followed by physical activity and health benefits of clean air. Social contact and connections were the motivation for being active outdoors.

Physical activity studies also provide useful insights into social factors, motivators and qualities of the physical environment in urban settings. Giles-Corti and Donovan (2002) found that the availability and amenities of the local environment in the city of Perth were secondary to the individual and social motivators of setting a health activity goal and having someone to exercise with. Elsewhere, links have been established between motivations and walking for recreation and having an aesthetically attractive green spaces to walk (Sugiyama et al. 2010; Carter 2009; Rhodes et al. 2006; Giles-Corti et al. 2005; Bedimo-Rung et al. 2005). These local places offer access to nature and are the most frequently visited (Bijker and Sijtsima 2017). The availability of nearby natural elements—views, trees, well-landscaped grounds and places for walking—were also the most important factors in neighbourhood satisfaction (Kaplan 2005) and have been found to be important regardless of urban density (Kearney 2006).

Distance to attractive greenspace was also found to be relevant: proximity was predictive of whether people chose to walk (Sugimaya et al. 2010). However, in terms of 'how much' people walked, closeness was less important to the surveyed group (young to middle-aged adults) than whether a larger attractive park was within walking distance (Sugimaya et al. 2010). The importance of proximity is likely to be different for others like children and older adults. Access alone is insufficient to facilitate physical activity and environmental and design responses need to consider 'fit' for different groups. Recreational walking is viewed as having the most potential for increasing physical activity but Ward Thompson (2011: 91) suggested that it is necessary 'to understand these relationships better' and consider 'how the scale and grain of the environment matters for different physical activity and populations'. This leads back to what affordances encourage people to be active in nature. A study of park users in suburban Adelaide found that a linear parkway along the River Torrens was used for more (metabolically) intense activities like running, fast walking and cycling, with 'this physical

health benefit exclusive of other potential benefits of linear parks such as urban connectivity and wildlife corridors' (Brown et al. 2014: 42).

Natural experiments are another means to explore whether physical changes to the environment influence physical activity but very few have been conducted (Veitch et al. 2012). A natural experiment study of park visitation following the installation of a 'natural playscape' by Parks Victoria in Melbourne found that this intervention increased park visits and encouraged users to be physically active. The playscape was designed to connect children and accompanying adults with nature using references to local flora, fauna and Indigenous stories and was developed in an area of the park with no previous amenities (Veitch et al. 2018). Researchers suggested that these attractors can be enough to promote outdoor activity, even with other barriers like distance (Sugimaya et al. 2010).

In terms of beneficial nature access, other factors may affect different groups. For example, getting city workers to access greenspace for restorative reasons was hindered by the 'power of personal routine', established indoor office habits that are difficult to change (Hitchings 2010: 100). This interesting research posited that 'working with the grain of city worker's lifestyles' might disrupt this indoor routine and get them outdoors. It quoted the example of a London Parks agency sending texts to office workers to remind them about nearby greenspace and interesting times to visit (Hitchings 2010: 101). This example shows how social media can be used by Parks agencies, along with event programs and the design of infrastructure to align with public health outcomes (Pett et al. 2016). Workplace settings near nature can provide opportunities for everyday contact (Kaplan 2007), which is arguably important to build urban support for conservation (Miller and Hobbs 2002).

2.2.6 Experiences of culturally diverse users in nature reserves

Cultural diversity is a critical factor in the social settings of urban nature reserves. At the 2016 Census, 26% of Australia's population was born overseas and nearly half (49%) of all Australians were either born overseas or had at least one parent born overseas. Those born overseas are more likely to live in a capital city; 83% reported living in a capital city, compared to 61% of the Australian-born population. More recent migrants were also more likely to live in a capital city (ABS 2017). Very few Australian studies consider multi-culturalism and national parks, suggesting that these potentially different community experiences are not reflected in management and interpretation (OEH 2013; Wearing et al. 2008; Thomas 2002). The NSW National Parks and Wildlife Service (NPWS) funded research into the experiences

of two different migrant communities in Sydney (Thomas 2001, 2002) and also in specific park settings (Wearing et al. 2008).

The 2001 study focused on the Macedonian community. Sydney's national parks were found to have:

> played a unique role in consolidating the feeling of being Macedonian in Australia. Picnics and barbecues provided occasions where they could be together *en masse*. They could speak their language, drink their grappa, sing and dance without ridicule…They could enjoy their own food, cooked according to the Australian barbecue tradition. Young people could meet, socialise and some would marry (Thomas 2001: 93).

In the study, NPWS officers described how different areas in national parks are preferred by different groups of visitors. The walking tracks are described as 'very Anglo; the beaches – a mix of different cultures'. The 'ethnic communities gravitate towards the picnic areas', with certain localities popular for different ethnic communities (Thomas 2001: 30). Officers identified the challenges staff faced because of their 'lack of training in cross-cultural negotiating skills' and the 'difficulties that include, but extend beyond, the frequent lack of common language' to ensure user safety and protect wildlife (Thomas 2001: 32).

The 2002 study explored the experience of Vietnamese migrants, with most preferring more manicured public parks. Many viewed national parks as 'frightening and dangerous', as the space, smells and sounds strongly contrasted with the landscapes of their home. Most visits to national parks required a 'cultural mediator – either a non-Vietnamese friend or younger Vietnamese person who had previously visited to initiate the visit' (Thomas 2002: 126). National parks are popular for recreation, especially picnicking and fishing, and also religious activities and scouting, providing the younger generations with 'a sense of belonging, attachment and pride in being Australian' (Thomas 2002: 128).

Wearing et al. (2008) built on this work by studying how a culturally diverse urban community uses the Georges River Parklands, including the national park. Arabic participants utilised the parklands in the evenings for religious and cultural activities (breaking the Ramadan fast after dusk). Anglo and Vietnamese Australians showed a preference for early morning exercise and Aboriginal people shared memories of using the park before the park boundaries were placed. Young Anglo Australians showed a preference for (unauthorised) party activities deep in the bushland, which were often a nuisance for park neighbours. The study also compared the social values of the cultural groups and park management approaches, particularly around providing

facilities, access to parks (opening hours and lighting) and expectations about suitable behaviour. It found that visitor management should be adapted to incorporate the needs and experiences of the culturally diverse urban community and proposed a 'Cultural Opportunity Spectrum' for application (Wearing et al. 2008: 28).

The findings of these Sydney studies mirror a study of Chicago park users from Caucasian and minority communities (Black, Latino and Asian). The minority groups engaged in passive park activities like picnicking and socialising, often using the same areas in the park and visiting in large, family-oriented groups, whereas the Caucasian users favoured solo physical activities and were mainly individuals or couples. All users expressed a preference for the natural features of the park and shared concerns about cleanliness, maintenance and safety (see Gobster 2003).

These studies suggest key challenges for park agencies to incorporate cross-cultural understandings and manage the 'significance of the park estate for communities whose perspectives have generally been overlooked' (Thomas 2001: 101). One key area is interpretation and communication with culturally diverse park users—particularly new migrants who may speak limited or no English. Coming from different cultural settings makes it difficult to understand the conservation purpose of parks and the norms around using these places (see Thomas 2001). Static park signage is the generally the main means of communication for park users. Staiff et al. (1999) found that interpretative signage tends to be scientifically-based and rarely communicates other cultural understandings about landscapes (e.g., their social history and aesthetics).

While not widespread, some Australian park agencies have designed programs to encourage culturally diverse communities to visit parks. Parks Victoria has used activity-based programs ('Healthy Parks Healthy People', 'Active in Parks') and grants to community organisations (Discover Parks). Parks Victoria (2013: 28) reported that 'in partnership with the Springvale Community Aid and Advice Bureau, Parks Victoria held two park visits for 42 newly-arrived culturally and linguistically diverse communities in South East Melbourne'. Tasmania's 'Get Outside with Community' program is run by Wildcare Inc. It involves excursions to reserves with people seeking asylum, people from refugee backgrounds and with other culturally and linguistically diverse (CALD) communities. More than 60 trips including over 1,000 CALD participants were held between 2012 and 2016 with Tasmania's Parks and Wildlife Service Discovery Rangers, Wildcare volunteers and migrant leaders. Since 2013, over 30 new arrivals

have been trained in outdoor leadership to support these trips by leading walks, delivering safety briefings and facilitating sensory experiences.[16]

2.2.7 Barriers to engagement in nature reserves

The preceding sections have captured the diverse literature about aspects of our social relations with urban nature reserves. However, being proximate to green spaces does not always equate to direct experience and physical activity in nature (Lee and Maheswaran 2011) and there are many factors that may influence how people feel about connecting with reserves. These include a lack of life experience in nature, cultural background, landscape preferences and feelings about safety and danger transmitted through the media and social groups (Eyles 2013; Thomas 2001; Tuan 1979) as well as social norms and attitudes. The potential influence of the media and how it frames nature is explored in a topical case study in Chapter 3. This includes relevant literature and a content analysis of news articles to uncover how media representations of nature might influence urban engagement. Childhood connection to nature and what this means for developing an affinity for nature and latter adult engagement is the subject of a short topical case study in Chapter 4.

Where life experience in nature is lacking, urban residents may need additional knowledge and skills to live sympathetically near nature reserves (Thompson 2004). US studies revealed that while desiring to protect adjoining reserves, urban edge residents had limited knowledge about how their household practices might affect conservation (George and Crooks 2006; Youngentob and Hostetler 2005). Sales centres can educate potential homeowners about green features that lead to a purchase but this only the 'first step' (Noiseux and Hostetler 2010: 571). Another US study found that few municipalities had policies to educate edge residents about their impact, address encroachment and promote stewardship (McWilliam et al. 2015). Recent experience with new residents of the suburb of Forde, adjacent to the Mulligans Flat Woodland Sanctuary in Canberra, showed that early community education and engagement that reinforces information and provides instruction can build awareness among householders about sensitive ways of living near a nature reserve (Ikin et al. 2015). This type of orientation is an important step in building new community norms (Thompson 2004). Where these new behaviours are publicly visible (e.g., Forde residents looking out for local wildlife and volunteering in the

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[16] https://wildcaretas.org.au/branches/get-outside-with-community/

turtle patrol project), it becomes easier for others to take action, described as 'social diffusion' (see Winter 2000).

2.3 Theme 2: Design and development near nature reserves

2.3.1 Land use planning and nature reserves

Statutory land use planning and environmental assessment systems provide the framework for decisions about new settlement in cities and the protection of biodiversity within and outside conservation areas like national parks and nature reserves (Thompson and Maginn 2012). However, traditional planning tools and concepts such as zoning (used to separate incompatible land uses and optimise suitable ones) and the use of environmental objectives and overlays for physically constrained land have not been able to effectively protect biodiversity and maintain habitat connectivity across the urban landscape (Fitzgibbon et al. 2007; Drinnan 2005; Beatley 2000). Standardised zones and controls used in local plan preparation, as in NSW, [17] can also work against integration and protection of biodiversity across the urban matrix and management of the multiple values of natural areas in cities. To some extent, this is a product of biodiversity policies that prioritise the retention of larger and more connected areas over smaller remnants, which are often considered less valuable in a landscape sense (Soanes et al. 2019; Wintle et al. 2019; McDonnell 2007) and overlooked in the negotiation of biodiversity offsets. [18]

Global research also revealed that these small areas may be important for biodiversity, with these 'isolated patches of remnant habitat likely to contain disproportionately more unique or rare biodiversity values that may be irreplaceable, compared with equivalent sized areas in highly intact landscape' (Wintle et al. 2018: 912) There are some region-specific studies in Australia examining the value of small urban remnants (Soanes et al. 2019; Kendal et al. 2017; McCarthy et al. 2006).

Wintle et al. (2018: 909) proposed that society 'rethink the way we prioritise conservation to recognise the critical role that small, isolated patches play in conserving…biodiversity'. This is particularly important for urban regions, which support more threatened species (Ives et al. 2016) and where, with significant changes to land use, there is a need to maximise the native

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[17] https://www.planning.nsw.gov.au/Plans-for-your-area/Local-Planning-and-Zoning/Resources.

[18] Biodiversity offsets are measurable conservation outcomes that compensate for the negative impacts of development (https://www.iucn.org/resources/issues-briefs/biodiversity-offsets).

vegetation in the landscape (Hahs et al. 2009). Cities also contain many areas of 'wildness' that could connect the larger 'nature-rich spaces' like nature reserves and habitat patches to prevent the island effect (Threlfall and Kendal 2018: 348) In some cases, these are the last remnants of a species or ecosystem (Hahs et al. 2009) and Australia has many examples of this in its cities (Soanes and Lentini 2019; McDonnell 2007).

Beyond connecting remnant vegetation with the large protected spaces in urban areas, nearby residential and other land uses near these important reserves must be planned, designed and managed in a sympathetic way to maintain the ecological functions of these areas, retain vegetated corridors and avoid negative effects (Keane and Davies 2015; Hostetler et al. 2011). A study of four national parks in Sydney found that the values of these protected areas were not adequately protected in key local government land use plans that guided decisions about adjacent urban development (Keane and Davies 2015). This study identified the need for interface controls to minimise adjacent impacts and the need for an outwards focus by national park planners (see Section 2.4.4) to influence regional and local environmental planning for adjacent land. The Management Plan for Noosa National Park is one of the few that identifies other reserves and land of conservation value in the Noosa region that have 'ecologically significant components and functions as connective or buffering areas to the national park' (See QPWS 1999). Some local governments have employed specific interface controls for subdivisions next to significant bushland (Wyong Shire Council 2005) to manage edge effects and provide buffers along watercourses, access to reserves and manage bushfire and water-sensitive urban design (WSUD) requirements.

2.3.2 Role of practitioners, disciplinary dimensions and barriers

While land use planners are key actors at the interface of land use and biodiversity conservation (see Garrard and Bekessy 2014), they are not leading integrative planning practice across the landscape. Few policy/practice-focused papers about biodiversity planning have been published in *Australian Planner* over the last decade, with only a few substantive contributions made (see Lemke, 2009; Rhodes et al. 2008; Fallding 2004). A 2010 'Biodiversity' edition had two short focus pieces and did not attract any peer-reviewed articles (Fowke et al. 2010). Competencies in biodiversity planning are also not required for registration as a 'practising

planner', [19] although the need for this professional education and understanding has been recognised (Jay 2011; Grose 2010b).

Planners are not alone in neglecting this important space. Ecologists have been absent from public discourse on how biodiversity is retained in urban landscapes (Corbyn, 2010; Miller 2005; Mascia et al. 2003; Marzluff 2002; Miller and Hobbs 2002) and are often reluctant to work in human-dominated landscapes (McDonnell 2007, 1997). Ecological research also needs to respond to the urban context and practitioners' questions to help them improve urban biodiversity outcomes (McDonnell and Hahs 2013; Grose 2010b; Garden et al. 2006).

A single Australian study has explored the experience of planners and other practitioners seeking to protect biodiversity in residential projects in a biodiversity hotspot region in Western Australia (Grose 2010b). Practitioners were frustrated by the lack of ecological landscape planning at regional levels and over-emphasis on process, which undermined opportunities for innovation and site-sensitive responses. The planners felt hampered by their limited ecological knowledge and lack of access to ecological specialists and applied research, while the landscape architects felt they had no influence in policy outcomes. The planners felt that improved strategic planning at the landscape scale would lead to better ecological outcomes. Similar sentiments were expressed by planners in Sweden (Sandström et al. 2006) and Finland, who felt that ecologists should be more active in providing insights for plans, connecting information and researching function of spatial responses like ecological corridors (Yli-Pelonen and Niemela 2006).

These calls by the planners are borne out by studies in the US, which revealed that local governments with higher environmental performance have biodiversity specialists within their planning teams (Stokes et al. 2010; Miller et al. 2009). Access to ecological expertise is also needed for post-occupancy management of retained habitat and biodiversity interventions (like constructed wetlands) in urban developments. The same Australian study found limited ecological knowledge among many municipal managers (Grose 2010b). There were similar findings about the management of implementation phases of conservation subdivisions in the US (Hostetler 2012; Hostetler and Drake 2009). A critical component of this management is the post-development monitoring of habitat corridors and water-sensitive design features like wetlands, rain gardens and natural swales. This monitoring is critical, both to ensure their

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[19] https://www.planning.org.au/membershipinformation/registered-planner.

ecological functioning and maintenance and to provide a feedback loop reflecting how these systems are working to inform design and decision-making processes about new urban development (Hostetler 2019; Eyles 2015; Taylor and Ives 2009). Hostetler et al. (2011: 370) called this feedback the 'monitor to manage' approach, which is key to enabling innovation, creativity and improvement in urban development and management practice, including reviews of regulatory and other standards that may stifle innovation (see Eyles 2015). This post-development phase requires the same focus as front-end design and planning (Hostetler and Drake 2009).

The lack of disciplinary integration and post-construction monitoring seems surprising given the complex statutory biodiversity protection regimes in most Australian jurisdictions. These were introduced to align planning and conservation decisions, including bio-certification schemes (NSW Government 2015, 2011) and biodiversity offset policies (NSW Government 2017; ACTG 2015b; DSWEPC 2012). In particular, urbanising areas were identified as a priority for guidance about design and implementation of offsetting regimes (Connolly and Fallding 2009; Farrier et al. 2007). Ecologists are starting to respond by developing metrics to measure the effectiveness of biodiversity offset regimes over time (Miller et al. 2015) and researching their conservation benefits (Maron et al. 2013). Strategic mapping tools are being developed to integrate ecological data in urban settlement planning, allowing practitioners to visualise opportunities to enhance habitat connectivity (Bekessy et al. 2012; Parker et al. 2008). The need for this strategic biodiversity planning at the regional scale was highlighted in the Sydney national park and Perth practitioner studies (Keane and Davies 2015; Grose 2010b) and also US research (see Miller 2006; Kaplan et al. 2004; Beatley 2000). Recent ecological research in Canberra's urbanising areas has provided much-needed evidence about edge impacts and priorities for urban habitat conservation that can inform new urban edge planning (Ikin et al. 2015; Le Roux et al. 2015; Rayner et al. 2015; Ikin et al. 2014).

Meanwhile, Australia's urban development industry has devised rating tools to assess the sustainability performance of its residential building projects (Drummond 2011), some of which include biodiversity aspects. [20] A 2010 report for the *Fifth Estate* found six existing tools and a further 13 under development in Australia, but there was little integration across these rating schemes. Many are designed to measure parameters that give the greatest market advantage, limiting their ability to influence wider practice change across the industry

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[20] See UDIA Envirodevelopment Ecosystem Element http://www.envirodevelopment.com.au/

(Blundell 2010). The Green Star communities rating framework has moved past the pilot phase (McNabb 2013; GBCA 2011). This internationally recognised certification is now applied to large-edge urban development in Canberra (GBCA 2016). Biodiversity-sensitive planning guidelines for urbanising areas have been developed to augment these industry schemes (Garrard et al. 2018a, b; Garrard 2015), and to address biodiversity, which had received less attention than other sustainability elements like energy efficiency and water use.

Despite the tools and research available to assist biodiversity decision-making, there is little evidence of integration and collaboration across different disciplinary domains; most ecological knowledge is outside the institutions that employ urban planning and management practitioners (Handel 2014; Grose 2014, 2010a). Taylor and Hurley (2015: 4) also noted that much urban research is 'poorly tailored for professional implementation', creating barriers to 'research-to-practice' information exchange. Researchers argue that more integrated methods and greater interdisciplinary collaboration are needed (Williams and Smart 2012; Garden et al. 2006) beyond traditional knowledge and tools (Manning and Fischer 2010; Mascia et al. 2003).

The potential contributions and representations of those with lay and local knowledge about ecology should also be integrated but are rarely included in planning decision-making. Hillier (1999a) examined how different meanings are represented in land-use decision-making and found that local and community knowledge was underestimated and discounted and that scientific and technical information (generally presented by 'expert' consultants) was given greater weight despite omissions and distortions. Privileging one form of knowledge risks overlooking key information, especially in local and community domains (Aplin and Batten 2010)—and this is not only an issue for land use planning.

The way natural resources are planned and managed is compartmentalised, with separate statutory regimes for national parks, threatened species, land use and development, natural resource management, open space, fire and weeds (Keane and Davies 2015; Farrier 2002). Rather than enabling integration, this separation leads to bounded thinking and practice (Gill et al. 2009) and creates disciplinary divides (Low Choy 2009). The multitude of layers challenge the implementation of landscape-scale approaches needed to connect fragmented habitat in cities (Garden et al. 2006). This also blocks the necessary organisational coordination and progress towards more logical governance of regional landscapes, including the opportunity to pool resources, jointly fund research and share expertise. Most 'instances of cross-boundary collaboration are largely prompted by opportunistic funding opportunities' rather than the forging of effective landscape partnerships (Evans 2011: 7).

Conservation biologists argue that 'relaxing the [disciplinary] boundaries to engage the viewpoints of all who have a stake in the way in which biodiversity persists and functions…will generate more robust conservation solutions' (Green et al. 2015: 386). Similarly, Turnhout et al. (2013: 154) argued against 'technocratic approaches to biodiversity [that] selectively privilege certain aspects of scientific knowledge while ignoring the plurality and diversity of knowledge-making in regard to biodiversity'. Crofts (2004) called for new integrated planning approaches that link the conservation core of protected areas with surrounding landscapes, engage with local and other communities of interest and recognise the value of local knowledge to complement scientific data and analysis. While these authors acknowledge that local community knowledge is important, there are few effective mechanisms to build this knowledge into public planning processes. Conversely, pathways are also needed to feed learnings about what works in urban settings back into biodiversity design and management (Hostetler 2019, Hostetler et al. 2011; Eyles 2015; Miller 1996). This requires willing and motivated practitioner champions within planning and regulatory government agencies and development firms to ensure the necessary cross-sector participation, to build coalitions and to work effectively with community groups (Brown 2008; Fischler 2000).

Partnerships and shared governance or learning structures are two potential means by which local groups and knowledge might be integrated (Eyles 2015; Durant 2004). Models that work for practitioners include the 'community of practice' concept (Wenger and Wenger Traynor 2015; Wenger 2010, 1998) These are safe spaces for participants to jointly explore ideas and reflect on what does/might work, but they are anchored in the realities of development practice, which is the critical context (Wenger 2010). Such knowledge-sharing environments have been described as 'soft spaces' because they allow for collaboration across boundaries and create opportunities for leadership and promotion of cross-sectoral initiatives (Illsey et al. 2010: 305). Social and collective learning (see Brown and Harris 2014; Cundill and Rodela 2012) are implicit in these practice-sharing structures because people with diverse perspectives collaborate and co-design solutions through continuing dialogue and deliberation (Keen et al. 2005). Conceptual models have been developed to assist understanding of the learning process and value created by such structures (Brown and Lambert 2013; Wenger et al. 2011; Brown 2010, 2008). Deliberative participatory methods and processes are another means to unite different insights and contributions across disciplines and knowledge communities (Stern 2005; Dietz and Stern 1998).

2.4 Theme 3: Managing urban nature reserves

2.4.1 Protected areas

The International Union of Conservation and Nature (IUCN) defines a protected area as 'a clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values' (Dudley 2008: 8). Protected areas originated in nineteenth-century North America, Europe, Australia and South Africa and were set aside to protect spectacular natural features and wildlife (Watson et al. 2014; McNeely 2005; Philips 2004a) or for outdoor recreation for respite from the bustle of cities (Moseley 2012; Nash 2001). For most nations, protected areas are the centrepiece of nature conservation strategies. While most recently principally reserved for their conservation value, they underpin economic activities like tourism and provide intangible or immaterial values for communities (therapeutic, spiritual, aesthetic and artistic) and support recreation, culture, identity, education, research, peace and existence (Secretariat of the Convention on Biological Diversity 2008; Harmon 2004). Protected areas 'have increasingly become the means by which many people see, understand, experience and use parts of the world that are often called nature and the environment' (West et al. 2006: 255). Indeed, it is 'the protective impulse…the motivation to safeguard special places…that drives the modern conservation movement' (Harmon 2004: 19).

The IUCN has developed a suite of different protected area types and management categories that are used by national governments to classify their park estates and these are often applied through legislation. The categories relate to the intensity of human intervention, from wilderness areas through to sites managed for both natural resource extraction and biodiversity (Dudley 2008).

The creation and categorisation of protected areas is not without criticism particularly given the social effects on traditional peoples reliant on their resources (Wells and McShane 2004). This process separates people from their surroundings (Chape et al. 2003) and often simplifies existing social practices and relations to fit conservation-based categories, particularly for Indigenous peoples. This binary separation 'mirrors imaginaries of nature and culture and imposes them on the world', often 'erasing the social history of these places, "fixing" communities and peoples in time and space' (West et al. 2006: 256).

To counter these criticisms, practitioners argue for a broader 'understanding of the range of possibilities. In the definition of a protected area and the…categories…to embrace parts of the lived-in landscape' and for nations to develop 'more people'-focused national protected area legislation (Phillips 2004b: 31, 20). The categories and their prescriptions are not mandatory unless given effect in legislation and 'the most suitable management system should be identified and applied…this being a matter for governments and other stakeholders to decide' (Dudley 2008: 11). Many different institutional and governance arrangements might be suitable, depending on local and regional social and ecological contexts (Chape et al. 2003), ranging from public ownership and community or co-management to philanthropic organisations and private land with conservation agreements in place (Trzyna 2014: 6).

The IUCN categories are widely used to manage Australia's protected area estate but Australia differs from many other countries in that the primary responsibility for managing protected areas, particularly those in cities, lies with eight state and territory governments (Brown 2001). The Commonwealth Government manages a number of iconic national parks in the Northern Territory (Uluru and Kakadu), Boodoree at Jervis Bay (NSW) and national parks in Australia's external territories. [21]

Australia's history with protected areas began in Sydney in 1879 when the colonial government was petitioned that 'the good health of the people should be the primary consideration of all good Governments and to ensure the sound health and vigour of the community, it is necessary that all cities towns and villages should be possessed of parks and pleasure grounds as places of recreation' (Brown 2001: 22). Over 8,000 ha was dedicated on the southern edge of Sydney in April 1879, followed by a further 17,000 ha a year later, protecting sandstone heath communities, eucalypt woodland and forests, rainforests, wetlands and estuaries as well as beaches and coastal cliffs. The reserve later become known as the Royal National Park—the world's second national park after Yellowstone in the US. [22] However unlike 'Yellowstone, this was no distant park in the wilderness but within easy reach of the continent's largest city (Brown 2001: 23) and was for the benefit of urban residents. A further declaration followed on the northern edge of Sydney in 1894 with the creation of the Ku-ring-gai Chase National Park. Of a similar size to Royal, it protected more of Sydney's sandstone ecosystems and the

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[21] See http://www.environment.gov.au/topics/national-parks.

[22] The Royal National Park was the first gazetted national park in the world.

spectacular coastal shores of Pittwater and Broken Bay. Today, 40% of the Sydney Basin is reserves managed by the NPWS (NSW Government 2015).

2.4.2 Differences between urban protected areas and other protected areas

Urban protected areas are defined as 'protected areas situated in or at the edge of larger population centres' (Trzyna 2014: xi). They differ from remote protected areas because they have higher numbers of frequent visitors who 'tend to be more diverse ethnically and economically'. They have many stakeholders—'government decision-makers, media, opinion leaders, educational and cultural institutions' and may be threatened by urban expansion and 'disproportionately affected by crime, vandalism, littering, dumping, and light and noise pollution' (Trzyna 2014: xi, 4). Urban protected areas also have multiple ecosystem values: water quality services, buffering noise and air pollution, and provide visual amenity and aesthetics, recreation, outdoor education, respite, restoration and everyday nature connection (Parks Forum 2008; Miller and Hobbs 2002; Connor 2003; McLoughlin 1999), but these values are generally less regarded than their natural values (IUCN 2005). This complex combination of values (Borgström et al. 2013) means that urban nature reserves are often contested management spaces, particularly with biodiversity loss. Living near urban nature reserves has also become a matter of status, adding prestige and real estate value to adjoining properties (Compton 2006).

Many urban protected areas are the legacy of 'segregating' nature into reserves, parcels of land generally considered too difficult for urban development and (at that time) not valued (Hiller 1998b: 194). Some nature reserves were originally set aside for outdoor recreation or for scenic reasons (Borgström et al. 2013; Phillips and Gay 2001; Seddon, 1987) and most protected areas have long histories of human impacts and ecological manipulation (Vaccaro and Norman 2008). The agricultural and urban development legacies of this landscape transformation have lasted for hundreds of years (Hahs et al. 2009).

These social factors and urban proximity present a suite of challenges and opportunities for managers (Worboys and Trzyna 2015). There are opportunities for positive contact with nature (Nilon 2011) as many neighbours live in their immediate vicinity (Brown 2001). Simultaneously, neighbours are often considered a threat (Gill et al. 2009) because of edge effects, including disturbances to drainage, water pollution, vegetation trampling, encroachment, unauthorised tracks and access, predation, household and garden rubbish, weeds and removal of bush resources like firewood and bushrock (Wright et al. 2011; Smith

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and Smith 2010; Stenhouse 2004; Brown 2001; McLoughlin 1997; Matlack 1993). Trampling and disturbance of habitat is more significant in smaller urban reserves surrounded by and within 400 m of housing (Florgard 2000), as is the case for most of Canberra's older nature reserves. The collocation of utility infrastructure within nature reserves and its ongoing maintenance also creates disturbances (OCSE 2011a, b) and where reserves adjoin major roads, noise can affect wildlife for a kilometre or more (Forman and Alexander 1998).

The size and shape of nature reserves influences the level of disturbance. Urban reserves often have a long edge-to-area ratio (McLoughlin 1999) and research from Melbourne showed grassland reserves with a high urban perimeter-to-area ratio as more likely to be degraded (Williams et al. 2005). A study of 50 national park interface sites in the NSW Blue Mountains recommended buffers of 60 m to minimise urban edge effects. Disturbance was greater at level sites; informal tracks were present at 60% of sites and weeds had penetrated up to 30 m into the national park in older housing areas (Smith and Smith 2010). A US study found 95% of damage in reserves was within 70 m of the suburban edge and concentrated around trails, with even greater impacts where there was road access to the reserve (Matlack 1993). A Queensland study found that informal trails were the most common trail in endangered urban forest remnants, with vegetation lost to informal trails and their edge effects. Informal trails are challenging for managers as they are often poorly sited, traverse sensitive habitats and proliferate where there is a lack of trail-design and compliance (Ballantyne et al. 2014).

Proximity also creates significant safety risks, with many homes in Australia's cities located in bushland areas of high bushfire risk (Moritz et al. 2014). For example, in Canberra, 25% of urban homes are located in the 'bushfire prone area'—this number is increasing with the development of new suburbs on the western edge of Canberra, the greatest bushfire risk area (Corbell 2014b). For the Sydney region, Chen (2005) estimated that almost 10% of homes are within 130 m of bushland. Local government areas bordering national parks have more homes at the interface with Ku-ring-gai Council and the Blue Mountains (36% and 73% of homes, respectively). Ku-ring-gai borders three national parks and has 90 ha of urban bushland interface (Ku-ring-gai Council 2009). In Sutherland, half of the Shire comprises bushland, national parks and other reserve systems (Sutherland Shire 2010). Homes have been destroyed by fire in all Australia's southern cities. [23] After these bushfires, public discourse turns into a

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[23] Houses have been lost in the cities of Perth (2010), Melbourne and Adelaide (2009 and 1983, respectively), Canberra (2003), Sydney (1994) and Hobart (1967).

debate about fuel reduction in national parks and operational failures rather than strategic questions about avoiding further development in bushfire prone areas (Eyles 2013; Buxton et al. 2010). One of the few recommendations not adopted by the Victorian government following the Royal Commission into the State's 2009 bushfires was the voluntary buyback of homes in high bushfire risk areas (Sheales 2010).

The management of bushfire risk is consequently the most complex issue at the urban edge and bushland interface and the highest priority for managing agencies in Australia (Gill 2005; NPWS 1997). Managers face 'interconnected' scientific and social 'management challenges' to protect assets on both sides, coordinate fuel reduction treatments and provide community information (Gill and Stephens 2009: 1). This challenge is compounded by continued urban expansion into bushfire risk areas (Bowman 2015; Corbell 2014b).

Largely as a result of the severe fire events affecting urban and peri-urban communities in the last two decades, managing bushfire risk is one area where some uniformity is emerging between land use planning and nature reserve management. There are new requirements to manage fire risk at the urban edge, including fire risk mapping, new building controls and water storage requirements, and operational fire plans (DELWP 2017; ACTG 2014; NSW RFS 2006a). However, safety challenges remain in older suburbs constructed before new building regulations were instituted (Pyne 2009). Building upgrades and retrofits are recommended but not mandatory (NSW RFS 2011), although in the ACT, any new and substantially extended dwellings in bushfire prone areas of older suburbs are now required to meet bushfire building regulations (Corbell 2014b).

The use of asset protection zones (APZs) in new urban bushland edge estates now provides a buffer for fuel maintenance, brigade access and safe (defensible) areas for firefighters and residents. While it is recommended that APZs be located wholly within urban estates (NSW RFS 2006b; ACTG 2014), there are many cases in the ACT where the APZs extend into adjacent nature reserves (Thistleton 2011a). This not only affects biodiversity but also safety. Research shows that where the APZ is part or wholly in the reserve, fuel maintenance is unlikely to have occurred (Pinfold 2009), although this is no longer the case in the ACT where fuel control and urban reserve edges became a priority after the 2003 fires (Bushfire Council 2013).

The threat of bushfire evokes strong emotions and while there is much focus on protecting the urban side of the fence (Corbell 2014 a, b), there has been little communication about the

important ecological role of bushfire as a natural regenerative process (Steven 2005). Urban perceptions are fuelled by the occurrence of the 'high-intensity fire events' (Moritz 2014; Steven 2005) and media narratives of devastation and destruction (see Chapter 3 and Eyles 2015). Narratives about regeneration, renewal and the involvement of urban people in landscape recovery projects receive significantly less or no airtime (Towell 2003).

Communication about most hazard reduction burns is also primarily posed as 'reducing the risk of fire to hundreds of homes' (see Ives 2018) when, quite often, they also play an ecological role in nature reserves. This is a missed opportunity to communicate the importance of fire for ecological health and learning to live with and prepare for fire: a 'co-existence' narrative (Moritz et al. 2014). The ACT has highlighted the ecosystem health role in recent communications about prescribed burning (Bushnell 2018), but more work is needed to build community understanding about living with bushfire (Steven 2005).

This requires more imaginative strategies for engaging communities in urban settings to unite them and counter negative narratives. Ideas like seasonal festivals have worked in other contexts (Turner 1992; Jordan 1992) and similar efforts could encompass neighbourhood building events like clean-ups in preparation for bushfire seasons and barbeques (see Figures 2.9 and 2.10; Section 8.10), which both respect close relationships with nature while fostering a sense of community and feelings of safety. This also draws on the important role of 'effect' in community education, which recognises emotion as a gateway to learning and action (Steven 2005). Post-bushfire social research revealed that people who are more attached to their natural environment have better health and well-being after fires (ABC Radio 2019a, Gibbs et al. 2013b). This may relate to this emotional attachment affording comfort about living and being in the bush and greater awareness of natural systems and recovery.

While there is a considerable literature about fire ecology and risks, fewer studies consider the experiences and perspectives of residents and reserve and fire managers at the urban edge. These social dimensions are further explored in Chapters 6 and 7 and considered more fully in Chapter 8, the case study of urban Community Fire Units (CFU), which includes an overview of the literature about community preparedness and communication with residents of bushfire prone areas.

| **Figure 2.9 Filling the skip with vegetation** | **Figure 2.10 Covering the skip for pick-up** |

Figures 2.9 and 2.10 Neighbours clean up along the edge of Mt Taylor Nature Reserve

Photos: Peter Taylor

2.4.3 Urban neighbour relations

Surprisingly, there is little published literature about how park agencies work with their urban neighbours, except for Lane Cove River National Park in Sydney where there was a specific project to engage park neighbours in post-fire restoration (see Brown 2001). Developing positive relationships with urban neighbours fosters richer and more regular engagement than is envisaged in most literature. Stern (2010) found that positive relationships are characterised by open, respectful communication, local input and cooperation, fair, consistent enforcement of park rules and regular outreach.

A study of how Australian conservation agencies manage neighbour relations was prepared for the then Australia New Zealand Environment and Conservation Council (ANZECC) in 1997. It found that priority neighbour issues for managers were hazard reduction, feral animal control, weed control, fencing and water management. Knowledge about neighbour relations was generally based on the manager's field experience and not social research—and the market style research undertaken by Park agencies was targeted at visitors, using 'satisfaction-type' surveys (NPWS 1997). Best practice management principles were identified for Stakeholder Management (Neighbour Relations) Guidelines as part of the wider ANZECC work *Best Practice in Protected Area Management Planning* (Parks and Wildlife Service 2000).

However, a review of policy published by park agencies found few explicit policies or references to 'urban' park neighbours outside management plans. The NPWS has a Neighbour Relations Policy (OEH n.d.); Tasmania has a Good Neighbour Charter (DPIPWE 2016); both

Western Australia (WA) and QLD have a Good Neighbour Policy (NPSR 2010; DEC 2007) but all have a distinctly rural flavour. Two states also have rurally focused neighbour programs: Victoria's 'Good Neighbour Program', focused on managing weeds and animal pests, and Tasmania's 'Working Neighbours Program', which links managers, neighbours, local communities and volunteers to work collaboratively to manage cross-boundary biosecurity and natural resources in the Tasmania Wilderness World Heritage Area.

In the ACT, neighbour policy is articulated in the management plan for Canberra Nature Park (CNP) (ACTG 1999), though this research has revealed that few neighbour-focused management actions are properly resourced (see Chapters 6 and 8). Given the embedded urban setting of Canberra Nature Park with thousands of urban neighbours, one might expect that the desirable skills of CNP Rangers would include community engagement. However, the ACT Parks and Conservation Service (PCS) uses a generic position description for Rangers, that does include community partnering as part of the job. There is no competencies required or reference to demonstrated experience with community engagement and aptitude for working collaboratively with volunteers and community partnerships to deliver work programs (ACTG 2019a, b; see also Dovers et al. 2014). In relation to volunteers, the Senior Ranger is required to 'supervise', which has a specific meaning: 'observe and direct the execution of (a task or activity)'. [24] The language used to describe relations with volunteers and park users, 'supervise' and 'patrol', arguably reflects the agency's cultural attitudes and practices, and is not framed to enable partnership and work with users promote care and stewardship behaviours.

2.4.4 Planning and management of protected areas

The growing focus on social outcomes (McCleave et al. 2006) has highlighted the central importance of community participation and collaboration in park planning processes to improve park management (Spoelder et al. 2015). The goal is to shift practice from 'a top-down, regulatory style, to one that features close and diverse partnerships and collaborations between management agencies and local communities, resource users, other management agencies, non-governmental organisations (and private sector)' and 'which, in some cases, leads to shared decision-making' (Spoelder et al. 2015: 415, 393).

However, most formal planning and management for protected areas has been slow to adapt to this participatory context and the reality is different, with managers relying on dated plans.

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[24] https://en.oxforddictionaries.com/definition/supervise.

These are heavy on natural resource information (Lockwood 2006) and position parks as 'bounded' conservation units without reference to their local communities and users (Gill et al. 2009; Gurran 2005). Even where there are specific commitments to ensure local participation, the process may suffer from a lack of enabling rules or principles to guide participation (Hovik et al. 2010). This is partly because park agencies focus on managing the natural environment and do not have a culture or history of managing for diverse groups/values or a community service orientation (Larsen et al. 2006; SUPER Research Group 2002). The natural sciences have also been the main information tool for planning and decision-making (Vaccaro and Norman 2008). A NSW study found very few national park Plans of Management included 'explicit' reference to social or cultural values of parks for local communities (Gurran 2005).

Most Australian park managers learn about the social context and values from their sporadic interactions with park neighbours, users and visitor-type surveys—not social research. This is despite an estimated 30% of Australian park staff having roles in neighbour relations in 1997 (NPWS 1997)—and this figure has likely grown in the past two decades. The dearth of research about people and park relationships remains a critical knowledge gap for planning (McCleave et al. 2006)

Most nature reserve planners and managers are educated and skilled in the physical and natural sciences (Larsen et al. 2006) and many are uncertain of how to apply social values information in management (Miller and McKee 2001). Ives and Kendal (2014: 71) observed that the many different disciplinary perspectives that generate human and social values data can make it challenging for ecologists to 'penetrate this literature and apply it', which highlights the need for social scientists in park agencies (Manning and Fischer 2010; Mascia et al. 2003; Stankey 1989).

Another challenge is that many tools used to manage social values (e.g., visitor management) are designed for remote destinations and tourism (Spenceley et al. 2015); they are less applicable to everyday local visitation in urban national parks (McArthur 2000). Agencies also hold their own cultural norms and attitudes about appropriate park uses and the 'ideal visitor' and this affects how they interact with urban users, particularly culturally diversity communities (Wearing et al. 2008; Thomas 2001). A Queensland study documenting park rangers' views on visitors and recreation found that those who had previously worked in multiple-use environments (e.g., forestry) were more likely to consider their visitor management responsibilities a 'necessity' and an 'asset'. In contrast, rangers with conservation backgrounds saw these responsibilities as detracting from their 'real duties' in natural values

management, requiring more 'time and resources' and also being 'less enjoyable' and 'less rewarding' (Larsen et al. 2006: 43−44). These agency cultural norms are not confined to Queensland. The NPWS was described as a 'predominantly a science-driven organisation that has historically privileged scientific (and sometimes pseudo-scientific) ways of knowing' (Thomas 2001: 48). Staiff et al. (1999: 6) observed that as 'natural science is the dominant language and because of the authority that science carries culturally, the pervasiveness…does several things simultaneously: it communicates an assumption that this knowledge is universal, authoritative, and seemingly, outside the realm of contestation'. In this way, it can 'eclipse the social ecology of the many people whose lives are enriched through contact with national parks' (Thomas 2001: 95).

The social and ecological disjunct is apparent on both sides of the park boundary. A study of Sydney's iconic national parks found limited recognition of park values in local government strategic plans—and no mention of 'the presence, proximity or value that the adjoining national parks and their contribution to the local character, sense of place or biodiversity' (Keane and Davies 2015: 9). While management plans identify urban effects on park water quality, soils and habitat and propose cooperation with other planning agencies, they appear to rely on the local planning framework to interpret what protective controls are required outside the boundary rather than driving this regional integration (Keane and Davies 2015).

Beyond simply contributing their ecological expertise, one solution is for park managers and planners to become actively engaged in regional and local planning processes for lands adjoining and within catchments of their protected areas (Lopoukhine et al. 2012; Garratt 1982). This engagement has been found to be important to build trust and minimise planning conflicts (Mannigel 2008) and would also address many land use planners' concerns about the need for this ecological expertise (Eyles 2015; Grose 2010b) to facilitate better planning outcomes for local and landscape-scale conservation. Conversely, park planners would gain an understanding of reserves' social value for local and regional communities and could reflect these in their own management planning processes (Gurran 2005).

Competencies and skills in community engagement and collaboration are increasingly important for managers, as is dedication of sufficient time and resources to these practices (Dovers et al. 2015). Park planning processes still tend towards procedural forms of participation where the community is asked to react to plans prepared in the agency and/or selective community involvement (often involving the obvious groups like recreational users) rather than embracing more creative, inclusive participatory processes (Butz and Andrews n.d.;

Butz 1988). Linear forms of communication are common (e.g., newsletters, web-based surveys or public meetings): agency people simply inform the public of the plan. These processes 'not only leave participants unable to learn a common language and to learn from each other but also create uncertainty about the handling of their inputs' (Gronholm 2009: 240).

Park agencies can also draw on experience from other sectors where new tools are used to engage local communities through collaborative platforms like Web2.0 and Wiki (Williamson and Ruming 2019; Williamson and Parolin 2013; Williamson 2013). Built around a Wiki site, the City of Melbourne's (n.d.) 'Future Melbourne' planning project enabled planning officers and the community to edit the Wiki pages and/or comment on the new draft plan for the city (Elliot 2009). The use of this technology and its policy scale, community uptake and collaboration were the first of its kind in Australia. Following Melbourne's example, Parks Victoria used these new web technologies to reform its park planning process, [25] the 'wePlan project', and this positive experience shifted planning culture in the agency (Elliot M. 2011).

2.4.5 Alternatives for urban nature reserve management

There are many alternatives to centralised or top-down park management approaches. Regional, participatory, deliberative and community co-management approaches are some examples but these models have been slow to manifest in practice (See Gronholm 2009; Hanna et al. 2008; Stern 2001). Mathevet et al. (2016: 6) observed that 'the paradigm transition from "fencing nature"… to creating "networks of nature" beyond park boundaries is problematic. The 'traditional legislative and administrative arrangements within which government agencies operate do not always make long-term, shared, experimental and flexible management easy' (Dovers et al. 2015: 417; Wyborn and Dovers 2014).

Participatory and cooperative (co-management) approaches to nature reserve governance are characterised by the inclusion of local people as genuine partners (Lopoukhine et al. 2012; Lockwood 2010; Plummer et al. 2009; Carlsson and Berkes 2005). A key principle is that communication to build these local alliances should begin as early as possible (Dovers et al. 2015). Pretty and Smith (2004) observed that the process of management learning, if socially embedded and jointly engaged with, can provoke changes in behaviour that are important for achieving integration of protected areas with their surroundings. There are other practical benefits. Bounded management makes threat mitigation more problematic and positions nature

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[25] https://collabforge.com/weplan-parks-victoria-loves-spotlight.

reserves as outside the urban system. Weed control, bushfire risks and native wildlife all require management across the urban matrix, land tenure and usage (Nilon 2011; Buxton et al. 2006; Fallding 2004). Active engagement and cooperation with adjoining landowners and communities (Hansen and DeFries 2007; Trzyna 2005a, b; Crofts 2004) recognises this broad community of interest in landscape management, and the necessity for cross-tenure and landscape scale approaches to conserve biodiversity (Worboys et al. 2013). Managers can collectively explore the social and ecological interdependencies of the system, including interconnectivity and multi-functionality (Mathevet et al. 2016; Thorpe 2014), and cultivate new management partners (See Bainbridge 2009).

'Adaptive' planning and governance 'recognises participation among diverse stakeholders as an alternative to rigid bureaucratic management arrangements relying only on "expert" inputs of knowledge' and natural resource management is evolving towards adaptive governance (Dovers et al. 2015: 417). Grounded in natural science knowledge and practice, park organisations are not well-versed in the participatory processes that work well in multiple-value urban environments. While most park agencies have partnered with other resource management agencies, they are less likely to have worked with community service agencies (SUPER Group 2002).

There are successful regional and bioregional governance approaches that are suitable for urban and urbanising environments (Low Choy 2007, 2008). The regional parks model in Perth recognises multiple values (Jennings 2007) and has catalysed integrated planning for parks and protected areas at a landscape scale, involving the community in design and volunteer partnerships (Dooley and Pilgrim 2009). Further, the City of London entered into a partnership of local government and volunteer groups and developed a Biodiversity Action Plan (Phillips and Gay 2001) and Indigenous Protected Areas in Australia are delivering social, economic and environmental benefits for communities through conservation management (Davidson 2018; Social Ventures Australia 2016; Hill et al. 2013). Biosphere reserves should arguably also be explored more closely as a model for integrative approaches to biodiversity governance in urban regions (Matysek et al. 2006; Bridgewater 2002).

New quantitative and qualitative tools are emerging (like public participation geographic information systems (GIS) to test standardized ways of collect and interpret the values the community holds towards natural places and their experiential needs (Bijker and Sijtsma 2017, Ives et al. 2017, Brown et al. 2014, Brown 2009, Brown 2007) These tools can also ensure the

values of everyday individual users are represented in planning process not just the (well) and regularly consulted organised user groups.

Social studies also provide some foundations for re-framing planning and management practice in a way that builds in human dimensions and local site-specific place understandings (Gill et al. 2009; Waitt et al. 2009; Gobster and Westphal 2004). Robert Ryan (2000, 1997) draws on his Michigan social study to describe a 'people-sensitive design' approach to management planning (Ryan, 2000:216) and landscape studies draw on people's preferences as a guide for design and management (Cary and Williams 2000; Nassauer 1993; Kaplan and Kaplan 1989).

2.4.6 Managing for multiple values and using local knowledge

Parks cannot be managed as islands and an understanding of their social and cultural context is needed to both to maintain their ecological functions and achieve the social objectives of nature conservation (Stolton and Dudley 2010; Stankey 1989; Garratt 1982). For managers, 'making connections and working across professional and institutional boundaries' and to 'the area around protected area' (Phillips 2004b: 22) will help to collaboratively manage the edge effects and risks described above.

Understanding these social values and relationships is particularly critical in urban natural areas with many park neighbours (Brown 2001) and more diverse users (OEH 2013; Wearing et al. 2008). Ives and Kendal (2014: 71) proposed that managers must consider 'whose values might be relevant' and this might require a 'portfolio of natural places' (Bijker and Sijtsma 2017: 162) to meet different social needs (Natural England 2010).

Scientific knowledge is not the only reliable knowledge about nature reserves. Vaccaro and Norman (2004: 367) posited that 'cultures of nature' (how people perceive or cultural construct the place) are 'important sources of knowledge generated by years of careful observation and experience' and key to understanding social interactions. Nature reserves are not a homogeneous cultural construction but are overlaid by multiple meanings and practices of the local people who use them. The earlier place studies (see Sections 2.2.2 and 2.2.3) show that because of their local attachments, knowledge and regular interactions with reserves, users and nearby residents are key stakeholders for park planning (Buta et al. 2014, Brehm et al. 2006).

Using this local knowledge in park planning also allows for social learning and shared understandings, and has the potential to improve decision-making (Gronholm 2009), especially where local people actively desire co-management approaches (Zachrisson 2008).

Management decisions are also less likely to be challenged if the views and values of key stakeholders like reserve users have been considered (Ives and Kendal 2014). Stern (2010: 188) found that too much social distance led to a lack of trust in management and was also a factor where there was a lack of transparency about how managers treated local input to planning processes. Positive and respectful interactions with managers influenced local attitudes and preparedness to comply with park rules (Stern 2010: 191–192). Trust was lowest in areas with no or only sporadic management presence.

Managers can commission their own social values research (Wearing et al. 2008; NPWS 2002; Thomas 2001; Thomas 2000) and/or draw on relevant published research about how people use and experience nature reserves (Gill et al. 2009; Head and Muir 2007; Bartlett et al. 2005; Ryan 2000, 1997). These studies provide a more nuanced understanding of how people experience reserves in both visually and contextually sensitive ways (Gobster 2011). They can help identify features that might encourage more active engagement (Thompson 2013, Dallimer et al. 2012), manage landscapes to build urban nature connection (Standish et al. 2011) and uncover what might prevent those who are infrequent users (Hitchings 2010).

This experiential knowledge has a practical application to inform reserve management and build a local constituency for care and stewardship (Nassauer 2011). Waitt et al. (2009: 57) observed that the pleasure people derive from walking in a nature reserves 'functions as a type of care' and managers need 'an understanding of the fine-tuned and place-specific knowledge' to 'engage with a large pool of people already caring for reserves'.

2.4.7 Effectiveness of the protected areas and bounded management models

Well-managed protected areas are effective in combatting threats to biodiversity by reducing habitat loss (Geldmann et al. 2013). However, global studies raised serious questions about their effectiveness as a long-term strategy in conserving biodiversity (Watson et al. 2014; WWF 2004). The declining support by national (and other) governments for management of protected areas has been identified as the key factor affecting global effectiveness (Watson et al. 2014). 'Disproportionate funding cuts, reductions in professional staff and agencies ignoring their own policies…with inadequate funding also prevalent in some of the richest countries such as Australia, the United States and Canada' (Watson et al. 2014: 70).

Studies also show that exclusionary bounded approaches to protected areas are of questionable viability on socio-economic grounds and impossible to implement without generous staff

funding and comprehensive management planning (McNeely 2001). The funding crisis facing protected areas indicates a need 'to advocate for and identify innovative models…to encourage the community to take collective responsibility', (Watson et al. 2014) through participatory and collaborative approaches discussed earlier.

There is little qualitative research about how park agencies and staff manage the implementation challenges associated with limited budgets (Parks Australia 2010; Byrne and Jin Jun 2009) although there has been some media coverage in Australia of the decline in resources across all jurisdictions (Davies 2018; Cubby and Tovey 2013) and agency reporting along these lines (NCA 2011). A study of Queensland (QLD) park rangers found resources and support provided to the agency are 'grossly inadequate for effective management' and stifled their ability to achieve all kinds of management objectives' (Larsen et al. 2006: 44) The resource deficit covers funding, field staff, visitation data collection, recreation planning and training, poor policy communication and lack of GIS, compliance support, field staff consultation and decision-making feedback. Park rangers felt this reduced their ability to manage park visitation and led to poor relations with key stakeholders from local communities and the tourism industry. They also noted the community's awareness of under-resourcing and increasingly scepticism about government announcements and initiatives. Within their organisation, rangers noted the 'lack of value' placed on their field work and environmental commitment and disconnection with other corporate and policy goals. This affects 'staff morale', creating 'high staff turnover' and 'loss of productivity' (Larsen et al. 2006: 45). Similarly, a study of NSW park managers found that both staff resource and natural area capacity constraints to manage additional visitation are required by other policy goals (e.g., tourism promotion; Wearing and Brock 1991).

At the site scale, inadequate budgets affect compliance, natural and cultural resource management and provision of suitable park infrastructure. Important tasks like species monitoring and rare plant recovery receive the least attention (Schwartz et al. 2002). Nature reserves are often managed through regional offices with funding attached to these organisational units, not individual parks (Gronholm 2009). Poor asset maintenance may deter park use and negatively affects the aesthetics of the place and perceptions of safety (Powell et al. 2003). This creates a 'broken windows' scenario, where environmental conditions encourage either desired (permitted) or prohibited behaviours (Wilson and Kelling 1982)—and undermine the conservation purpose of the place.

While insufficient resources are considered the key reason for poor management performance, effectiveness is also undermined by siloed agency structures, internal inefficiencies and management underpinned by limited research. A survey of managers about park interpretation found that delivery of interpretation projects was driven by crisis or short-term site-specific needs, not management goals or values research (Black and Weiler 2008). Shortages of funding, staff time and prioritisation prevented evaluation-based research even though its necessity was recognised.

Lack of staff presence and time can harm relations with stakeholders and limit opportunities to engage local people (Stern 2010). This includes enlisting citizens to assist with monitoring tasks (Kight 2012) and day-to-day management (Bainbridge 2009; Gobster and Hull 2000). Kingston et al. (2015: 36) noted that 'these projects have the added advantage of potentially speeding up the data-collection process, as well as increasing sample size and coverage as long as constraints around data collection, management, analysis and bias are put in place'. Citizen science not only collects valuable information for managers but is also a means to build a supportive and hopeful constituency for conservation. It also provides a substantial resource for managers, agencies entering into research partnerships (Shorthouse et al. 2012) and for stewardship (See Section 2.4.8).

Watson et al. (2014: 71) observed that 'a business as usual approach, in which most countries do not provide adequate resources to ensure effective management of protected areas, and undervalue the need to for continued expansion, means the broad goals of the estate will fail'. This reflection supports the urban imperative to more effectively engage urban communities, build social constituencies and expand partnerships with local stewards to improve effectiveness and free-up agency capacity for management.

2.4.8 Urban volunteering and ecological stewardship in nature reserves

Globally, ecological stewardship groups manage a range of public commons, including community gardens, urban waterways and natural areas (Hawken 2008; Brown et al. 2002; Gobster et al. 2007; Gobster and Hull 2001). This growing social movement is primarily locally based and can be an emotional response to 'ecological grief,' an overlooked response to biodiversity loss (Ellis and Cunsolo 2018), which has yet not been widely studied in the urban context. This local engagement is inherently valuable in the bigger picture; Gobster et al. (2007: 960) observed that 'it is difficult for people to understand, care about and act purposefully, upon phenomena that occur at scales beyond our experience'. Nassauer (2011: 321) suggests

[tapping] 'into the immediacy of noticeable care and the deep cultural norms of taking care of one's own circle of life and one's own particular place' as a means of extending care to the stewardship of public resources.

Participation in stewardship activities increases people's appreciation of, and attachment to, their local natural areas and can 'transform the way that people view the natural environment', creating a reciprocal relationship between volunteers 'who receive many benefits' and the 'improved environment—a self-reinforcing relationship' (Ryan 2000: 644) Similarly, Nassauer (2011: 323) posited that these 'small actions can be contagious from neighbour to neighbour, within social networks and across…our propensity to care for small spaces may extend and aggregate across and beyond landscapes'. This can be observed in wildlife gardening programs where sympathetic practices in front- and backyards and streetscapes can scale up across the landscape (see Mumaw et al. 2017).

These relationships and care practices also 'go far beyond the counting, controlling and commodification' of biodiversity (Turnhout et al. 2013: 158). These foster carers have intimate histories and relationships with their 'local patches' and are actively co-constructing with nature and forming a 'potentially powerful constituency of knowledgeable advocates for the environment' (Ryan 2000: 647).

However, most literature about civic environmentalism focuses on national and global campaigns and non-government actors, not urban environmental stewardship (Svendsen and Campbell 2008). Similarly, in community-based partnerships in natural resource management, the focus is on rural areas and developing nations. For example, Australia's 'Landcare' volunteering has been richly explored in rural and agricultural settings (see Youl et al. 2008; Mues et al. 1998; Lockie and Vanclay 1997; Campbell 1994) but overlooked in urban areas (Davison 2006). There is only a small body of research about urban care volunteers (Gooch 2005; Davies and Christie 2001) which is surprising, given the urban origins of the bush regeneration movement (Buchanan 1989) and the fact that conservation on public lands relies heavily on urban volunteers (Measham and Barnett 2008).

With volunteer care programs across all of Australia's urban regions, there is also significant additional capacity for regional landscape management (Rankin 2013). These groups are critical for sympathetic edge management, but this local social capital is rarely acknowledged in national park management plans (Gurran 2005) and most groups are not auspiced by park agencies. In Sydney, over 90% of local Councils support Bushcare volunteers, supplying tools,

materials and plants, while providing assistance with grants, technical advice and on-ground works (Stenhouse 2004). The large bushland shires to the north and south of Sydney have active Bushcare programs. Ku-ring-gui Shire has over 800 environmental volunteers caring for remnant bushland and local parks and streets. [26] Hornsby Shire has over 400 registered volunteers working at 65 different bushland sites and its program, established in 1989, was one of the earliest in NSW. [27] It also has a 'Floating Landcare' volunteer group who restore the Hawkesbury River Estuary, performing bush regeneration activities in locations only accessible by boat. Sutherland Shire has over 700 volunteers involved in caring for over 120 bushland reserves within the Shire. [28] With their focus on invasive plant control, these programs are a vital component of biodiversity management, as all border Sydney's sandstone national parks. Appendix 16 examines how authentic partnerships between land management agencies and stewardship groups can free agencies' time by delegating day-to-day management tasks in nature reserves to local groups. These interstate case studies also show the value of using respected local community organisations as the primary contact point for reserves and managing neighbour relations.

Victoria has over 200 volunteer groups that spend 200,000 hours on care activities each year. In 2009−2010, volunteers contributed over 25,000 days in 116 state parks and reserves, the equivalent of 101 full-time employees (Parks Victoria 2010). By 2015, this contribution had increased to 29,000 volunteer days or the equivalent of 127 full-time staff (Parks Victoria 2015). This significant contribution indicates the need to understand what motivates park volunteers (Measham and Barnett 2008; Safstrom and Byrne 2001).

2.4.8.1 Volunteer motivations and challenges

Australian studies reveal that urban stewardship volunteers share concern for the environment, enjoy working outdoors and value the social contact. Making a difference and seeing tangible results is an important motivator, along with opportunities for learning and applying new knowledge (Wolcott et al. 2008; Gooch 2005; Davies and Christie 2001). Older stewards are more likely to link their environmental activities with leaving a legacy for future generations;

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[26]

http://www.kmc.nsw.gov.au/Current_projects_priorities/Key_priorities/Environment_sustainability/Our_community_programs/Volunteer_for_nature.

[27] https://www.hornsby.nsw.gov.au/environment/flora-and-fauna/bushland-management/bushcare.

[28] http://www.sutherlandshire.nsw.gov.au/Community/Volunteering/Bushcare-Volunteers.

they use this time of life to give back, an important generative response (Warburton and Gooch 2007). Volunteers involved in monitoring programs for particular wildlife species, like birds, cite helping conservation of birds and their habitat, contributing to survey efforts and observing the birds themselves as motivation (Eyles and Davey 2016; Wolcott et al. 2008).

US studies offer similar findings: volunteers were motivated by a responsibility towards future generations (Shandas and Messer 2008), tangible ecological outcomes and learning. This learning was also significant in ongoing commitment and duration of volunteering, suggesting it is a key factor in sustaining long-term volunteer interest (Ryan et al. 2001). A study of stewardship groups in six north-eastern US cities found volunteers' nested within larger quality-of-life and environment issues (Svendsen and Campbell 2008). In the UK, an appreciation of the environment and awareness of the need for its restoration were primary motivations for volunteering. For some, this was 'aesthetically based', whereas for others, it concerned their 'philosophical approach' to life, suggesting 'clear links to the ways people value nature and the environment' (O'Brien et al. 2008: 73) A conceptual framework derived from this study provides a useful summary of volunteer motivations and benefits that are generally consistent with and reinforce findings from Australian studies (see Figure 2.11).
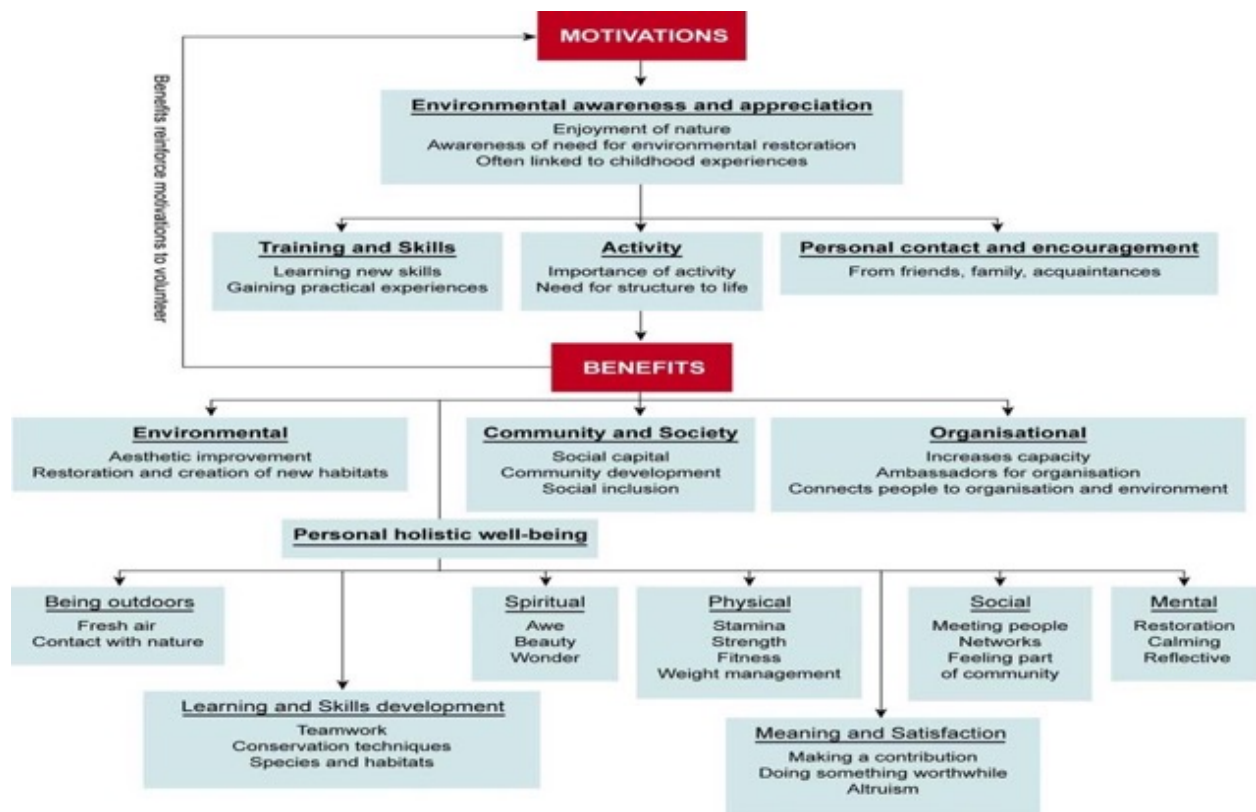
Figure 2.11 Conceptual framework of individual motivations for environmental volunteering and benefits to the individual, society, environment and volunteering organisations

Source: O'Brien et al. 2008:73

Stewardship volunteers face significant challenges that can frustrate and affect their capacity for involvement (Gooch and Warburton 2009). Many groups operate as 'small cohorts of community volunteers' and have 'a reserve of social capital and expertise that could be better utilised' by managers (Svendsen and Campbell 2008: 1). Scientists have often been reluctant to involve volunteers in data collection and monitoring despite the excellent citizen science records of community organisations like Birds Australia (Wolcott et al. 2008). The tradition of citizen naturalists is longer established in some countries (e.g., the UK) and for certain species (birds), but presents opportunities, particularly for species for which management is under-funded, like rare plants (Gollan 2013; Schwartz et al. 2002). A local collaboration between a nature park user and a scientist in Canberra led to the creation of an app-based mapping tool, Canberra Nature Map, to record regional biodiversity. [29] It is supported by a team of amateur

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[29] https://canberra.naturemapr.org/

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naturalists and experts who verify sightings and assists with the mapping of rare plants and allows managers to quickly respond to sightings of invasive weeds (Walmsley 2015b).

Although not the primary land managers, volunteer groups can also assume significant responsibilities with limited support and many rely on and are often competing with other groups for the same pool for donations, local foundations and municipal support (Svendsen and Campbell 2008). Groups may also rely on the leadership and commitment of only one or two members, which is risky for maintaining the group over the long term (Dhakal and Paulin 2009). There are innovative volunteer leadership models in other spheres that have proved to be both empowering for volunteers and key to sustaining and building programs (Purcell 2007).

Maintaining the involvement of volunteers and providing them with adequate organisational support and funding are two common and interrelated challenges for sustaining collaboration (Holley 2009; Weston et al. 2003; Ryan et al. 2001). Strategic funding is important to sustain volunteer groups (Dhakal and Paulin 2009), along with agencies providing practical and professional support for group processes and work (Safstrom and O'Byrne 2001). This support must be provided in a way that respects volunteers and their autonomy (Measham and Barnett 2008) and offers flexibility (Shandas and Messer 2008). Respectful relationships are critically important, with many volunteers most appreciating a simple 'thank-you' (Moore 2016; Wolcott et al. 2008).

Managing agencies also need to recognise and accommodate the complexity and variety of volunteers and groups (Dovers 2000), particularly smaller 'friends' groups that may not have the same means to maintain important interactions with other organisations. These groups may benefit from assistance with communication tools like web technology (Dhakal and Paulin 2009). Another important factor is recognising how volunteers grow through their participation and drawing on this learning to 'nurture both individual growth and the environment' (Ryan et al. 2001: 645). The most successful stewardship projects are those that are initiated by volunteers and located physically near to volunteers' homes (Shandas and Messer 2008).

Supporting volunteers has often been considered discretionary and left to ad-hoc grant programs, rather than being funded as a core management activity of park agencies. This is a missed opportunity, as co-production develops community ownership of local places, increases the number of volunteers involved and lengthens the geographic reach of projects, as well as augmenting what public managers are able to achieve (Shandas and Messer 2008). Despite

heavy reliance on urban stewardship for conservation work in Australia's cities, the most recent round of the National Landcare Program provided no funding for urban Bushcare groups. [30]

2.4.8.2 Diverse and vulnerable groups: young people and CALD communities

The mental health benefits of environmental volunteering (Townsend 2006) suggest the opportunity for structuring programs to assist people with health vulnerabilities. This requires significant cooperation between the health and environment service sectors (Gooch 2005, Connor 2000) and has been pursued in Victoria (Senior and Townsend 2005).

Children are more likely to participate in community-service-type activities if their parents are role models or encourage them to volunteer (Fletcher et al. 2000). Environmental issues also have more personal meaning if children have opportunities for direct interaction with nature and see the evidence firsthand (e.g., 'clean up' days in their local environments) (Chawla and Flanders Cushing 2007) This is important, as childhood nature experiences may contribute to volunteers' knowledge and concern for environmental degradation (Christie 2004). School service programs have seeded ongoing interest in environmental volunteering in the ACT. [31]

The Intrepid Landcare program originated in urban Wollongong and focuses on engaging young adults. [32] The concept has now expanded nationally to other urban regions and settings (e.g., universities; the Australian National University [ANU]). Its flexible and adventurous program (locations and activities from rafting to exploring caves and hiking up mountains) demonstrates new ways to structure urban conservation volunteering to appeal to young people (Landcare Australia 2015).

Given the multicultural diversity of Australia's major cities (ABS 2017a), recent research provided some insights into how people from CALD backgrounds might engage in volunteering and the barriers they face (CIRCA 2016). CALD people do a large amount of 'informal volunteering', often in their own communities, but this is under-reported in formal surveys (e.g., the Census) and 'poorly understood by mainstream organisations, policy makers and academics' (CIRCA 2016: 2). The CIRCA study (2016: ix) recommended 'support for partnerships and collaborations that promote better understanding, communication,

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[30] https://landcareaustralia.org.au/news/the-future-of-the-national-landcare-program/.

[31] https://www.youtube.com/watch?v=tKgE0V3ZhW4&feature=youtu.be.

[32] https://intrepidlandcare.org

relationship-building and culturally sensitive approaches among volunteer-involving organisations'. Partnerships with ethnic community service organisations could be used to encourage CALD people to participate in ecological stewardship programs. The experiences of the Victorian and Tasmanian parks services with orientation programs are good starting points for this (see Section 2.2.6).

2.5 Knowledge gaps and lines of inquiry

The review of existing literature in this chapter suggests the urban protected areas and their social settings are under-studied and many management models and tools used in more remote protected areas may not be suitable for the urban context. Taking each theme in turn, there is multiple studies about the health benefits of protected areas (and other greenspaces) but little exploratory research examining day-to-day 'living'. The key gap is understanding the experiences of urban neighbours and nature reserve users and how they are connected—or what might prevent connection. Another dimension overlooked in the literature includes the long-standing contributions, knowledge and capacity of urban people and neighbours in ecological stewardship, which may differ from those of rural areas.

In the 'developing' context, a missing dimension is the experiential perspectives of practitioners working to conserve urban biodiversity and those building residential suburbs and estates near nature reserves. There appear to be cultural and institutional barriers to integrative planning practice that enables cross-disciplinary and community knowledge sharing and there is little evaluation where bio-sensitive innovative approaches have been used. These professional perspectives are needed to inform dialogue about maintaining biodiversity in urban landscapes.

The literature of 'managing' protected areas suggests that bounded models and planning practice for nature reserves may not be effective in urban landscapes where ecological and social connectivity are important. Social research, neighbour relations and engagement programs are often considered discretionary, rather than core business for science-focused park managers. As a result, there is little evidence and field experience to demonstrate the benefits of incorporating people-centred programs and approaches (that the literature calls for) into nature reserve management.

These vignettes highlight key contexts where qualitative research could contribute useful experiential understandings about urban protected areas to assist managers to meet the

challenges of protecting biodiversity and engaging local people. There is a specific opportunity to examine the 'relational aspects and connections' in terms of social associations with urban protected areas rather than physical separation (see Head 2008).

This broad premise can be distilled into a central research proposition and the specific research questions to frame the thesis inquiry:

> Ecological management of urban nature reserves is more effective when coupled with a richer understanding of their social relations and place context.

Research questions:

1) How do urban neighbours and users experience and connect with nature reserves, and what might influence their relations, engagement and motivations to care?

2) What is the experience of the practitioners who plan for, develop near and manage urban reserves—and what knowledge domains do they draw on?

3) What do these relational perspectives mean for the management of urban nature reserves, their biodiversity and human relationships in urban settings?

The research approach and the suite of qualitative research methods used to explore these questions are described in Chapter 1. The methods used for each case study described in Chapters 3−8 and Appendix 16.

Chapter 3: Case Study of Media Representations of Nature in the City

> **Researcher's story and reflections—the media lens**
>
> I have been an avid consumer of print media since childhood, when my family read the daily and weekend editions of Sydney newspapers. It has been one of the ways I learn about what is going on in the world and a valuable store of information about topical issues. From the start of this research, I assembled a dossier of relevant content from both the Sydney Morning Herald and the Canberra Times collecting articles, editorials and features and also readers' letters that touch on our relationships with nature.
>
> This collection provided the foundation for content analysis of the way the news media frames stories about nature and our relationships with nature in urban and city environments. This lens is of particular interest in Sydney and Canberra, where the urban structure of these cities is defined by the natural landscape and many suburbs interface with bushland. It is also of interest given the urban disconnect with nature, particularly our children and the perceptions of risk that may be driving this phenomenon.
>
> The print media landscape changed significantly after 2013, and social media emerged as a new communication medium to engage the community in government, private and community organisations and for sharing news. This presented an opportunity to experiment with social media in the place-based case studies, enabled by the adaptive approach to the research.

3.1 Chapter Overview

This chapter is the first of two topic-based case studies exploring wider societal influences that might affect nature experience in urban areas (Research question 1). This chapter builds on a peer-reviewed paper *Media representations of nature in the city,* presented at the 6th State of Australian Cities Conference held in Sydney 26−29 November 2013 (Eyles 2013). This case study considered how the news media frames stories about the natural environment and the messages communicated to readers. Drawing on a content analysis of almost 200 print media articles published between 2011 and 2013 in Sydney and Canberra, it unites the dominant narratives represented in news reporting and considers how this framing might influence how urban people perceive and engage with nature. A 'Postscript' provides an update on the rapidly changing media landscape, especially the growth of digital media since the 2013 content analysis. It examines opportunities to engage urban audiences and communicate about nearby nature reserves using social media platforms.

3.2 Introduction

The news media exerts significant influence on what issues and events are given prominence in public discourse and how they are represented (Corbett 2006). Newspapers 'set the agenda' by telling readers not what to think but what to think about (McCombs and Shaw 1972). This explains why some issues are more prominent in the public's mind. Kahneman (2011) observed that people assess the importance of issues by the ease with which they are recalled from memory; this is largely determined by frequency of news coverage.

In turn, what journalists report as news corresponds to their view of what is in the public's mind, a process described as reflecting society back to itself (Simons 2007). What becomes news is a constructed version of social reality as the journalist decides what issues and facts to portray (or exclude), what sources to use and what frame of reality to present (Muller 2013; Corbett 2006).

Generally, newspapers do not have good records of reporting on the environment and nature (Dennis 1991), despite most having specialist reporters assigned for this task (Corbett 2006). Reporting tends to be superficial, focusing on specific environmental events in isolation rather than systemic problems and the social forces in play (Beder 2004). This failing has become more critical in the face of growing evidence about global biodiversity, raising questions about the news 'values' and 'significance' criteria used to compile the daily news (Matthews 2012).

The changing media landscape over the last decade is also altering how people receive daily news and resources available for investigative news journalism. Despite these changes, demand remains for quality titles, where news reporting is well researched and edited (Brown 2013; SMH 2013). The successful entry of *The Guardian* into the Australian market in 2012 is an example of this. The topics these 'quality' titles choose to cover, the way the stories are framed and the sources used influence how readers might perceive an issue and its relevance to them. This is particularly so for stories about the natural environment.

This case study examined how two metropolitan newspapers represent nature. The aim was to understand how news portrayal might influence public perceptions of nature and contribute to understanding about and engagement with nature. This is an important area for study in an urbanising world with more limited opportunities for physical connection and direct experience of nature, particularly for children (Monbiot 2012; Louv 2005).

Continuing urban growth also means that new urban development will interface with nature reserves and remnant vegetation within and bordering cities. This urban−bush interface requires active management to maintain biodiversity and human access while also protecting property and people from bushfire. Uncovering how these issues are represented in the media is of interest to practitioners involved in urban planning and development, biodiversity management and promoting healthy communities.

3.3 Methodology

Content analysis is widely used to examine 'what' is being communicated in news content (Krippendorf 1980) and to interpret substantive meanings in that content (Spencer et al. 2009). It provides a technique to critique how the media represents important issues and whether information is communicated in an accurate and meaningful way (Bowles 2006; Berger 1998).

This case study used content analysis to review 195 newspaper articles about nature from two metropolitan daily newspapers: the Sydney Morning Herald (SMH) and the Canberra Times (CT) over the period from 1 January 2011 to 30 June 2013. These newspapers were selected because they have reputations as 'quality' titles (Barr 1983), publish six editions per week and have regular readership in Australian cities noted for their natural landscapes. Both newspapers employ specialist science and environment reporters, and the SMH is recognised for its investigative and independent journalism (McClymont 2013; SMH 2013, 2012).

Articles were identified for analysis on the basis that their content primarily concerned the natural environment and elements of nature likely to be understood by most readers. This included stories about plants, animals and their habitat, and nature reserves, national parks and bushland spaces that interface with urban areas. Articles that reported on benefits for human health and well-being, and nature-based volunteering and engagement were also selected for analysis. The articles were identified by reading the papers and retaining selected pieces for analysis.

A two-step process was used to code each news sample. The articles were read and a coding sheet was developed based on the most commonly occurring topics (n = 11) and themes (n = 10) in the sample. Key words, lead content, quotations and headlines were used to identify assertions or the 'obvious and manifest' meaning of the article (Bowles 2006). As assertions recurred, they become themes. The articles were then reread and coded against the topics and themes (see Tables 3.2 and 3.6). The type of news article, the reporter/s and source/s were also

recorded. Any letters to the editor published following a news article were also recorded along with observable trends and patterns in coverage over the period of study.

3.4 Content Analysis

3.4.1 Types of news articles and front pages

The majority of articles sampled (85%) were news stories (see Table 3.1). Of these articles, 10% were front-page stories, eight (7.2%) articles in the SMH and twelve (14%) in the CT.

Table 3.1 Number and type of articles reviewed: 1 January 2011 to 30 June 2013

Article	The Sydney Morning Herald	The Canberra Times
News	92 (83.6%)	74 (87%)
Feature	3 (2.7%)	8 (9.4%)
Editorial/Opinion	10 (9.1%)	5 (4.9%)
Investigative/Analysis	5 (4.6%)	0
Total	**110**	**85**

3.4.2 Topics covered by news articles

The topics covered by the newspapers closely reflected the parameters identified for initial sampling purposes (Table 3.2). Articles about wildlife and their habitats were coded against two categories: urban and rural. This was done to determine how much coverage concerned wildlife and human interactions in urban environments and wildlife people might encounter. Stories about national parks and nature reserves managed for conservation were coded separately from articles about urban open spaces.

Bushfire management was the most reported topic in the SMH (16.4%), followed by national park management (15.5%) and urban wildlife and habitat (14.6%). The same topics were the top three in the CT but in a different order (see Table 3.2). When combined, stories about bushfire management accounted for 17.4% of the sample, followed by national parks (17%), urban wildlife (17%), management of urban open spaces (8.2%) and scientific research about nature (7.7%).

Every story had a human dimension (e.g., articles about national parks covered human access, funding decisions and introduced pests) but very few focused on the opportunities and beneficial effects of engaging with nature. Articles about citizen science projects and nature

volunteering accounted for 5.3% of articles and stories about the benefits of outdoor recreation for health and well-being covered 3% overall. Reporting about community awareness covered both declining levels of public concern about nature as well as stories about programs to increase awareness and interest (6.7% of total).

News content about regulations and policies to protect nature was often embedded in the article rather than presented as the primary topic and accounted for 6.1% of sample. Stories about wildlife and habitat outside urban areas and pest management constituted 7.1% and 4.6%, respectively. Stories coded under pests described introduced species whereas articles about native species causing nuisance were coded under urban wildlife.

Table 3.2 Topics of news articles

Topics	No of SMH articles	% of SMH articles	No. of CT articles	% of CT articles
Bushfire management	18	16.4	16	18.9
National park and reserve management	17	15.5	16	18.9
Urban wildlife and habitat	16	14.6	17	20
Urban park, tree, beach, waterway management	10	9	6	7
Scientific research about nature	10	9	5	5.9
Community awareness	10	9	3	3.5
Regulation and policy to protect nature	7	6.4	5	5.9
Wildlife rural	6	5.5	8	9.4
Pest management	6	5.5	3	3.5
Citizen science and nature volunteering	6	5.5	4	4.7
Nature-based recreation, health, wellbeing	4	3.6	2	2.3
Total	**110**			**85**

The time span of the study allowed patterns to be identified in the coverage. Stories about bushfires were filed from the start of the fire season with communication about threats, warnings and actual events. However, this analysis coincided with the two wettest years in

south-eastern Australia for a decade, which affected both the number of stories about fire threats and events, opinion and analysis. [33]

Other patterns in news coverage related to seasonal wildlife activity (Wingate-Pearse 2011), the annual ACT kangaroo cull (Page 2013a; CT 2013a, 2012a) and wildflowers (Thistleton 2012d; Cook 2011a). Stories were predominantly one-off reports with the exception of contentious topics like threats to national parks. Urban wildlife generated a series of articles, some negative, discussing property damage and nuisance (Thistleton 2013b; Cook 2011d; Elliot 2011; Munro 2011b, c) and a positive article about Sydneysiders using Facebook to track cockatoo movements (Phillips 2013a).

3.4.3 Topics featured on the front page and in opinion and analysis

Stories featured on the front page of the SMH tended to be about contentious policy decisions. These included proposals for hunting (Nichols 2013b), mining (Cubby and Nichols 2011) and logging in NSW national parks (Nichols 2013a), and the outcomes of the NSW State of Environment report (Cubby 2013d). Possums made the front page after devouring the pansies at Kirribilli House (Elliot 2011).

CT front page stories covered an inquiry into management of Canberra's Nature Parks (Towell 2011a), the annual kangaroo cull (Knaus et al. 2013b), cut-backs to the Parks service (Beeby 2011f, h), myrtle rust effects (Beeby 2011g), impacts of new urban development on endangered species (Thistleton 2013a; Doherty 2011c) and the Cooma district bushfires in January 2013 (Knaus et al. 2013a).

Opinion pieces covered topical issues like declines in biodiversity and natural capital (Gittens 2012), the assault on national parks (Gall 2013), the species extinction crisis (Flannery 2012) and youth disengagement with nature (Brown 2012). The SMH also sourced opinion from The Guardian about urban disconnection with nature (Griffiths 2012; Monbiot 2012). Investigative articles covered bushfire management and recovery and the adaptation of urban wildlife (Cubby et al. 2013; Howden 2013a; Phillips 2013b). Editorial comment covered the fate of the koala (CT 2011a), the kangaroo cull (CT 2013a, 2012a), the new Arboretum in

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[33] A comparison with reporting on the spring bushfires in NSW in September and October 2013 supports this finding. A total of 78 articles about bushfires were filed over this period, over four times as many as in the study sample, including 8 front pages, 5 editorials and 5 opinion/comment pieces. Reporting on these events elicited 35 letters to the editor.

Canberra (CT 2013b), weeds (CT 2011b) and a light-hearted commentary about the white cockatoo (SMH 2011).

3.4.4 Reporters writing about nature

The employment of specialist reporters has expanded both the number and quality of environmental articles in newspapers (Hansen 1991). This was borne out in the analysis where environmental, science, urban affairs and rural reporters generated the largest number of nature stories (see Table 3.3). The SMH specialist science and environment reporters were responsible for almost half of all articles in the SMH sample and also filed the investigative stories about nature (Cubby et al. 2013; Phillips 2013b; Cubby 2012a). This was also the case at the CT before the specialist reporter, Rosslyn Beeby, took a voluntary redundancy following the re-structure of Fairfax media mid-2012. Over the period of this analysis, the SMH also had regional specialists and the Hobart correspondent filed stories about marine research (Darby 2013a, b, c) and the Tasmanian bushfires (Darby and Ralston 2013). The specialist crime reporter at the SMH filed stories about the NSW bushfires in January 2013 (Ralston 2013a, b, c). Despite further staff losses at Fairfax in 2016 and 2017 (Slattery 2017), the SMH has retained an environmental editor and reporter; their stories also reproduced in the CT.

Table 3.3 Type of reporter in news sample

By-line of Reporter	Sydney Morning Herald		Canberra Times	
	No. stories	% of total	No. stories	% of total
Science and Environment	45	41	21	24.7**
Urban Affairs	8	7.3	7	8.2
Rural and Indigenous Affairs	5	4.5	0	0
General	13	11.8	40	47
Crime	8	7.3	5	5.9
Political	6	5.4		
Economics	2	1.8	1	1.2
Opinion/Editor	11	10	3	3.6
Other*	12	10.9	8	9.4
Total	**110**		**85**	

Notes: * This category includes Social Affairs, Education or interstate reporters, Australian Associated Press (AAP) or articles where no reporter/source is identified. ** *Canberra Times* Science and Environment reporter Rosslyn Beeby left Fairfax Media in July 2012.

News articles about scientific research were predominantly written by specialist reporters at the SMH and CT (Phillips 2013c, e, 2012a, b; Beeby 2012d, e, k, 2011a; Smith, B. 2012; Smith, D. 2012; Smith 2011a, b, c). These articles often quoted the academic researcher and drew on findings in published papers in journals. A few articles explored how the findings might be applied by wildlife and land managers (Beeby 2012h; Phillips 2011). This is significant given the crucial (but rarely exercised) role the media can play in linking science, policy and management practice (Boykoff 2009).

Opinion and comment pieces were written by senior journalists and guest writers (Gittens 2012; Wyndham 2012; Duffy 2011) and presented nature through the writer's lens of interest. Very few comment pieces (two in total) were authored by scientists and one of these was an edited excerpt about the species extinction crisis from the *Quarterly Essay* (Gall 2013; Flannery 2012).

3.4.5 News sources

The origin of news and sources of information has a significant influence on content (Corbett 2006). The increasing use of communication and public relations material from government agencies and businesses to trigger news affects content quality and accuracy (Mann 2008). An independent study examined over 2000 articles in 10 daily newspapers over five days in 2009. The researchers found that the SMH was the least likely to rely on media releases and public relations than its competitor, *The Daily Telegraph,* where 70% of articles were triggered by public relations material (Bacon et al. 2010).

These findings are supported by this analysis, which found that over 70% of articles in the SMH drew on two or more sources and 37% of articles used three or more (see Table 3.4a). Where one source was used, 38% of articles used government sources, 27.5% used academics and 20% accessed community sources (see Table 3.4b). It is worth noting that many bushfire alert/update stories quoted a single authoritative source, the Rural Fire Service or Bureau of Meteorology (Andrews 2013; Hannan 2013; Ralston 2013a, d; Knaus 2011).

The higher number of single-source stories in the CT may be attributed to publication of more local stories that draw on local informants such as park rangers or community groups (Anderson 2013a; CT 2012b; Thistleton 2012a).

Table 3.4a Number of sources used

No. Sources	Sydney Morning Herald		Canberra Times	
	No. articles	% of SMH articles	No. articles	% of CT articles
1	29	26.3	32	37.6
2	40	36.4	31	36.5
3	22	20	10	11.8
4	12	10.9	7	8.2
5+	7	6.4	5	5.9
Total	**110**		**85**	

Table 3.4b. Breakdown of single-source stories

Single source	Sydney Morning Herald		Canberra Times	
	No. articles	% of SMH articles	No. articles	% of CT articles
Not identified	3	10.	1	3.1
Government only	11	38	15	46.9
Scientists only	8	27.5	9	28
Community only	6	20.7	7	22
Other politician	1	3.5		
Total	**29**		**32**	

A number of patterns were observed across sources in this news sample. Where government sources were accessed, on-ground employees were used, including rangers, wildlife, weed and fire managers, biodiversity and threatened species officers as well as agency-based scientists like meteorologists and entomologists. This gave the content a level of authority that could not be achieved using unnamed spokespeople, a practice routinely used in other content areas (Corbett 2006).

Government ministers were used as sources for new policy announcements or to defend contentious decisions, often with their opposition counterpart, a Greens member of parliament, [34] or a peak environment group also providing comment (Cubby 2013a, d, 2012a; Cubby and Tovey 2012; Robins 2011). Peak environment groups were often sources where government policy and/or performance was under the spotlight (Arup 2013; Nichol 2013b; Thistleton 2012e, 2011a; Patty 2011) or where the group managed engagement and nature recovery programs (Towell 2013; Thistleton 2012b; Cook 2011c, Doherty 2011a, b).

Park managers were used as sources in both science and management stories (Cubby 2013a, b, 2012c; Cook 2011a; Beeby 2012f; Doherty 2012), while academics were the primary source in wildlife stories, particularly where research was underway and/or findings were reported (Darby 2013a, b, c; Howden 2013b; Phillips 2013a, 2012b, 2011c; Smith, D. 2012, 2011a, b; Beeby 2012d, h, 2011b; Thistleton 2012f; Cook 2011b). Scientists were also the main source in stories about bushfire research (Cubby et al. 2013, 2012b; Thistleton 2012c).

The views of local residents were sourced in reports about human interactions with nature including nuisance wildlife and tree damage (Munro 2011a,b,c; Jacobsen 2011). Business owners were quoted in stories about nature-based business, including whale-watching, outdoor recreation and tourism, green developments and pest control (Howden 2013a; Power 2013; Arlington 2012; Anderson 2012; Stevenson 2012; Elliot 2011).

On some topics, certain officials and scientists were regularly used as sources, suggesting that specialist reporters have networks of trusted, reliable sources within agencies and academia. Prior to the retirement of the CT environment reporter, there were periodical features about research underway in universities as well as profiles of Canberra-based scientists (Beeby 2012b, c).

3.4.6 Interpretation of news messages by readers

Tracking letters to the editor is one means to assess how readers interpret news content (see Table 3.5). Approximately 8% of articles in the sample generated letters, mainly from individuals (22) and also conservation groups (2). A common response was to defend native wildlife portrayed as a nuisance and to present additional perspectives about habitat loss and

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[34] The Greens are an Australian Political party focused on ecological sustainability, grassroots democracy, social justice and peace and non-violence. https://greens.org.au/about

potential solutions. This suggests that many readers are ecologically literate and fact-check news content. The letters also suggest readers enjoy observing and interacting with wildlife.

Table 3.5 News stories generating letters to the editor

Article topic	No. letters	Reader sentiment	Articles (n = 15)
Urban wildlife and habitat	12	Strong support for volunteers guarding Manly Cove penguins from dogs (3) More humane to relocate penguins to zoo (1) Possum behaviour due to loss of habitat and proposed backyard solutions (1) Cockatoos smart and having too much urban fun (2) Leaving flying fox colonies in peace; solutions that replace lost habitat needed not colony destruction (3) Kangaroo numbers in reserves need managing (1) Roo cull is cruel and not based on credible evidence (1).	Elliot 2011; Jacobsen 2011; SMH 2011; Cook 2011d; Maley 2011; Phillips 2013a; Page 2013a
Non-urban wildlife	5	Distressed about shameful treatment of Fraser island dingoes; conservation action needed not hysteria (4) Recovery of vulnerable species like greater glider needs statutory regional/landscape conservation plans	Robson 2011a, b; Cubby 2012f
Disconnection with nature	4	Kids need chance to observe nature firsthand to understand its diversity (1) Lamenting low levels of concern about the natural environment and disconnect from everyday lives (2) Low concern due the effect of distorted media portrayal about what is important in society (1)	Monbiot 2012; Cubby 2012e; Flannery 2012
Fire management	3	Beauty and danger of fire in image about Leura fire (1) More hazard reduction in Blue Mountains to minimise risks to people (1) Spend money used to fight fires on promoting property protection and homeowners' responsibilities (1)	Lewis 2011; Ralston 2011; Bonges and Martin 2013

3.5 News representation and discussion

Framing is a method of representation used to construct news stories using a particular set of facts and values that create a dominant meaning or social reality (Robbins et al. 2010; Castillo 2008). Although framing is an active process, journalists tend to reconstruct the world in similar ways, reflective of news-making norms and practices and existing social structures

(Corbett 2006; Lumby 2006). This was borne out by the analysis where a recurring set of meanings (themes) were identified from articles and used to code the sample.

Table 3.6 presents these themes and provides illustrative examples of how headlines and language are used as framing devices. Articles that represented nature as threatened by human activities and as an arena of battle and conflict between groups in society accounted for the most stories in the sample (22.5%). The next most frequent assertion was that nature is dangerous, an unpredictable force posing threats to people and property from bushfire and health risks (18.5%). Battle metaphors were often used in headlines and reiterated through storylines (Ralston 2013a, b; Ralston and Howden 2013). The scale of the disaster was quantified in terms of losses of lives, land, property or stock (Anderson 2013a; Darby and Ralston 2013; Ralston and Davies 2013). Where disaster was averted, the narrative suggests a lucky escape. Only two articles covered the social effects and community-based regeneration efforts after the Victoria and ACT fires (Howden 2013a; Thistleton 2012a, b).

Table 3.6 Themes in representation of nature

Themes	SMH n = 110		CT n = 85		% of sample n = 195	News headlines (from sample)
	No.	%	No.	%	%	
Nature is threatened and disappearing.	27	24.5	17	20	22.5%	*Bushland doomed for more apartments; Mining threatens national Park plan; Logging looms in national parks; State emblem under threat from wildflower poachers; Capital nature parks go to seed: Myrtle rust biggest threat to ecosystems; Unmourned death of sole survivor; Whale of time over for monsters of the deep; Battle over fate of Fraser island dingoes.*
Nature is dangerous and threatening.	18	16.4	18	21.2	18.5%	*Anger flares on fire frontline; Red alert on bushfire threat; Nature's fury kept at bay for now; Day of danger; Bushfire battles in four states after soaring temperatures; Summer stalks capital again; Man feared dead, at least 80 properties lost; Fire trap fears for Molonglo suburbs.*
Nature is rampant and troublesome.	12	10.9	7	8.2	9.75	*Not even PM's pansies safe from city's possum plague; Sex and the city numbers rise as rabbits hop to it; Wet weather entices slippery customers*

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					inside; Geckos become reptile rulers with successful invasion; Beak hour traffic destroying heritage buildings.
Nature is a source of new knowledge and discovery.	11	10	8	9.4	9.75	ANU professor cracks mystery of dead parrots; Amateurs discover Namadgi's tiny dancer; Research has native moth world aflutter; True blue experience for scientists tracking world's biggest mammal; Woodland birds return to farms.
Nature is place for engagement and connection.	11	10	8	9.4	9.75	Blood sweat and volunteers keep park as nature intended; Botanist leaves trees to do the talking; Planting seeds of love; Give a hoot and find a tree-dwelling neighbour.
Nature is resilient and can recover with/without human agency.	7	6.4	12	14.1	9.75	Amazing bush recovery follows 2003 firestorm; Nature takes its course; Native rats go wild in a return to the city; Native flowers bloom after firestorm; Park sightings suggest glider is back.
Nature can be left on the back-burner.	11	10	5	5.9	8.2	Park hunt bags O'Farrell an F; Priorities askew when parks get pushed aside; Parks go unstaffed as environment jobs slashed; Secret plan to muddy the waters, Environment committee falls victim to O'Farrell cuts.
Nature is becoming disconnected from everyday lives.	6	5.5	2	2.4	4.1	Save the environment -what's the point; Nation 'indifferent' to environment; Rich capital no green zone; What young people fear most and it's not the environment.
Nature is amazing and unexpected.	5	4.5	3	3.5	4.1	Rare majestic little creature spotted; One will really amaze you, the other eats his mates, Red beaches glow dark; A day for deep blue bonding; Red-bellied black fury in snake pit.
Nature is valuable and worth saving.	2	1.8	5	5.9	3.6	Malabar headland becomes national parkland; Parks, pests take priority; O'Farrell shuts out mining colossus; Grand plans for Jerrabomberra wetlands.

The successful adaption of some native species and the spread of introduced species often lead to conflicts with urban residents. These stories are framed to imply that nature is rampant and controls are needed to stem the invasion—to battle the plague. This storyline accounted for over 9% of the sample but the headlines often softened it with the use of puns around the 'pesky wildlife' and witty cartoons by SMH's Cathy Wilcox (Philips 2013d; Cook 2011d; Elliot 2011; Munro 2011b).

A suite of articles frame nature in terms of human interest and engagement—as an exciting place for scientific discovery and community connection—accounting for 9.75 % of articles sampled. Articles represented the beneficial role of urban citizens monitoring wildlife, including flying foxes (Cubby 2013c), cockatoos (Phillips 2013a; Huxley 2012; Cook 2011d), whales (Cubby 2012e), spiders (Beeby 2012g) and powerful owls (Cook 2011c). Articles that represented nature as resilient and recovering (9.75%) often presented a human dimension where volunteers have been active participants in the recovery process (Thistleton 2012a, b, 2011b).

On policy and governance of nature, 8% of stories framed nature as an area of government inaction and neglect (Nichols 2013b; Cubby and Tovey 2012; Beeby 2011a, h; Patty 2011) and less than 4% of stories represented nature receiving positive attention from government (Tovey 2012). A total of 6% of articles framed nature in terms of the growing disconnect with urban communities, including young adults and children (Brown 2012; Cubby 2012e; Ruppert 2012). Two opinion pieces sourced from *The Guardian* (Griffiths 2012; Monbiot 2012) suggested that this disconnection is of greater public concern in the UK. Disengagement may be partly attributed to the prominence given by the media to other issues (particularly the national economy) and the tendency of journalists to represent reality in a way that maintains the social and political status quo (Corbett 2006; Lumby 2006).

Stories about the state of the economy, financial indices, employment figures, and business surveys are published daily, along with the SMH *Business Day* for investors (also in the CT) and the weekly *Money* supplement. In contrast, there is only a handful of stories about nature in a 'good' week, an annual report (if published) about the state of the environment (Cubby 2013d) and some gardening and lifestyle articles (Anderson 2012; Maddocks 2012a, b).

The pervasiveness of economic messaging and superficial discourse about nature (Matthews 2013; Beder 2004) translates to low levels of public understanding about how human futures are bound to the health of natural systems. This is evident in articles that reveal how young

people are more concerned about jobs and their economic future than the protection of nature (Ruppert 2012) and report widespread indifference to the natural environment across the community (Cubby 2012e). Only a few articles in the news sample directly challenge the economic narrative in the face of growing evidence about ecological decline (Beeby 2012e; Gittens 2012; Moncrief 2012).

3.6 Case study insights and postscript since 2013

The news is a socially constructed product and plays an agenda-setting role in elevating certain social concerns and issues over others (Corbett 2006). How people perceive the importance and value of nature in their everyday lives is influenced by the messages conveyed in the news. These messages are critical in an urban world, where people have less direct experience and contact with nature. Moreover, the bushland that remains in urban areas will require active management, community advocacy and care to maintain its values for wildlife and humans.

This study has revealed that nature is most often portrayed as under threat, battling human forces driving habitat and species loss. Conversely, nature is represented as a force to be combatted and controlled because of the risks posed to humans and property (bushfires at the urban edge) and the nuisance occasioned by some urban wildlife. These danger and control narratives present a reality where nature is perceived outside the realm of everyday experience apart from the odd wildlife encounter.

Representing nature in an arena of battle and conflict fits most neatly with the news values that drive news construction but ignores the complex issues underlying human relationships with nature (Hull 2013; Barr 1983) and the urgency to re-cast the news narrative (Matthews 2013). This narrative would be one that links human health and survival with that of the natural world, building societal understanding about interdependence that challenges how people currently think about the place of nature in their lives. Social change is unlikely unless this relationship is given greater prominence and thoughtful attention in the media. Stories that may inspire greater public understanding and connection are too few in number to counter the prevailing discourse, and few scientists choose to communicate these issues in the 'quality' titles reviewed in this sample.

Changes in the media landscape may well provide the resources and quality media to present new socio-ecological narratives, particularly with global growth in philanthropic, not-for profit journalism (Beecher 2013; Houston 2013; Knott 2013). New online platforms that are less

news-driven and more about mapping knowledge may provide a means to present complex stories using global networks of sources (Carson 2016; Heemsbergen 2013; Summers 2013; Simons 2007).

3.6.1 Postscript: tracking changes to the media landscape since 2013

Since this analysis was performed in 2013, Fairfax Media (publisher of the SMH and CT) has further re-structured its business (Slattery 2017; Kennedy 2016) and late last year, merged with the Nine Entertainment Company (McDuling 2018). Both titles now publish online editions and use social media platforms. This 'cross-platform' strategy appears to be working for the *Herald,* which is currently Australia's best-read title and has more than 8 million readers across its print and digital platforms at June 2019 (SMH 2019). Growth is mostly in the digital space, as print readership decreases (Robertson 2016; Dunkley 2017; Roy Morgan 2017) but suggests ongoing demand for quality news titles (with trusted reporting) in Australia.

US research suggests that engagement with news through social media platforms continues to grow: 62% of adults view news on social media (an increase from 49% in 2013) and 18% read it often. Of those adults, 64% view news on just one site (most on Facebook) and 26% use two sites. Facebook is the largest social networking site in the US, reaching 67% of adults. Therefore, the two-thirds of Facebook users who see its news amount to 44% of the population. (Gottfried and Shearer 2016) This contrasts to earlier surveys that found most adults did not use Facebook to read news; rather, 'news' was incidentally received. Younger adults (< 30 years) were found to be less engaged with the mainstream news platforms and more with news on Facebook (Pew Research Center 2013).

In Australia, almost eight in 10 Australians (79%) are on social media—a 10% increase since 2016—but the proportion of people using social media platforms to access news and current events is much lower than in the US: 37%. A greater proportion of the 30−50 age group (43%) source news on social media with the younger age group a little lower at 30% (Sensis 2017). Television remains the main news source for Australians (46%), while digital news platforms are preferred by those under 35 years old (Watkins et al. 2017).

As audiences shift to digital media platforms, technology is helping journalists to construct stories that would previously have been difficult to file due to location or time constraints, as alluded to above. This is the case with reports of natural disaster events (e.g., fire and flooding),

where real-time footage can be uploaded by emergency workers and the public (Emergency Management Victoria 2014).

Australian journalists identified 14 research tasks made easier by social media, including 'finding names and verifying identities, speeding up investigations, verifying associations between people, and crowd sourcing information' (Gearing 2016). While most journalists now work online (Dodson 2016), many do not view social media as 'a panacea for investigative journalism', due to the risks, including factual errors, exclusivity loss, physical safety and legal concerns (Gearing 2016). Media cut-backs have also seen increased use of 'listicles' (mixtures of articles and lists, in the realm of 'click bait') in online news. This content is designed to generate advertising revenue and viewed as replacing 'traditional journalistic values' of accuracy, balance or fairness (Dodson 2016).

Another Australian study about social media is of particular interest to this research, as it shows the growing use of social media platforms by a diverse range of community advocacy organisations to communicate local news content. The low-cost base allows the community to engage through commenting and sharing, which build and expand stories (Carson 2016; Carson et al. 2016). This not only fills information gaps left by the loss of many local print titles, but also provides new avenues for interactive public discourse about human relations and co-existence with urban nature. It could be used to present alternative frames about nature to contest the risk and control narratives traditionally represented in news media (see Table 3.6) and pitching nature as locally accessible, within the realm of everyday experience.

3.6.1.1 Potential role for social media to engage people with nature in local urban settings

To explore these opportunities, I experimented with publishing content on Facebook, setting up two local community Facebook pages to support my role as a participant observer (see Tables 1.5 and 1.6). @Mt Taylor Nature Reserve is a 'Community' page for the reserve, one of the Canberra place-based case study sites (see Chapter 6). The Facebook page is used to engage local people through posts of wildflower and wildlife photo content and shared conservation community news and events. @actcommunityfireunits is a 'Community' group page for the ACT CFU Volunteer network. This page is used to promote activities of urban fire volunteers and news items relating to bushfire season and awareness (see Chapter 8).

Facebook posts on the page of another case study site @Mulligans Flat Woodland Sanctuary were also made. This page was established by the non-government organisation (NGO) the

Woodlands and Wetlands Trust, who work in partnership with the Parks Agency to engage the community in the Sanctuary. Content about events and the activities of the volunteer Friends of Mulligans Flat group, of which I am member and then participant observer (see Tables 1.5 and 1.6), have been posted. The Facebook page description and an illustrative content summary for the month of October 2017 are provided in Table 3.7. [35]

There are some differences between the local pages I established, and the Facebook page managed by the Woodlands and Wetlands Trust. At the time the Trust had a communications manager who posted content to Facebook, and an active strategy, using paid promotion to 'boost' posts (mostly Sanctuary tours and other events) and actively pursue people who liked posts, inviting them to like the page. In contrast, apart from inviting 'friends', I did not pay to boost posts (though regularly offered the opportunity by Facebook with 'high performing posts'), nor have I followed-up and invited people who liked shared posts. These strategies have been shown to boost engagement with the Mulligans Flat Facebook Page by an average of 40+ new followers every week, as revealed by Page Insights.

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[35] October 2017 is for illustration purposes only, being the month before drafting the postscript.

Table 3.7. Description of Facebook Pages and Content Summary for October 2017

Facebook Page	Description	No. and Type of Posts	Page likes Followers (as at 31.10. 2017)
https://www.facebook.com/MtTaylornaturereserve	*Mt Taylor Nature Reserve – Canberra ACT - a community page for park users to share photos of wildlife and the landscapes of this special place.*	Total = 20 posts Shots of city views: 10% Shots of wildflowers: 40% Shots of wildlife: 20% Shared wildlife posts: 20% Volunteer events: 10%	409
https://www.facebook.com/actcommunityfireunits	*Community Fire Units – Canberra ACT – a community page where CFU volunteers share stories about their bushfire awareness and mitigation activities at the urban-bush edge*	Total = 10 posts CFU volunteer events: 10% Bushfire awareness events: 50% Sharing group training activities: 10% Shared news items: 20%	294
https://www.facebook.com/MulligansFlat/	*Wildlife Sanctuary - NGO* *We aim to sustain a representative diversity of woodland plants and animals and inspire respect for and understanding of the beauty, species and ecological processes of Australia's woodlands.*	Total = 33 posts Promoting paid tours, events and products: 27% Sharing tour shots: 12% Sharing wildlife and wildflower shots and videos: 18% Volunteer-led tours and monitoring projects: 15% News items conservation: 12% About Sanctuary research projects (#Quollcam): 9% Artist-in-residence posts: 9%	8005

The most engaging content on the Mulligans Flat Facebook page in October 2017 (identified by likes and shares) featured wildlife, flowers and landscapes. Often, these images were

supplied by visitors to the Sanctuary and posted with the hashtag #photooftheday (see Figure 3.1). Professional photographers have also been commissioned to shoot engaging wildlife images to entice the audience to book paid night tours (see Figures 3.2. and 3.3). Posts also showcase volunteer-led activities (e.g., the Spring Wildflower walk, see Figure 3.4). The most engaging post in October 2017 was a wildlife video on #quollcam, capturing footage of playful Eastern quoll babies in their den. The post had attracted 725 likes and 104 shares as of December 2017.

This demonstrates the pull-power of real-time visual content and the shareability of engaging nature content. This footage was made possible by camera technology installed to support scientific research in the Sanctuary and allows an intimate insight into the lives of these animals. People both share the researcher's journey tracking the re-introduction of this threatened species and learn about the next chapter in the sanctuary's restoration story. However, there is a possibility that novelty also affects engagement and influences the propensity for sharing. The first video posted by the Sanctuary in December 2016 featured that season's litter of baby quolls and amassed twice as many likes (1,500) and 10 times as many (1,000) post shares. That post still attracts likes because of its social reach through 1,000 shares and position pinned to the top of the Facebook page. [36]

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[36] https://www.facebook.com/MulligansFlat/videos/1167430196627670

Mulligans Flat Woodland Sanctuary

Published by Elsie Percival· October 5 #photooftheday by Matthew Frawley – a close encounter with the rare and flightless Key's Matchstick Grasshopper! **#abugslife #animalsofmulligansflat**

Figure 3.1 Grasshopper photograph in the reserve

Figure 3.2 Engaging wildlife advertise night tours:eastern curlew

Figure 3.3 Engaging wildlife help advertise night tours: eastern quoll

Mulligans Flat Woodland Sanctuary added 8 new photos. Published by Kathy Eyles October 22

Fabulous sunny morning for the Friends Spring wildflower walk in Little Mulligans Flat. Big thanks to our walk leader, Michael Doherty, who weaved in lots of fascinating info about this remnant grassy woodland landscape. We were rewarded with an amazingly diverse array of wildflowers including native buttercups, violets, parrot-peas, yam daisy, tiger orchid, Grey guinea flower and more - and great views.

Figure 3.4 Post about a volunteer-led wildflower walk

Source: Mulligans Flat Woodland Sanctuary Facebook page

The Mt Taylor Nature Reserve Facebook page posts in October 2017 featured photographs of wildflowers as they emerged in different parts of the reserve and some butterfly sightings. These visually attractive posts (see Figures 3.5 to 3.7) are generally the highest performing (in terms of likes). The intention is to encourage people to visit the reserve and discover them firsthand. Beyond highlighting what is flowering, and where, providing the names of plants visitors may have observed for many years builds interest (as suggested by previous comments). These posts are often shared on other local community pages, both in the conservation sphere and elsewhere. I used the page to share events that might trigger reserve neighbours to take individual action to care for it. In October, this included the Spring Weed Swap where residents could remove weeds from their backyards and get native seedlings to plant in return. I also shared educational posts produced by the Parks Service about magpie swooping and snake awareness.

Mt Taylor Nature Reserve added photos. Published by Kathy Eyles October 25· Still plenty of gorgeous spring wildflowers on Mt Taylor - Creamy candles *Stackhousia Monogyna* above the small dam	**Mt Taylor Nature Reserve** Published by Kathy Eyles · October 23 An amazing and apparently rare sighting for the ACT - Matt Frawley finds a mating pair of Day flying moths on Mt Taylor Canberra Nature Map #cowabunga	**Mt Taylor Nature Reserve** added 4 new photos. Published by Kathy Eyles October 20 The bush is loving that drop of rain - keep an eye out for Hop-bush Dodonaea on the slopes - a dainty flower mass of green to lilac to maroon
Figure 3.5 Wildflowers	**Figure 3.6 Rare moth**	**Figure 3.7 Wildflowers**

Figure 3.5–3.7 Social media posts about nature on Mt Taylor Nature Reserve

Source: Mt Taylor Nature Reserve Facebook site

The Community Fire Units Facebook Page is designed for a more targeted 'group' audience: the 750 local volunteers in 50 suburban CFU units around the bushland edge of Canberra. (see Chapter 8). Engagement with the page has been slow, largely because of the older age of the volunteer cohort, many of whom do not use Facebook. The content of posts in October 2017

focused on the start of the bushfire season, including shared news items about bushfire, the Bureau of Meteorology's weather outlook and various events to mark the start of the fire season across the emergency services community. The page has the potential to be used more widely to communicate and share incident news and educative posts about community preparedness for risks posed by natural event (see Figures 3.8−3.10).

Figure 3.8 Shared topical content	Figure 3.9 CFU Awareness activities	Figure 3.10 CFU training activities
ACT Community Fire Units - CFU shared The Canberra Times's post. Published by Kathy Eyles [?] · October 1 · ⊘ **ct The Canberra Times** September 30 · ⊘ "We really need to make Canberrans aware that the conditions out there are very dry, it is going to remain dry to at least December." Canberrans urged to prepare for a dangerous bushfire season **ACT Community Fire Units - CFU** shared CFA (Country Fire Authority)'s video. Published by Kathy Eyles [?] · October 15 · ⊘ **WALK TWO STREETS BACK** 12,400 Views **CFA (Country Fire Authority)** October 15 · ⊘ Do you live on the urban fringe or next to grassland, parks or paddocks? You could be at risk of grassfires. Watch this short video to find out what to do if a grassfire approaches you.	**ACT Community Fire Units - CFU** added 5 new photos. Published by Kathy Eyles · October 14 · Great morning at Chifley Park raising bushfire awareness on #CFUSaturday with CFU's from Chifley, Pearce and Torrens, the crew from #RiversRFS and our Woden ACT Fire & Rescue and the ACT Parks and Conservation Service with their new state-of-the-art light unit. The kids loved the tanker and flame game while the fire peeps chatted with the locals - thanks to ACTFR chief Mark Brown for calling into support the volunteers #PrepareActSurvive	**ACT Community Fire Units - CFU** added 6 new photos. Published by Kathy Eyles · October 31 · Mt Taylor urban edge CFU's - 25 Hawker St Torrens, 46 Parkhill St Pearce and 43 Wilsmore Cres Chifley got together for a joint session on the Torrens interface with Shane and the ACTFR tanker crew from Phillip Station last Sunday. Torrens CFU 25 Team Leader Peter Taylor says, "*It was a great roll out of members and very valuable, it will help to shift the focus of our training*" An added bonus for the CFU vollies was a family of Tawny Frogmouths keeping a keen eye - how lucky are we to live in the Bush Capital! Thanks Peter T for the great action shots - bring on the recruitment video

Source: ACT Community Fire Units Facebook page

While a limited sample, observations can be made from these examples and my experience of generating and tracking content for these pages over a three-year period. Sharing traditional news items (posts linking to online news media pages like the CT) were only a small component of the content on the place-based sites but filled more content on the CFU group

site. The obvious potential of social media lies in the ease of sharing positive stories and recovery narratives about urban nature through a powerful visual medium (still photos and videos) that generates excitement about scientific projects (like the woodlands research underway at Mulligans Flat) and engaging people with local wildlife and places. Another communication opportunity is in developing social media content to assist volunteer recruitment, particularly for restoration and citizen science projects.

3.7 Overall Findings and Conclusion

In closing, this case study provides useful insights into what topics the news media covers and how the meanings conveyed might influence how people think about nature and its place in their lives, and their potential to engage with nature, as posed in research question one. The action-based research experiment with local Facebook pages indicates opportunities to re-engage local people about nature in the places where the live, recast news narratives that play into people's fears and build further social capacity to care for these places.

While there are some limitations with the content analysis, given the Fairfax-centric sample and changing media landscape, the findings are of interest to urban biodiversity managers and community groups seeking to understand prevailing community values and what this means for how people and biodiversity in cities might be managed, posed by research question three.

Social media is playing an important role in communicating information and safety messages to neighbours and users of urban nature reserves, about fire danger, weed spaying, pest control and infrastructure upgrades. It is a cost effective medium, particularly with limited ranger presence and in the absence of formal neighbour liaison programs as in the ACT (see Chapters 6 and 8). [37] Managers can also assess the value of the information provided by tracking how people respond to posts through their comments and sharing of content as well or two-way communication when needed.

At the same time, the exciting sharing power and immediacy of digital technologies, provides managers with a whole new realm to communicate with urban audiences about caring for the

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[37] The ACT Parks and Conservation Service now has a Facebook site to communicate with the community

valuable ecological systems where they live, as well creating a platform for countering fears about risks that might pose barriers to their physical engagement.

The take up of social technologies suggests new 'virtual' relations are forming between local people and nature via the digital experience and exciting opportunities to engage a much larger audience than may physically experience the place. This adds another emergent dimension to the human relations with nature reserves posed in research question one, as well as the possible engagement pathways and management responses, posed by research question three. The implications of this changing media landscape for enabling community engagement and care of urban nature reserves is discussed in Chapter 9.

Chapter 4: Case study of Childhood Nature Connection

Researcher's story and reflections—the childhood lens

I grew up in northern Sydney at a time described by Delia Falconer as Sydney's 'romantic period, in the late sixties and seventies, squeezed between its faded golden age and destruction' (Falconer 2010: 63). We lived in the suburbs but also in the bush; from an early age, we were free to roam the streets and create our own adventures in the bushland at the end of street. This bush playground now forms part of the Lane Cove River National Park. I also spent many hours in a canvas tent on the vacant block next door, perilously close to an enormous Sydney red gum, *Angophora costata*. During school holidays, we went to our 'fibro shack' backing into the craggy sandstone country of Brisbane Water National Park and climbed the rock faces to capture views to the ocean, body surfed and beach-combed.

My childhood was strongly influenced by my mother, who was curious about, and respectful of, nature. She was an early adopter of bio-sensitive living, propagating native plants and cultivating the first native garden in our street and taking on roles as a native wildlife carer, well before the advent of wildlife rescue organisations. She rode an old Speedwell bike, recycled, composted and refused to drive anywhere that could be reached on foot or by Sydney's red 'rattler' trains. She was an active member and financial supporter of the NSW National Parks Association, Field Ornithologists, and Society for Growing Native Plants, the ACF, Wilderness Society and Wildlife Preservation Society QLD.

Nature or nurture? This childhood experience undoubtedly influences my everyday actions, favourite places as well as decisions about study, work and social causes. I feel a deep sense of love and nostalgia whenever I am immersed back in Sydney Sandstone country.

As part of this research, I was keen to learn about the childhood nature experience of the research informants with similar professional and community interests and about their observations about the experience of the current generation. As a parent, I actively encouraged my now-18-year-old daughter to be independently mobile; she walked to primary school and explored our nearby nature reserve with local friends. We know our neighbours, volunteer in local groups and socialise at the local shops. This connectivity is no longer the norm and children are less visible in the neighbourhoods. With childhood obesity and declining physical activity likely to have profound effects on children's health, it is worth exploring what might be driving this change and limiting their opportunities to experience nature near home.

4.1 Chapter overview

This chapter documents the second topic-based case study about childhood connection and exposure to nature. It charts some of the changing social norms around children's play and mobility and how this might influence their engagement with nature reserves. The introduction to childhood disconnection and overview of responses (see Sections 4.2 and 4.3) is not intended to be an exhaustive review of literature but rather, aims to capture the social context, main arguments and some of the evidence. The value of childhood exposure is explored using a

small experiential case study drawing on the findings of semi-structured interviews with over 70 (adult) research informants, who describe their childhood experiences and reflect on their influence on their adult lives and environmental affinity. These experiences are then contrasted with the experiences of their own children and grandchildren and what this might mean more widely about children's access to nature. Insights are drawn about the social barriers, possibilities and value of nature connection in local contexts, to build an understanding about how these early relations might influence engagement in nature (Research question 1.)

4.2 Introduction

With more people now living in cities, there is concern about the loss of everyday contact with nature, both for health reasons and with developing an affinity for nature (Soga and Gaston 2016; Kahn 2011; Chawla 1998). The disconnection of children is considered particularly harmful for their well-being (Broom 2017; Monbiot 2012; Louv 2005). Disconnection not only has implications for childhood health (Maller 2009) but also restricts opportunities for positive exposure to and engagement with nature, which has been found to be significant in the development of pro-environment behaviours and environmental sensitivity (Asah et al. 2012; Kahn 2011; Chawla and Derr 2012; Thompson et al. 2008; Chawla and Flanders Cushing 2007; Dutcher et al. 2007; Chawla 1999, 1998).

A US study of adult visitation to Minnesota state parks found that those adults who participated in nature-based activities, were more likely to choose to these activities in adulthood (Asah et al. 2012). This exposure both increases their adult 'desires for nature-based activities or motivations and also makes them more willing and able to mitigate constraints and increase their participation' (Asah et al. 2012: 562). This includes feeling safe and prepared to be alone in nature (Thompson et al. 2008) and being able to employ strategies to 'manage constraints' or events that might worry those who did not enjoy the same nature exposure (e.g., fears about safety in nature and/or getting lost).

A US study of adults involved in environmentalism found that the key factors influencing their activism were experiences in nature as children and role models (Wells and Lekies 2006). Another study situated in Spanish school yards, examined whether spending restorative time in nature influenced children's environmental attitudes and activities. It found that fascination (as a restorative quality) motivated children's reported pro-environment behaviours (Collado and Corraliza 2015), mirroring similar studies in adults (Hartig et al. 2007).

Children are more active outdoors (Ferreira et al. 2007; Sallis et al. 2000) and have an inbuilt desire to explore their local geographies; this curiosity and empathy with their natural surroundings extends from the early years to middle-childhood (Sobel 2008; Kellert 2005; Carson 1956). Observations of children having free time in nature revealed seven 'play motifs' that were constant (regardless of class and race): 'making forts and special places; hunting and gathering games; shaping worlds; developing friendships with animals, constructing adventures; descending into fantasy; and following paths and figuring out short cuts' (Sobel 2008: 20). A UK literature review found that improved health outcomes for children and the acquisition of positive feelings about nature are best achieved through this type of hands-on free play and less structured child-directed engagements, which involve repeated visits to the same site (Gill 2014, Greater London Authority 2011a). Recent experience with outdoor adventure parks in the UK suggests that these local spaces do not need to be pristine; the messier, the better (Rosin 2014). Riskier and more adventurous activity is particularly attractive to boys (Natural England 2010).

Having both freedom to use local spaces and spaces that are accessible and support physical activity is important (Ward Thompson 2013). Freedom to explore without an adult has been correlated with higher activity levels, with boys likely to enjoy this freedom—although gender was less of an issue where children lived close to a local park (Mackett et al. 2007). Children's freedom to roam, engage in 'spontaneous play' and navigate their local neighbourhoods has diminished (Gibbs and Nansen 2013; Tranter and Sharpe 2008). This is occurring at the same time as growing evidence about the links between nature exposure, health and well-being grows (see Davern et al. 2017) and the importance of nature-based activities during childhood for 'the beginning of a nature-acculturation process' and positive adult 'environmental attitudes and behaviors' (Asah et al 2012, p.560).

Several factors appear to be driving this phenomenon: availability of home-based technology (ACTG 2016a), changing housing stock with no or smaller backyards (Hall 2007;Tranter and Malone 2004) and risk-averse parenting (Wyver et al. 2010; Gill 2007; Rosin 2014) which has influenced norms about independent mobility and where and how children should play (Tandy 1999). Residential streetscapes have also changed, with large garages on street frontages and fewer street-facing windows or front patios that allow for passive surveillance of the street (Palmer et al. 2005). More working parents means children also spend significant time in after-school care—formerly free time that was important for their social, cognitive and physical development (Simoncini 2010).

One of the few child-centred studies about urban children's connection to local nature found that access is determined by two main factors: available and accessible natural areas and parental licence. Most relevant to the Canberra case setting, the children in this New Zealand study generally had access to biodiverse urban environments, but whether they used them depended on societal and parental licence (Freeman et al. 2015). No children were able to freely range in their neighbourhood and only accessed specific areas, mainly gardens, streets, local parks, sports fields and school grounds. Other natural areas were rarely used. As a result, most children were missing the significant hands-on interaction with nature that affords physical and psychological benefits—and develops their appreciation of the natural world (Kahn 2011).

This New Zealand research mirrors Australian findings about parental licence. A survey of 1,000 Australian parents of children aged 7−12 found fears about strangers and worries about injuries are impacting on children's outdoor play and mobility. Almost all the parents (90%) surveyed were able to leave their home unsupervised when they were growing up but only a third of those parents allow their own children to do the same. The children were also, on average, two years older than their parents before they were allowed to undertake activities like going to the shops, posting letters or catching public transport unsupervised. [38]

Victorian research explored how parental risk aversion affects children's physical activity, through play and everyday walking or cycling (Zubrick et al. 2010). A survey of parents revealed two key fears about children's safety: travelling to/from school; and during unsupervised play in the local environment or street (VicHealth 2014). Almost 50% of surveyed parents worried about 'stranger danger' and 18% feared for their child's safety when out alone 'without a known adult'. Gender and location also affected independent mobility, with boys given more independence than girls, and children living in rural areas having greater freedom and independent mobility than urban children. Many parents worry about what family, friends or teachers think if they allow their children out without an adult (ABC Radio 2017e).

Parental fears about strangers abducting their children do not accord with the evidence surrounding fatal harm. Research on family homicides in Australia (Mouzos and Rushforth 2003) and an analysis of child homicides in NSW revealed that children are more likely to be harmed by people they know (Niellsson et al. 2009). The instances of children being abducted

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[38] http://www.stihl.com.au/stihl-launches-my-green-wall.aspx.

by strangers are still extremely rare but possibly linger in people's minds because of the media saturation surrounding such events (Bearup and Box 2015).

While the spread of exaggerated parental fear is not 'easily explainable' (Rosin 2014), it has created what has been termed 'surplus safety' in childhood (Wyver et al. 2010). Paradoxically, this exposes children to longer-term health risks, with dramatic rises in childhood obesity and declines in physical activity. Everyday activities like walking to school are now a novelty: two-thirds of Victorian children are driven to school even though they live less than 2 km or 15 minutes away (Gibbs et al. 2012) and only one in four Year 6 children in the ACT walk or cycle to school (ACTG 2016a). Special programs and days are now held nationally to promote walking and cycling to school. [39]

A Canberra-based survey also found that almost two-thirds of parents consider car parks and set-down areas around local school unsafe (ABC News 2014). Paradoxically, driving children to school to keep them safe makes the streets around the schools less safe for the children that do cycle or walk. It also reduces the children's ability to meet daily physical activity requirements (Boddy 2016b). This is borne out in both the weight and physical activity data for children in the ACT: 25% of 5−17-year-olds are overweight, with little change over five years (ACTG 2016a, Boddy 2016c). This is consistent with national figures for this age group (ABS 2013a). The number of overweight children nationally has also doubled in one generation since 1985 (NHMRC 2003; Margarey et al. 2001). This has profound implications for their health as adults (ABC Radio 2017e): 80% of 5−17-year-olds did not meet daily minimum physical activity recommendations (ABS 2013a). An innovative longitudinal study of Canberra primary school children confirms this activity deficit. Only 42% of boys and 37% of girls in Year 2 meet daily recommendations. By Year 6, this falls to 30% for both genders (Telford 2017; Telford et al. 2013, 2012) and, in high school, falls further to 14% (ACTG 2016a).

4.3 Global and Australian responses to childhood nature disconnection

The loss of direct contact between urban people and nature (particularly children) has been described as the 'extinction of experience' (Soga et al. 2016; Krasny 2015; Pyle 1975), 'environmental generational amnesia' (Kahn 2011) and 'nature deficit disorder' (Louv 2005). Kahn's concept of generational amnesia posits that when children are born, they construct a

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[39] http://www.walk.com.au/wstsd/

baseline of what is environmentally normal; if the condition of the environment is degraded, this is considered normal (Kahn 2011).

Concern about childhood disconnection has prompted advocacy movements in the US, UK and Europe, aiming to raise public awareness and promote research and policies to reconnect children with nature. [40] There were also high profile policy interventions in the US, including programs to improve school students' environmental literacy [41] and the Federal initiative, 'Every Kid in a Park', which provided free passes for every 4th grade student to experience and visit their national parks. [42]

In the UK, local authorities are setting goals to offer children 'engaging everyday nature experiences' that involves exploratory, play-oriented, hands-on contact with nature (Greater London Authority 2011b: 3). A report by the 'All-Party Parliamentary Group on a Fit and Healthy Childhood' raises concerns over constraints on children's play, challenges attitudes that stigmatise children (and their parents) who play outdoors without adult supervision and proposes a series of measures to raise awareness of the importance of play and create the right environments to foster play (APPG 2015). UK planning instruments now require new housing to include informal recreation spaces so children can play outdoors and be 'independently mobile'. They also ensure that public realm developments incorporate incidental play space and facilities to encourage outdoor activity across the community (Mayor of London 2017).

In Australia, longitudinal research demonstrated how urban design policy influences physical activity and public health (Hooper et al. 2015; Giles-Corti et al. 2013, 2008, 2005), including how attractive parks and green spaces benefit physical and restorative health (Maller et al. 2002). National principles and indicators have been developed (Rozak and Giles-Corti 2017; Paine and Thompson 2016), [43] and Canberra's Territory Plan was amended to include these 'Active Living Principles' to ensure opportunities for daily physical activity are built into the design of urban spaces (ACTG 2016b).

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[40] https://www.nationaltrust.org.uk/children-and-nature

[41] http://parks.state.wa.us/972/No-Child-Left-Inside

[42] http://www.everykidinapark.gov/

[43] http://www.healthyactivebydesign.com.au

The physical activity research does not distinguish the differing 'play' needs of children, whereas other authors (Tranter and Freeman 2011; Wyver et al. 2010) take a more holistic view of the urban environment to address the risk factors that affect children's health and independent freedoms. They argue that designing urban spaces to meet the needs of children, allowing them to be adventurous and freely navigate and explore their environments, creates healthy, sustainable neighbourhoods for the whole community. This premise is supported by childhood health experts who stress the importance of outdoor play and freedom to play without adult interference. Dr Anne Kennedy speaking on ABC Radio (2017b) noted:

> *[play] it's a very serious business, we call it the work of childhood…once we [adults] enter that play we change the whole scenario, the whole context – they [children] often change the way they are playing when we are there…aware we are watching and listening… and they have their own secrets and they have a right to those secrets…we've got to trust that children do have the capacity in most cases work their way through …without our interference and surveillance (ABC Radio 2017a).*

Most recently, interventions that reintroduce risky play into playgrounds are seeing positive results in children's social behaviour, psychological wellbeing and physical activity (Brussoni et al. 2017). Other studies show that outdoor play supports and enhances children's self-regulatory capacities and cognitive development (Ulset et al. 2017) and that natural playgrounds provide children with more opportunities to develop gross-motor skills (Wood and Martin 2010). Outdoor lessons in formal education were found to improve students' engagement upon returning to the classroom, expressed as 'refueling in flight' by researchers (Kuo et al., 2018). This supports the Kaplan's theory that experiencing nature introduces a state of 'soft fascination' that allows the 'mental muscle' to direct attention to 'rest', enhancing the ability to focus again later (Kaplan and Kaplan 1989).

Schools in Australia and elsewhere are also implementing additional time outdoors for free play (Cook 2017; McDonald 2017). Indeed, kindergartens that allow 'unstructured' outdoor play reported improvements in the quality of interactions between the teachers and children (ABC Radio 2019b, 2017c). The first 'nature-based' primary school opened in 2018 on the mid-north coast of NSW (Siossian 2019) and new early childhood centres are being developed in Australia to draw on the successes of long-standing forest schools in Europe and the UK (ABC Radio 2017a; Brennan 2016). [44] The 'Nature Play' program is designed to create opportunities for children to engage in natural settings and is now operating in most states of

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[44] www.bushkindergarten.com.au/

Australia, including the ACT (Boddy 2016a). Further, international 'nature play' advocates have visited Australia to engage with early childhood educators and health and design professionals (Bienenstock 2017; with Richard Louv sponsored by ACF in 2014. [45]

These developments support the view of some Australian researchers that 'surplus safety' for children does not necessarily need to be an outcome of urban living (Wvyer et al. 2010). The Victorian research also indicates the cultural changes that will be needed to encourage parents to give children independence to navigate their local environment and neighbourhoods (VicHealth 2014). These important dimensions are often overlooked in the physical activity literature and health policy interventions (ACTG 2013d), and understanding the scope of this cultural change is essential with further research required (Staempfli 2009).

4.4 Methods and Analysis

This topical inquiry was designed to explore the value of childhood exposure to nature and outdoor play, drawing on the childhood experiences of a group of environmental professionals, ecological researchers, nature reserve users, neighbours and volunteers (the informant groups for the place-based case studies). This study sample was diverse; not all participants worked or volunteered in conservation or related areas (see Table 1.4) but the fact that many had chosen conservation-oriented vocations or activism is of interest, as they might be expected to have empathetic perspectives of nature. The age of informants, 70% over 40 (see Appendix 3), also suggests they could provide insights about their own experience as well as the next generation, their own children and/or grandchildren.

I took the opportunity when designing the lines of inquiry for the semi-structured interviews for the place-based case studies (Chapters 6-8) to pose a series of questions to uncover the informant's personal experiences of nature during childhood (see Section 1.8.2.1). This was framed as a 'warm up' question and designed to establish rapport with the informant before the substantive interview took place (interviews were face-to-face and up to an hour in duration and the interview process is described in section 1.8.1.2).

The 'warm-up' question was designed to capture descriptive data about their access to nature and outdoor activities as a child; supervision and rules; the role of adults; memories of special

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[45] http://richardlouv.com/appearances/

places; influences on later life; and the differing experiences of (their) children and grandchildren today (See Appendix 4).

This descriptive data is presented below and follows the format of the relaxed conversation that flowed from the 'warm up' question. There are some limitations with data that relies on participants reconstructing and relating their childhood memories of nature exposure. However, once people construct their own account of events, this remains remarkably persistent over time (Campbell et al. 2011; Wynn and Logie 1999). Informants who are more involved in nature-based activities are also more likely to 'more vividly recollect and report their childhood nature experiences' than others (Asah et al. 2012: 561).

For analysis purposes, the descriptive findings are situated with the evidence and current debates about childhood connection, providing a Canberra context for the wider social changes affecting childhood. Importantly, as enabled by the adaptive approach to data analysis (see section 1.9), this descriptive data can be viewed alongside the empirical findings from participant observation and resident interviews in the 'living' and 'management' place-based case studies (see Chapter 6 and Chapter 9) for explanatory purposes.

4.5 Findings

4.5.1 Childhood location and access to nature

Approximately half the informants grew up in urban environments (including 22% in Canberra) and just under half were in rural areas (see Figure 4.1) Regardless of the environment, all but one informant were allowed out to play alone or in the company of siblings and friends (Figure 4.2). Those in rural areas were more likely to play with siblings, and those who played alone were in rural settings with no siblings around the same age.

Only one informant recalled being supervised during outdoor play, and only 20% nominated rules that applied to their outdoor play. Rules were straightforward, including being home by dark and swimming in the baths or between the flags at beaches. One informant's mother used a cowbell to summon them home from the paddocks.
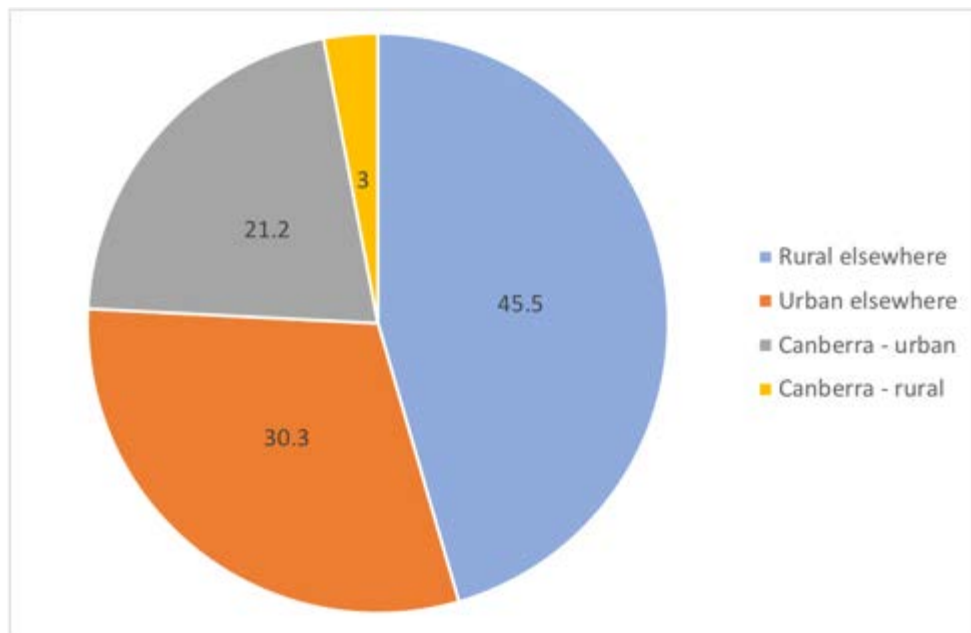
Figure 4.1 Location of childhood home (%)

Note: Some participants were raised overseas; 15% of informants n = UK (8), Vietnam (1) and US (1).
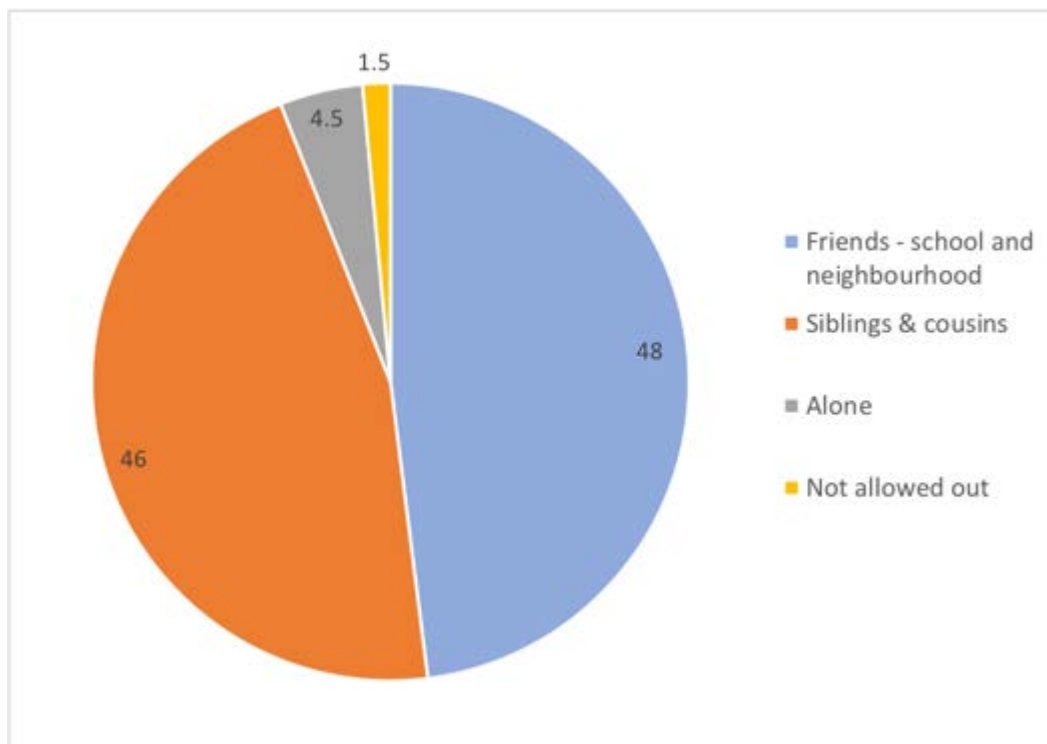
Figure 4.2 Outdoor playmates (%)

When asked what they did outdoors, informants were overwhelmingly engaged in free and creative play, building things, exploring on foot and cycling, often with the dog, and making the most of the natural and other resources in their immediate environments, including playing on a dump and along railway lines (see Table 4.1). Those in rural environments often looked

after animals and boys went hunting, while those near waterways and the beach went swimming, exploring and surfing.

Table 4.1 Informants' outdoor activities

Activity	Mentions	Descriptions
Exploring Roaming	33	*And me, my brothers and my neighbours spent all our time, on Mount Majura; up and down like a chook without a head.* *Mostly exploring, that's all it was, exploring the creeks, exploring the hills, exploring what was on the other side.*
Riding bikes	16	*Yeah, us kids used to ride our bikes in the bush all the time and break our bikes 'cos there was no mountain bikes in those days.*
Rivers, creeks, dams	15	*There was a system of ponds and we seemed to gravitate there.* *We backed onto a big reserve, we, all the kids spent heaps of time in (there) It had a waterfall we'd jump off into the water.*
Building forts and cubbies	13	*It was a great place as a kid to run around and, you know, cowboys and Indians and forts and you name it, you know, that sort of stuff.* *We used to make cubbies, make jumps on our bikes and just destroy the environment, really.*
Yabbying and tadpoles	10	*I loved yabbying down Ginninderra Creek, we used to follow the creek along and down towards Parkwood* *We'd make pontoons and we'd fish for yabbies.*
Looking after animals Watching animals	11	*Mostly outdoors, chasing chooks, horses and helping inoculate.* *There was these giant boulders not far from the house that I used to just go and hang out on. An echidna lived under there…so we used to go down and watch him, just lay there and look at him.*
Sport paddock or on the street	9	*We just went out and played. Big open fields in front of my house where we played sports on.*
Beach combing	8	*My folks had a beach house, so we clambered all over the rocks.*
Shooting	7	*I used to go off on long walks by myself and usually shooting with a slug gun and try and shoot rabbits.*
Lizarding	7	*We used to spend a lot of time lizarding.*
With the dog	5	*I used to spend a lot of time on my own with the dog.*
Tree climbing sitting	4	T*here was a tree that I climbed, tried to make a little treehouse and it was terrible, it was a plank, but I thought it was great anyway.*
Rock collecting	3	*You'd just collect rocks, or you'd collect something along the way.*
Horses/riding	2	*I'd run through the fields to my friend's house, and we had horses and we'd be riding all the time.*
Things in back garden	2	*I used to create gardens and plant things all the time, and dig and weed, like I was just a ferocious weeder.*
Railway lines	2	*There were there old railroad tracks that I used to walk along.*
Rock climbing	2	*We were always rock climbing.*
At the dump	1	*We had endless hours of fun at the non-putrescible dump.*
Sling-shot	1	*Yeah, there was a few fights and sling shots were probably the most dangerous thing – it's lucky no kid lost an eye.*
Motorbike	1	*I got into motor bikes before they fenced everything.*

4.5.2 Adult influence on nature experience

Participants offered many interesting recollections of the influence of adults on childhood and their appreciation of nature (see Table 4.2). Many informants experienced nature when camping and bushwalking with their parents, family and others. This was described as subtle immersion rather than a process of specific instruction and/or introduction. Others described how an adult (parent, grandparent or teacher) drew their attention to nature or mentored their interest in it (see Table 4.3).

Table 4.2. Significant Nature Exposure Through Adults

Adult	Informants %	Descriptions of Adults role/influence
Father	27.2	Father was farmer x7; Bushwalker x 4; Fishing x4, Shooting x2 Camping x2; Forester; Arid Ranger; National Geographic; Neighbourhood Father; all x1.
Both parents	12.2	Camping holidays x5; Birds x2; Gardening parents; Bushwalkers and native garden; Kombi trip north; all x1
Mother	10.6	Bushwalker passing on stuff x3; Birds; School teacher mother: Curious about nature; Strong nature ethic; Bush regenerator; Field Naturalists; all x1
School teacher	8	Loved Geography subject x2; Encouraged to work with animals; Art, environment; Rural village school; all x1
Grandparents	6	Farmers x2; Fed birds; Trapping, building stuff; all x1
Other family	6	Uncles x3—camping; interest in Geology all x 1
Scouts	6	Family friends were scout leaders x2
Other: Field Naturalists	3	Taught Plant identification, survey lizards and spotlighting;; all x1
Family Friends	1.5	Visiting rural property x1
None	19.5	
Total	**100**	

The influence of the adult is often related to that adult's passion or interests (e.g., bird watching) or their involvement in nature-based organisations. One informant (a park ranger) could vividly recall a particular teacher's influence on their appreciation of nature:

The only one I can identify was just a brilliant teacher, part of what she used to do was to take us down into the forest, because our school was in—kind of forestry area, and down to the river. You'd just collect rocks, or you'd collect something. Anything that attracted you, you'd look at. You'd have to take notes on it. And, you'd take it back to the class room. So, she'd relate these physical objects you would collect back to science, but then we also used them for the creative process. So, we'd look at the rock under a magnifying glass and then basically do creative writing, that's your stimulus. So, you're not writing about a rock; you're using what you are seeing to stimulate your creative writing processes to write a story. So, and these things, like here I am at 47, still going 'Shit, that was a meaningful experience'. I just remember it from memory; it's a long time ago, 1978 or something. (ranger)

Two younger informants (< 30 years) cited their memory of the Walt Disney film *Fern Gully* influencing how they felt about nature. The naturalist and TV celebrity of the 1970–80s, Harry Butler, was also recalled with fondness by some informants including this ranger:

I grew up watching Harry Butler and I've got both his books. I had every poster that he had on my wall. I used to go to sleep looking at this guy's posters (ranger).

The Dr Seuss story *The Lorax* was also recalled by a resident informant and, incredibly, was used by him as an induction tool at work:

I think the most powerful experience I had as a child was having The Lorax *read to me. And it's still probably my favourite book. In fact, because I used to do the inductions for (organisation), and it would always be one-on-one with them, all the new Directors got* The Lorax *read to them. And they used to think it was a joke…until we got about a third of the way through the book and they'd think: 'this guy's not going to stop, I'm going to have to listen to this whole book'. (resident)*

Informants who were raised on farms described learning about the seasons, life cycles and climate from observing and helping around the farm:

My dad was very gentle and I was his little shadow. Everywhere he went on the farm I followed him. Yeah, with four seasons and summer was harvesting time and autumn, was harvesting for vegetables and potatoes. We had potato-picking school holidays— that's what we called them: potato-picking holidays. Yeah, and then in the winter the animals were inside and they were being fed. So, it was a real cycle (resident).

Table 4.3. Participants' Recollections of the Role of a Significant Adult and Nature

Adult	Recollections about influence of significant adult
Father	*Dad in the holidays, we'd all go camping, he really didn't necessarily point anything out, but just made it happen. Took us to lots of national parks.* *My dad was passionate about the bush, interested in birds, wildlife magazines.* *Yeah, the old man…yeah, he took us camping, all the family. He was a bit of an adventurer. Oh, and a founding member of the National Geographic Society* *My stepfather, we clicked very well, I loved all the stories about nature. He was incredibly good at plant identification. One of those classic botanists.*
Mother	*Mum. Always mum. Yeah, she's one of these fonts of useful information. We'd go for walks and it'd be, 'Ah, that's such and such'..* *My mother was intensely interested in environment and joined the Field Nats—that's where the seeds were sown and we went on camps and gemstone hunting.* *Yeah, very much my mum, even though she was learning as well, but it was a discovery, so we'd go on spotlighting tours with her. It wasn't like a tutorial. It was more of, you know, 'Wow, I wonder what that is?', you know.*
Grandparent	*So, my grandfather, I used to spend a lot of time with my grandfather and he taught me a lot of things; in particular, trapping and, a lot of bush skills.* *Probably my grandparents who had a farm and that great love of the land and natural world—it was freer there with lots of cousins around to swim in the river.* *Probably my grandparents actually. Yeah, because they were quite into nature., they used to feed the birds, the possums, they showed me everything like that.*
Teacher	*I did was zoology and we had a teacher took us on holiday courses to field study centres, one involved zonation along the seashores that really captivated me.* *The teachers were good teachers, very sympathetic and supportive. I wanted to work with animals and the teachers encouraged me to think about that.*
Club Leader	*There was a lovely old guy in the field Nats who had a bushland property, which was perhaps unusual for then and, I used to cycle out on the weekends and he became my mentor. He introduced me to Australian nature, not just to catching a few lizards and keeping them as pets, but to the field side, finding things, recording them. He also got me involved in the fight to stop the Strathbogie Ranges from being logged, so I was introduced early to a conservation cause*
Neighbour	*There was a guy who lived up the road, he was a bean farmer so I'd just head up, if there was nothing happening around home after school, I'd head up there and if Bob was there I'd just jump on the back of his tractor and we'd drive around the place and do stuff, a very rural activity but I think also in nature.*

4.5.3 Recollection of special or favourite places

Nearly all informants could recall a special place and, significantly, over 70% nominated a local space nearby or part of their home: a local body of water, park, nature reserve, backyard or trees (see Table 4.4). These spaces were the focus of daily activity and the local scale and ordinariness of these recollections concurs with the evidence that positive feelings about nature are acquired through hands-on free play and repeated visits to the same sites. The management of these local spaces and whether they were conservation reserves or a vacant paddock did not figure in children's minds.

Table 4.4 Special or Favourite Places

Location	No %	Specifics	Descriptions
Local bush reserve paddock	22	Little Mt Taylor Paddocks at Holt Red Hill treehouse Mt Majura & Pines Pentland Hills woodland Fields and hedgerows	*Definitely Red Hill, We had a tree house, a cubby we built in a drain, yeah. And we had our BMX track which we were very fond of. The reserve two streets away was a big open area with, you know, nothing but a couple of trees, it was like our own little world there.*
Local creek, river, dam	15	Ginninderra Creek BBQ on dry creek beds Murrays Corner Cotter Ororal Valley Oallen Falls	*The creek was my favourite, people say I could swim before I could walk and the creek, teemed with fish, turtles and eels and snakes . We had a creek running through (our place) and we spent our free time along the edges and in the creek, the freedom, happiness.*
Farm bush block	14	Childhood farm x3 Grandparents farm x3 Family bush block x2 Old dump on farm	*My grandparents farm and aunt and uncles great love of the land and natural world.* *I used to go to the old dump; there was old cars there, bits of tractors and relics*
Home backyard	12	Under the house In the garden x3	*Underneath my gran's Queenslander—it was cool and dark.*
Coastal area	9	Mangroves Cornish coast Coastal heath alley-ways South Coast x3 Goolwa Sydney sandstone	*It was dead calm, and the sunset was just phenomenal, glass as far as the eye could see, and the Peninsula and the Coorong, and I just felt this overwhelming sense of 'this is where I belong'. I had seen Storm Boy in my early-20s and that left an indelible thing in my head.*

Mountains	9	Snowy Mountains x2 (Bothering Plains Snowy Plains Spencer Creek) Blue Mountains Strathbogie Ranges Brindabella Ranges	*There was a stream flowing; there was wild flowers and though I came from the beach, , the alpine environment I really love.* *There was a place up in the Strathbogie Ranges that was my favourite place. I went camping when old enough with a few friends.*
Local— urban area	7.5	Under railway bridge Belconnen Golf course School playground	*In my primary school, we played in an area called 'the rocks'; we just loved it.* *I used to love being under the bridge over the railroad tracks, it was cool in summer.*
Up or under a tree	4.5	Mango tree Brittle gum Old peppercorn	*It was everything, the mango tree.* *There was a big old tree walking home from school loved and there was always scorpions and ants. And it was probably a Brittle gum.*
Remote rainforest	3	Cape Tribulation, PNG	*I guess my favourite place growing up was up at Cape Tribulation, where we camped, and back then it was untouched, totally pristine.*
National park lake	3	Lake Eucembene Lake Eyrie State Park NY	*Lake Eyrie was a magic place, where the lifeguards' first action everyday was to dig a path through the seaweed with a snow shovel so people could get out to swim.*
Remote national park (arid)	1.5	Flinders Ranges	*We'd go camping at Flinders Ranges. So, yeah, Brachina Gorge in the Flinders Ranges that was very special for me.*
Old gold dig/mine	1.5		*We were really close to old gold-digging fields with big cuttings and there was a fallen down log we'd cross to the cuttings and play.*

4.5.4 Reflections on childhood nature exposure and life

Most informants were able to the link the influence of their childhood experiences to their feeling about nature and their pathways, in some cases, to environmental study and the desire to work outdoors (See Table 4.5). Many informants spoke of their love for nature and feelings of comfort being in nature. They mentioned it 'being within' and spoke about having a deep affinity with nature, equated to biophilic feelings (as described by Kellert 2005), and also about special places—topophilic feelings (Tuan 1977). Others discussed their preference for living

in less-urbanised environments arising from their country childhoods. Living in nature-rich Canberra was explained as a sort of 'halfway house' between the country and city.

Table 4.5. Reflections on Childhood Nature Exposure and Life

Personal Reflection	Mentions	Descriptions
Loves being outdoors	15	*Nature and the outdoors is an antidote to being deskbound. Whether I'm in it or driving through, I love being outdoors. Always been an outside person loved the outdoors.*
Has affinity for nature and trees	12	*I love nature, and you know, I'm a little addicted to trees. Just having that general affinity, loving nature caring for it.*
Likes living in the country (not city)	9	*I still very much have the country in me, just deep love for open spaces and the country and nature, I am very conscious of it always look always for occasion to be in the country.*
Studies topics related to nature	6	*Parents proud when I went to Uni, to go and do Biology, Topographic maps, all that sort of stuff, because I love that side of things, more geography than sort of hard science.*
Was influenced by local environment	6	*But there's no doubt being exposed to that environment sort of brought that out, and I think led me quite early in life to decide that I wanted to do this sort of thing.*
Was influenced by popular culture	4	*I remember the video of 'Fern Gully the Last Rainforest' as a kid;—formed my view around value of forests.*
Pursued physical work	3	*I chose physical jobs ranging from irrigation farming to working in mines in Western Australia. The decisions about where you end up are a combination of your whole life.*
Was led into teaching	2	*It was the community and living in the country that led me to teaching and my love of animals, I passed onto lots of kids.*
Parenting style is influenced	2	*It does play a part in how I bring the kids up. I insanely ration computer time because I like them to be outside.*
Pursues hobbies/gardening	2	*I still reflect. I'm a keen gardener one of my favourite pastimes. I kept chooks all my life. I grow my own vegetables and I know its related to my lifestyle as a child.*
Joined the Field Naturalists Club	2	*The one thing that probably absolutely got me going on that journey was joining the field naturalist club.*

4.5.5 Present-day childhood and parenting

Informants with children (or grandchildren) were asked whether they allowed their children out to play and explore on their own (or with other children), what affected their decisions

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about their children's play and what strategies they employed to manage outdoor play (see Table 4.6). The age at which children were allowed out is generally older than that of their parents and strategies or rules about roaming distance, time curfews, mobile phones and remaining together were used. Parents listed factors that affect their decisions about their children's play, including the perception that urban areas are riskier than rural communities and the loss of community connection. Here, one factor was that many people who moved to Canberra had grown up or lived in country or rural communities.

Only a few parents allowed their children freedom to play in a way that could be considered comparable to their own childhood experiences:

> *Well, I think I'd be a bit of a hypocrite if I had tried to control them since, you know, my life was so good because my parents didn't stop me from doing things (Policy manager).*

One of those informants described how she challenges the fears of other parents to ensure her children have freedom to develop judgement and decision-making skills:

> *Yeah, I mean it's a different age now, it's funny. I'm okay with it. I do find that when I tell…other parents that I let him go off to Stromlo on his own; they absolutely freak out and I think, 'Oh my goodness, am I like a bad mother?' People worry more about stranger danger; Um, I have people say to me, 'Aren't you worried about some weirdo getting them, you know,' and I'm like, 'yeah, I guess it is on my mind, but…they have to be given the time, the space to develop that. If they don't get to use their own judgment, how do they develop that for later on when you are in a situation as an older adolescent or young adult where you have to make the decisions, yes. I mean it's a big risk though. If they make that one bad decision, things could be very different. But he has a good weirdo radar. Kids do. He's also allowed to cross the road on his own. He's even allowed to take his four-year-old brother across the road because I trust him. He's—when it comes to that, safety and—He just, he grows with that responsibility (resident).*

Informants with adult children had generally given their children more freedom to roam; others described taking their children camping to engage them with nature:

> *We lived at the edge of a reserve in Sydney and our kids love of the bush is because every day they were out the clambering over sheer rock precipices by themselves (ranger).*

> *Our kids grew up in Alice Springs and we did lots and lots of bushwalking and camping. That's what you do and not in tents, you just had your swag or, you know, your sleeping bag in the sand and the kids say, you know, 'Mum couldn't have brought us up in a better place' (Resident and CFU volunteer).*

Table 4.6. Present-day Parenting Concerns and Strategies

Concerns and strategies	Mentions	Descriptions
Parent concerns about the safety of urban areas (v. rural) and less connected community.	9	*I'd be a bit reluctant, it's concerns me about the suburban lifestyle. Yeah, I haven't worked out the answer to that [letting the kids roam], it's something that troubles me a little.* *I grew up in a small community and if you had a problem you'd just knock on the neighbour's door. But I think the problem is community doesn't mean the same thing as then. I knew the local policeman the teachers, the publican, and they knew your family.*
Children are allowed out with rules.	6	*Yeah there's a rule at the moment where they can't cross a fence. Park across the road is fine. They're allowed to run amuck there. As they get older, yeah, at 13, he's fine to go down to his mates but … I'm very firm with, 'You be home by 5:00. That's cut-off time'. The only thing he has to do is take his phone. So, I bought a cheap phone with no games on it…because he wouldn't go anywhere with games. He has a time to be home by. Often, he'll ring and say, 'I've met such-and-such, can I stay and do blah'.*
Parents are waiting until children are older.	3	*[Child] is six, so I would say I'd give him another couple of years, but he would have to go in a group, not on his own.* *They're outside as much as we can get them outside, but I don't have any qualms to sending them off to the bush when older*
Children are now supervised	2	*I'll admit with my own kids I have to supervise them all the time.*
Older children supervise.	2	*And I do let him take his little brother on their own, but not as far. They just go over to the creek and play over there.*
Parents took camping outdoors.	2	*We did a lot of camping trips with them and bushwalks So my son's grown up with these ideas and he has through those experiences, now, like, he'll go camping with his mates.*
Parents try not to worry	2	*Well, I use my rational mind and I know what the potential chances of something terrible happening and they are very small.*
Children are allowed to roam the neighbourhood.	1	*Funnily enough, because we have a cul-de-sac and a park, and they—on the weekends, I actually don't know where they are. I know they're either at that neighbour's house, or at the park, and I'm happy with that—I've let them go to the shops by themselves. I try to be conscious of giving them a similar set of freedoms to me. I think it's good for them to have that sense of responsibility.*

Parents ensure their children know the neighbours.	1	*We make sure the kids know the neighbours so that if something happens, they can race across and speak to whoever. I guess part of the protection instinct as a parent, if you know that person that's okay, but there are boundaries.*
Parents have created outdoor space.	1	*So, the place we have chosen to live backs onto a reserve. So, they'll have unfettered access, and our own backyard is landscaped with cool stuff for them to play and get dirty and…so we've set it up for them. Until they get their iPods!*
Parents kept them busy.	1	*We did lots of walks together, had a dog, up Mount Painter; we'd walk down through Aranda. They had horse-riding lessons and, you know, tennis, piano, netball, soccer. But we liked the outdoors.*
Children less adventurous than parents.	1	*Well I'm frustrated because they are not as adventurous we're close to Mt Taylor and I say why don't you get on your bike and they'll come with me but less keen to go up on their own.*
Children prefer indoors and computers.	1	*They were much more indoor kids than me. They would come home from school and be on computers and that's the huge change once they grew out of the sandpit, it was computers.*
Children do scouting.	1	*My son's ended up having exposure mostly through structured activities, like Scouts and he absolutely loves scouting and recently went up to Jamboree in Queensland, two months. It was massive.*

4.5.6 Differences in childhood experiences

The final part of this inquiry captures informants' observations about the differences between their own childhoods and those of the current generation (see Table 4.7). The key differences relate to their greater independent mobility, being outdoors (all day) for play, the absence of technology, few rules and less focus on risk. The most striking contrast is the absence of parents or adults mediating their play and the individual agency exercised as children to conceive and create their own fun outside. The responses evoke the feelings of freedom and inhabiting local places that characterised those times.

There were only a few recollections of dangerous or potentially harmful incidents, although such experiences may have been forgotten. One resident informant described how a dangerous encounter when she was young made her more aware of risks:

You know, you'd come across people in the park. I was 11 or 12. I developed late, so I was still small at that age. So, I remember having a boy coming into the public toilets at the local oval and bail me up; he was probably 17 or 18. And you know, in

the end I kicked him in the shins and bolted. I had the dog with me and the dog went crazy. She bailed him up and I just knew that I had to get out of there as quick as I could and so…Mm, went home and told mum and mum was like, 'Oh yeah, okay good on you'. She was so blasé about that stuff, Well I remember that I was quite frightened and I mostly didn't go into those toilets again and I…if I ever had to, I always stopped and looked and made sure that no one was around and in and out as quick as you could. So, it teaches you to be aware. And not to take risks; to minimise your risks. (resident)

Table 4.7 Differences in Childhood: Then and Now

Differences	Descriptions
Risks and injuries	*Look, quite a few fires were started from kids mucking around with firecrackers. But look there was no disaster from my memory, no kid got maimed or anything.* *Kids had somewhere to explore on their own—that's where everything happens; you can be taught by grown-ups but when you take responsibility, you learn.* *In the '70s there would have been no Indian mynas in backyards because they would be easy pickings for every kid with a slug gun.*
Curfew	*We only had to be home by dark. That was the only rule. My mum was worried we might fall out of the tree, but she never worried we would be abducted.* *So, early '70s, especially with daylight saving, 'don't come in 'til it's dark' or 'don't come in 'til it's dinner time'—expect you home when it was getting dark,* *Left the door at 9 o'clock and came back when the call came out for dinner.* *Came home for lunch and back again at dark. That was the only rules we had.*
Independent mobility	*No, you'd bike ride around to your friend's house and to school and yeah, that's how you got around. Your parents didn't drive you anywhere* *We used to be able to just jump on our bikes and disappear for the day as long as you're home by sunset, everything was fine.* *We did a lot of walking my friends and I; we loved walking at night and you know, in a group we felt entirely safe, so it was walking around my area. I remember one night I think we walked from x to x, just because we could.*
Outdoor play	*We were outside all the time. We had five acres at our place. We were always outside. Inside was\meal time and that's pretty much it; meal time and bedtime. We weren't allowed in the house. I'm the eldest of six and we had to be outside.* *As kids then you just disappeared and played…tadpoling, all the usual stuff.* *It was sort of different I guess, when I was growing up; mum would kick us out of the house and say 'Come back at dinner time', so we'd fill in the day with throwing water bombs at people to bike jumps, racing cars up the street.*

	We spent all of our free time roaming unaccompanied and unsupervised through the countryside up and down the creeks and into the mountains. Like I could [be] gone for you know the whole of the daylight hours; never came home for lunch.
Computers	*There were no computers and you just made your own entertainment and you'd be out there, just in the bush I guess, on the bike and running around.* *Computer games weren't around then so I think that led to more roaming around like that and, you know, I just had friends I'd meet up with and we'd just do stuff.*
Nature clubs	*I think there's a lot to be said for old—perhaps that would be old fashioned, the concept of nature studies and...The Gould League...was revolutionary. Too many people still don't know what a Rosella or a...Peewee is. I think Canberra's more educated than most, but even so there's a lot of ignorance, a lack of empathy.*
Children's world	*We just didn't tell Mum and Dad what we were doing.* *My parents wouldn't have had a clue what we were doing out the whole weekend.*

4.6 Overall Findings and Conclusions

The case study findings, while descriptive and reliant on informant memories and interpretations, offer some useful insights about how people understand their own childhood experiences and relate these experiences to their appreciation of nature. The descriptions also reveal that the most meaningful nature experiences that persist in participants' memories were not mediated by adults. Many described sensory and 'biophilic' feelings about nature (as described by Wilson 2003; Kellert 1993) and relate their love of the outdoors and affinity with nature to these childhood experiences.

Another interesting finding was that local natural spaces (parks, paddocks and nature reserves) were frequently recalled as favourite places, rather than just places of pristine nature. These places were also the sites of the most repeated local nature exposure. The responses also evoke a sense of freedom from being in these spaces (Tuan 1977).

Many informants were nostalgic about their free childhoods; many of the activities they enjoyed (building cubbies, bicycle tracks, yabbying and lizarding) are now actively discouraged in urban nature reserves (see Chapter 8). Perversely, these same activities and engagement with local spaces appear to have seeded a love of nature and led to individual life choices about study and work. All the park rangers that were interviewed had similarly active, nature-rich childhoods, which translated into their desire to work in and care for the

environment. [46] This correlates with the findings of other environmental affinity research (Broom 2017; Harris 2009; Chawla 1999) and another study of Victoria parks staff that found childhood nature experience, an inspiring champion/mentor, reading and observation 'turned on the light' to biodiversity (Platt et al. 2001).

The recollections also suggest that children will use whatever resources are around (i.e., vacant blocks and even dumps); their management status is largely irrelevant. The pace of growth in urban areas means that there are less vacant spaces in most neighbourhoods and reduced opportunities to play on streets with more traffic. Many backyards are also smaller and organized for outdoor living rather than free play.

The views of informants with children suggest that their own positive memories and nature associations are insufficient to counter parental fears and perceptions that local urban environments are more dangerous and urban communities are less-connected. This social conundrum is interesting, given the informant group are well-educated professionals who understand concepts of risk and evidence, and recognise the benefits of nature play for children from their own experiences. Most significantly, this means that pathways to reconnect children with nature can only be considered in concert with reformation of societal norms around parenting, childhood freedom and play.

The differences between the childhood experiences of informants and the current generation accords with evidence elsewhere about children having less contact with nature (Kahn and Weiss 2017; Kahn et al. 2011) and the limitations on their ability to roam in local environments (Freeman et al. 2015). This is further evident in the place-based case study in Chapter 6, which found very few children using the Mt Taylor nature reserve in ways related by the informants here. Therefore, growing up in a nature-rich city does not insulate children from the pervasive social norms around parenting and childhood. This Canberra finding mirrors a New Zealand study about children having restrictive home ranges despite generally living close to natural areas (Freeman et al. 2015).

Only a handful of informants who were parents actively encouraged 'unsupervised play' and independent mobility and had strategies to manage their children's engagement in the local environment. These strategies included ensuring children knew their neighbours and setting play and time boundaries. Parents exercising this agency and co-opting other households is an

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[46] A total of 12 park rangers participated in semi-structured interviews for this research.

obvious measure to counter worries about other people's opinions should they allow children to play outdoors unsupervised (ABC Radio 2017e).

Early childhood researchers argue that positive risk-taking experiences should be built into outdoor physical play by managing risk rather eliminating it (Little and Wyver 2008). Reconstructing outdoor play settings around natural elements in education facilities and urban playgrounds and new 'nature' play programs are important strategies to normalise outdoor play. This nature-based recreational focus is particularly critical, as studies show that 'providing [these] recreational opportunities for children and families has enduring implications for later life participation in nature-based activities' (Asah et al. 2012: 562) and natural playgrounds are considered more restorative than unnatural ones (Collado and Corraliza 2015). The opportunities here extend from early learning to after-school-hours care settings and programs, purpose-designed environmental education facilities and outdoor classrooms. They further apply to nature-play adventure-oriented public playgrounds (a number of which have been recently been constructed in Canberra). These playgrounds in natural outdoor settings can 'facilitate creative, child structured and child-directed play' (Staempfli 2009:278).

These natural playgrounds should be complemented by natural spaces for everyday free play close to home (Chawla 2015, 1999). The findings from this case study point to these spaces being foundational for developing awareness and affinity with nature. The creation of child-supportive urban environments with accessible natural spaces however must be accompanied by interventions that give parents the confidence to allow their children to explore and enjoy these spaces. One of the confounding insights from this inquiry is that even though Canberra is one of the world's most nature rich cities, changing social norms about parenting and community perceptions of risk mean children enjoy far less unstructured outdoor play than previous generations. What this loss of connection and changing childhood experience means for community motivations to care about nature (Research question 1) and the management of nature reserves and biodiversity (Research question 3) will be explored in Chapter 9.

Chapter 5: Case Settings—History and Site Descriptions

'National Capitals tend to be monumental – Canberra is in unique in that the natural setting has become the primary monument' (Seddon 1987: 26)

'It is the most renowned urban landscape laboratory in the world' (Taylor 1992) [47]

5.1 Chapter Overview

This chapter describes the primary research setting, Canberra, the national capital of Australia, colloquially known as the 'bush capital'. Canberra is best understood through the social lens of its past, deep time Indigenous history, pastoral land uses and a century of city-making that re-shaped the natural grassy landscape into a capital city.

This chapter uncovers the conceptual iterations of Canberra's 'natural landscape' through the various stages of city planning that informed the making of its unique urban structure. It traces the origins of the ACT's nature reserves, examines the governance of the nature park and related landscapes, and considers how landscape values have changed, especially the recognition of the ecological values. The chapter also incorporates a historical description of the place settings—the Mt Taylor and Mulligans Flat and Molonglo River nature reserves—at relevant points. These local place histories show how the social and ecological are inextricably entwined across Canberra.

A social/demographic profile of the suburbs beside each case study site is provided at the end of the chapter and Appendix 7. This data assists understanding of the communities living adjacent to the nature reserves.

5.2 Methods

Archival research and document analysis were employed to describe the history and making of Canberra, and the specific case settings in this chapter, along with contemporary observations where relevant. The archival research was predominantly conducted through the ACT

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[47] Ken Taylor presenting to the first public hearing of the Joint Committee on the National Capital inquiry *Our Bush Capital – Protecting and Managing the National Capital's Open Spaces* (C of A 1992: 1)

Archives. [48] Historical newspapers and other digital records were retrieved from the Trove portal of the National Library. [49]

There are significant documentary sources covering the planning and design history of Canberra, including scholarly literature, books, public documents and reports published by the Commonwealth government. These include National Capital Development Commission (NCDC) Policy Plans over a 30-year period up to 1989 and the Annual Reports of the NCDC and the Department of the Capital Territory (DCT) and later, Territories and Local Government. (See also section 1.8.2.5)

5.3 Cultural History: Ngunawal, Land of Rocks, Water, Bark and Yams

The traditional custodians of Canberra, the Ngunawal people, helped create the grassy woodland landscape, their relationship with Country dating back 21,000 years (Flood 2010). The Ngunawal had an intimate relationship with country, as did Aboriginal people across Australia (Rose 1996). Oral traditions encoded knowledge about 'micro-environments', enabling their survival in specific locations (Nicholls 2014).

Fire was used to manage the landscape (Rose 1996), with burning applied as 'a planned, precise, fine-grained, local caring' (Gammage 2012: 3). Anthropologist Josephine Flood wrote:

> Fire was extensively used in the Canberra District. In August 1820, Joseph Wild reported from the northern end of Lake George that 'from the hills the party saw the fires of the natives who appeared numerous'. On 18 April 1824, Botanist Alan Cunningham observed in the Tuggeranong Valley that 'these interesting Downs had been burnt in patches about two months since'. This is evidence that Aboriginal 'fire-stick farming' took place both in winter and summer' (Flood 2010: 9).

Patch burns stimulated the grassy ecosystem and triggered the seeding of plants, promoting fresh growth of grasses attractive to herbivores, and tubers and forbs used for bush foods (Bell 2014). Fire shaped the vegetation on the grassy plains, enabling shepherding of animals and good sightlines for hunting. It was a 'land of nurtured sustenance with a plant for every purpose

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[48] ACT Archives is part of the Territory Records office and provides access to the ACT Government archives (see https://www.archives.act.gov.au). They also maintain a photo archive.

[49] https://trove.nla.gov.au/general/about.

and the tools and the tools made from resources in the bush, key to surviving in this landscape' (Brown 2011).

Much more is recorded about the Aboriginal history of Mulligans Flat than those of Mt Taylor or the Molonglo Valley. The area around Mulligans Flat 'was an important meeting place' (Brown 2011) and provided many resources, as evidenced by artefact scatters, an important 'chert' or 'tuff' rock quarry site (Johnston and Moore 2008) and the presence of bush foods, including yam daisy, other native tubers and herbs. Large open camp sites have been found, corroborating historical reports of large gatherings of Aboriginal people at Mulligans Flat (Cooke 2010). The headwaters of Ginninderra Creek, an important pathway, lie within Mulligans Flat, and a significant scatter site dating back 3,000 years lies in Forde near the nature reserve (ACT Government 2013b). The Old Coach Road through Mulligans Flat, so-named for its use by settlers, was a pathway for Aboriginal people moving east-west across country (Bell 2014).

At Mt Taylor, the NCDC *Sites of Significance in the ACT* (1988) states that 'unlike most of Canberra, Woden and Weston Creek are not rich in cultural sites and no significant historic or prehistoric sites have been identified' (NCDC 1988b: 2) This is surprising, as no cultural study had been undertaken when the volumes were written and these two valleys would have provided pathways between the Rivers and the Ranges. Only in recent years have traces of Aboriginal history became recognised with scar trees and a ceremonial site identified on a heritage walk and talk on Mt Taylor led by a Ngunawal elder (Bell 2017). A cultural study conducted as part of the Molonglo Valley urban development identified a number of important Aboriginal sites within the urban section the river corridor (Huys et al. 2013) and point to the river environs as a place with food and water resources, suggesting traditional use as a pathway or for trade and ceremonial purposes (ACTG 2018e).

5.4 Post-contact: The Arrival of European Settlers

This carefully tended grassy woodland landscape was attractive to the first European settlers. Stories of first contact between Europeans suggest that Aboriginal people aided the discovery of the Limestone Plains (Wigmore 1963). In 1821, Dr Charles Throsby and his convict overseer Joseph Wild wrote:

> *it is perfectly sound, well-watered, with extensive meadows of rich land on either side of the rivers; contains very fine limestone in quantities perfectly inexhaustible, slate sandstone and granite fit for building, with sufficient timber for every useful purpose;*

and, from the appearance of the country, an unbounded extent to the westward (cited in Gillespie 1992).

Bill Gammage drew on the field observations and artwork (see Figure 5.1) of surveyor Robert Hoddle to describe the grassy plains with scattered trees:

> In 1832−35 [Robert] Hoddle surveyed much of the Canberra District especially along watercourses. Along what he called 'Giningininderry Chain of Ponds', he plotted 'open plain' and 'open forest marking their boundaries with dotted lines' His foreground is framed with trees perhaps too slender to have grown in the open but the scene matches his field books' (Gammage 2014: 43).

Figure 5.1 Robert Hoddle's pictorial perspective of the Canberra District landscape

Source: Gammage 2014

The first graziers in Canberra around 1825 were John Moore and George Campbell, who settled on land grants around the Molonglo River (Wigmore 1963), then Campbell's nephew George Palmer at Palmerville, (the Ginninderra Homestead) around 1826 (Gillespie 1992). Deborah Rose detailed the rapid social and ecological transition in these settler landscapes:

> In general, settler ideology did not recognise Aboriginal land management, and did not recognise landscapes as the product of Aboriginal knowledge and labour. Settlers in their first years harvested the productivity which was the fruit of Aboriginal people's labour…Where people took up land for grazing, the results were rapid. Within ten years or so the hoofs of introduced cattle and sheep had vastly altered the soils and plants (Rose 1996: 75−76).

Flood stated that there was 'remarkably little violence' in the 'Canberra region between the two societies during the contact period' and that until 1840, 'Aboriginal seasonal movements and traditional campsites were maintained' and:

> Aboriginal people of the region were able to retain a largely traditional if somewhat altered way of life until European disease cause such decline in their numbers that this was no longer possible…Traditional food sources were also being depleted, as more and stock were introduced and outstations spread' (Flood 1996: 40).

By the mid-nineteenth century, the demand for small farms led to legislative reform and land beyond the original estates was sold to tenants and settlers and properties began to be fenced (Flood 1996). Mulligans Flat was one of these new settlements from 1841, with many small farm holdings along the Old Coach Road through the Flat. This was an Aboriginal pathway (Bell 2014) used by settlers travelling from Murrumbateman to Bungendore. Walter Ginn's settlement 'Dungarvon' was at the eastern end of the Coach Road (Moore 2010).

5.5 Commonwealth Leasehold Administration

The Commonwealth of Australia was formed in 1901. Yass-Canberra in NSW was selected as the location of the federal capital in 1908, being 'at least 100 miles from Sydney' and 'not contain[ing] less than 900 square miles in area' (Altenburg 1993: 1). The lead surveyor, Scrivener, was to determine the best city site with a water-catchment area, proper sewage disposal and easy access to Sydney and Melbourne. Further he had to 'bear in mind that the federal capital should be a beautiful city occupying a commanding position with extensive views and embracing distinctive features which will lend themselves to the evolution of a design worth of the object not only for the present but for all time' (DoI 1965: 2).

The surveyed Federal Capital Territory (FCT) area of 903 square miles included the water catchment of the Cotter River, and the river valley of the Molonglo for the setting for the city (see Figure 5.2; AHDB 2004) The state of NSW surrendered the land and granted water rights for the eastern river catchments. [50] The surrendered area had supported mixed farming and grazing in the north, smaller farms and enterprises from the 1850s and larger sheep stations in the south.

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[50] *Seat of Government (Surrender) Act 1909* of NSW and *Seat of Government (Acceptance) Act 1909* (Cwth) transferred control of the Territory which was vested by proclamation from 1 January 1911.

In 1912, an international competition to design the capital was won by Chicago landscape architect Walter Burley Griffin who, in collaboration with his architectural artist wife Marion Mahony Griffin, created:

> a stunning composition: a city of hexagonal boulevards and streets joined by bush corridors, studded with monumental buildings and anchored by land and water axes. Its heart, where the axes met, was an artificial lake that would emerge with the damming of the Molonglo river to flood the plains (Daley 2016).
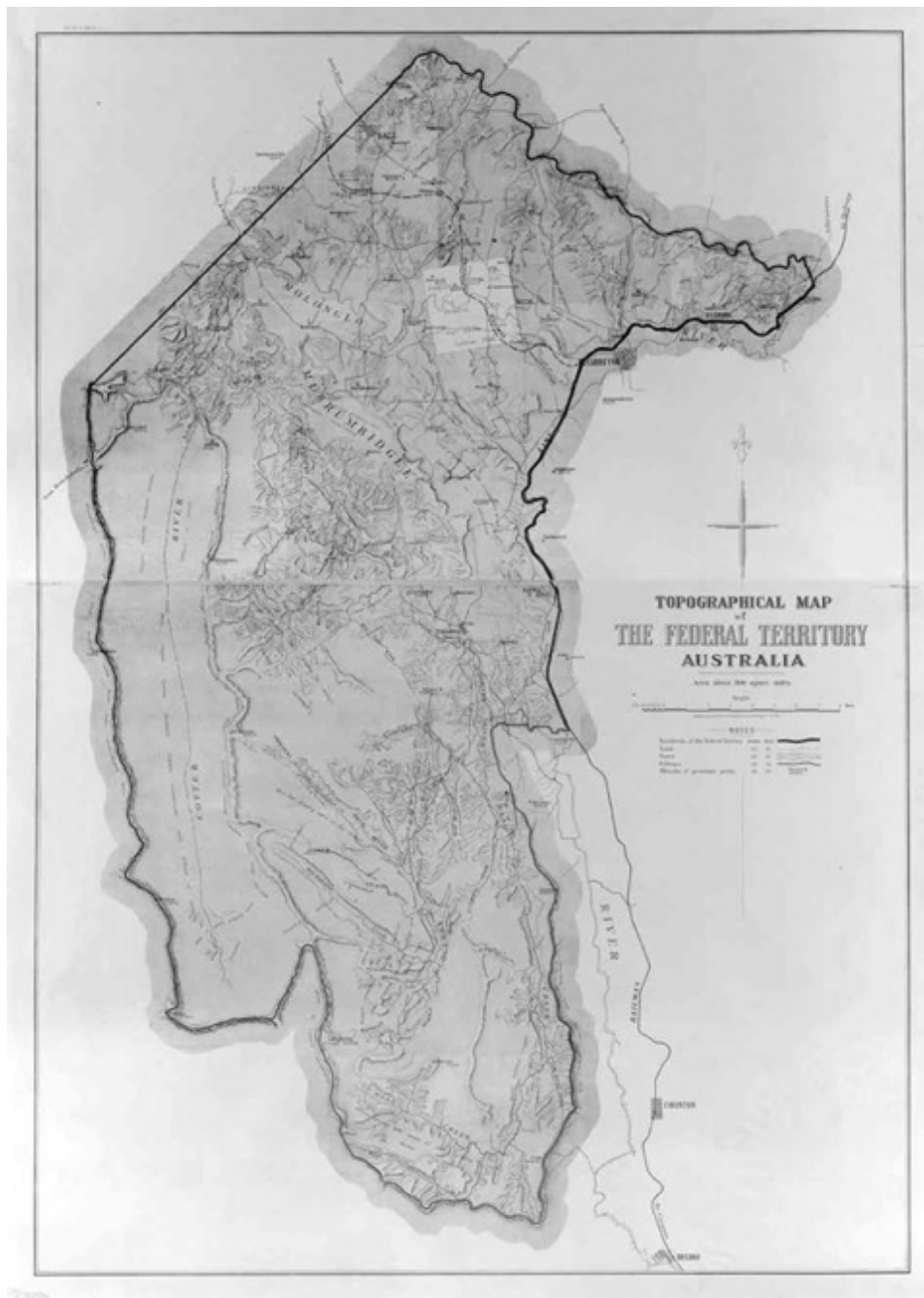
Figure 5.2 Topographical map of 'The Federal Territory Australia' 1910

Source: Trove https://nla.gov.au/nla.obj-232176126/view.

When Canberra was proclaimed in 1912, the river flats of the Molonglo, and surrounding hills had been denuded of vegetation from clearing and grazing. This area was the setting for the central designed landscape of the Parliamentary Triangle (see Figures 5.3 and 5.4) the core of the Griffin's design vision for Canberra:

> its symbolic representation of the democratic interchange between the people and their elected representatives and its use of the natural landforms to generate a strong planning geometry. It expresses a masterly synthesis and ordering of topographical features and administrative functions to meet the needs of a national capital (AHDB 2004).
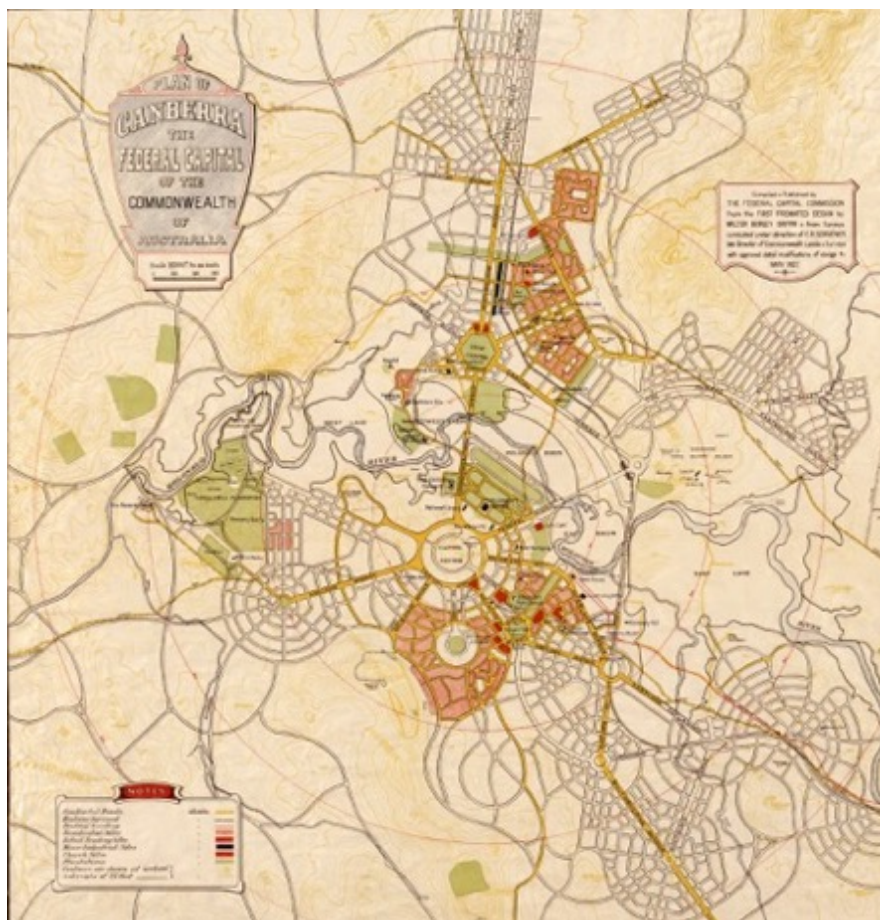
Figure 5.3 Griffin's central designed landscape of the Parliamentary Triangle

Source: Reid (2002)

Figure 5.4 Marion Mahony Griffin's rendered drawing of the central landscape

Source: NAA - Series no. A710, 39-42 Drawings submitted in the Federal Capital Design Competition.

An early player in the realisation of Griffin's landscape was horticulturalist George Weston, who 'set his hand to his unique task'—that of turning a treeless plain into 'shaded parks and sheltered gardens'. [51] Weston experimented widely with different tree species to test which could survive the severity of the winters and dry summers. By 1920, 820,000 trees had been planted out, and 44,900 trees planted for trials in the arboretum (Murphy 1963), and the mountain and hill reserves were designated for afforestation and regeneration (Gray 2001).

By 1920, the Commonwealth had also surveyed Federal Capital Territory (FCT) land into two subdivisions for soldier settlement. [52] The land was leased to soldier settlers for 5−25 years. The scheme was not successful:

> Rabbits, weeds, isolation, financial hardship along with the high prices of stock and equipment, compounded by the lack of transport infrastructure in the FCT, were continual problems. Also, the new Commonwealth Public Service as landlord set unrealistic lease conditions on the Soldier Settlers. The small size of rural blocks allocated, along with falling commodity prices throughout the 1920s followed by the Depression saw most Soldier Settlers struggle to make any sort of profit from their leases. However, the leasehold system in the FCT did enable struggling lessees to transfer or consolidate their leases, allowing those who wished to leave the land to do so with relative ease (ACT Archives 2015).

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[51] Weston was officer-in-charge, Afforestation Branch, Canberra from May 1913 until 1926.

[52] The Soldier Settlement Scheme for Australia's repatriated World War I1 soldiers was designed to create employment opportunities for returned servicemen, open new land to agriculture and to grow Australia's economic wealth (see https://www.archives.act.gov.au/repatandrabbits).

By 1927, the Scheme was replaced and servicemen could apply for subsidised loans to purchase leases from existing lessees (ACT Archives 2015). The following review of the land use of the areas that became Mt Taylor (Section 5.5.1) and Mulligans Flat (Section 5.5.2) provides critical insight into the genesis of their ecological condition and other factors that impact on their management.

5.5.1 Mt Taylor Nature Reserve

Land acquired for the federal capital and now, the Mt Taylor Nature Reserve, was mostly contained in Stromlo Block 22 (Allawah) and the eastern part of Stromlo Block 23 (Kambah) with a small part of Woden Block 25A (Oakey or Melrose) (see Figure 5.4).

← Mt Taylor: formerly Stromlo Block 22 with eastern part of Stromlo Block 23 and a small part of the south end of Woden Block 25A
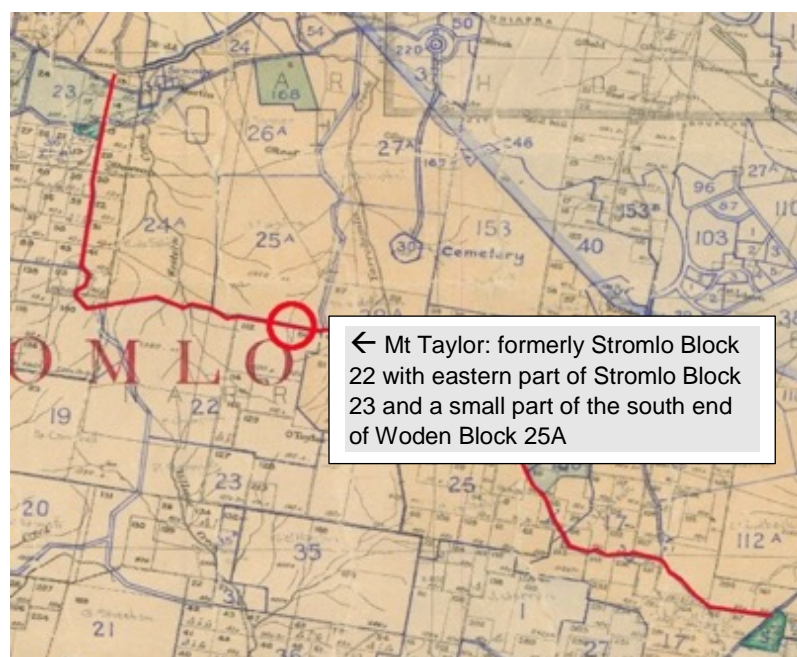
Figure 5.4 Configuration of Stromlo Blocks 22 and 23 and Woden Block 25A

Source: ACT Archives 2015

These blocks were first leased by the Commonwealth as part of the Soldier Settlement Scheme in the 1920s. [53] They bore no relationship to the topography and were of insufficient size to generate a living; a large part of Block 22 was steep and rocky (see Figure 5.5).

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[53] Stromlo Block 22 was leased to Kenneth Primrose Anderson in January 1926. Stromlo Block 23 (the south-eastern part of Mt Taylor) to Ray McClymont in December 1925
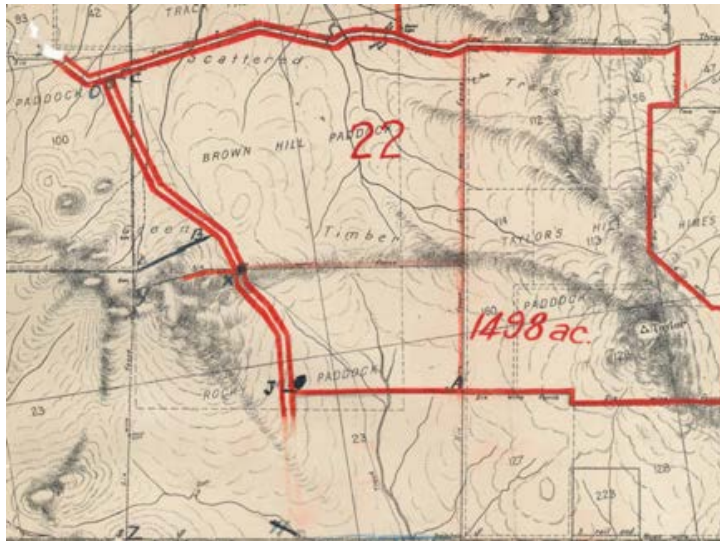
Figure 5.5 Topography of Stromlo Block 22

Source: ACT Archives 2015

Specific conditions attached to the leases required 'improvements'; fencing, destruction of rabbit harbours and ringbarking but with little income, these works could not be affected. The Schedule of Improvements for Block 22, were common to all leases (see Figure 5.6).
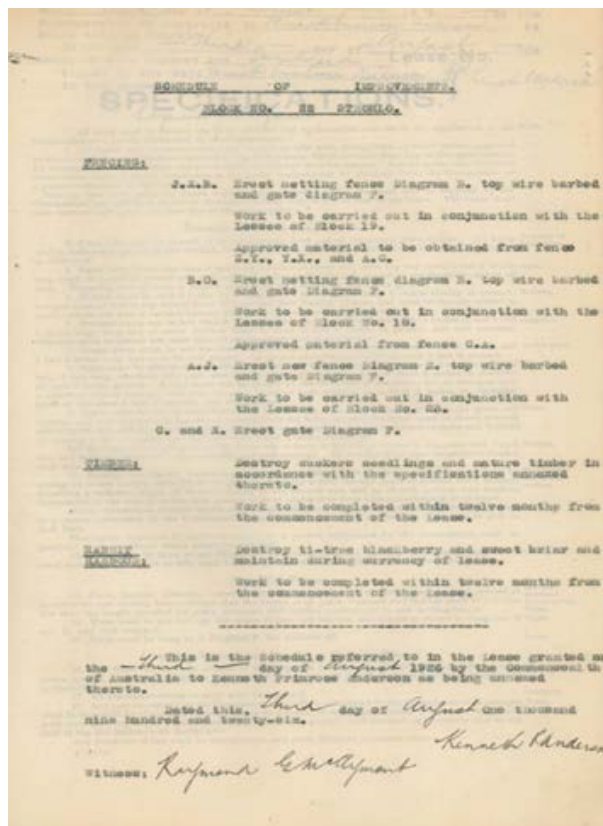
Figure 5.6 Schedule of Improvements for Block 22

(Source: TL File 945)

The lease was transferred many times until its surrender in the late 1950s. [54] These 1,503 acres (608 ha) became suburbs of Weston Creek and Woden and most of Mt Taylor Nature reserve (see Figure 5.7; ACT Archives 2015).

Figure 5.7 Overlay of Block 22: most of the slopes and the summit of Mt Taylor

Source: ACT Archives 2015

The lease of Block 23 also changed hands many times before its surrender. [55] Prior to lease transfers, repairs to fencing on all boundaries, including making 'netting rabbit proof in creek and gullies' and 'eradicat[ing] scattered briar and seedlings' had to be completed—or the payment of a deposit for the required works (approximately £15). [56] These 596 acres (608 ha)

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[54] The lease of Block 22 was transferred in 1932 to Stella Dent in 1934 who repaid Anderson's rent debt and transferred onto her son John Dent in 1933. Philip Champion held the lease on its surrender.

[55] The lease of Block 23 was transferred in 1928 to Alexander Lessey who repaid McClymont's rent debt then twice in 1934 (to Turtle and then Merriam) and then in 1937 to Robert John Hyles. Bennett Sim held the lease on surrender in the 1950's.

[56] Letter to A. Percival (for Secretary) to K.R Boardman Solicitor Queanbeyan 5/2/1937 (Territory Lease File 915).

became part of the suburbs of Kambah and Torrens, the lower southern slopes of Mount Taylor Nature Reserve and Horse Paddocks (see Figure 5.8).
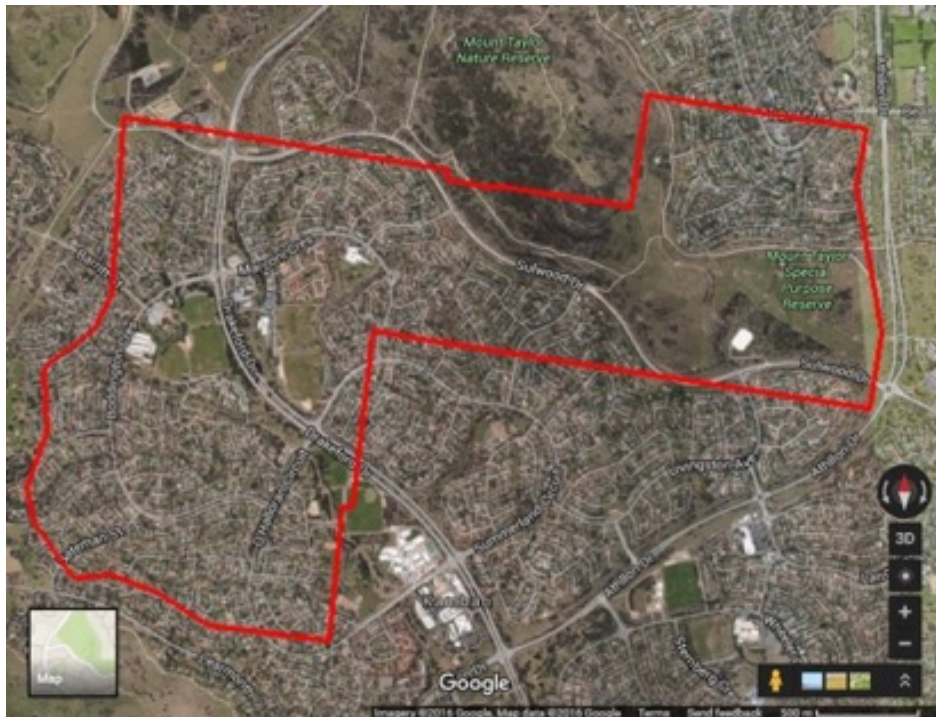
Figure 5.8 Overlay of Block 23 showing the southern lower slopes of Mt Taylor

Source: ACT Archives 2015

Stromlo Blocks 22 and 23 had multiple managers before their surrender for urban development (Taylor et al. 2004). The grazing land use has left a management legacy including rabbit and woody weed infestations. The next phase for Mt Taylor was its conversion to an urban hill reserve and a nature reserve in 1993 (Section 5.8).

5.5.2 Mulligans Flat

Land at Mulligans Flat was parcelled up as Block 1, Gungahlin District. It was known as 'Walter Ginn's scrub paddock' (after the previous owner) and deemed rabbit infested and of poor grazing potential, the 'last area unimproved in the locality'. [57] A 10-year lease was issued in 1922 with conditions for clearing of 'useless' timber except forested slopes roughly marked on a map (see Figure 5.9).

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[57] Lands Inspector Brackenreg, Department of Interior Territory Lease File 6165.
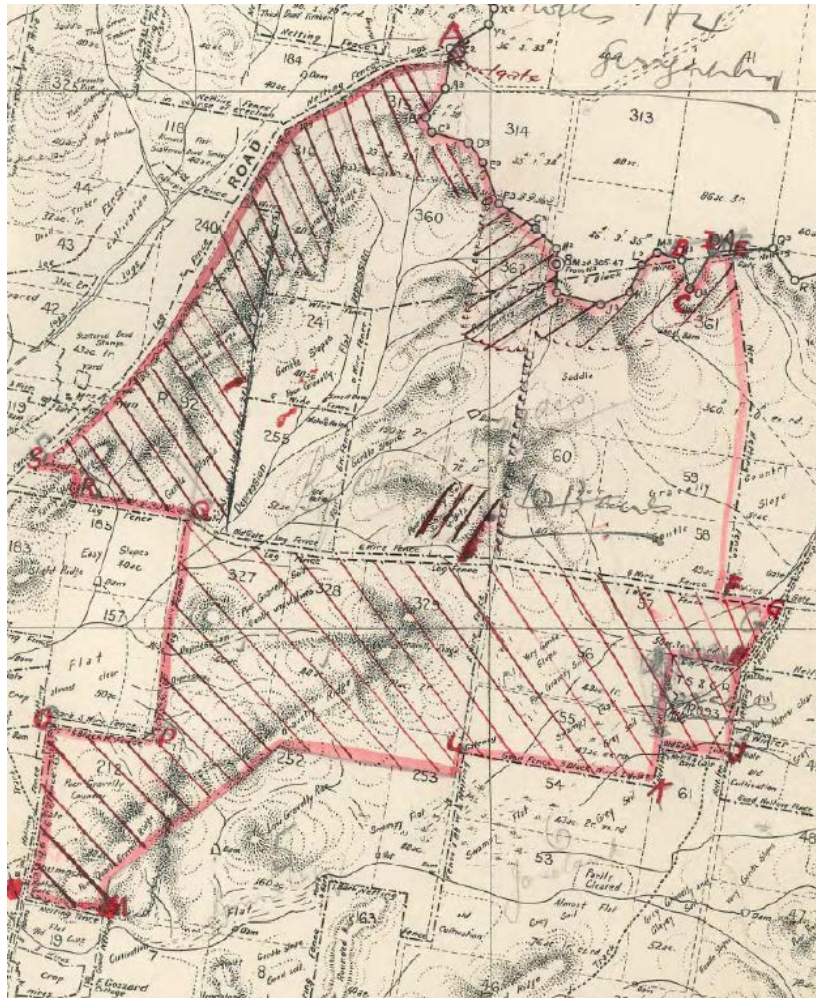
Figure 5.9 Areas not to be cleared (hatched) 1922 lease to Hardy

Source: TL File 6165

The next lease from 1933 included conditions requiring improvements to enhance the land's grazing potential, particularly tree removal 'ringbarking' (see Figure 5.10). [58]

While the ridges were not cleared, the amount of timber removed from the Flat was significant after ringbarking of 600 of the 1,200 acres. Lease administrators authorised the initial timber removal to 'improve' the property, but later aimed to retain the remaining standing timber as a resource for fencing and Commonwealth purposes (see Table 5.1).

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[58] The first lease to William Hardy was taken up by John Donnelly on quarterly tenure in 1932 until a 10-year lease issued in 1933. This lease was transferred to Robert Crace in 1934. A new lease was issued to Crace in 1936 (expiring June 1958) but transferred to Henry Curran in 1939. TL 6165

Figure 5.10 Timber work to be executed - 10-year lease 1933

Source: TL File 6165

Table 5.1 Lease Managers' Perspectives on Woodlands

1922, Lands Inspector Brackenreg recommending the first lease:
'The area is unoccupied and fast depreciating value by increase of shrub and ravages of vermin. It is heavily rabbit infested and in this way is a menace to adjoining areas'.
1932, Lands Officer Ryan on block inspection:
'about 200 acres of the 'scrub' in the east and west had been ringbarked, by Donnelly…On the western side the man engaged was leaving about one tree to the acre and on the eastern side all the timber was ringbarked…I consider that ringbarking all timber is wrong. The large box trees that have been ringbarked may be of use in 50 years but by ringbarking young trees and saplings there will be nothing to take their place'.
1940, Surveyor-General Percival to the lessee:
'The Inspector has pointed out that a few trees in isolated positions have recently been ringbarked. It is desired that no further ringbarking be carried out on this block until permission is obtained'.
1942, District Valuer Lipscomb on inspection to reappraise the rent mapped to the vegetation:
'the timber treatment has been effected and dead timber to a large extent cleaned up by the woodcarters; a belt of green timber has been left on the southern boundary…and judiciously left along the old road, along the Gundaroo Road and in patches on the hilltops…The block is now reasonably well-grassed particularly on the areas where timber treatment has recently been effected'. (see also Figure 5.11)
Source: Territory Lease (TL) File 6165

Annual inspections enforced lease conditions and permits to remove 'standing and fallen dead timber suitable for firewood' were issued although there were instances of illegal cutting of poles. Figure 5.11 is a map of groundcover at the time of reappraisal of the rent on the lease in 1942. There were further permissions to take timber before clearing ceased in 1973. The lease was withdrawn in 1974, with a three-monthly grazing licence issued to the former lessee. With delays to urban development of Gungahlin, a five-year lease was issued in 1982 with quarterly tenure thereafter. No clearing was allowed and stock limits applied to limit the amount of compensation that would have to be paid on resumption for development.
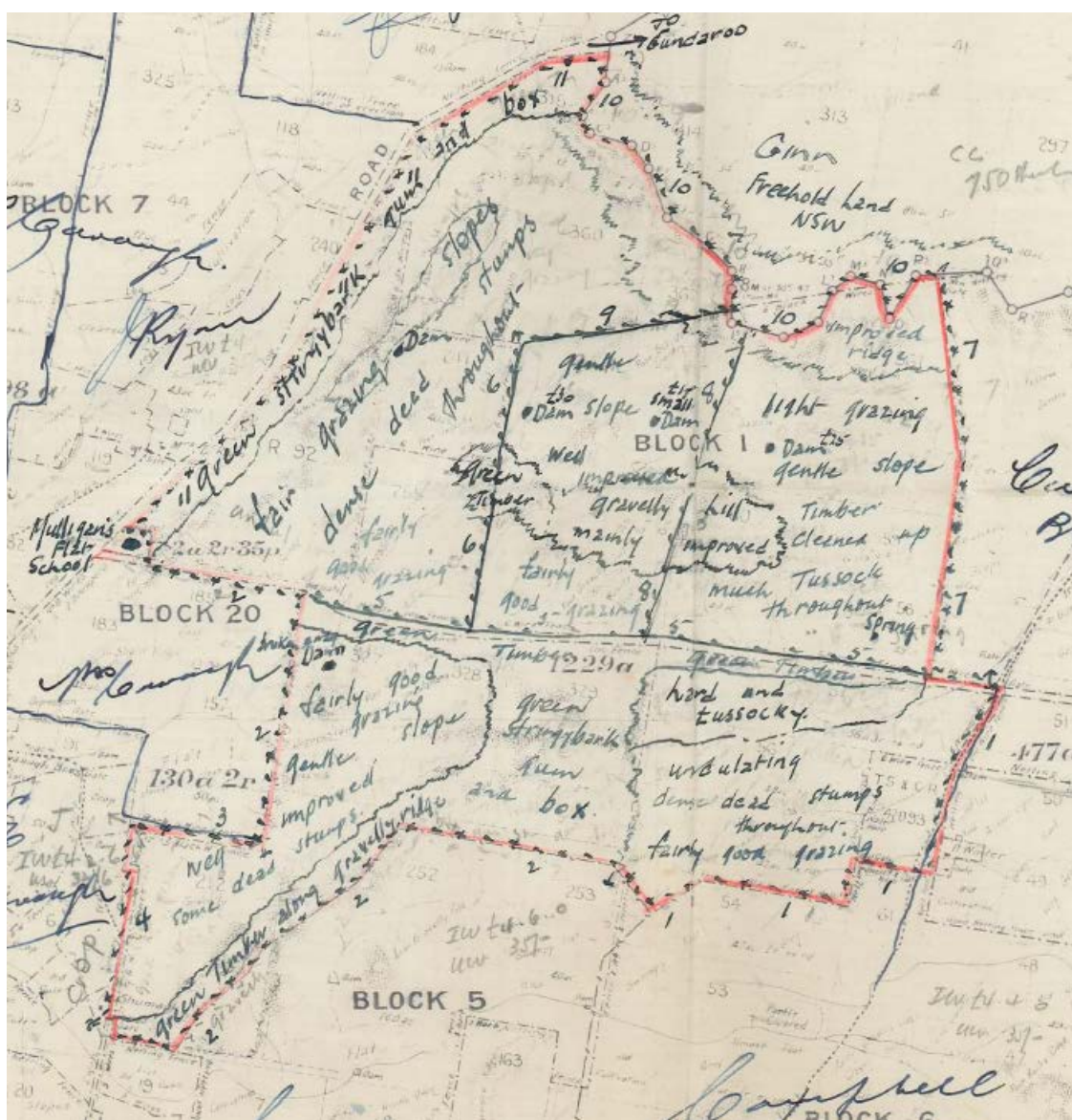
Figure 5.11 Hand-drawn map of vegetation cover 1942

Source: TL File 6165

Even though Mulligans Flat was generally grazed lightly, and at least one lessee only used the block intermittently for drought feed (Val Jeffrey 2014, personal communication), selective grazing of native herbs by sheep and the sowing of pasture species like *Phalaris,* affected vegetation condition and species composition and abundance at Mulligans Flat (Macintyre et al. 2010; Lepschi 1993). Weeds and pest animals were also introduced; levees and dams constructed and there were bushfires, including a significant blaze through Mulligans Flat and Goorooyarroo in 1979 (Campbell 1984). There has been a decline in species like yam daisy that 'grew in abundance' in grassy landscapes but 'became rare' with livestock grazing (Rose 1996: 77). Yam daisy is found only in isolated patches in Mulligans Flat and it has been suggested that some plant species may be lost despite restorative treatments (McIntyre 2015). The next phase in the history of Mulligans Flat was its identification as an important woodland and protection as a nature reserve (Section 5.7.1).

5.6 The Plans of the City-Makers

Both the First World War and the Depression of the 1930s disrupted the building of Canberra. A Senate Select Committee was appointed in 1954 to investigate the development of Canberra in relation to the Griffin Plan of 1918. The committee took considerable interest in Griffin's design, aided by interpretative evidence provided by respected town planning academic Peter Harrison:

> One of the cleverest things Griffin did…was to develop a scheme which does not depend for its realization on the construction of grand buildings…Griffin's scheme depends on landscape architecture as a setting for the public buildings like jewels in the landscape. It is not an architectural composition but a landscape composition. [59]

Griffin's ideals of a democratic garden city 'implicit' in the 1918 Plan (Reid 2002:227) influenced future design and planning for Canberra. Several of the Committee recommendations dealt with design, including resolution 30:

> *'That the importance of the 'pastoral' or 'garden' atmosphere of Canberra be kept before future administration and the tree patterns, wide streets … be recognised as important factors which must govern the future planning and development of the city (Reid 2002: 231).*

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[59] Harrison, quoted in Reid 2002 p. 226 from para 452, Report from the Senate Committee on the development of Canberra.

The Committee recommended the establishment of a commission 'to plan and develop Canberra with adequate finance to carry out a long-term coordinated program' (Linge 1975: 28) that was given effect by the *National Capital Development Commission (NCDC) Act 1957* (Reid 2002).

British town planner Sir William Holford was invited to report on the development choices for Canberra and proposed amendments to the 1918 Plan (Holford 1958). He proposed a Garden city with modern systems of communication by road and air, and a cultural and administrative centre. The schema he produced retained little of Griffin's plan, although Reid observed that 'the landscape maintains the unity of the site' (Reid 2002: 242).

The new NCDC had a brief to summon 'new suburbs into existence' (Wigmore 1963: 12), extending into rural areas that were mostly 'treeless grazing land' (Taylor et al. 2004: 65). The Future Canberra Plan (1965) was the strategy to guide growth and resolve the future form and shape of the city. It proposed a series of new towns, separated by bush-clad hilltops and ridges and linked by a road. The Plan stated:

> one of the distinctive characteristics of the city…[is] the residential areas lying in the valleys and within a framework of tree-covered hills.. This arrangement seems to reflect the way most Australians would like to live…At the end of every street in Canberra is a glimpse of tree-clad hills (NCDC 1965: 57).

The 1965 Plan also described how the landscape would evolve:

> Garden city planting will stop where the urban area stops and the open country-side begins − about the hills…As the population grows so will the task of protecting these hill forests, and those on the distant peaks, from fire, vandalism and change due to excessive use. At the same time, thought must be given to opening up the forests for public use with walks, riding trails, picnic ground and observation points. Where the hills have been partly cleared the development task will be to strengthen the tree cover where necessary and to control erosion and the fire risk (NCDC 1965: 101).

The concept of a city in the landscape went beyond planning statements and was embedded into the landscape design approach of the NCDC. The Commission's first landscape architect, Richard Clough noted:

> in its simplest terms this was to relate the urban landscape to the existing natural and man-made rural landscape in a direct manner using all the open spaces in the city to provide a unified landscape (Clough, quoted in Reid 2002: 271).

Chief Architect of the NCDC, Paul Reid observed that this approach succeeded:

> Canberra became one garden suburb. Fitting the city sensitively into the landscape
> was something the NCDC believed it had inherited from Griffin. It retained the hills
> in their natural bush-clad state and extended the planting down from the hills and
> through the suburbs. Every NCDC Planning study started with and analysis of
> landform and landscape preserving from development all significant hills and
> waterways. The new city everywhere was framed by the natural world. Canberra
> landscape was divided by nature into a series of valleys which became the basis of
> settlement areas (Reid 2002: 254).

The next planning strategy in 1970, 'Tomorrow's Canberra', acknowledged Canberra's desire
for low densities and garden suburbs, with the retention of the small-town character and
conservation of readily accessible open space areas (NCDC 1970). The Y-plan concept
grouped these new self-contained towns in a linear pattern extending from the city centre using
the main valleys in the shape of a 'Y' (see Figure 5.12). Peripheral parkways flanking urban
areas and vegetation were used as the third dimensional framework (see Figure 5.13).

Figure 5.12 A Plan for Growth: the Y plan

Source: NCDC 1970

Figure 5.13 The integrated spatial structure of Canberra, integrating existing natural features, road network and open space

Source: NCDC 1970

5.6.1 Evolution towards a national capital open space system

The idea of a capital open space system can be traced back to Griffin's plan to recognise the hills, mountains and river as 'essential parts of the landscape of the National Capital' (Altenburg 1993: 154). Areas of special national concern had been flagged in Future Canberra (NCDC 1965). These areas (see Figure 5.14) were important to shaping the character of the city, the 'hills and ridges which figure so prominently in the Canberra landscape' (NCDC 1971a: 15) and for their future value:

> Canberra is very fortunate in the scenic qualities of its setting and the opportunities it offers for a wide range of outdoor recreation in an attractive natural environment. Experience elsewhere has shown that the wisdom of setting aside adequate open space areas as part of a comprehensive system well before urban growth pressures. As well as providing for future needs…the open space system can also be used to define shape and give distinction to the city…the hilltops, in most cases too steep for development are to be preserved as an integral part of the city's landscape. Because Canberra is the national capital it must be accepted that all open space is not necessarily public parkland but land retained for purely landscape purposes for the setting – the proportion therefore, might be higher than in other cities (NCDC 1971a: 154)
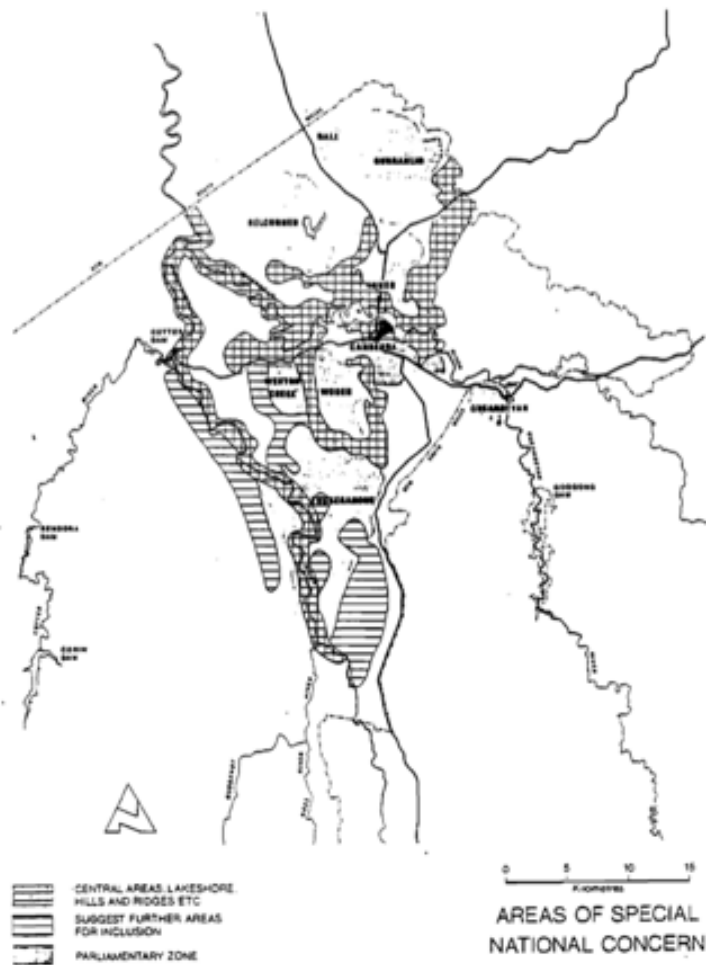
Figure 5.14 Areas of special national concern

Source: NCDC 1984b

The NCDC's proposed parkland and open space system had four key elements: local parks, playgrounds and sportsgrounds; metropolitan parks outside the built-up area (including a river park along the Molonglo River); hill and ridge reserves; and mountain forest and bushland areas west of the Murrumbidgee River (NCDC 1971a: 155−162).

The urban hills and ridges (accounting for about 10,000 acres around Central Canberra, Woden and Belconnen) were acknowledged as 'for the most part land too steep for normal urban development or land uneconomical to service'. The lower saddles were flagged as possible sites for golf courses, to 'help to spread the responsibility for maintenance of the landscape system' (NCDC 1971a: 160). The NCDC further acknowledged that:

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the hill and ridge reserves [would] have an important visual function in preserving the natural setting and landscape character of the city, making for a clearer distinction between urban areas. This is more desirable than having urban areas merging with one another without a break. While the value of hill and ridge reserves is mainly in visual rather than use areas for recreation, they nevertheless provide opportunities for panoramic views bush walks, horse riding and children's adventure play, and could justify some lowering of space standards in the built-up area. In areas of natural forest such as Mt Ainslie, Majura and Black Mountain, the emphasis would be on conservation, whereas cleared ridges might either be retained in their present state except for planting or regeneration aimed at strengthening their scenic value. (NCDC 1971a: 160)

The parkland and open space system was the forerunner of the National Capital Open Space System (NCOSS) and an urban reserve network, Canberra Nature Park (DCT 1975).

A DCT-based Nature Park Working group was set up in 1974 to explore the proposal for a nature park for the undeveloped hill areas. There was concern about management of these areas (see Figure 5.15) and the group was charged with:

developing this new concept for the Canberra scene tried and proven in Europe since the war years, but until now not strongly developed in Australia. In Europe, attempts are made to reconcile the legitimate interests of the populations of rural zones— connected by parks—with those of neighbouring urban populations…In Canberra the concept will probably need to be modified to take into account local conditions but the principle of creative use of city nature parks by people whilst maintaining an unspoilt environment remains the central management theme' (DCT 1975: 4).
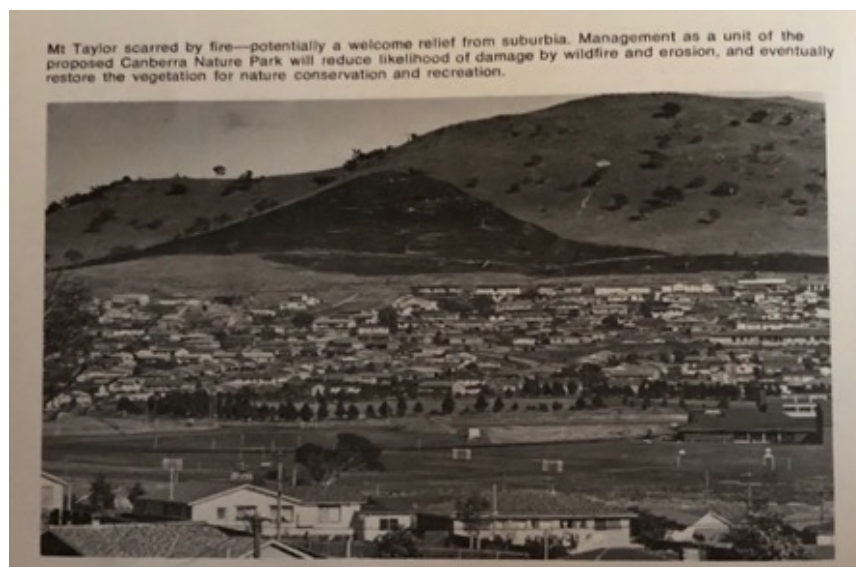
Figure 5.15 Mt Taylor scarred by fire in the early-1970s

Source: DCT 1976

The DCT's Annual report (1978−79) identified areas outside of the hill reserves as areas managed 'in sympathy' (see Figure 5.16), where works to 'improve undeveloped hill areas without destroying their character continued'. These included erosion control, fencing and control of 'illegal incursion by trail bike and four-wheel owners and firewood collectors' (DCT 1979: 21−22).
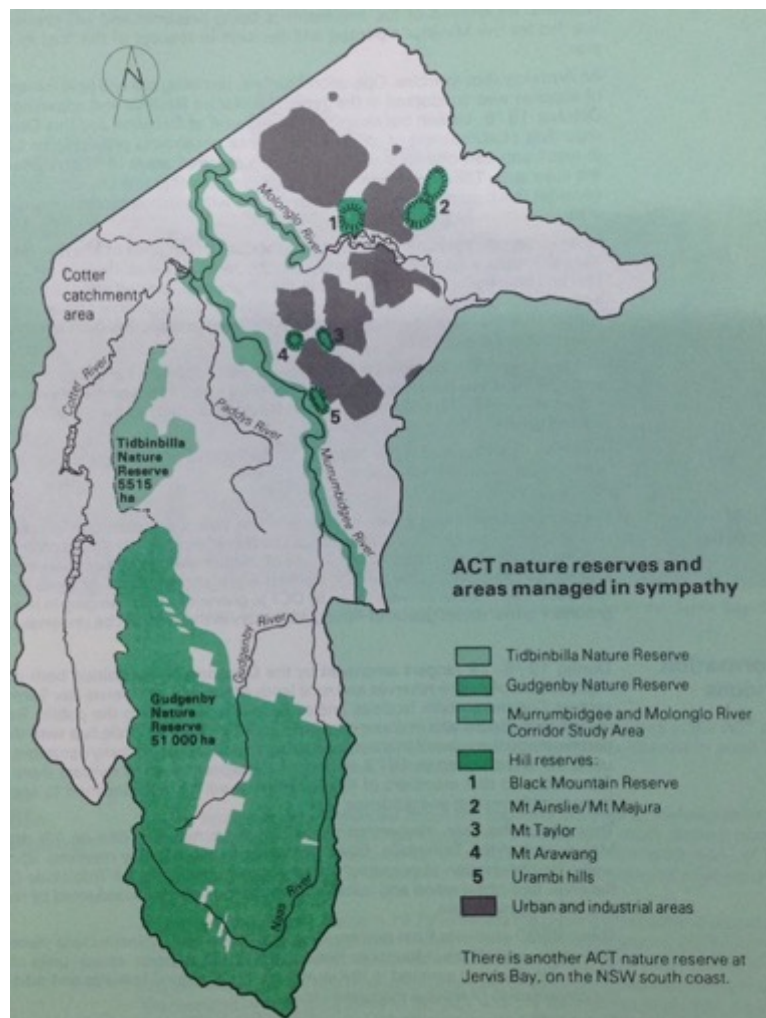
Figure 5.16 ACT nature reserves and areas managed in sympathy

Source: DCT 1979

Work had also commenced to expand the NCOSS concept; an interim report by a joint team from the NCDC (planners and designers) and DCT (land managers) (NCDC 1976) recognised how function of the system was changing:

> Today it provides not only a pleasing harmonious visual background to the Capital but also a diverse recreational, cultural and ecological resource for residents and visitors. An area for serious ecological study has also been created, a contribution this being made to the Australian National Estate (NCDC 1976: i).

The report also recognised the challenge of providing recreation opportunities while maintaining the landscape setting, 'ensuring the environmental quality of the river corridors and conserving a valuable ecological resource' (Altenburg 1993: 158). Three management strategies were identified: natural area management, intensive management (for areas to be modified or developed) and special purpose rural management (for forest plantations).

In 1977, the joint team collaborated with academic George Seddon on the role of the open space system (Seddon 1977). Seddon saw the system as playing a 'symbolic role' with the natural landscapes as 'national monument' (rather than the buildings) and believed their significance could be promoted and enhanced (Altenburg 1993: 159). This required 'the landscape to be understood and this require[d] an interpretive system' (Seddon 1977: 4).

Beyond the important roles of landscape protection and water quality preservation, Seddon recognised the ecological functions and allied research opportunities: 'Canberra's role as a major research centre is likely to grow, and for this reason alone it is important to reserve viable samples of all of the natural environments of the ACT' (Seddon 1977: 31).

Another report by Seddon in 1981 (unpublished, cited in Altenburg 1993) identified the need for formal recognition of the system (there were perceptions there was too much open space) and a management structure. Seddon viewed the NCOSS as 'essentially a management concept' with multiple objectives. He accurately predicted the future resourcing issues around transition from a rural landscape (low management for government) to public open space and the potential for conflict between recreation and conservation' (Seddon 1981: 71−74). Seddon also identified the disjointed planning and management with two separate agencies-the NCDC and DCT (Altenburg 1993).

In 1983, a definition was agreed, that the NCOSS 'should consist of not only the hill and river system but should also include the mountain and bushland areas in the south-west of the ACT…including Gudgenby, Tidbinbilla/Gibraltar, and Cotter catchment and also the Uriarra and Pierces Creek pine plantations'. [60] Planning continued through the joint team; the NCDC and the Department of Territories and Local Government (DTLG).[61] In 1984 the NCDC

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[60] Letter to Secretary DLGT from Allan Phillips Acting Secretary and Manager, NCDC, dated 13 July 1984 – Definition was confirmed by the Minister in 1983 at a meeting of the NCDC commissioners and the Secretary of the Department of Territories and Local Government (the former DCT and functions).

[61] The Department of Territories and Local Government took on the functions of the DCT

prepared a draft Policy and Development Plan for NCOSS for consultation with DTLG. [62] The Plan identified the main functions:

- Landscape setting − in providing a landscape setting which is symbolic of Australia and contributes towards Canberra's role as a national showpiece;

- Recreation − as a diverse and accessible multiple-use recreation resource for use by residents and visitors to Canberra;

- Conservation − in the conservation and public appreciation of the natural and cultural resources of the ACT; and

- Land bank − as a land bank to satisfy future Commonwealth and tourist-related needs associated with Canberra as the National Capital. (NCDC 1984c: 5)

The Department disagreed about the main function as a symbolic landscape setting; stating:

the NCOSS is primarily for the use and enjoyment of Canberra residents. The primary functions of water harvesting (in the Cotter catchment), softwood production and areas for educational and scientific research could also be included. There should not be too great an emphasis placed on the landscape setting. It could be argued that the prime purpose of an open space system adjacent to a city are recreation and conservation…as ACT residents will be the major users of the NCOSS and most concerned with the planning management…there should therefore not be undue emphasis placed on the 'national' nature of the resource. [63]

These comments are surprising given Canberra's was the National Capital and its design origins. It was not accepted by the NCDC, who, while incorporating 'most of the Department's comments', retained the symbolic landscape setting as function. [64]

The Department had also promoted one 'land managing authority'. A Parks and Conservation Service (PCS) was established in the Department in 1984 to unite land management functions, including the lakes and streams and in future undertake 'day-to-day maintenance and management of both municipal open space and, also National Capital Open Space'. [65] These ideas did not progress until ACT self-government in 1989. The NCDC was disbanded and

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[62] Ibid Letter to Secretary DLGT from Allan Phillips Acting Secretary and Manager NCDC dated 13 July 1984, National Capital Open Space System Draft Report for comment and endorsement, File 82/3454.

[63] Letter to Secretary and Manager NCDC from R.A.L Bradford for Secretary DLGT dated 25 September 1984 – National Capital Open Space System Draft Report - File 82/3454

[64] Letter to Secretary DLGT from B.M.Browning Secretary and Manager NCDC dated 17 October 1984 File 82/3454

[65] Minute J.A Turner First Assistant Secretary Parks and Conservation Service to Assistant Secretary Self Government Secretariat 20 September 1984 – Open Space Management in the ACT. File 82/3454

planning responsibilities were divided between a new National Capital Planning Authority (NCPA) and the Territory Planning Authority (NCA n.d.). The NCOSS was formalised in the National Capital Plan 1989 (C of A 1989) with the NCPA retaining responsibility for the Parliamentary Triangle and an approval role for 'Designated areas' including the inner hills and ridges (see Figure 5.17). The Plan required:

> The hill area shall be managed and conserved as a multiple-use and inter-connected system with different elements having their own special character' (C of A 1989: 78).

The new ACT Government assumed management of all land, including the designated areas with the hill areas to be managed in accordance with a management plan, procedures and standards necessary to achieve the principles and policies for this area (C of A 1989).
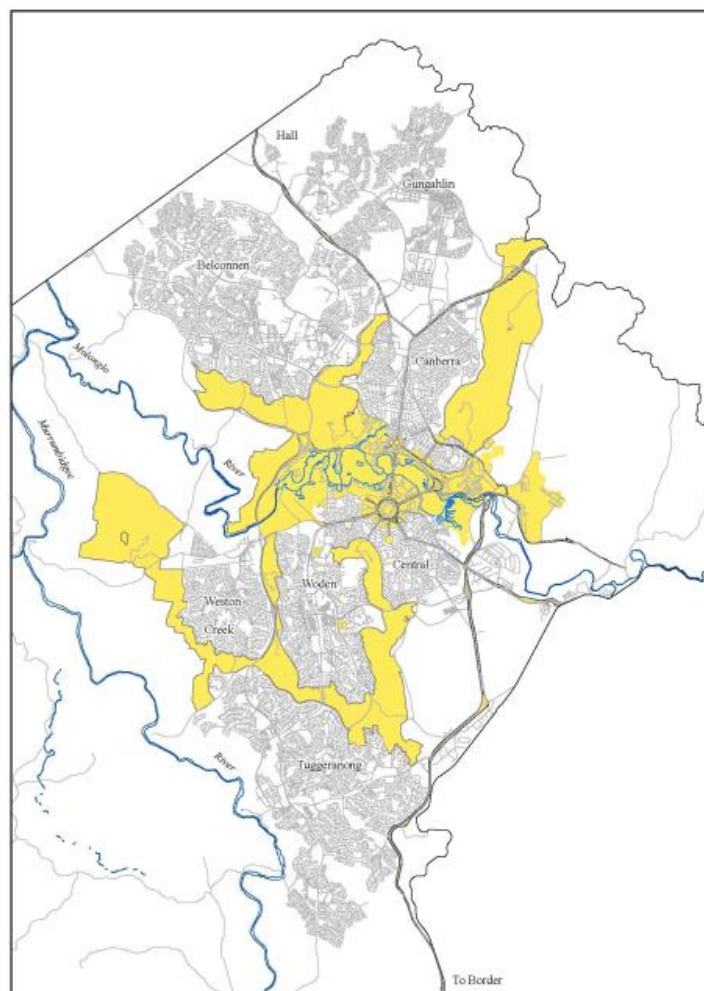
Figure 5.17 Designated areas in the National Capital Plan

Source: NCA 2014

5.7 Changing Values of The Lowland Landscape

The approach to developing the city of Canberra had been to build in the valleys and leave the hills untouched (Hull 1992). Little heed was paid to the ecology and values of this lowland landscape, the tussocky plains providing the perfect canvas for the garden city aspirations. The plains were remade as new suburbs, with ornamental trees planted along streets and in parks and native amenity planting along creeks and on hill slopes. Botanist, Lyndsay Pryor, reflected on this transformation:

> The growth of trees in Canberra has been remarkable because so much of the city was originally treeless. Forty-five years of development have made big changes in the appearance of Canberra and it is now not easy to realise what the natural condition was unless one turns to memory or record (Pryor 1968: 5−6).

Early publications on ACT ecology noted that much of Canberra's lowlands and woodlands had been modified and some dependent wildlife lost before the ACT had been 'fully explored in a biological sense' (DoI 1968, 1971). These lowlands, 'open savannah woodland' (see Figure 5.18), were considered 'suitable for [city] development' (NCDC 1970a: 42).

Figure 5.18 The Woden Valley showing open woodland 'suitable for city development'

Source: NCDC 1970

The grassy lowlands were lost in the development of Woden Valley and much of Belconnen, except where the Commonwealth retained land for its own needs (e.g., the CSIRO Ginninderra

Field Station). [66] Similarly, Mulligans Flat might similarly have been developed. While an airport proposal in the locality was abandoned because of concerns about fog (Cranston 1969), in 1970, the NCDC canvassed Mulligans Flat/Gungahlin as one of two options for the next full-size town. Their publication, *Tomorrow's Canberra* explained:

> To program [Gungahlin] Mulligans Flat before Tuggeranong would delay the introduction of a rapid transit system. To develop Tuggeranong first would increase pressures to fill in Woden and redevelop South Canberra. If Mulligans Flat were first, similar pressures would be exerted on Belconnen and North Canberra. Mulligans Flat development would increase speculation on lands north of the ACT border whereas Tuggeranong development would relieve them. In balancing development of town centres, Tuggeranong had the advantage. The development of the third stage of the Woden Centre would be relate to the early growth of Tuggeranong. It would use the facilities Woden provided until it got its own centre (see Linge, 1975: 81).

The NCDC's ultimately selected Tuggeranong and the first residents started moving into the new suburb of Kambah, south of Mt Taylor in 1974.

Consecutive plans had identified most of the grassy lowlands at Mulligans Flat for urban development apart from the timbered hills ridgelines (see Figure 5.19). The decision to develop Tuggeranong first was a reprieve for Mulligans Flat.

Different proposals were floated to commence Gungahlin through the 1980s, (Hobbs 1987; Andrews 1980; Longhurst 1980) until its development was finally announced in 1990 (Hobbs 1990). The Metropolitan Policy Plan 1984 and the Gungahlin Policy Plan (produced just before self-government) retained the original urban extent of the Y Plan (Middleton 1989; NCDC 1984b), see Figure 5.19. There was no provision for grasslands and woodlands on the lower slopes even though their significance had been flagged in the NCDC's ecological study (NCDC 1984a) and they has been identified as the highest priority for protection (Sharp 2014). Mulligans Flat was also identified as important for birds 'supporting breeding habitat of a number of rare and declining species' (NCDC 1988a: 41).

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[66] https://ginninderraproject.com.au.
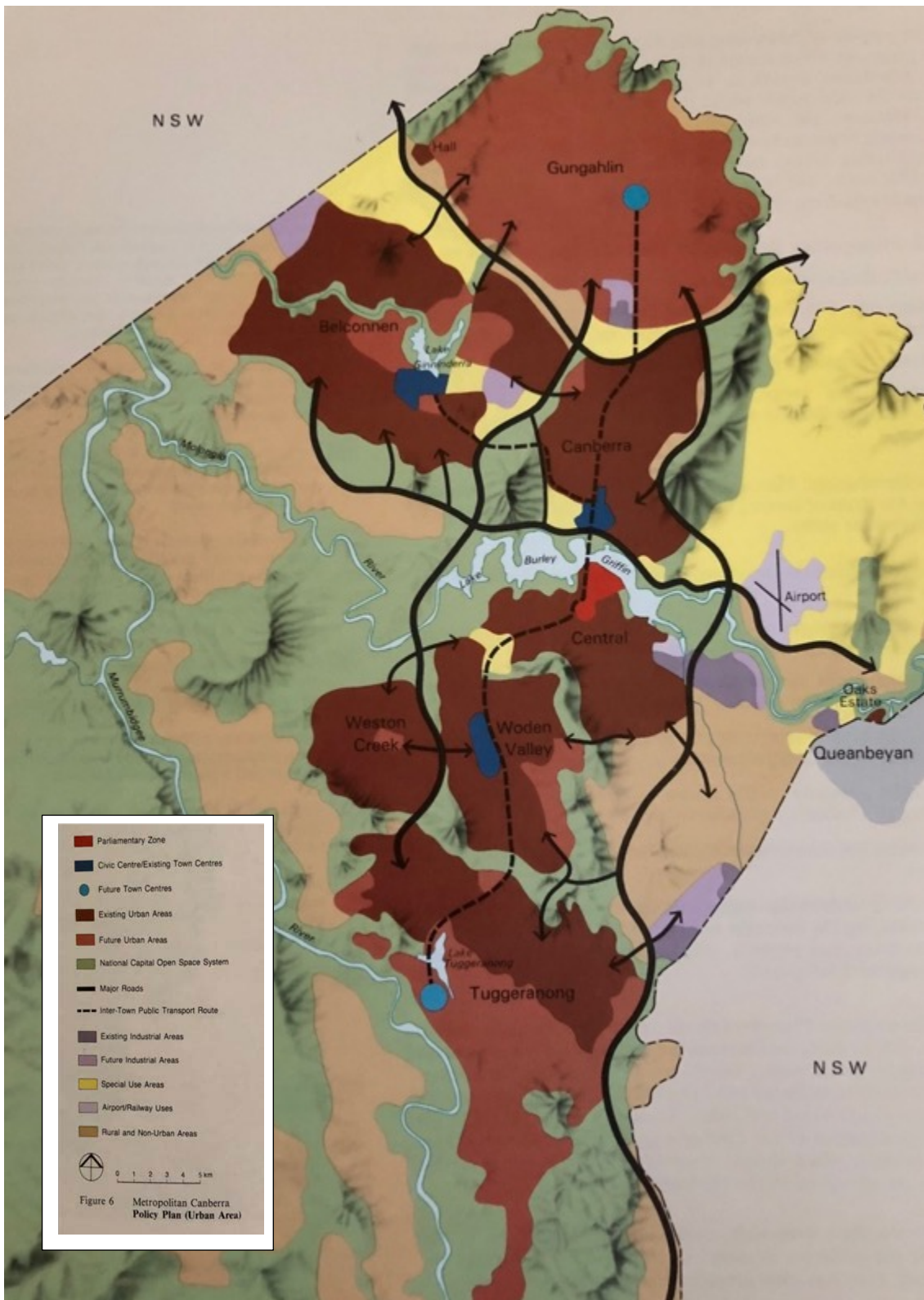
Figure 5.19 Metropolitan Canberra Policy Plan 1984 showing only high land and ridgelines of Gungahlin in the NCOSS

Source: NCDC 1984b

5.7.1 A community awakens: saving the grassy woodlands at Mulligans Flat

It is unclear why planners ignored the lowland ecosystem values? The NCOSS while bold in its ideals was premised on retaining the dramatic elements of landscape as a frame for the city—the urban hills, ridgelines and river corridors—and for recreational and visual amenity (NCA 2014; Seddon 1977). It was conceived as a symbolic and aesthetic rather than an ecological landscape (NCDC 1976), although it has assumed this function as values changed (NCA 2016). Additionally, the need for protection of these grassy woodland ecosystems was not yet on the radar in Australia. [67] Grassy woodlands were more familiar than spectacular: the archetypal rural landscapes across the western slopes and tablelands of the Great Dividing Range, from southern Queensland, NSW, the ACT and Victoria; they had been extensively modified for agriculture (McIvor and McIntyre 2004).

It was the National Parks Association (NPA) of the ACT that assumed the task of advocating for these ecosystems, compiling a comprehensive report about the ecology of the ACT's remnant grasslands and woodlands, mapping their extent and arguing for their conservation (Frawley 1991). The report identified Mulligans Flat (see Figure 5.20) as the largest and densest area of remnant open forest, woodland and grassland in the Gungahlin area. [68]

Figure 5.20 Typical grassy woodland scene, Mulligans Flat Nature Reserve

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[67] Sharp (2015:5) notes: 'the Commonwealth Government listed the Natural Temperate Grasslands of the Southern Tablelands (NSW and ACT) in 2000 among the first cohort of listings under the EPBC Act'.

[68] The vegetation falls into three structural types: (1) open forest of red stringybark (E. macroryncha), scribbly gum (E. rossii) and bundy (E. goniocalyx), an uncommon species in the ACT, towards the ridge crests, with eucalypt regeneration and an understorey of native woody shrubs; (2) woodland, including yellow box (E. melliodora), Blakely's red gum (E. blakelyi) and apple box (E. bridgesiana), original forest cover that has been altered; and (3) native grassland in varying condition and as a woodland understorey.

This report underpinned the 1991 campaign to save the lower slopes and native grasslands, of Mulligans Flat which were identified for urban development (Figure 5.19). Conservation groups rallied and site visits were organised with government officials. The process of networking with ministerial advisers and information sharing continued alongside work in government to review planning boundaries in Gungahlin (Wood 1991). Then-president of the COG, Bruce Lindenmayer, coordinated the proposal for a nature reserve for Mulligans Flat to government in 1992 on behalf of seven conservation groups (Lindenmayer 1992). Bruce described what was different about Mulligans Flat:

> We realised what a wonderful place this was. There were very few places you could go where all the tussocks were intact, where there were bugger-all weeds and, you know, in those days there were brown tree creepers everywhere. You saw lots of hooded robins, scarlet robins, the odd diamond firetail, speckled warblers, you know, things that you rarely see there now unfortunately. Wouldn't this make a great area to put a feral-proof fence around. [69]

The community coalition effectively formed a 'policy subsystem' targeting the right people (Baumgartner and Jones 2002). There were no noisy protests: a persuasive case was presented and managed within the 'subsystem' with public airing only at key points (Clack 1992; Hull 1992). The scientific credentials and local knowledge of the people within the community coalition were acknowledged as assisting the campaign (B. Lindenmayer 2015, personal communication).

In 1994, a nature reserve was declared over this large, gently sloping plain in the north-eastern part of Gungahlin (Miranda 1994). It was a watershed for grassy woodland conservation, and 'broke the mould of planning suburbs on all the flat land' (Bounds 2014). Mulligans Flat was 'the first reserve to be established specifically to protect grassy ecosystems' (Sharp 2015: 4) and paved the way for further grasslands added to the reserve system at Gungahlin (Cooke 1995; Kazar 1995), the grassy woodlands at Goorooyarroo in 2004 and elsewhere in Gungahlin (ACT Government 2013b). The ACT listing of these ecosystems [70] and conservation policy followed (ACTG 2004b, Sharp 2015). The lowlands became a legitimate component of

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[69] Interview with Bruce Lindenmayer, discussing the campaign to protect the Mulligans Flat block, recorded by Kathy Eyles, 15/6/2015.

[70] Natural Temperate grassland was listed as endangered in 1996—the first ecological community to be listed in ACT—with grassy woodlands declared threatened in the ACT in 1997.

Canberra's landscape, with the ACT recognised for their conservation in 2006 (Stanhope 2006).

The Mulligans campaign reveals the value of the strong social associations and citizen science at Mulligans Flat that continues today. In 1986, the COG started a survey at Mulligans Flat for the ACT Bird Atlas Project; this data formed an integral part of the nature reserve proposal (Taylor and COG 1992). The method was redesigned in 1995 to assess changes in birds from alterations to land management and advancing urban development (Davey 2001). The 85th Mulligans bird survey was completed in 2015 (Bounds 2016). Data from early frog surveys by the ACT Herpetologists are also now used in a project to detect changes in frog calling behaviour relating to climate (ACT Frogwatch 2015).

In 2005, a new research partnership was established between the ACT Government, the Fenner School of Environment and Society, ANU and the CSIRO to establish a scientific experiment to test management treatments for restoration of the grassy woodlands at the Mulligans Flat and adjacent Goorooyarroo nature reserves, with potential applications at other woodland sites (Shorthouse et al. 2012). By this time, these combined nature reserves were recognised as the largest conserved remnants of critically endangered Yellow Box-Blakely's Red Gum woodland in south-east Australia. [71]

In 2009, a predator-proof fence was constructed around a large section of the Mulligans Flat Nature Reserve with a perimeter of 11.5 km (see Figure 5.21). The fence enclosed 455 ha (two-thirds) of reserve and allowed the reintroduction of regionally extinct native animals to the ecosystem as part of the Woodland research experiment (Shorthouse et al. 2012). Self-closing gates along the fence permit public access and fire management (see Figure 5.22). Once fenced, the reserve became known as the Mulligans Flat Woodland Sanctuary.

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[71] https://www.youtube.com/watch?v=JI1lmgkG8Hw
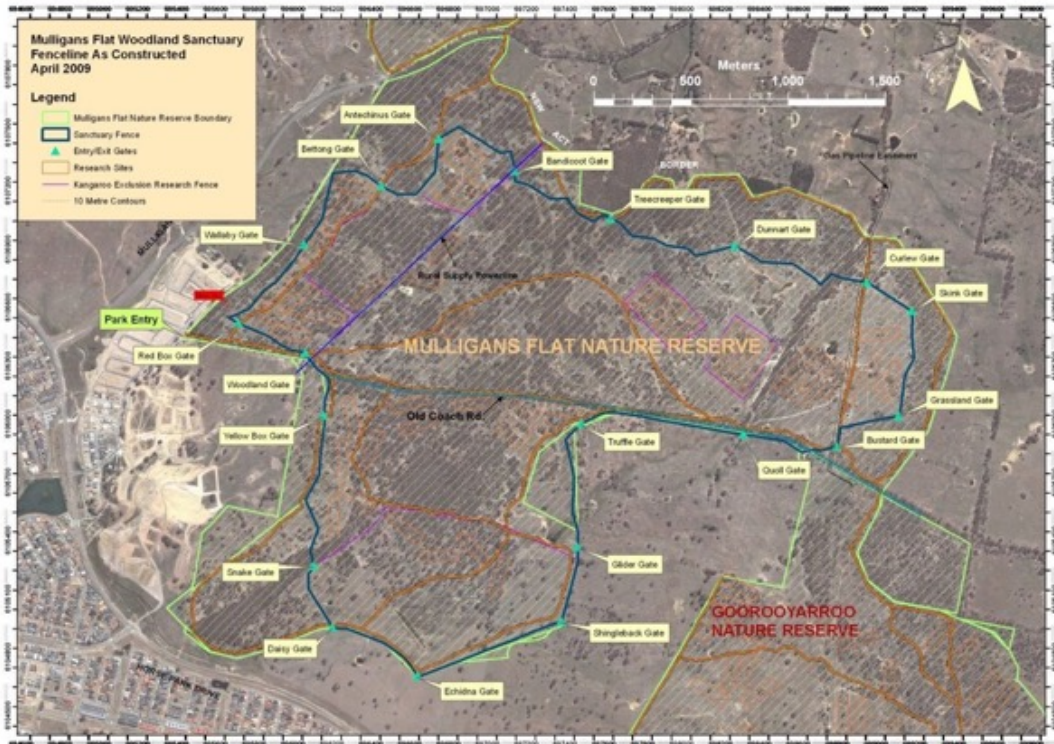
Figure 5.21 Constructed fence line around Mulligans Flat Nature Reserve

Source: ACTG, note development of the new suburb of Forde along the western boundary.

Figure 5.22 Self-closing 'Woodland' gate: the main entrance to the Mulligans Flat Woodland Sanctuary

A new governance structure for Mulligans Flat was initiated in 2011 by then-ACT Chief Minister Jon Stanhope and involved a philanthropic trust to raise funds for conservation research and management. [72] As part of the Trust, an 'expert' committee was established to manage the reserve in partnership with the ACT Parks Service (ACTG 2011, Mulligans Flat Board of Management 2011). [73] The idea for this co-management partnership evolved in part from the long-term social associations and citizen knowledge about Mulligans Flat. Jon Stanhope acknowledged this was one of the drivers for the model:

> I was hoping as an experiment, a trial, it would engage all these experts…why wouldn't you have them involved in the day to day management of Mulligans Flat'. [74]

The transition to these novel arrangements took time, and a review of the governance arrangements in 2013 led to the injection of new Trust board members (Rattenbury 2014).

In 2015, approval for the new suburb of Throsby, adjacent to the Sanctuary and the Goorooyarroo Nature Reserve, under the Commonwealth's EPBC Act, required expansion of the Mulligans Flat and Goorooyarroo reserves with new contiguous areas (biodiversity offsets) added to both (ACTG 2013a, b). These additions have facilitated the extension of the existing predator-proof fence to the adjacent Goorooyarroo Nature Reserve, to create a larger Sanctuary (Clisby 2013; see Figure 5.23). The Trust launched its first public fund-raising campaign in June 2015 to expand the Sanctuary (Colley 2015; Maher 2015). A Woodland Learning and Visitors Centre is being constructed adjacent to the reserve boundary in Throsby and a concept plan and interpretative strategy have been prepared to guide the expanded Sanctuary (TRC 2016).

Collaboration with the wider community to inspire care and stewardship of the Sanctuary is now a key focus of the Trust, which aims to engage the new suburban settlers in this unique conservation asset (TRC Tourism et al. 2016; Woodlands and Wetlands Trust 2014).

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[72] The Capital Woodlands and Wetlands Conservation Trust (see www.cwwct.org.au).

[73] Day-to-day land management is undertaken by the ACT Parks Service and unlike other ACT nature reserves, there is a dedicated ranger team

[74] Interview with Jon Stanhope, discussing Mulligans Flat, recorded by Kathy Eyles, 17/10/2011.
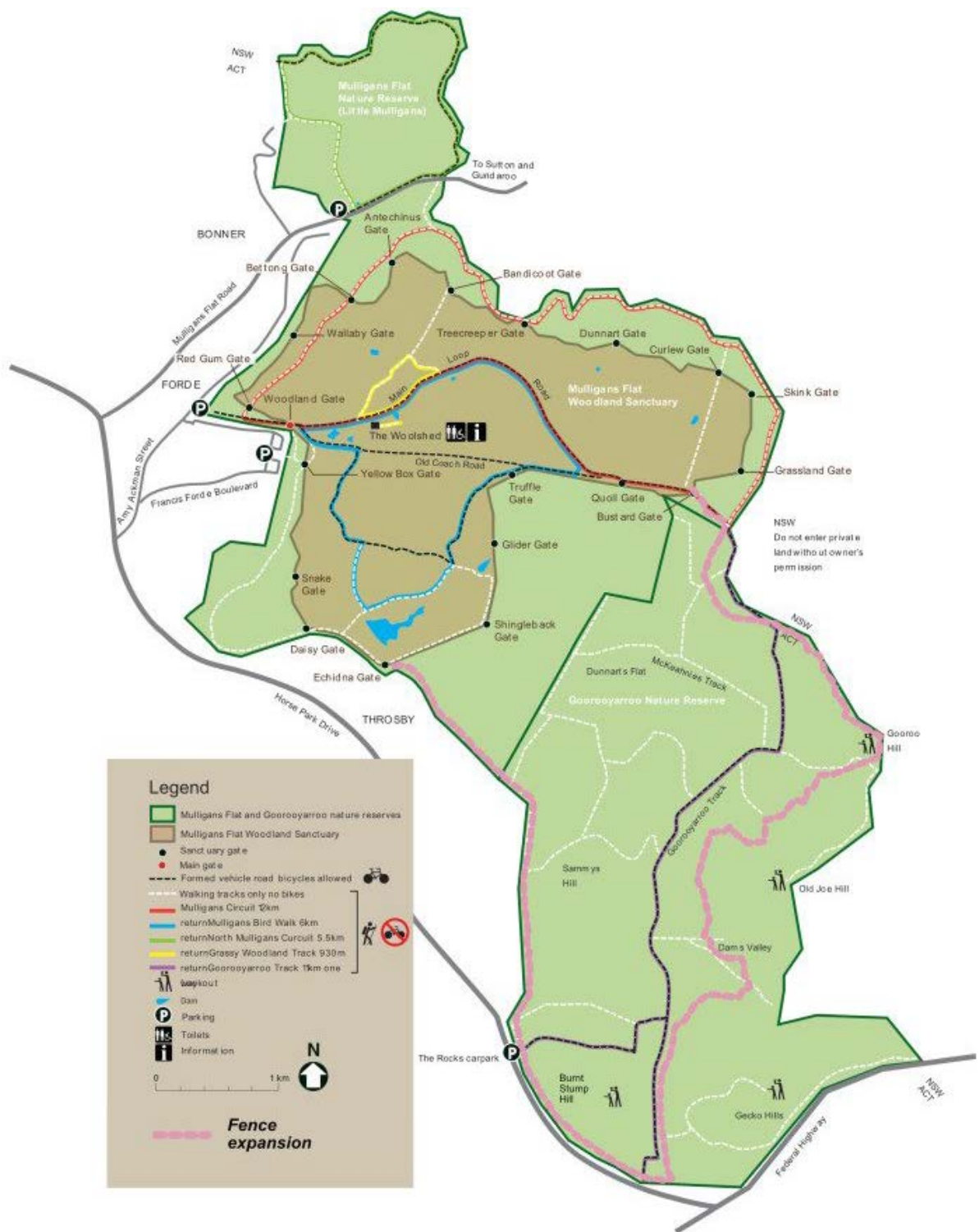
Figure 5.23 Mulligans Flat Nature Reserve including the original Woodlands Sanctuary and proposed expansion Goorooyarroo Nature Reserve

Source: TRC Tourism et al. 2016

5.8 The Urban Hills and Ridges: Mt Taylor

Development of the new town of Woden began in 1962 in adjacent valleys 9 km from the city designed to accommodate 67,000 people (NCDC 1977) The urban structure followed the pattern of retaining the hills and ridges (see Figures 5.24 and 5.25).
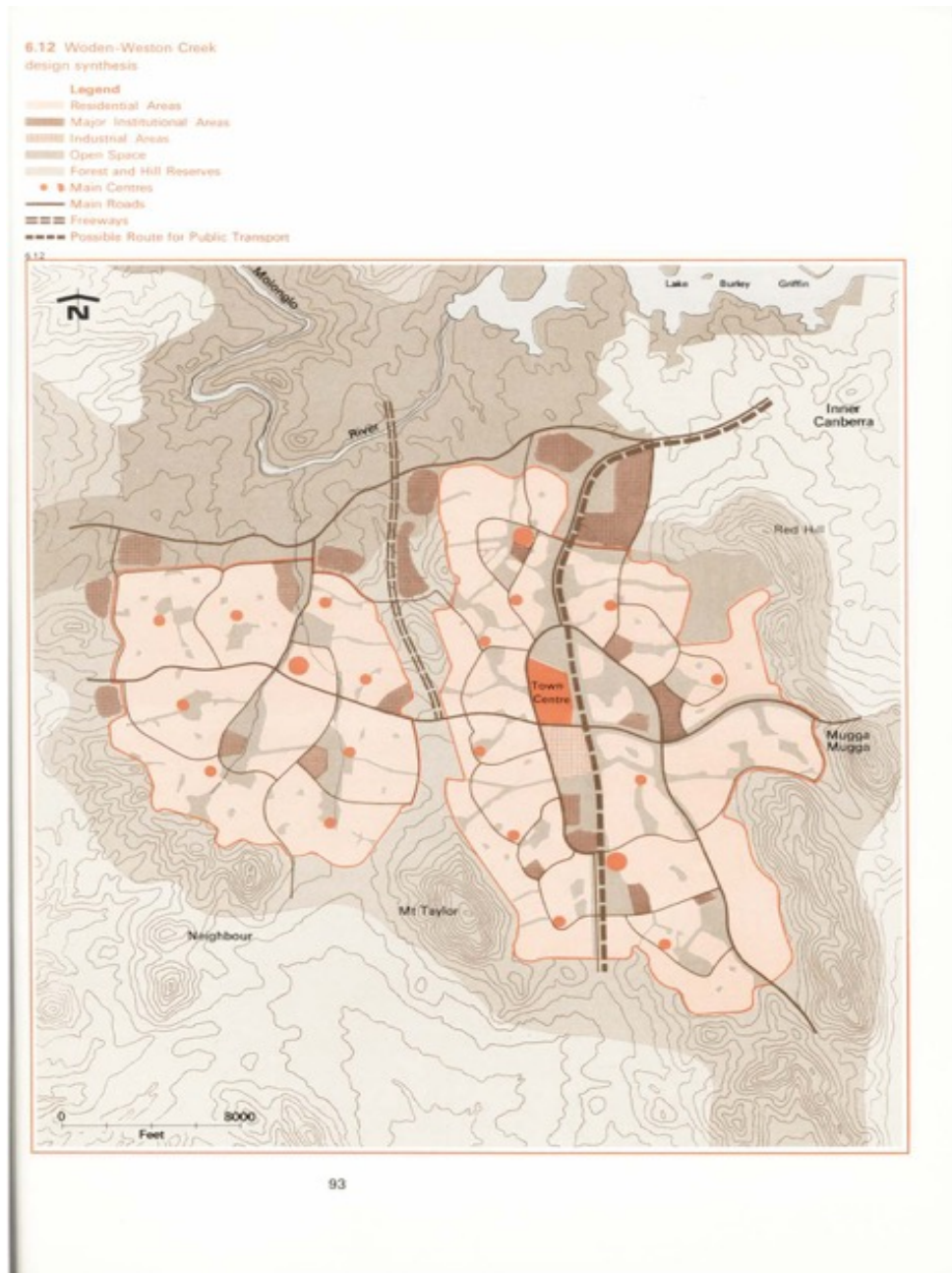
Figure 5.24 Urban structures of Woden and Weston Creek retaining hills and ridges

Source: NCDC 1970
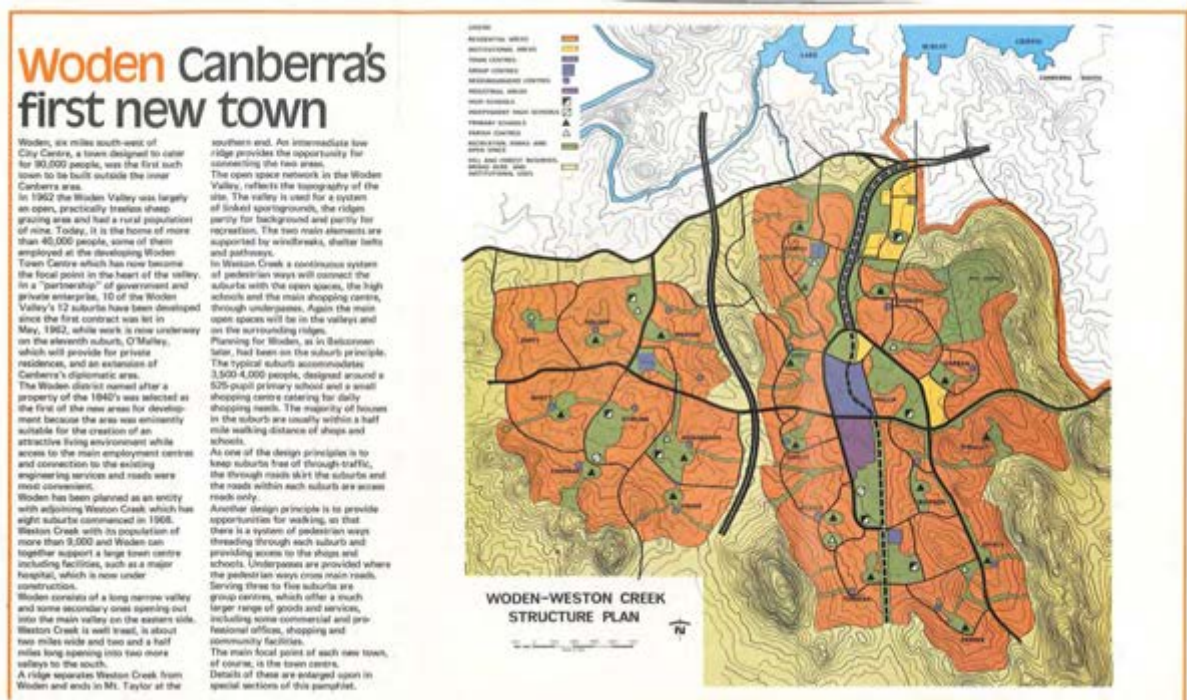
Figure 5.25 Plan for Woden and Weston Creek, 1971

Source: NCDC 1971b

The hills and ridges framing the new Woden suburbs were Mt Taylor to south-west, Oakey Hill to the west, Farrer Ridge to the south, Issacs Ridge in the south-east and Red Hill to the east (see Figure 5.26). Mt Taylor had been extensively cleared for grazing, particularly the summit, eastern and north-eastern slopes that face Woden Valley. The sparsely vegetated slopes are visible in the top-right corner of Figure 5.26 and in Figure 5.27 from Red Hill looking west across Woden to Mt Taylor. The steeper, colder southern-facing slopes of Mt Taylor were not as heavily cleared and preferentially grazed (see Figure 5.28 taken from the then-undeveloped Tuggeranong Valley in the 1960s).

Figure 5.26 Aerial view over Woden Valley with the hills and ridges along the western, south-west, south and eastern boundaries

Source: NCDC 1967

Figure 5.27 The view west to Mt Taylor from Red Hill showing sparsely vegetated eastern slopes, circa 1962

Photo: Mark Rowland

Figure 5.28 The southern slopes of Mt Taylor ahead of the development of Tuggeranong, circa 1960s

Source: ACT Archives

Mt Taylor was grazed until September 1970 when it was 'set aside as a regeneration area for natural eucalypts' and 'regarded as a hill reserve', although short-term agistment of sheep was used to manage fire risk until 1972. [75] Conflicts emerged between the grazier and the new urban neighbours, who were accessing the mountain for recreation. There were ongoing attacks on sheep by dogs and 'Letters to the Editor' of the CT, about the dead sheep rotting on the mountain (see Figures 5.29 and 5.30). The DoT responded in an article for the community newsletter to set some 'common-sense rules' about how the public could use Mt Taylor and also respect the grazing practices assisting fire hazard management in the short term. [76] The message was for people 'take every precaution to prevent damage and ensure the safety of animals'; if they were 'truly public spirited they [would] pause a moment before taking the dog along', noting the 'sheep who are disturbed by dogs are working for all of the users on Mt Taylor' to reduce the fire risks. [77]

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[75] Memos: J.J. Huston, A/Director, Agriculture to Director Land Coordination, 17 September 1970; J. Huston, A/Director, Agriculture to Assistant Secretary Land Administration, 28 June 1971. File 70/126

[76] Departmental contributions to the *Voter's Voice* column dated 11 August 1971 and 'Torrens Talk' for the Torrens Development Association dated 19 August 1971, Folios 24−30.

[77] Ibid.
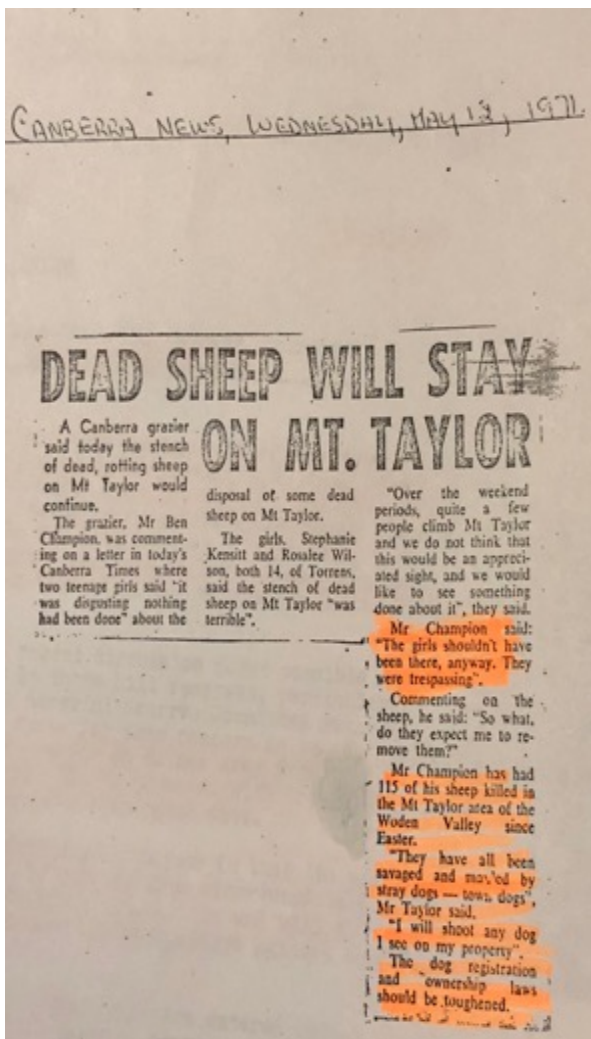
Figure 5.29 Letter to the *Canberra Times*, May 1971

Figure 5.30 Article from the *Courier Mail* about the future of Mt Taylor, June 1971

Source: DCT File 70/126

Grazing was not without ecological risks. The EIS for a television translator proposed for Mt Taylor described the effect of grazing on the flora:

> Although originally covered by trees the area was extensively cleared for grazing and much of the mountain is now dominated by grasses and herbs and sparsely covered with mature Eucalypts. This is particularly so on the eastern and northern slopes facing Woden Valley. The southern slopes on the other hand are well covered with a discontinuous canopy of Eucalypt woodland. [78]

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[78] EIS for TV Translator Appendix I 1. Existing Environment of Mount Taylor (undated) on DCT File 70/126

The EIS further noted that the mountain had 'enriched areas like the old sheep camp on the summit distinguished by a high percentage of weed species and, given the poor condition of the few remaining eucalypts and minimal seed fall, it seems that the northern and eastern slopes would require artificial stimulation for regeneration to take place' on these heavily cleared slopes. Photographs taken by a local resident, Heather Buchler, around this time show the advanced degradation of the north-eastern slopes (see Figures 5.31-5.33).

Figures 5.31 and 5.32 The Buchler family walk up the north-east slopes of Mt Taylor

Photos: Heather Buchler

Figure 5.33 Mt Taylor's heavily grazed and weedy slopes, circa 1980

Photo: Heather Buchler

Run-off from the heavily-cleared eastern slopes caused problems in the adjacent suburbs and the NCDC constructed earth embankments around the lower eastern and southern slopes to channel water away from the new suburbs and into drainage ditches. After agistment ceased, adjacent residents raised concerns about the fire risk of long grass. Hazard burns were costly in terms of 'the man hours involved and damaging to young trees growing'. [79] Creation of 'a manageable verge on the eastern perimeter of Mt Taylor' made 'accessible to a tractor drawn slasher mower so the long grass can be mown as required' was proposed, noting:

> It is difficult to manage in its present state for several reasons:
>
> i.   the geology and topography of the area,
>
> ii.   the subdivision plan which allowed residential properties to back directly onto the reserve,
>
> iii. the provision of an open stormwater drain near the property line. [80]

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[79] Memo: W. James, Ranger, Canberra Nature Park to Director, Head Biologist and Reserves Officer dated 6 February 1976, Folio 14−16, DCT File 70/126.

[80] Ibid, Folio 16.

Significant earthworks were proposed to remove large boulders, mounds and depressions to create the 'manageable verge' (see Figure 5.34). Importantly, this work was the ACT's first Asset Protection Zones. Ranger James noted:

> If successful this treatment could be employed on other units of the Nature park where a similar situation exists, i.e. Mt Arawang, Mt Urambi and Wanniassa Hills [81]

Figure 5.34 Hand-drawn plan of the proposed a 'manageable verge'

Source: DCT File 70/126

The rangers also managed soil erosion associated with use of the mountain for siting electricity and water supply infrastructure. Poor construction methods (steep cuts/batters and inadequate drainage structures) along the main powerline road caused slope and surface erosion [82] (see Figures 5.35 and 5.36). When the ACT Electricity Authority (ACTEA) failed to address the damage, the Ranger wrote:

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[81] DCT File 70/126. Folio 15

[82] Memo D. Fletcher Ranger Canberra Nature Park to Manager CNP 6 October 1976 Powerline Easement Mt Taylor – Folio 190-191 DCT File 70/126

We are being laughed at. The ACTEA wool over our eyes is getting heavy. Anyone in doubt of this should drive along the powerline track on the western side of Mt Taylor, [we need to] make our protest to ACTEA felt. Unless we do this expensive damage will continue (DCT File 70/126: Folio 190).

The cut batters aren't really batters at all. Some parts are still overhanging.

This cut batter is fine for pedologists but not agronomists, conservationists or people who clear stormwater drains.
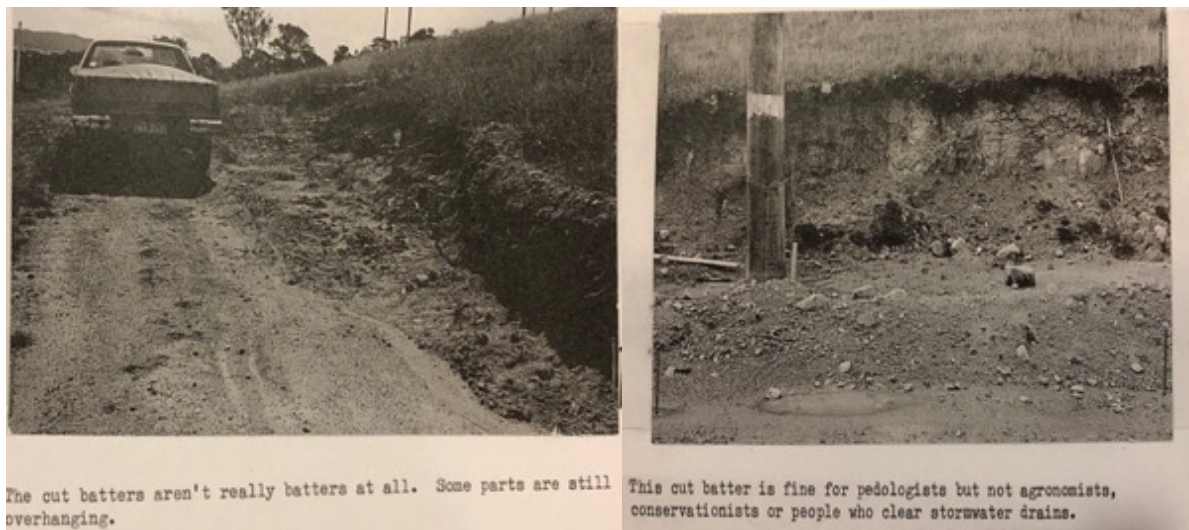
Figures 5.35 and 5.36 ACTEA trail on Mt Taylor, showing poorly constructed batters

Source: DCT File 70/126

The DCT was frustrated that the 'NCDC persist in responding to demands for sites and easements in an ad-hoc manner'. [83] Ongoing issues with batter erosion on Mt Taylor can be traced to construction of the western powerline access track (see Figure 5.37). The effect of utility agencies' activities in nature reserves led to the development of a code of practice for staff and their contractors in 2009 that was initiated by ParkCare volunteers (ERM 2009), and is an ongoing issue (see Section 5.9.5 and 8.4.1).

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[83] Memo D. Everall Reserves Officer to Manager CNP 7 January 1977 Powerline Road Mt Taylor – Folio 179-180 DCT File 70/126.

Figure 5.37 Erection of a silt fence along the western powerline trail in 2017

A television translator was proposed for the Mt Taylor summit in 1976 to improve broadcast reception for residents of Kambah. By this time, the mountain was increasingly used by the nearby residents and the EIS for the translator project noted:

> current human activity on the mountain is mainly confined to small groups of children and teenagers who make expeditions to the top or use the slopes rock outcrops and trees for games. Other visitors include teachers and school children who make use of the mountain for nature study, family groups, members of organised clubs such as the NPA of the ACT, cross country runners, kite fliers and trail bike riders. Infrequent observations suggest that approximately 3000 people could make use of the mountain in one way or the other each year. The physical impact of recent recreational use is limited to several walking tracks, a maze of mini and trail bike tracks confined mostly to an area on the lower north-west slopes, an occasional 'fort' of rock and branches and some rubbish around the summit. The walking track from the Torrens reservoir to the summit has steadily increased in width as the original track becomes too eroded and slippery. In places it now exists as three adjacent foot pads with two eroding and no longer in use. [84]

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[84] EIS Translator Project, Section 2. See Appendix I, Existing Environment. File DCT 70/126

Figures 5.38 and 5.39 show a small group of children and teenagers meeting a group of horses at summit in 1973 (ownership unknown).

Figures 5.38 and 5.39 Horses and local children, Mt Taylor Summit 1973

Photos: Lois Padgham

The EIS flagged the planning intention for Mt Taylor as being 'retained as part of the ACT Metropolitan Open Space System…at some future date it [was] envisaged that the mountain [would] be declared a reserve and form part of the hill reserve system of Canberra'. [85]

The NCDC, DCT, local Member for Canberra and Minister for Capital Development had received letters from neighbours of Mt Taylor who were experiencing nuisance, noise and dust from trail bikes and vehicles on the mountain, and from participants and spectators of hang-gliding activities. [86] Residents noted that the track was 'extensively used on the weekend by trail bikes and cars…with the windy conditions, the traffic…generate[d] an intolerable amount of dust so that our clothesline is unusable, and it takes just one trail bike rider a few minutes to

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[85] EIS Translator Project, Section 2. Section 2.2.

[86] Letters from R.B. Aronsen to Secretaries NCDC and DCT, 27 September 1974, 9 April 1975, 18 June 1975; Letter to Member for Canberra Ken Enderby, 2 July 1974; Letters from Ken Enderby to Minster for Urban and Regional Development, 2 July 1974 and to Minster for Capital Territory, 18 August 1975. Letter to Secretary, Torrens Residents Association, from City Manager DCT, 3 April 1974.

raise the wrath of hundreds of citizens, and to destroy natural growth that takes years to replace'. [87] Figure 5.40 shows a group of trail bikers on the eastern slopes.

Plate 35. Trail-bikes on Mt Taylor. Motor-biking and trail-biking is an activity that is rapidly growing in the number of participants (200 per cent per annum: Mercer, 1977, p. 5). It offers an experience of power, excitement, some danger, and a strong sense of group interaction — and it is very destructive of the natural environment. If legitimate outlets for these needs are not provided, illegitimate ones will be found. Disused brick-pits and old quarries should be considered as sites for bikes.

Figure 5.40 Trail bikes on eastern slopes of Mt Taylor, 1970s

Source: DCT 1979

The DCT noted that trails bikes had been 'the subject of considerable correspondence from residents' and the need for clear management objectives 'if conflicts of interest [were] to be resolved' and 'adept Rangers have developed a rapport with many Mt Taylor residents and have had considerable success in handling difficult situations of this type'. [88] The department also observed: 'the residents are taking a proprietary interest in an area beyond their lease boundaries and then maintaining they have a management right over it'. [89]

In May 1975, Mt Taylor and other hill areas were transferred to the DCT Reserves Management group. [90] Guidelines for interim management and a preliminary plan (see Figure 5.41) shows

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[87] Letter from G. Terei to Minister for Capital Territory, 28 May 1976; Letter from R.B. Aronsen to Member for Canberra Ken Enderby, 7 June 1974.

[88] Minute to the Minister for Capital Territory (through the Secretary, FAS Lands), 25 June 1976

[89] Minute to Secretary from Peter Harvey, dated 29 September 1975.

[90] Minute to the Minister for Capital Territory (through the Secretary, FAS Lands), 25 June 1976. (Folio 77−78).

two interim zones, Regeneration and Development, with a large area for regeneration on the summit and slopes. [91]

Figure 5.41 Interim Management Zones for Mt Taylor, September 1975

Source: DCT File 70/126

The DCT was rationalising its management of the hills and open land areas of the ACT into a system that became known as Canberra Nature Park. This Policy marked:

> a significant advance in development of a coordinated system of conservation reserves in the ACT….Supervision and maintenance activities carried out in Black Mountain and Ainslie and Majura reserves which form the nuclear of the proposed CNP have been expanded to include other hill areas including Mt Taylor. The aim is to maintain and improve the natural environment and ensure it is available for an increasing variety of cultural, recreational and educational uses and for wildlife conservation' (DCT 1976: 22).

The NCDC had identified the primary role of the urban hills and ridges as visual, preserving the natural setting and landscape character and separating urban centres:

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[91] Letter to Mr G. Terei from A.A. Staley, Minister for Capital Territory, dated 25 August 1976.

hills and ridges visible from the central area…contain the spread of urban development and provide a continuous background…the emphasis is on maintaining and/or reinforcing landscape and scenic quality while permitting public access and unobtrusive development in some areas. These include Bruce Ridge, Painter, Mt Taylor, Oakey Hill and Issacs Ridge (NCDC 1976: 67−68).

Management works were undertaken on the urban hill areas along with 'regular ranger patrols' (DCT 1977: 19). Rangers liaised with 'construction authorities, schools, residents and visitors, and monitored the intrusion of uncontrolled domestic dogs and off-road vehicles, particularly trail bikes' (DCT 1980: 21). There were also programs to provide: 'fencing for the control of access…tree planting to enhance vegetation development and fire trail construction and prescribed burning to improve fire safety' (DCT 1979: 22). By 1980, increasing numbers of school groups were visiting Mt Taylor with 'a picnic area constructed on the northern slopes of Mt Taylor' (DCT 1980: 15).

In the early-1980s, extensive amenity tree planting was undertaken, with five thousand trees planted on Mt Taylor as part of the program to revegetate hilltops and ridgelines. This was consistent with vegetation restoration policies for the NCOSS that proposed 'replanting or regeneration' with 'disturbed areas adjacent to residential areas, e.g. Mt Taylor' prioritised (NCDC 1984c: 180). The department assisted local groups and schools to mark World Environment Day and the UN Association of Australia Year of the Tree on 5 June 1982 with a tree planting ceremony (see Figure 5.42) on Mt Taylor (DCT 1982: 18) These young trees required watering during an extended dry season in 1982 (see Figure 5.43).

Planting on Mt Taylor was done plantation style; the aesthetic of linear rows reflected the planting fashion of that time. These plantations have now matured and transformed the degraded slopes (see Figures 5.44−5.49).

Figure 5.42 *Canberra Times* **article about tree planting on Mt Taylor, 6 June 1982.**

Figure 5.43 Watering plantings 1982   **Figure 5.44 The same summit area 2018**

Source: DCT 1982.
Note. The same [original] box gum tree can be seen in the left half of each photo

Figures 5.45−5.48 The now-mature trees on Mt Taylor from planting in the 1980s

Figure 5.44 (top left) shows the Summit; Figure 5.45 (top right) shows the upper eastern slopes; Figures 5.47 and 5.48 shows the lower western slopes.

Figure 5.49 Mature tree planting on Mt Taylor's northern slopes from Oakey Hill, 2016

Like many of Canberra's urban hills, Mt Taylor experienced many bushfires (see Figure 5.50; DCT 1978, 1975). A fire in January 1975 burned 'out the whole mountain in one afternoon and piles of logs were still smouldering the next morning' (Hueneke 1977: 13).

Mt Taylor scarred by fire—potentially a welcome relief from suburbia. Management as a unit of the proposed Canberra Nature Park will reduce likelihood of damage by wildfire and erosion, and eventually restore the vegetation for nature conservation and recreation.

Figure 5.50 The burned eastern slopes of Mt Taylor in 1974

Source: DCT 1976

Over the 1984−1985 bushfire season, the new PCS was 'confronted with the worst bushfire season ever recorded in the ACT' with 'significant fires on the city's hill reserves Mt Ainslie, Black Mountain, Mt Taylor and Red Hill'. A large proportion of fires were 'deliberately lit' (DCT 1985: 105).

Mt Taylor was burned entirely by fires on 18 January 2003 (see Figure 5.51). Eyewitness report described how: 'the flames swept around the base and sides of Mt Taylor, before tentacles of fire crept down into surrounding suburbs'; 'the fire was at the top of Mt Taylor and in 10 minutes it was on our back fence'; and that 'at the foot of Mt Taylor, two houses were burning and a ute was in flames, blocking the path of residents rushing to evacuate the area' (The Age 2003). Amateur video footage captured the mountain bursting into flames. [92] The extent of the fire is indicated graphically in the bottom-right quadrant of Figure 5.52, an image captured by satellite on 20 January 2003, a few days after the fire. [93]

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[92] See https://www.youtube.com/watch?v=SlovOPanNKU.

[93] Image form IKONOS satellite operated by Space Imaging Inc. through Raytheon Australia. Provided to the ACT Government to assist damage assessment and recovery strategies.

Figure 5.51 Mt Taylor on fire, 18 January 2003, viewed from Farrer

Photo: Liz de Chastel
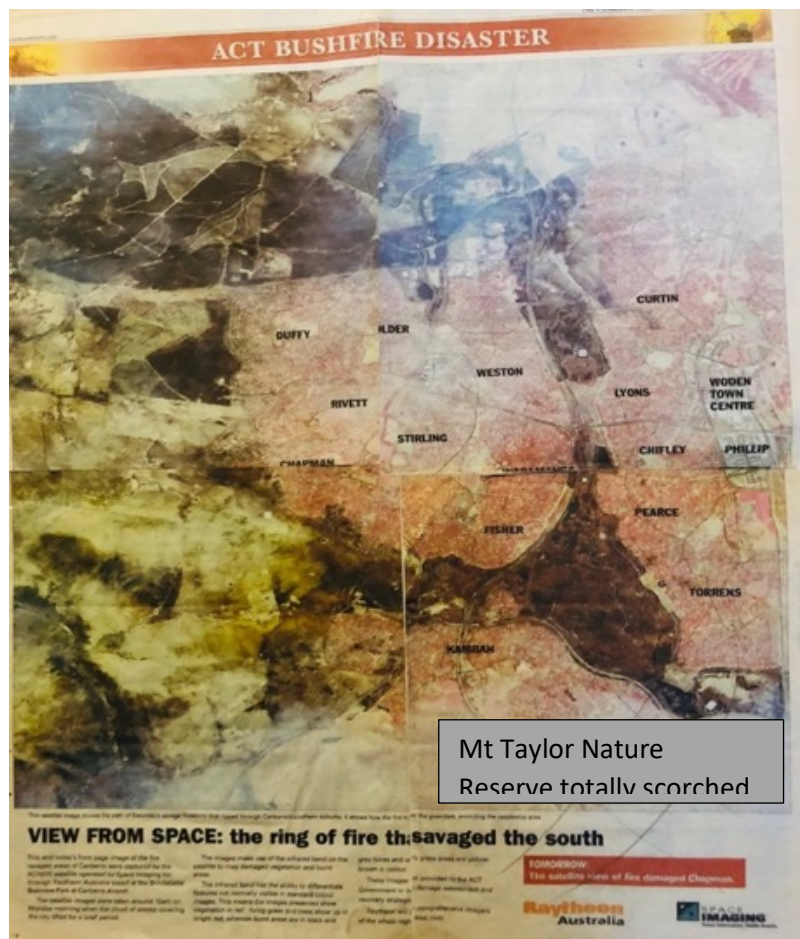
Figure 5.52 Aerial view of the ACT Bushfire

Source: Canberra Times 25/01/03

In 1985, the PCS initiated ranger-guided tours in the urban reserves of CNP. For Mt Taylor, guided walks included school holiday nature activities; exploration of reptile habitats; mid-week Twilight Walks and an early spring walk for Wattle Day (see Figures 5.53 and 5.54). [94]

Rangers also consulted users directly about the 'badly eroding' walking tracks in 1987 and the proposal 'to construct a number of gently graded walking tracks', aiming to 'discuss these proposals with all interested persons and take a walk along one of the proposed tracks'. [95]

Figures 5.53 and 5.54 Guided ranger walks in Canberra Nature Park

Source: DCT 70/126

Tree planting in the early 1980s was followed by community involvement in regenerating Mt Taylor. A small group was active on the northside of Mt Taylor in the mid-1980s (Jenny

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[94] Public Notices, *Canberra Times*, January, May, September 1985; March, June, August 1990, May 1991.

[95] Public Notice: Walking Tracks Mt Taylor, 8 August 1987, ACT Department of Sports and Arts.

Widdowson 2012, personal communication) and an active ParkCare group operated from 1989. ParkCare involves groups of local environmental volunteers working in partnership with the Parks Service to remove weeds and undertake erosion control and restoration works (Rainbird et al. 2012). Since 1989, the Mt Taylor group has removed over 45,000 woody weeds and planted over 1,000 trees and understorey shrubs. Approximately 300 volunteers and 60 park rangers were involved over this time (I'Ons 2009) (See also Section 6.4.3.)

The ecological value of Mt Taylor has been the subject of debate, particularly before the trees planted on the slopes matured. In 1982, the ACT National Trust noted: 'having been largely cleared of trees, it is of little ecological value but serves as a reminder of pastoral land use'. [96] The regenerating ecology of Mt Taylor is now described in terms of the major vegetation associated with the remnant woodland, including scribbly gum (*E. rossii),* red box (*E. polyanthemos*), broad-leaved peppermint (*E. dives*), with Blakely's Red Gum (*E. blakelyi*), mealy bundy (*E. dives*) and hill oak (*C. stricta*). A floristically rich kangaroo grass *(T. triandra)*-dominated grassland includes populations of the small purple pea (see Figure 5.54; WRU 1992). Since the 2003 fires, there has been significant regeneration of casuarinas (*Allocasuarina verticillata*) and acacia (*Acaxia penninervis*) species (I'Ons 2009). The mountain also supports a significant population of pink-tailed worm lizards (*Aprasia parapulchella)* within the open rocky native grassland habitat of the lower western and north-eastern slopes (see Figure 5.55; Osborne and Wong 2012; Osborne and McKergow 1993; Osborne et al. 1991).

Mt Taylor was finally declared a nature reserve in 1993 and, as part of the NCOSS, is a 'Designated Area' under the National Capital Plan (NPCA 1994). The reserve encompasses an area of 297 ha and is surrounded by six suburbs and a major transport corridor, the Tuggeranong Parkway, on its western boundary and an east-west connector road, Sulwood Drive, to the south and south-west (see Figure 5.56).

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[96] NTA, ACT (1982) Register of Classified Places as at 1 July 1982, the National Trust of Australia (ACT), Manuka, Canberra, p. 30.

Figure 5.54 *Swainsona recta* in flower on Mt Taylor

Photo: Matthew Frawley

Figure 5.55 Pink-tailed worm lizard on Mt Taylor

Photo: Matthew Frawley
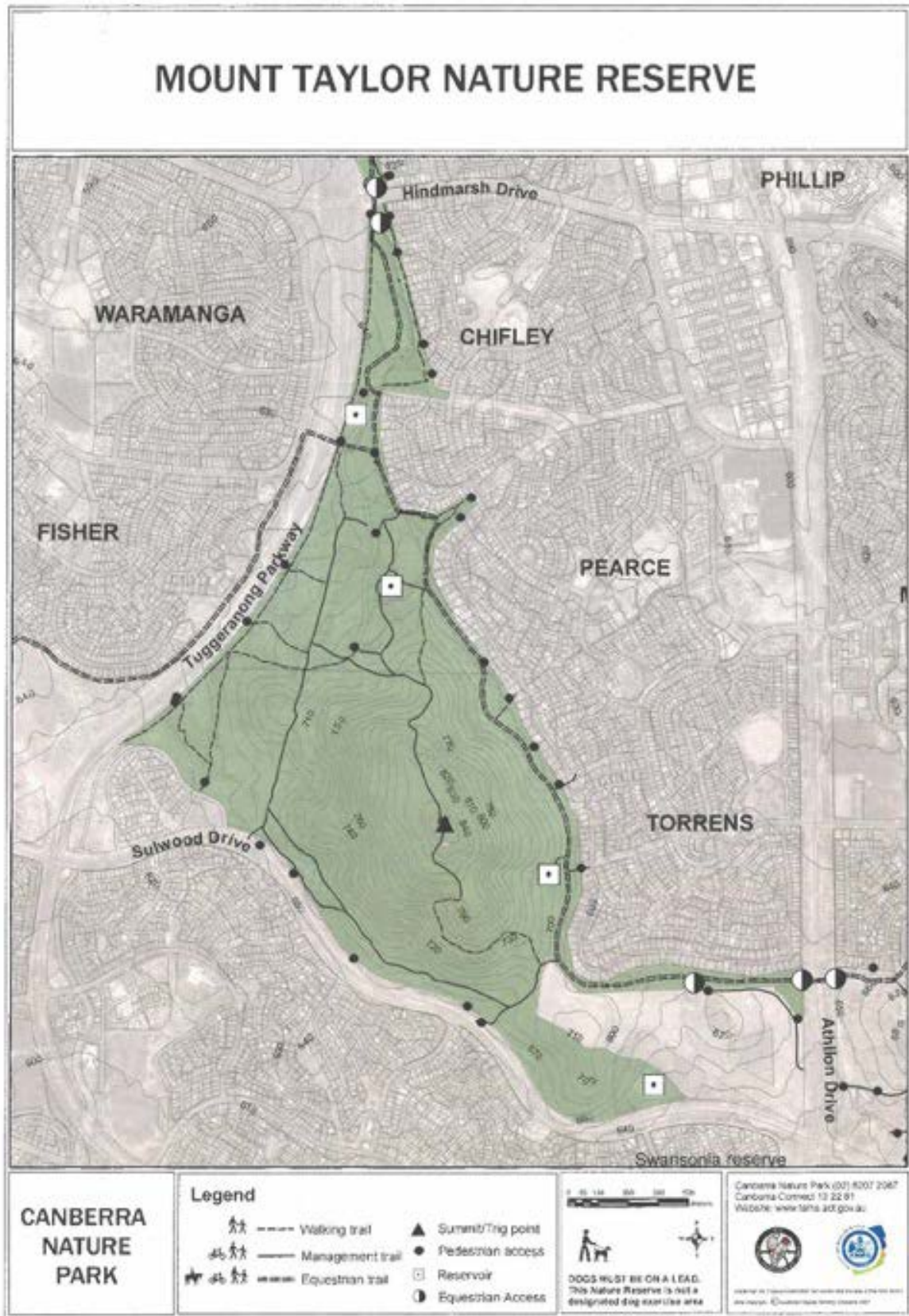
Figure 5.56 Map of Mt Taylor

Source: ACT Parks and Wildlife Service

Mt Taylor is a hybrid landscape, with a legacy of former grazing land uses and urban development around its perimeter. The northern and eastern slopes have been most affected by grazing and timber removal with less impacts on the southern face. [97] Many of the issues captured in its history remain relevant, including the activities of utility agencies and neighbours. [98] Annual weed infestations and an abundant eastern grey kangaroo population (see Figure 5.57) continue to affect the regeneration of native vegetation (Ryan 2011)—as does illegal trail construction by mountain bike riders (see Chapters 6 and 8).

Figure 5.57 Eastern grey kangaroo mob and annual weeds on Mt Taylor

Photo: David Flannery

Mt Taylor is one of the mostly heavily used hill reserves in Canberra, its ascent to the summit (857 m) attracting walkers, mountain runners and people training for trekking adventures. Indeed, trail trackers recorded over 14,000 passes on the main southern walking trail and 6,000 passes on the eastern face 'zigzag' trail in the month of February 2017 (ACTG 2017a). Riding horses and bicycles is allowed on fire trails and dog walking on a lead. Group events like orienteering are permitted subject to agency approval. A survey of 16 user groups showed that most use Mt Taylor for walking, followed by running and cycling (Chevalier and Norman 2010) Chapter 6 presents a detailed case study of Mt Taylor's users.

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[97] Canberra Nature Park Mount Taylor, Brochure, ACT Parks and Conservation Service 1989.

[98] Chifley NHW newsletter, October 2013, 'Motor bike on Mt Taylor. Rubbish on Mt Taylor'.

5.9 Reviews, plans and inquiries about Canberra's bush landscape

There have been several inquiries into management of Canberra's natural landscape since self-government in 1989, initiated by the Commonwealth and the ACT governments.

5.9.1 The Bush Capital: protecting and managing the national capital's open spaces

In late-1991, the Commonwealth Joint Committee on the National Capital was asked to conduct an inquiry 'and report on nature conservation policies and environmental management practices within those areas of the open space in the ACT of national significance' (C of A 1992: v). Interestingly, the report claimed that the 'ecological values of the NCOSS are the principle reasons for its existence', while 'at the same time, other values have an important place', further citing its 'role as a symbolic and landscape setting for the national capital, the definition of urban form…cultural heritage and opportunities for recreation rural use forestry research and education'. (C of A 1992: xv).

This ecological interpretation is not borne out by history and NCDC plans and policy underlying the NCOSS (NCA 2014, 2011; Seddon 1987). The committee's conclusion appears to have been influenced by the conservation submissions and evidence presented at the inquiry (C of A 1992: 26), which outweighed evidence of Canberra's planning and landscape design history (C of A 1992: 139−145). The presumption that the NCOSS 'has been instrumental in protecting the majority of ecosystems communities and species' is somewhat misleading (C of A 1992: 27).

Rather, the evidence suggests that ecosystem protection was largely coincidental. The most endangered national ecosystem, temperate lowland grassland, was still not recognised or protected by the NCOSS, or in Canberra's nature park system at the time. Further, the remaining remnant areas of lowland grassland (at Gungahlin and Jerrabomberra) were not in the list of areas proposed to be added to the nature park system in the inquiry's recommendations (C of A 1992: xx). However, the inquiry identified a number of inadequacies in the planning arrangements for the NCOSS, which mirror the policy and management issues raised by George Seddon a decade before (Altenburg 1993: 159−163). The committee structured its recommendations around establishing a system for long-term protection of 'what most people believe is the essential character of the national capital, a bush capital where the open spaces will be protected as the population continues to grow' (C of A 1992: xvii).

5.9.2 ACT Standing Committee on Urban Services Report on Final Draft Management Plan for Canberra Nature Park

In April 1989, the new Territory administration released a brochure, 'Shaping our Future', and sought input to the forthcoming CNP Management Plan (J. Geue 2014, email communication). This began a lengthy public consultation process culminating in a Legislative Assembly of the ACT Standing Committee Report examining the draft management plan in 1998 (Legislative Assembly of the ACT 1998). The report identified the ongoing conflicts between recreation and conservation uses, and noted: 'existing staff resources do not enable effective management of the park existing activities, let alone the addition of new ones' (Legislative Assembly of ACT 1998: ix)

The Management Plan for CNP was gazetted in 1999. It sets the context, describes the nature park, identifies issues, expectations and constraints; sets direction for management and states the basis for evaluating management success. Overall objectives are to:

- conserve and improve native plant and animal communities and maintain biodiversity and ecological process.
- conserve features of cultural, geological, geomorphological and landscape significance.
- protect CNP and adjacent areas from the damaging effects of fire, erosion, pollution, pest plants and animals or other disturbances.
- ensure appropriate practices by other agencies carrying out works in or adjacent to CNP.
- provide and promote a range of opportunities for raising awareness, appreciation and understanding.
- provide and promote appropriate recreation and tourism opportunities.
- preserve sites and biodiversity elements of scientific significance (ACTG 1999).

5.9.3 ACT Commissioner for Sustainability and the Environment Inquiry into Canberra Nature Park

In 2009, the ACT Commissioner for Sustainability and the Environment was charged to investigate the condition of land in CNP, Molonglo River Corridor and Googong. This included instructions to: identify actions to correct and enhance; review existing land management programs/practices; identify urgent actions and longer-term changes for management; identify knowledge gaps research and survey needs; examine ways of working with stakeholders including Aboriginal people; and investigate grazing pressures (OCSE 2011a). Reports were commissioned relating to land use history, climate change, legal obligations and values.

The inquiry report (OCSE 2011b) found that the parks agency was 'struggling to maintain the huge expanse of urban nature reserves in the ACT − about 12,000 ha − with less than half the budget it need[ed]'. The directorate received $364 per hectare for nature reserves (not including bushfire management) but needed $850 per hectare (OCSE 2011b: 151−153). One funding solution investigated was an environmental levy on ACT households. Approximately $6.5 million could be raised annually to protect and enhance the reserves through a levy program like that of Brisbane City Council (OSCE 2011b: 162).

Public submissions to the inquiry were predominantly received from conservation groups and individual volunteers associated with care groups (OSCE 2011c). They covered consistent themes including: management of weeds and pests; maintenance of infrastructure; inadequate resources; ranger turnover and workloads; poor communication; community education and neighbour impacts; connectivity and the need for management plans for CNP units. [99] Submissions also reinforced the important role of ParkCare groups in managing reserve units and the need for adequate support for volunteers. [100] Forums and surveys held with existing recreation and conservation user groups reiterated the management issues raised in public submissions (Chevallier and Hoffman 2010).

5.9.4 Review of the National Capital Open Space System (NCOSS) 2010

While the OCSE inquiry was underway, the National Capital Authority (NCA) announced a review into the NCOSS in May 2010. The review aimed to establish 'principles for guiding

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[99] see OSCE 2011c Submissions 1, 3, 4, 6, 8, 9, 10, 16, 17, 19, 21, 22, 2, 27, 29, 30, 31, 32, 36, 38, 39.
[100] see OSCE 2011c Submissions 2, 3, 9, 12, 16, 20, 22, 27, 34.

land use and management for the NCOSS' (NCA 2012: 7) with a discussion paper released in September 2011 for public consultation.

Consultation involved interviews with key stakeholders, an online-community survey and public submissions. Much like the CNP inquiry, most public submissions were from conservation, community and recreational user groups, and individuals connected to these groups. (NCA 2014: 15) The survey results showed significant recognition of the importance of the NCOSS for ecological and recreational functions, with responders considering the symbolic and economic values less important. Environmental values were the highest recorded vote (46%), followed by social (42%) and symbolic (12%) values. These perspectives suggest limited community understanding of the use of the natural landscape to design the capital—or recognition of its symbolism as part of Australia's identity and uniqueness from an international perspective (where cities are trying to retrofit and restore landscapes). The short answers articulated the importance of the NCOSS landscape and bushland setting for residents, visual amenity, urban liveability, sustainability and biodiversity (NCA 2014: 11). The NCA noted:

> The NCOSS is part of the Canberra residents' inhabited sense of place. The research supporting this report shows residents make very little distinction between the suburban streetscapes and the urban bush when referring to the character of the city…their relationship to the landscape is far more nuanced and subjectively constructed in and through interactions, rituals and daily life experiences of walking and driving through the city than can be reflected in the Plan (NCA 2014: 42).

The consultation process also revealed 'a low level of appreciation of the respective responsibilities of the Australian and ACT Governments in the planning and management of the NCOSS' (NCA 2014: 33). This is unsurprising, given that the NCA acknowledges the complexity of NCOSS governance:

> the practical work of protecting the landscape values in this area come under the responsibility of many groups and organisations including; the NCA, a number of ACT government departments, non- government organizations, volunteer groups and private leaseholders (NCA 2014: 43).

An expert reference group was used to guide the NCOSS and make recommendations for amendments to the National Capital Plan. These included: amending policy and descriptive elements of the plan to ensure its contemporary relevance; public communication for community stakeholders to understand the importance and role of the NCOSS; and the

improvement of governance arrangements through a seven-year review of the plan and communication with land managers (NCA 2014: 10−13).

5.9.5 Comparison of inquiries, reviews and reports into the NCOSS and Canberra Nature Park

It is useful to assimilate the policy, planning management issues and findings of these reports to identify common threads and compare them with earlier NCOSS reviews by Seddon in 1976 and 1981 (see Section 5.6; NCDC 1981, 1976): For comparison see Appendix 6. The most striking observation is that very few recommendations have been implemented at either level of government, particularly management and recreational planning, community education programs and policy and controls to guide management of nationally significant lands.

The CNP management plan was prepared almost 20 years ago and there have been significant additions to the park as well as new policies for grassy woodland conservation, ecological connectivity, mitigating climate change and promoting community health and well-being. In 2018 yet another ACT Legislative Assembly Standing Committee inquiry was held ('Nature in our City') with a similar scope to previous reviews. It reported in February 2020 after this research was completed. [101]

5.9.6 Existing planning policy and management controls for Canberra Nature Park

The Canberra Spatial Plan (2004) was the ACT Government's long-term planning strategy and proposed to create a more compact and sustainable city structure. The plan acknowledged that 'containing outward spread of the city so that the "footprint" of the city on the landscape is minimised (whilst balancing it with the need to provide housing choice) assists greatly in protecting biodiversity' (ACTG 2004a: 17).

Following the 2003 fires, the plan identified a future urban area adjacent to the Molonglo River, breaking with the Y-Plan structure that had guided growth since 1970. It outlined two 'containment lines' around the city centre and set a target for at least 50% of residential development to occur within a residential intensification line 7.5 km from the city centre by 2020 and urban development to 2035 to be contained within a 15 km radius of the city (see Figure 5.58). It also proposed a new bushfire abatement zone and risk mitigation measures to

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[101] https://www.parliament.act.gov.au/parliamentary-business/in-committees/media-releases/2018/2020/media-release-report-tabled-inquiry-into-nature-in-our-city.

be built into the design of all new development areas, drawing on the recommendations of the McLeod Inquiry. [102]
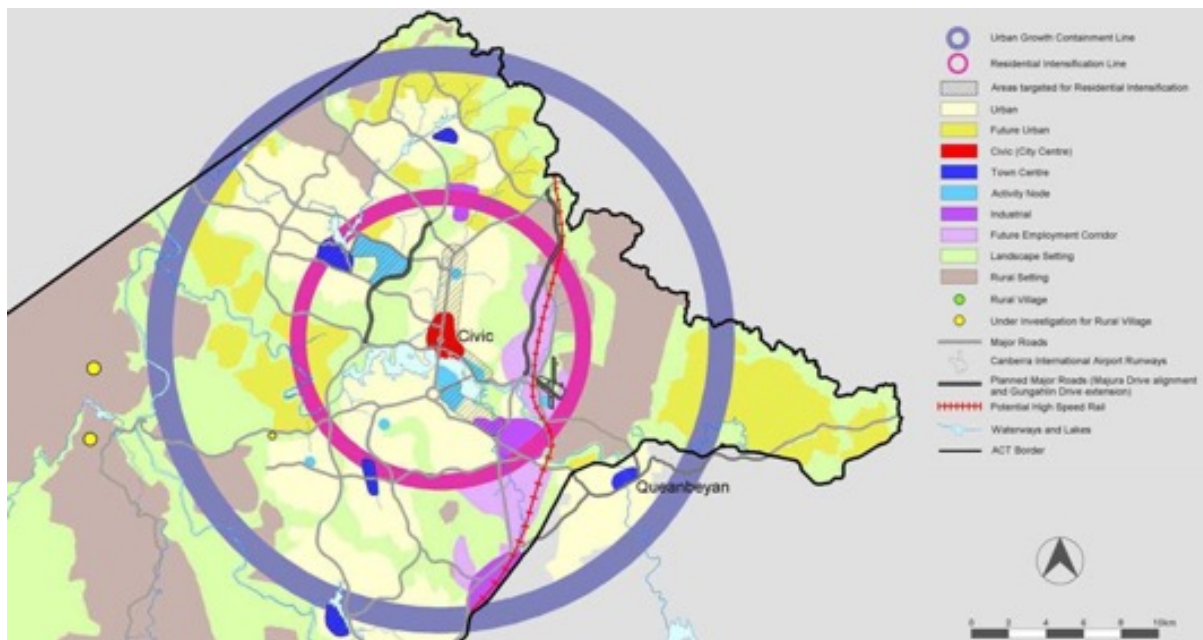
Figure 5.58 Urban structure for Canberra consolidating the central western edge

Source: ACTG 2004a

Importantly, the Spatial Plan retained and reinforced the national and regional open space landscape setting and nature reserve network (see Figure 5.59). It also promoted ecological connectivity and aimed to 'protect and enhance biodiversity through nature reserves and maintaining connectivity between them' (ACTG 2004a: 17) and to 'maintain sense of place' through companion policies and actions to 'preserve landscape features that give the national capital its character and setting' (ACTG 2004a: 62). It also included goals and policies to give effect to conservation strategies like the *Woodlands for Wildlife: ACT Lowland Woodland Conservation Strategy* (ACTG 2004: 72, 86).

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[102] The McLeod Inquiry into the Operational Response to the January 2003 Bushfires in the ACT recommended planning principles to minimise risk, including an abatement zone, bushfire protection planning and declaration of bushfire-prone areas.
(see http://www.cmd.act.gov.au/__data/assets/pdf_file/0008/113939/McLeodInquiry.pdf)
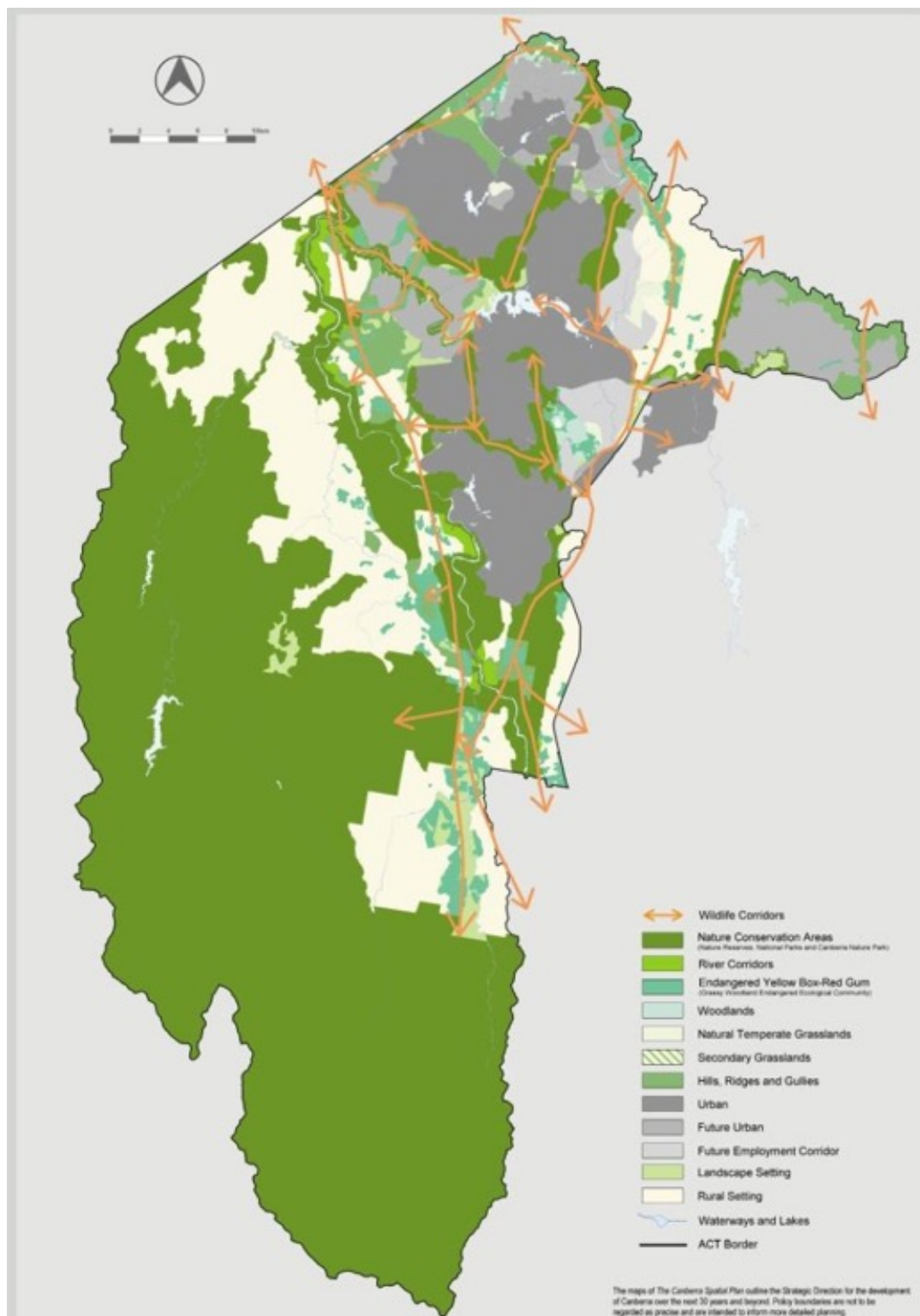
Figure 5.59 Key nature conservation areas and corridors om Spatial Plan

Source: ACTG 2004a: Map 7

The ACT Planning Strategy (2012) replaced the 2004 Spatial Plan. A community consultation process, Time to Talk, was held in 2010 before preparation of the strategy. The community's desired future for Canberra was one where 'Canberra will maintain its reputation as a "capital

in the bush"', as a 'city known for clean air, open space and convenience' (ACTG 2012a: 15) and 'keep its bush capital feel and landscape vistas' (ACTG 2012a: 17).

The 2012 Strategy had five outcomes and a suite of strategies and actions to achieve them. Those related to landscape and the nature reserve system include:

- Outcome D—'in 2030 Canberra will be the 'capital in the bush', recognised for the quality of its public places and buildings that reflect its unique climate, character and identity' (p. 5)

- Outcome E—'in 2030 Canberra will be at the centre of a region that demonstrates the benefits of good stewardship of the land, its resources and the beauty of its rivers, mountains and plains' (p. 5)

- Strategy 6—'invest in design that will ensure urban change creates amenity, diversity and a more sustainable built form, and adds to Canberra's landscape setting' (p. 54)

- Strategy 7—'Canberra's system of streets, parks and waterways can provide important habitat that improves the connectivity of ecosystems. The design of these public spaces should support and extend our natural systems (such as the Dickson and Lyneham wetlands) to improve the quality of Canberra's environment and foster resilience to climate change' (p. 57)

- Strategy 8—'the interface of the suburban edge with adjoining natural or rural areas will be carefully designed and managed having regard to the threat of bushfire and the need to control other hazards such as weed infestation, predation of native fauna, contamination hazards and flooding' (ACTG 2012a: 58)

A revision of the 2012 Planning Strategy was undertaken in 2018 and proposed a focus on 'urban infill', with 'development of land [in] the CBD town centres and major transport corridors'. The aim was to 'protect what's unique about our city and maintain the natural setting that Canberrans value' (ACTG 2018b: x, ACTG 2018c). The regulatory and land use controls for management of Canberra's natural landscape are described in the *ACT Planning and Development Act 2007*. This Act protects nature reserves and open spaces in Canberra through a public land reservation in the *Territory Plan* for: wilderness, national park, nature reserve, special purpose reserve or urban open space. [103] The high-order management objectives for

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[103] *ACT Planning and Development Act 2007*, s. 315.

public land reserved for nature reserves are: 'to conserve the natural environment: and, to provide for public use of the area for recreation, education and research'. [104]

The Act further requires the preparation of a public land management plan, with management plans for nature reserves to be prepared in accordance with the process under the *Nature Conservation Act 2014*. [105] The IUCN management categories may be assigned to nature reserves or a zone within a nature reserve and the area must be managed in accordance with those categories. A report on the implementation of management plans is required every five years with management plans to be reviewed every 10 years after commencement. [106] A draft reserve management plan for CNP has been prepared to replace the existing 1999 Management Plan and was released for public comment in 2019. [107] It is yet to be finalised.

5.10 The Molonglo River Corridor

The Molonglo River Corridor comprises both nature reserves and a special purpose reserve. The Molonglo River reserve covers an area of 1,280 ha in its entirety and extends 23 km along the river from Scrivener Dam to the Murrumbidgee River Corridor Reserve, (ACTG 2018e). The area of interest in this research is the urban section beside the new suburbs (see Figure 5.60) which forms one of the place-based case studies in Chapter 7 . The nature reserves protect the river corridor and its biodiversity values and provide for low-key recreational uses. The River Corridor is not part of the CNP but is a component of the NCOSS.

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[104] Ibid. Schedule 3.

[105] See s. 177, *Nature Conservation Act 2014*.

[106] Ibid. see s. 171−175.

[107] https://www.yoursay.act.gov.au/act-parks/canberra-nature-park.
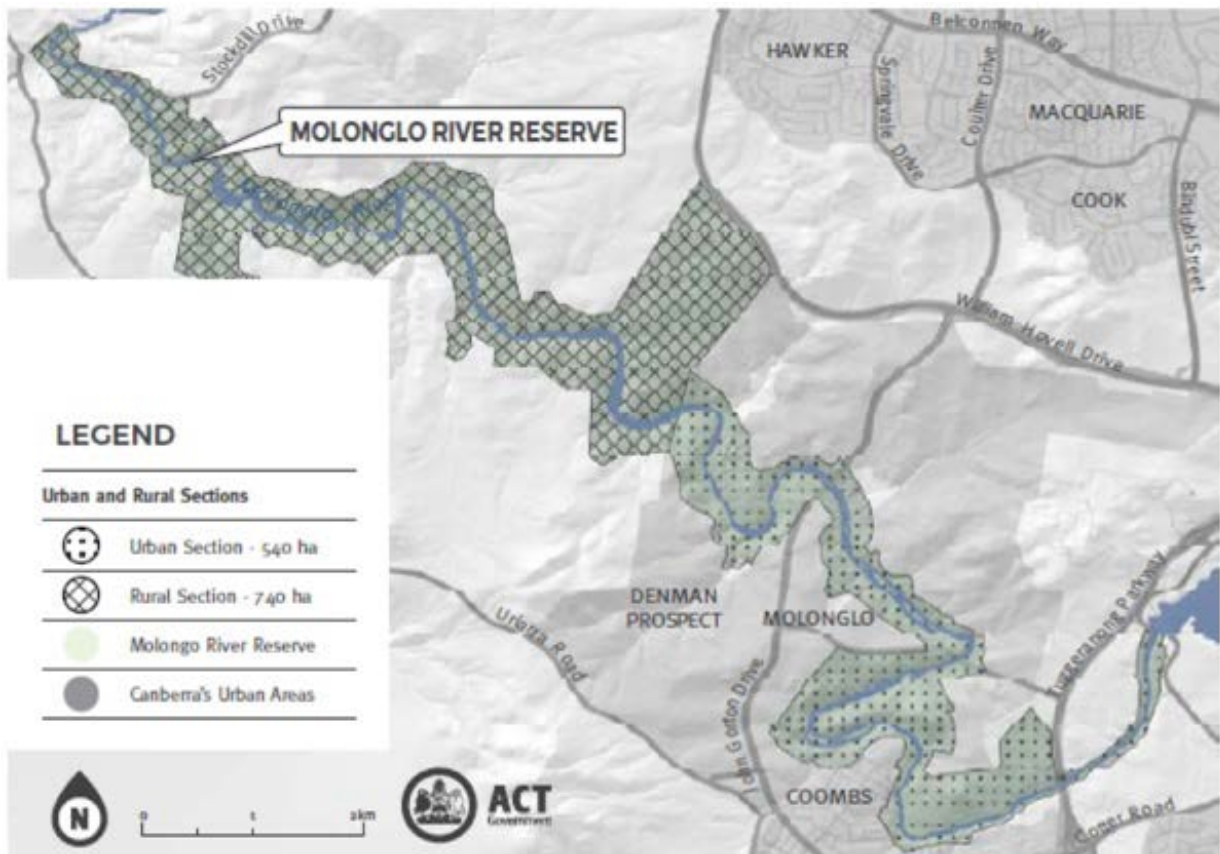
Figure 5.60 Map of the Molonglo River Reserve and adjacent urban areas

Source: ACTG 2018e

The environment around the river is an open valley with scattered remnant trees and mixed vegetation along the riparian corridor (see Figure 5.61). The upper urban section is a former plantation and will be a 'central landscape feature' for the new residential community, while also providing restored habitat for threatened species. (ACTG 2018e: 19) The riparian zone is degraded (see Figure 5.62) and weed removal, erosion control and ecological restoration works are underway (see Figures 5.63−5.64). Within the urban section, 'the Reserve is most significant for its river landscapes and nationally threatened species and communities. In particular, the habitat for pink-tailed worm-lizard is amongst the best remaining in Australia' (ACTG 2018e: 10).

Figures 5.61 The River Corridor looking south towards the new suburbs

Figure 5.62 The degraded riparian zone, eroded slopes and weeds

Figure 5.63 The riparian edge near Coombs (erosion control in foreground)

Figure 5.64 The River Corridor looking west to Coombs (weeds in foreground)

5.10.1 Land use and planning history

During early European settlement, most settlers farmed eastward of the now Molonglo River reserve on the Molonglo plains, 'where the grazing was better and river access easier' and this lower part was useful 'as a source of water and extra grazing' for those with holdings 'higher in the landscape' (Ryan and Ryan 2013a: 11). While some grazing continued, large pine plantations were established by Charles Weston on Stromlo Hill in the 1920's (Murphy 1963). This softwood forestry continued, alongside recreation in the forests and along the River, until the 2003 Canberra bushfire.

NCDC policy was to retain 'the existing pine plantations…as multi-use areas for recreation and other uses compatible with the primary productive purposes' (NCDC 1984c: 164). The pine forests were also key landscape elements of the NCOSS, with the Molonglo Valley, a 'significant' element of these rural landscape foreground (NCDC 1984c: 130). The NCDC recognised that, if carefully sited and managed, pine forests added variety to the landscape and, 'because of their nearness to the urban areas', that:

> Pine plantations offer a special environment suited to some activities, and forests near urban areas are a well-used recreation resource. Stromlo Forest, for example, is heavily used for horse-riding, orienteering and educational excursions, in addition to its use for picnics and barbecues. (NCDC 1984c: 83).

The early planning for the Molonglo River Corridor aimed to protect the rural and western edge city landscape setting with the lower section and allow for low-key recreation (NCDC 1984c). Even at this time, the flammability of these areas was recognised and, 'because of fire danger, access must be restricted at times during summer' (NCDC 1984c: 129). The river below Scrivener Dam, was 'likely to remain unsuitable for swimming because of low river flow and the adverse effect of urban drainage from Woden and Weston Creek' (NCDC 1984c:140)

The (Lower) Molonglo River Corridor Plan (2001) provided for low key recreational uses in the rural section, with little formal infrastructure in the form of signage and tracks (ACTG 2001). The pine plantations both sides of the river and up to Stromlo had become popular with walkers, runners and cyclists (Ryan and Ryan 2013b) and residents of Weston Creek.

After the 2003 fires, the Molonglo Valley became the focus of a new urban development front west of Central Canberra and between Belconnen and Weston Creek. The Canberra Spatial Plan (2004) proposed to 'complete the urban edge of Canberra to the west' and recognised the landscape setting:

> The Molonglo Valley is framed by undulating hills, including Dairy Farmers Hill to the east and Mount Stromlo to the south-west, and is bisected by the lower reaches of the Molonglo River, downstream of Scrivener Dam and Lake Burley Griffin' (ACTG 2004a: 7)

The Plan acknowledged that while the natural vegetation in the valley was significantly modified by grazing and forestry, substantial areas of Yellow Box-Red Gum woodland remained (ACTG 2004a: 31).

Subsequent planning for the Molonglo Valley proposed that up to 55,000 new residents will settle in the valley over the next 30 years, with some future challenges identified with natural topography for urban land development. At the same time, the River Corridor was seen as offering opportunities 'to demonstrate best practice in ecological conservation, bushfire management, local recreation, and unique and distinguishable landscape and landmark design features for the urban area'. [108]

A River Park Concept Plan was prepared in 2012 to provide a framework for conservation, recreation and bushfire management in the Molonglo River Corridor—particularly to inform the design and operational plans for landscape restoration, recreation, trails and fire management (Hassell 2012). A strategic environmental assessment of the Molonglo Valley urban development under the Commonwealth's *Environment Protection and Biodiversity Conservation Act* (EPBC) produced a series of requirements to protect threatened ecological communities and wildlife species in the Molonglo Valley. A suite of ecological, research and monitoring plans are being implemented to meet these approval requirements (ACTPLA 2011). For this, regular implementation reporting and preparation of a reserve management plan for the River Corridor are required. A draft statutory management plan, prepared in accordance with the *Nature Conservation Act 2014*, was released for public comment in 2018 and finalised in 2019 (ACTG 2018e; 2019d).

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[108] https://www.planning.act.gov.au/planning-our-city/planning-studies/molonglo-valley

The experiences of planning and development practitioners involved in the planning and design studies, environmental assessment and first stage of development in the Molonglo Valley (Wright and Coombs) is explored in Chapter 7.

The ACT Government's decision to develop the Molonglo Valley and the associated requirements of the Commonwealth's EPBC Act approval, led to significant capital investment in ecological restoration and management of degraded woodlands and grasslands (ACTG 2018d; ACTPLA 2011). This work is transforming the slopes and hills along the river corridor, and the area has become an important research site for understanding the pink-tailed worm lizard. Habitat enhancement of the grassy slopes (see Figure 5.65) will benefit this vulnerable lizard and other reptiles (Reinfrank 2015). The installation of vertical habitat structures and other novel interventions is providing new habitat for hollow-dependant wildlife (ABC News 2016) and trails, seating, signs and shade facilities have been constructed for reserve users. This new infrastructure is low-key and sympathetically designed to enhance appreciation of the grasslands. This is the first infrastructure designed to facilitate public access to, and education about, temperate grasslands in Canberra (see Figures 5.66−5.70). Overall, a new social and ecological story is unfolding for this part of the Molonglo River and the new residents (see Section 5.11).

Figure 5.65 Ecologist Richard Milner in the enhanced pink-tailed worm lizard habitat

(Photo: ABC News, https://www.abc.net.au/news/2015-05-06/richard-milner-pink-tail-worm-lizard-habitat/6450532 accessed on line October 2016)

Figure 5.66 Low-key hardened gravel trail and attractive wood and steel fencing

Figure 5.67 Shelter structure and trees planted for shade

Figures 5.68 and 5.69 Interpretative signage about wildlife in the corridor

Figure 5.70 Logs, tree planting and trail entrance (looking back towards Coombs)

5.11 Insights and Learnings: Primary Case Setting and Case Study Sites

Canberra has a rich landscape history, past and present shaped by Indigenous and rural management practices, urban settlement plans and changing community values about grassy ecosystems. This cultural landscape story has been explored at two scales in this chapter. For Canberra, purposeful design of city in the landscape has created a beautiful place to live and an international design exemplar in its embrace of natural landscape (C of A 1992). Writing about Canberra, Mannheim (2018) stated: 'many people mistake our open spaces and abundance of greenery for privilege, because that's what marks the suburbs of the wealthiest Sydneysiders and Melburnians. Here, it's just a benefit of good planning'.

Importantly, consistent application of planning policy over 30 years of Commonwealth administration has maintained the necessary framework to protect these elements in development of the city. Since ACT self-government began, policy has failed to align national and territory objectives and equitably share responsibility for the management of this nationally important landscape.

What became apparent in tracking this history is how social perspectives of Canberra's natural landscape have evolved over time. These have shifted from Indigenous curation of landscape to modification by rural settlers and then, reafforestation into the garden city with strong symbolic visual presence and recreational value. Now, there are imperatives for ecological conservation, mediating the effects of climate change and promoting human well-being. These evolving dimensions in Canberra accord neatly with four visions of nature identified by Paul Gobster in his work with community stakeholders (see Gobster 2001: 40). They are presented here and referenced with documentary sources from the chapter:

> *Nature as pre-European settlement landscape*—nature before arrival of pastoralists and city-makers tended by Indigenous custodians (Gammage 2013; Gillespie 1984; Flood 1996).

> *Nature as designed landscape*—natural landscape as the setting for design of a new capital city - the Griffin Plan and as the enduring element of its urban structure National Capital Open Space system (NCA 2016; ACTG 2004a; NCDC 1984a, c,1976).

> *Nature as habitat*—from early concepts of Canberra as a Wildlife Sanctuary and now its national importance for lowland grassy woodlands conservation and experimental restoration research (Shorthouse et al. 2012; ACTG 2004b; DoI 1968).

Nature as recreation—amenity and accessible natural spaces for all people who live in the city to recreate and connect with nature (Seddon 1977).

The Mt Taylor and Mulligans Flat nature reserves have their own social histories and management legacies that have shaped how these places are valued, used and managed. By accident of history and location Mulligans Flat has been less affected by sheep grazing than Mt Taylor. Mt Taylor has also had 50 years of urban recreational use with limited management investment and presence. The legacy of sheep grazing is ongoing—weeds, eroded slopes and gullies, all of which are now exacerbated by a growing grey kangaroo population over-grazing the regenerating native grass cover. Legacies also remain from urban utility infrastructure, poor construction of access tracks and poorly-located walking track alignments. Much of the conservation-related restoration work since the DCT amenity tree planting program in the 1980s has been undertaken by ParkCare volunteers. The residential amenity and recreational history of the mountain strongly influence how the reserve is perceived and used by neighbours (see Chapters 6 and 8).

Mulligans Flat was predominantly valued by birdwatchers and other citizen scientists attracted to the high-quality habitat and relative isolation. This social association has continued with many now involved in the WWT Mulligans Flat management committee and undertaking wildlife monitoring in the Sanctuary. The predator-proof fence was erected in 2009 and signalled to the new urban neighbours that Mulligans Flat is a place for conservation and research. Respectful passive recreational and nature-based activities have been shaped by a combination of well-maintained walking infrastructure and a regular ranger presence in the Sanctuary (see Chapters 6 and 8).

The Molonglo Valley was a rural edge landscape remote from most of developed Canberra, with limited access to the River and the plantation forests used for recreation. The 2003 fires destroyed this social history and provided the canvas for a new urban edge community and ecological restoration of the riparian landscape. The works along the Molonglo River reserve are creating a regenerated natural landscape with enhanced threatened species habitat and a unique recreation setting. New walking trail and visitor infrastructure are designed to assist interpretation and appreciation of the native grasslands. As the first of its kind in Canberra, it offers new opportunities for the community to learn about and value the lowland landscapes.

5.12 Social Dimensions of Canberra and Neighbour Communities of Case Study Sites

5.12.1 Introduction

Canberra is a growing city and recorded the largest population growth rate in Australia states in the 2016 National Census of Population and Housing. In the five years following the 2011 census, the population grew by 11.2% from 357,222 to 406,403. The northern town of Gungahlin was the second-fastest growing region in Australia over that period (O'Mallen and McIlroy 2017). This growth has continued with the addition of 8,761 people in 2017 (2.15% annual growth) and net overseas migration and natural increase at the 'highest levels ever experienced in a calendar year by the ACT' (Canberra Times 2018). Two of the case study sites (Mulligans Flat next to the suburbs of Forde and Bonner and Wright and Coombs next to the Molonglo River Corridor) are located in the fastest growing regions in the ACT (Fettes 2017). The new edge communities of Forde and Bonner are approximately 10 years old; Wright and Coombs are less than five years old and still growing (Thorpe 2014).

An understanding of the social characteristics of households settling in these new suburbs can assist to identify factors that might affect people's ability to engage in nature reserves, and help reserve managers to design and target community education and programs. The factors that might influence community formation, cohesion and social networks are another key area of research interest in these new suburbs. There is also value in understanding where in-migrants to these areas originated, whether local to Canberra or from overseas or interstate. People born overseas are likely to be less familiar with the Australian bush, and those outside Canberra are less familiar with the grassy woodland systems of the region.

For the established suburbs next to Mt Taylor Nature Reserve, Chifley Pearce and Torrens that were developed in the 1960s and early-1970s, it is interesting to examine whether demographic change is underway by comparing census data and consider household factors that might influence the formation and maturity of social networks in the local community. A recent factor affecting these suburbs is the demolition of houses with loose-fill asbestos insulation, known as 'Mr Fluffy houses'. The demolition scheme created a stock of vacant land in these established suburbs. [109] This is expected to affect household composition over-time, as dual-occupancy opportunities will attract many new residents (McDonald 2015). The numbers are

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[109] 85 vacant lots: 17 in Chifley, 36 in Pearce, 32 in Torrens, totaling 85 blocks (see http://www.asbestostaskforce.act.gov.au/affected-properties/list-of-affected-properties).

significant: approximately one in 20 houses (5%) in Pearce and one in 25 homes in Torrens will be demolished. Hawker Street in Torrens, which adjoins Mt Taylor, has more Mr Fluffy houses than any other street in Canberra (Lawson 2015). Changes will not be obvious until the 2021 census and may also be confounded by other changes, including significant medium-density housing reconstruction in the established suburbs, particularly Chifley, that are fuelling population growth and additional housing stock (Fettes 2017).

5.12.2 Data and methods for Demographic analysis

The Census of Population and Housing (Census) by the Australian Bureau of Statistics (ABS) was used to prepare the demographic analysis of the suburbs adjoining the case study nature reserves (see Appendix 7). The 2016 Census was the primary dataset for this analysis.

The suburbs adjoining Mulligans Flat, Forde and Bonner, were still being developed in 2011; thus, data about these new communities from the previous Census were limited. Development of the suburb of Wright and neighbouring suburb Coombs, adjoining the Molonglo River Corridor, commenced in 2011; 2016 is the first Census for these suburbs.

Other methods used to characterise these new communities included: documentary analysis of published reports about Canberra's demographics; interviews with practitioners who were involved in developing the new suburbs; focus groups with the staff of the then-Land Development Agency (see Chapter 7); participant observation at community meetings for the new Molonglo Valley community; and pilot engagement activities at Mulligans Flat (see section 6.5.2).

There are seven suburbs of interest in the demographic analysis in Appendix 7. They combine to form three core areas adjacent to the case study settings (see Table 5.2).

Table 5.2 Suburbs for Demographic Analysis

Suburb	Area of Interest	Abbreviation	Established	Characteristics
Bonner	Bonner/Forde	B/F	2010 (dev)	Border Mulligans Flat Nature Reserve
Forde			2008 (dev)	
Chifley	Chifley/Pearce/Torrens	CPT	1966 (gazetted)	Border Mt. Taylor Nature Reserve
Pearce				
Torrens				
Coombs	Coombs/Wright	C/W	2010 (gazetted)	Border Stromlo Forest Park and Molonglo River Corridor
Wright				
Whole ACT				Main comparator

5.12.3 Insights from demographic analysis (Appendix 7) observation and other methods

A number of factors clearly differentiate the edge suburbs of interest in terms of their age structures, family and household compositions, household incomes and housing stock. The demographic data for Coombs and Wright showed younger, highly educated populations with many professionals, more employed people, full-time working families and people working long hours (especially in Wright). Around half of the housing stock in Wright is apartments.

Bonner and Forde were characterised by young families, with the highest proportion of people under 18 and also couple families in the ACT. Both suburbs had many full-time working families and people working long hours. Housing costs were high: Forde had fourth-highest owner-occupied housing cost in the ACT (monthly mortgage payments) and, along with Bonner, a very high proportion of large homes (more than four bedrooms). At the same time, Forde had very high household incomes.

The Census data reveals that a significant number of people settling in the new suburbs were born overseas and this in-migration was identified one of the key factors driving the ACT's population growth (Canberra Times 2018). The cultural diversity of the new suburbs was also observed by sales and community development staff of the Land Development Agency (LDA) and the LDA's Home Sustainability Advisor, who worked with people building homes in

Wright and Coombs. [110] Research on the housing preferences of Australian migrants showed that many favour the archetypal Australian housing product, preferring single detached dwellings over apartments (Levin 2015, 2012), which, in Canberra, are supplied in these edge suburbs. The high number of CALD residents is an important consideration for managers designing engagement programs for people who are less familiar with grassy woodlands and their wildlife and will need orientation-style information (in language) and structured activities.

The established suburbs of Chifley, Pearce and Torrens had more homogenous age structures: more people over 65 years, retirees and volunteers and less young families, reflecting the age of the suburbs. Working residents were highly educated and many worked long hours. There were less households likely to experience mortgage-related housing stress and rental costs were lower than in the new suburbs (although Chifley had the highest proportion of people of all suburbs that might experience rental housing stress). There is no obvious movement in the age data in the established suburbs.

The age and household structure of the local community is also important, as new residents may require orientation and retiree communities may potentially be able to take on more active volunteering and stewardship roles. Unsurprisingly, the number of people volunteering was higher in the established suburbs with more retired people. The combination of working families, long working hours and high housing costs suggests that many young people/families are time-poor and this trend will likely continue in those suburbs.

Altogether, these data show the capacity of people in these different edge suburbs to engage in social networks and contribute to building their local communities. Developers of the new suburbs of Forde and Bonner funded programs in both suburbs to boost community formation and seed community associations. Both observation of, and interaction with, the community association in Forde found them struggling to recruit enough active volunteers, with one committed young family in Forde doing the lion's share of the work running the organisation and arranging events. [111] Bonner had insufficient interest to establish a formal community

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[110] LDA Focus Group July 2012 and interview with the Home Sustainability Advisor 2015
[111] https://citynews.com.au/2018/forde-couple-our-best-neighbours/.

association [112] but has a Facebook page for communication between residents; through this social network, care-based activity is evolving with events held to clean up the suburb. [113]

A different proactive spirit evolved in the Molonglo Valley when some of the early residents of Wright and Coombs set up a community advisory group. [114] While this group works collaboratively with the developer-funded community development 'Mingle' program, it was the residents' initiative rather than an imposed structure. A series of community social groups (books, gardening, 'Young at heart') have been driven by residents' interests and willingness to organise themselves. A small renovated cottage on public land provides a base for activities and a number of community-wide events have been held to celebrate important cultural festivals and allow sharing of cultural experiences, including Diwali, Christmas Carols and Halloween. [115] This provides a good foundation for the future social evolution this community when the Mingle program is no longer funded. [116]

5.13 Conclusion

This chapter draws together the physical and social history of the primary research setting Canberra and the urban edge nature reserves selected for place-based case studies, as well as providing a summary of the demographic characteristics of neighbouring suburbs to build an understanding of the communities living adjacent to the case study reserves.

These communities range from newly forming (Forde and Bonner next to Mulligans Flat and Wright and Coombs adjoining the Molonglo River) to ageing and re-forming (the Woden Valley suburbs of Chifley, Pearce and Torrens adjoining Mt Taylor). These patterns are instructive for reserve manages and community organisations responsible for community outreach, education and interpretation activities.

The historical analysis reveals that Canberra is a dynamic cultural landscape shaped by Indigenous and rural management practices, urban settlement plans and changing community values about the grassy ecosystems. Each nature reserve in turn has its own unique ecology,

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[112] Personal communication Karen Jesson, Communities@Work, 17 November 2016.

[113] https://www.facebook.com/BonnerCommunity/.

[114] Molonglo residents Ben and Jess speaking at the Molonglo Valley Community Information Night, 17 November 2016, about how the new Molonglo Residents Group and seeking resident participation.

[115] https://www.facebook.com/groups/molonglovalley/.

[116] Mingle operate in the early years of suburban development; 3−4 years in other settings in Canberra.

management history and community associations, with the use of these information rich cases providing the opportunity for comparisons between them later in this thesis.

The analysis also reveals that planning decisions and land management practices of the past continue to have a profound impact on the ecological condition of many of Canberra's nature reserves. These legacies also influence how people relate to these nature reserves; their social infrastructure and value for biodiversity management (Research questions 1 and 3).

An understanding of the research setting and place context is important for readers leading into Chapters 6, 7 and 8, that explore the experience of people living near the case study nature reserves and the practitioners developing adjacent to and managing them.

Chapter 6: Case Study—Living with Nature

'as we produce nature, so do we produce social relations' (Katz & Kirby 1991, p 264)

Researcher's story and reflections—the experiential lens

I grew up next to the bush in suburban and beach settings and this lived experience has had a lifelong impact on my housing choices and desire for space. *Google Earth* Figures 6.1 and 6.2 are aerial views of my childhood homes. Since arriving in Canberra in 2000, I have lived in two nature reserve edge settings in older suburbs (developed in the late 1960s) with large blocks and suburban backyards and small cul-de-sacs that border the reserve. Living in one of these cul-de-sacs in Chifley (see *Google Earth* Figure 6.3) means I can walk 50 metres and be in the Mt Taylor nature reserve. This proximity, serendipitously, made it an ideal research setting for direct observation and this time-intensive task became feasible as a single researcher.
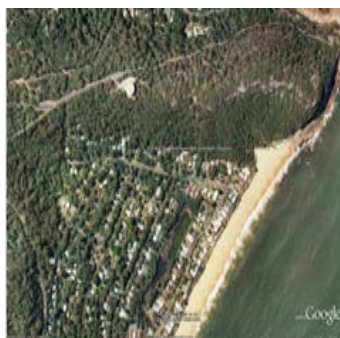
Figure 6.1 Sydney   **Figure 6.2 Pearl Beach**   **Figure 6.3 Chifley**

I have been an urban (environmental) care volunteer in different urban settings for over 20 years, including the Mt Taylor ParkCare group (since 2005), in which I was able to undertake participant observation. I also became part of the Chifley Community Fire Unit (CFU) in 2011 to participate in and observe their activities. I joined the inaugural Friends of Mulligans Flat group in 2011, and took on a more active role (from June 2013 to December 2015) as the group convenor. This allowed purposeful participation in and observation of this group and the opportunity to pilot community engagement activities with local people at Mulligans Flat.

The iterative nature of this research meant that I was able to use my early observational findings from Mt Taylor to pilot these activities with the Friends of Mulligans Flat, with the trust and support of members in the group, the Management committee and Sanctuary rangers.

6.1 Chapter Overview

This chapter is the first of three themed case studies; and explores the experience and relations of people 'living' near urban nature reserves, using case studies of Mt Taylor Nature Reserve, Mulligans Flat Woodland Sanctuary and a smaller case study about some of the first residents in the Molonglo Valley (Research question 1). This chapter builds on a peer-reviewed paper, *Harness the 'love'- using social connections to re-frame how we manage urban nature*

reserves, presented at the 8th State of Australian Cities Conference held in Adelaide on 28−30 November 2017 (Eyles 2017). Drawing on semi-structured interviews with neighbours and reserve users, direct observation of reserve users, ParkCare group participation and pilot engagement activities, the chapter presents insights into how people experience the nature reserve and their perspectives of its care and management. The chapter closes with insights and learnings about these social relations, drawing on concepts of place attachment with some comparisons between the reserves. The potential for these attachments to be built into the care and management of reserves is posited and will be explored in Chapter 9, along with strategies that could be used to facilitate childhood connection.

6.2 Research Setting and Context

The land use and social histories of nature reserves selected for these place-based case studies and their adjacent communities were described in detail in Chapter 5.

Mt Taylor Nature Reserve is an older nature reserve, part of the Designated 'hills and ridges' Areas of the NCOSS, and Canberra Nature Park. Mt Taylor has been used by local residents since the late-1960s and is surrounded by six suburbs and a major transport corridor, the Tuggeranong Parkway, on its western boundary and east-west connector road, Sulwood Drive, to the south and south-west (see Figure 5.8). The nature reserve encompasses 297 ha and provides habitat for two nationally threatened species, the Pink-tailed worm lizard (*Aprasia parapulchella)* and Small Purple-pea *(Swainsona recta).*

Mulligans Flat is a high-conservation-value nature reserve and the suburb of Forde adjoins its western boundary with parts of the suburbs of Bonner, Gungahlin and Amaroo within a short walk (see Figure 5.23). It covers 486 ha and protects nationally critically endangered box-gum grassy woodlands. A predator proof fence was constructed around the reserve in 2009 to enable the re-introduction of regional extinct animals as part the Mulligans Flat - Goorooyarroo long-term woodland research experiment that commenced in 2005. [117] Prior to residents moving into Forde from 2008, visitation to Mulligans Flat was mainly small groups, citizen scientists and individuals who enjoyed bird watching and the area's remoteness; it was rare to encounter another user (J. Bounds 2015, personal communication)

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[117] http://www.mfgowoodlandexperiment.org.au/aboutMFGO.html

The Molonglo River Reserve is a riparian corridor being restored post-fire in an urbanising landscape. It covers an area of 1,355 ha and extends 23 km along the River from Scrivener Dam to the Murrumbidgee River Corridor Reserve and protects nationally endangered grassy ecosystems and wildlife, including the Pink-tailed worm lizard (*Aprasia parapulchella)*. The upstream section is adjacent to the new suburb of Coombs and future suburbs and town centre (yet to be developed) (see Figure 5.60). Residents began moving into first suburb Wright, in 2013, but have only recently been able to access the river corridor. It was previously used by dog walkers and horse riders on trails as well as runners from the adjacent Stromlo Forest recreational area.

The Mt Taylor Nature Reserve is located in the geographic centre of Canberra. Mulligans Flat Nature Reserve is on the northern ACT−NSW border and the Molonglo River Nature Reserve is the central-western edge of the urban area of the ACT (see Figure 6.4).
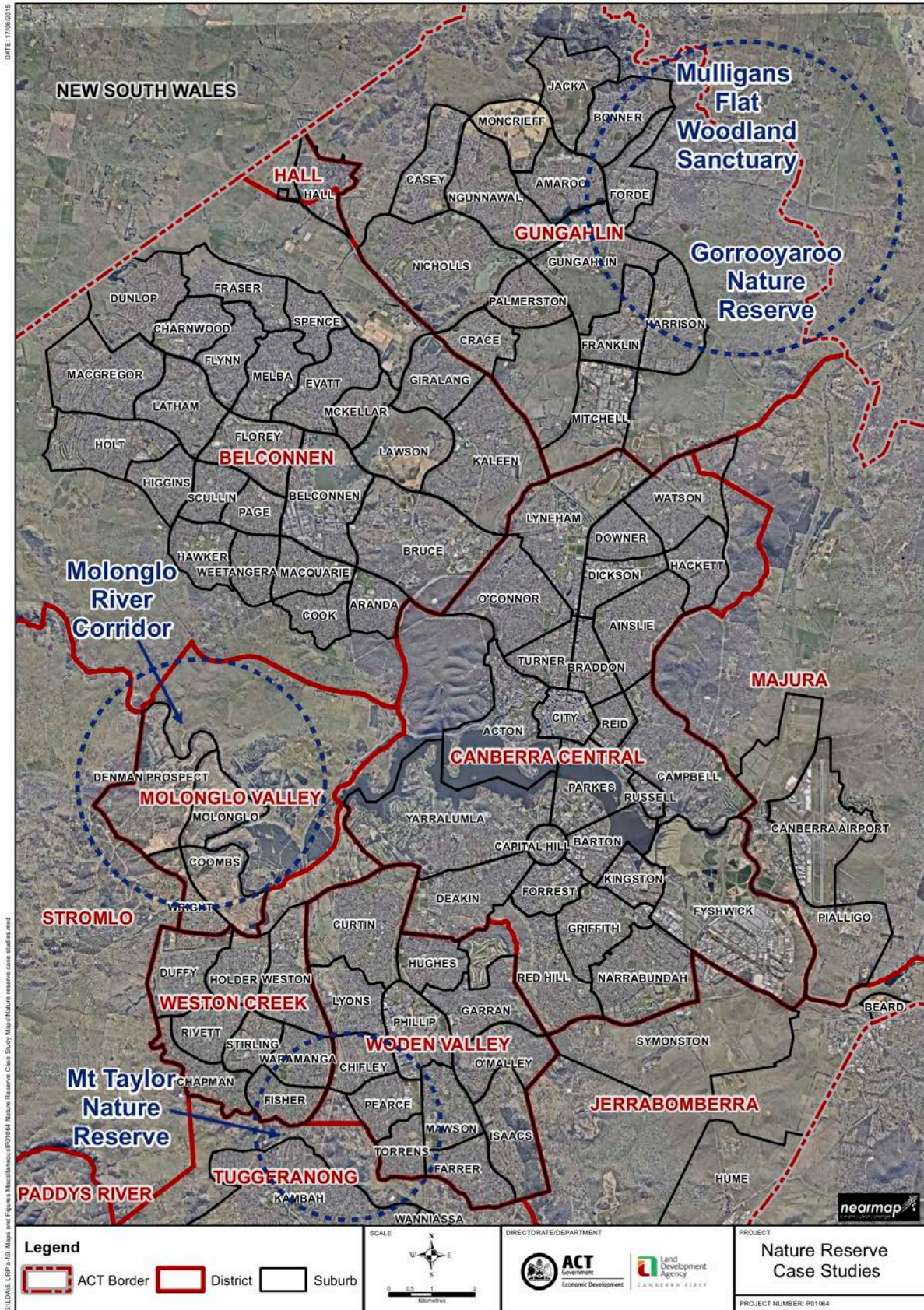
Figure 6.4 Case study settings in the ACT

Source: LDA

6.3 Research Approach and Methods

As outlined in Chapter 1, this research uses place-based case studies of urban nature reserves to explore how people use and experience them. Depending on the reserve setting, a suite of qualitative methods was used, including: direct observation, semi-structured interviews, participant observation and document analysis of reports and media.

On Mt Taylor, direct observation was used to understand the relationship between people and place. Observation is widely used to study interactions between public spaces and people in urban and built environment settings. Gehl and Svarre (2013: 3) noted: 'As a general rule, users are not actively involved in the sense of being questioned, rather they are observed, their activities and behaviour mapped to better understand the needs of users and how city spaces are used'. These on-the-ground impressions of users and daily activity reveal the 'authentic local context' and provide rich descriptions of the socio-temporal context (Wolfe 2017; Hay 2010). The direct observation practice used here involved walking in the nature reserve on different days, times and trails and across the seasons from 2011 to 2014. Observations included the types of users, their activities, dog-walking, signs of park maintenance and physical evidence of other behaviours. Where opportunities arose, casual everyday conversations took place with users, but without direct questioning. I was also part of monthly work parties held by the Mt Taylor ParkCare Group, observing their activities as well as the school community service events held with the group. By actively participating in these activities in the reserve, I built trust and familiarity with the group over the lengthy observation phase and undertook an iterative and grounded process of analysis (Patton 2015) to organise and categorise the data.

Semi-structured interviews were used to complement and build on the observational data. Interviews were conducted with residents and users, including Parkcare volunteers at Mt Taylor and Mulligans Flat, and new residents of the Molonglo Valley (Table 6.1).

Table 6.1 Informant Information

Case study site	Residents and users (RU)	ParkCare volunteers (PCV)	CFU volunteers (CFUV)
Mt Taylor	9	3	4
Mulligans Flat	9	3	N/A
Molonglo Valley	4	N/A	N/A
Total	**22**	**6**	**4**
Note: 'User' has been adopted to categorise informants. It is a commonly understood term in park management while recognising the limitations to describe the diversity of social relations.			

Interviews about Mt Taylor and Mulligans Flat explored how people experience and use the reserves and also their perceptions about impacts, care and management. The lines of questioning varied to reflect the different urban settings and management approaches at each reserve (Appendix 4).

The suburbs of Wright and Coombs in the Molonglo Valley were under construction when the research commenced and by 2013, new residents had started to move into Wright. Some of the prospective and early settlers were interviewed to discern their reasons for buying in this location. While capital works to rehabilitate the river corridor meant new residents had not had the chance to experience the nature reserve, their views were sought concerning future access and management of the river nature reserve (Section 6.6).

6.4 Case study Results—Mt Taylor Nature Reserve

Observations are a prime source of quantitative data in this case study, along with qualitative data from semi-structured interviews. A brief overview of some of the social dimensions of the Mt Taylor ParkCare group from participant observation is reported in Section 6.4.3, with volunteer motivations and agency relationships explored in detail in Chapter 8.

6.4.1 Direct Observation

Direct observation yielded a rich picture of Mt Taylor users. A total of 110 observations on weekdays and 100 on weekends, of an hour to an hour and half long, were recorded in a diary between 2011 and 2014. Activity types (walking, running, dog walking, mountain biking) and patterns (time of day, day of week, seasons), both diurnally and seasonally, were captured as well as some socio-demographic data like broad age and social groups (see Appendix 8).

6.4.1.1 Patterns of activity

Walking is the most popular activity in the reserve and accounted for more than 95% of user observations. A distinct seasonal pattern was observed with the warmer seasons attracting five times more users. The most popular day for walking is Sunday, both morning and afternoon, across the seasons (See Figures 6.5−6.7). Other activity peaks were the early evening during daylight-saving months, with a younger adult cohort observed. Public holidays and early in the New Year saw a threefold increase in users. School holidays caused a burst in family groups and even teenagers, although increases in vandalism were also observed in holiday periods.

Figure 6.5−6.7 Sunday morning(s) at the Mt Taylor summit

6.4.1.2 Walking practice

The diversity of people walking the mountain is extraordinary; from fit young and older people ascending to the summit (see Figures 6.8 and 6.9) to a retired couple who walk the lower fire trail and campaigned for over three years for a seat to rest and enjoy the view. Repeated sightings of the same people confirm the daily walk as a ritual for many—the so-called 'constitutional'—as are regular weekend walking groups.

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Figures 6.8. Sporty Hannah   **Figure 6.9 Groups of walkers at the summit**

There is a strong social component to walking practice. This includes groups of walkers, particularly women in pairs (see Figure 6.10), a female walking group called 'Team Bliss' in coordinated active wear who enjoy coffee together after the climb (Figure 6.11), a group of Woden-based public servants who walk together before work and social groups training for mountain hikes and overland treks in Australia and overseas. A group of regular early morning walkers, an older cohort, have formed close friendships and meet for an annual Christmas drinks event at the summit (see Figures 6.12 and 6.13; Warden 2014 and Box 6.2). In 2017 another group started up, the Mt Taylor Challenge 2017, a social media driven network where users join the group and post photos at the summit when they climb the mountain with the 'challenge' to climb every day. The members of this group are a bit more 'hard core' than the early-walkers, posting times and taking selfies doing chin-ups on the trig and also late at night. A few have an eye for nature, posting reptiles encountered along the trail and kangaroos and one posted wildflowers. They held their own early morning Xmas party in 2017, (see Figure 6.14). Posts on their Facebook page reveal a strong sense of camaraderie and peer support for new people undertaking the 'challenge'. [118]

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[118] See https://www.facebook.com/groups/340128089713445

Figure 6.10 Walking women (with fly swatters)

Figure 6.11 Team Bliss at the summit

Figure 6.12 Mt Taylor Early Morning Walkers Christmas party 2014

Photo: Ian Warden

Figure 6.13 Mt Taylor Early Morning Walkers Christmas party 2017

Figure 6.14 Mt Taylor Challengers Christmas party 2017

The promise of a great view across Canberra and to the Alpine mountain ranges in the west is an obvious motivator, with many people gathering around the summit signage to identify the northern hills, the lake and city and the mountain peaks. (see Figures 6.15−6.18). Regular walkers bring visitors to the summit to enjoy the view, which also provides overseas visitors the chance to see kangaroos.

Figures 6.15−6.18 Walkers enjoying the view from the summit of Mt Taylor

Approximately one in 10 people was observed walking with a dog, with two-thirds of dogs on a lead and one-third off-lead. There was no significant difference in lead compliance between weekdays and weekends. There were a handful of observations of off-leash dogs chasing kangaroos, which tended to ignore people and dogs on-lead along the trails (see Figure 6.19).

Figure 6.19 Dogs on leads and kangaroos next to the path

Photo; David Flannery

6.4.1.3 Children on the mountain

The most surprising observation was how few children use the reserve, either in the company of walking adults (4.2%) or on their own (1.7% of observed users). Most children observed in the reserve were with adults (see Figures 6.20−6.24); only a handful were observed on the mountain on their own, some on bikes and a few with other children.

Figures 6.20 and 6.21 Grandparents with grandchildren at the summit

Figures 6.22−6.24 Parents with their children at the summit

The other occasions where children were sighted were school visits by Marist College students undertaking community service activities (see Figure 6.25) and weekly physical education activities of the local public high school, where (mostly reluctant) students walked the lower trails (see Figure 6.26).The most unusual observation of young people using the reserve was four musicians in a band called 'Drift Ashore', who dragged their instruments up the hill to shoot a video. Unfortunately, they had insufficient battery power to film the video and so, took stills, which they happily shared (see Figure 6.27).

Figures 6.25 Marist Community Service students on Mt Taylor

Figure 6.26 Melrose High School students

Figures 6.27 Local band Drift Ashore in action

6.4.1.4 Park management observations

No compliance activity and very little on-ground land management by the Parks Agency was observed. Rangers were sighted on only three occasions (see Figure 6.28). A District ranger and the Parkcare ranger were present at community service events with Marist High School (see Figure 6.29). Emergency services search and rescue personnel were observed using the summit for training purposes on a few occasions.

Figures 6.28 and 6.29 Rangers on the beat and at Marist Community Service activity

6.4.1.5 Other user behaviours

Incidents of antisocial behaviour and vandalism in the reserve were recorded by observing the evidence left behind, including artefacts like camp fires (see Figures 6.30−6.31) and a diverse assortment of 'bongs' for smoking cannabis (see Figures 6.31−6.33). Car-based, risk-taking behaviours were observed from fresh skid marks and discarded motor oil bottles along access roads (see Figure 6.35). This activity was observed more often in school holiday periods, perhaps initiated by older teenagers.

Figures 6.30 and 6.31 Informal and formal camp fires on Mt Taylor

Figures 6.32−6.34 Evidence of parties on Mt Taylor: 'bongs'

Figure 6.35 Oil and skid marks on the reserve access road

Incidents of dumping of trade, garden and household waste as well as cars were observed along the access road and reserve edge (see Figures 6.36−6.39). Other activities like the construction of bike tracks (Figures 6.40−41) was observed closer to the urban edge.

Figures 6.36−6.39 Household, garden and trade dumping on Mt Taylor

Figures 6.40 and 6.41 Construction of bike tracks and jumps

Certain observations defied explanation, including the slicing of the steel supports of the trig at the summit with an angle grinder, and a car illegally driving to the summit via the graded fire trail and then down the main southern walking trail, where it rolled. There was also evidence of reptile theft, with large rocks overturned in the reserve (see Figures 6.42−6.44).

Figures 6.42−6.44 Rolled car on walking trail, the sawn-off trig and turned rocks

Other observed artefacts revealed personal bonds and special connections to place and included various memorials erected by loved ones and visited by relatives, with fresh flowers occasionally placed. While not strictly permitted in the reserve, there was no attempt to discourage the practice until a young ranger removed certain memorials (see Figures 6.45 and 6.46) after attempting to contact the families without success. The plaques in Figure 6.45 were restored to the same rock after the matter was raised on talk-back radio with the ACT Chief Minister and a native climber was planted to replace the other.

Figures 6.45 and 6.46 Memorials on Mt Taylor

6.4.1.6 Casual encounters with users during observation

A number of casual encounters and short conversations with users occurred during the observation fieldwork and when I attended the Early climbers Christmas drinks (see Figures 6.12 and 6.13) and worked with the Mt Taylor ParkCare group (6.4.3). Some comments made during these encounters provide useful insights into social life on the mountain (see Table 6.2).

Table 6.2 Conversations with walkers on Mt Taylor

'there's no problem in life that can't be resolved by a walk up the mountain'—female walker
'it gives me life'—85-year-old regular early morning walker
'I'm training to stay alive'—male mountain walker
'When you're up here (the summit) everything seems possible, down there it seems harder'—female mountain walker
'It's like peak hour on the Parkway today'—female walker on the number of walkers (January)
'I'm a watcher of everything – birds, reptiles, insects'—male walker with binoculars
'It's just enough for me…getting up here'—older male walker at top of a steep track at sunset
'We made it'—two young female walkers as they reach the top
'You're either gold digging, an axe murderer or geologist'—male walker about my mattock
'I haven't got a backyard so I need to get out'—young female walker living in an apartment
'I come up five days a week. I do the steep track next the Zig Zag I love it!'—CALD walker
'It's a free mountain I can walk wherever I like'—female walker to ParkCare group
'It's my outdoor gym'—male runner doing chin-ups using the trig structure at the summit

I regularly encountered 'Yanky John', the so-called 'Water Boy' because he carries two-litre bottles of water to the summit for the dogs. He is friendly and talkative; the mountain walk is an important part of his daily routine. He particularly likes to speak to female walkers and has left romantic messages for the 'mountain ladies' on Valentine's Day. After an accident on his bike, he left the water bottles at the bottom of the hill for others to carry to the top and after yet another fall, left another note to herald his return (see Figures 6.47−6.50). To acknowledge his connection with the mountain, a kindly walker placed a 'happy birthday' sign at the bottom of the eastern Zig-zag trail to wish Yanky all the best on his 60th birthday.

Figures 6.47−6.50 Messages from 'Yanky John'; magpies enjoying the dogs' water

Some encounters were particularly indicative of social relations on the mountain. I met Lesley Moran the organiser of the Early Climbers Christmas Drinks every year and she agreed to be an informant for the research (see Section 6.4.2.4). I regularly encountered a local resident, who is a long-term steward, collecting litter left on the mountain (averaging 120 kg per year over two decades), using a pair of small silicone tongs to retrieve tissues and the like. He related how he became tired of picking up tissues one winter and wrote a humorous limerick and stuck it on the gates to draw attention to the tissues. It had a remarkable effect and tissue litter decreased. His litter picking had also been challenged by another user who asked, 'who gave him permission to do that?'.

6.4.2 Semi-structured interviews

To build on the observational data, semi-structured interviews were held with 12 local residents and reserve users at Mt Taylor, including three ParkCare and four urban fire volunteers (see Table 6.1). Thematic analysis of the interview data was used to distil people's experiences of Mt Taylor and perspectives of its care and management and quotes are used in tables to illustrate the common and differing perspectives of neighbours and users.

6.4.2.1 Theme 1: Multiple place meanings and experience

The nature reserve plays an important role in people's lives, providing amenity and views for neighbours, convenient backdoor access for walking, opportunities for nature-therapy through regular exercise, wildlife for viewing and an environment for making new discoveries (for one volunteer in particular). The mountain is embedded in people's living environment and is not considered a separate space. Most people could nominate a favourite walk or place in the reserve (see Table 6.3).

Table 6.3 Residents' and users' perspectives of living near, and using Mt Taylor

On living near Mt Taylor
'I like that there's greenery outside my house. I see bush and mountains, it's very distinctive about Canberra, green that meets the eye. That has a major psychological impact on me'.
'I bought here because it was right next to Mt Taylor It's got a beautiful view, that whole concept of having a city in a national park appeals to me enormously'.
'It might sound passive, but just sitting on the veranda and watching what transpires in front of you, a whole mob of roos go up the hill or, roo in your yard, just being able to see it is important'.
'We get the greatest pleasure out of the bird life that comes in and also the kangaroos. So, for us, to have no houses there, is the nicest thing and we feel very blessed to have bush around our house'.

On favourite walks, places and activities
'Mt Taylor for me is a place of quiet calmness. There's a little outcrop I stand there and breathe in deeply. It's very important to me, the mountain, to walk every morning and see friends up there'.
'I have two nice walks that get me away from the main track to where the foreground feels natural and undisturbed and with fantastic views of the Brindabellas'.
'There's plenty of hidden areas, 90% of people walk the main trails and nobody knows those beautiful things. I never cease to find things when I'm observing what's around'.
'I particularly like the 4WD path along the east side of Mt Taylor. There's some nice trees—it has dappled light—and the north side has a beautiful view, but really the whole thing is pretty special'.
'We love it—the kids say can we go to top of Mt Taylor and make half day of it with a picnic. They really enjoy climbing rocky outcrops and seeing lizards and what's around the next little knoll'.
'My favourite spot is on the little rise halfway up the mountain, looking out over, all the way over Woden Valley to Civic and I think that's a gorgeous spot…The views from the top of Mount Taylor itself are spectacular and I love those but I guess that spot and walking there in the mornings'.
'Halfway up the walking track from Mannheim Street, in that area where there's all the wallaby grass and I love that there. Yeah, it's really nice where that seat is'.

6.4.2.2 Theme 2: Multi-dimensional local knowledge

Informants had only patchy knowledge about the conservation values of Mt Taylor, though ParkCare volunteers were more aware of the ecology. However, most people could describe what factors might be indicators of the condition or health of the reserve (see Table 6.4) and also things that could harm the values of the reserve (see Table 6.5).

Table 6.4 Residents' and users' perspectives of condition and values of Mt Taylor

'I don't know a lot about Mount Taylor, but I do know that when I was working in health (Woden) in the 1980s, Mount Taylor never had a tree on it ... because every now and then, somebody ... would get some foam or something and write huge messages on the side of the hill. It was just a facetious remark,. And then, the trees started to appear. I think the sheep were taken off it'.
'I think biodiversity has improved but I think it can go a lot further but needs help with re-planting of appropriate species, weed management and kangaroo management'.
'So, an indication to me of the health of the reserve is litter and vandalism they seem to go hand in hand. You start to have a shabby-looking infrastructure as in eroded trails and poor facilities and graffiti, then you start to find more vandalism and more litter and more illegal behaviour'.
'Generally, those areas where the wildflowers are being magnificent. I think it's pretty good actually, except for overuse and also the large number of kangaroos and what the roos are doing, making a lot of extra tracks and dust bowls and things'.
'It looks pretty trashed to me. I mean both aesthetically in terms of the powerlines and also what I can see in terms of vegetation change but I suppose my expectation of (urban) nature parks is not necessarily that the ecological integrity is going to be the same as Namadgi [national park] or somewhere like that...it serves a purpose for green space, in terms of exercise and all the rest'.
'I guess just seeing the variety of plants growing. I mean, Taylor is just one of those places that burns out every so often, and it was devastating after the 2003 fires, but now I realise, it's just part of a cycle. It's really interesting to see how its grown back, the density and variety of vegetation'
'I'm aware of a little bit from some of the interpretive material that the parks people have put up. So that's given me a bit of an understanding of some of the species that are natural to the area, both plants and animals. And I'm generally aware that it's a remnant site for grassy woodland type environment and that it has some of those values'.
'I don't think I know much at all about Mount Taylor to tell you the honest truth. I guess I could look at those signs up there to see but I haven't really read those signs'.
'Mount Taylor is very short of trees by comparison with what I've experienced in the Australian bush. And I don't know if that's natural or unnatural'.

Informants identified the heavy recreational use of the nature reserve and lack of maintenance as harmful, with poor design and condition of tracks also contributing to this harm. One user, also a volunteer, identified weeds and kangaroo mobs as harmful (see Table 6.5).

Table 6.5 Residents and users on what might harm the reserve

'I think people who don't respect the mountain leave a lot of rubbish. I hate that'.
'I mean it's good seeing everybody using it, but it makes it deteriorate much faster'.
'Look from what I've seen up there—I see people wander off heading into the gullies, not just on the main tracks, tracks everywhere and getting more eroded'.
'Overuse that's number one, because it's being literally loved to death and the lack of track maintenance'.
'I think allowing people unfettered access, like, the tracks up there are a mess and the new track on this side was poorly designed and encourages people to cut corners'.
'Once you never saw a rabbit and then you'd start seeing one or two, then you start seeing five or six. That's a shame'.
'I think weed and kangaroo management. It concerns me that kangaroos breed up, because I haven't seen a lot [of] that species of orchid up on Mt Taylor and wonder whether the kangaroos are eating them out'.

Informants also identified the lack of compliance and the absence of rangers as their major concerns. This agency shortfall was viewed as undermining the existing ParkCare partnership and exacerbating existing problems. Both the volunteers themselves and other reserve users felt that too much is being expected of the ParkCare volunteers (see Table 6.6).

Table 6.6 Residents' and users' concerns for the reserve

Concern	Description
Dumping	*'I see lots of rubbish and leftover materials. A clean-up would improve the look, hopefully dissuade others from dumping and to take an interest in the reserve'.*
Agency neglect	*'To me until Parks have a presence, I can't see anyway of ending vandalism. You can't leave it up to the volunteers; if you take a photo of someone doing something illegal, you are likely to get hurt depending on what they are doing'.*
	'The thing that worries me is the benign neglect by Parks. They don't have the money, but then some things they do are not very useful: they put signs up which people ignore, and you end up with all this stuff that's never taken down'.
	'I have only once seen a ranger, yeah, a long, long time ago'.
	'I've probably been on Mt Taylor more than 150 times and never seen a ranger'.
	'One of the major problems is the complete under resourcing of Parks, they can't do what should be done—they know it— one can't help but sympathise'.
Vandalism	*'There have always been problems with Mt Taylor reserve; there's so much damage done, you know, cars burnt out. But there is a short-sightedness in the ACT government that will not close off the access road at night because they say "Well, somebody has to unlock and lock the gate every day" '.*

Support for ParkCare	*'I think a lot is being imposed on ParkCare. The government's not bad at writing plans. It's implementing them that's an issue. Nothing ever happens!'*
	'It appears that ParkCare gets very little support. That's a pity because these things feed off each other; if you've got support and money that builds the group up. Our contact changes frequently and we haven't seen a ranger for years'.
	'[track] maintenance is bigger than we [ParkCare] can cope with. Nobody has done any maintenance on tracks for at least two or three years…it's the one that drives me mad; it's the lack of maintenance for Taylor'.

6.4.2.3 Theme 3: Seeds of local stewardship

The perspectives revealed under Theme 2 demonstrate that users have a solid grasp of management issues and mixed feelings about the absence of (agency) management authority. Beyond ParkCare activities, some 'lone' stewards operate outside a formal group setting but perform management tasks like litter collection (See Section 6.4.1.5). The concept of shared responsibility for management and the need for closer partnerships between community and government was articulated by nearly all informants. Most felt that the government should be responsible for the large-scale maintenance, compliance and overall security (see Table 6.7).

Table 6.7 Residents' and users' perspectives of management responsibility

'Look, I think there's roles for different groups. The major roles—to take away dumped car bodies—obviously lies with ACT Government and maintaining safety and security of the infrastructure, I don't think it's right to expect the community to maintain paths. Weeding and re-vegetation—there's a role for community as long as the material is provided for them'.
'It comes back to Parks and Conservation. They have to have overall control of it'.
'The government should have an overall managerial (role) but I hope that people who live near the edges would volunteer and be willing to help. But, it has to be both ways'.
'It does need to be under a structure that is going to protect it, and government is the way to do that. But with Mount Taylor, they're never going to have enough money. So, they do rely on volunteers, and it's really a perfect mesh—the care and eyes on the landscape, done by volunteers and agency people when specific things need to be done and tap into resources'.
'Oh it's a public asset so it's a government responsibility. I think that the community custodianship and ownership being formalised through a ParkCare Group is really important. And I think the ParkCare model does so much that people don't even realise it's happening'.

6.4.2.4 Theme 4: Value of place-based social relations and networks

Encounters and interaction with early morning walkers during the Observation phase (see Section 6.4.1.6 and Figures 6.12 and 6.13) and the social network that ensued was of particular interest in this experiential research. Lesley Moran, who organises the annual Christmas drinks, agreed to be an informant for the research and consented to attribution of her recollections about the formation of this group. Lesley walks every Monday to Friday, all year round at 5 am. She attributes her good health to walking and the friends she has made, as well as the mental stillness she enjoys on the mountain first thing in the morning (see Warden 2014).

Lesley spoke about how the Early Climbers Christmas drinks originated with her and another small group of three early walkers who got together in 2008. The next year she put a sign up to attract the attention of other morning walkers (see Figure 6.51). Over time this event has grown to over 50 people meeting up on the mountain for drinks before Christmas. A key indication of its significant social value was the one year when she didn't put the signs up. People asked her 'where are the signs?' and she realised then, 'there were a lot of people who enjoyed it'. Lesley has found that 'if you stay home you don't talk to anyone. If you go up there, there's always someone to have a chat to. A lot of people up there tend to be people who are on their own and yeah, so I think that regular meeting of people, slowly get to know them, is what is most important'.

Lesley's story has strong resonance, given societal concerns about health and well-being and countering social isolation and loneliness in urban settings (Magen 2018). The story shows how Mt Taylor provides a 'third place': a 'public space that provided informal opportunities for local people to mix socially on neutral ground', which helps to reduce urban loneliness 'by creating or enhancing a sense of community' (Matthews and Dolley 2018).

Figure 6.51 Lesley's sign for Early Climbers Drinks 2016

6.4.3 Participant observation: Mt Taylor ParkCare group

I attended 28 work meets on weekends and various other activities that involved the ParkCare group, including the Marist High School community service events (see Figures 6.25 and 6.29). The ParkCare group comprises 12 regular members [119] and a long-term coordinator who has managed the group since it started in 1989. A further 60 people (including Parks staff) are on the group email list. All regular members are local residents from the suburbs adjoining the mountain: Chifley, Torrens, Pearce and Kambah.

My observations mirrored the perspective of some informants (see Table 6.6) that much is expected of the ParkCare group in the absence of active agency management of the reserve and the communication challenges caused by turnover in the Parks personnel. I observed that the skills, knowledge and commitment of the long-term coordinator inspire loyalty from members, suggesting that this role is pivotal in the 'feel' of the group and member retention. Most members are happy to arrive and do whatever is required; they like how the coordinator runs the group. Every meeting ends with morning/afternoon tea and good conversations. The group resisted becoming incorporated, which would create particular obligations and additional administration. The incorporated Southern ACT Catchment Group (SACTCG) provides support for the Parkcare group to apply for, and administer, grants, taps the group into a wider community network and undertakes advocacy. For example, the SACTCG obtained environment grant funding to help manage threatened species habitat in 2019, and heritage funding in 2016 to run cultural heritage walks, including a walk on Mt Taylor in partnership with the ParkCare group, led by Ngunawal elder Wally Bell and his brother Tyronne Bell (see Figure 6.52). This walk provided the foundation for an ongoing relationship between the ParkCare group and the traditional custodians to identify and maintain the cultural heritage sites on Mt Taylor.

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[119] Regulars were defined as people who attend two or more meetings per year and over the period of observation.

Figure 6.52 Ngunawal Elder Wally Bell on Mt Taylor

When the group engaged in citizen science activities, particularly the Reptile Survey with Dr Will Osborne in 2011, there was significant additional engagement and regular members' families assisted with the survey. The Reptile Survey was a positive experience for the group because Dr Osborne was enthusiastic in sharing his knowledge and working with the volunteers to undertake the fieldwork (see Box 6.2). Finding evidence of the cryptic pink-tailed worm lizard provoked much excitement, as did learning about the variety of reptiles using the rocky habitat on Mt Taylor. This learning enabled the group to focus more activities on the care and maintenance of the habitat for the vulnerable pink-tailed worm lizard and secure grant funding to help them manage and monitor the habitat.

Box 6.2 Backyard Naturalists—Citizen Science in Action

Over spring 2011, my local ParkCare group assisted Dr Will Osborne to survey the Mt Taylor Nature Reserve for the nationally vulnerable Pink-tailed worm lizard (*Aprasia parapulchella*). When Will surveyed Mt Taylor 20 years ago, it had one of the highest recorded densities in the ACT of this cryptic species—unique for a reserve surrounded by suburbia. Will is an enthusiastic field scientist who enjoys working with volunteers (and has long been involved as a trainer and participant in ACT Frogwatch). Thus far, with Will's guidance, the group has learned what reptile species are likely to be found on the mountain and surveyed approximately 10 sites for *Aprasia*, adding to those surveyed by Will and his students from the University of Canberra. The Group's contribution includes a 'before and after' survey of *Aprasia* habitat on Mt Taylor subject to a fuel hazard reduction burn in 2011.

While surveying for *Aprasia*, the group recorded observations of other reptiles, including many sightings of the striped skink (*Ctenotus robustus*) and Boulenger's skink (*Morethia boulengeri*). A lucky few were fortunate to witness a remarkable display of two male eastern brown snakes (*Pseudonaja textilis*) entwined in combat, a truly amazing sight (Figure 6.53).

The survey revealed that the key to involving local people in scientific surveys lies with the researcher be willing to thoughtfully educate, train and work alongside the volunteers (Figure 6.54). By valuing the capacities of local people and enhancing their ecological literacy, this a process of shared learning and discovery, not just a data gathering exercise. Our new knowledge about reptiles can help inform management of the important rocky grassy habitat on Mt Taylor that supports the worm lizard and other species (Figure 6.55). As a small group, we can assist by restoring disturbed habitat and removing weeds. The larger tasks of managing recreational impacts (many informal tracks traverse the rocky slopes) and stopping reptile theft requires the resources and intervention of the Parks and Conservation Service.

The reptile survey was a small step in a longer term project to draw together knowledge about the incredible diversity of the Mt Taylor nature reserve, ideally with practical help from experts like Will. ParkCare members' have prepared botanical and bird lists for the reserve and are keen to learn about many other species, especially small mammals, insects and arachnids. We hope the knowledge we gather will evolve into a field guide or similar so the many visitors to the reserve can learn about its hidden natural treasures.

Figures 6.53−6.55 Brown snakes, Dr Will Osborne working with Mt Taylor Park carers and a Pink-tailed worm lizard

Source: reproduced from https://clearasblog.wordpress.com/2011/10/31/backyard-naturalists/.

6.4.4 Intersections between interview, observational and other data on Mt Taylor

In addition to generating insights about personal experience and user perspectives of management on Mt Taylor, the interview data also complemented many of my direct observations (see Table 6.8) about walking and trek training, seasonal variation in usage and certain demographics (see Appendix 8).

Table 6.8 Residents' and Users' Views That Align With Direct Observations

'You've got the more elderly lot in the morning'.
'I've come across quite a few people and they're carrying packs and you say, "Where are you training for?" and it's nearly always the two Ks- Kilimanjaro or Kokoda'.
'I don't think parents these days let their kids go up there on their own. I think those days are gone'.
'A lot of people use it, and especially go up there for the view...and you see a lot more in the summer months, definitely'.
'People that go up there for the view, take a picture, There's a lot of that'.
'Most people—they haven't got much time—they go up the top and come straight back and if you see them they'll say "Hi" but they continue walking. I think it's just a good exercise place quite frankly'.
'It has been co-opted for fitness and is used a lot by people training for Kokoda. Mmm, I love that and I stop and they love telling you what they're training for. Cradle Mountain's the other big one'.
'You know, I would think 99 per cent of the people walking up there are return visits'.
'The older kids don't want to go on walks up the mountain; they are too interested in computer games. I encourage our youngest, who is seven, to walk with me to points of interest'.
'You don't see a great many kids—they are up there and building cubbies a few of them and rangers have just removed them'.

Case study observational data and Parks trail data

In 2017, the ACT Parks Service installed track counters on the main walking trail to the summit from the southern side and the zig-zag track up the east face. The pass counts show that in the peak month of January, around 12,000 people used these tracks and there was steady use all year (see Figure 6.56). The count did not capture people ascending from the fire trail on the northern side from the car park and using other tracks. While the data is not directly comparable to my direct observation data because different methods were used to collect the user data, it does support observation findings that the most popular month for walking is January and that there is a slight peak in autumn and September at start of spring.
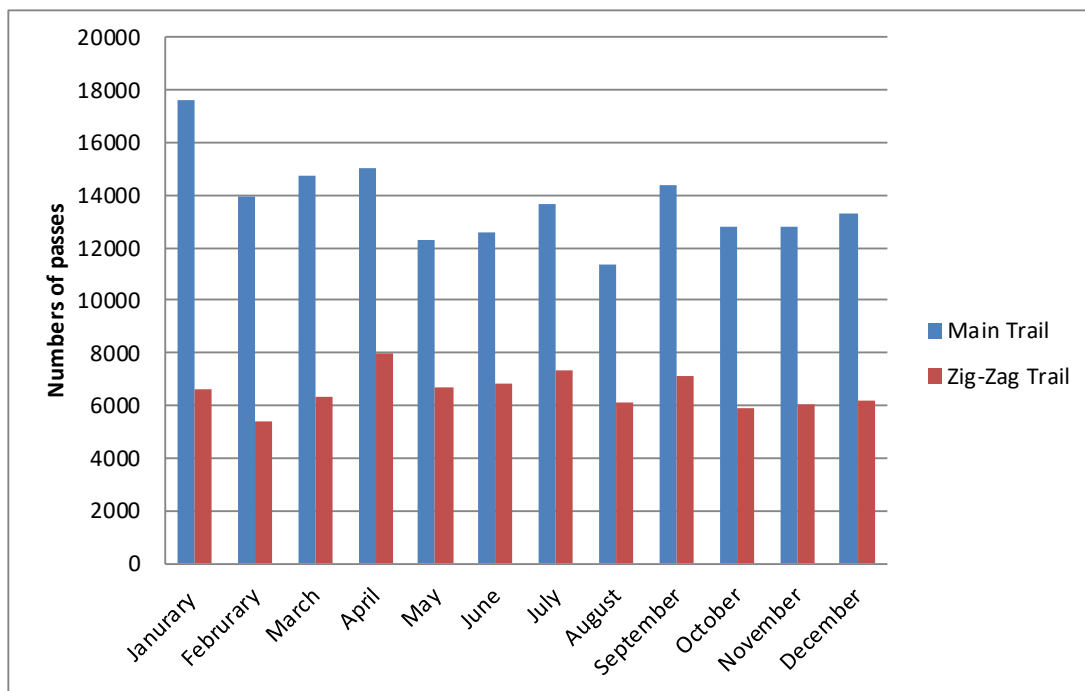
Figure 6.56 Trail counts for the southern and zig-zag trails

Note: Users who ascended and descend on the same trail were counted twice.
Source: ACT Parks and Conservation Service.

6.5 Case Study Results—Mulligans Flat

6.5.1 Semi-structured interviews

Semi-structured interviews were held with 10 local residents and reserve users at Mulligans Flat, including three ParkCare volunteers in the Friends of Mulligans Flat. The social setting at Mulligans Flat is different from that of Mt Taylor. The reserve is bounded by a new urban community to the west and broad-acre rural neighbours to the south in the ACT and to the north and east in NSW. Reserve-specific interview questions were pursued (Appendix 4) to reflect the urbanising setting and the predator-proof fence and scientific research underway in the reserve (see Chapter 5) as well as residents' experiences of the reserve, awareness about values and the science, and their views about management. Thematic analysis of the interview data was used to distil people's experiences of the sanctuary and their perspectives of its care and management.

6.5.1.1 Theme 1: Multiple motivations for living at the edge

Given that the residents were all new settlers, they were asked whether their housing purchase decision was influenced by being near the reserve. The natural setting and proximity to the

reserve were heavily promoted in the marketing of Forde and informants from Forde confirmed this had influenced their decisions to buy in Forde (see Table 6.9). They were particularly pleased that the suburb is surrounded by the reserve and will never be built out. Land and housing costs were also important for some residents who initially considered Forde but settled in nearby Bonner because land was more affordable there. This generally fits with the observations of practitioners (see Section 7.4.8; Table 7.9) that the landscape setting and amenity at Forde was important for some. For others, particularly younger family households, cost was the critical factor that led them to Bonner.

Table 6.9 Resident's Views on Buying Property Near The Reserve

'We liked the idea that Forde would never grow into this huge suburb, that it's quiet, it's peaceful and we'd be surrounded by the reserve'.
'Quite frankly, at that time, we just thought "oh if it's a reserve, they're not going to build on it" '.
'We liked the suburb of Forde, and what the plans were and I think basically, the reason we got here was because of the (reserve) outlook'.
'Bonner right next to Forde is $30,000 cheaper, so with the size of the house we wanted to build, that's what it came down to. And we liked that in Bonner and Forde, cats don't roam around'.
'We thought it was going to be a nicer suburb [Forde] and it wasn't going to be a huge suburb, and we were right beside the reserve'.
'[My husband] doesn't like feeling hemmed in. He just likes that little bit of space around so I think that's why we chose this home…we found out we wouldn't be built out so we have that view. I think it was one of the main things once we realized the [reserve] was over there'.
'My husband, he wanted a new home, and this [Bonner] was a very new suburb. Forde was up and running, so we looked at Forde but it was a lot more expensive, So that's why we decided on here'.
'Forde is our forever home, close to the reserve and so many parks, with everything in this home designed with getting older in mind so it's a single storey, flat block and no steps, and every evening, there's only once we haven't had a sunset'.

6.5.1.2 Theme 2: Evolving sense of place—favourite walks and places

All informants had visited the sanctuary but frequency of use was affected by proximity (those who lived closer visited more often), age and dog ownership (see Table 6.10). Residents who used the sanctuary were asked to nominate a favourite walk or place in the reserve. A number of informants used the urban open spaces and walking trail network in and around Forde (including the Bonner residents) for their regular daily walks because they had dogs and because of the even surfaces. One resident (a grandparent) used the playgrounds in Forde closer to home that had play equipment suitable for the small grandchildren and mentioned the nearby

urban ponds. These findings accord with an online survey of 117 people carried out for the Woodlands and Wetlands Trust in 2016 that found walking was the most popular activity, with wildlife viewing also highly rated (TRC 2016).

Table 6.10 Residents' Favourite Walks and Places

'We walk more in spring, summer and autumn and probably once a fortnight in winter but definitely more in nicer weather and in the evening when lighter, we walk after dinner. And I take visitors up to the Woolshed, even if they're not big walkers, I say there's a short walk we can do'.
'But I love the dam. To me the prettiest bit is the dam and the walk around the edge and my walks are nearly always along there because there's really good walking paths along the edge'.
'I guess my favourite walk is Little Mulligans Flat; on the high ridge where you get those views'.
'I'd probably be out there once a fortnight just walk—doing a morning walk around the back water of the large dam. Really nice down there. And just leading back into the grassy plains area. But really the whole area I think is really good—the Quartz Ridge is so interesting'.
'We try and get there at least a couple of times a month. Sometimes if we've got a day off [my husband] and I'll take the bikes through just the two of us which is Heaven. But with the kids…we go for a walk or a ride. Most weekends and a couple of times a month it'd be through there'.
'Realistically, probably once every couple of weeks, we'll go in. I'll take the boys, sometimes on their bikes up to the woolshed. They like to explore around there, look for the lizards and we ride back. That's probably about the extent, for [my son], his limit of riding at the moment is to there'.
'As you're going in the main path, there's sort of a left-hand turn before you get to the gates. And it goes up and down this little gully and it's at the back there—you can sort of look over the top. It's just beautiful up there, a couple of beautiful views over Bonner. Yeah, that's my favourite e so far'.

6.5.1.3 Theme 3: Perceived risks of using the sanctuary

When asked whether they had any concerns about using the sanctuary, nearly all informants nominated snakes, but with opposing perspectives: some were not worried, while others were concerned. This almost singular response suggests a need for community education so that people are not discouraged from using the sanctuary and know how to behave if they encounter a snake (see Table 6.11). One informant acknowledged that the sanctuary's wide paths provide good sight-lines for walkers and keeps people to the main tracks.

Table 6.11 Residents' Concerns About Using the Reserve

'No, not really, but I'm a bit wary sometimes of the big, big kangaroos. I mean I love kangaroos but I do keep my distance'.
'I'm not perturbed by snakes; I've seen one snake in 13 years, and that was after heavy rain and it was down on the path near the dam. Yeah, no, there's nothing that worries me'.
'Nothing worries me in there. If you get bitten by a snake you've got first aid kits'.
'Oh, obviously looking out for snakes. That's it. Just keeping an eye out, that's the only thing'.
'I'm a bit…wary of snakes and I won't go off the track in summer, but they're so wide [the tracks] and I reckon the snakes probably are just as—more—scared of me. I mean I'm not intending on antagonising one, but you never know, you could accidentally tread on one'.
'Yes, snakes. I'm paranoid. I grew up in [a place] where snakes are nasty, alright; they chase you. Yeah, that's always in my head'.

6.5.1.4 Theme 4: Optics and support for conservation and science

Given the conservation research focus and predator-proof-fence at Mulligans Flat, residents were asked about living near the sanctuary, the conservation program and the fence. Forde had only a small population when the predator-proof fence was constructed in 2009. Fencing of the reserve was not foremost in the minds of the new community and for many, appears to have reinforced the 'specialness' of the place and the joy of wildlife encounters (see Table 6.12). There was one reservation about the effect on the wildlife of being beside suburbia and one observation about what this means for park users who might expect to recreate in the reserve.

Table 6.12 Residents' Feelings About a Sanctuary in the Suburbs and the Fence

'It's wonderful having Mulligan's on the back door; but I wonder about an ongoing effect on the habitat and the animals, great for humans, not so sure a good effect on the animals'.
'It's changed the sense of the place dramatically for me…the feel is very much about the science and the experiment and I fully accept that, but that may be different for other people because recreation, I think necessarily, is a secondary consideration'.
'I think it's good. I'm all for it. And following that [vandalism of the fence], I do actually keep an eye out. I don't mind being an extra set of eyes and ears seeing what's going on across there now'.
'But I love the fact that every time we go through [the fence], except for the last two walks for some reason, we have seen one or more echidnas on the way through. That to me is amazing'.
'I don't think I was aware of it, that it was being built. I think it's a great idea and particularly now with the suburbs so close in. It's not there to keep humans out'.
'I think it's a good thing if it can keep out predators'.

Residents were asked about the values of Mulligans Flat and their knowledge of happenings behind the fence as part of the woodland research experiment. Most knew a little about the values, were aware of the science but offered very few specific details (see Table 6.13). Forde residents had also received in their Welcome pack, a copy of *Gungahlin's Treasures,* a booklet about natural and cultural values including at Mulligans Flat (CCACTR and CAS 2009). Residents could not recall receiving this booklet, suggesting that such information might be better distributed at park orientation and purpose-designed events after home purchase.

Table 6.13 Residents' awareness about values of Mulligans Flat and the Experiment

'It was to protect one of the last remaining strains of yellow box and red gum…in this region, possibly south-east Australia?'.
'For me, I can just get in there and it's a bit of escapism. I'm just enjoying it but I know there's a lot more going on'.
'Well, I know there's lots of scientific projects running, trying to protect the box gum and to preserve the ecosystem too, introducing the little bettong, and, is it 11-kilometre feral proof fence. I don't know fully what they're doing'.
'Well I know there's a lot of research going on there. I've noticed the nest boxes; I can see they're trying to preserve that area, that's about as much as I know'.
'Well, because of the yellow box planting, the woodland…It's a sanctuary for native wildlife and the re-introduction of the bettongs'.
"The revegetation and the logs that they brought back in, and that kind of thing. I'm just absorbing as I go rather than making a particular study of it. I wouldn't say I've got an in-depth knowledge of things'.
'I guess one of the things, as a layperson, I know there are research plots in there, but it would be really nice to know the purpose behind some of them'.

6.5.1.5 Theme 5: Opaque management

At the time of interviews, it was clear that very few local people were aware of the partnership between the Parks and Conservation Service (PCS) and the Wetland and Woodlands Trust (WWT) to collaboratively manage the sanctuary. This is principally because residents and users regularly encountered the government's PCS ranger team working in the reserve. There were no paid Trust staff at that time. The employment of a Trust Ecologist and guiding staff, and establishment of the Trust office at Forde in 2016 have likely increased awareness, although the nuances around co-management would be lost on most people when they regularly see the Park rangers in the reserve. Most informants felt that the government should be responsible for funding and the major management tasks but also identified roles for

community involvement (fundraising, events, monitoring and projects) to build local ownership (see Table 6.14).

Table 6.14 Residents' awareness of Management Model and Responsibility

'I would think the government…I'm not sure about the community. Education probably, would help. The reason I say government is for funding, so that would be the best way of funding it, so whether or not, if they're not going to fund all of it, communities helping with funds and organising events and things like that…Not sure though'.
'Well, the community in a sense because it's ours, isn't it? It's our resource. And I think if people are more aware of what's in there and just being careful, not dropping litter and, you know, not having the feral animals in there too. And I suppose, well the government, but I think the community at large should have a responsibility'.
'Look, I would say it would be the ACT Government so probably the community as well. There is one group and I've forgotten the name of it. We just talked about it before, the Friends of…'.
'I know that the rangers are in there and the work they're doing, the way things are sectioned off and managed off for various projects and things. As far as managing the resourcing and that kind of thing, the only real funders capable of that is on governmental level, but I would see it as a partnership between the state and federal; perhaps both states seeing as it does border onto NSW'.
'I know the rangers are in there pretty much 24/7. I do hear the gunshots go off occasionally. Yeah, the rabbits or whatever, the foxes, I see them going around in the spotlights, obviously reducing the kangaroo population occasionally'.
'Well, I know there's lots of rangers going through. I see the rangers regularly, the Parks and City Services, they've just finished the kangaroo cull'.
'You can involve community bodies as far as assisting and keeping an eye out for damage or for helping out with projects or for that kind of thing. But when you're talking about physically managing it I think it has to come from a government level. You just don't have the funding otherwise'.
'I suppose ultimately it should come down to the ACT Government, comes back to …the rangers. That do the bulk of the work and stuff like that. And then the Friends of Mulligans Flat which is part of the whole Landcare Canberra. I know it's got a sort of board but I'm not sure of the actual links with the government or whether it's an independent organisation'.

6.5.2 Participant observation and pilot activities: Friends of Mulligans Flat

I joined the Mulligans Friends Group upon its formation in late-2011 and from June 2013 to December 2015, I took on a more active role as the convenor. A key part of this role was to build the relationship with the PCS Rangers based at Mulligans Flat and co-convene the quarterly work parties for traditional on-ground care activities like litter collection, erosion control and weeding. The Senior Ranger had also established an 'Adopt a Patch' activity in

2012, which allowed individuals in the Friends to work anytime and run a specific management area in the sanctuary, mainly weeding and rabbit burrow identification.

As convenor, I also participated in and presented a report from the Friends to monthly Mulligans Flat Management committee meetings, produced event flyers and other promotional articles and posted content on the Facebook page (see a sample of Friends reports and event flyers in Appendix 9 and 10). I also helped stage citizen science projects in the sanctuary, including kangaroo counts, rabbit burrow identification, annual field training for the Frogwatch Census and turtle patrol. As the headwaters of the Ginninderra creek lie in the sanctuary, I also took up opportunities to network with other care groups across the catchment and thus, tapped the Mulligans Friends into the Ginninderra Catchment Group (GCG). This afforded opportunities to observe and participate in GCG meetings and community events. I also had an existing relationship with GCG as the convening organisation for the Gungahlin BoB (see Section 8.6). I observed the very first Indigenous Heritage Walk in Mulligans Flat in March 2014, led by Ngunawal elder Wally Bell and organised by GCG with funding from an ACT Heritage Grant (see Figure 6.57). This was the first of series of cultural walks and talks along Ginninderra Creek, an Indigenous pathway. These walks were the most appreciated and well-attended community events I observed over the course of the research. At this point, the only cultural tours available in Canberra were led by the Indigenous rangers at Tidbinbilla Nature Reserve and there had been little cultural interpretation of urban nature reserves. A new Landcare group followed to help protect and maintain the cultural sites in the Ginninderra Catchment. [120] Because of the community interest, I arranged a second cultural walk as a Friends event in Mulligans Flat in 2015, led by Wally Bell and funded privately.

As part of the adaptive approach to this research (see Section 1.9), I was, as the Friends Convenor, able to initiate a number of pilot engagement activities to observe community interest and uptake. The design of activities was informed by two sets of my early findings:

- local residents' limited awareness of the conservation values and experimental research in the sanctuary (see Table 6.13 above); and

- informant evidence of childhood nature disconnection in Chapter 4, and my observations that very few local children were using Mt Taylor (see Section 6.4.1.3).

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[120] https://ginninderralandcare.org.au/aboriginal-landcare/.

I designed two different activities to promote awareness and learning for local residents: an annual community science forum and guided nature walks in the Sanctuary (see 6.5.2.1−6.5.2.2 below). To engage and introduce local children and families to the sanctuary, I piloted activities designed to be fun and immersive as well as educational (see 6.5.2.3−6.5.3.6 below).

Figure 6.57 Elder Wally Bell at the first Indigenous Heritage Walk, Mulligans Flat

6.5.2.1 Pilot activity 1: Science in the Sanctuary Community Forum

Interviews with Forde and Bonner residents suggested limited awareness about the science behind the fence (see Table 6.13). I was also conscious that there would be significant public interest in the wildlife re-introduction projects but that the scientists involved had not presented their work to the community. To address both issues, I proposed a community event involving a series of short talks designed for a community audience about the research and management projects in the sanctuary. The first forum was held in June 2013 and featured a short film about echidnas (shot in Mulligans Flat by naturalist Matthew Higgins), the eastern bettong re-introduction research presented by a PhD scholar and future projects. The forum was warmly received by participants, has been held annually since 2013 and became known as 'Science in the Sanctuary'. Each year, PhD and Honours scholars update the community about progress

and success in the re-introduction of regionally extinct native wildlife (the Eastern bettong, Eastern quoll and Bush-stone curlew). Parks staff have covered the rabbit removal project and Trust staff presented wildlife monitoring programs for common species like long-necked turtles and echidnas. The forum has grown since the first event, attended by 30 people, into one with over 100 participants in 2017 with some having attended for five years running (see sample of Forum Programs, Appendix 10).

6.5.2.2 Pilot activity 2: Volunteer-guided walks in the sanctuary

Ranger-guided walks were used to orientate and introduce local people to the sanctuary as part of the Community Development program at Forde (K. Wallace, personal communication). These walks ceased in 2011, partly because the rangers were busy preparing for the threatened species re-introductions from 2012, particularly undertaking rabbit control. I proposed that the Friends Group could partially fill this gap. Volunteer ParkCare groups at other nature reserves had successfully staged weekend walks using a knowledgeable group member or an amateur naturalist to lead the walk. As the event is run by the ParkCare group, insurance coverage is available to cover community attendance. I used my scholar network ANU to invite a local ecologist with knowledge of the woodland ecosystem and wildflower species to lead a walk in the sanctuary in 2013 (see Figures 6.58 and 6.59). The Friends Spring wildflower walk has since become an annual event and is free of charge; it attracted over 60 people in 2017. While informal, the walk not only focuses on finding wildflowers (although this is the highlight), but also introduces people to the ecology of the woodlands, anchor tree species and a range of natural processes like the roles of insects and mistletoe. This is an additional benefit of having an ecologist lead the walk and has been highlighted by participants as a positive aspect, particularly in the lean wildflower years.

Figures 6.58 and 6.59 Ecologist Michael Doherty leads Wildflower Walks 2014 & 2015

Mulligans Flat is one of the best birdwatching sites in the ACT (Lindenmayer 1992) and in 2014, I piloted a guided bird walk in autumn and spring. Autumn would allow participants to observe the influx of migratory species (e.g., honeyeaters) and breeding and nesting activity could be observed in spring. Once again, I drew on my contacts, inviting local bird enthusiasts

from the Canberra Ornithologists Group (COG) with knowledge of the species within the sanctuary to lead the walk. Both the bird and flower walks were intended to be gentle introductions to encourage people to make return visits and appreciate the diversity. As volunteer-led walks, the group was not constrained by having to pay guides (excepting a 'thank you' bottle of wine) and insurance was covered by the ParkCare program. Having relaxed events free of charge provided the right environment for local people to become familiar with the sanctuary and meet the Friends. Morning tea was provided after the walks to encourage this interaction and promote the sanctuary. The bird walks are now annual activities held in autumn and spring, with well over 40 people attending each event (see Figures 6.60 and 6.61). Copies of the posters for some walks are in Appendix 10.

Figures 6.60 and 6.61 Mulligans Friends bird walks, 2014 and 2015

6.5.2.3 Pilot activity 3: Snap-Film-Draw 'Spring into Nature' children's art competition

The first activity planned for spring 2013 was an art competition to encourage local children and families to visit the reserve and to sketch, photograph or video an aspect of their sanctuary adventure. The aim of the competition was not to prescribe an educative outcome, but to promote self-discovery and creativity in nature. By keeping the subject matter open, children could present their experiences through their own eyes. By proposing different media (drawing, photography and video), the competition was designed to attract the full spectrum of age groups to participate. The then-community-owned bank Bankmecu sponsored the competition and the then ACT Parks Minister launched the competition at the start of the school holidays (see Figure 6.62). University colleagues assisted with the design of artwork for a poster and

letterbox flyers for Forde (see Figure 6.63). The judging panel included an artist from the Friends and a young Friend who was not an entrant. All the artworks were exhibited at the CSIRO Discovery Centre at Black Mountain, then at Bankmecu's CSIRO Branch and finally, in the Mulligans woolshed. The diverse array of subjects and acute observations suggests the competition was successful in getting children to relate their experiences of the sanctuary. Artwork featured discoveries at the micro-scale and depicting encounters with the unusual wildlife (see Figures 6.64 and 6.65) This was a pleasing outcome, as there had been subtle suggestions from the Management Committee that it should have an overt 'educative' component. A second 'Snap-Film-Draw' competition was run in 2015, and generated further nature-inspired entries and a 'people's choice' voting process.

Figures 6.62 and 6.63 Competition launch at the woolshed and advertising poster

Figure 6.64 and 6.65 Snap-Film-Draw Artwork, 2013 and 2015

6.5.2.4 Pilot activity 4: Bettong Buddies Kids Club and email newsletter

The interest generated by the art competition in 2013 led to another concept: a children's nature club for the sanctuary. Children who participated in the art competition were invited to propose names and ideas for the club. 'Bettong Buddies' was voted the best. I produced a series of quarterly email newsletters in 2014 based around the seasons to highlight different wildlife in the sanctuary, provide updates on the bettong re-introduction and profile key people working in the sanctuary who families might meet. We also provided advance notice of fun activities for children and families in the sanctuary (see Appendix 10).

6.5.2.5 Pilot activity 5: Nocturnal tours for children and families

I volunteered for the first spot-lighting night tours offered by the Trust during National Science Week in 2013. There were no age restrictions and the two-hour walk tired the younger children who struggled with the distance. These walks provided the basis for the introduction of regular paid night tours in the sanctuary (but these were to limited children over 12 years). To address the gap for younger families, I proposed that the Friends pilot a nocturnal tour for younger children involving a shorter circuit and duration. Importantly, the event was held at no cost because the sanctuary ecologist and one of the casual guides volunteered to lead an abridged tour for the children. The first tour was held in autumn 2014 and was over-subscribed, requiring a waiting list to be kept for another walk in spring. The children relished being out in the bush at night with torches and the Friends provided hot chocolate and bettong cupcakes in the woolshed after the walk to share wildlife sightings (see Figures 6.66 and 6.67). This also provided an opportunity to discuss the work underway in the sanctuary and how families might participate.

Figures 6.66 and 6.67 Mulligans Friends Kids Night Walks

6.5.2.6 Pilot activity 6: Hike and Bike Buddies tour

The sanctuary's main trails are excellent for bike riding, providing a circuit around the sanctuary and thus, I designed a 'hike and bike' tour for the Bettong buddies kids club (and their parents). The sanctuary ecologist led the bike hike, which began at the main gate with stops to examine key features and explore the habitats of different wildlife including tree hollows and wallaby grass used by bettongs (see Figure 6.68). Participants found the bike ride a good way to orientate themselves in the sanctuary and discover places to revisit later. The bicycles also made it feasible to traverse the whole reserve with the children (see Figure 6.69). Good suggestions were put forward to propose totems that could signal areas of interest at particular locations for self-guided exploration. A grant application was made in 2015 to cover the cost of guides to lead future 'Buddies Hike and Bike' rides, but was unsuccessful.

Figures 6.68 and 6.69 Buddies on their Bikes with sanctuary ecologist Kate

6.5.3 Findings from pilot activities

Although a simple construct, the 'Science in the Sanctuary' forum has become an important conduit for the local community to follow the research and creates a foundation for growing local ownership of the sanctuary—an aspirational outcome identified by the Mulligans Flat Board of Management in its strategic plan for the sanctuary. The forum also provides a vehicle for the WWT to demonstrate that research is being disseminated in the local community in a more substantive way than only via social media.

Based on my observations at the forum, one-on-one conversations and insightful questions posed by attendees, the local audience was demonstrably engaged by the research experiment and the Trust's management projects. Interestingly, the fates of some of the common wildlife species have truly captured public interest. There was an extraordinary community response to the call for volunteers to help turtle passage (turtles found against the fence are recorded and assisted into/out of the sanctuary by volunteers under a Trust program that has run since 2015) and the sanctuary echidna population is benefitting from the predator-free environment; they are easily and regularly observed by delighted visitors. Importantly, these stories reinforce the value of the sanctuary for all wildlife—as well as the charismatic small mammals that have been reintroduced—and contribute to its wider community appeal.

I also observed that the Forum is a learning journey for the (mostly young) research scholars who usually present to academic audiences. The researchers have become willing participants and tailor their presentations to the community/lay audience. They have related how much they appreciate the genuine and thoughtful public interest in their work:

> *'Great work on a great event. Always such a warm and fuzzy feeling afterwards'*

> *'Thank you so much Kathy for organising this! I think it's sooo important'.*

> *'It's a wonderful opportunity to present our findings to the community. Thanks for having us!'*

The volunteer-led bird and wildflower walks attracted a new cohort of people every year (along with regulars) and social media has boosted promotion of the walks in recent years. There is also a cohort of keen photographers in every group. Feedback has always been positive and participants are particularly effusive about the knowledge of the volunteer guides. These walks provide an alternative to the paid tours now offered by the Trust and the relaxed morning tea afterwards provides an opportunity to promote the Friends group and volunteering in the sanctuary. It also provides a good orientation for new visitors to the sanctuary, allowing them to experience the place in a friendly group and learn more about it.

The key observation from the pilot activities with children was the desire of parents for safe, structured activities for their children in the sanctuary, and also activities to do with their children to share the experience (particularly the bike ride and nocturnal tours). This agrees with the change in parenting norms discussed in Chapter 4. Importantly, since these pilot events for children and families, the addition of more guiding and outreach staff at the Trust saw the

introduction of the first school holiday programs in 2016. These included the popular abridged children's night walk piloted by the Friends of Mulligans Flat and other fun events that promote discovery in the sanctuary. [121]

6.6 Case Study results—Molonglo River Nature Reserve

6.6.1 Semi-structured Interviews

During the interview phase of this research, the first houses were being built in Wright, the first suburb in the Molonglo Valley and the first stage of the second suburb, Coombs, was under construction. The civil construction works in Coombs and also restoration works in the river corridor precluded public access. Therefore, interviews with new and potential residents focused on why people chose Wright (or were considering land in Molonglo) and their thoughts about future management, rather than their experience of the nature reserve.

6.6.1.1 Theme 1: Multiple motivations for living on the edge

Residents were attracted to being in central Canberra but also on the edge of the city. They cited the open rural landscape, prospect of mountain views, outdoor recreational opportunities like adjacent Mt Stromlo Forest Park and future access to the river corridor, the Arboretum and the Cotter reserve. For these new residents, Molonglo evoked a feeling of space and opportunity as well excitement about future access to the river (see Table 6.15). Surveys of new residents conducted for the LDA's Mingle program confirmed these findings: people were attracted to Molonglo for its central location and natural environment. [122]

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[121] See https://mulligansflat.org.au/tours/.

[122] Elton Consulting reporting a survey of 230 residents at the Molonglo Mingle Meeting at Orana School on 6 December 2014.

Table 6.15 Why Residents Chose the Molonglo Valley

'Mt Stromlo, the river and access to being able to cycling river and mountain, the affordability of that area was a big factor—it's just so perfect, close to the city and parliament, but on the edge of the city. I wanted the public accessible open areas'.
'But I really like it, because I love the arboretum ... and it goes around the back of that, and then it's got the river corridor, the only place in Canberra which will have access to the river corridor.
'I think it was almost three years ago now and they were just starting to develop here, and when I saw the [Molonglo] signs. I said to [a friend] "I want to live there". I find this such a unique part of Canberra. The proximity to the Cotter is lovely and having the mountains and Mt Stromlo'.
'Because it's such a nice spot here. So yeah, even though it will be suburban, it's got a really lovely rural feel to it because of the proximity. I like to say that the arboretum is my backyard'.
'Stromlo Park was probably one of my biggest influences for our choice. You're going to have to come up with something really bloody good to beat this because my view is incredible. I've got the whole of Canberra. I can see everything'.

6.6.1.2 Theme 2: Seeds of local stewardship

Residents were asked how they saw the river and its future management. Perhaps because they are new settlers and excited about the future prospects, there was a strong feeling that the community should play a key role in its stewardship and management. There was also recognition of the scale of the management task, volunteer capacity and likely urban effects on the riverine environment, all of which demonstrate good awareness of the reality (see Table 6.16, Figures 6.70 and 6.71).

Table 6.16 Ideas for the River Corridor and Management Responsibility

'But, if they're looking at this new [reserve], something so precious as this river corridor, if that's well looked after and well flood-controlled, it will be of great advantage to Canberra. It would be actually a good way to set up a new model of working with the community'.
'So, it would be good to have a model where you could have a better working relationship between the government and the community groups that really encouraged the community to be involved. I mean, they've done a fabulous job on the hills. You know, with—20 years ago when they set up all these Landcare groups'.
'I would say a combination of community and government and business in terms of developers or whoever else is there and impacting upon it.. Whoever is utilising it and benefiting from it should be investing in it'.
'Ideally it would be nice for it to be a joint thing'.

Figures 6.70 and 6.71 Molonglo River and urban edge and a new walking trail

6.6.2 Researcher observations at inaugural community events in Molonglo

Beyond participating in the Molonglo BoB meetings, I also attended various community events hosted by the LDA for new residents between 2013 and 2017 as part of its Mingle Program (see also Section 7.3).

The first community event, the launch of the Mingle (Community Development) Program for Molonglo in September 2013, was attended by over 100 new and potential residents. There was a palpable sense of excitement among the new settlers with much information being exchanged about their experiences with builders and contractors; many phone numbers were exchanged. The primary purpose of this event was to gather ideas about activities that might be run under the Mingle program to help the community build networks and meet their neighbours. These early Mingle meetings were also a means for residents to hear updates on the civil works and landscaping of the new suburbs (see Figures 7.23 and 7.24). As the suburbs have continued to grow, the LDA convenes a larger biannual Community Information Night to provide development updates with all the key government service agencies present. [123]

In May 2014, I attended the first community woodland restoration planting event at Barrer Hill (a woodland restoration site upstream of the suburb of Coombs) and was interviewed about my research at this event (see Figure 6.72 and Thistleton 2014b). Only a small cohort of residents attended the first planting event but many more attended the next planting event in August 2016. This suggests growing community interest in the river corridor and the potential for future stewardship, as suggested by informants (see Figures 6.73 and 6.74).

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[123] https://suburbanland.act.gov.au/news/wright-and-coombs-community-information-night/671.

Figure 6.72. Researcher at Barrer Hill planting, May 2014

Source: Canberra Times

Figure 6.73 PCS Ranger James and ecologist Dr Darren Le Roux

Figure 6.74 Barrer Hill Planting, Molonglo River

6.7 Local Environmental Awareness of Urban Edge Residents and Reserve Users

All informants across the three case study sites were asked generic questions about how they received environmental information, what they should be informed about living next to a reserve (for Mt Taylor and Mulligans Flat only) and other activities undertaken at home to look after the local environment (all). Residents unanimously identified the relevant government website as the place to source information. Forde residents could not recall receiving the 'Gungahlin Treasures' booklet provided in their 'Welcome Packs'—but all recalled being given a large amount of information when they purchased their homes. This suggests that orientation materials would be better circulated after the settling-in process and at suitable events focused on sustainability or similar issues.

When asked about which reserve management activities neighbours should be advised of, residents nominated hazard burns (at both Mt Taylor and Mulligans Flat), changes to infrastructure (trail repairs/closures) for Mt Taylor, reserve closures and use of poisons for baiting (at Mulligans Flat) and community events and projects for volunteers (at both Mt Taylor and Mulligans Flat). The erection of signs on the entrances to trails were the preferred method for advising residents about trail works. One Forde resident recalled receiving and retaining an information brochure about the Fireweed biosecurity threat (Fireweed was brought into Forde in the turf used for landscaping some spaces).

All residents easily identified activities undertaken to care for the environment, with many using native plants in their gardens, installing energy and water devices in their homes and feeding native birds (see Table 6.17). All informants had high levels of awareness about the application of domestic measures to help the environment—only one informant described a more holistic approach to living that also included environmental activism. When asked whether there were any particular species they did not like around their homes, most residents stated that enjoyed their interactions with wildlife, particularly birds. Species that were considered 'pesky' were the introduced Indian mynas (six mentions), followed by cats (three mentions) and currawongs, white cockatoos, spiders, rodents and possums (one mention each).

Table 6.17 Activities Undertaken by Local Residents to Help the Environment

Action	No. of mentions	Description
Planting native species	14	'We've removed a lot of exotics out the front and started again completely planted up to natives'. 'We plant for the birds and keep water out for them'. 'Since we have such a dry climate, we try to do a lot of native plants... that don't require so much care and water'. 'We're careful about exotic plants escaping into the bush, so our garden is mostly natives'. 'our garden is native plants...recommended for this area'. 'I'm removing all the invasive weeds and replacing them with bird and butterfly-attracting plants to bring nature in'.
Installing water and energy saving measures (internal and external to house)	14	'We've got double-glazing, north-facing living areas, the angle of the eaves, extra insulation, sislation in the roof'. 'I mean our house is double insulated and double glazed'. 'We're very conscious of water and energy usage'.
Feeding birds / providing water	10	'We have a lot of the local birds and things 'cos I've put the feeder out in our front yard with the native bushes'. 'I confess I do feed the magpies, meat, occasionally'. 'We've got the bird bath just on the other side'. 'I've got a bird bath just out the side'.
Composting/worms	5	'I've got a compost bin and I collect banana peels from everybody at school in a special tub'. 'We've got two compost bins; one always on the go'.
Growing vegetables	5	'I have a little veggie patch. I love my garden'. 'I'm planning a community garden...on the verge—all herbs and things so if the neighbours up the road are cooking a roast and they want rosemary, come down, chop it off'. 'I'll do veggies, I've got a two-and-a-half-metre easement at the back...Which is perfect for veggie patches'.
Recycling	4	'I'm conscious of domestic hints about recycling'. .
Using bicycle transport	2	'I'd say that day to day, I make a whole range of small decisions environmentally, like I prefer to ride my bicycle'.

6.8 Case Study Insights and Learnings

6.8.1 Mt Taylor

Case study findings revealed that Mt Taylor is a 'social' egalitarian space supporting a diverse range of activities that range from individuals with regular exercise regimes to those who walk to experience the naturalness of the place. The 'place' frame fits most coherently with the multiple values of urban nature reserves and the place attachment expressed by informants in their descriptions of experiences. It can also be used to cover the experiential spectrum from biological immersion in the reserve among environmental stewards (like ParkCarers) through to expressions about the natural outlook, views and amenity enjoyed by reserve neighbours.

Few people have a singular relationship with the mountain; it satisfies a number of different needs with multiple values and meanings among its users and neighbours with social and physical dimensions covering its:

- utility—an outdoor recreation venue
- amenity—a beautiful view/place to view
- specialness—a place to refresh and commune with nature.

The popularity of walking accords with other studies that found recreational walking associated with having access to open space within 400 m of home (about a five-minute walk) and having a space to walk in that is at least 1.5 ha in area (Rozak and Giles Corti 2017).

Beyond exercise, this close proximity and long-term recreational use of the reserve have created intimate relationships, expressed in both emotional and protective feelings towards the reserve. These feelings fall within the concepts of place attachment (Scannell and Gifford 2010; Altman and Low 1992) and place-based discounting, wherein people discount across both time and space, tending to place higher value on places that are more proximate (see Brown and Brabyn 2012). Accessible spaces for nature-based recreation also build place attachment in urban reserves (Beery and Jonsson 2017): attachment grows the more frequently people experience the place, whether through daily recreation or volunteering (Ryan 2000).

The positive local attachments evident on Mt Taylor are important for community engagement (Head and Muir 2007) and, potentially, an expanded role for the community in management (Gardner and Stern 1996). A sense of social stewardship evolves, as is evident on Mt Taylor in both formal (ParkCare) and informal (early morning walkers) social networks and bonds

among locals (Stedman 2003a). This suggests that regular users could act as advocates, partners and carers for programs developed to 'harness the love' and encourage care behaviours. Behavioural research also suggests that 'observing how others behave and modelling our behaviour on what we see around us provides more effective and promising avenues for changing behaviours than information and awareness campaigns' (Jackson 2005: xi).

The most surprising finding of the Mt Taylor case study is the absence of children using the reserve, with those observed mostly in the company of adults. This builds on the findings in Chapter 4 and is part of a wider phenomenon with changing social norms around child safety, risk and play (Gill 2007). Given parental fear of strangers and injury, few children enjoy the same neighbourhood freedoms their parents enjoyed (O'Brien 2013). This change is happening amid mounting evidence showing the benefits of outdoor play for cognitive development and to counter increasing rates of childhood obesity and declining physical activity (Telford 2017). Importantly, outdoor experiences involving repeated visits to the same site (at an accessible local reserve like Mt Taylor) give children the exploratory, play-oriented contact with nature that builds affinity with their environment (Gill 2011). At the most recent World Parks Congress in 2014, there was unanimous recognition of the need to connect young people with nature and the role for protected areas to offer these meaningful experiences (IUCN 2014). Engaging children was the driver of experiments with family-based activities at Mulligans Flat.

Part of the conundrum for managers is that managing these older reserves as bounded ecological units using prescriptive use frameworks excludes rather than facilitates youth engagement with little tolerance for immersive and exploratory activities of the past like cubby building (Ryan 2016). This makes it more difficult to align with other policy initiatives as there is a reluctance to promote recreational uses of reserves and inadequate maintenance of facilities that might encourage more physical activity and visits to meet public health goals (McCormack et al. 2014; Bedimo-Rung et al. 2005). This has created a glaring policy disconnection in Canberra. The ACT's 'Healthy Weight Action Plan', a 'whole of government' policy, makes no mention of Canberra's nature reserve network nor are funds being directed to this outdoor infrastructure (ACTG 2013). Nevertheless, funds are spent on retrofitting 'nature' playgrounds (Gupta 2016), which, while meritorious, ignores the natural free-play areas that already exist. The opportunity for this policy alignment was recognised over a decade ago by Maller et al. (2006:50):

> Public health has a key role to play in environmental conservation, and environment administration has a key role to play in human health and well-being. On this basis,

potential exists for parks and natural reserves to gain an expanded role, scope and influence in urban-based societies. A collaborative socio-ecological approach between health and environmental management sectors is required to ensure that contact with nature is integral to sustainable development strategies for local and global urban communities.

While Mt Taylor is a designated nature reserve, there is no active Parks Service presence, which effectively leaves volunteer stewards responsible for a resource-stretched agency (Beeby 2011h). There is also an observable element of disaffection and frustration among users, who have lost faith in the Parks agency, now self-organise and may not engage at all with organised efforts. The absence of management has created a vacuum, evidenced not so much by the random acts of vandalism but in the liberties certain users take to create their own tracks and engineer mountain bike circuits. A number of factors undermine the ability of the Parks Agency to actively manage this reserve, including the churn of rangers in district offices and increasing off-park workloads (see Chapter 8). The reserve essentially an island surrounded by suburbs with messy boundaries, many linear links and multiple entry points which suggests it needs to be managed as part of the adjacent urban landscape and with people, to address these impacts.

Informants at Mt Taylor identify 'overuse' as the major consequence for the reserve; this perspective appeared repeatedly in other studies (ACTG 2010; Chevalier and Hoffman 2010; CoA 1992). 'Too many people' has become a dominant narrative but one that masks the real challenges of urbanised settings in planning and management for multiple values and infrastructure maintenance; these failures were thoroughly described by informants.

6.8.2 Mulligans Flat

The perspectives of residents and users at Mulligans Flat concerning reserve management contrast with those of Mt Taylor's users. This relates in part to deliberate protection of Mulligans Flat for nature conservation well ahead of urban development, with visitation mainly by small bird-watching groups and individuals. It lends itself to 'bounded' management, having an active Parks management presence and clearly visible markers, signified by the predator-proof fence and buffers between the edge of the suburb and the reserve boundary. All provide cues about its management for conservation.

Not surprisingly, being near the Mulligans Flat reserve was attractive to new residents because it would never be built out and provided some security for their future amenity and the suburb's size. Informants clearly related to the design concept of the generous outdoor space both in or

around the sanctuary in deciding to settle there. This is reminiscent of a dialectic used by Yi Fu Tuan: 'place is security, space is freedom' (1977: 3).

While the reserve was initially viewed through the lens of a home purchase, studies elsewhere suggested that because of its proximity, attachment to the reserve will grow the more frequently local people visit it, whether through recreation or volunteering (Ryan 2000). This is important for engagement and suggests that a sense of stewardship will evolve with the local community. This has occurred in other areas of Canberra, as at Mt Taylor and other reserves with mature urban ParkCare groups (Rainbird et al. 2012). The developers of Forde assisted this process by making new residents aware of the special setting and funding projects to engender stewardship (CIC 2012; Brown 2011). Forde's community development officer described an evolving sense of community among Forde's young settler population (K. Tennant 2013, personal communication) and the formation of a Community Association in 2014. About half of the active volunteers in the Friends of Mulligans Flat were local residents in 2015.

Most residents experience the reserve as a place for respite and recreation, family activity and enjoyment of wildlife and views. Its importance for biodiversity conservation and research is secondary. This finding is supported by the results of 2016 user survey for the Trust, which found half of the sanctuary's visitors went to connect with nature and enjoy the peace and quiet. A further 22% visited for health and fitness reasons; 15% visited for education and to learn about nature (TRC 2016).

A similar pattern was found in other urban studies showing that people value access to bushland but do not necessarily have or need an understanding of its biodiversity (Gill et al. 2009; Barnett et al. 2005). Importantly, while the residents in this case study were vague as to the specifics of the ecological research, all supported and recognised the importance of the predator-proof fence for native wildlife. The possibility of seeing wildlife also featured in participants' responses and mirrors the results of the Trust's 2016 survey that found the practices of wildlife viewing, birdwatching and photography were popular (TRC 2016). Also and possibly because of the flatter terrain and well-maintained trails, the Trust survey suggested that more users run and cycle at Mulligans Flat than at Mt Taylor.

The challenge for managers is to decide whether to actively focus on improving the users' ecological knowledge or to leave them to engage with nature on their own terms. The answer may lie in considering people's everyday experiences of the woodlands, taking them on a subtle educative journey across the seasons, the wildlife and plants, and relating this to the story of

recovery. Social media has been useful for showcasing re-introduced and existing wildlife in the sanctuary and for promoting events. This medium has led to significant online engagement (see Chapter 3) but whether this translates an accurate picture of the research is less clear and outside the scope of this study.

The Friends annual 'Science in the Sanctuary' Forum, staged since 2013, provides a more structured avenue for scientific outreach and building community interest and ownership. It is also a forum to explain the management regime of the sanctuary and who is responsible for which projects. The approach applied during the Friends guided bird and wildflower walks has been to explain aspects of the research and management when an opportunities arise at particular locations (e.g., entering the Sanctuary fence and at grazing exclusion plots) during the walks and through interactions over morning tea. Some locals have actively chosen to learn more by engaging as regular volunteers in the Friends and helping with wildlife monitoring in the sanctuary. As residents and users learn more about the sanctuary, the knowledge and experiential gap between those who manage the woodlands and the people living near the reserve will not be as significant.

Unlike at Mt Taylor, there is an active management Parks Agency presence at Mulligans Flat; residents and users regularly see the rangers, who have a base at the Woolshed. Importantly, residents and users support the predator-proof fence and recognise its benefits for wildlife, which they translate to their own experiences in regularly encountering wildlife like echidnas and reptiles. Managing the sanctuary as a bounded ecological unit and the associated prescriptions are more readily understood and effective in this high-conservation setting.

Only one Mulligans informant, a long-term user mentioned restrictions on use and only one raised the potential negative effects of 'too many people'. In this sense, the visibility of the rangers, the camera-surveilled fence and well-maintained track infrastructure have subtly managed anti-social behaviours in the sanctuary. The main concerns expressed by Mulligans informants related to snakes; there were no concerns about the behaviour of users or the condition of the reserve, as observed at Mt Taylor.

6.8.3 Molonglo Valley

At the Molonglo Valley, some findings were similar to those in the other places: residents described the sense of space and place evoked by the urban edge setting, outlook and proximity to nature. However, Molonglo residents had yet to access and use the river corridor; thus, more

intimate experiences of the reserve and its importance could not yet be captured. With new trail infrastructure, shelters, seats and signage, the new settlers can now explore the reserve (ACTG 2018e, Figures 5.67-70).

Molonglo residents were particularly open to the idea of a different model of management for the river corridor even though they were yet to experience the reserve. In common with the other case study settings was the view that the community should have an element of responsibility for management.

Nevertheless, the emerging reality is that the traditional Parks Service managed model will apply to the Molonglo River nature reserve with the potential for a ParkCare group at some point (ACTG 2018e). Limited natural open space opportunities in the adjoining suburbs will make the river corridor popular for recreation and its long linear (messy) boundary to the urban section will likely make it challenging to manage into the future.

6.9 Overall Findings and Conclusion

Urban nature reserves are important places for nature contact in cities and key to boosting physical health and mental well-being (Maller et al. 2006) and building social cohesion and connection (de Vries 2010) in urban communities. The place-based case studies in this Chapter describe how people experience and connect with the nature reserves, as well as drawing out factors that might influence their relations, engagement and motivations to care (research question 1).

The case studies reveal long-standing place attachments between residential neighbours and recreational users at the Mt Taylor Nature Reserve, evolving attachments at Mulligans Flat and high potential for this attachment in the Molonglo Valley.

Both Mt Taylor and Mulligans Flat nature reserves are physically and socially embedded in their urban settings, appreciated for views (Mt Taylor) and their naturalness and physical accessibility for exercise and communing with nature (Mt Taylor and Mulligans Flat). Molonglo residents were attracted to the physical setting of their new suburbs, encircled by Stromlo Forest Park to the west, the Molonglo river reserve and Arboretum to the east and north-east.

Common across all the case studies is the sense of place evoked by living near nature reserves, and the feelings of space whether neighbours physically walked in the reserves or not. Views

of and an outlook to the reserve featured frequently in responses. Whether people use nature reserves is also influenced by practical matters, including proximity and ease of access, track conditions, reserve shape and boundaries and the availability of access to other recreational facilities and management rules (e.g., legal dog walking). User perceptions, particularly feelings of safety in the reserve, the presence of rangers and levels of maintenance served to mediate the experience of users in the reserve. Related to the safety perception (see also Chapter four) is the absence of children observed engaging in creative unstructured play opportunities in local reserves.

Collectively, these case studies show how the different social histories and management contexts (as described in Chapter 5) influences people's relations with the reserves and their sense of responsibility and agency around co-management. The length of time people having been using the reserve and the type of management in place created different experiences and types of engagement in the reserve.

Local residents and neighbours initiated the restoration of nature on Mt Taylor with this continuity of stewardship engendering valuable social practices and care relationships (Bieling et al. 2014). ParkCare volunteers have assumed more management responsibilities in the absence of an active ranger management presence. At Mulligans Flat, well before the arrival of urban neighbours, local naturalists and citizen scientists were the foundational community that enabled its protection and proposed the ideas that led to the later creation of the fenced sanctuary (CCACT 1999). The new neighbours at Forde and Bonner (and more recently the new suburb of Throsby) are continuing these care relationships but in close partnership with the land managers who direct their care activities. Citizen science in the reserve is also evolving in new ways enabled by digital technology. [124]

The narratives about how local people bond with nature reserves, reflected in their descriptions of favourite walks, trails, places and viewsheds, provides useful finely-grained data about the environmental 'affordances' (Sugiyama and Ward Thompson 2008) in these reserves. These 'qualities' help to guide which affordances might be promoted to encourage physical activity and public health outcomes in different population groups (Ward Thompson 2013).

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[124] https://digivol.ala.org.au

What these eco-social relations and multiple values mean for management practice in urban environments (Research question 3) will explored together with the perspectives of nature reserve managers, community organisations and local care volunteers in Chapter 8. Managers who understand what features encourage activity and engagement in reserves (Dallimer et al. 2012) can then manage in a way that builds nature connection (Standish et al. 2011). Ideas for re-framing conservation management practice to align with community health and education policy domains will be explored in Chapter 9.

The next chapter explores the experiences of the planning and development practitioners who are designing new residential suburbs next to urban nature reserves, as well as those in the conservation community concerned with improving residential development practice to minimise the edge impacts identified by local residents and users in this chapter.

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Chapter 7: Case Study – Developing near urban nature reserves

'Thus, cities designed well, with nature in mind and at hand, can be understood as natural, supportive of both ecosystem integrity and public health' (Kahn 2016).

Researcher's story and insights—the experiential practice lens

I have had a diverse professional career, working for many years as an environmental planner in strategic policy and development assessment roles in urban and rural settings, in national environmental policy and community-based natural resource management. Planning practice draws heavily on different disciplinary knowledge within public and private institutions and would be enriched by more interchange with local and community knowledge.

Much of the evaluation of planning and land development practice focuses on the statutory processes, urban governance and housing producers. This context is undeniably critical to practice but I have experienced my own feelings of frustration and futility, playing around the margins in planning systems heavily geared towards production goals. This research created an opportunity to examine this contested space through the experiential lens of the practitioner—not just planners, but all those who play roles, from community practitioners in NGOs with intimate local ecological knowledge through to developers of residential estates.

7.1 Chapter Overview

This chapter is the second of three themed case studies; and explores the experiences of practitioners 'developing' near urban nature reserves, using place-based case studies of the suburbs of Forde next to Mulligans Flat Woodland Sanctuary, and Wright and Coombs adjoining the Molonglo River nature reserve (Research question 2). It builds on a peer-reviewed paper, *Practitioner Perspectives of Nature Conservation at The Urban Edge,* presented at the 7th State of Australian Cities Conference, on the Gold Coast 9−11 December 2015 (Eyles 2015). It explores examines how these new suburbs were planned and developed using focus groups and semi-structured interviews with a diverse suite of practitioners. It presents practitioner insights into the challenges of working beside nature reserves, their willingness to experiment with bio-sensitive development measures, perceived barriers to innovative practice and views about the role of developers to seed community engagement and stewardship. An embedded case study of the Bush on the Boundary (BoB) forums at Forde and Molonglo documents how this boundary organisation bridged the disciplinary cultures to share local knowledge and its potential as a model for knowledge transfer and improved urban development practice near nature reserves.

7.2 Research Setting and Context

Two new urban estates adjoining nature reserves in the ACT were selected for the practitioner study; the nature reserve settings were explored in detail in Chapter 5. Forde in Gungahlin is on the northern edge of Canberra, adjacent to Mulligans Flat Woodland Sanctuary; Wright and Coombs in the Molonglo Valley are on the central western edge of Canberra, adjacent to the Molonglo River Nature Reserve (see Figure 7.1). Gungahlin and the Molonglo Valley are the main urban development fronts in Canberra that will accommodate around 70,000 and 55,000 people, respectively, once completed (Thorpe 2014). Both districts support remnants of endangered lowland grassy woodland ecosystems (ACTG 2013b; ACTPLA 2011; ACTG 2004b) and there has been significant public debate about the effects of this suburban growth on threatened biodiversity (Clisby 2014a, b; Thistleton 2014a, 2013a; Cook H. 2011; Doherty 2011c). The Mulligans Flat Nature Reserve protects nationally endangered box-gum woodlands, providing habitat for threatened woodland birds and other wildlife. A long-term ecological research project is underway to explore the response of these woodlands to various management treatments. A predator-proof fence erected around part of the nature reserve in 2009 has enabled the reintroduction of threatened species to the reserve (Shorthouse et al. 2012). Figure 7.2 shows the suburbs of Forde and Bonner, which border the reserve.

The Molonglo River nature reserve supports endangered natural temperate grasslands and box-gum woodland, including the largest ACT population of the nationally vulnerable pink-tailed worm lizard and many threatened woodland birds (ACTPLA 2011). The Molonglo urban development was subject to strategic assessment under the Commonwealth's *Environment Protection Biodiversity Conservation (EPBC) Act* 1999, with development approved subject to biodiversity offset and restoration requirements, including new nature reserves, research and monitoring of endangered ecological communities and threatened species (ACTG 2013; ACTPLA 2011). Figure 7.3 shows the new suburbs of Wright and Coombs under construction beside the Molonglo Reserve.
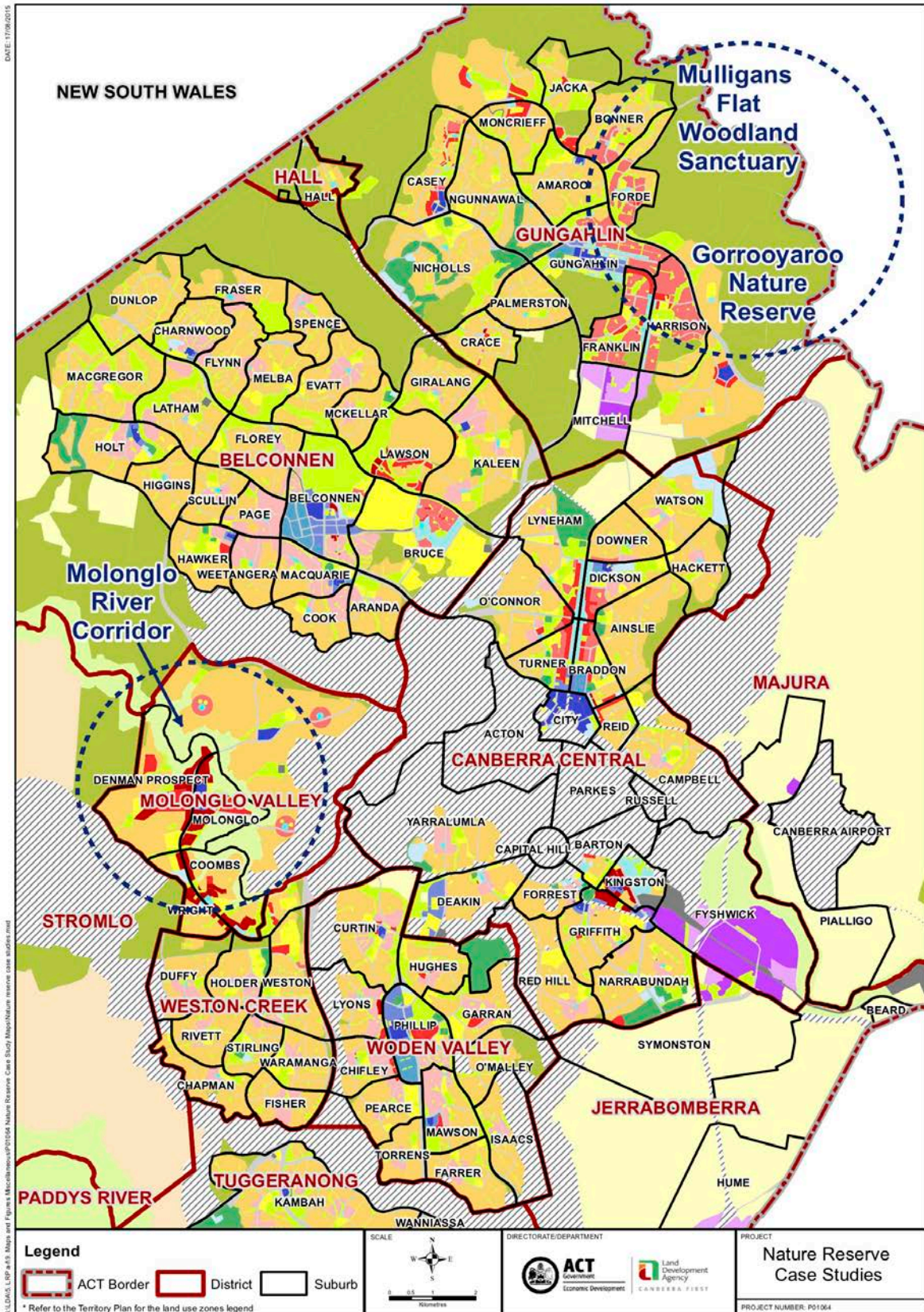
Figure 7.1 Case Study locations

Source: LDA

Figure 7.2 New suburbs of Forde and Bonner adjacent to Mulligans Flat and Little Mulligans Flat nature reserves May 2013

Source: LDA. The almost complete suburb of Forde next to Mulligans Flat (top-left corner) and the new suburb of Bonner next to Little Mulligans Flat Nature Reserve (foreground and bottom half).

Figure 7.3 The suburbs of Wright and Coombs, March 2013

Source: LDA. Wright in the foreground and Coombs top right adjacent to Molonglo River Nature Reserve

Given their proximity to these important nature reserves, development of the new suburbs is of particular interest to ACT catchment, environment and conservation groups who have long associations with the reserves both as advocates and citizen scientists (Bounds 2014 and Chapter 6). These groups initiated the novel Gungahlin Bush on the Boundary (BoB) Forum to minimise urban edge effects during the design and development of Forde, and then the Molonglo BoB for development of Wright and Coombs (CCACTR 2013). The utility of this collaborative community forum to advocate and enable bio-sensitive development practice and share local knowledge is a key theme of inquiry in this case study (see Sections 7.4.5 and 7.5)

7.2.1 Forde

Construction of Forde by a private and public sector consortium, Forde Developments, commenced in 2006, led by the private sector partners Lend Lease and Canberra Investment Corporation (CIC). Forde is Canberra's first master-planned estate and was conceived by the lead design partner Lend Lease to respond to the natural setting. They used the open space network to retain mature box-gum trees, augmented habitat with native landscaping and were sensitive to creek lines (see Figures 7.4−7.11). An integral aim of the design was to encourage residents to be physically active and engage with the outdoors; all homes are within 400 m of open space. Forde was the first suburb developed after the 2003 Canberra bushfires and integrated new planning requirements for an edge road and asset protection buffer along the reserve boundary (ACTG 2014; see Section 8). The high quality design set a new benchmark for residential development in Canberra, attracted premium pricing and sold out two years ahead of expectations (McNabb 2013; CIC 2012). Development is complete with over 1,250 lots accommodating approximately 4,300 people (ABS 2016).

Figure 7.4 Concept plan for Forde

Source: Forde Developments

Figure 7.5 Edge road, buffer and trail adjacent to nature reserve

Figure 7.6 Forde dog park

Figure 7.7 Edge road, buffer and trail adjacent to nature reserve

Figure 7.8 Water-sensitive design: creek lines and stormwater management, North Forde

Figure 7.9 Mature tree retention in open space

Figure 7.10 Tree retention and links to creek

Figure 7.11 Tree retention with remains of Forest View homestead, North Forde

7.2.2 Wright and Coombs

The ACT Land Development Agency (LDA) commenced construction of Wright in 2011 and Coombs in 2012, with over 4,500 dwellings proposed to accommodate about 9,000 people (ACTPLA 2014). At the 2016 Census, the combined population was 4,503 people (ABS 2016c). Wright and Coombs were the first *EnviroDevelopment*-certified suburbs in Canberra (in categories of energy, ecosystems, waste and community) and this was the largest development in Australia at that time to have received accreditation (UDIA, 2011). An agreement between the ACT Greens and the ACT Government stipulated how these subur.bs would be developed, including solar passive requirements for each dwelling (LDA 2010). The development sites has been burnt out in the 2003 fires and recreational pine forest was lost. Limited natural vegetation remained apart from a vegetation corridor in Coombs. A complex storm-water management system was designed to manage run-off through a series of retention ponds that would also provide recreational amenity and trees were planted in streets and around the ponds (see Figures 7.12−7.17). There were protracted negotiations over setbacks for the urban boundary beside the river to meet requirements for fire management and threatened species protection, to identify edge treatments (Eco Logical 2011) and to provide for public access and management (Hassell 2012; see Figure 7.16). The first residents moved into Wright at the end of 2014 (Thorpe 2014).

Figure 7.12 Entry signage to Wright with deciduous tree planting

Figure 7.13 Stormwater detention ponds and tree planting in Coombs

Figure 7.14 Tree planting along pathways in Coombs

Figure 7.15 Water-sensitive drain design and tree planting in Wright

Figure 7.16 Sediment control and fence along the edge between Coombs and the river

Figure 7.17 Vegetation and tree planting on slopes to River

7.3 Research Approach and Methods

This case study uses qualitative methods: semi-structured interviews, focus groups, participant observation in group settings and document analysis of technical reports, research papers and media articles. Thirty-five practitioners in planning, development, biodiversity conservation and management participated in interviews lasting 60 minutes. Interviews were audio recorded and transcribed. The study sample covered designers, advisers, developers, decision-makers and land managers in the private, public and community sectors with a range of roles at the study sites. Table 7.1 identifies interviewee categories and their roles; these categories are identified next to the quotes in the results to differentiate their perspectives (Tables 8.2 to 8.9)

Table 7.1 Practitioners interviewed in study

Practitioner group (interview category)	Interview number	Role at study site/s
Developers: private/public (D)	5	Concept planning, estate design and delivery
Public policy/decision-makers (DM)	5	Environment and planning decisions
Planners: government/consultant—land use and infrastructure (P)	5	Strategic planning and assessment advice
Ecologists: government/consultant/research (E)	4	Ecological advice
Community: ecology/sustainability/education (C)	4	Place knowledge, education, citizen science
Environmental advisors: assessment, fire, weeds (EA)	6	Impact mitigation, risk management advice
Public land managers (LM)	5	Land management advice
Others: real estate valuers (V)	1	Valuation advice
Total	**35**	

Two focus groups were conducted and the shared conversations generated insights that could be used as a sounding board for, and to expand on, the perspectives emerging from interviews (Finch and Lewis 2009). The first focus group (July 2012) explored the experiences of 10 practitioners from the LDA who were involved in developing estates beside nature reserves with an emphasis on reflective perspectives about their practice (Schon 1983). The focus group facilitation plan and questions are in Appendix 11.

The second focus group (November 2012) explored views about the BoB forums with 20 participants from government and the community sector who regularly attended the forums (see BoB case study, Section 7.5). I also attended bi-monthly BoB meetings; reference group meetings for the Molonglo River Reserve, Mulligans Flat management committee meetings and relevant public meetings (see Appendix 5). Active participation in these settings allowed observation and interaction with various practitioners (Layder 2013).

7.4 Results

Semi-structured interviews and Focus Group 1

Informant data from interviews and the LDA focus group were analysed to uncover commonly cited issues; these were coded into eight thematic files that represent the progression of the planning and development process at these case study sites (Spencer et al. 2012). Results are presented under the eight themes, as are comparative insights about the Forde and Molonglo cases (where apparent from the data). A summary of the key issues that emerged is provided where these issues were referenced by three or more informants. Excerpts from interviews and focus group are included to reveal the perspectives of different practitioner group categories (see Table 7.1).

7.4.1 Theme 1: Challenges of development near reserves

All practitioners acknowledged significant challenges in working on urban development sites adjacent to nature reserves; many expressed reservations about the desirability of this urban form (see Table 7.2). Advisors and decision-makers were most concerned about the long-term ecological consequences and significant upfront investments required for planning investigations and edge treatments. The development practitioners at Forde (especially private sector partners) were particularly mindful of the financial risks and close public scrutiny they attracted, while openly acknowledging the amenity and marketing opportunities presented by the high amenity reserve setting. At Molonglo, the community experts felt that proximity to the nature reserve allowed the developer to 'scrimp' on the provision of urban open spaces within the suburbs of Wright and Coombs.

Table 7.2 Perspectives of the challenges of developing near nature reserves

Summary of key issues
• The sensitive setting carries public and private risks (financial and environmental). • Greater scrutiny of developer and agency performance in this setting • The long-term biodiversity effects of development next to reserves are uncertain. • Large investment is needed in investigations and treatments. • Proximity to the reserves creates marketing opportunities. • Some perceive that reserves become proxies for open space in adjacent suburbs.

Interview excerpts about the challenges of developing near reserves
'Where it is difficult to develop because of environmental constraints, financiers see that as a risk and we have to reflect the time delay in bringing it to the market and holding costs' (V).
'You have to be conscious of its existence on your boundary. People are watching you. Whilst it has constraints, it has benefits; a reserve can't be built on so it's a great selling tool' (D).
'I think they've [Forde] gone well beyond what they originally expected that they might be doing. But they've also indicated that's enabled them to increase the value of the blocks. So there's a direct economic benefit' (E).
'I have no hesitation about the appropriateness but I want it done well, that environment protection is the best we can achieve while balancing our need for housing' (DM).
'New edge subdivisions are relying on reserves as 'sacrificial' open space. We've seen it in Molonglo with the river corridor' (C).
'(Some) people said all the River conservation work should be done before the development but they don't understand that the development funds the work and if it doesn't happen first nothing happens so that river corridor will stay the way it is' (D).
'Developers see the reserve in marketing terms. They incorporated the environment to a point with Coombs and Wright to get it off the ground' (P).
'We have to use our resources in smarter ways, achieve a pattern of settlement that doesn't continue to hit what are increasingly stressed ecosystems already' (DM).
'I think if you had a choice you wouldn't do it, but then it's beneficial that we're learning about it not just as planners and scientists but the community as well' (P).
'I worry about the economic imperative of developing edge suburbs; ecological common sense suggests you don't put suburbs right up against reserves' (E).
'Urban areas going up right against reserves, it was a conscious decision supported by the politicians. Now we're finding out there are lots of issues with working next to these reserves' (D).
Notes: V=Valuer; D= Developer; P= Planner; DM= Decision Maker; E=Ecologist; C=Community (Table 7.1)

7.4.2 Theme 2: Effectiveness of planning processes near reserves

The two case study developments differ in political context and planning complexity. Forde was developed in a district where structure planning occurred 20 years earlier. The Forde development consortium was able to bring their experience to revisit the structure plan and also educate practitioners within the ACT Government about techniques used elsewhere to maximise residential amenity. This involved sensitively integrating the natural features retained in the development site (mature trees and creek lines) and building edge trails into the reserve buffers. They created a new concept plan that was more environmentally responsive and commercially attractive than the previous government plan (see Figure 7.4).

Practitioners considered Forde a good demonstration project and model for how to design and develop estates next to nature reserves. Practitioners noted that once the new land use concept for the suburb was adopted and construction progressed, it set new standards for residential development (see Table 7.3). It was also the first new suburb developed after the 2003 fires and thus, incorporated edge roads using various treatments and fire-safe construction for some homes in the bushfire-prone area.

Wright and Coombs were the first suburbs in the Molonglo Valley, where land became available for urban land use only after the 2003 fires. There were many process fault-lines in this highly contested environment and also expectations around land supply, fire safety and environmental protection. Practitioners within and outside government perceived the planning process at Molonglo as compromised by political imperatives and targets to release land for housing. The key decision-maker revealed their frustration due to the 'turgid byzantine process to get land out' and obligations to deliver affordable housing for local people. For the practitioners, the strategic plans provided little guidance about weighting competing policy objectives and no principles for defining the urban boundary. Aligning requirements to manage fire risk and threatened species at the site scale required tailored solutions and different knowledge sets. Practitioners managing the various site investigations and trying to settle the urban boundary along the river corridor felt that these complexities were not well understood by the decision-makers and that managers did not translate this. Some practitioners cited instances where there was an unwillingness to prosecute agency policy in this politically-charged administrative environment.

Table 7.3 Perspectives of planning processes near reserves

Summary of key issues
- The bio-sensitive design at Forde shifted policy and practice and set new benchmarks.   - There were tensions in reconciling social/economic and ecological objectives at Molonglo.   - Land release targets were perceived as driving and compromising planning processes.   - Physical and ecological complexity at site scale not well understood by decision-makers.   - No-go areas and principles for setting boundaries should be addressed in strategic planning.

Interview excerpts about planning processes near reserves
'When we started the [Forde] project the government had prepared a different plan that was completely different our concept and in our view was hopeless. They spent a lot of time and money on it and they do it all the time. They don't have— don't seem to have the right drivers somehow' (D).
'Part of the journey at Forde was to get the officials to understand a new way of doing things. We took them interstate to show how it was done, to allay fears, because, there's a standard they wanted, and we had to change that. It was ground-breaking' (D).
'I mean, the high-quality landscaping, everybody's learnt from Forde. So, it's been a milestone for Canberra. The whole project term was very focussed on sustainability so we were lucky. We deliberately made the blocks smaller, more affordable, more sustainable, but, at the same time, by modelling the building [envelopes] guaranteed privacy and solar access' (D).
'I don't think it was appreciated how difficult Molonglo would be and how hard the physical planning would be, and nor did they appreciate the infrastructure costs' (P).
'Bushfire boundaries and no-go areas for environment should have been settled. The danger is if you get pressure to fast-track and don't give things as much as attention' (P).
'Many agency people don't trust the planning process they are asked to engage with' (EA).
'It's not a bad planning process but this insane desire to develop land at the quickest rate means we're not running processes sequentially so, jumping the gun on many decisions' (C).
'In reality it's political. We can provide all the advice in the world but it comes down to dollars and housing blocks. We're not fully involved and that's deliberate because we're seen as a barrier' (EA).
'And some managers, sign up to a target, even if unrealistic and up until the last, say everything's in hand, there was evidence of almost misleading advice being given, painting a rosy picture' (D).
'All those constraints should be identified before the block yields were determined. So, we were given this poison chalice, "here's the target, you go forth and get 1,000 blocks out of this site", with no market analysis done or all the due diligence' (D).
'At Molonglo, the key challenge was defining the boundaries. I would have thought that if not setting the boundary, then principles should be developed by the strategic planning' (D).
Notes: D=Developer; P= Planner; E=Ecologist; C=Community; E=Environmental Advisor (Table 7.1)

7.4.3 Theme 3: Knowledge domains, availability and sharing

Practitioners involved in the assessment of estate design plans and development impacts felt they had adequate information for decision-making but many referred to the poor systems for data capture, sharing and management across the ACT Government (see Table 7.4). The (then) separation of the ecological research and land planning and management functions was considered a barrier to knowledge transfer, although this was addressed in an agency restructure in 2016. Participants recognised that the ACT had made additional investment in conservation knowledge, including vegetation mapping to underpin woodland restoration.

Practitioners noted the absence of pathways to feed site-based and community knowledge into decision-making and a tendency for the planning cycle (and planners) to draw heavily on consultancy reports and discount other forms of knowledge and skills—a form of gate keeping. With the heavy reliance on consultants, some practitioners suggested that peer review of these consultancies should be used to verify how ecological information is interpreted and to incorporate other knowledge. Development practitioners acknowledged the utility of local knowledge and ideas during estate design and construction; the BoB was the primary forum for sharing this knowledge (see Section 7.4.5).

Table 7.4. Perspectives of knowledge and sharing

Summary of key issues
• Better integration of data/knowledge/systems is needed in and across agencies.   • Professional collaboration and integration of ecological research and planning functions   • Peer-review of external (consultant) ecological studies is required to ensure adequacy.   • There is recognition of the value of site-based and community ecological knowledge but few sharing pathways.
Interview excerpts about knowledge and sharing
'I was constantly thinking about what further information and research we could initiate and personally took a whole range of decisions about funding' (DM).
'In a new area where there are no residents, you rely on the community groups that have an association with the Corridor, we were able to walk the site with environment and horse-riding groups and learn' (P).
'A duplication of effort is going on. I'd like to see more consistent approaches and ways of sharing and utilizing data that others go to great effort to collect' (EA).
'In many departments, the officers believe that they are the sole repository of all the expertise, . there's a culture of "the professionals know best" ' (C).
'The sort of fragmented organisation we have with research sitting over there and us here is OK while we know each other but as time goes on that goodwill will disappear' (EA).
'We don't have enough environmental scientists and they should be on the same floor as the planners—prevents an "us and them" mentality. There is a lot of silos' (EA).
'With the way we work, a lot of knowledge in people's heads and we have a big turnover of staff. So, that's a real problem' (LM).
'If you're a land manager the most basic information you need is what land you manage. We don't even know that in the ACT. The system can't tell you what we manage' (EA).
'I don't think it's well integrated. Without the planners and the researchers working together…I don't think ecological advice is listened to. We're dominated by the development authorities' (E).
'I still think the planners hold sway, particularly when they're driving it as they have in Molonglo. Everyone with any environmental knowledge is either kept out or used selectively. I mean, I'm sure the work [named consultants] has done has been useful, but that's all been done in parallel with planning rather than informing planning, you know? Very little we suggested was taken up'. (C)
Notes: D= Developer; P= Planner; DM= Decision Maker; E=Ecologist; C=Community   EA =Environmental Advisor; LM=Land Manager (Table 7.1)

7.4.4 Theme 4: Post-occupancy management of suburbs near reserves

Practitioners were satisfied with the quality of landscaping and open spaces that had been created in Forde but conscious of the budgetary realities of post-occupancy maintenance (see Table 7.5). Since handover of the public spaces in Forde, weeds invaded the habitat plantings next to the reserve and along the waterway (see Figures 7.18−7.21). Development practitioners consider this 'neglect' (described this way many times) the most frustrating and demotivating aspect of their work to create more biosensitive developments and urban living environments.

One informant in the LDA focus group compared the previous regime to design, establish and maintain suburbs in Canberra under the former National Capital Development Commission (NCDC) to practice since self-government:

> *A typical example is you just look out this window and see the work that was done by the original designers of this city. And in the summertime, those trees are full. It's just a beautiful environment and you can understand the pride of the NCDC and the people who develop that. You go back in now, I developed an estate five years ago, and it's just overgrown with weeds; nobody gives a damn.*

The acute funding and technical capacity shortfalls in post-occupancy management of urban public open spaces were noted by all practitioners, including decision-makers responsible for those agencies and budgets. Several practitioners acknowledged that the suburban maintenance budget had not increased for a decade despite the addition of a dozen new suburbs in the ACT. There was also no across tenure management of biodiversity across the matrix from the nature reserve to the open space, wetlands, creeks and habitat in the adjacent suburbs.

At Molonglo, practitioners viewed the early involvement of the post-occupancy land manager (PCS) in the rollout of remedial and restoration works in the river corridor as a positive step. The injection of new funds for rehabilitation, post-occupancy management and monitoring along the Molonglo Corridor is a consequence of the ACT Government needing national environmental approval to develop beside the nature reserve—and requirements to mitigate potential effects on nationally threatened ecological species and their habitats. Many practitioners see this scenario as creating a two-tiered system where nature reserves next to new development are actively managed and well-resourced, but existing reserves miss out. [125]

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[125] Approval conditions relate to protection of matters of national environmental significance in the Molonglo Valley under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Table 7.5. Perspectives of post-occupancy management

Summary of key issues
• Disconnection between policy to protect biodiversity and the resources and professional knowledge to maintain conserved areas and new habitats after handover. • Fragmented management of biodiversity across urban landscape and no targeted research. • Funding for offsets creates a two-tier system between old and new reserves. • There is no maintenance/monitoring of suburban biodiversity measures (Forde). • There is an improved process where land managers are involved from the design concept and in remedial works (Molonglo).
Interview excerpts about post occupancy management
'I mean, the high-quality landscaping, everybody's learnt from Forde, a milestone for Canberra, but TAMS are winding it back. But look, we wouldn't have gotten across the line without it' (D).
'TAMS's resourcing has not grown in proportion to the asset base. People expect government to be efficient, but you can't do it off the smell of an oily rag and get quality maintenance' (DM).
'We need long term monitoring that enables us to assess the effects of remedial actions' (C).
'It's disappointing that when we leave the estate, it's down to dollars; the things that we've put in place for the environment are not maintained, If it gets approved with all the plans, I don't think it's unfair to assume they will then maintain it' (D).
'We have problems treating invasives but there's no weed research in the ACT' (EA).
'We don't adequately price the cost of maintaining our reserves. When you consider their value for human health wellbeing, as natural places, amenity value, we just don't capture that' (DM).
'But the asset acceptance people, aren't the same people who do maintenance so we hand it over and it's beautiful; no weeds all of the plants have to be healthy and everything's looking really smick and then within six months, the weeds are growing and the irrigation's turned off' (D).
'Well, they should be structuring funding around what they are accepting in three years' time so need x amount of dollars. They're not doing value management on what they're getting' (D).
'As developers we made a conscious effort with the environment; we put in the infrastructure; we water the verges to make the streets more livable, and TAMS come in and switch it all off' (D).
'We are weak on consequences and costs, if you want to maintain and improve biodiversity it costs. Newly planted trees need maintenance' (EA).
'I'm conscious of the numbers, it's a massive commitment and we struggle to manage the place— we have 17 times more green space than Sydney' (DM).
'TAMS make it quite difficult that handover transaction possibly because they know the obligations into the future for maintenance. The longer they delay it, ultimately, it means less financial stress to them' (D).
Note: D= Developer; P= Planner; DM= Decision Maker; C=Community; EP =Environmental Advisor (Table 7.1)
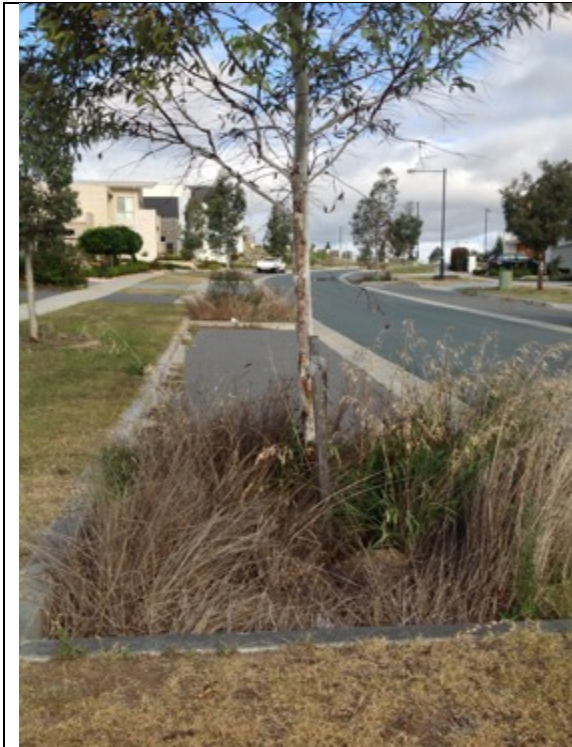
Figure 7.18 Rain gardens, a water-sensitive design measure.

These were trialled at Forde to manage storm-water but require a maintenance regime.

Figure 7.19 Verge landscaping using native species.

This was used to demarcate the buffer to the reserve (in background), but has been invaded by weeds.

Figure 7.20 Water-sensitive urban design stormwater channel

This was designed to slow and filter run-off using native species but has been invaded by weeds

Figure 7.21 Mature trees retained within Forde have died

This was likely due to ground disturbance and changed drainage but was not investigated.

Notes: Figures show post-occupancy condition of Forde

7.4.5 Theme 5: Collaboration with community stakeholders—the BoB

The BoB was considered a valuable forum by all participating practitioners (see Table 7.6). Strengths cited by informants revolved around its utility for learning and problem-solving because information was freely shared, concerns were aired and confidences were maintained. Having participants with the right skills and practical knowledge was viewed as a particular strength and also led to collaborative projects between community groups and developers. The success of practitioner learning and integration of community knowledge through the BoB at Forde created momentum for establishment of a BoB forum at Molonglo. The value of the forums is further explored in the case study (see Section 7.6), drawing on insights from Focus Group 2 and my observation of, the BoB groups.

Table 7.6 Perspectives of Stakeholder Collaboration - the BoB

Summary of key issues
• BoB is a beneficial forum to air and resolve issues during development.
• Strengths were information-sharing, confidentiality, informality, timing and place focus.
• Creative projects and partnerships evolved to deliver community education initiatives.
• Sharing and application of local knowledge were not enabled elsewhere.
• The model is readily transferable to other urban edge conservation settings.
Interview excerpts about stakeholder collaboration—the BoB
'We had the right people and could have discussion and thrash things out. It was collaborative relationship and an opportunity to get feedback before something got out of hand' (D).
'I think the big strength is bringing together people from research and government, land management and the community to talk through issues of common interest in an environment that's not formulaic. It's not making decisions; it's not trying to necessarily reach consensus: it's a space in which people can share views and discuss options' (E).
'They're all vocal and got their views, and special interests that they're looking after, but it seemed to me to work well as a forum. If there was a problem, it could be discussed' (D).
'Mulligans Flat Road was a good outcome—they were going to build a highway through the reserve and they ended up just sealing the existing alignment' (C).
'It was a huge surprise because, often NGOs are highly negative and highly critical. But BoB is the complete opposite; it's about wanting to help, not trying to tear it down' (P).
'When individual groups put in submissions, obviously they press their point of view. In BoB there is more of an attempt to come up with a solution that is satisfactory to all the different players'. (D)
Note: D= Developer; P= Planner; E=Ecologist; C=Community (Table 7.1)

7.4.6 Theme 6: Practice learning and innovation near reserves

Land development practitioners were inclined towards experimenting with new approaches but often resorted to the path of 'least resistance' for cost and time reasons Practitioners cited the rigid application of standards for some infrastructure as a disincentive for adopting new bio-sensitive practice as well as the absence of functional monitoring and evidence about how these measures are performing in the landscape (see Table 7.7). There was agreement about the need for post-occupancy monitoring to improve and inform future practice and projects. However, responsibility for monitoring would rest with the asset managers operating in a resource-constrained environment (see Section 7.5.4). The pace of development forces practitioners to rapidly shift to the next project with little time for reflection, although many acknowledged that learning is built into business planning for subsequent projects and that informal exchanges do occur. The asset handover and acceptance process was seen by all as cost-driven and not about innovation or biodiversity landscape improvements.

Table 7.7. Perspectives of learning and innovation

Summary of key issues
• Limited evidential base and rigid application of standards is barrier to willing innovators.   • Most learning is built into new projects via business planning.   • Some transfer of learnings happens through BoBs (Forde to Molonglo).
Interview excerpts about learning and innovation
'Cost indicators drive low maintenance solutions. They need technical capability, people with understanding because if you don't understand something, it's easier to reject it' (D).
'It's interesting for me coming from a background [that] treats developers with suspicion; they are currently totally frustrated by their inability to deliver environmental outcomes' (EA).
'There's a cultural aspect to asset acceptance and management, it drives innovation away' (D).
'We are challenging notions around infrastructure; that's a huge challenge for asset managers' (P).
'It's about who can stay in the trenches the longest? We end up on the path of least resistance' (D).
'Reflection happens in business planning in the next stage. What we do again or differently?' (D).
'I think there are improvements, learning we could feed into planning but often, the best discussions happened over Friday evening drinks and those informal conversations are important' (D).
'There's a general recognition that post-occupancy reflection, it's almost by chance because everyone's moved on to the next project and you're so focused on what's in front of you' (D).
'We really don't go back to check whether the work we've done on water-sensitive design and development of reserves: according to standards, but is that the best way to do it?' (D).
Note: D= Developer; P= Planner; EA =Environmental Advisor; LM=Land Manager (Table 7.1)

7.4.7 Theme 7: Creating new communities and nature connection

Both estates had community development programs that began once residents started to move into the new suburb but there were various views about whether developers should be 'creators' of community (see Table 7.8). The valuer (interviewee) noted that the most significant change in development practice over the last decade was the focus on creating communities and developing estate facilities to promote physical activity and community interaction.

As a master-planned estate, Forde was designed and marketed as an integrated community; diverse land/housing products were offered to create a cross-generational community and village lifestyle focused on the outdoors. A well-designed and generous open space network, it integrated heritage sites and stories connecting the estate to the nature reserve, to offset smaller lots and gardens. This was accompanied by investment in community development programs to orient residents as to their new community, its environmental features and how the estate was designed to respect the natural setting (see Figure 7.22).

These community programs were often delivered in a partnership model between the developer and local groups/organisations (see Section 7.4.5). The nature reserve was always visible along the entire boundary of Forde; the decision to create a fenced sanctuary in 2009 added to overall awareness of the natural setting. Practitioners acknowledged that community programs had a limited lifetime related to the developer's commercial interests.

The public land development managers had contrasting views about their role to create community: some saw their job as getting the land released, whereas sustainability and marketing experts saw value in investing in the new community and the living environment. They acknowledged that the LDA's 'Mingle' community development program could focus more on environmental orientation, particularly given the number of CALD households.

Unlike Forde, there were no mature trees to frame the open space planning at Wright and the relationship with the nature reserve was not explicit or even visible as works to rehabilitate the river corridor were still underway when people started moving into Wright and Coombs. While much planning work had been completed on the River Park, residents had to rely on panels displaying future plans at community meetings to imagine their future suburb (see Figures 7.23 and 7.24). Street tree planting and the water-sensitive design using large detention ponds were key elements for building amenity and natural spaces into Wright and Coombs. The convenient

proximity of the suburbs to the city and adjacent recreational facilities like Stromlo Forest Park was heavily promoted in the marketing for both areas. [126]

Table 7.8 Perspectives of Creating New Communities and Nature Connection

Summary of key issues
• Forde, the first master-planned community, was deliberately designed as an active outdoor suburb with a village feel and connections to the nature reserve. • Building a relationship with nature was reinforced through physical design, special programs and education in Forde with community partners. • Differing views on whether developers should create and invest in community programs. • The LDA's Mingle program could be used for conservation orientation, especially for CALD residents.
Interview excerpts about creating new communities
'At Forde we deliberately wanted to create a community for all generations - their forever home - marketing around the suburb that it will never be built out (because of Mulligans Flat) (D).
'Developers are raising the bar and changing practice if you look at estates now. They are meeting places; the focus is on creating communities as opposed to just a place to live' (V).
'I don't think that we, the LDA is doing anything to change the culture of people who are living in an edge environment and about using the assets that might be on their front door step' (D).
'We wanted to create an active suburb [at Forde] with all blocks walking distance and all walking trails lead to the reserve' the idea was to get them into the communal spaces' (D).
'Comes a point with community development programs where there is no marketing benefit, we are just adding to administrative costs' (D).
'At the moment, I don't think we should be doing too much more than just selling the land. I don't see how much more we need to do as a government land developer. Private developers put a lot more into the education and the building the community. Is that necessarily our role?' (D).
'The trade-off for smaller blocks was setting aside significant open space, even the furthest part of Forde are walking distance of the reserve and all walking trails lead to the reserve' (D).
'Some of the stuff at Forde, like Caring for Country, came about because we just couldn't do it ourselves so needed other people and groups to deliver these programs' (D).
'Now, I've got to be honest and say that there's not a massive emphasis on environmental elements, and especially at Bonner, near Mulligans Flat but it's really not a push to people to be involved or to be educated on it. It's not that it can't be but it just hasn't been a focus' (D).
'Maybe [for our CALD buyers] we need to do culturally-based programs to introduce them to the environment and how they can enjoy it, as many have never experienced the bush' (D).
Note: D= Developer; V=Valuer (Table 7.1)

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[126] https://suburbanland.act.gov.au/molonglo/about.

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Figure 7.22 Environmental orientation and programs in Forde

Source: Forde Developments

Figure 7.23 Residents at Molonglo Community meeting	**Figure 7.24 Presentation at Molonglo community meeting**
Note: 8 December 2014 to discuss plans	Note: 11 May 2017 to discuss facilities

7.4.8 Theme 8: Motivations of purchasers of new estates near nature reserves

The land development practitioners had unique insight into the interests and motivations of the people who bought into their estates. At Forde, they acknowledged the motivations principally include the appearance and atmosphere—and promise of a high-quality urban environment and lifestyle. At Wright and Coombs, it was securing a block of land with the setting and environmental features secondary to the price and block size in purchase decisions, although it was noted that the blocks near the river were sought after and sold at a premium. Few purchasers understood the implications of the new solar requirements for the site coverage and house they could build (see Table 7.9).

Forde was carefully marketed to promote the outdoor lifestyle and estate facilities to support it (e.g., hike and bike trails). The slogan 'like never before' and a high amenity narrative were used to differentiate the estate (see Figures 7.25 and 7.26). Informants from Forde recalled advertising promoting the specialness and proximity to nature. While the initial motivation might be securing a block of land, the natural setting and proximity were acknowledged and valued by residents and for a few, were the principal drivers of the purchase (see Chapter 6). The practitioner valuer observed that high-amenity premium offerings, like Forde, tend to retain value over time even with poor municipal maintenance. This can now be observed at Forde, where the natural amenity of the estate and its proximity to the reserve are heavily used in real estate marketing for house sales, and houses next to the reserve are more costly (Packham 2017).

Table 7.9 Perspectives about Homebuyers in Estates Near Nature Reserves

Summary of key issues
• Master-planned Forde was marketed on its high amenity, build quality and setting.   • Many extend themselves to buy into lifestyle concept and like-minded community.   • For LDA estates, the primary concern is access to a greenfield housing block.   • Environment or sustainability features are a secondary consideration in purchase.   • Aspirations to build a 'dream home' were apparent at both locations.
Interview excerpts about home buyers in estates near nature reserves
'The demographic is definitely young families and couples. A lot is based on affordability. The beauty of courtyard houses on small lots is price; that attracts young people' (V).
'To buy in Forde, to move there—it's the quality. They bought the dream. Unfortunately, I don't think it's for environmental reasons. So, the setting—yeah that it'll never be built out, quality open spaces, I mean, nice to have, but there's no way it's the major decision' (D).
'Yeah, there's an element of people extending themselves for sure. People come in the sales office and directly compare Forde to Bonner and they've got to pay more for the same size block. They go "Mm", that's a lot of money. So, they trade off something' (D).
'When we've asked questions about why have you bought here, and [whether] it's about close to open space or the sustainability features or price block size, price always wins' (D).
'Through the sustainability advice service (at Molonglo), their attitude with house plans, is that they don't care about the sustainability stuff; it's just still about the biggest house you can build. Few people want a smaller and more sustainable home' (D).
'I suppose the thing that we can gauge is the repeat business and the market; it's dictating a lot now. People do want to come back to an LDA estate. But is that driven on what we've done in the estate, or is that the market? Is it the price pointing back to the block size?' (D).
'Given our [buying] community is so multicultural, and most are economic and political reasons their first priority is a roof over their heads and the best way of doing that'. (D)
'When our customers come to a ballot, their priority is, one, to secure a block. And that's repeated every time we host a ballot; They're not looking at the environment we're trying to create as a developer, they're more interested in obtaining a block of land' (D).
'When they had choice, it was simply, is the flattest block that they can get. Things that we try to add on, like near the bush, they're not there. They're just not there' (D).
'With the Coombs ballot, the first blocks that went, were all the ones with the view to the river, and then near the open space, so there is a little bit of interest about that' (D).
'They [high-amenity estates] tend to retain their values over time because they attract a premium initially so they remain desirable even though the landscaping goes downhill' (V).
Note: V = Valuer D= Developer (Table 7.1)
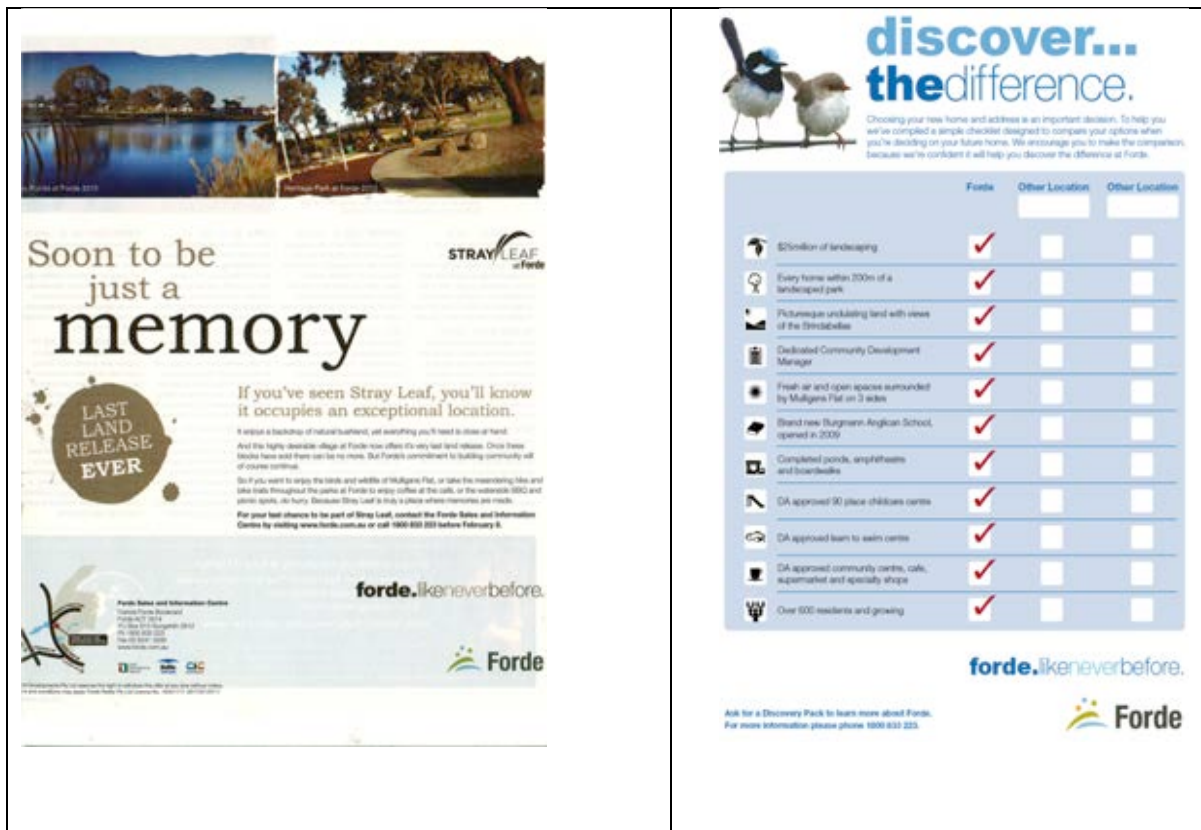
Figures 7.25 and 7.26 Marketing narratives in Forde

Source: City News

7.5 Bush on the Boundary Group

As part of this practitioner case study, the utility of a novel community learning and governance structure, BoB, was explored as a model to translate community knowledge and influence sensitive development practice near urban nature reserves (see also section 7.4.5). As Brown (2010: 124) noted, 'community knowledge is generated wherever groups of individuals share the same experience interests, and/or place'. BoB was first convened by conservation stakeholders to exchange local knowledge, generate ideas and facilitate early resolution of environmental issues during the construction phase of Forde, Gungahlin. It operated as a cross-sector forum, became the catalyst for community education and improved biodiversity design outcomes at the urban edge (Eyles 2015; Ginninderra Catchment Group 2013). Following the success of the Forde BoB experiment, another BoB forum was convened at Molonglo in 2011 to coincide with the construction of the new suburbs of Wright and Coombs.

7.5.1 Methods

From 2011 to 2015, I was a participant observer at bi-monthly meetings of the BoB forums at Gungahlin and Molonglo (n = 28). I actively participated, engaging in discussions and bringing information to the forum, and undertook research (Eyles and Mulvaney 2014) that was used by the BoB. I attended four field trips with the BoB: one to Bonner and three at Molonglo (see Figures 7.27−7.29) and produced an 'information and achievements' flyer for both forums (see Appendix 12). A number of BoB participants were also interviewed (see Section 7.4.5) to source experiential data about the forum using a range of methods.

Figure 7.27 Bush on the Boundary Molonglo Site Visit, 2013

Photo. LDA (Researcher 5th from left)

Figure 7.28 Bush on the Boundary Molonglo Site Visit, 6 July 2015

Photo: ACTG (Researcher first row right.)

Figure 7.29 Bush on the Boundary Molonglo Site Visit, 2016

Being immersed in these knowledge and practice discussions and observing the interactions gave me a unique insight into how learning and knowledge were used in this novel setting. To address obvious questions about my subjectivity as researcher, I convened a focus group workshop, independently facilitated and involving the same participants (under observation), so they could share their experiences of the forum. It was done in a way that would allow for a story to be weaved about its 'value creation' from the people who had both done the learning and taken it into practice (Wenger et al. 2011). The workshop was also designed to benefit the continuity (or otherwise) of the forum by allowing participants to reflect on future directions for the BoB and build on a previous workshop by the Gungahlin BoB in 2008 (see Davey 2008). There were 15 participants in the focus group, including the land development, management, planning and environmental/conservation practitioners from the Gungahlin and Molonglo BoBs (Figure 7.30). The facilitation plan and questions for Reflections and Future Directions Workshop were based on the Focused Conversation method (see Section 1.8.2.2) and a copy of the plan is in Appendix 13.

Figure 7.30 Bush on the Boundary Focus Group, 6 November 2012

7.5.2 Focus group findings

The focus group generated rich conversation about the value of the BoB forum, structured around questions designed to extract the essence of the BoB and the diverse perspectives of participants. Many observations emerged about the purpose, qualities, value and features of the BoB which were summarised by the facilitator:

'Focus is on where urban development interfaces with bush in broadest sense

A connective structure – collective from lots of different angles

Forum for knowledge exchange but not with the usual baggage

Created openness, trust and safety

Fertile space for ideas and new community industry partnerships

Able to deliver tangible outcomes

Focus on edge practice 'Principles' as a way of working

The full summary of views and observations is at Appendix 13. A number of issues and projects were identified as examples where good practice had been facilitated through the BoB, including: the realignment of Mulligans Flat Road, to retain roadside vegetation and mange traffic speed to protect wildlife (See Figures 7.31 and 7.32); and the Molonglo Planting Guide (see box 7.1 and Figure 7.33).

Figure 7.31 Responsive design retaining mature eucalypts on Mulligans Flat Road

Figure 7.32 Wildlife underpass, Mulligans Flat Road

Box 7.1 Example of a Collaborative Project, Molonglo BoB:

Molonglo Local Native Plant Guide

Objectives

Provide a multiple-purpose planting list for river corridor, open space areas, streets and gardens.

Ensure the right species and edge treatments to prevent future weed problems in the river corridor.

Manage tensions about habitat trees in open space areas and post-fire planting in the Valley.

Methods

Tailor species selection and tree categories for different spaces—gardens, streets, parks and reserve.

Check deciduous height range and identify smaller habitat trees for gardens.

Check consistency with regulations governing understorey species for fire management.

Make sure the product can be propagated (seeds or cuttings), has local provenance and is available at Yarralumla Nursery for residents using a $100 plant voucher.

Use colour photographs to show what different species look like.

Ideas for application

List to be used by Planning agency to advise applicants about landscaping in building applications.

Municipal agency retains the list and provides it to Urban Tree Management Team.

Sets planting standard and schedule for urban landscaping contracts by government.

Wetland species to be used for water-sensitive design urban ponds and WSUD projects.

Figure 7.33 Good practice outcomes from BoB: Species Planting Guide

7.5.3 Combined findings—participant observation, interviews and BoB focus groups

The reflections of informants from the BoB focus group (see Table 7.10) and interviewed practitioners (Table 7.5) were generally agreed with what was observed at BoB meetings. Informants confirmed use of the forum for information and knowledge exchange in a non-adversarial and collegial environment. The engagement of the land developer and key government officials and practitioners was considered critical to the legitimacy and effectiveness of the forum. In this way BoB provided the soft safe space for collaboration across both knowledge boundaries and across sectors (Illsey et al. 2010) and for important collective learning (Brown and Harris 2014; Keen et al. 2005). The people involved in BoB 'are the ones who have both done the learning and taken it into practice'; they are 'both the carriers and the witnesses of the process of value creation' (Wenger et al. 2011: 34).

While participating in BoB, I made observations about the effectiveness of BoB relating to both personality and inter-personal relationships that did not emerge from the focus groups and interviews. The first related to the pivotal role of certain individuals, who acted like brokers and change agents within their government agencies; this was similar for key people in private

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companies in the Forde case. These practitioners saw value in BoB as a means of securing early input to design plans and proposals, and also for identifying collaborative projects where local and community knowledge was advantageous. Particularly in the early phases at Molonglo, these practitioners were able to build coalitions with the key groups and champion the forum within the key agencies. Thus, the right participation was essentially linked to particular individuals. Interestingly, 'personality mattered' as much as process in this context in terms of the way these practitioners operated as well as their comfort and preparedness to work in a collegial way with the community. Studies of practitioners managing community engagement processes in Vancouver found that effective planning was not just about getting the process right; the way practitioners operated affected likely success (Grant 2009).

Personality also mattered in relation to community participants, particularly the Chair, who was instrumental in retaining interest, momentum and relationships with development and agency practitioners. Their understanding of the planning and development context and processes was also important. The Molonglo BoB effectively lost momentum with a change in the personnel (staff and Chair) of the Molonglo Catchment Group that had been coordinating meetings as well as change in professional staff at the LDA, and the Parks agency. There was also uncertainty about the development timing for the next stage of Molonglo, which was not resolved until 2014 when the LDA finally contracted out development of the next suburb, Denman Prospect (Clisby 2015). This observation about the personal community leadership was also mirrored by one key informant, who had observed both BoBs in operation:

> *I think the usefulness [of BoB] varied over time for a number of reasons due to sort of personal commitment. Like one of the driving forces during the mid-period I suppose of my involvement was with X, from X Group, who really picked up what they saw as a great thing happening in Gungahlin and kickstarted the Molonglo one. I never got the sense those who followed took it as seriously. So, from being a driving force to being a sort of almost reluctant participant sometimes.*

Another observation concerned the value of an iterative process, where learning moves and knowledge evolves with development firms and in key government agencies (Brown 2008, 2010; Keen et al. 2005). This was clear with practitioners working in CIC, who took the design and practice ideas (as well as the forum) to other edge development fronts (e.g., Crace and Googong) but was less successful at Molonglo. As soon as a new developer came on board (at Denman Prospect), initiatives like the Species Planting Guide were not carried through. This was despite the LDA managing this 'englobo' land. Two issues were likely causal factors here: personnel change at the LDA meant that this product slipped from the corporate memory. Most

importantly, this technical work had not been translated into a specification or standards for application in building site controls and public space landscaping contracts in subsequent stages, as was the intended action for the relevant agencies in earlier BoB meetings.

Where good practice is not taken up, valued and translated, participants can become frustrated and require significant energy to remain with the process. I often observed a sense of 'Groundhog day' in both forums.

7.5.4 Postscript: BoB today

A critical factor revealed by the focus group findings (see Section 7.6.1) was the need for a tight focus for the Forum to maintain interest and momentum; this was also revealed during practitioner interviews:

> *At Gungahlin, I mean it's really important for a group to have a particular focus and I got the sense from the Gungahlin that once the development focal point, which was really around Forde and Bonner and their relationship with Mulligans Flat…once it started to broaden its scope the energy diffused a bit as well.*
>
> *So, I think it served a really useful purpose for a period there, around with the focus on Forde and Bonner, and when it had interest from Lend Lease in the early meetings.*
>
> *Obviously, Molonglo was dynamic early on because there was a lot going on in terms of the assessment processes. Gungahlin took on a different complexion because the immediate development that it was set up to do had happened'.*

Both BoBs can now be considered effectively defunct. The Gungahlin forum stopped meeting once the suburb of Forde was complete. The developer contracted the community development role to the then-Gungahlin Regional Community Services and the Forde Community Association became incorporated in 2015. [127] Issues relating to the urban interface with the Sanctuary and the development of the new suburb of Throsby (see Section 5.7.1) are handled by the Mulligans Flat Management Committee, under the Woodlands and Wetlands Trust, and trust staff at Forde Community Centre (see Chapter 8).

The Molonglo BoB stopped meeting regularly in 2015 and I maintained a watching brief at Molonglo by attending a series of public meetings convened by the LDA to update residents on the development of Wright and Coombs from 2014 to 2017. A residents' advisory group is

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[127] http://www.fordecentral.com

already active for this fledgling community and various social events have been held, including community planting days to restore degraded woodland along the River corridor, which I attended to meet new residents. The advisory group is supported by the LDA through the Mingle program and a community development officer contracted by the developer.

Given that the key BoB successes were during the design and construction phase, it is clear that Molonglo BoB had a continuing role in the later stages of development to the north that was not fully appreciated once the personnel changed. I was invited to be part of the reference group for the development of the Molonglo River Reserve Management Plan and despite it appearing in draft form (ACTG 2016), fire and boundary issues delayed its public release until 2018 (see Chapter 5). Some of the issues that normally might be covered by the BoB are now managed by the Conservation Council and the Molonglo Residents Group. [128]

The proof of concept however is being realised elsewhere with a BoB is operating for the new development at Ginninderry adjacent to the Murrumbidgee River coordinated by the Riverview Group and Ginninderra Catchment Group. One of the Forde development managers with CIC also proposed to set up a BoB for the Googong development with the Molonglo Catchment Group and local Council.

A legacy outcome of the BoB was the Conservation Council's 'Urban Edge Policy and Guidelines', which contain a set of principles and recommendations to assist developers and the ACT Government to establish measures to protect and enhance ecological values at the urban edge (CCACT 2013). It also produced an awareness publication for edge residents *Living at the edge* that can be referenced in new edge settings (CCACT 2014).

7.6 Overall Findings and Conclusion

This case study explored the perspectives of practitioners involved in development of two new residential estates in Canberra adjacent to nature reserves. It revealed their challenges and frustrations, while noting that the local political, planning and environmental context very much shaped the development process and possible outcomes.

The interviews and focus groups allowed practitioners to reflect both individually and in a group on development practice, the knowledge and rules that govern that practice (e.g.,

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128 https://www.facebook.com/groups/molonglovalley/.

approval processes), the standards, the players who enforce them and the constraints arising from the relations of power in which they operate (Friedmann 2000). Other experiential studies about planning practice have also found that the political and planning environment creates the context within which practitioners are able (or otherwise) to pursue innovations (Grant 2009).

Practitioners were mindful of the ecological setting and open to working differently and using local knowledge to create more bio-sensitive urban communities near nature reserves. At Forde, private development practitioners drove a significant cultural shift from a conventional to a sympathetic design concept for the estate that respects the adjoining nature reserve and retains and augments habitat within the suburb. Importantly, this concept also focused on the future experiences of residents connecting with these natural open spaces and the adjacent nature reserve.

At Molonglo, practitioners found it challenging to marry policy objectives to deliver housing and amenable safe living environments while protecting ecosystems. They cited the complexity involved in translating strategic environmental and bushfire risk management requirements into acceptable measures at the site scale. With no local precedents to draw on and uncertainty about ecological effects, reconciling these requirements demanded significant inter-disciplinary collaboration and knowledge. This complexity was not well understood by decision-makers who had made political commitments to deliver housing and continued to be assured by senior agency officials. The issues of boundary setting at Molonglo were also identified in another study about planning for bush fire risk (Norman et al. 2014). Practitioners noted a tendency in the planning decision cycle to draw heavily on consultancy reports and discount other forms of knowledge, although BoB forums provided a means of transferring community knowledge during the construction phase.

These reflections highlighted perceived failures in knowledge flow, inflexible standards and inadequate investment in care and monitoring of urban biodiversity under the ACT's planning and management regimes. Practitioners cite the 'disconnect' between aspirational policies to protect biodiversity applied during design and planning and the on-ground management reality after construction. This has been observed with post-occupancy maintenance of green infrastructure elsewhere (McWilliam et al. 2015; Hostetler et al. 2011).

Practitioners in this study were more than willing to experiment and be creative to make more bio-sensitive urban landscapes but cited barriers created by inflexible regulations and resistant cash-strapped asset managers at hand-over as obstacles. This continues, with developers at

Ginninderry facing the same issues five years later; the developer claiming that 'bureaucracy is stymying the inclusion of mature street trees and trying to limit parks because of the cost of maintaining them' (Lawson 2018).

Practitioners were also disillusioned by the lack of maintenance of the natural spaces they curated and failures to monitor the effectiveness of these new on-site measures, particularly water-sensitive stormwater control. Many displayed notions of transformative learning; they were prepared to go beyond applying their current knowledge and wished to learn and apply new concepts to practice (see also Forester 1999) This was a missed opportunity for learning about bio-sensitive design and knowledge transfer to other urban development sites in the ACT.

This disconnection between practice during design and construction and post-management highlights the need for a cohesive integrated municipal regime in the ACT to manage urban biodiversity and monitor constructed ecological interventions outside of nature reserves. One informant summarised this

> *It's a bug bear, the lack of maintenance of green infrastructure within the city. You see weeds growing everywhere, and that's a reflection I think of the lack of priority in relation to that nature infrastructure that's cost the community an awful lot of money.*

At Forde, there was considerable investment in the design and construction of natural landscaped areas by retaining mature box-gums, using native species in street and park plantings and installing new water-sensitive wetlands and rain gardens to manage stormwater runoff in the suburb. Lack of maintenance has led to watercourses and planted habitat becoming weed-infested; the hardy native forbs used on street verges are being removed and replaced with grass that can be mowed (see Figures 7.18−7.20). This is equally frustrating for the new residents (Sawa 2015). A number of the mature trees have not survived despite being carefully sited in parks, possibly due to changed drainage regimes (see Figure 7.21).

This scenario is not unique to the ACT (Grose 2010a) and mirrors post-occupancy experiences in conservation subdivisions in the US (Hostetler 2012; Hostetler and Drake 2009). Management of the urban matrix needs more investment and collaboration between ecologists, open space and conservation managers to maintain conserved and created urban landscapes, monitor their functioning over time and channel this knowledge back into decision-making (Hostetler 2019; Hostetler et al. 2011; Taylor and Ives 2009; Crofts 2004). Research is underway on augmenting habitat for threatened reptiles and monitoring other species in the

Molonglo Valley and at other offset sites. This provides a model of how this might work but such projects are currently limited to only a few EPBC-listed species and communities (O'Riordan 2014).

A positive finding of this case study is the valuable role played by community stakeholders in facilitating BoB forums. These forums countered multiple barriers to the exchange of information between researchers and practitioners (problematic for translation of urban research identified by Taylor and Hurley (2015)) and also allowed for inclusion of local and community knowledge, which is often not valued in decision-making processes, as found by Hillier (1999b).

The BoB operated as a 'community of practice': a safe space for joint exploration and reflection on potential strategies—but was anchored in the realities of development practice, which is the critical context (cited by Wenger 2010). Practitioners were willing participants because they shared an interest in improving development practice near reserves. Illsey et al. (2010) described this sharing environment as 'soft space', which allows collaboration across boundaries and creates opportunities for leadership and promotion of cross-sectoral initiatives. The BoB also demonstrated how social and collective learning (see Brown and Harris 2016; Cundill and Rodela 2012) can occur when people with diverse perspectives engage and through continuing dialogue and deliberation, co-design solutions (Keen et al. 2005).

In the case of BoB, leadership from the community to organise and engage other parties was also critical to the success of these forums, as were willing practitioner champions within government agencies and residential development firms, who ensured the necessary cross-sector participation and built coalitions with community groups. Fischler (2000) found motivated planning practitioners essential for effective work with community groups, while Brown (2008) showed how these committed agents of change can transform organisations towards integrative practice.

Focused on Forde, the first BoB had a grounded experimental quality that saw developers and officials actively use the forum as a testing ground for ideas and options. Some novel and unlikely collaborations also emerged between developers and the community through the BoBs (LDA 2013), particularly to assist with community orientation and education. The value created lay not only in the quality practice outcomes and low running overheads (the BoB required only professional time and modest organisational funding), but also the collective learning outcomes and practice examples for application in the Forde developer's next project

at Googong in NSW. This value has been conceptually described (see Lambert 2013; Wenger et al. 2011; Brown and Brown 2008) and this study now provides a concrete example of it in a complex real-world setting.

The ecological and social context of these case settings is not dissimilar to outer edge urban development in other capital cities like Melbourne and Sydney, which suggests that the BoB is a useful 'knowledge-to-practice' model with potential applications in other Australian cities with similarly engaged practitioners. The need for this research translation into practice has been identified in the urban research space (Taylor and Hurley 2015).

This case study focuses on the residential design response to minimise ecological impact and enhance urban systems near reserves, not necessarily on purposeful residential design to influence interactions between people and nature, as described by Hobbs et al. (2013). However, Forde was explicitly designed to encourage physical activity and connection with natural spaces, with links to the reserve and early education to make residents aware of the setting. Practical information at point-of-sale, in newsletters and through sustainability workshops reinforced social norms about the how nature was respected across the site. This helped residents to understand the design underpinnings and become stewards in their own right (Thompson 2004). Interestingly this was an outcome of the developer's vision and development experience rather than explicit public policy framing. Here lies an opportunity to further evolve residential design practice to encourage nature connection and align with social and community well-being outcomes, particularly given the recent adoption of Active Living Principles in the ACT (ACTG 2016b).

Practitioners observed that the conservation setting is not the reason most people buy into new estates although the social programs facilitated by the developers can help raise awareness. The Forde study suggests that this early education is valuable, particularly environmental orientation activities, but that local stewardship evolves more slowly and may take a different form from older suburbs (see Chapter 5).

The relationship to natural open spaces was less explicit at Molonglo, with the adequacy of urban open space criticised by conservation stakeholders who felt the reserve was being used as de facto nature space for the suburbs. There is strong contrast in the different design responses of the two estates, their natural amenity, open space provision and public domain landscaping. There were also considerable delays in the delivery of the public parks in Wright and reduced amenity because of the lack of mature shade trees in these spaces (Molonglo Public

Meeting 2012). The upshot at Molonglo is that the environmental approval requirements have facilitated significant public conservation investment in the river corridor itself (ACTPLA 2011). Weed removal from river banks, woodland restoration and the development of walking trails, picnic and interpretation facilities is being delivered by the Parks Agency—the first grassland habitat to be afforded such facilities in the ACT (see Figures 7.35−7.37). There is also a management plan for the corridor that details policies to manage future relationships with residents and recreation in the corridor (ACTG 2018e).

Practitioners acknowledged that the early involvement of the Parks managers in the Molonglo development process, restoring the adjacent landscape and preparing a management plan, was a positive development. Involving the new community in some of the restoration activities also signalled the River corridor is important for conservation as well as a recreation space for future residents. The next Chapter explores the experiences of this group of practitioners, who manage urban nature reserves next to residential areas, as well as those in the community sector and the volunteers that work in partnership with the Parks Agency.

Figures 7.35 and 7.36 New Grassland trails along the River Corridor from Coombs

Figure 7.37 Interpretative signs, Molonglo River Corridor

Chapter 8: Case study - Managing urban nature reserves

'Urban protected areas are at the heart of the struggle to create more sustainable prospects for both nature and people. Their importance cannot be over-stated' (Trzyna 2014: 4).

Researcher's story and iterative research

In previous chapters, I related my professional experience which has included managing programs to support volunteers and community partnerships. This experience gave me insight into the valuable local site knowledge and capacity for reserve management and governance. In particular, opportunities to leverage neighbours and community groups to manage threats like weeds, pest animals and bushfire risk across landscapes and tenure boundaries. These local networks have demonstrated extraordinary resilience in the face of constant changes in government program support, that often fail to recognise the value of this community capital.

Volunteering has given me unique access to these people and insights into the workings of these programs. I participated in bi-monthly meetings of the ParkCare coordinators and the CFU team leaders and volunteer training courses and exercises for both programs. The iterative nature of this research allowed me to participate in relevant projects as opportunities arose, including the design of pilot engagement activities at Mulligans Flat (see Section 6.5.2) and community awareness about bushfire preparedness (see Section 8.9.6).

I have been able to contribute my research findings and observations in a number of fora like the World Parks Congress 2014 (Appendix 18), planning and program consultations: the Community Reference group for the Molonglo River Reserve Management Plan (ACTG 2018e); the draft Management Plan for Canberra Nature Park (ACTG 2019c); and, focus groups involving CFU volunteers to evaluate the CFU program (Bird et al. 2016).

8.1 Chapter Overview

This chapter is the last of three themed case studies; and explores the experiences of practitioners 'managing' urban nature reserves, using place-based case studies of Mt Taylor Nature Reserve and the Mulligans Flat Woodland Sanctuary (Research question 2). The first part of the chapter draws on semi-structured interviews with land managers, their advisors, community-based conservation managers and ParkCare volunteers to distil their management experiences and the knowledge domains they draw on. The challenges and management structures of each reserve are compared using these diverse perspectives. The complexities of managing bushfire risks and the role of volunteer programs in assisting both bushfire and reserve management are explored the second half of the chapter. It also investigates research question one by considering what motivates local people to become engaged in these programs using interviews with ParkCare and CFU volunteers and managers, complemented by

participant observation in group settings. The maturing network of community-based fire units established following the 2003 fires is building more resilient urban edge communities. There is potential for collective learning and programs to use these valuable community-based partnerships to share responsibilities and improve management capacity and effectiveness.

8.2 Research Setting and Context

The land use and social history of the nature reserves selected for these place-based case studies are described in Chapter 5, with maps of the reserves at Figures 5.56 and 5.23. The Mt Taylor Nature Reserve is located in the geographic centre of Canberra and the Mulligans Flat Woodlands Sanctuary is on the northern ACT−NSW border (see Figure 1.2). Both reserves are part Canberra Nature Park, a network of almost 40 urban nature reserves of varying sizes, configurations and ecological conditions.

The key management issues for Mt Taylor are recreational access, threatened species habitat management and weed and vertebrate pest control (see also Sections 5.8 and 6.4.2.2). The reserve is managed by the ACT Parks and Conservation Service (PCS) assisted by the volunteer Mt Taylor ParkCare group.

At Mulligans Flat, the extent and quality of the grassy woodland ecosystem is unique in both the regional and national contexts (ACTG 2004b). As described in Chapter 5, this has seen the significant investment in the nature reserve; a long-term woodland research experiment and the creation of a sanctuary with the erection of a predator-proof fence around the reserve (see Section 5.7.1). The Sanctuary is being expanded to the adjoining Goorooyarroo Nature Reserve and has a community-based Management Committee advising on strategic management of the Sanctuary, supported by a Sanctuary manager and dedicated team of PCS rangers.

8.3 Research Methods

Semi-structured interviews were the primary method employed to gather the experiences of the reserve managers. A broad scope was applied to the term 'manager' and practitioners here included those in conservation policy and decision-making roles, specialist advisers, operational rangers, NGO and ParkCare program managers and convenors, and CFU program managers and volunteers (see Table 8.1). The questions varied to reflect the different roles, urban settings and management approaches at each reserve.

Table 8.1 Breakdown of Informants

Management practitioner group	No.	Role at study site/s
Conservation and emergency services policy specialists/decision-makers (DM)	6	High-level (political and agency head) Nature reserve management and emergency management decisions
Ecologists: government, research (E)	4	Ecological advice
Community: volunteers coordinator (C)	4	On-ground management, local knowledge, education, citizen science
Program managers: volunteers (VPM)	7	Management of volunteer programs
Environmental advisors: fire, weeds (EA)	5	Threat mitigation and risk management advice
Public Land Managers (LM)	9	Land management, operational planning and on-ground works
Total	35	

The second part of the chapter, which documents the case studies of ParkCare and CFU volunteer programs, uses semi-structured interviews, archival and document analysis of report, and participant observation in volunteer groups, including pilot engagement projects within ParkCare and CFU (see Table 1.6).

Participant observation was used to understand the relations between managers and volunteers and to identify the value and capacity of partnerships in nature conservation and urban fire management. By participating in program coordination meetings (quarterly ParkCare coordinator meetings and CFU team leader and consultative committee meetings during the bushfire season), I gained a unique insight into how these volunteer programs are integrated (or otherwise) into organisations and agency planning (see Section 1.8.2.4, Tables 1.5 and 1.6).

Part 1: Management of urban nature reserves

8.4 Case Study Results—Mt Taylor Nature Reserve

Managers were asked questions to distil their experiences and perspectives about management, condition of the reserve, their relationships with users and neighbours, community engagement, barriers and challenges in the urban setting.). Thematic analysis of the interview data was used to distil managers views and quotes are used to illustrate to the common and differing perspectives of the land managers. Observational data is included where relevant to the

thematic analysis of interview data, as are some comparisons with the views of users and neighbours of the reserve (see Chapter 6).

While Mt Taylor is the primary focus, many of the land managers interviewed are responsible for all urban nature reserves and their views and responses reflect this wider ambit and experience. For example, rangers in the southern (urban) district manage 16 urban reserves between them. Thus, many views can be generalised to management of CNP.

8.4.1 Theme 1: Key management issues

The key issues identified by managers were managing human behaviours and impacts and also the expectation of utilities to site infrastructure; these issues were raised more than traditional issues like weeds (see Table 8.2). The most mentioned issue for Mt Taylor was the difficulty of controlling access to the reserve. There are 27 entrances and walkers have created desire lines [129] across the mountain, damaging vegetation and creating erosion. These observations coincided with issues identified by neighbours and users (see section 6.4.2.2; Figures 8.4−8.6), although users suggested that poor track maintenance exacerbates the situation. Management of access is applicable to most of the other CNP urban reserves with long suburban boundaries.

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[129] Desire lines are paths created when people take shortcuts because there is no constructed path or the constructed path takes too circuitous a route. They typically represent the shortest or most easily navigated route between two points (see https://www.highwirepress.com/insight/what-desire-lines-tell-us-about-user-experience/).

Table 8.2 Manager Perspectives of the Key Management Issues

'I think the nature-based issues, feral species, erosion control, those classic land management issues, and then human behaviour. If you talk to the rangers, they'll say the biggest issue they face is [managing] human behaviour, which is perhaps—the weeds ..as well to some extent'. (DM)
'The attitude of many other government agencies that this is the empty land that they can put all their infrastructure in—pipelines, transmission lines, roads. Our nature reserves are seen as fair game so this sort of death by a thousand cuts is still occurring in the reserve'. (LM)
'The emerging issues, mountain bikers not thinking have an impact, they're just mountain biking, but seeing the trails being cut through the parks. Dogs off leads. I see dogs harassing kangaroos. So those human behavioural issues around people not understanding of their impact'. (LM)
'On Mt Taylor, the high number of people that use the reserve and dogs off leads—probably my biggest safety concern for management is with dogs off leads and small children'. (LM)
'Our biggest issue is we can't control where people access the nature reserve—they access where it's most convenient, so "desire lines"…where a track gets formed erosion starts and people start complaining ..and then we feel obliged to fix it up, but often it's not in the best location or aligned with the contours for an actual walking track'. (LM)
'Trying to balance the different user groups and the different land management policies, I guess, is probably the biggest challenge'.(LM)
Notes; all responses were from Public Land managers rangers (LM) (Table 8.1)

Figure 8.5 Unauthorised track damage up a steep slope through orchid habitat

Figure 8.6 Mountain bike track, Mt Taylor

Figure 8.6 Managing utility agencies and their impacts

8.4.2 Theme 2: Condition management

Managers were questioned about the reserve's condition and most conceded the poor condition of Mt Taylor and identified potential causes as a combination of historical land use, drought, weed invasions, grazing animals (see Figure 8.7), lack of maintenance and human use (see Table 8.3). The impact of recreational use and an inability to maintain track infrastructure were also identified as contributing to degradation. This mirrors the concerns of users and residents (see Tables 6.4–6.6).

Table 8.3 Views About Mt Taylor Nature Reserve Condition

'I look at it and there's no doubt it's highly disturbed. That's a consequence of decades of the way it's been managed and used I'd say it's in average health. it's certainly not pristine. And it is variable. it's in better condition than it was three years ago but that's because of rain'. (DM)
'It's clearly in not particularly good shape.. partly the impact of drought, partly increasing public use and lack of resourcing for [agency] to manage recreational use so we see areas degraded by mountain bikes, impacted by dogs and cats and other feral animals and weeds'. (LM)
'Look I would say fair to poor condition, based on the active erosion'. (LM)
'It's not in too bad a condition. I mean, I've seen pictures of it in the past as well, and I think that it has improved over the years in terms of vegetation'. (LM)
'We inherited the land because it's above 600 metres above sea level, not because it had conservation values; it's former grazing land and has been cleared and heavily modified'. (LM)
'If you were to think of, take the IUCN criteria, it's not in good condition.' (EA)
'We are so lucky in Canberra to have these spots and yet condition's declining. So, we've got to come to terms as a community, (do) we let them decline or address weeds and value them'.(LM)
'Another indicator of condition is if you have a vibrant active community group attached to a particular patch of bush, you're almost certain to have a better managed tract of land'. (DM)
Notes: LM=Land Manager DM=Decision-maker EA=Environmental Advisor (Table 8.1)

Some managers contributed strategies for improving condition (see Table 8.4), including applying a scientific approach to assess baseline condition and monitor the effects of management actions. The ACT Woodland Strategy was cited as an exemplar of good practice. The siting of signage and other infrastructure could be based on experience to avoid vandalism of signs and other infrastructure. Interestingly, one senior manager acknowledged that having an active community group is likely an indicator of good condition because of the volunteers' management effort in the nature reserve.

Figure 8.7 Loss of native groundcover: Mt Taylor

Note: Groundcover loss is due to a combination of drought and over grazing by herbivores.

Table 8.4 Strategies to Improving the Condition of Mt Taylor

'We need to set up some long-term monitoring that enables us to assess not only the condition of our reserves but impacts of threats and remedial actions That would answer that question.' (EA)
'A lot of things we did in the past didn't have science behind them but with [the Woodland Strategy], it's been quite scientific in its approach, using the satellite imagery to improve connectivity it's a good way of doing a targeted restoration program. (LM)
'First and foremost, we really need to look at the weed control within and in the wider area around those reserves. I see that as a key threatening process for the ongoing relatively, I certainly wouldn't say pristine, but relatively good condition of our nature reserves.' (LM)
'Both in terms of soil function and erosion, the type of native vegetation that will deal with impact of weeds, of kangaroo grazing, impacts of recreation that maintains integrity.., but it does need to support the ranges of species that are important for our own well-being.' (E)
Notes: LM=Land Manager E=Ecologist EA=Environmental Advisor (Table 8.1)

8.4.3 Theme 3: Relationships with urban users, neighbours and managers

Managers were asked about relationships with their urban neighbours and nature reserve users (see Table 8.5). Research suggests that most park managers glean information about social values through their interactions with users and neighbours during their daily work (NPWS 1997). A similar thread emerged from these interviews. Most interaction with reserve

neighbours occurs while administering operational policies about access to reserve land (e.g., a neighbour seeking access to the rear for house building works), [130] or when rangers respond to urban wildlife issues and reports about asset damage. The time consumed in following-up urban wildlife reports and managing access permits was viewed as limiting the time available to rangers for land management in the reserve (see Figures 8.8 and 8.9). The absence of rangers on the ground was reiterated in the data provided by users and neighbours, who could not recall seeing a ranger on the mountain, and also my observational data (see Sections 6.4.1.4 and Table 6.6).

Many rangers related the negative aspects of their interactions with the public, dealing with 'anti-social' and other behaviours. This was succinctly stated by one ranger: 'Most of the work is managing bad people problems, not positive interactions'.

Table 8.5 Manager Relationships with Neighbours and Users

'Most neighbour liaison is for access permits, somebody filling out a form to get access to their back gardens. A ranger has a look to make sure that it's appropriate to take a trailer in, puts a lock on the gate, and then checks after .. there's a huge amount of work involved'. (LM)
We let them know about burns, fox control so that we don't kill their dogs. But we won't know what they need unless we have a relationship with them. We need to be receptive to that'. (LM)
'We've learnt from Mt Taylor, things like putting interpretative signage just far away enough from where someone might park so that—we call it "the two stubby rule". If it's two stubby walk, they'll do damage to it, but if it's further than that, then you're probably safe.' (LM)
'I'd like to know what our immediate neighbours believe is the biggest gap in the way we look after those areas, and what…in their view, what we're failing on, what is the biggest issue that they consider to be a complete failure? We don't understand our neighbours very well'. (DM)
'It's an ongoing battle to communicate with users that this area that you're recreating in has multiple values. It's not just a bike track or an equestrian trail, or a patch of land that you can run around and do orienteering. And that gets through to some, but not the majority'. (LM)
'So, most of our engagement, is through injured animals and responding. Injured animals are very political and yeah, you get curly ones, swooping magpies is a shocker, and snakes'. (LM)
'Mount Taylor: we know everything that goes on up there because people ring us and tell us, because there's so many people up there. Which is good for us, because we're alerted to problems a lot quicker than we probably would be if those people weren't there'. (LM)
Notes: LM=Land Manager DM=Decision-maker (Table 8.1)

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[130] Residents may apply for approval for vehicle access through a nature reserve under the *Public Unleased Land Act* 2013; fees, conditions relating to access and rehabilitation apply.

Figure 8.8 Managing access permits for neighbours and compliance

Figures 8.9 Injured kangaroo to be euthanised

Figure 8.10 Kangaroo killed by a collision

One senior manager conceded that they knew little about their neighbours and was interested in hearing neighbours' opinions of Parks operations. The local residents and users, while sympathetic to Parks employees, were of the view that the Parks Agency were unable to do their job. They observed the deterioration of track infrastructure and human damage to vegetation and park assets that result from the lack of management presence in the reserve (see Tables 6.6 and 6.7).

During the observation period in Mt Taylor ParkCare group, the most effective interaction observed between a ranger and neighbours occurred during public consultation for the draft ACT Trails Strategy (ACTG 2013e). The ParkCare ranger took the initiative to erect a marquee tent at the bottom of the main southern walking trail on Mt Taylor, conversed with park users about trails and sought ideas and feedback. One good strategy was to 'whipper snipper' along trails during the warmer months to cut vegetation away and maintain sightlines along tracks, recognising the potential for snakes (Field notes, November 2013).

8.4.4 Theme 4: Engagement with the wider community

Managers were asked about community education and engagement, and the responses suggests little engagement is happening with community (outside of ParkCare) with constraints around both Ranger capacity and the absence of an organisational focus and/or willingness to educate and engage (Table 8.6). Managers identify the need and importance of this engagement in their responses, despite the lack of organisational focus and a specific program for CNP.

Table 8.6. Managers' Views on Community Engagement

'We should say: here's your nature reserve. where you can learn about nature, and get that care reaction going. It not happening It's about the dollars, insurances, all that kind of thing'. (VPM)
'I always feel that we're only engaging a very small select group of people who are self-selecting and choose to be engaged. It's a real challenge and I don't know how we overcome that'. (LM)
'I mean, interpretation in Canberra Nature Park: it's more or less non-existent, ad hoc.' (LM)
'I think that a very sizable proportion of the population are just, they're living their lives and don't have the time or they may not have the knowledge or both to get engaged'. (VPM)
'We can't negate the huge effort the Canberra community puts in (as volunteers) it's very high in the national statistics, so it's not all about money, it's harnessing that community'. (LM)
'I've probably got five enquiries by schools to talk about snakes; that I can't do, used to be an education program, a unit, but now only Tidbinbilla runs education program'. (LM)
'I certainly fully support the ideas of using art and music and those kinds of cultural strengthening devices to connect people with nature reserves'. (LM)
'The majority of Canberra residents probably appreciate their reserves even if they don't visit them. What you have to do to engage them is offer a spectrum of recreation opportunities'. (VPM)
'I think there's been a change in culture, look after your nature strip, pride in the park, et cetera. Now, they couldn't care less about the nature strip or across the fence to reserves'. (LM)
'When we talk about the word education, we just think about schools. Well, let's think less about schools and more about the people that are walking in here; it's just a procession all day'. (LM)
Notes: LM=Land Manager VPM=Volunteer Program manager (Table 8.1)

Surprisingly, there are currently no formal programs to communicate with CNP neighbours and/or educate the community about urban reserves, apart from walks and talks delivered by volunteer ParkCare groups, ageing signage (currently being replaced at Mt Taylor and some other CNP reserves) and, most recently, social media. [131] The new reserve signs contain 'cues' about behaviours and ways to get involved through ParkCare (see Figures 8.11 and 8.12). Facebook provides a real-time and visual medium to communicate with users about management works and trail closures.

Figures 8.11 and 8.12 Reserve Signage, old and new

Historically, there were ranger-led walks in urban nature reserves (see Section 5.8, Figures 5.51 and 5.52) but ranger workloads now leave little time for education and interpretation activities. School community service activities in the reserve provide opportunities for rangers to meet students. Prior to the appointment of the ParkCare ranger in late-2013, the rangers had limited capacity to plan and organise community service groups. I observed the Marist College service events with the Mt Taylor ParkCare Group. The students enjoyed the interaction and physical work with the rangers (see Figure 8.12). These events also provide a less formal opportunity to deliver educational messages.

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[131] https://www.facebook.com/ACTParks/.

Figure 8.12 The ParkCare ranger advising Marist students on how to handle the tools

Managers were also asked whether particular policies, rules and regulations might exclude people in CNP (see Table 8.7). The responses identified the lack of facilities and infrastructure for users (e.g., toilets and parking) and prohibitions on 'cubby' building and bike jumps. Rangers were aware that children needed somewhere to build bike jumps and that demolishing their structures might push them into more sensitive areas. This was particularly the case on Mt Taylor, where children had constructed jumps in an area adjacent to the suburban boundary—an area of highly-modified acacia regrowth that is subject to intensive bushfire management (see Figures 8.15-8.18). Often, policy is justified by perceptions and not evidence, as is revealed in the discussion about public liability below (Table 8.7). One ranger suggested that every suburb needs its own dirt bike circuit like the Gungahlin facility (see Figure 8.19).

Table 8.7 Land Managers' Perspectives of Factors Affecting Community Engagement

'I reckon we're creating the barriers for engagement. There's tension, Why put in facilities? Well, to encourage them so they engage and meet people and chat about the birds and wildlife'. (LM)
'We have this nature interface so we've also got to encourage people to appreciate and enjoy the space. There's not much point if the infrastructure is degraded and not maintained'. (LM)
'There is a cultural change about what you can do in these nature reserves, and they're less appealing. You take the huge grasslands at Gungahlin. Lovely to look at but there to protect "a" species. Ride a bike. Do things in there. Nup'. (LM)
'Removing BMX jumps. It's hard, but we have to get rid of them because of public liability issues. But, you're always conscious: if you knock it down, they're highly likely to just go further in and ruin something else. You might push them into something really significant. (LM)
'I looked into this issue about liability, and out of all the claims against this agency for injuries, there was 300 or something about urban playgrounds. There was only one about a bike!' (LM)
'So, we're adjusting organisationally to one strand of environmental business, biodiversity,...And some of our bureaucrats have the narrowest interpretation of what should happen in a nature reserve. They wish to constrain the access by those living near them. to put the fence up. (LM)
'And the government's response would be...well, "You can't have the bike jumps because we'll take the liability if someone gets hurt". And the other one will say, "Well we built Stromlo Park for a zillion dollars, they should go there". But that's no good to a 14-year-old kid, is it?'(LM)
Notes: LM=Land Manager C=Community (Table 8.1)

Figures 8.15–8.18 Various Bike trails and jumps, Mt Taylor Nature Reserve

Figure 8.19 Dirt bike track, Gungahlin

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8.4.5 Theme 5: The multiple use challenge

A consistent thread in the interview data was the challenge of managing for multiple values in nature reserves where the primary land use objective is conservation. Managers recognised the need for people to access nature and use these places with all that comes with that like walking dogs, riding bikes and horses (See Table 8.8)

Table 8.8 Challenges in Managing Multiple Values

'We've got a tension because we want people to be close to nature reserves (and) undoubtedly humans are having a negative effect. The purpose in legislation is conservation and one of the things to navigate are those expectations about access compatible with the aims'. (E)
'Living in the bush capital, reserve planning should be sympathetic to the population having access but it is difficult to maintain areas when you have people hard up against it'. (EA)
'Let's have a recreation strategy that we've been asking for, for years. That will help us guide— where the mountain bikes to go? Where the horses go? Where the visitor centres go?' (LM)
'Well, a nature reserve, if you like, by definition is probably going to focus on nature. And our reserves are right beside large urban developments, so you're optimistic at best'. (EA)
'Look, I am a believer giving people access to the bush but also believe in other cases not giving access in some areas except for research reasons, feral pests and weed control'. (EA)
'I feel quite strongly: the well-being of the community is important, if not more than the well-being of a section of reserve. Having kids use a space that isn't actually fenced in, in the public corral, and maybe say okay, if you're going to build your dirt jumps, do it there'. (LM)
'I see people who want to ride bikes through the bush as being legitimate, it's just the rusted-on people think; they don't appreciate it. And that kind of conflict is a waste of people's energy. let's work it out, have a conversation like we did at Bruce Ridge. That's really important'. (LM)
Notes: LM=Land Manager E=Ecologist EA=Environmental Advisor (Table 8.1)

An element of ambiguity is reflected in these responses because the managers are trying to hold together two or more things that do not necessarily 'cohere' (Law 2004: 90). The proximate urban setting serves to heighten this tension and enact conflicting practices and views among managers, with some holding the conservation fortress line and others expressing a more pragmatic and human-centred view.

These two distinct value sets are difficult to resolve while these urban bounded reserves are viewed only as ecological units and managed separately to the adjoining landscape. There is a lingering question about whether this model is 'fit for purpose' in urban settings. Canberra's urban nature reserves have been categorised as IUCN Management Category IV to conserve

flora and fauna species and their habitats. The guidance notes that reserves in this category are often small but also critical for wildlife, and accordingly, require regular management intervention to mitigate threats and to restore and conserve species and their habitats. Recreational uses (apart from 'opportunities that are available for providing public education and the appreciation of wildlife species') are not envisaged in this management category (See Dudley 2008: 19).

The ambiguity is even more apparent in certain policies and projects in nature reserves. Many consider the 2013 Centenary Trail a primarily recreational facility, despite some conservation and heritage elements within its interpretation strategy (Field Notes 7 May 2013; 14 August 2013). The ACT Trails Strategy was released for consultation but then shelved (Field notes, 11 November 2013; 11 June 2014) and the launch of 'Connecting and Building Recreation – A Vision for the Territory' on 29 July 2015 (including the 'Nature play' program) was not necessarily aligned with the *ACT Nature Conservation Act*, which uses Reserve Activities Declarations to regulate reserve uses (Field notes 9 February 2016).

8.4.6 Theme 6: Barriers to management—the 'fault-lines'

Managers were asked about barriers to managing nature reserves. The responses were separated in this theme (See Tables 8.9-8.11) to examine the different views of rangers, decision-makers and NGOs interacting with Park Service but outside of the agency. Inadequate resourcing is the consistent theme, as well as an element of resignation that conservation does not attract the same funding prioritisation. There are feelings of personal frustration and disappointment among rangers about their capacity to do the job (see Table 8.9). Only one ranger suggested the need to triage and allocate resources based on the conservation value of the different reserves, although this is already happening to some extent at Mulligans Flat and new nature reserves created as biodiversity offsets.

Table 8.9. Rangers' Perspectives of Barriers to Management

'Environment does get funded but not to the same extent as hospitals and education, and that's the way our society is but it makes it difficult trying to make a few dollars go so far'.
'We don't do enough compliance. That's one of the things that we fall down on, where we don't follow-up our education with providing that on-the-spot fine.'
'There could be a lot of improvements done on Mt Taylor, if we had more resources.
'We are under the pump constantly. Plus, I mean, each ranger manages up to seven reserves themselves, of which they, you know, struggle because of resources'.
'The barrier is do the Canberra public really know how much it costs, that we need to sustain them and that's a trade off with something else. For every dollar we spend on conservation, it's a dollar that's not spent elsewhere. So, I think resourcing is a big one'.
'I see the resourcing of the maintenance of reserves as something that really needs to be improved. And Canberra is now 360,000; which means that it will continue to grow and continue to put pressures on those areas, both for development and use pressures'.
'It depends a lot on the nature of the park, because management of Black Mountain is very different to Mount Painter; they're not very far apart geographically, but they have different site issues, so different management and restoration challenges'.
'But what I would change would categorise our reserves; I guess it's to an extent triage, based on conservation value. But if we've got this amount of money, should we keep putting little band aids and lose the battle or should we actually—let's make a difference in a few reserves'.

The decision-makers (including senior managers) identified staffing and depth of skill in the Parks agency as well the failure to capture and reflect the value of nature reserves and fund maintenance accordingly (see Table 8.10).

Table 8.10 Decision-makers' Perspectives of Barriers to Management

'Without a doubt, resourcing is our biggest problem, and that will always be the case. But there's also the politics. Sometimes the things we want to do aren't the sorts of things that the community is willing to accept through its elective body. And good staff is a challenge; getting good people'.
'I've no qualms with raising additional resources. I think people have an expectation and government has to be efficient, but you can't do it off the smell of an oily rag and expect a high quality of conservation or standards maintenance'.
'We don't adequately price the cost of maintenance of our nature reserves. When you consider the value they add to the city, health and well-being their inherent value as natural places, their broader amenity value and the landscape setting and so…we just don't adequately capture that'.
'My observation is there's some skilling and personnel shortages in the agency. That's always an issue in a small jurisdiction like ACT. We don't have the depth of expertise'.

The perspectives of practitioners (NGOs with volunteer program) outside the Parks agency were different (see Table 8.11). The need for Parks to have its own infrastructure budget and a budget for each reserve (unit) was also observed. There is debate about whether this is due to resourcing, a structural issue or, perhaps, leadership within government. While many nominated resourcing, others considered whether failing management might be a consequence of the government wanting to maintain control and not exploring the opportunities for partnership and resource-sharing with the community. The ACT's community-based catchment groups have secured substantial project funding through Commonwealth and ACT Environment programs in the past decade—now invested in CNP. Community-based governance can often respond more quickly to new information and delivery of on-ground works (Spoelder et al. 2015) and groups are eligible for a range of funding not available to public agencies. This responsiveness was already demonstrated in the ACT in landscape recovery following the 2003 fires (Bartlett, et al. 2005) and in the early years of Canberra's landscape regeneration, where Greening Australia was the foundation organisation for implementation of the funding under the Commonwealth tree-planting programs. [132]

Table 8.11 Community NGOs' Perspectives of Barriers to Management

'Parks are one of the few areas that don't have an ongoing source of funding. Other infrastructure has a guaranteed source of funding and Actew can guarantee ongoing funding for its infrastructure'.
'Is it resourcing or just bureaucracy that's in the way? They always see resources as them putting on more staff, rather than a different model. And I think the willingness of government to entertain sort of partnership models with the community... much could be done with the community doing it'.
'My feeling is the problems are more in resources than the structural framework, although we've lost a lot of experience with people getting exasperated because of lack of resources'.
'You hear of rangers being shifted around and the morale is often not good, because they say "I want to stay here for a time". But they always get shifted. I know there's reasons, but can we have some proper resourcing to manage these nature reserves—we just don't know how good we've got it here'.
'Look, they don't have the staff to for it. These people come in keen and get knocked on the head after a while and most work is contracted out so they've lost touch with doing it, whether trails or weeds'.
Note: All responses were from Community-based volunteer program managers (VPM) that interact with the Parks agency and care volunteers. (Table 8.1)

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[132] Letter to the Editor, 'Planting for the Future', *Canberra Times,* 16 December 1991, undersigned R. Prinsely Chair, Field J. Deputy Chair and Wiseman V. Manager, Greening Australia ACT and SE NSW Region Inc.

8.4.7 Theme 7: Managing for fire risk, conservation and people

Perhaps the greatest challenges and issues of consequence for urban managers (decision-makers and operational personnel) is managing bushfire risk, human safety and biodiversity in urban nature reserves. Managers are mindful of the high priority that fire management has assumed since the 2003 Canberra fires (see Table 8.12).

Historically, Canberra suburbs were constructed with backyards abutting nature reserves, placing the APZ wholly within the reserve. This not only conflicts with conservation but makes fire abatement more complex as a significant area of urban ACT is bushfire prone. After the 2003 fires, new planning policies and tools were adopted to minimise fire risks by implementing the recommendations of the operational response inquiry. [133] This included site-specific fuel management approaches, APZs and new edge treatments with edge roads incorporated in the design of new development areas adjacent to nature reserves to provide a defensive space within the suburb boundary (see Figures 8.20 and 8.21). Research conducted after the 2003 fires found that even with grassed buffers of 55–84 metres, 43% of homes in the first two rows of residences at the urban interface were destroyed as the result of ember attack in the older suburbs (ACT Bushfire Council 2012).

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[133] The ACT Spatial Plan 2004, adopted the planning risk recommendations of the McLeod Inquiry ACTG (2003) including a Bushfire Abatement Zone (Map 9) to mitigate the risk of bushfire hazards to life and property within metropolitan Canberra. Fuel management within this zone will be site specific to respond to the threat and conserve the landscape qualities of the 'bush capital'. The Bushfire Abatement Zone has been defined relating to both existing urban areas and future urban areas.

Table 8.12 Perspectives of Managing Fire Risk

'I still think there's a real conflict between fire management and Park management and the so-called protection of the city area. I think we're going to have to live with because I think fire management, or impact management, will always take priority, particularly after 2003'. (LM)
'So, fire. It's obviously—our number one responsibility, because it's the highest risk. The highest consequence activity. So, yeah, that really, does drive a lot of what we do'. (LM)
'Well I find the problem is we managers talk at totally different scales and it's hard to relate to if you're an individual who lives [next door] concerned about individual bushes and trees behind their house. The entire Mount Taylor is kind of the detail we'll get to'. (LM)
'The way Canberra was designed, isn't quite as problematic as some of the other states. They kept all the hills for scenic reasons, so what you have generally, is houses downhill from the bush, which is good from a fire point of view. If you look at Sydney, it's the opposite'. (EA)
'In the older suburbs where houses back onto the nature reserve, the inner asset protection zone has become a sacrificial area, actively managed to reduce fuels, and this gets a mixed response; some people happy, some not, but it's legislated, we don't have a choice'. (LM)
'Well, there aren't very many reserves that actually have the APZ outside of the boundary. It's caused a lot of tension, specifically with user groups that see it as giving up important values by burning them or mowing them every year. We would rather avoid it obviously'. (LM)
'The difficulty with the established reserves is there needs to be an outer asset zone, and this compromises the edge of reserves and within reserves ecologically as well as, compromises the safety of fire fighters. So, if you've got houses next to a reserve, you lose that edge'. (E)
Notes: LM=Land manager E=Ecologist EA=Environmental Advisor (Table 8.1)

Figure 8.20 Edge treatment in an older suburb- showing fire trail

Figure 8.21 Forde next to Mulligans Flat, showing the edge road and buffer with a walking trail external to the reserve

The ACT's Strategic Bush Fire Management Plan (ACTG 2014 and 2019) provides that APZ will be contained in the development footprint of new developments adjacent to nature reserves (rather than in the reserve) and may be wider (40 m) where needed for safety and to address concerns about the effect of fire management on conservation values. Managers were asked whether the ACT was better prepared for fire since 2003 (see Table 8.13). The new planning rule requiring an edge road between new residential subdivisions and the nature reserve was recognised as an improvement, along with the ACT's capability to manage mid-range fires. Challenges remain in funding fire management across an expanding western urban edge and the future prospect of more extreme or catastrophic events as well as communicating with the new edge residents, a significant proportion of whom are from CALD backgrounds (see section 5.12, Appendix 7).

Table 8.13 Thoughts on Fire Management in the ACT Since 2003

'I can see the advantage of an edge road with the new fire rules. It creates passive surveillance. It also creates a clear delineation between residential and nature reserve'. (LM)
'There was a great leap forward after 2003 with the edge roads [in new subdivisions]; there was a recognition that it wasn't appropriate to put houses right on the boundary of reserves. I think the last time that that happened was down in Tuggeranong in a development in Conder'. (E)
'For mid-range fires, we are better equipped, our arrangements are better, but if fire came over the Hill tomorrow same as 2003, the reality is it is to some extent unmanageable'. (EA)
'In comparison to before, 2003, we got a whole lot of stuff in place for fire now, we've got our strategic plan and our regional ops plans, but that doesn't change the nature of the risk' (LM)
'There is a need to develop a model for increased fire management funding, which takes account of and keeps up with the rate of urban edge development in the ACT'. (EA)
'There's an old saying with fire that 5% of fires do 95% of the damage. So, in reality we can deal with 95% of the fires that do 5% of the damage. To deal with that 5% of fires, you'd have to do things that are socially and politically unpalatable like concrete the Molonglo River'. (EA)
'The extreme event is almost impossible to deal with. What you can do is certain things that allow you to protect critical assets and that's what we're investing our time. We do regular burns ...lots of little patch burns to reduce the fuel. They're designed to help us attack more routine fires. In a catastrophic fire, the fire trail five metres wide all of a sudden pales into insignificance'. (LM)
Notes: LM=Land Manager DM=Decision-maker E=Ecologist EA=Environmental Advisors (Table 8.1)

8.5 Case Study Results—Mulligans Flat Woodland Sanctuary

Interviews conducted with managers associated with Mulligans Flat had a different focus to reflect the woodland conservation values and condition and its partnership governance model. As described in Section 8.3, an expert management committee, part of the philanthropic Woodlands and Wetlands Conservation Trust, is responsible for strategy to support the ecological and education projects in the sanctuary. The Parks ranger team is responsible for the operational management of the sanctuary and the Trust employs an ecologist communications manager and casual tour guides.

The ranger team were specifically asked about operational management at Mulligans Flat and how it compares with their experience working elsewhere in CNP. All managers were questioned about the values and character of the Sanctuary and the alternative model of governance and the opportunities it presents for conservation and engagement.

8.5.1 Theme 1: Operational heaven

Rangers working in the Mulligans Flat ranger team were asked about the difference in being able to focus their work on one nature reserve. Their responses contrasted significantly to those of rangers working at Mt Taylor and other CNP reserves (see Section 8.4.6). Mulligans rangers were unequivocal about the value of being part of a dedicated team, both in terms of their ability to improve the condition of the reserve and perform ongoing maintenance. They also cited the professional rewards of being able to make a difference (see Table 8.14). In the establishment days of removing foxes and cats for the fenced sanctuary, ranger Grant Woodbridge, quoted in the *Canberra Times,* cited looking after the reserve as his dream job:

> I've been doing vertebrate pest management for 10 years but it was always on a broad scale and you were never able to win the war completely because of constant reinvasion from the outside – this was the opportunity to practise it in an area where the actual goal of eradication may be achievable. [134]

Table 8.14 Rangers' Views on Working in a Dedicated Team in the Sanctuary

'But I really saw this as something to put on your tombstone; something special rather than just the normal grind of Canberra Nature Park where I used to do…the best half-arse job I could in 27 different areas, you know. Because I just didn't have enough hours in the day to do anything well".
'Well my previous one was at the southern areas along the Murrumbidgee River corridor which is total contrast to this place. Anything that…if you took any pride in anything or built along there it'd be vandalised or destroyed within that week…I just jumped at the chance to come here'.
'Well after many years trying for new ideas to get away from the reactionary work, I said, "I'll take it on", there's a fair bit of construction work in the beginning and I was prepared to have a crack, where I could leave a bit of a mark. And I got wind that people in high levels said it'll never happen—I wouldn't be able to do it. I wanted to prove them wrong'.
I would argue that, despite this being seen as expensive with the salaries, if it was replicated, the money would come out neutral, because as reserves get neglected they get overrun with weeds and rabbits, then in 10 years' time, they throw…massive amounts of money at it and walk away again. Whereas, if you're chipping away every day, you never have to throw that contract money at it'.
'Yeah, well …it was a chance to do something for conservation too. And something out of left-field that might have some flow-on effects to other parts of the woodlands, which were vastly forgotten about in the national park system'.
Note: all responses were from Public Land Managers (LM)   (Table 8.1)

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[134] 'Cat fight How scientists are tackling the feral cat threat', *Canberra Times*, 2 May 2010.

Apart from these ecological and professional benefits, while interacting with this ranger team as the Friends Convenor, I observed the value of their site-based knowledge and their relationships with sanctuary users, volunteers and researchers. These social relations are in stark contrast to experiences at other nature reserves, where users never see rangers (see Table 6.6) and rangers are rarely able to work with volunteers. Local residents and users regularly see and interact with the rangers at Mulligans Flat (see Table 6.14). The rangers are also able to plan and organise work parties for the volunteers and lead them (see Figure 8.22), akin to the early years of the CNP ParkCare partnership (section 8.7, Appendix 14).

Figure 8.22 Rangers Whitty and Woody (left) and Mulligans Friends at the Winter Work Party 2014

The ability to remain on top of maintenance in the sanctuary is also considered critical and cost-effective over time. I observed that trail damage after heavy rain at Mulligans Flat was repaired within the month, whereas at Mt Taylor, it was more than two years before a contractor repaired the upper-southern fire trail and the erosion continued unabated.

The existence of a small depot and equipment store on site as part of the Mulligans woolshed means the rangers are present in the sanctuary most days. Along with the visual barrier of the fence and the cameras at each gate, this deters anti-social activity. The only major incident at Mulligans Flat since the sanctuary was created was related to the annual kangaroo cull (Knaus

2013b) and was not a random act of vandalism. The simultaneous construction of the new suburb and the sanctuary fence provided a 'sweet spot' to reinforce care and stewardship with new neighbours, which was actively supported by the Ranger team leading orientation tours.

8.5.2 Theme 2: Jewel in the crown

Managers were asked how Mulligans Flat was different and the range of responses included its land use history, ecological integrity, attraction of visitors and the evolution of something different and innovative in the conservation sphere with the creation of the fenced sanctuary (see Table 8.15). Reserve condition (compared to other CNP reserves) can be related to land use history and management attention, as described in Chapter 5.

Table 8.15 Managers' perspectives of Mulligans Flat

'We were lucky that Mulligans Flat and Goorooyarroo will return and restore. Mulligans was farmed but in a light way so wasn't the standard destruction of native grasses and that's only as a result that leaseholders over time were simply not prepared to invest in a lease with a withdrawal clause and so...the grasslands that survived as result of that accident of history'. (DM)
'Mulligans will be an absolute jewel, a special place to maintain interest and enthusiasm as long as the people around and embrace it. I just think Mulligans special'. (DM)
'Overwhelmingly, the response has been positive. People see it as, as something different: "Wow, look, the ACT government is actually trying something innovative". This is something that occurs in other parts of Australia where people have an innovative outlook, not here in Canberra'. (DM)
'Stanhope, for example, was the biggest one behind it, our local elected fella. And he's behind the two million bucks for Mulligans Flat, the Trust but ownership is by the community of ACT'. (LM)
'It reflects the government investment and it's partly the experiment. We're lucky everyone recognises with the woodlands that we do have the biggest, most botanically diverse patch of yellow box red gum in Australia and it's worth investing in, and recognition of its value'. (E)
'A lot of credit has to go to a few people in relation to conceiving the idea and saying, "This could work here even with people right up to the boundary". Now in all the areas with predator-proof fences, they've been out bush, in arid areas or remote. This is right up close'. (LM)
'It's the sort of a place where people bring their visitors to Canberra. Yeah, we notice it in the visitors' book. People come out and you get the people from the Netherlands and the UK and the USA and they've been brought out here by their friends in Canberra'. (LM)
'I think there is an opportunity to make a difference. It'd be nice to be a purist and keep this forever as it is but it's not going to happen and I would rather the investment go in there so it makes it something different from the rest of Canberra Nature Park'. (EA)
Notes: LM=Land Manager DM=Decision-maker E=Ecologist EA=Environmental Advisors (Table 8.1)

8.5.3 Theme 3: New ways of working

The potential for an alternative way of managing Mulligans Flat can be traced to the long-term social associations, place relationships and knowledge of many individuals and groups, as described in Chapter 5. Citizen scientists provided the foundational evidence that secured protection of these woodlands in public ownership (and the future setting for the Mulligans Flat – Goorooyarroo Woodland Experiment). They continue to contribute ecological and place knowledge through the management board, running wildlife surveys and assisting research and monitoring programs.

Managers were asked about the new governance model with the Woodland and Wetlands Trust for managing Mulligans Flat and its potential application elsewhere (see Table 8.16). At the time of the interviews, there were set-backs for the partnership that have since been resolved with the appointment of a new Trust Board in 2015. Overwhelmingly, the responses reflect confidence in the model and the ability to leverage additional resources and qualified, interested people for conservation. The value of having a community is considered essential to the long-term success of the model. There is also a feeling that the Trust partnership model needs to be proven here first before being transferred elsewhere. The findings in Chapter 6 also revealed that the Trust model was not obvious to many local residents and users, although the proposed creation of a new Gateway and Woodland Learning and Visitor centre may change these perceptions (Healy and Nowroozi 2018; TRC DC Landscape Architects and Locales 2016).

Table 8.16 Managers' Perspectives of the New Governance Model

'The governance thing, I think it's got the potential to succeed because of the funding model of the Trust—getting philanthropy external funding and sponsorship and then funding work, I think we've just got to give it a bit more time to see whether it works'. (DM)
'I think it's a really good way of engaging community ownership around some very valuable natural assets. So, I say all power to them because it lifts the status of parts of the environment which deserve attention and the capacity to leverage investment, not just public money'. (DM)
'It's a very exciting model. I don't think any of that [species reintroductions] could've happened if we didn't have the governance model and relationship at Mulligans with the Board, people that have the networks and the know-how to do these reintroductions'. (EA)
'And having the board and the community, and the power of a board that's got community involved to say, "You know, hold on; is there another way we can do this, or can we get some money to support this?" The power of that means that the end result will be much better'.(DM)
'Jon [Stanhope] had a particular vision and the bit I like about it is bringing in expertise and the boards are full of people with a wealth of knowledge, and bringing in the additional resources that we can add to it with the rangers who are out there doing the work on the ground'. (E)
'Well, it constantly needs attention and engagement. The birth has been a long one and it's still a bit country. Luckily, we've had two things; the research experiment with a separate relationship with government, and rangers, a particularly good team that carry on whatever's happening'. (E)
Notes: E=Ecologist DM=Decision-maker EA=Environmental Advisors (Table 8.1)

8.5.4 Theme 4: Missing voices in sanctuary management

As described in Chapter 5, the deep history of the grassy woodland landscape at Mulligans Flat originated with the cultural management practices of the Ngunawal people. Then, is it possible to restore these grassy landscapes without an understanding of the human agency that shaped these ecosystems over thousands of years? Aboriginal people in settled regions have retained relationships to their country (Mackay 2014; Rose 1996) and there are opportunities to adapt the 'values and fragments of knowledge' in managing landscape (McIntyre 2012).

Ngunawal descendants have initiated projects to resurrect language (AIATSIS [Australian Institute of Aboriginal and Torres Strait Islander Studies] 2014), transfer cultural knowledge to on-ground site management (Walmsley 2015a) and document seasonal knowledge (Bell 2015). The management of threatened species and the use of fire are potential areas of interface in management of the sanctuary (Hill 1999) as is knowledge cross-referencing (Gill et al. 2002).

A role for traditional knowledge was not built into the research experiment, although the potential to apply this knowledge is acknowledged (Manning 2015). Bio-cultural knowledge is applied in northern Australia, but has been absent from much conservation science in southern agricultural zones (Ens et al. 2015). This is changing, with seasonal patch burns now used to manage exotic plants and increase the abundance of native grasses and forbs, including in urban settings (Campbell 2015; Bainbridge 2009). Cultural burns now occur in some ACT nature reserves (ABC Radio 2017) and cultural knowledge is transmitted via Aboriginal ranger programs (Eckford-Nicholson 2014). The inaugural South-East Australian Aboriginal Fire Forum was held in Canberra in May 2018, bringing together researchers, land management practitioners and Indigenous community elders and rangers to share knowledge (Gentleman 2018).

8.6 Case Study Insights and Learnings

The case studies reveal that even though both nature reserves are protected under the same legislative regime, their histories, social settings and conservation values have induced different drivers around their management.

Mulligans Flat was purposefully set aside for conservation and the extent and relatively good condition of the woodlands has provided an ideal setting for ecological research. The emergent research and community partnerships have levered proactive and novel management responses and ongoing investment in the nature reserve to maintain its ecological condition.

In contrast, Mt Taylor was intensively grazed, originally set aside for urban amenity and surrounded by suburbs; conservation might be desired in theory but cannot be achieved in practice (Law 2004: 92). In the absence of management interventions and investment, this conservation asset is being degraded and facilities are not maintained. The sense that emerges from Mt Taylor is one of an agency struggling to deliver the basic services and infrastructure needed to maintain the urban network of older protected areas. The sense of resignation among managers accords almost seamlessly with the views of users and their concerns about the condition of infrastructure and management (see Chapter 6) and the visual evidence I gathered during direct observation (see Appendix 8). Changes to edge fire management since 2003 have also added to the complexity of managing nature reserve values while ensuring the safety of adjacent communities and protecting assets. The most critical gap is the absence of regular communication and relationships with park neighbours and users—and any public education and compliance. The primacy placed on scientific knowledge in the planning and management

domain means that social connectivity with the place is not recognised. Relationships with neighbours and social networks (identified in Chapter 6) are now necessary in the managers' toolbox.

This story is repeated across most other Canberra urban nature reserves. The bounded science-driven model has not made a difference in these reserves and there is potential to examine other pathways to support managers. More novel ideas to address shortfalls (e.g., community-devolved models) and more autonomy and support for ParkCare all came from the NGO and community land managers. The interstate case studies (see Appendix 16) show how land management can be contracted and/or devolved to community organisations and volunteers in urban settings. These case studies also show the strength that continued cooperation with a community group with long-term social associations can bring to local reserves. In both cases, this fosters development of trusting neighbour relationships and a focal point for communication about the reserve.

The contrast between Mt Taylor and Mulligans Flat shows that managing reserves as an separate ecological unit can function in urban settings when accompanied by timely management interventions (to maintain ecological condition and infrastructure), daily management presence (to subtly influence user behaviour) and, most importantly, explicit community engagement programs. This investment in personnel allows rangers to respond to maintenance and their presence deters the proprietorial and anti-social behaviours observed elsewhere. Regular users become familiar with their rangers and the outreach programs enabled by the Trust partnership support regular communication with the local community.

The omission of cultural knowledge is being addressed at Mulligans Flat by involving the traditional custodians in native species reintroduction projects (Colley 2016) and early consultations with Ngunawal custodians about the expanded sanctuary fence (which I initiated in late-2015, ahead of formal clearance processes). Weaving in these missing voices and knowledge supports the experimental science and restoration underway at Mulligans Flat. Other opportunities lie in building traditional knowledge into future grassland restoration projects in the expanded sanctuary. A project to restore the yam daisy in south-east NSW involved knowledge transmission by Aboriginal women across generations and partnerships with scientists and demonstrates how cultural knowledge can be applied in a restoration framework (Eden Local Aboriginal Land Council 2012). Similarly, at Mt Taylor, important cultural sites are being identified and relationships established between the ParkCare group and the traditional custodians to manage these sites.

Part 2: Volunteer programs and management of urban nature reserves

8.7 Case Study—The ACT ParkCare Program

This case study explores the history, perspectives of managers and views and motivations of volunteers of ParkCare. The methods used are detailed in Section 8.2. At the time of writing, the program has been running for almost 30 years. Its 25th anniversary was celebrated in 2014 and by then, there were 20 ParkCare groups, eight of which originated in CNP, and 15 urban landcare groups working in natural open spaces. [135]

ParkCare emerged from a strategic coalescence of interests. Its roots are in the community and it blossomed through partnership with dedicated Parks agency staff who embraced the opportunity to work with the community and not dwell on the risks. Importantly, ParkCare was not a creation of, or response to, government funding—the human or social compact emerged before the 1989 decision to fund the first ACT ParkCare coordinator to support, train and provide capacity to volunteers. The history of the program is contained in Appendix 14, along with a profile of the 2014 Parkcare volunteer community and their aspirations.

8.7.1 Managers' perspectives of the ParkCare program

When asked about the ParkCare program partnership, managers were overwhelmingly positive about the value and contributions of care volunteers across the spectrum of management activities (see Figures 8.23 and 8.24) and their local knowledge (see Table 8.17). This response from a district ranger perfectly encapsulates the synergy that flows from the partnership:

> *They're the eyes and the ears for us... most of the time we have two rangers in the field each day—sometimes one, sometimes three—so our capacity to get around the 16 reserves, plus the other unleased land that we manage, and the urban wildlife function, it's a busy job, so ParkCarers ..because they're out in their reserve—often, they live very close—alert us to the issues going on. Also, for example, the rabbit work, some ParkCare groups have been invaluable ..marking all the rabbit warrens with a GPS, it's really resource-intensive but they can knock that sort of thing over ..in half a day and it makes a huge difference to our ability to spend the money more sensibly and wisely... and weed work as well .. weeds that we never get to because we prioritise the most noxious weeds— the ParkCarers can do areas that the contractors can't access, or they might then focus on another weed we're not spraying; so yeah, their contribution is enormous.*

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[135] https:// www.youtube.com/watch?v=tKgE0V3ZhW4/.

The benefits of local knowledge and experience are invaluable to management of protected areas and mitigating the challenges of managing urban reserves (Worboys and Trzyna 2015: 243–245). Managers also consider ParkCarers central to adaptive management through reports about illegal activities and early warning signs about invasive plant and animal species. Managers emphasised the need to properly support the volunteers and work towards shared management outcomes.

Figures 8.23 and 8.24 ParkCare activities: planting and erosion control on Mt Taylor

Table 8.17 Managers' Views of the ParkCare Partnership

Aspect	Views
Adding value to land management	*'Just in the work they do, the management across so many reserves—with the biggest budget in the world issues around rabbits and weeds, government just cannot do it and should perhaps try to support it more'. (DM)*
	'The work ParkCare does is incredibly invaluable. It's immeasurable; it adds value to our spending and also having the volunteers feel they're contributing, because they want to be plugged in, making the difference to the parks'. (LM)
	'I want more [groups], because that's actually amplifying government capability. That's the prism through which I see it. And we need to make sure we're managing so its joined up, that's worthwhile for both parties'. (DM)
	A really good ParkCare group, it frees us up. So we'll go to a [reserve] and deal with the really invasive weeds that need herbicide and quick spray units, like serrated tussock, chilli noodle grass that's wrecking this reserve'. (EA)
	'I regard them like volunteer rangers in a way; they're bush regenerators but they also keep an eye out for tracks with erosion problems, rabbit issues'. (EA)

	'It's a really good model; it's sort of decentralised because there's all these parks and people can look after their local bit of bush. It's actually not—it's not resource intensive at all'. (VPM)
Being part of the bigger picture	*'It gives volunteers the opportunity to be involved in something they enjoy and is fulfilling, and my sense is that works pretty well. As to the impact, it seems like it probably does. That's my impression. It's not an informed one'. (EA)*
	'I guess the feedback I get from them is definitely [that] they like when what they're doing was part of a bigger plan, that they make a difference'. (VPM)
	'Look, I think it's been good as far as engaging people in work on the ground, but I think the challenge is direction for them, because none of the volunteers want to be out there unless they feel like they're contributing'. (LM)
Valuable local knowledge	*'There's the endangered plants the ParkCarers know about and with turnover of rangers, that knowledge transfer is really important, so rangers don't send a contractor to boom spray Paterson's curse and wipe out wildflowers'. (EA)*
	'The other particular value is most ParkCare groups have very skilled people, professional botanists or retired folks that become very good at botany and bush regeneration and they complement the work the organisation does'. (LM)
	'I mean they are, by definition, users and local groups. They spend far more time than our staff in the reserves; they know the reserves very well'. (LM)
Ownership	*'I think that level of community custodianship and ownership being formalised through a ParkCare group is really important. I think there are some downsides with that; people can become very parochial about their patch'.*
	'It's a good partnership between Parks and ParkCare groups; it can be a little bit difficult sometimes because they have a very strong interest in the reserve they are looking after and feel that other groups should be excluded'. (LM)
	'Any changes, you need to go very carefully because ParkCare groups, they're well established and passionate. So it's got to be a careful discussion'. (LM)
Advocacy	*It's groups like that—people who really care that, keep the bastards honest, to use that term. Things would slip under the radar without these groups'. (VPM)*
	'ParkCare are also an effective ginger groups kept government honest; can be pesky from time to time but always in a productive way'. (DM)
	'I see them as guardians and the pinnacle of my work is ParkCare; you've got to protect the boundaries and that can't be done without these groups'. (DM)
	'Well, they're essential for maintaining budgets and they lobby for money for land management, so clearly they keep the budget going for the Service'. (LM)
Notes: LM=Land Manager DM=Decision-maker VPM=Volunteer Program manager EA=Environmental Advisor	

8.7.2 Managers' and volunteers' perspectives of the health of the partnership

Managers were asked about the state of the partnership between the Parks Agency and volunteers (see Table 8.18). The ability to meet volunteer expectations was a recurring theme. Simultaneously, there was also a feeling that the volunteers are not given sufficient priority in the agency and need broader-based support. One manager observed that if volunteer programs were important, it would be reflected in positions across the agency. Managers (both volunteers and rangers) present in the early days of the program described how there was more communication and Agency capacity then; rangers and volunteers worked together at meets. A closer working relationship with district rangers and improved communication were key issues raised by ParkCarers in workshops and forums to reflect on the program over the last 25 years (see Appendix 14).

Managers from outside the agency pursued the idea that government could delegate more to the community and/or better resource the ParkCare network to take on greater responsibility for on-ground management. The idea of providing resources to the community was not raised by Agency managers, except in the case of Mulligans Flat, where the delegation of some roles was initiated by the responsible minister, although it was actively resisted by certain senior managers at the time.

Table 8.18 Managers' Views on the State of the ParkCare Partnership

Managing expectations
'I'm a big fan of community groups, as long as they've got the assistance from us. It's one thing to sort of create 10 of them and then if we've only got one ranger to try and assist'. (LM).
'I think, from a management point of view, the biggest issue is trying to meet the expectations of groups [given] our own perspective on what's important and resource limitations'. (LM)
'And I'm saying that we are resourced, to a degree. It is a collaborative effort, but their expectations are higher than what we can deliver. I could do my whole job on ParkCare'. (LM)
'And I think one of the other issues is that some ParkCare groups who are very vocal and very active, really make it difficult for the others, because we spend all our time managing them'. (LM)
Legitimacy in agency
'It's under stress, It's quite a difficult job for the coordinator, and you've got to have the right person, or it can be a real problem. And from a district point of view, if the staff don't see the value of the groups, or don't prioritise them, then they don't get value out of them (VPM)

'I think that there's a very mixed response from people in [agency] to ParkCare. Some people are incredibly supportive and some see it as a pest that gets in the way of us as professionals getting on with the job. So, I think it should be strengthened, regularised and effectively resourced'. (LM)
'If the volunteer side of management of the reserves was a core part of the Park Service business then it would be reflected in everyone's position description'.(LM)
'ParkCare...the impression I get is that give it to one person and they've given it a very small budget to keep the volunteers placated. I didn't say happy, let's just shut 'em up so we can get on with the real task at hand, which is us managing the nature reserves'. (VPM)
'They're fighting to get anyone to pay any attention to their needs, they need more resourcing. The story that always comes up is that the rangers are always too busy'. (VPM)
'When I first started as a ranger, we used to work with the ParkCarers 'cause they're all land managers. And as workloads increased, that dropped off and the ParkCarers had to look after themselves; and that led to a breakdown in communications, that's been a big mistake'. (LM)
Joint planning and succession
'There needs to be better cohesion between ParkCare and the rangers, each park unit needs an operational plan, and that operational plan needs to be in place so that the rangers and the ParkCare groups are working to the same goal'. (LM)
Look, I think they're consulted when there's a review of a management plan. In terms of reserve decisions, the ParkCare group should be involved, even if only in an advisory capacity where you had a representative group that met twice a year to discuss the management of different reserves'
'It's usually the same volunteers hanging in there for year after year, incredibly dedicated. So yeah, so there's some succession issues , but I think it's a real asset —they're not always going to get the resourcing that they want, but I think it's— on the whole, it's a good fit'. (VPM)
'You know, with any sort of relationship, the individuals make it or break it. And we've been lucky to have a couple of conveners. For example, Mount Taylor is Anne Ions. She's been there since God was a boy. yet she's had to deal with a revolving door of rangers'. (DM)
Notes: LM= Land Manager DM=Decision-maker VPM= Volunteer program coordinator (Table 8.1)

At the time the interviews were held, the ACT Greens pledged to increase the resources provided to nature reserves and the ParkCare program as part of their election commitments (ACT Greens 2012). A key outcome was the employment of a dedicated ParkCare Ranger at the end of 2013 to provide on-ground support to complement the office-based program coordinator (Field Notes 16 October 2013). The Ranger position was made permanent in 2015 (Field notes 10 November 2015) but the role is challenging for one ranger, given the number of ParkCare groups, the condition of reserves and the needs and expectations of groups that have been operating with little district support for some years. There is also a perception that this ranger can do all the heavy lifting around volunteers within the Agency. However, a close

working relationship with the district rangers (the land managers) is equally important for volunteers (see Table 8.19) and provides a sense that volunteering is supported across the organisation.

Table 8.19 Volunteer Convenors Perspectives of Partnership Health

'Well, we're lucky if we get told about spray programmes and I keep saying: this is really good if you let me know because I tell the others and we have that contact with the broader community and I think it's very good liaison to know when you're doing those things...'
'We need much more involvement with our rangers and management; much more proactive is the word I think. Because if we've got this back-up, it makes us much more enthusiastic. I mean, we are still enthusiastic, but we would like support. The bottom line: maintenance again and again'.
'We need better resourcing and move away from their constant shifting of personnel 'cause no sooner have you educated them about the issues on the reserves then phft they've gone'.
'We have been consulted and I have a sense that consultation over and above that a lot depends on the individual. I try to be encouraging and appreciative; maybe that's one of the things that helps. I don't know; hard to say'.
'A dedicated ranger...I think that is so critical: someone that the ParkCare group can go to and can—they're just going to stay there—I think that would be a start and in a perfect world: a ranger that takes on some of that organisation role'.
'I go 'round and see the rangers [at the depot] They'll help as much as they can, but as for seeing them in the reserve, it can go for months. Management have become off-hand,. I really feel very sad about it because the rangers, the management guys; really got stuck in as part of the group'.
'We have to make sure that volunteers are not (only) fulfilling the goals of bureaucracy as seems to be the case in some institutions. I think the emphasis should be around the other way: i.e., what is practical for volunteers (assuming there is a will to attract, keep and encourage) and what do government staff need to do to make volunteering safe and enjoyable?'.
Note: all responses were from Community Parkcare Volunteer Convenors =C (Table 8.1)

During participant observation in the Mt Taylor ParkCare Group, I saw the partnership (in terms of agency support and relationships with the volunteers) as one of weathering 'ups and downs'. The volunteers, while often expressing frustration, were resilient despite the many changes that occurred with the program through agency restructures and staff turnover. They understand the value of working to maintain the partnership and similar pragmatism and endurance was observed in the interstate case study of the Maroochy Wetlands Sanctuary Group (see Appendix 16).

Similar to observations of the importance of empathetic officials in the BoB case study (see Section 7.5.3), the attitudes of people employed to manage the ParkCare program are important. While there is a dedicated position to coordinate the program, having the right person is critical to create a foundation of mutual trust and respect and to display sensitivity to the history and social capital within the volunteer community (see Table 8.19).

Matters that have challenged the partnership related to proposals to change the program that did not emanate from, and/or were viewed as being foisted upon, the volunteers. One involved an attempt to refresh the program logo as part of the 25-year celebration (Field notes 30 June 2014) and the other was the introduction of new systems to record volunteer effort and manage volunteer health and safety (Field notes 12 May 2015). A new system to manage volunteers was first canvassed in 2015 to make agency volunteering consistent with national best practice and formalising procedures already in use (sign-on sheets, activity reporting, risk assessment, etc.). This was shelved and then revisited in 2017, although with a heavier-handed approach. My observation is that the volunteers are mindful of safety and apply field-based common sense drawn from decades of experience working in reserves. Recent safety alerts about not 'working under trees' in windy weather and exercising care when working alone failed to acknowledge the strategies volunteers already had in place, like taking a mobile phone when working on their own. [136] In communications about working alone and in reference to the Volunteer Policy, the veiled message was that volunteers should not work alone, when, in fact, this is a longstanding practice. Another way the agency could have approached this issue was to 'acknowledge this practice and think about how to make it safe'. [137]

An expansion of the program's scope and the new ParkCare Hub occurred without consultation with existing volunteers (Field notes 21 August 2017; 24 October 2017). ParkCare volunteers, as the original partners, could reasonably have expected to be consulted about the changes and asked to assist with program design—even more so since the 25 year ParkCare forum in 2014 had focused on generating ideas and setting directions for the future (Hall 2014). The expanded program scope saw the Parks Service resuming management of the Volunteer Interpreter Program at Tidbinbilla and Namadgi National Parks and a new pathway to allow individuals to volunteer in wildlife and ranger-led projects. The nature reserve-based ParkCare groups,

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[136] Field notes: Agency email communication with Conveners, 8 October 2018.

[137] Field notes: Email communication from ParkCare Conveners, 9 October 2018.

were re-named 'ParkCare Patch'. [138] It is likely the reserve-based ParkCare volunteers would have supported the new program scope but they were never asked. One interpretation of this change is that it is an attempt to adjust the program to better meet the agency's needs, ignoring the important social capital, networks and site knowledge that are the hallmarks of the program and have provided significant value to land management over almost 30 years.

Initiatives that have worked in cementing the partnership include the engagement of ParkCare volunteers in reserve operational planning (Field Notes 5 August 2014; 9 February 2016) and the joint staging of a forum to celebrate 25 years and develop future directions (Hall 2014). I did not observe the directions of this forum acknowledged in recent changes to the scope of the program and introduction of the new ParkCare Hub—although these were strategies identified by volunteers at the 2014 forum, including diversifying volunteering activities and using the 'ParkCare Central' web portal for reporting and engagement.

8.7.3 Motivations of ParkCare volunteers

The ParkCare convenors interviewed for the case study were asked about their motivations and the personal benefits that ensue from volunteering (see Table 8.20). They mentioned a combination of factors ranging from the environmental outcomes and social connections to the team effort and results. These responses mirror those of the larger group of ACT convenors, who were asked why they volunteer in May 2015. The collective responses included that they: enjoy time with people; build community; care for the environment; get outside into the bush; make a difference; set an example for children and grandchildren; make an impact in conservation; keep busy; connect with Canberra and the bushland; observe and enjoy wildlife; improve reserves; observe birds; educate others and learn new things. [139]

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[138] See https://www.environment.act.gov.au/parks-conservation/parks-and-reserves/get-involved/the-ParkCare-initiative.

[139] Motivations of Conveners, Park Care and Land Care Coordinators Meeting, 12 May 2015.

Table 8.20 Motivations of Volunteer ParkCare Convenors

'I think it's just part of me, the process of seeing things achieved—we've got 240 people who have worked on [the reserve] and that was part of the 20-year celebration, yeah. And I think that's a very important part here: enjoyment of seeing what everybody has achieved because it's not just me; it's the group and their enthusiasm. We've never lost anybody who has gone off in a huff'.
'I'm happy that its back to my original interests. I think I'm a person who tends to like the practical applied activity—high-level policy activity; while I appreciate its importance, it's more of an effort. I have to force myself to sit down and think about and put it into a coherent argument. I can do it, though; I spent my time on committees doing that sort of thing'.
'The contact with other people, the stimulation you get talking to them, whether about [the nature reserve] or completely different things going on the world—things they might have done in the past and the pleasure of seeing people learn, work together, become friends and stay involved'.
I suppose social engagement, being part of your local community, becoming a respected member of the local community, opportunity to provide professional input when decisions are made on the basis of good information rather than guess work'.
Note: all responses were from ParkCare Volunteer Convenors = C (Table 8.1)

An opportunity arose to explore the perspectives and motivations of more than 50 volunteers attending the 2014 ParkCare Forum, *Reflect Explore Inspire*, the 25th anniversary forum in October 2014. I was part of the organising committee and we invited Professor Valerie Brown to explore the future of ParkCare as a whole-of-community concern using the knowledge and collective wisdom of ParkCarers (see Brown and Harris 2014). The forum session was entitled 'Let's put our heads together - Drawing on the collective wisdom of ParkCare' (Hall 2014). Professor Brown framed it as an opportunity for each volunteer to consider their own perspective of ParkCare as a part of their community. Participants were asked to think about their work in seven different ways: as making a difference to their life; as a physical task; as a contribution to society; as an ethical purpose; as an aesthetic feeling; as sympathy with other living things, and by reflecting on the combined meaning of all these. Combining everyone's answers gave 'a rich understanding of the potential of ParkCare for the next quarter century' (Val Brown, 11 August 2014).

Participants were invited to contribute their responses to this research and 51 people consented. Those responses were analysed and the perspectives that distil volunteer motivations (see Table 8.21), benefits and wider societal contributions are presented.

Table 8.21 'Why do I volunteer?' Motivations of ParkCare Volunteers

Reason	No. of mentions	Descriptions
Give back to environment Contribute; do my bit	20	*'I think I should "put my money where my mouth is" and help out'* *'make a contribution to something I believe in'*
Appreciate and care about the environment Value nature	14	*'I care about the natural environment and like to be part of its enhancement'* *'share appreciation of nature with my family'*
Make a difference Inspire others	12	*'I do it for the future and to leave the world a better place for my being here'* *'to help change part of the world for the better'*
Belonging to social group Like-minded, engaged	11	*'enjoy the interaction with like-minded people'* *'to be part of a group, active in the environment'*
Restore and improve	8	*'I want to help rehabilitate the natural environment and assist in restoring biodiversity in our urban environment'*
Have time—retired	8	*'I'm retired and have time and wanted to something hands-on after a professional career'*
Love being in bush outdoors	7	*'to get into the natural world, away from built-up reality'*
Learning and knowledge	7	*'I enjoy knowing I am helping to educate children and parents about the environment'*
Like physical hands-on work activity and am capable	6	*'It's work with purpose'*
See the need to compensate for shortfall	6	*'filling a gap I feel is not being filled by government and any other group''*
Satisfaction, self-worth	6	*'it brings so much richness to my life, creates friendships and helps me to be stronger'*
Feel duty, ethical, sense of responsibility	5	*'Important to set an example to my children, my neighbours and friends'*

There were multiple motivations, but the overriding reasons concerned contributing and 'giving something back' to the environment, making a difference by leaving a better place for the future, experiencing a sense of belonging to a social group/wider cause and learning. For many, there were related benefits of being outdoors and doing physical work in the bush, as well as responding to a need because of the shortfall in public resources. A few participants

described feeling a sense of duty to offset human impacts and also to set an example for others and this was also implicit in many responses about giving back. These findings are not dissimilar to other studies of urban volunteers, although there appears to be a strong sense of altruism in the motivations of the ParkCare volunteers.

On the question of what sort of society volunteers felt they were creating through their actions, an overwhelming number of ParkCarers sought to create a caring society that values and appreciates nature and is aware of the interdependencies and actions required to create a more sustainable society (see Table 8.22). The desire for social cohesion around cooperation, future planning, sharing, strength in connections and networks featured in many responses. These sentiments mirror the reflections of the Maroochy Wetlands Sanctuary volunteers (see Appendix 16).

Table 8.22 'What sort of society am I creating?': Volunteers' Societal Contributions

Type of society	Mentions	Examples
Cares, appreciates nature *'Sharing the love'*	15	*'Caring community that values nature'* *'a society that appreciates the beauty and cares for the natural places where we live'* *'a community that cares'* *'more sympathetic to conservation of nature'*
Healthy, sustainable, lives within environmental means	10	*'a low-energy sustainable, society'* *'one which fits in with the natural environment'* *'less consumption-focused'*
Caring and actively involved	9	*'Caring community who want to recover the lost'* *'takes responsibility for reversing threats'* *'where people care and pull together to do things'*
Ecologically aware; understands dependence on nature	6	*'society that realizes human beings do not own the planet, they are part of it'* *'society that values the interconnectedness of living and non-living things'* *'One that can see how we depend on nature and put ourselves inside it to manage its needs alongside ours'*
Wiser, forward-thinking, adaptive	6	*'Hopefully a wiser one that observes and learns, adapts to challenges'* *'One that is more trusting and robust to future challenges like climate change'* *'a society that thinks for the greater good, past their insignificant problems'*
Caring and actively involved	9	*'community who want to recover the lost'* *'takes responsibility for reversing threats'* *'where people care and pull together to do things'*
Socially connected, involved, cooperative and responsible	7	*'a more considerate and thoughtful society'* *'social networks to help the environment—strength in numbers'*

8.8 ParkCare Case Study Insights and Learnings

At its core, ParkCare is a social movement that has proved to be a mutually beneficial relationship for the managing agency in many ways, creating a rich store of local knowledge and community capacity for on-ground ecological recovery and care. The ecological values of CNP nature reserves were not well understood in 1989. ParkCare enabled learning and knowledge about the natural systems that had been substantially modified by a century and a half of grazing. The occurrence of small patches of some rare and threatened plant species was known but the remnant box-gum grassy woodlands and temperate grasslands had not yet been identified as critically endangered and worthy of national protection (Sharp 2014); notably, their nomination was spearheaded by individuals in the ParkCare movement.

This learning continues, as evidenced by the responses of the community of volunteers, land managers and scientists and by community-led research about how to manage these cryptic and important ecosystems (Maher 2016). When respected ecologists and land managers acknowledge that much of their knowledge evolved from this on-ground partnership, it is clear that something infinitely valuable has been created. This local provenance and place connection are the strengths of ParkCare—as are the visible signs of care that allow other locals to perceive the nature reserves as valuable and take more care themselves (Nausser 1987). The motivations of ACT care volunteers mirror findings elsewhere about urban groups with a strong generative element, love of learning, positive contribution and social connections. There is a sense that they want their actions to speak about a fairer, more caring and just society that values nature.

Over the last three decades, the care volunteers have endured changes in both the ACT and Federal governments that shifted policy priorities and funding programs. The most significant effect on the relationships in the partnership has been the relentless turnover of District rangers and managers and expanding workloads for District staff, particularly fire and kangaroo management, in the last decade (see Section 8.4.3, Stratford 2018). The creation of the ParkCare ranger position in 2013 was important in demonstrating the value of close collaboration with the District land managers (a hallmark of the early days) and working towards shared management goals so volunteers can focus on complementary activities. However one dedicated ParkCare Ranger position (even with the most committed incumbents)

is insufficient to provide support for groups working in CNP. An additional ParkCare Ranger position was proposed by Convenors in 2018 to address the gap. [140]

With personnel changes in Parks, the ParkCare program has morphed into a scheme to fulfil the goals of the bureaucracy rather than an on-ground land management partnership. This is evident in changes made to the program in 2018 without consultation with the foundation ParkCare community and their catchment partners.

The inability of the Parks Service to effectively manage their urban estate creates space to consider different ways of working with the conservation volunteers. There are many mature autonomous ParkCare groups with long histories of managing nature reserves and the ACT catchment groups have coordination and delivery skills to manage works like weed and erosion control across reserves and leverage additional project funding into CNP. This is not a new idea, as the interstate examples show (Appendix 16). An evolution of roles would also recognise the history, positive social and ecological legacy of ParkCare and land care volunteers and make better use of community-based governance in the catchment networks and the skills and capacities of the volunteers.

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[140] Letter from ParkCare Convenors to ACT Minister for Environment and Heritage, Lands and Planning about Canberra Nature Park management, ParkCare support and Catchment Groups, 26 September 2018.

8.9 Case Study—ACT Community Fire Units

8.9.1 Introduction

The 2003 Canberra fires resulted in the loss of four lives and 487 homes on the urban edge. The level of community preparedness ahead of the fires was covered in the McLeod Inquiry (ACTG 2003) and the ACT Coronial Inquiry (Doogan 2006). Both concluded that Canberra was not well prepared or informed about risk, and made recommendations for community information and engagement programs and community safety and evacuation.

Canberra's experience post-2003 shows how such a disaster can create the opportunity to initiate 'rapid institutional and social adaptation to future events' (Gill et al. 2013). It dramatically changed how bushfire risk is managed in the ACT, including the addition of a new statutory regime for bushfire planning and management (reviewed every five years), edge roads for new suburbs adjoining nature reserves and standards governing the construction of new and extended dwellings in fire-prone areas (ACTG 2014). New programs to engage urban edge communities were introduced to build community preparedness and resilience (ACT Bushfire Council 2012), including the Community Fire Unit (CFU) program.

The ACT CFU program was modelled on the successful NSW program, established following the severe 1994 bushfires that affected Sydney's bushland edge communities. [141] NSW CFUs have since played a significant role at a number of fire incidents in NSW, particularly in the Blue Mountains (Haynes and Bird 2014; Lewis 2011). Research published by the Bushfire Cooperative Research Centre (CRC) Lowe (2008) documented the value of CFUs, noting that the rural fire volunteering model was unsuitable for the suburban interface, where socio-economic characteristics are different with many dual income professional families with busy lives. Similar observations could be made about ACT urban edge communities. The CFU model offers communities a degree of self-resilience with a minimum of commitment, appealing to the volunteer's self-interest in housing (asset) protection. This scope was found to be important for the success of the NSW program (Lowe 2008: 12).

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[141] A CFU is 'a team of local residents living in urban areas close to bushland who are supported by Fire & Rescue NSW (FRNSW) to enhance their safety and resilience to bushfires. Volunteer CFU members do not fight fires, nor are they firefighters. Being a CFU member is about preparation, prevention and protection from bushfires.' https://www.fire.nsw.gov.au/page.php?id=133

The CFU program in the ACT began in 2005.[142] Over 50 units are now established in Canberra's edge suburbs within the bushfire-prone area (BPA) (ACT 2014: 53). Each unit is provided with a trailer of basic equipment: standpipes to connect to fire hydrants, fire hoses and a petrol pump to access other water sources (see Figure 8.25). A CFU was established on the western suburban edge of Chifley adjacent to Mt Taylor Nature reserve in 2009, and at different times for the three other reserve edges south of Chifley (see Figure 8.26). The entire Mt Taylor Nature Reserve was burnt out in the 2003 fires (see Section 5.8, Figures 5.51 and 5.52). The Chifley edge was affected by the loss of sheds, cars, back fences and some utility infrastructure but no houses. Houses were lost further south along the edge in the Torrens, south of Chifley.

Figure 8.25 The CFU trailer

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[142] A CFU is a 'volunteer team of residents who are trained for property protection, operating as part of ACT Fire & Rescue' (ACTG 2014 : 51)

Figure 8.26 Boundaries of CFU Units 43 (Chifley), 45 and 46 (Pearce) and 25 (Torrens)

(Source: ACTFR)

8.9.2 Community Fire Unit 43

The suburb of Chifley in the ACT was developed in the late-1960s and its edge is characterised by family homes on large blocks (up to 1,000 m^2) with some backing the nature reserve up to 2,000 m^2. There are 52 dwellings within the boundary of the CFU 43 area: 25 with a back or side boundary to the reserve. Since the 2003 fires, 36 of the 52 dwellings (70%) have changed ownership, some twice, including five blocks where houses were demolished because they contained loose-fill asbestos (known as 'Mr Fluffy blocks'). These blocks are vacant and being redeveloped. There is also significant demographic change underway in the Chifley CFU area;

eight original and older residents passed away since 2011. Younger family households have since purchased these homes. About 15 of the 52 dwellings (35%) are tenanted households; the others are home owners or purchasers. The age breakdown of the heads of households in the CFU area (Bushfire season 2016–2017) is shown in Figure 8.27. These community characteristics are significant, as research has found that older retired households are better prepared for bushfire than other households and home owners are better prepared than renters (Morrison et al. 2014).
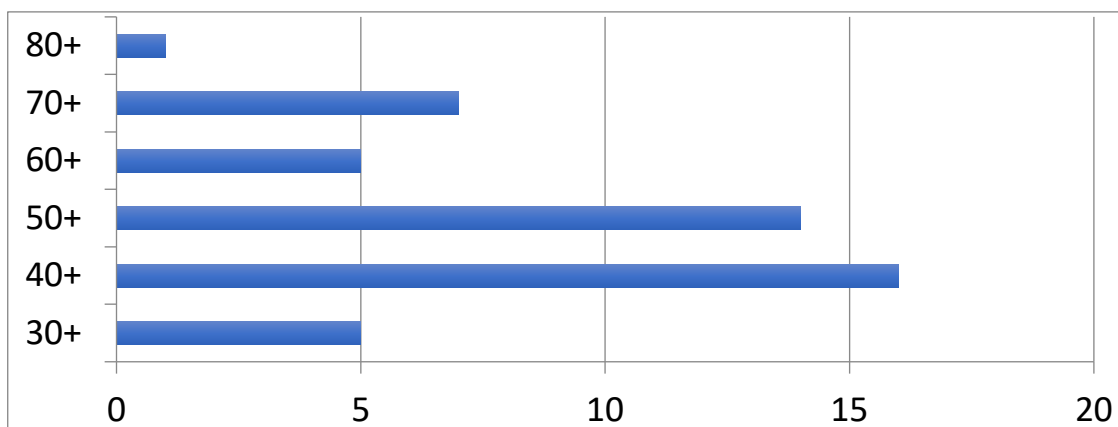
Figure 8.27 Age of household heads, Chifley CFU 2016−2017 Bushfire season

8.9.3 Research methods

The methods used are described in Section 8.3 and include: document and literature analysis (see Section 8.9.4); semi-structured interviews with urban edge residents, CFU volunteers and program managers; participant observation as a member of the Chifley CFU (in both training exercises and CFU team leaders' meetings from the 2011/2012 bushfire season onwards) and pilot engagement activities I initiated as opportunities arose. These covered:

- Initiating and organising the annual CFU Saturday community awareness and preparedness barbeque at the beginning of the fire season (n = 4)
- Undertaking a neighbourhood door-knock on CFU Saturday to discuss fire preparedness and identify household changes and vulnerable residents who may need assistance (n = 3)
- Hosting a fire ecologist to walk the Taylor edge with volunteers (n = 1).

These activities allowed me to engage in informal and friendly bushfire conversations with local people and volunteers and to generate additional data about awareness and preparedness, including some revelatory personal experiences with the 2003 fires in the neighbourhood. I

also observed another CFU's training to observe operational differences between groups (Field Notes 15 October 2015). Both the Chifley CFU unit and the other unit observed, were aware of my role as a volunteer and participant observer. [143]

8.9.4 Community preparedness and awareness

For the purpose of this case study, research about community preparedness and responses for bushfire as well as policy documents (ACTG 2014; 2019d), training and operational materials for CFUs and other communication materials were reviewed. This enabled identification of studies about community preparedness and communication efficacy that were relevant to the ACT and thus, could be compared to ACT bushfire policy and program responses.

The 2003 Canberra fires dramatically exposed the lack of preparedness of both the emergency services and the urban edge communities. Emergency service agencies had not seriously contemplated the possibility of fire entering the urban area and few residents had made adequate preparations (if any). Analysis of victim questionnaires following the fires highlighted the inadequate information and lack of warnings about the fire (Doogan 2003). The ACT Coronial Inquiry heard that an information brochure 'Will you survive?' had been distributed to urban edge residents (along with a fridge magnet) after the summer bushfires of 1994 but there had been no ongoing education programs about bushfire risk in the ACT. An ACT 'Fire Prevention Handbook' was developed for use in primary schools but there is no record of its distribution (Doogan 2006). Evidence submitted to the inquiry also suggests that these passive mediums do not have adequate penetration and cannot be used to assume the recipient is aware of the risks and measures they need to undertake (Roche, cited in Doogan 2006: 114).

This concurs with other studies that found that making information about bushfire risk available does not necessarily motivate household action and that active participation of the community is needed (Paton et al. 2013; Rhodes 2011). Many residents in fire-prone areas lack a specific response plan (either to evacuate or stay and defend) and households intending to evacuate had prepared their properties to a lesser extent than those who intended to defend them (McNeill et al. 2013).

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[143] Agreement to the researcher's observation of the Unit was negotiated prior to joining CFU 43.

There is also disagreement in the literature about whether having experienced a bushfire enables community preparedness. New Zealand research found that the frequency of fires does effect awareness and preparedness; communities experiencing more frequent fires were more aware, prepared and active at the community level (Langer and Hart 2013). However, Annear (2013) questioned this assumption, as the Victorian 2009 Fire fatalities report found no evidence that prior experience of bushfire was an advantage to survival.

In contrast, programs that 'actively' prepare householders for bushfire, like Victoria's 'Community Fireguard', have proved more effective, with 80% of regular 'attendees' saving their houses in the 2009 Victorian fires, compared to 55% of irregular attendees (Clode 2009). The Fireguard program also assisted attendees to prepare physically and psychologically for the bushfire experience (Gibbs et al. 2010). An economic analysis examining the costs and benefits over 10 years found that the program provided significant cost savings from reduced property loss and fatalities (Gibbs et al. 2014a, b). Similarly, advisory services like 'Fire Safety Assessments' resulted in households being more likely to make changes around the property, with 69% clearing gardens and many purchasing fire-fighting equipment and relocating combustible materials (Foster 2013). However, this research noted that these actions are all 'low hanging fruit': non-labour intensive and inexpensive property modifications. For many people, amenity and landscape preferences still overrode urgency to make changes.

There are also important differences in the self-reliance of households, with residents of urban BPAs more likely to rely on the local fire brigade and expect government to be responsible for bushfire response than take action themselves. This suggests that agencies need different strategies in urban communities to assist households assume some responsibility for preparedness. Examples include assisting garden clean-ups by supplying green waste skips and targeting newcomers to make them aware of the required preparative activities. Agencies should also consider how they provide information and connect with different community networks, including informal networks, and 'view community as a resource not a problem' (Bushnell and Cottrell 2007; Cottrell et al. 2006; Cottrell 2005).

Emergency services agencies remain heavily focused on response and the rollout of centralised awareness programs every year, preferring to look internally than to build relationships with external stakeholders (see Bhandari et al. 2014). Communication methods like door-knocking have proved effective with the social interaction meaning the information is more likely to read, retained and recalled. This is borne out by the recent experience in Victoria. The Country Fire Authority (CFA) has acknowledged that it has trustworthy communicators in its local

brigades, an '*authoritative and authentic*' voice in the local community (Devenish 2016). This change occurred when a small group of CFA volunteers were interested in changing the narrative from fighting fires with a fire truck to enabling community preparedness through education. This focus reinvigorated volunteering and created new meaningful roles in local brigades, particularly for women (O'Meara 2013). Different Victorian brigades are implementing innovative locally devised programs with potential applications elsewhere, like the 'Red Bucket Campaign' (see Figure 8.28). The program is designed to reinforce self-sufficiency in bushfire events, supporting the message: 'The red bucket is your fire truck'. The red bucket contains safety information to help people prepare as there may not be a fire truck.

With rapidly changing media for communication, social media may be considered a panacea for relaying information during emergencies. There are challenges with this because of the age differential of users, spatial variations in use and concerns about the trust and credibility of the medium. Social media is mostly used for communicating with family and friends and should not replace traditional communication forms. In emergencies, people prefer to use a range of media, like local ABC radio, television and the web (see Haworth and Bruce 2015).

Figure 8.28 Firefighters with the Red Buckets Source: CFA

8.9.5 Semi-structured interviews

Decision-makers', emergency managers', volunteers' and residents' perspectives from interviews are organised according to themes emerging from the data, drawing on the literature and policy documents. Managers (including decision-makers and CFU volunteers were asked about community awareness of bushfire risk, the concept of 'Shared responsibility' and the value and operation of CFU's, the ACT's primary initiative to share responsibility and raise

community awareness (ACTG 2014). Edge residents were asked about the changes that they had initiated in their households since the 2003 Canberra fires.

8.9.5.1 Sharing responsibility

The concept of 'shared responsibility' emerged from the Victorian Royal Commission into the 2009 Bushfires (Lukasiewicz et al. 2017). ACT decision-makers and managers viewed the concept as the community being aware and keeping themselves safe. Encouraging the community to take responsibility was considered a challenge, although one manager felt more could be done to encourage people. Most suggested that government should shoulder a greater share of the responsibility, especially for vulnerable households (see Table 8.23).

Table 8.23 Managers' Views On Shared Responsibility

'It means a responsibility for householders to be aware and informed, the volunteers, and the broader community as to what they need to do to stay safe. So that brings responsibilities on government to make sure information is provided in a timely manner and in terms of preparedness and response'.
'It's a reasonable approach; we all have a responsibility to build a safe environment for ourselves and others. But I also think there is still significant part of that responsibility with government… for those less able… that they pick up the slack for these people; that's a government function'.
'Shared responsibility doesn't hold enough people's attention—for residents, it's just something they think about in their own backyard and with their neighbours. It's a big ask to have everyone collectively on the same page either understanding the environmental risk issues or whatever else'.
'Yeah but the problem is trying to get the community to do it. It's just been governments; encouraging the community to do things is an area that they haven't taken on as seriously as they could have'.
'My reflection is that people disconnect between their desire to live close to nature and willingness to accept bushfire risk. There's an issue to contemplate about what trade-offs they're willing to make'.
'Not living your life in a complete absence of knowledge and assuming that the government will save you if something goes wrong because in some instances, there will not be a fire truck at your front door. You may not even be able to get through on 000 in a really bad instance'.
Note: all responses were from Decision Makers responsible for Emergency services including CFU's. (DM)

These views generally agree with how shared responsibility is framed in the ACT Strategic Bushfire Management Plan (SBMP) (ACTG 2014; see Box 9.1). The plan has a suite of actions for 2014–2019 to achieve this objective, including using the CFUs and RFS Volunteer Brigades for face-to-face community engagement education and awareness in BPAs, encouraging people to volunteer in a fire group or other community organisations and updating awareness materials (e.g., Bushfire Survival Plan) and media communications.

Some of the challenges raised by managers mirror national research that found that in sharing responsibility in practice, 'stakeholders face a multitude of diverse, yet overlapping and interacting challenges' (McLennan and Handmer 2014:6). One of the cultural challenges is how emergency management personnel view themselves and their colleagues compared to the people living in BPAs. The language used is also critical to community relations. Research suggests that Australian emergency managers believe they have superior knowledge and skills to those in the community. This is incompatible with the premise of shared responsibility, which requires a shift from top-down approaches and responses to increased community preparedness (Brady 2014). Evidence from the US shows that when the community were seen as 'partners' and not 'victims', emergency managers worked differently with them (Brady 2014: 55). Brady (2014: 57) wrote:

> the perception of emergency managers may still be skewed towards a belief that emergency management personnel have superior knowledge, behaviour and skills to the rest of the community. These attitudes are not reflective of the increasing focus on shared responsibility in emergency events by Australian and New Zealand emergency management leadership…without dismissing the hard-earned expertise of many professionals in the field, such a dramatic difference in the regard for the skills and knowledge that others in the community can bring to these situations makes for a difficult starting position for a genuine and respectful shift from top-down directives to shared responsibility.

National research also suggests that sharing responsibility must go beyond community engagement and include 'broader social participation throughout the whole bushfire policy process – from agenda setting and planning through to implementation and evaluation'. This requires a 'focus on developing processes for stakeholders to collectively negotiate and engage in responsibility-sharing at the different levels and in the diverse settings where risk management takes place' (McLennan and Handmer 2014: 7).

In the ACT, this would mean volunteers having a role in the bushfire planning process and potentially participating in preparations for their reserve edge (e.g., prescribed burning; see Section 8.10). During the SBMP review in 2014, CFU volunteers were invited to be involved but passively so: assisting with letterbox flyer distribution to advertise public meetings (see Figure 8.29) and attending public consultation meetings. The current approach, where public meetings are held in Canberra's north and south and discuss a high-level ACT-wide plan, does not engender locally focused engagement or input. [144]

Part of the difficulty is that most residents and volunteers would be more likely to engage if they could contribute to the Bushfire Operational plans for their areas, which relate to their local context and their CFU's operational setting. These plans identify fuel management works in nature reserves and document planned hazard burns: here, the relationship between the urban edge and mitigating risk is more explicit. ParkCare groups are increasingly being engaged (or at least, informed well in advance of any hazard burns on their reserve) and have had the opportunity to contribute on matters relating to avoiding sensitive ecological areas and revegetation projects. CFUs could be afforded the same information for their areas.

Figure 8.29 Article about living on the edge SBMP consultation

Source: Canberra Weekly 27 March 2014

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[144] Public Forum, Southern Cross Club, Jamison, 8 April 2014 and Holt, 9 April 2019.

8.9.5.2 Community awareness and resilience

There was a mixed response from decision-makers and managers about the level of community awareness about bushfire risk (see Table 8.24): some observed positive changes with the establishment of CFUs and a communication shift to encourage more self-reliance. Some managers felt that awareness was high among people who were actively engaged, like CFU members and those right on the edge, but viewed many households that might be affected and the broader community as less aware.

Table 8.24 Managers' Thoughts About Community Awareness

'In an ideal world, we'll have everyone doing enough thinking ahead of time about what they're going to take with them, which will fit into the boot of their car. And so, if we can get to that point sometime before the next fire hits, I'll feel very happy'.
'I've observed changes in behaviour since the fire; people have cleaned up and stopped storing things in nature reserve like firewood and compost heaps'.
'I still think there's a high level of complacency, I think people on the urban interface get it. They can see the grass getting high and we get the complaints [to] cut the grass. But it's the people nearby who don't realise that they're vulnerable—people don't appreciate how fire can impact them, it's not the flames running up to the wall in your house; it's the ember attack'.
'There's a lot of understanding among CFU members because they stay in touch, whereas the broader community tends to forget. But we still have sufficient numbers of people on western edge that lived through it and understand what can happen. Anyone that went through that event will remember. But those who have moved in didn't live through the event'.
'We like the sense of awareness that says there aren't enough of us to turn up to your house when 500 houses [are] on fire at the same time, so you need a level of resilience and awareness but we are also aware that most people when faced with something like this—it's a lot more difficult that they think it's going to be, a lot more challenging, more frightening'.
'Now they [Canberra community] have seen a bushfire and what it can do, they think it's the worst fear but its manageable and you will have a warning and don't have to go that far to get away from it. We're different to most country areas, you only have to drive a few 100 m and you are in another built-up area. It's not like driving through the bushfire to escape like in Victoria'.
Note: all responses were from Decision-makers responsible for Emergency services including CFU's.

The ACT Bushfire Council's 10-year review of management arrangements found that community education programs were implemented but it was difficult to assess their effectiveness (ACT Bushfire Council 2013). One council member noted: ''We think they've done a good job in increasing the messages getting out, but there's no evidence to support that people are actually understanding the messages' (Tony Bartlett. in Doherty 2013).

8.9.5.3 The value of Community Fire Units

The concepts of sharing responsibility, building community awareness and fostering resilience are implicit in the CFU program. Decision-makers' and managers' views were overwhelmingly positive about the program and its benefits, particularly those surrounding local empowerment, neighbourhood connectedness, awareness, social capital and networks (see Table 8.25). Interestingly, these views validate the CFU Program for purposes beyond activation and response and mirror the perspectives of agency managers interviewed for the CFU Review (See Bird et al. 2016: 61–63 and Figure 8.30). Managers' only concerns are about maintaining participation and motivation of CFU volunteers as time passes between significant fire events.

Table 8.25 Managers' Views on the Value of the CFU Program

'I think the CFU Program has overwhelmingly been very successful. There is a challenge in maintaining participation because the longer you go without something happening the harder it is to keep volunteers motivated. So that's true for any volunteer service, whether it's CFUs or RFS, SES, although they have a more active program of training to keep people engaged'.
'We have a good level of ownership of CFUs and it certainly helps edge pockets of streets [to] feel much more empowered and taking responsibility for risk, looking out for themselves and their neighbours; that's what's really powerful, the social capital elements of a CFU'.
'Big benefit is the community neighbourly thing, taking care of your neighbour assisting with clean up. Everyone doesn't have to be engaged; it's the connection. I don't know how far we as a uniformed fire service can do that—that sort of thing is up to energy of the people in the CFUs'.
'The property protection stuff is very helpful and it would almost certainly help save property but what is more powerful is the social capital, the sense of ownership and taking responsibility'.
'It's great, the whole concept of the CFUs but there a limit to people's ability to commit to something. You've gotta find that right level of commitment and keep the momentum and interest'.
'Most CFUs have being doing it for 10 years and still haven't been to a fire yet. The first fire you go to, might involve your property. I'm very aware it's a huge load, they won't be as prepared as they think and we don't expect a lot, just understanding of the risks. Maybe its best just to leave'.
Note: all responses were from Decision-makers responsible for Emergency services including CFU's.

Figure 8.30 Most frequently cited words in relation to perceived personal and community benefits of the CFU program

Source: Bird et al. 2016: 63

8.9.5.4 Volunteer motivations for joining the CFU

Volunteers (see Figure 8.31) were asked about their motivations for joining the CFU and identified the sense of individual responsibility, recent memories of the fire and the opportunity to be part of the solution as key reasons:

> *The firefighting capacity of the ACT was inferior to the problem and so when I was allowed to become part of a solution I was just ecstatic.*

> *The sense I got the day of the bushfire was of helplessness. There weren't enough firies and equipment to go around, so we need more bandwidth, more people and equipment so I said I'd be part of it.*

> *A flyer came around and I said to [partner]: 'This looks useful'. The fires were still very much in people's minds. And I just thought living on the bush, the urban fringe, it was probably a good thing to know about...it's also taking a degree of responsibility.*

Figure 8.31 Jude and Andrew, Chifley CFU

Following these interviews, a survey of 250 CFU members was conducted as part of the 10-year review of the ACT CFU program (Bird et al. 2016). Volunteer motivations elicited from this survey were consistent with the sentiments of the Chifley informants, with the top three reasons respondents joined the CFU being:

> I know that I live in a bushfire prone area so I wanted to be able to protect myself/property/family in the future (94% agree/strongly agree)

> If I and my neighbours are trained and equipped to defend our home its gives us the greatest chance of saving them (88% agree/strongly agree)

> Bushfires affected my local area in the past so I wanted to be able to protect myself/property/family in the future (85% agree/strongly agree)

8.9.5.5 Volunteer views about their role in operation of the CFU

Volunteers were pragmatic about their role in the CFU. Most felt that they knew enough about the equipment to perform wet-down functions and keep themselves and their neighbours' safe—but were also acutely aware of their limitations (see Table 8.26). Volunteers saw their role to alert and keep neighbours informed as an important function, particularly on fire danger days and for vulnerable households. Engaging new households migrating into the area was also considered important. One volunteer expressed concern that the CFU raises local community expectations that units may not be able to meet with limited volunteer resources.

Table 8.26 CFU Volunteers Views on Their Roles and Functions

Abilities and limitations
'I mean if something was happening, I feel confident that we could behave adequately. We have the right equipment and we could, you know, self-activate. And the comms, if our battery was working'.
'I think practising periodically is important. Here's how you open the hydrant with a hydrant bar. Here's how you use the connectors to the hoses, the splitters, the branches which are the nozzles, you know, here's the backpack you can use to spray out fires afterwards'.
'My hope is that the CFUs will continue to be funded and resources made available to help us become functional and recruit enough people so that should another 2003 happen again, our back fences will be protected no-one will feel scared because everybody will have help evacuating'.
'I'm comfortable. I wouldn't say I'm super confident. So in a situation, hopefully one can stay calm. You know, that we don't start bumbling about and running into one another'.
'Our team leader has made sure we understand what our role is and the limitations. We are not there to fight fires so, we know where our boundaries are; where we can train—but we also understand that we are protected, you know, for O, H and S; he [team leader] is so safety conscious. It's not the property, you can rebuild, so look after your buddies, look after yourself'.
'We are competent for a limited role, but anything beyond that is just—we're not equipped. If those conditions of January 2003 were replicated, the CFU would be the furthest thing in my mind…they were so exceptional, with that wind and weather system blowing up'.
Community awareness and liaison
'And I think on the day itself, I mean there's a role for a runner or something like that within the CFU and just knocking on doors saying "Guys, are you aware this is the situation. What we're doing at the moment is just wetting areas down, but you may want to think of leaving" '.
'I think we need to be good communicators for our suburb and I think by going around in our uniform testing the hydrants, people come out and we say what we're doing'.
'It's more than the fire side. I've got 10 households that I keep contact with, just to confirm names and addresses. But one of those ladies lives alone. She rarely gets to talk to another person. She'd be in her 70s and she looks forward to my visit—I'm lucky if I get out of her place in two hours'.
'So as a new family comes in, getting them involved and getting them being part of it so that's going to be one of the challenges is keeping that membership up'.
'Once you wear the uniform, they [local community] expect that you know something. It's enough to make you give your uniform back. And we actually need another 30 volunteers to cover all the things that the community will expect of us'.
Note: all responses were from CFU volunteers (see Table 6.1)

In contrast to this interview data, the survey of CFU members conducted as part of the CFU program review found that communication between CFU members and non-members in relation to reducing bushfire risk has been limited, with almost half (49%) indicating that communication has occurred 'to some extent' while 39% stated 'not at all' or 'very little' (Bird et al. 2016: 51). This may be a reflection of the different way CFU groups operate: some are more actively engaged in their local communities.

8.9.5.6 Household preparedness

Local edge residents of Mt Taylor and Mulligans Flat were asked what changes they made towards household bushfire preparedness since the 2003 fires (see Table 8.27). Every household had initiated changes and taken specific actions, predominantly around garden and gutter maintenance. Having a plan was less common, although most had an idea or had taken steps to prepare what they might take with them if they had to evacuate.

Dunlop et al. (2014) defined bushfire preparedness as any prior cognitive or physical action that will reduce the risk to the householders' lives and/or the property in the event of a wildfire in terms of three goals: staying and actively defending a property, evacuating safely and preparing a property to improve its chances of surviving a fire without someone to defend it.

Residents' responses suggest a broad range of actions designed to prepare properties to improve their survival and evacuate safely; only one household hinted at 'active defence' by referring to an independent water supply. They also suggest that the 2003 fires created a legacy of awareness and action among edge households to prepare their properties and take responsibility their own safety (although not in the form of written plans). New norms were also observed with residents taking on the responsibility to physically maintain verges and mow the asset protection buffer—the 'defensible space'—on the urban boundary, supplementing the public mowing program (see Figure 8.32).

Table 8.27 Household Changes and Actions Around Bushfire Preparedness

Area	Responses
Gardens and trees	*'Yeah, we made changes. We planted fire retardant plants and this summer, it's time to get some of those things out that release a lot of leaf litter'.*
	'Yes, we cut stuff away from the house and have a Tom's Trash pack and this time of year, we watch the fire ratings. We sweep the gutters on the road as our street tree is eucalypt and keep the public laneway mowed on our side and the neighbour's.'
	'Since the fire, we mow out the back, up the horse trail'.
	'I've got these big eucalypts here and they drop masses of leaves, and brush fences, so with the body corporate, I've taken over the interface with the gardeners, so they clean out all the leaf litter once a year. I'm much more aware of fire risks now'.
	'Well, it certainly makes you think more, but there are houses beyond us and if people keep their blocks clear, it's quite a good break. And we have these capped fences, that's for fire…and special gutter guard and screens to keep the embers out'.
	'This house has got fire proofing so it's got the things to stop embers getting into gutters and under eaves. It's got guards and all that sort of stuff'.
	'We are a few houses in [from reserve]; neighbours are the buffer but we have taken a few precautions: gutter guard, metal buckets, a fire blanket'.
	'I clean out my gutters much more frequently now and I'm just aware of having hoses around and that sort of thing'.
Household plan	*'We do have a loose plan; we haven't finished putting our water tanks in. So once that's done, we'll have a pump attached for independent water supply'.*
	'We have had a box packed before and we just talked about this the other day. Yeah, I had the radio, extra dog leads, water for the dogs and important documents—We talked about an evacuation plan; not written down but our daughter in (X) is close'.
	'We've got a little pack ready to grab if we have to evacuate. Oh we do have the hoses sort of ready. That's about it as far as we've gone'.
	As for a plan, it's too hard because last time, the guys next door were renting and they'd gone out all day and left all the windows open and no one had any access. And we are all joined together so if one thing goes wrong…'.
	'I guess our plan is, like last time, we know exactly what we needed to take with us; we had the car packed, just enough space left for the cage for you [to the cat]'.
Note: All responses were from local residents living near Mt Taylor and Mulligans Flat (Table 6.1)	

Figure 8.32 Neighbour mowing the asset protection zone Chifley edge

Note: 'Percy used to cut it all the time on his ride-on mower—he did us a good service with his ride-on' (quotation from informant about Percy, now deceased)

The survey of CFU members conducted as part of the program review (Bird et al. 2016) asked volunteers to rate their perceptions of preparedness for bushfire in their households, fellow CFU members and non-CFU members in their areas. Respondents rated non-CFU people as far less prepared than themselves and other CFU members (see Figure 8.33).
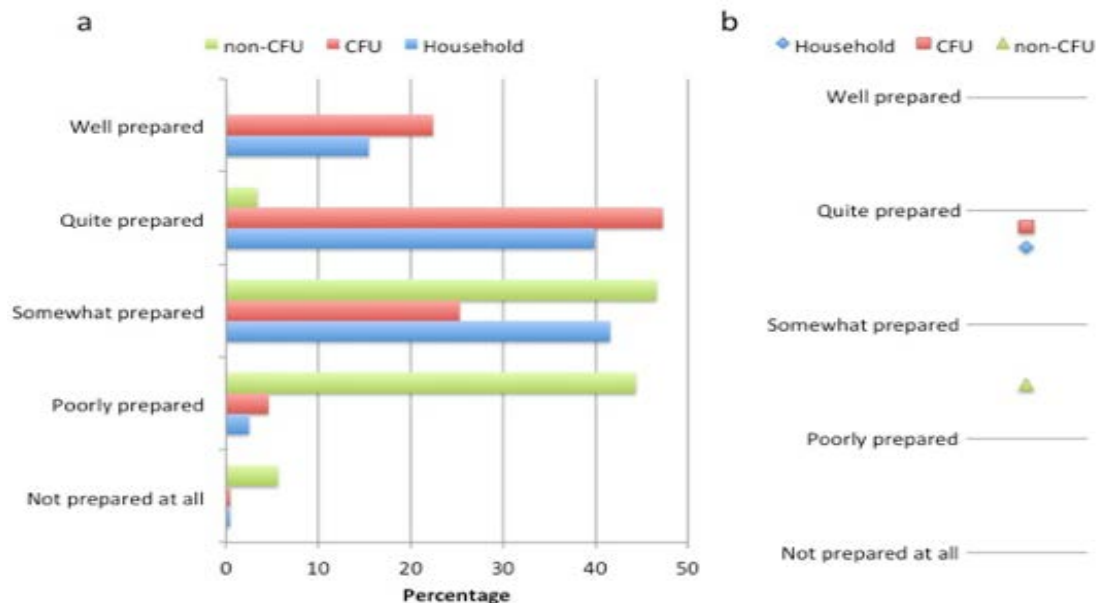
Figure 8.33 Perceptions of household preparedness, CFU Members' Survey 2016

Source: Bird et al. 2016: 52 Note: Perceived preparedness of 'people in your area who are NOT Community Fire Unit members' (non-CFU); perceived preparedness of respondents', 'Community Fire Unit' (CFU); and, perceived preparedness of respondents' 'household' (Household). a) shows the total percentage per category and b) shows the weighted response.

8.9.6 Participant observation and pilot engagement activities

As a participant observer and member of CFU 43, I gained an insider view of CFU programs and the support provided by the ACT Fire and Rescue Service (ACTFR). As part of the adaptive approach to this research (see Chapter 1), I also took the opportunity as a participant observer in CFU 43 to initiate pilot community engagement activities with the group during the fire season. These activities allowed me to engage in informal and friendly conversations with local people and volunteers to generate additional data about community awareness and bushfire preparedness.

8.9.6.1 CFU training drills

Beyond undertaking the induction and refresher training provided by the ACTFR for CFU volunteers (1 December 2012 and January 2016), I participated in 10 practice training drills with the Chifley unit during the bushfire season (ACTFR 2017). I also observed a CFU training drill with another unit to compare different approaches to training, operation leadership and new member orientation. The Chifley unit met once a month on a Sunday afternoon and drills led by the team leader included: cleaning hydrants, shifting a standpipe, connecting hoses and using the pump to access an alternate water source like a swimming pool or tank (see Figures 8.34 and 8.35).

This seasonal training gave firsthand insights into the response activities volunteers are expected to perform should the unit be activated and primarily covers setting up the equipment to wet back fences and the APZ ahead of the arrival of appliances. A joint training exercise with the Rivers Volunteer Rural Fire Service (RFS) Brigade showed how the CFU could work with firefighters by providing local information, setting up equipment in advance and filling their pumpers from hydrants (see Figures 8.36 and 8.37).

Figure 8.34 Pump training drill, CFU 43

Figure 8.35 Pump training drills, CFU 43

Figure 8.36 Joint training, Rivers RFS and Mt Taylor edge CFU's

Figure 8.37 Joint training, Rivers RFS and Mt Taylor edge CFU's

8.9.6.2 Team leaders' meetings and the consultative committee

During group observation, I attended 10 team leaders' and Consultative Committee meetings (the Consultative Committee is a group of team or deputy leaders who advise the ACT Fire Service on the CFU program). These meetings provided unique insight into how the program is administered by the ACTFR and an opportunity to observe the team leaders. The conversations and volunteer expectations expressed at these meetings showed a considerable diversity of approaches and practices among the units. [145] Some team leaders actively approach new residents in their areas and a few conduct the annual door-knock and regularly communicate with their neighbours.

I was also able to observe changes over time concerning how the program was perceived and managed within the ACTFR. Management of volunteers was new business for the [urban] Fire and Rescue Service when CFUs were established, as opposed to the long-standing State Emergency Service and ACT RFS volunteer programs. Until 2015, the ACTFR struggled to meet expectations for the program, due to insufficient program management resources: 1.3 staff (one experienced fire fighter) to manage almost 1,000 volunteers. The attitudes and communications with some professional firefighters (at local stations) also revealed negative perceptions about the volunteer community-based units. [146]

From 2015, two experienced fire fighters were appointed to manage the program and a revolution occurred, partly also due to the appointment of a new Fire Chief from NSW who was familiar with the CFU program and its benefits (ACTG 2015a). The focus shifted to a suite of standardised operating procedures and core training drills (ACTFR 2017) and emphasised unit safety to conform with workplace health and safety requirements. Refresher training included 'hot training', under the guidance of trainers to experience the heat of a fire firsthand (see Figures 8.38 and 8.39). This emphasis on safety and personnel protection is believed to increase the chances of survival (Gill et al. 2013).

There was also an evolution in how the volunteers were perceived as a valuable and integral part of incident response, with notification/activation of CFUs for bushfire incidents through the Comcen (ACT Emergency Communication Centre). Accountability boards were erected in trailers to track members during activation and tabards were given to identify Team leaders on

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[145] Generally, only about half to two-thirds of team leaders regularly attend Team Leaders meetings
[146] This observation was made by a volunteer informant in the early years of the CFU program.

the fire ground (see Figure 8.40; Field Notes 15 February 2016). Once activated, team leaders were tasked to brief station officers and provide situation reports using local intel (e.g., *'fire is from west—a fence is fully involved. We've got a hose ready, and stand pipe set'*). Integrating CFUs in the response structure conforms with community safety research findings that where community members are involved in response activities, there should be a shared understanding of the command and control structures (Bushfire CRC 2009a, b).

Under this new integrated incident response, the Chifley CFU was notified about a grass fire on the western edge of the Mt Taylor Nature Reserve in December 2015 (see Figures 8.41 and 8.42) but did not activate, as there were significant fire appliances at the scene.
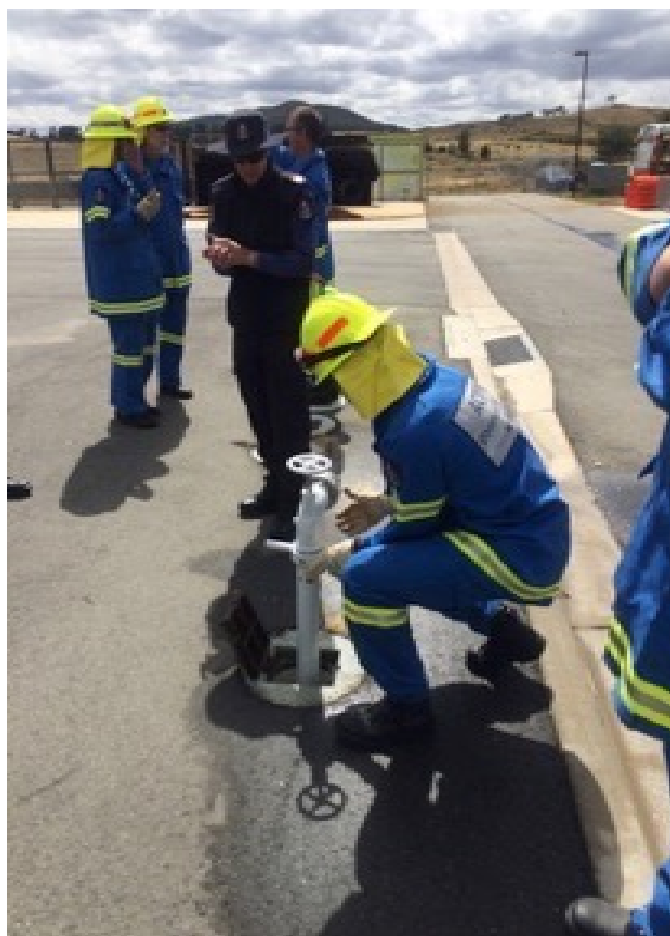
Figure: 8.38 CFU skills training

Figure 8.39 Hot fire training for CFU Volunteers, January 2016

Figure 8.40 Then-CFU 43 leader Marcel in the tabard

Figures 8.41 and 8.42 Fire on Mt Taylor, December 2015

8.9.6.3 Pilot activity 1: CFU Saturday Community Awareness events

The so-called 'CFU Saturday' is held on a weekend (usually the first or second weekend in October) at the start of the bushfire season. It is designed to allow CFU groups to raise awareness in their local communities. Activities range from community barbeques to displays at shopping centres and training drills (Maher 2014).

In 2013, I initiated the first CFU Saturday Community Awareness BBQ for the Chifley CFU and invited the three other CFUs adjacent to the Mt Taylor edge to join us in our local neighbourhood park (see poster and letterbox flyer in Appendix 15). A crew from the local Fire Station (Philip) and a volunteer unit from the ACT RFS were also invited to attend with their appliances. The ACTFR supplied supermarket vouchers to cover the barbeque supplies and information bags containing fire safety messaging and a guide to preparing a fire plan.

The community barbeques have been held annually since the 2013–2014 season (organised by the researcher) and have become the unit's principal means of reminding existing residents and orienting new households about bushfire risk, with about 50 people attending through the morning. The event has continued to be supported every year by ACT RFS volunteers and the Woden Fire Station crews. The flame game, a fire hose and a large fire truck (or two) are an attraction for families (see Figures 8.43 and 8.44). These barbeques have resulted in a number of new residents engaging with CFU volunteers; this included two new home owners in 2014, a new renting household and two new home owners in 2015 and 2017.

Observations of interest from the Community BBQ events relate to building social capital and networking—not just connections between local neighbours and residents (who become familiar with CFU members) but also the network of four Mt Taylor urban edge CFUs, the Rivers RFS Brigade volunteers and the Woden urban brigades. The network has led to three joint training exercises and an understanding of the different roles and how CFUs can work with the other crews (see Figures 8.38 and 8.39).

Figures 8.43 CFU Saturday, Chifley Park 2013

Figure 8.44 CFU Saturday 2016: the network of CFU, RFS and Urban Brigades

8.9.6.4 Pilot activity 2: Neighbourhood doorknock 2012−2015

I participated in three neighbourhood doorknocks at the start of the 2012−2013, 2013−2014 and 2014−2015 bushfire seasons. The doorknock was an opportunity to introduce the CFU, disseminate bushfire awareness bags and talk to householders about simple preparations and

having a fire plan. The potential recruitment of new volunteers for the unit was a secondary objective. With consent, data were collected about household size, vulnerable persons and other useful information (e.g., back gates and swimming pools). Observations of interest from the doorknock relate to local community awareness, the importance of memories and the experience of fire and its aftermath.

Bushfire Awareness

Local residents displayed varying levels of awareness about bushfire risk, largely dependent on whether they experienced the 2003 event. Interestingly, two households that had moved in since the fires came from Weston Creek and experienced the fire in their previous homes. Many new residents (since 2003) were not aware that they were living in a BPA. Residents were happy to answer questions and share information about household size and vulnerable household members who may require assistance and pets. Those with a boundary backing onto the reserve were asked about gates into the reserve and access to swimming pools as a water source, if needed. The doorknock also opened conversations surrounding fire plans and potential volunteering. Some households had taken steps to self–organise, had their own water tanks and pumps and were clearly ready to collaborate in case of an event.

Edge memories and experience

The 2003 Canberra fires left homeowners with a variety of direct and indirect (i.e., through the accounts of neighbours, friends and mass media) fire experiences. Some of these stories were chronicled after the fire (Matthews 2003). Residents who lived through the fire were happy to share their experiences during the doorknock. Perhaps unsurprisingly given the chaos, there were vastly different accounts about when the flames hit the Chifley edge, the extent of the front (possibly because of the smoke and ember attack) and the fire's direction of origin, which had three different accounts:

> *It came over the top (from the south-west).*
>
> *It came from Oakey Hill (from the north).*
>
> *It came from the underpass (west from the Tuggeranong Parkway).*

The age of the suburb appears to have affected who was available to help suppress ignition around homes. There were common accounts about the human responses on the day (see Table 8.28), especially car loads of young people arriving, many friends of those who had grown up in the area and that were aware their parents/friends' parents may have needed help.

Following the fires (see also Table 8.28), residents described the removal of much garden vegetation and all trees within 30 m of the urban boundary (this occurred across Canberra; see Figure 8.45), the replacement of wooden power poles destroyed by the fire with concrete ones and the replacement of charred timber fences with colourbond steel (see Figure 8.46)

Table 8.28 Residents' Recollections of the 2003 Fire, the Response and the Aftermath

'Only those who were here will have any sense of what it can feel like. And I don't know how to transmit that, what it's like to have your mountain burning'.
'One of the power poles unfortunately kept spurting embers into Judith's yard, so she and her sons were dousing the embers in her front garden, and no-one would touch it [the pole]'.
'Anyone who lives on the edge should make an inventory of what's in their garage and shed; two years later, I'd go to get a tool and think "I don't have that", couldn't claim again on insurance'.
'We were lucky, lost two cars in yard, a couple of sheds and the garage; that eucalypt tree went up and, the row of pine trees between the neighbours went up like a roman candle. The top of the street light melted and ran down the pole like candle wax'.
'I was reliant on all the volunteers that night until about 12 o'clock [midnight]'.
'I wasn't home but some people turned up to help and used that [rear] access from our place—if you lock your gates, how do people get through?'
'Help comes to those that help themselves. These teenagers turned up and grabbed a whole lot of wheelie bins– not sure where they got them from—and filled them up for me'.
'When the fire front hit our fence, the flame was about five metres above the fence'.
'Everyone was so busy, we had no water so relying on standpipe, wet towels were useful'.
Note – All accounts from Chifley residents during the Neighbourhood doorknock. see. Section 8.9.6.4

Large numbers of residents taking material to the dump after cleaning up around their gardens in the week following 18 January. Photo printed with permission of the *Canberra Times*.

Figure 8.45 Vegetation clearing after the 2003 fires

(Source: ACTG 2003)
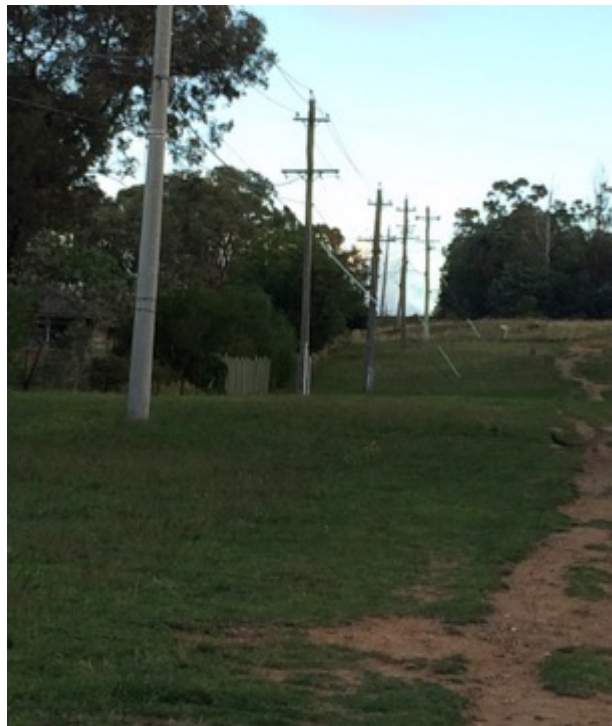
Figure 8.46 New concrete power poles replaced burnt wooden poles

8.9.6.5 Pilot Activity 3: Ecologist walk and talk around the Chifley urban edge with the CFU

In my first year as a member of the Chifley CFU, I observed that very few of the volunteers had knowledge about the fire history of Mt Taylor although the 2003 event had sharpened their awareness about the likely risks. While some general information on fire behaviour was provided at the ACTFR volunteer induction training for CFU members, it was not tailored to Canberra's specific vulnerabilities or urban edge risks. To assist this learning, I invited a Fenner School colleague, the respected fire ecologist, Dr Malcolm Gill, to talk to the Chifley CFU about Mt Taylor's fire history and issues relevant to the western nature reserve interface with the suburb (e.g., wind direction, weather conditions and fuel presence and treatment). Part of the purpose was to build on people's situational awareness from the 2003 event. Malcolm had also been a member of one of the inaugural CFUs on the western edge of Canberra and had a good understanding of the role of the CFU (see Figure 8.47).

Observations of interest from the walk and talk include personal reflections about the 2003 experience and interesting revelations about risk perception, the role of the CFU and local preparedness in the event of a fire. The walk was useful to uncover these perceptions of risk, the likely fire direction, fuels and the use of building materials along the edge, particularly choice of fencing materials. One volunteer suggested that bushfire risk had increased since they stopped grazing sheep on Mt Taylor and another sought Malcolm's advice about whether to remove a tree on the boundary. Yet another volunteer hoped Malcolm would provide a plan for implementation; however, the aim was to reveal and grow their existing knowledge of the risks.

In this way, the walk distilled what Goodman and Gawen (2008) identified as the 'latent and actual community capacities'. During the walk along the boundary, conversations about people's personal experiences of the 2003 fire made the risks more real for those who had not experienced the event and also increased their understanding of the likely hazards. It also revealed which volunteers already held useful knowledge about the risk in their own backyards and how they might assist their neighbours to prepare for and understand the risk.

Figure 8.47 Fire Ecologist Malcolm Gill talks to CFU 43 volunteers

8.9.7 Insights, learnings and observations

The ACT CFU program has evolved into a cohesive social network of around 800 volunteers, working with their neighbours to 'share responsibility' for household safety and community awareness. This is a significant social transformation since the 2003 Canberra fires. The units that are thriving have creative team leaders, strong neighbourhood relations and volunteer succession plans. They have created a neighbourhood culture where even if people aren't volunteers, they are made aware of how they can take responsibility for keeping their own households safe through regular communication and contact with the unit. These proactive units have created new social networks at the neighbourhood level and across their suburbs and have developed collegial relationships with the volunteer RFS and professional ACTFR brigades. This transformation is recognised at the highest levels of the agencies:

> We understand the important social capital in CFUs: being ready to respond and the focus you give to people around your neighbourhood that they are in a bushfire prone area. CFU's play a tremendous role and we want to help keep you motivated, keep your units refreshed and help out how we can (Dominic Lane (then ESA chief) CFU team leaders meeting, November 2013).

> You are pivotal to us being able to manage bushfires, we can't just rely on the burning program – be reassured as Chief Officers and Executive of ESA we value you. You also hold critical knowledge, we need to extend those 40,000 households that sit within bushfire prone within 100 m of vegetation that could carry fire' (Andrew Stark (then Chief Officer, ACT RFS) CFU team leaders meeting, September 2015).

The 2016 review of the CFU program supports the findings of this case study: the benefits of the program in the ACT extend well beyond equipping and training people for response, with

'neighbourhood engagement and social networks important for enhancing community resilience' (Bird et al. 2016: 61).

Even so, it was observed that the ESA does not always recognise and use CFU social networks: some perceptions of superior knowledge resting in the agency remain (Brady 2014). For example, the ACT's bushfire awareness communication is centralised; CFUs are advised about ESA campaigns after design and not asked to contribute. Local doorknocks by CFUs identifying vulnerable households (and keeping this data current) were not acknowledged (team leaders meeting 14 October 2014) and CFU-led activities are often ignored in the planning of annual awareness campaigns, although some changes were evident in 2015 (team leaders meeting 22 September 2015).

The CFU focus on response and equipment involves significant training and work health and safety obligations. Discussions about 'equipment' and 'training' are the focus of team leader meetings and gender may play a part. I regularly suggested that the first response of a CFU (particularly if insufficient numbers are available to stand up the unit and, more importantly, if a catastrophic warning is issued) should be to doorknock and advise neighbours about evacuation and the location of safe places and ensure the safety of vulnerable households.

Also, volunteers must be trained to safely use the equipment but the comfort zone of each volunteer and their individual reactions in the event of a fire have not been tested (observed by managers; see Table 8.22). Some volunteers might feel more comfortable doorknocking and ensuring safe evacuations. New CFU membership categories (auxiliary and cadets) introduced in 2017 provide capacity to recruit a greater diversity of volunteers. Expanding the volunteering roles within a CFU also agrees with evidence that community safety programs cannot use a 'one size fits all' approach and improvements in Agency-led bushfire mitigation will only be significant if the community is better educated and engaged (Ellis et al., 2004: 42).

One community response to fire that has not been pursued in the ACT is the role (and management) of 'spontaneous volunteering'. This was significant in the neighbourhood responses during the 2003 Canberra fire event and local residents confirmed how many (mainly young) people arrived and helped haul water and extinguish embers, relieving exhausted home owners (see Section 8.9.6.4). QLD trialled a system placing a risk management framework around the use of spontaneous volunteers in emergencies and recovery (McLennan and Molloy 2016), recognising the community's inclination and willingness to help. The QLD study showed how volunteers can be channelled to where they are needed using a conduit (local)

organisation to manage offers of help. This has enormous potential to be adapted elsewhere (McLennan et al. 2016).

As a participant in Mt Taylor ParkCare and the Chifley CFU, I was able to integrate some volunteer activities. Only two volunteers (of 800 CFU volunteers) are also ParkCare volunteers (myself and a colleague at Aranda). Building a relationship with the Parks Agency and their seasonal fire management program is an obvious synergy for CFUs and a potential training opportunity for local units when hazard reduction burns are planned. The value of CFUs being able to observe hazard burns was recently acknowledged by the ACTFR (CFU Consultative Committee Meeting 5 April 2018) and discussions are underway between the two agencies. The process of notifying CFUs about adjacent prescribed burns has improved over the period of observation, with email notification of the CFU network. This contrasts with an experience in spring 2011 when neighbours only became aware of a prescribed burn at Mt Taylor was when signs were placed and smoke visible (see Figures 8.48 and 8.49).

Figure 8.48 and 8.49 Prescribed burn, Mt Taylor Chifley edge, 2011

There is also value in CFU volunteers having knowledge of bushfire history in the adjacent nature reserve and likely risks from geography, wind direction and fuel. This is not part of CFU training, although one team leader took the initiative to prepare a detailed plan incorporating some of these elements (Field Notes 22 October 2011). The generation of a base plan showing these elements would be useful, as would building the volunteers into processes of bushfire management operational planning (see also Section 8.9.5).

The annual neighbourhood doorknock and CFU Saturday BBQ were both excellent ways to communicate with Chifley neighbours about household preparedness. To complement these activities, signage could be erected at the local school oval and sports grounds to help reinforce this message (e.g., NSW signage, see Figure 8.54). Signage reminds people about safe

locations and reinforces that part of the suburb is within a BPS. This simple cost-effective strategy is critical, given the rate of demographic and household change and associated loss of fire memory observed in the Chifley BPA and reported in other CFU areas (Bird et al. 2016: 19−20).

Figure 8.50 Safe place signage, NSW

Since the CFU program was established, new urban edge suburbs have been developed in the Molonglo Valley, West Belconnen and north Gungahlin. The demographics of these new suburbs are different from those of established edge suburbs (see Section 5.12, Appendix 6), as is their planning and building design, which include edge roads around the suburbs and building standards that govern bushfire risk for properties in BPAs. These new areas have a higher proportion of CALD residents who have not grown up with the Australian bush and may not have experience of living with bushfire. They require tailored approaches and communication that creates awareness. There is also a need to counter perceptions that new planning and building standards have mitigated all bushfire risks.

The neighbourhood doorknock and CFU Saturday BBQ also revealed that many people migrating to the established suburbs are unaware of the BPA. Bushfire-prone properties could be disclosed to potential purchaser/s as part of the contract of sale of residential property in the ACT, as in NSW and Victoria. In NSW, the Planning (s. 149) certificate attached to every sale contract identifies whether a property falls within a BPA. Bushfire mapping by local councils is certified by the NSW RFS and new development is subject the planning and building controls

(AS3959 – 2009) to improve the survivability of the development and its occupants (NSWG 2006). Victoria has introduced changes to the sale of land that require a 'Bushfire Prone Area Property Report' to identify BPA status and provide a map of the property from BPA mapping, prepared following the recommendations of the Victorian Bushfires Royal Commission in 2009.

8.10 Case Study Insights and Learnings—Urban Edge Volunteer Programs

The value of the social capital provided by local communities is acknowledged by agency program managers as invaluable for both land management (ParkCare volunteer) and community safety (CFU volunteers). The motivations of both groups of volunteers have a 'place' element but they differ in their spheres of interest and influence. Fire volunteers are focused on their local edge and property asset protection; many are motivated to become more self-reliant following their experiences during the 2003 fires. In ParkCare, the stewardship ethic drives volunteers and while individual groups are focused on a particular nature reserve, all have a sense of belonging to a wider movement to protect ecosystems and ensure intergenerational equity.

Both programs are predicated on partnership with the government and have experienced varying levels of commitment from the partner agency. With CFUs, agency engagement and partnership over the observation period was transformed. In contrast, ParkCare is heavily reliant on the attitudes and capacity of the Programs Coordinator and Community Programs Team. Also, unlike the CFU Consultative Committee, there is no collective or representative voice for ParkCare volunteers to provide advice to the Parks Agency on management and program design, and to underpin the partnership. Landcare ACT and ACT Catchment Groups can perform this role but are often excluded from ParkCare program communications. The Friends of Mulligans Flat have a distinct advantage over other urban ParkCare groups; not only do they have a dedicated ranger team for collaboration and planning their work program, but they also have a seat to date on the Mulligans Flat Board of Management.

There is potential to examine the potential synergies between the ParkCare and the CFU programs on the reserve edge. The CFUs have created new suburban norms around mowing verges and garden clean-ups (see Figure 8.51). These vegetation cleaning events could also help target plants that are known to be invasive in the nature reserve. Similarly, ParkCare groups with tools and weeding skills could assist with mechanical fuel management control in reserves, as noted by a former Volunteer program coordinator:

I've approached the firies about whether we can get the ParkCarers to do the cleaning around the trees. This is something that we do as the GSOs and fire people we clear around some of the trees so they don't go up in smoke, so the fire doesn't burn up to it. Sometimes we do like to see straggly bark burn so we've got to be selective but there's no reason we can't train the ParkCarers to do it. There's no reason why I can't be there working with the ParkCarers to do this and we can build a bridge that way. And often, because they do they a vested interest and they're emotionally invested and physical invested as well 'cause their houses are down there they're probably going to do a better job.

Figure 8.51 CFU 25: Torrens neighbourhood clean-up, 2018 (Mt Taylor in background)

(Photo: Peter Taylor)

The CFU program is one of the largest volunteer organisations in the ACT but maintaining interest is more challenging than in other forms of volunteering where the outcomes are more tangible and immediate (e.g., children's sports). The time that has elapsed between 2003 and a significant fire incident is also a factor, with no major activations over the last 15 bushfire seasons until the season of 2019-20. Expanding the range of functions that CFUs might undertake around hazard prevention (see Figures 8.52 and 8.53) and building new alliances with the Parks Agency and ParkCare could boost unit motivation and expand their knowledge of the management of the local reserve and its risk context. This could include a joint neighbourhood program focusing on issues relating to stewardship behaviours, and bushfire risk (e.g., rubbish dumping, weeds and bushfire safety).

Figure 8.52 CFUs observing a prescribed burn, Aranda Nature Reserve, 2011

(Photo: Michael Doherty)

Figure 8.53 Prescribed burn, Mt Taylor Nature Reserve, 2016

8.11 Overall Findings and Conclusion

This Chapter documents the diverse experience of management practitioners and the groups and volunteers involved in urban edge community programs at the case study sites, Mt Taylor and Mulligans Flat nature reserves (research question 2).

Collectively, the case studies reveal how history, social setting and conservation values have resulted in different approaches to management and resourcing, which has influenced the social relations between the neighbouring local communities and reserve managers.

This research found strong local attachments on Mt Taylor, that reserve managers are unable to nurture due the lack of agency focus, resources and commitment for community education and neighbour relations. For these older reserves with ongoing management legacies, the neighbours and users are seen more through an impact lens, and there is little time to work collaboratively with the volunteers. Managing these reserves as bounded ecological units with insufficient resources is failing to protect conservation values. The ParkCare volunteers are holding it together for a resource stretched agency (Beeby 2011).

At Mulligans Flat, the Agency is collaborating to enable a genuine community partnership which has leveraged new resources and ideas to manage the reserve. The new neighbours and users have been positioned as advocates, partners and carers, with orientation programs developed to build this social capital and encourage care behaviours. Agency resources are focused on delivering the basic park infrastructure, enabling the education and outreach to be delivered by the community partners. This synergy was also evident in the interstate case studies (Appendix 16) where community organisations have been part of the building blocks for management success at the studied nature reserves for over three decades. These partnerships have enabled local community engagement and education and added significant value to reserve management.

There are also opportunities for better alignment with the very public policy domains that are seen by managers as attracting the greatest share of public resources. Allied initiatives in preventative health and education, particularly situating nature reserves as part of the policy responses in these domains is possible with an understanding that these much-loved places motivate people to be physically active, look after their mental health and care about their local environment (research question one).

Managers need to share and devolve more responsibilities to competent community organisations who are skilled and better equipped to deliver the community outreach and education needed to manage the multiple values of urban nature reserves. This would allow the land managers to focus on core activities like repair and maintenance of infrastructure.

These benefits will be further explored in the next Chapter by drawing on the collective perspectives and ideas of local residents, managers, community organisations and local care volunteers. These insights will show how nature reserves might be managed in concert with important social goals for community health and connection and in a way that maintains biodiversity within nature reserves and the surrounding landscape.

Chapter 9: Discussion and Conclusions

9.1 Chapter Overview

This chapter revisits the research proposition and questions and draws together the key learnings and insights from the case studies. It also describes how these build on the existing literature and/or provide new contributions to understanding. The chapter concludes by presenting ideas to reframe management in a way likely to benefit both urban people and conservation for consideration by planning practitioners and nature reserve managers. These relate to the ACT, acknowledging the primary setting for the research and the study findings about management practice, but could be used as reference points and resources for managers in other urban settings with similar challenges.

9.2 Thesis Purpose, Research Proposition and Approach

With more people now living in cities and growing evidence that exposure to nature provides many health and well-being benefits, urban nature reserves positioned as key places to connect people with nature (Maller et al. 2006) with urban people critical to building support for conservation (Watson et al. 2014).

The review of literature (Chapter 2) suggests that the social settings of urban protected areas are under-studied and human values are rarely incorporated in management planning frameworks. They way reserves are managed, ecologically separated from their surroundings, suggest current planning tools and practice may not be suitable for the urban context. This invites qualitative research to deepen current understandings of important social values that underlie human relationships with nearby bushland. These opportunities fall into three key areas. First, one must understand the relations and experiences of neighbours and users of urban nature reserves to examine the processes of connection and also in what capacities local people might contribute to care and stewardship. Second, if urban nature reserves are to be managed cooperatively with adjacent landscapes, the experience and views of practitioners working in these landscapes is important to understanding how knowledge is used and identifying institutional barriers to innovative and integrative practice. Third, one must question whether the models used to manage nature reserves are fit for purpose and effective in urban settings,

where ecological and social connectivity are both important and building neighbour relations and community engagement should be core business for managers.

This context informed the research proposition and the design of specific questions to frame the inquiry to explore the experiential perspectives of key actors and their relations with urban nature reserves.

The research proposed that ecological management of urban nature reserves is more effective when coupled with a richer understanding of their social relations and place context. The research questions were:

1) How do urban neighbours and users experience and connect with nature reserves, and what might influence their relations, engagement and motivations to care?
2) What are the experiences of practitioners who plan for, develop near and manage urban reserves—and what knowledge domains do they draw on?
3) What do these relational perspectives mean for the management of urban nature reserves, their biodiversity and human relationships in urban settings?

Use of an experiential 'lens' was proposed to provide a more nuanced understanding of the social relations and professional practices of the main actors using different case settings in Canberra. Multiple cases allowed the juxtaposition of several stories, a focus on a number of issues and testing of the orienting concepts (see Section 1.10) across the cases. Table 9.1 shows how the research questions, concepts and case study chapters are linked and offers examples of how the concepts were used to analyse and explain the data.

Table 9.1 Summary of the Adaptive Approach in Multi-Case Research

Orienting concept	Chapters	Value of orienting concept
Research Question 1 How do urban neighbours and users experience and connect with nature reserves, and what might influence their relations, engagement and motivations to care?		
Topophilia and biophilia	Chapter 4 Chapter 6 Chapter 8 Appendix 16	These concepts are useful for explaining how experience in place creates meaning and attachment. Ecological stewards displayed intensive affective bonds, some akin to biophilia.
Extinction of experience and	Chapter 3 Chapter 4	Captured in some media stories, these narratives may fuel parental risk and perceptions about safety.

nature disconnection	Chapter 6	Observations provided firsthand evidence about this phenomenon, creating the opportunity for experimental research in the young family community of Forde.
Place attachment and a sense of place	Chapter 6	These concepts align with attachment to local reserves and the sense of place that emerged in the reserve, not only to the physical space but also socially, as networks have developed (e.g. Early climbers). They are also expressed through visual relationships (view) and sense of place evoked by amenity and backdrop (bush setting).
Knowledge domains	Chapter 6 Appendix 14 Appendix 16	People's interactions with the reserve build individual and local knowledge about place. Fine-grained knowledge was evident in local Care groups, as was internal group transfer of, and collective learning about, place and practices.
Boundaries buffers edges	Chapter 6	Homes and neighbours in older suburbs share boundaries with reserves, producing more interchange (in weeds, wildlife and other territorial-type practices) and edge entry points. New suburbs have physical separation and clear boundary demarcation; homes face the edge road to reserve, reducing entry points. Conservation infrastructure reinforces that place is habitat.
Research question 2: What are the experiences of practitioners who plan for, develop near and manage urban reserves—and what knowledge domains do they draw on?		
Boundaries and buffer edges	Chapter 7 Chapter 8 Appendix 16	Managers in older reserves manage interfaces (access permits to backyards). More intensive management is required along urban edges and 30 m into reserves for hazard reduction. Since 2003, new suburbs next to reserves are required to have managed APZs and edge roads within suburb boundaries. Conflicts exist in managing habitat and maintaining APZ fire. Buffers were incorporated into fire practice to create defensible space during eco burns.
Knowledge domains and collective thinking	Chapter 3 Chapter 4 Chapter 6 Chapter 7 Chapter 8 Appendix 14 Appendix 16	Media articles often quote an expert (scientist or manager) and cite published research. These are useful for understanding why technical and scientific knowledge prevailed in planning spheres (land use and management planning) Many examples show that local knowledge was insufficiently valued but critical for local-scale management. The question of whether childhood immersion and this grounded local knowledge translates into disciplinary preferences later was outside scope of this research.

Community of practice and social learning	Chapter 7 Chapter 8 Appendix 14	This is apparent in how the BoB operated sharing and diffusion of knowledge and ideas in safe spaces. This provided an opportunity for the ParkCare convenor group and team leaders to share local knowledge and ideas within the volunteer community.
Managing commons	Chapter 6 Chapter 8 Appendix 14 Appendix 16	This applies to public good resources like nature reserves. Volunteer networks show elements of small groups with a common restoration goal who assume land management responsibilities that the agency cannot deliver. Elements of this also apply to the collective responsibility undertaken by CFUs in local areas. There is potential to expand this idea across the entire urban landscape (greenspaces, streets, parks, etc.) but that is outside scope of this research.
Care ethic and stewardship	Chapter 6 Appendix 14 Appendix 16	This underpins nature volunteering and is consistent with volunteers' generative, altruistic motivations.
Extinction of experience and nature disconnection	Chapter 4 Chapter 6 Chapter 8 Appendix 16	Addressing disconnection is not yet evident in the management of urban reserves, which have no formal programs to connect local people (except Mulligans Flat). Interstate sites are pursuing imaginative activities to connect people with nature.
Research question 3: What do these relational perspectives mean for the management of nature reserves, their biodiversity and human relationships in urban settings?		
All concepts	Chapter 3 Chapter 4 Chapter 6 Chapter 7 Chapter 8 Appendix 14 Appendix 16	All concepts proved useful for theorising how people see and experience nature. Ensuring that social relations and meanings are reflected in planning and programs requires integration of local knowledge, respecting care and ethical motivations in partnership support and the potential to expand capacity to manage urban commons.

9.3 Reflection on methodological approach and study limitations

The multi-case study and adaptive research approach allowed me to target key groups of actors and use ethnographic methods to capture their social meanings and practices in nature reserves. While the primary research interest concerns these people–nature relationships, the aim was also to understand why others might not engage with 'nature on their doorstep'. Yi Fu Tuan

wrote that the experiences of places and encounters between people and environment are 'shaped by the cultural setting in which they operate' (Tuan 1993: 122). Here, the cultural factors that might shape nature relations and engagement (e.g., popular media and childhood connection) were examined. This topical pathway provided an opportunity to test certain concepts during the research by using social media pages (see Section 3.6.1.1) and initiating and observing various engagement activities in group settings (see Section 6.5.2). Thus, the adaptive approach both enriched the research process and also added to its 'messiness' (see Law 2004) and the challenge for a single scholar to combine it.

As a participant observer embedded in different group settings, I chose to contribute and continuously presented the research findings for committees and others during the research period. The extended timeframe over which the study was undertaken presented additional research opportunities but also some limitations for the findings. The ethnographic data concerns people and their personal meanings and professional interactions in that place and with programs at one point in time. There is also potential bias in the data from local residents and reserve users, as it captures the stories of people who use, and/or are interested in, urban nature reserves and not those who do and are not, although the reason was theorised for the absence children connecting with nature reserves.

Some management issues raised by informants and/or observed may resolve themselves, whereas others are ongoing. This is expected, given the dynamic nature of the case study reserves and their neighbour communities. For example, agency attitudes and the volunteer training regime in the CFU program transformed over the observation period (see Section 8.9.6.2) and other initiatives under development may recast the management of nature reserves (or not), including revision of the Management Plan for CNP, the Landscape Assessment, and yet another inquiry in the Legislative Assembly into Canberra's natural landscape, including nature reserves, entitled 'Nature in the City'. [147] The opportunities section (9.6), explores how practitioners might apply the findings of this study and related literature.

One area excluded from this study was an examination of the natural spaces beyond the nature reserves: the bio-sensitive urban landscapes developed within the new suburbs (e.g., Forde) where the edge and internal design was sympathetic to the neighbouring conservation reserve setting (see Section 7.4.2). There are two aspects of research interest in these adjacent

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[147] https://www.parliament.act.gov.au/__data/assets/pdf_file/0005/1480091/9th-ETCS-10-Inquiry-into-Nature-in-Our-City.pdf

landscapes. The first is their social value: how they are used by local residents, what features are valued and why, their role in nature connection and whether their provision takes recreational pressure off nearby nature reserves. The other aspect is their ecological functions and value: their roles in providing complementary and connective habitat across the urban matrix and their capital cost-effectiveness and ecological sensitivity (maintenance) over time. This is critically important evidence to facilitate the take-up of alternative development practices and innovation, particularly in denser cities.

9.4 Significance of the Study Findings

The introductory chapters of this thesis set the research context: given global urbanisation and the growth of city regions, urban protected areas are important for the protection of threatened species and providing natural places for human–nature connection. This section distils the major findings of the case studies that expand current understanding of social relations in and around urban nature reserves. The research questions are used to frame the explanations.

9.4.1 What 'might influence local people's relations and engagement with urban nature reserves'? (Research question 1)

A global transformation is underway in the transmission of information, platforms used to deliver media reporting and new social media platforms. The media play a specific role in the dominant narratives about how humans live in the world, including their relations with nature. These representations influence how they perceive nature, risk and safety while in nature. The case study of media representations (see Chapter 3) examined how nature stories are framed and the messages they communicate to readers. Content analysis of a sample of stories from quality print media in Sydney and Canberra found that the dominant narratives discuss threats to nature from human activities and nature as an arena of battle and conflict between different groups. These are followed by negative narratives—nature is dangerous, an unpredictable force posing threats to people and property from bushfire—and those discussing health risks and nature as rampant and troublesome. These narratives use battle metaphors, which feature in headlines and storylines. Far fewer stories feature themes around urban connection, knowledge and discovery and/or resilient and recovering nature with positive human dimensions. These findings indicate that danger and control narratives present a social reality—nature is considered outside the realm of, not part of, everyday experience. This effect is compounded if people have less direct contact with nature and counters imperatives to build an urban community constituency to advocate for conservation and care of local places. These social

changes are unlikely unless beneficial human–nature relationships have prominence and thoughtful attention in the media is required to inspire public understanding of, and desire for, nature connection.

To expand these findings given the rapidly changing media landscape, I tested how social media might be used to present alternative socio-ecological narratives and as a real-time tool for engaging local people by inviting them to experience nature, both virtually and in nature reserves. Social media also recently proved its worth as a compliance tool to manage antisocial human behaviour in the reserve. [148] This social media experiment highlighted the potential of this powerful visual medium and the ease of sharing to generate excitement about nearby urban nature—wildflowers at Mt Taylor and restoration science at Mulligans Flat—and attract people for community events and volunteer recruitment. Given the prevalence and potential reach of social media, it is a cost-effective tool for nature reserve managers; however, noting findings in other arenas (e.g., emergency services), it must complement not replace other mediums (Haworth and Bruce 2015).

Expanding urban and digital worlds affect societal norms around childhood and parenting and have spawned concerns about childhood disconnection from nature (Broom 2017; Louv 2005). This radical generational change presented an opportunity to explore how these norms might translate in the local context. Findings from two pieces of research dovetailed: the research informants' self-reported nature exposure and current experience as parents and grandparents and the data from direct observation on Mt Taylor. Taken together, these data showed that disconnection is a reality: few children were observed in the nature reserve on their own or groups of children—in contrast to previous generations, who spent their free time in sibling and friend groups, most using nearby local reserves and other outdoor spaces (see Chapter 4). All but one informant were allowed out to play, either alone or in the company of siblings and friends, regardless of the environment. They engaged in free and creative play, built structures, explored on foot and bicycles and fully utilised the natural (and other) resources in their immediate environments. Nearly all informants recalled a 'special place' and significantly, over 70% nominated a local space that was near or part of their home: a local waterbody, park, nature reserve or backyard. The most striking contrast is the absence of parents or adults

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[148] I posted pictures on social media (taken by an unhappy reserve neighbour) of a trail bike rider who had been menacing walkers. Within hours the rider made contact via the Facebook page and pleaded for the post to be removed. This was agreed after a verbal commitment from the rider to stay out of the reserve. The rider's name will be given to the PCS rangers if there are further incidents.

mediating children's activities and the agency exercised by children to conceive and create their own outdoor play. Many recalled a significant adult who assisted their nature appreciation, although this was outside everyday play. Many of the free-ranging activities of previous generations (e.g., building cubbies, BMX tracks, yabbying and lizarding) are now actively discouraged in urban nature reserves (see Chapter 8). Perversely, this outdoor play seeded a love of nature and influenced the life choices of the rangers in this study, all of whom reported that their active, nature-rich childhoods had translated into the desire to work in and look after the environment.

Where children were recorded during direct observation on Mt Taylor, most were in the company of adults. This agrees with how informants related their own parenting and/or observed their grandchildren: more supervision, less local freedom (or freedom at a later age), more rules around independent mobility, more digital devices and more extracurricular activities. The few parents who allowed their children freedoms similar to their own were the exception. Reasons given for curtailing freedom related to perceived risk in urban environments (considered riskier than rural settings) and loss of local community connections.

The significance of these childhood findings is profound and important for a number of reasons. Canberra is arguably one of the most nature-rich cites in the world and there are no distance or socio-economic barriers to accessing nature: all suburbs have public green spaces and nature reserves. Thus, disconnection is a result of more than physical access; availability alone does not enable childhood connection. These places are competing with wider cultural trends—currently prevailing over the benefits they provide. Therefore, pathways to reconnect children with nature must be considered in concert with societal norms around parenting, children's freedom and play and re-building trust in local communities to foster these practices. The Mulligans Flat pilot engagement activities (Section 6.2.5) show that parents are seeking structured activities and programs for their children, mediated through adults, which, although meaning fewer intimate encounters, reflect a potential strategy to manage these strong social pressures. Ironically, public open space agencies are building 'nature play' spaces in urban parks to 'provide unstructured play experiences [so children] can be creative and imaginative, using primary elements from the landscape, such as logs and rocks' (Roberts 2018; Connery 2016)—while simultaneously limiting children's unstructured play and their contact with these very elements in proximate nature reserves.

The other inescapable reality of these findings is the lost opportunity for children to develop an affinity for nature from regular exposure and to counter fears (in media) and build comfort

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about being in nature. The childhood health data (ACTG 2016a) also suggests that more research is needed about the impact of reduced independent mobility on children's physical health (Telford 2017). Both the interview data and direct observations from Mt Taylor Nature Reserve show the value of looking beyond the quantitative data of trail counts used by Park agencies—these provide numbers of walkers but no information about the 'who' 'why' or "why not'.

9.4.2 How do neighbours and users experience and connect with urban nature reserves and what do these relational perspectives mean for the management of urban nature reserves? (Research questions 1 and 3)

The Mt Taylor and Mulligans Flat 'living' case studies must be understood in the context of public land use policy in Canberra and the social history of the reserves (Chapter 5). While both places are nature reserves, they are products of purposeful human design, modified ecological systems shaped by many cultural layers and this dynamism will continue. They reflect careful Indigenous curation (being uncovered at Mt Taylor), the biological effects of European settlement, clearing and grazing (ongoing), the intentional symbolic landscape in city-building, a use for utility infrastructure and now, ecological protected areas that have been transformed under the care of local people. These histories show that many contemporary place meanings are linked to past and ongoing social associations. This is most apparent in the local people (and reserve users), who are long-term stewards of the place, and the citizen scientists at Mulligans Flat, who were instrumental in creating the nature reserve and whose survey work continues to provide the basis for new research. These individuals and groups are co-creators and managers, not passive participants or mere stakeholders.

Mt Taylor is valued for its amenity, space for recreation and nature therapy. It is a 'social' egalitarian place fostering everyday nature connection and networks. These social networks are critical to the associations and relations people have with place. These rituals and associations (apart from stewards') do not necessarily relate to its contemporary purpose as an ecological asset; rather it as an amenity landscape. That said, local users treasure the mountain and elements of mutualism appear in their relations with the reserve. They share legitimate concerns about the condition of the mountain and it is impossible to dissociate people's experiences as they use degraded trails and observe the visual evidence of failing land management. This manifests in frustration at ineffective management and the Parks Service itself. User observations of poor management of Mt Taylor starkly contrasted with those of the management of Mulligans Flat. There, users observed regular ranger presence and land

management activity; the Trust also undertakes neighbour relations and community engagement programs. Users do not witness the physical deterioration of the place they love on a daily basis.

People's observed behaviours and use patterns and personal stories about favoured places, walks and settings illuminated the natural qualities of the Mt Taylor reserve that provide a sense of freedom, escape and delight. The place evokes deeply personal meaning by providing space to reflect, escape and ponder life dilemmas, with the natural and social entwined in these expressed meanings. Most people using reserves are walkers and there are many regulars who experience the multiple health benefits of this simple ritual, eloquently described by Yi Fu Tuan (1977): 'to the true devotee, walking not only unclogs thought, it also unclogs body fluids and so promotes physical well-being'. [149]

The climbing of Mt Taylor is also a highly physical and energetic activity, which for many is best done with a mate and much distracting conversation. At Mulligans Flat, walking also offers the benefit of seeing interesting wildlife and the realisation of living near and being able to share in the specialness of the place evokes a kind of awe in neighbours and reserve users. People did not need to know the full details of the experimental research or its novel management to have this affective attachment with the reserve.

Social relations concern place attachment and feeling a 'sense of place' and 'sense of community'. Place attachment might not necessarily be physical visits; one neighbour described the everyday pleasure gained from the view of Mt Taylor from her kitchen window. Others described how much they enjoyed the amenity of living close to the reserve. At Mulligans Flat, the promise and possibility of living near this vast natural space (that will never be developed) influenced their home purchase decisions, as did the setting's high amenity.

The case studies reveal that one place may have multiple meanings and motivations for people who engage with it. These meanings provide cues about the affordances and environmental support that encourage people to use reserves. Observation revealed their utility and proximity as outdoor 'venues' for a range of visitors from those walkers in full exercise gear with earphones to others who exercise in social groups (e.g., walking for pleasure). For others, reserves provide 'unsurveilled' space for experimentation and risk-taking. The most novel

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[149] http://www.yifutuan.org/archive/2012/2012onwalking.htm

observation was the encounter with the teenage band 'Drift ashore' who used the mountain to film a music video (see Figure 6.27). Mulligans Flat attracts groups of naturalists, wildlife photographers and school groups.

How most people experienced the physical space of both reserves, formed associations and expressed belonging is consistent with topophilia, the meanings and attachment to place that result from frequent experience. Only the stewards whose descriptions verge into deep love and fascination about the place exhibit the so-called biophilic values. At Mt Taylor, people have also formed strong territorial and proprietary social associations with the reserve. This was observed both in the stewards and some regular users who felt they had the right create their own paths and move materials, and those who sabotaged the construction of the zig-zag track. Together with the social data about age and household structure (see section 5.12.2 and Appendix 7) and the experimental activities, these relations suggest the types of programs that could be designed to manage human behaviour and connect people with nature. Mt Taylor stands out as a regular and sufficiently challenging exercise space and the focus should be on physical health, assuming that this is also accompanied by capital investment in upgrading trail infrastructure and other useful information about health benefits.

At Mulligans Flat, the more easily navigable space is ideal for the young families: wide flat trails and an interesting venue (the heritage woolshed) within a short walk of the main gate. Here, programs should offer a spectrum of opportunities that allow for local people to become familiar with and comfortable in nature with their children: strategies range from guided orientation tours (particular for CALD groups and perhaps in partnership with a local CALD organisation) through to self-guided walks to discover wildlife species, landscapes, heritage and ecology using digital applications. [150] This would also suit the social setting of Molonglo River Reserve. The new Woodland Learning Centre under construction at Mulligans Flat provides the foundation for exciting new relationships with the local community and visitors to Canberra. [151]

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[150] https://mulligansflat.org.au/app/.

[151] https://mulligansflat.org.au/sanctuary-space/.

9.4.3 What motivates local people to care about nature reserves and what does this mean for management of urban nature reserves? (Research questions 1 and 3)

Urban neighbours and volunteers play varied roles in nature reserves.

In the ParkCare and CFU volunteer case studies, the people involved are physically embedded; many share property boundaries and/or are connected through large corridors extending from the suburbs into nature reserves. This proximity influences the motivations and individual agency evident in local edge volunteers. The motivation of community fire volunteers involves protecting their homes and neighbourhoods; many joined because of their feelings of helplessness during the 2003 Canberra fires. They desire greater individual agency over their lives in the future. Indeed, volunteer groups desire trust, autonomy and respect for their local knowledge but the way programs are administered has often undermined these tenets of partnership by imposing rather than negotiating change. Some uniformity in group practice and drills was needed in the urban fire groups and this has since allowed the Fire Service to incorporate volunteers into professional emergency responses in reserves. This required two experienced fire officers and a leadership change. It has worked, partly because the CFUs perform roles that are best undertaken by local people, including: neighbour relations and awareness, and limited property and boundary preparation (e.g., wetting down and setting standpipes). Building community narratives into the centralised messaging of emergency communications remains an issue, as do linking urban volunteers (CFU and ParkCare) and creating opportunities for both groups to understand bushfire risk modelling and planning and potentially assisting with hazard reduction activities and invasive weed removal in the APZ in nature reserves.

There are both generative drivers behind the motivations of the ParkCare volunteers and a strong sense of altruism and mutualism: giving back to the environment while enjoying the benefits of continual ecological learning and on-ground achievement. The cultural barriers are different for ParkCare volunteers with the Parks Agency. Here the agency is the planner and land manager, but their plan for CNP is dated and they have insufficient resources to meet their basic land management responsibilities for urban reserves. The Mt Taylor ParkCare group and individually motivated stewards do their best with little agency support, The Parks agency treats volunteering as an 'engagement' program rather than an agency-wide responsibility framed around a land management partnership. This is despite almost 30 years of the so-called partnership, and long-term local associations and expertise that has transformed degraded urban reserves. The opportunity here is to consider the Care groups as capable delivery agents

and respect their skills, local knowledge and the diverse social settings to devolve more management responsibilities to competent volunteer organisations. These could include outreach and land management tasks. This is already happening with community outreach at Mulligans Flat. The Trust delivers programs to foster local appreciation of the sanctuary, encourages sympathetic behaviours (building on the developer's orientation activities) and is expanding the range of community partnerships and volunteer programs for a willing public.

The interstate case studies (Appendix 16) also reveal that urban nature reserves elsewhere are successfully managed by community-based organisations. Unlike government agencies, the commitment and continuity in these local organisations provide the basis for trusting neighbour relations and enlarged social networks that result in new and unexpected alliances to engage local people in reserves. This also fosters acceptance and understanding of regenerative practices (e.g., regular ecological burns at Ngarri-djarrang Grasslands).

9.4.4 What has been revealed about the experience of practitioners who plan and develop new suburbs beside nature reserves and the knowledge domains involved? And what does this mean for management of urban nature reserves? (Research questions 2 and 3)

The history of Canberra's suburban development (see Chapter 5) shows that different policy drivers now influence planning and development of new suburbs next to nature reserves. The case studies of new edge suburbs next to the Mulligans Flat and Molonglo River reserves show how recognition of woodland ecology, fire risks and political imperatives to deliver housing worked to deliver different outcomes at each site. The suburb of Forde benefitted from the private-sector-led partnership that saw the opportunity to capture the amenity value of the woodland conservation setting and adopt a sympathetic design in the adjacent urban landscape. This involved retaining important ecological assets and features (mature trees, water sensitive treatments, winding trails, native landscaping) within a generous open space reserves to lure people outdoors. The marketing narrative incorporated both ecological and social dimensions to create a sense of specialness about living in this setting. This was reinforced by their investment in a quality urban landscape and facilities, community orientation activities and the implementation of new rules governing cat ownership and edge roads and buffers for bushfire fire management. The decision by government to construct a predator proof fence around Mulligans Flat, creating Australia's first urban wildlife sanctuary, only served to reinforce this narrative. A particularly novel outcome was how the developers embraced the community-driven BoB forum which provided an avenue for incorporating local community knowledge into the development process. The private developer, government agencies, conservation and

community development organisations all worked to implement bio-sensitive development adjacent to the reserve. Factors in the BoB's success include its time-limited role, localised place focus and willing champions within the developer and key government agencies prepared to listen to the community and able to influence practice within their respective organisations. This novel process emerged because there were many urban design and policy firsts in the new suburb of Forde (cat containment, edge roads/buffers, heritage storylines and no backyard boundaries) assisted by the developer, who pushed innovation and experimentation and used strategic marketing to convey the specialness and measures for future care of the place.

The success of this community-of-practice model at Forde inspired a second forum that operated during the first stage of the development of the suburbs of Wright and Coombs in the Molonglo Valley, but with different players. The BoB was successful in brokering creative solutions early on but the wholly government-led development had different drivers and a timeframe extending over decades. Personnel turnover in the key agencies disrupted the transfer of learnings and also meant that initiatives lost traction. Practitioners had different views of whether the developer should play role in community engagement to engender nature connection. At Molonglo, the ecological values of the setting were not as apparent; the degraded Molonglo river corridor was fenced off for restoration over the first five years of the development. There was only limited partnering for environmental orientation and this focused on restoration of public land further up the river corridor and distant from most new homes. There were some lost opportunities to build awareness about the nearby river landscape by linking the excellent native planting guide for Molonglo (initiated by the BoB) to the developer's cashback incentives for new residents to landscape their front yards.[152] This would have embedded an understanding of the River landscape behind the fence and sympathetic practices to avoid future weed invasion. Interestingly, Molonglo now has an active group interested in their community (related to the structure of the community with many young professionals and empty-nesters) that may provide the basis for a future stewardship group.

The reality for practitioners planning the new suburbs of Molonglo concerned meeting ambitious housing targets and protecting nationally important ecosystems on a physically challenging site. Many felt that critical local information and policy advice were considered a barrier to the political and administrative imperative to get approvals. Thus, many opportunities for diffusing different forms of knowledge into decision-making—knowledge from both within

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[152] https://suburbanland.act.gov.au/plantguide/native_plant_guide.html

and outside government, particularly from citizen experts with long-term associations with the river corridor—was not given the same weight in the process. The planners relied on expert consultants whose language and reports were tailored to the way the planning and environmental assessment processes are administered. The absence of this fine-grained knowledge made it more difficult to translate strategic environmental and bushfire risk management (regulatory) requirements into acceptable measures at the site scale. Some integral local knowledge that would have assisted was sought only after decisions were made about important elements like the urban edge and river corridor boundaries.

At both Forde and Molonglo, higher-order planning objectives sought to achieve more sustainable development around energy and landscape but efforts to design and construct bio-sensitive infrastructure were made harder and challenged by the rigid standards applied by the municipal manager. The poor maintenance of the bio-sensitive infrastructure after handover in Forde and the absence of any performance monitoring also provided no evidence of the lifecycle costs and benefits of this green infrastructure. This not only undermines the potential ecological service functions but also makes developers less likely to persevere with innovative treatments or promote their uptake in new developments. These bio-sensitive landscapes also have important social functions to create amenable public landscapes in higher density suburbs; providing shade and visual amenity through mature tree retention and water-sensitive features (like urban wetlands) and places that foster nature connection and physical activity.

Despite the efforts of the developer and community (through the BoB) to create a bio-sensitive adjacent landscape, once management responsibility transferred to the resource-strapped municipal agency, many of the landscape assets degraded; weeds invaded the native landscape buffers and there was insufficient maintenance of the water-sensitive infrastructure and care of mature trees. This brings into sharp focus the complexities of managing urban nature reserves as separate ecological units when the adjacent urban landscapes are not managed in complementary and sympathetic ways. Threats to conservation values within the reserve are impossible to control if not also addressed across the urban matrix. The 'siloed' manner in which land management is undertaken appears counterintuitive in such a small jurisdiction.

9.4.5 What has been revealed about the experience of practitioners who manage urban nature reserves and the knowledge domains involved? (Research questions 2 and 3)

The condition of Mt Taylor is linked to the legacies of grazing, pest plant and animal introductions and the extensive suburban boundary with multiple entry points and poorly sited

trails. The way reserve managers experience CNP is framed through the lens of adverse human impacts, which have persisted over more than 25 years. This narrative makes it difficult for Parks to imagine new ways to work with the community and fails to acknowledge other factors that influence human behaviour, including poor maintenance of infrastructure and the absence of a regular management presence and any compliance activity.

The practitioners managing these older reserve units of CNP appear overwhelmed by the scale of the management challenges and limited resourcing. Imperatives to present nature reserves as places for human health, well-being and nature connection are problematic, given the limited capacity of the Parks agency to meet their current land management responsibilities. Only a few suggested more creative work strategies and opportunities to leverage community and new alliances for devolving and partnering with both government and competent community organisations. Only practitioners outside the Parks agency made these obvious connections.

This cultural separation also affects planning practice with management plans still largely conceived in-house (or prepared by a consultant). It also influences the type of consultation undertaken; the views of the conservation community and organised recreation groups are always well represented and shape the narrative. None of these perspectives are neutral, nor do they reflect the experiences and interests of the majority of reserve users observed in this study. Also, the agency's epistemic reliance on scientific knowledge precludes other perspectives and the ability to embrace participatory planning processes, that enable the inclusion of social information about the communities living around reserves, their views and potential capacities.

Neighbour and social relations should be considered critical components of the agency's urban work; this requires an understanding of the motivations and experiences of reserve users and their diversity, as revealed in this study. This social focus would create possibilities for policy alignment with domains like the public health sphere and address objectives to promote physical well-being and encourage nature connection, both of which are necessary to build urban support for conservation. Currently, there is no community education program or active neighbour relations—and no Parks agency focus on these imperatives in CNP.

The findings of the interstate case studies reveal the value of developing closer relationships with local communities to share responsibility for urban reserve management. Both case study sites are managed using community partnership models, which, while different, are well suited to their relative settings, particularly their roles in neighbour relations. They provide management continuity for the local community, unlike their local government partners, who

have undergone many organisational changes and amalgamations. The value of partnering with community groups lies in their local relationships, place-focused knowledge, links into other community networks, eligibility for funding, nimbleness and freedom to generate ideas. Utilising local social capital by working with willing, competent community partners is highly advantageous for resource-constrained agencies with many competing management priorities.

In contrast to Mt Taylor, the experiences of managers at Mulligans Flat reflect its more recent origins and the opportunity to build relationships with the new community in a way that aligned with conservation goals. While Mulligans Flat is managed as a separate ecological unit, there has been a commitment from the start (initially through the developer) to build an appreciation of the setting and encourage sympathetic behaviours among the neighbours. The Parks agency has a dedicated ranger team and the collaborative partnership with the Trust continues to build social capacity. This not only provides continuity in neighbour relations, but the rangers also find their management work more effective when compared in this study to that of their urban colleagues from other parts of CNP.

The high number of young families in Forde and Bonner also provided an opportunity to pilot some experimental community engagement activities to follow-up my observation evidence from Mt Taylor that showed very few children visiting the nature reserve. A suite of activities was piloted, including an art competition; children/family-focused night walks, a 'hike and bike' activity and relaxed volunteer-led nature walks focused on birds and wildflowers. The most revealing outcome that is important for the design of programs is that parents wanted to participate alongside their children in nature-based activities and like educational structure. In contrast, the art competition gave children the opportunity to be independently creative using their own perceptions. Thus, engagement activities should embrace both elements—one to satisfy hovering parents and another to provide a space for children to experience nature and work with natural materials without too much structure. The Trust now runs school holiday programs involving nocturnal walks and wildlife exploratory activities while citizen science programs like the Turtle Patrol are a popular shared family activity.

Comparing the three different urban reserves in this study shows that funding is critical for effective management and affects the morale and job satisfaction of rangers. All reserves are managed as separate protected areas and have been designated under the same IUCN protection category (see Dudley 2008); however, their management is unequal and shaped by their histories and social contexts (see Chapter 5). EPBC Act approval requirements to protect threatened ecological communities and species is shaping ongoing investment in nature

conservation as most new urban development in Canberra is adjacent to important biodiversity assets, including the Mulligans Flat and the Molonglo River nature reserves (see Table 9.2).

Table 9.2 Management Context and Resource Comparison of Case Study Reserves

	Molonglo	**Mulligans Flat**	**Mt Taylor**
Ecology	Nationally endangered ecosystems and species. Degraded grassy woodland. High-quality pink-tailed worm lizard habitat on rocky slopes. PTWL and habitat restoration research site.	Nationally endangered ecosystems and species Grassy woodland in good condition. Important woodland bird habitat. Long-term woodland research experiment.	Nationally endangered species. Modified grassy woodland—plantations on north and eastern slopes. High-quality pink-tailed worm lizard habitat.
Historical land use	Grazing and pine plantations—destroyed in 2003 fires. Declared nature reserve in 2019.	Grazing (light) small farms. Declared nature reserve in 1994.	Grazing until 1971. Slopes and summit replanted in 1980's. Declared nature reserve in 1993.
Physical shape	Linear river corridor with high perimeter to area ratio.	Large well-shaped grassy woodland connected to adjacent reserve.	Steep summit and slopes with high perimeter to area ratio. No physical connectivity to other reserves; major roads between adjacent reserves north and east.
Urban neighbours	Western boundary; two suburbs to date. Limited entry points.	Western boundary; three suburbs. Gated entry points.	All boundaries; six suburbs. Many entry points
Parks support	Research ecologists (2), Ranger in Charge and field staff.	Dedicated Ranger team and Sanctuary Manager. Offsets Ranger/s for extended sanctuary.	One ranger in team of four responsible for 16 urban reserves including Mt Taylor.
Other funding support	Significant capital works (offsets), ongoing corridor rehabilitation	Predator-proof fence 2009; extension 2018.	Southern fire trail capital upgrade (2018–2019) and car park.

	and new trails, fencing picnic shelters and signage.	Woodlands and Wetland Trust Partnership. Outreach officers (2). Philanthropic donations Significant capital works (offsets) signage and boardwalk and rehabilitation. ANU Research ARC Linkage Grants. Rabbit and fox removal in expanded sanctuary.	New signage, 2018.
ParkCare group	No	Yes	Yes
Community Fire Unit	Yes (1 and planning for more new units)	No	Yes (5)
IUCN category	IV	IV	IV
Management plan	Yes—draft released 2018 finalised 2019.	Yes—WWT Strategic Plan, Concept plan and Interpretation Plan for extended sanctuary.	Part of Canberra Nature Park Management Plan 1999; in review with draft released 2019.
Education and outreach program	No but ad-hoc orientation walks and community planting events	Yes—night walks, school visits, School holiday and other tailored programs. Visitor audio app. Volunteer-led bird and wildflower walks.	No—wildflower and butterfly walks by ParkCare group.

9.5 Relationship of this Multi-Case Study to Other Research

This section discusses how the findings of this case study research relate to and build on those of other studies. To frame this discussion, it recalls the three themes used to organise the literature review in Chapter 2, and the place-based case studies (see Chapters 6–8) about living with nature, developing near nature reserves and managing reserves.

9.5.1 Theme 1: Living with nature

Australian cities are defined by their natural settings. This study adds a new layer to the narrative of the nation's capital Canberra and its evolution as a place of social and ecological experiment (Sparke 1988; Seddon 1977; NCDC 1970). Using a historical lens to track land use and social origins of places that have become nature reserves in Canberra, provides useful contextual background about how social relations and practices evolve in nature reserves: an approach that might be adopted in studies elsewhere.

This study confirmed the findings of the small body of Australian research about human relations with urban nature reserves (Gill et al. 2009; Head and Muir 2007; Barnett et al. 2005), specifically how local people value and appreciate these places without a textbook knowledge of the biodiversity and how many form intimate relationships with their local reserves. This study expands this research by examining multiple reserves and showing how different social and land-use histories can shape users and their behaviours in the reserve and foster long-term social associations. It also captures the perspectives of reserve managers, users and neighbours rather than relying on documentary sources (management plans and signage) to represent these views. The use of direct and group observation generated a rich picture of the diversity of users and various cultural practices over an extended period of time. In contrast to commonly used tools in national parks like visitor surveys and trail counters (DEWNR 2017; Roy Morgan Research 2017b; Newspoll 2012; Ramsay 1997), these methods provided rich descriptive data about the multiple relations and different social groups that use these places (Hillier 1998b). Relations with place might be about a venue, outdoor gym or quiet place to commune and learn about nature—or a space for communal activities. Cultural rituals (e.g., the Early Climbers Christmas party on Mt Taylor) were found to be important to particular groups and their feelings of social connectedness. These place-based rituals have been found to be particularly important for culturally diverse communities using Sydney's national parks (Wearing et al. 2008; Thomas 2002; Thomas 2001).

This study found that both physical place attributes and social relations combine to create place meanings and attachment, confirming the findings of natural place studies in Australia and elsewhere (Dickinson et al. 2017; Stedman 2003a; Eisenhauer et al. 2000). Importantly, the observation methods produced grounded place-based evidence about the groups not using nature reserves and the phenomenon of childhood nature disconnection (Monbiot 2012; Gill 2007; Louv 2005). This finding can be extrapolated across Canberra because of the evidence that study informants provided about their own childhood exposure to nature. These

recollections revealed the dramatic decrease in the frequency of childhood nature contact over the past two generations, particularly when informants' experiences were compared to those of their children and grandchildren. The factors that influence parental decisions about allowing children explore local reserves are similar to those found by research examining practices like walking to school and local shops (Gibbs and Nansen 2013; Gibbs et al. 2012) and other seminal research about changing childhoods in urban environments (Freeman and Tranter 2011; Wyver et al. 2010) The findings of the media case study also suggest that particular narratives might also affect parental perceptions of safety and this has perhaps become even more pervasive with new social sharing platforms and media digitisation.

The park rangers interviewed in this study (and many other informants) related their professional careers, lifestyles and volunteering choices to their free-range childhood nature experience. These findings mirror the work of Chawla (1999, 1998), Harris (2009), Thompson et al. (2008), Palmer (1993) and others, who found that positive contact with nature during childhood is one of the most significant influences of development of environmental sensitivity, awareness and pro-environment behaviours. Another dimension unearthed in this research is the loss of creative unstructured play opportunities using resources in local reserves, which featured strongly in the childhood recollections of the study informants. Where children are given this opportunity, they participate eagerly, as shown in studies about natural experiments (Veitch et al. 2018, 2012), creative projects (Song 2012, 2008; Wheatley 2008) and the experimental engagement activities developed here (see section 6.5.2 and Eyles and Davey 2016).

This study provides narratives about how people bond with nature reserves, reflected in the descriptions of favourite walks and places in reserves, viewsheds and the emotions evoked by regular contact. Other studies identify the importance of such finely-grained descriptive data for understanding environmental affordances (Sugiyama and Ward Thompson 2008) and allowing managers to focus on features that encourage active engagement in reserves (Dallimer et al. 2012) and to manage urban landscapes in a way that builds nature connection (Standish et al. 2011). This study answers some of the questions posed by Ward Thompson (2013) about which qualities of natural spaces are important for promoting physical activity in different population groups. This is a critical contribution for urban environments where public nature reserves may be the only means of accessing nature and boosting physical and mental well-being (Maller et al. 2006) and building social cohesion and connection (de Vries 2010).

9.5.2 Theme 2: Developing and designing near nature reserves

This study's outcomes have both confirmed and expanded the literature about the professional experience of practitioners working in new urban edge residential developments, particularly the interplay of disciplinary knowledge (Grose 2010b; Stokes 2010; Miller 2009). The case study of the new suburbs of Wright and Coombs, next to the Molonglo River reserve confirmed the struggle over translation that occurs in the context of existing institutions and planning space (Law 1992). Similar to the observations of Hillier (1998) in Perth, only certain 'representations of nature' are mediated through planning processes; this was found to be in the scientific and technical realm, rather than in local and community knowledge (Hillier 1998: 78). In another Perth study (Grose 2010b), regional ecological knowledge and values were inadequately represented in planning decision-making. This happened to some extent at Molonglo where ecological advice was provided by consultants; place-specific knowledge within government and the citizen science groups with long associations with the River corridor was not given the same weight. This case study also provided insights into the way the political process can distort the representation of knowledge in decision-making. The economic and administrative drivers behind releasing land for housing trumped other policy outcomes with lip-service paid to landscape amenity and good urban design. While these policy failures are often raised by community advocates (Beeby 2012h, 2011e; Thistleton 2011a), they are rarely heard from the practitioners involved.

In contrast, the case study of the new suburb of Forde next to Mulligans Flat showed how some practitioners are prepared to innovate, push boundaries and work closely with community stakeholders to improve outcomes for biodiversity in urban development and to create amenable living environments for people. This 'lens' has not been explored in the few practitioner studies elsewhere (Grose 2010b), although there exist literature and new guidelines calling for these approaches (Garrard et al. 2018a, b; Garrard 2015; Rhodes et al. 2008; Fallding 2004; Carr and Williams 2000). The two key ways that developers changed and improved development practice are documented in this study. First, they were prepared at the design and planning stage to recognise and adopt a sensitive approach to the conservation setting. Second, at the often-messy construction phase, they were willing to work with the conservation community and key government agencies to share knowledge and apply collective thinking to broker mutually beneficial solutions as issues arose through the BoB forum. In addition, they invested heavily in creating a quality public domain, nature-oriented marketing and educating the new residents in partnership with the conservation community. According to one

practitioner: '[e]verybody's learnt from Forde' (see Section 7.5.2, Table 7.2) The BoB is a superb example of the 'community of practice' concept in action, as described by Wenger (2010, 1998) and Wenger et al. (2002), it is anchored in the reality of urban development practice. It provided the soft space for collaboration across knowledge boundaries and cross-sectoral initiatives (Illsey et al. 2010) and for collective learning (Brown and Harris 2014; Keen et al. 2005). This novel forum also created significant value because it was place-focused and time-limited; it managed potential conflicts, provided real-time solutions and delivered many tangible mutual benefits for the developer and the conservation community. The value created lies not only in the quality practice outcomes and low running overheads (the BoB required only professional time and modest organisational funding), but also the collective learning outcomes and practice examples for application in the developer's next project. This value has been conceptually described (see Lambert 2013; Wenger et al. 2011; Brown and Brown 2008) and this study now provides a concrete example in context in a complex real-world setting.

It also demonstrated how protected area managers can effectively engage with adjacent land managers and local communities (Dovers et al. 2015; Spoelder et al. 2015; Phillips 2004a, b) to ensure sympathetic landscape management next to the reserve (Keane and Davies 2015).

9.5.3 Theme 3: Managing nature reserves

The history of Canberra's development documented in this study reveals the extraordinary public policy commitment to the landscape as an urban structure that has created an high amenity city sympathetic to its natural landscape. Simultaneously, it reveals the management challenges of maintaining this landscape particularly as new layers of meaning about its nationally important biodiversity values raise the stakes.

The vast majority of CNP is 'hills, ridges and buffers' originally set aside for their visual amenity and landscape values, not nature conservation; these origins are not dissimilar to those of other places (see McNeely 2005; Phillips and Gay 2001). The management of these older reserves is funded from a regional operational budget rather than a specific budget allocation for each reserve. As found elsewhere (Gronholm 2009), apportioning across the urban estate dilutes management effort.

While the funding constraints affecting CNP mirror the evidence in other Australian jurisdictions (Davies 2018; Parks Australia 2011) and worldwide (Watson et al. 2014), this research provides insight into how these limitations affect the frontline managers, rangers,

which is not captured in other studies (Byrne and Jin Jun 2009). Canberra's urban rangers are frustrated by their inability to affect any real change on the ground and this study shows that volunteers assume many of the Parks agency's land management responsibilities. Kangaroos, urban wildlife and annual fire management have depleted capacity for core land management functions, community education and compliance (Stratford 2018). Unlike other municipal services like roads and footpaths, the management of nature reserves receives very little public airing despite much local frustration and concern about the condition of reserves (Beeby 2011e, h). Combined with an irregular management presence at Mt Taylor Nature Reserve, poor condition has allowed certain user behaviours to flourish (e.g., illegal trail construction), which erodes relationships and lowers social trust in the Parks agency, as found in other studies (Stern 2010; Powell 2003).

By examining the existing relations between volunteers and reserve managers (and other reserve users) using group participation and interviews, this study also provides deeper information about the volunteer experience than survey-based research (Peters et al. 2015; Gooch 2005; Davies and Christie 2001). It shows how the delivery of the ParkCare volunteer support program has shifted from a close working relationship between district rangers and volunteers in the first decade to more limited professional support and administrative focus on risk and regulatory supervision in the last decade. Volunteers are seeing less of the trust, shared goals, decision-making and effort that should underpin the partnership. In contrast, this study found agency support for the volunteer CFU program has dramatically improved and has become embedded in the bushfire operational response, although there are opportunities to involve volunteers to better understand risk modelling and mitigation planning. This builds on studies about sharing responsibility (McLennan and Handmer 2014, 2012) by showing the cultural change that is possible within an emergency agency. The effectiveness of pilot engagement activities in Chifley CFU reinforces findings elsewhere about the value of active interaction with householders to raise awareness about bushfire risk: fire volunteers can doorknock, tap into local networks, manage neighbour communication and host events for social interaction (Devenish 2016; Paton et al. 2013; Rhodes 2011; Bushnell and Cottrell 2007).

This study confirms research about other urban nature reserves in Australia (Abell 2005; Reidy et al. 2005, Brown 2001) and elsewhere (Svendsen and Campbell 2008; Gobster et al. 2007; Ryan 2000) showing the willingness of local people to be involved in caring for local bushland and the knowledge and capacity they contribute to that management. It expands this work by

progressing beyond individual groups in specific reserves to consider the motivations of the volunteer community across CNP and in urban land care. These findings capture some of the ethical dimensions of the society these stewards aim to create through their volunteering. This was framed by drawing on the work of Brown and Harris (2014) and Brown and Lambert (2013) and extends the concept of cultural norms about 'care', described by Nassauer (2011), which begin with looking after one's own circle of life and place. For these stewards, this care ethic extends beyond their backyards (Head and Muir 2007) to nature reserves that belong to all, the public good resources (Ostrom 1990). The evidence from 30 years of stewardship in Canberra shows the potential for 'heterogeneous approaches' involving diverse local groups in different places to upscale and achieve more than the individual actors intend (Nassauer 2011: 321). The interesting difference with these urban stewards is the altruism beneath their conservation ethic (see Wilson 2002) when compared to their more widely-studied rural counterparts, where considerations of benefits for private land management and future economic livelihood often underlie motivations.

The views of the volunteers and some practitioners in this study suggest that this mature local knowledge and stewardship capacity is undervalued despite the widely acknowledged benefits for the management agency. It remains situated as an 'engagement program' despite the ParkCare groups contributing more than 20,000 hours annually to land management: equivalent to 10 full-time staff. Studies elsewhere identify the necessity for greater legitimisation of these partnerships within the agency and consistent program support (Holley 2009; Blahna and Kruger 2007; Safstrom and O'Byrne 2001; Ostrom et al. 1999). The emerging reality from this research and many other studies (Peters et al. 2015; Shandas and Messer 2008) is that respectful and meaningful partnerships with the willing community are essential to meet policy goals to protect ecological communities, species and habitat within and beyond protected areas and to build the urban constituency for conservation (Watson et al. 2014).

9.6 Ideas and Opportunities Arising from this Research

This research has generated ideas and potential opportunities, most relating to management practice within and around nature reserves. The seeds of many ideas come from the users and practitioners who experience and manage these places.

The resource constraints facing park managers will likely continue. Nevertheless, obvious opportunities include working with developers and managers of adjacent land to complement

conservation work in nature reserves, as well as making better use of existing community capital and partnerships and forging new alliances in related policy spheres. This approach recognises the importance of using the knowledge and capacity of competent community organisations and aligning nature conservation with policy domains where government prioritises its social investment (e.g., education and health). This may leverage new resources for public lands that provide health benefits and educational settings for local people. As a small jurisdiction, the ACT has the advantage to work smarter and more collaboratively across its agencies and share responsibility for managing public lands with community organisations outside government (see Table 9.3). Ideas have been presented using the three research themes. and government should assess what activities and programs can be more effectively delivered by, or in partnership with, community organisations. Building a narrative about the city's natural spaces that draws all these opportunities together, like the recently launched London National Park City, [153] is a possible starting point. While the ACT is the primary focus for these ideas, they may be relevant to managers in other urban settings with similar challenges.

Table 9.3 Summary of Ideas for Reframing Management Practice

Theme	Ideas and opportunities	Existing	Future
Living	Develop a Canberra Nature Park outreach program (focused on neighbour relations and stewardship behaviours) with delivery by community organisations experienced in outreach in partnership with PCS.		X
	Tailor outreach messages and programs to suit the audience in adjacent urban settings (age, cultural diversity and households of neighbour communities) Orientation walks focusing on Indigenous cultural heritage, wildlife and wildflowers are most effective.		X
	Use catchment community organisations to build partnerships around 'Healthy Parks Healthy People' and new alliances around existing ACT programs (Healthy Weight Action Plan with Health Nature Play with Sport and Recreation) and new programs; e.g. a Park Buddies Program for local schools (Education) Seniors Health (COTA), cultural heritage (ATSI) and awareness for	X	X

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[153] http://www.nationalparkcity.london/

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	migrant neighbours and users (CALD). Devolve delivery of new programs to community organisations.		
	Use catchment community organisations to promote the use of nature reserves as educational settings close to local schools; ongoing relationships can be managed by catchment partners.	X	
	Re-frame the 'Nature Play' program to interface with all public land managing agencies and devolve the program from government to community-based organisations to expand its reach and take-up.		X
Developing	Establish a 'Biodiversity-Sensitive Urban Development' Community of Practice; involve professional associations (Landscape Architects, Engineers, Planners) to promote biosensitive practice and work with government to review design standards for new infrastructure (road verges, stormwater, tree planting, parks, etc.) and enable programs to monitor landscape function and performance.		X
	Design activation activities to build a stewardship ethic in new communities and reserve neighbours (sustainability workshops, bushfire readiness, snake awareness) with catchment groups. Include ranger tours and reserve orientation as part of suburban community development programs (e.g., Molonglo Mingle) and focus on encouraging respectful user behaviours using soft compliance (Rangers on the beat).	X	X
	Develop ACT-wide urban landscaping guidelines to maintain and augment biodiversity assets and minimise future weed invasions (streetscapes and open-space management), drawing on the Molonglo Planting Guide and restoration research.	X	
	Encourage Bush on the Boundary Groups wherever new suburbs are being developed near nature reserves	X	X
Managing	**Across tenure**		
	Investigate the feasibility of 'one' agency to: manage urban public land (urban open spaces, streets and nature reserves); enable ACT wide planning for all biodiversity		X

	assets (including mature trees, wetlands, lakes and creeks) and cultural heritage sites; to reduce duplication, share resources and develop consistent approaches to urban biodiversity management.		
	Build a Community of Practice for public land managers to share knowledge and expertise; convene annual cross-tenure land managers forum – agencies; contractors and community to manage biosecurity.	X	X
	Enable sympathetic management of streetscapes and urban open spaces adjacent to nature reserves, through consistent contracting arrangements and ACT-wide (all tenure) codes of practice for urban landscape design, management and weed control.	X	X
Canberra Nature Park Plan			
	Expedite review of the Canberra Nature Park Management Plan ahead of new strategies for use of CNP and the Landscape assessment.	X	
	Set a minimum annual budget for each CNP unit, with works focused on threatened species habitat and maintenance of heavily-used trail infrastructure.		X
	Establish a CNP trails Ranger to manage trail assets (outside Centenary Trail), set management standards for trails and build an annual maintenance component into construction contracts for upgrades and new trails.		X
Partnership			
	Update all CNP rangers' Position Descriptions to recognise Agency responsibilities for neighbour relations and building community partnerships.	X	X
	Develop a Memorandum of Understanding to recognise community partnerships, define volunteer and Agency roles, field support and consultation including input into the development of operational plans for nature reserves and bushfire risk.	X	X
	Utilise the community governance and skills provided by ACT catchment groups to deliver community outreach and urban biodiversity management services (weed control, regeneration and maintenance), support	X	X

	local care groups and leverage additional funding for CNP and delivery of citizen science programs (Frog and Waterwatch)		
	Risk		
	Install signage to identify community safe places in bushfire-prone areas (e.g., school oval).		X
	Amend regulations to require the bushfire risk of residential properties to be notified in ACT Contracts of Sale of Property.		X
	Organise annual 'Backyard Blitz' clean-ups and woody weed removal in bushfire-prone areas as a joint initiative using CFUs and ParkCare Groups.	X	X

9.7 Closing Remarks on Study Contribution

The major contribution of this research is to show how a richer understanding of social relations of urban nature reserves is possible by drawing on historical, local community and practitioner perspectives about place. The research reveals that Canberra's nature reserves are socio-cultural landscapes shaped by Indigenous and rural management practices, urban settlement plans and changing community values about grassy ecosystems. It situates the present and future as the new unfolding of a continuing story of humans and landscape.

People form multiple meanings and attachments with urban nature reserves; these may be about the sense of place felt by an individual and/or sense of a community and connectedness from communal experiences—or both. Social relations form while part of self-organising stewardship groups or those with a common concern, while in groups that socialise for health and fitness or while engaged in nature study. Understanding these dynamic social relations and the diversity of place attachments creates potential for more community involvement, leveraging the capacity and local knowledge of the communities living near urban reserves. This potential can only be realised if urban nature reserves are considered part of the wider urban landscape—not separate—and managed in way that recognises their social settings. This study has contributed ideas about how urban management practice could be reframed to share responsibility for urban biodiversity within the reserves and beyond their fences.

This requires a cultural shift to prioritise agency relations with neighbours and local communities and professional collaboration with other land managers to achieve more sympathetic adjacent land use and complementary management of biodiversity threats across

the landscape. The first step is to make more effective use of the existing ParkCare and catchment networks, including devolving more land management tasks, as is already practiced in urban nature reserves elsewhere. A more ambitious step is to build the shared infrastructure for community outreach about the human well-being benefits of connecting with nature reserves and develop support for public investment in improved infrastructure to enable this connection. This requires a coalition of existing and new partners, particularly the public health and educational institutions to address childhood connection. Creating new opportunities for local people to experience and value their local nature reserves provides the forum to instil care messages and sympathetic behaviours that will assist maintenance of their ecological values.

Given, the realities of urbanisation, managers must adapt to the changing social context that flows from more compact ethnically diverse cities and use new tools and alliances to meet the challenges of protecting urban biodiversity and to provide opportunities for urban communities to experience nature in their daily lives.

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