CONSERVATION MANAGEMENT PLAN: BLUNDELLS FLAT AND SHANNONS FLAT, A.C.T.

MARK BUTZ

Funding for this project was provided by the ACT Government through the ACT Heritage Grants Program – HG04/22

CONSERVATION MANAGEMENT PLAN:
BLUNDELLS FLAT AND SHANNONS FLAT, A.C.T.

MARK BUTZ

Funding for this project was provided by the ACT Government through the ACT Heritage Grants Program – HG04/22

EXECUTIVE SUMMARY

Blundells Flat and Shannons Flat are montane flats located about 27 km west of Canberra, just inside the north-west corner of the ACT. Located within the Uriarra Forest, both include valley bottom wetland complexes and associated hillslopes.

This Plan:

- considers both areas within their biophysical and cultural landscape settings, integrating natural and cultural heritage elements as an expression of continuity and change in the landscape
- describes in detail the natural and cultural heritage values of both flats, and assesses their significance
- recommends management approaches for conservation of their values.

Blundells Flat is distinctive for the number and strength of themes represented there.
This value is enhanced by functional linkages in the landscape.
Together these themes enable ready demonstration of both continuity and change.

Shannons Flat is the only verified location in the ACT for the locally rare *Eucalyptus camphora* subsp.*humeana* (Mountain Swamp Gum), which is close to the northern limit of its range.

The value of both places for interpretation and education is enhanced by their proximity to Canberra and relative ease of access.

The Plan recommends works which could be undertaken as a significant element in celebration of Canberra's centenary in 2013.

The preparation of the Plan began in 2004 and was not completed until 2008. However, during this period the Plan has been used to guide numerous significant management approaches, decisions and works, including:

- on-ground works undertaken by TAMS and Greening Australia under the River Rescue and Land Keepers programs and by TAMS (with EcoWise) as part of catchment protection works
- policies and plans e.g. Draft ACT Wetlands policy (2006); Draft ACT Aquatic Species & Riparian Zone Conservation Strategy (2006); and Lower Cotter Catchment Draft Strategic Management Plan (2006)

The Plan has benefitted from a wide range of inputs from interested parties, and their contributions are gratefully acknowledged.

Research continues into the natural and cultural heritage of this area.
For enquiries or to provide additional information, please contact Mark Butz:

Phone +61-2-6251-2923
Mobile +61-418-417-635
Email mark.butz@bigpond.com
Web www.MarkButz.com

LIST OF CONTENTS

LIST OF FIGURES

PHOTOGRAPHS AND CREDITS

Page	Image	Source
30	Five views of wetland communities vegetation recovery	Mark Butz
34	Wet gully on Fastigata Creek	Mark Butz
35	*Eucalyptus camphora* in close-up; Woodland of *E. camphora*, Woomargama	Mark Butz Mark Butz
36	Northern Corroboree Frog	Environment ACT
38	*Engaeus cymus*	John H Hawking, CRC for Freshwater Ecology
40	Key's Matchstick Grasshopper	CSIRO; DEH rp03866-20101
42	Bogong moth	CSIRO
43	Bogong Moth sculptures at Acton	Mark Butz
44	T A Murray; Stewart Mowle	Wilson 1968
45	John Gale	Gale 1927
48	John McDonald and Eliza McDonald (nee Webb)	Gillespie 1991
50	John Blundell; Sarah Blundell (nee McKenzie)	CDHS 12219; 14059
51	Phoebe Anna Blundell	CDHS 12218
52	Views of the Blundell homestead c.1910	Roy Bush
53	John Blundell with his bullock team	Roy Bush
55	Samuel Adolphus Shannon; Martha Shannon (née Southwell)	Gillespie 1988
57	Blundell graves at Tumut	Mark Butz
58	Settler's house thought to be that of David Perrott, Condor Creek	Higgins 1994a
59	Remains of Phil Hardy's house (1931)	Whelan MS 1931 CDHS
62	Surveyor Pulver at Coree trig 1926; Pulver's packhorses at Blundells Flat (1927)	Pulver 1981 CDHS
66	Hardwood logging in the Brindabella Range 1951	W Pedersen (top to bottom) NAA A1200, L13561, 7534047; L13558, 11188686; L13562, 11188642; L13559, 11188687
68	Condor Camp (Condor Hut); Forestry workers Forestry Camp Mount Coree Oct 1927	KHA Web site © Olaf Moon 2000 NAA A3560, 3649, 3064942
69	C E Lane Poole AFS Camp 1927	ANBG Web site (top to bottom) NAA A3087, 16, 7827619; 20, 7827623; 14, 7827617; 15, 7827618; 18, 7827621; 26, 7827629
70	Site of AFS camp 1927 Site of AFS camp 2005	NAA A3087, 17 – 7827620 Mark Butz
	Timber cubicles at Mount Coree Forestry camp Oct 1927	NAA A3560, 3655, 3086127
73	Blundells Arboretum aerial Sep 1999 Blundells Arboretum and its distinctive 'collar' c.1991	Bill Crowle Kim Wells FACTA
74	Poplar arboretum below Mount Coree 2006	Mark Butz
76	André Léon Tonnoir	Upton 1997
78	John Blundell guiding in the bush John Gale, John Blundell & fishing party near Brindabella (1910) John Blundell and tree ferns below Coree (1911)	Roy Bush Roy Bush R H Cambage; Roy Bush
79	Bushwalkers helping cars through one of the Five Fords of Condor Creek (1933) Blundells picnic area	Allen et al 1977 ACT Forests
91	Heavy ringbarking on the hills to the east and willows along the creek at Blundells Flat	Roy Bush
93	Blundells Flat 1927 Mt Coree in snow 1927 Blundells Flat 1931	NAA A3560, 3653, 3086125 NAA A3087, 12, 7827615 Whelan 1931 ms CDHS
94	'Mt Coree Pine plantation 1958' Aerial photo Blundells Flat detail 2001	NAA 7913474 NSW LPI orthophoto 2003
95	Oblique aerial of Blundells Flat; Aerial photo Shannons Flat detail 2001	N Rosengren NCDC 1989 NSW LPI orthophoto 2003

Continued

Page	Image	Source
97	Blundells Flat from Brindabella Road 17 Jan 2003 Blundells Flat after the fires 2003 Blundells Flat August 2006	Jeff Cutting nla.pic-vn3510189 Environment ACT Mark Butz
112	Views of Blundells Flat Wetland Soak/Peatland	Mark Butz
116	Views of Blundells Flat Eastern Meadow	Mark Butz
120	Views of Blundells Flat Western Meadow	Mark Butz
123	Views of Blundells Flat Eastern Terrace	Mark Butz
125	Views of Blundells Flat Eastern Foothills	Mark Butz
128	Views of Blundells Flat Riparian Zone	Mark Butz
131	Views of Blundells Flat Eastern & Southern Slopes	Mark Butz
133	Views of Blundells Flat Western Slopes	Mark Butz
136	Views of Blundells Flat Northern Slopes	Mark Butz
138	Shannons Flat - Condor Corridor	Mark Butz
139	Shannons Flat – Wetland	Mark Butz
140	Shannons Flat – Wombat Creek	Mark Butz

PART A INTRODUCTION

The views expressed in this Plan are those of the author and are not necessarily the views of the Australian Forest History Society Inc. or of any of the sources cited.

Background

This Conservation Management Plan (CMP) has been prepared on behalf of the Australian Forest History Society Inc.

The charter of the Australian Forest History Society Inc. is to advance historical understanding of human interactions with Australian forest and woodland environments. See www.foresthistory.org.au

Funding for this project was provided by the ACT Government through the ACT Heritage Grants Program (HG04/22).

The stated aim in applying for the grant was for the CMP to:

- document and assess significance of natural and cultural heritage values
- identify threats to heritage values and mitigating management practices
- identify measures and priorities to address knowledge gaps
- identify opportunities and themes for interpretation of heritage values
- link heritage themes and associated interpretation to those in adjacent parts of NSW, including components of the Australian Alps national parks
- identify, and develop supporting information for, any new nominations to the Heritage Register

Currency

In the course of its preparation, this Plan has been used to guide activities of government agencies in management interventions to protect and conserve important resources in the area covered by the Plan, and in associated parts of the Cotter water supply catchment.

This has meant that many recommended policies and actions in the Plan needed to be implemented while it was still being compiled. This series of processes, although welcome, has delayed completion of the Plan.

This Plan includes notes on progress in implementation to April 2008.

Methodology

This Plan owes its form to a number of well-established frameworks, including those described in Kerr (2000); AHC (1998); NSWG (2000); Cairnes (2003) and Lennon & Matthews (1996). Reflecting these frameworks, preparation has included:

- examination of documentary and secondary sources such as published material; reports and correspondence; maps, plans and surveys; aerial photographs; ground photographs
- oral information; and
- identification and recording of physical evidence during field inspection from 2003 to 2006
- consultation with people associated with the history of the place; and
- consultation with people and organisations who have an interest in the place.

The Plan takes into account the Burra Charter (Australia ICOMOS 1999), the Australian Natural Heritage Charter (AHC 2002) and provisions of the *Heritage Act 2004*.

ACT *Heritage Act 2004*

The Heritage Act provides for a Conservation Management Plan to be prepared to:

- ensure the conservation and future use of a heritage place or object are consistent with its heritage significance; and
- ensure that any threat, or potential threat, to the heritage significance of the place or object is identified, and managed in accordance with the plan.

The ACT Heritage Council can approve a Conservation Management Plan if the plan adequately manages the threat, or potential threat, to the place or object.

A public authority is required to act in accordance with an approved plan in its management and maintenance of a place or object and to ensure adequate resources are applied to its conservation. This aims to reduce the need for frequent Heritage Council involvement in individual activities relating to the place or object.

This Plan has the status of a consultant's report and has not been formally requested or approved by the ACT Heritage Council or by any public authority.

Integrated landscape approach

This Plan considers the Blundells Flat and Shannons Flat areas within their biophysical and cultural landscape setting. Although the Plan identifies both natural heritage elements and cultural heritage elements, it seeks to communicate the interaction of these as an expression of continuity and change in the landscape.

As a 'cultural landscape', the approach broadly follows guiding concepts such as:

A cultural landscape is a physical area with natural features and elements modified by human activity resulting in patterns of evidence layered in the landscape, which give a place its particular character, reflecting human relationships with and attachment to that landscape. (Lennon & Mathews 1996)

The cultural landscape is a mosaic consisting of:

- *natural features and elements*
- *physical components from a number of historic periods resulting from human activity and modification to the natural features; and*
- *patterns created in the landscape over time; these are layers in or on the landscape*

(Taylor 1989)

In cultural landscapes '*continuous periods of history are overlayed resulting in a composite picture displaying interrelationships between people, places and events. It is therefore across the landscape that history is written, so that a hut, an orchard, a stockyard, a stock route, a homestead, are not separate artefacts in the landscape, they are part of a culturally interconnected network which holds meaning for various cultural groups.'* Taylor (1992)

A similar intent is inherent in integrated catchment management which advocates a holistic and integrated approach to the entire system, and interactions and interdependency between social, cultural and environmental components (ACT Government 2000).

A related approach for biophysical elements considers their ecological function in the landscape in terms of their ability to retain resources such as soil, water and nutrients within the landscape or ecological system rather than having them 'leak' out of the system (Ludwig et al 1997).

This requires going beyond an understanding of each abiotic and biotic element, including human agency, to consider all of these as an interlinked system. Changes in one domain of the system, social or ecological, will impact on the other domain. All of the elements help to define the resilience of the system. Resilience is the capacity to absorb disturbance without losing function, structure, and the feedback loops which signal change. It is affected by factors such as diversity, flexibility of response, and the nature and degree of connectedness between elements (Walker & Salt 2006).

Lennon & Mathews (1996) emphasise that the significance of cultural landscapes is largely derived from the relationship between the landscape and the elements within it, as well as the relationships between the individual elements themselves. Their view is that *'heritage conservation practice is moving away from identifying places as items or dot points on maps, to examining the spatial context and connections of those places'*. The items are important as physical remains of past use, and have their own specific management requirements. But neither the broader landscape nor the remains can be understood without reference to the other. Both need to be conserved and managed to maintain the integrity, meaning, and significance of the landscape. The loss of one will reduce the significance of the other.

Broadly parallel approaches for biophysical elements go beyond consideration of spot localities for species and communities of concern to emphasise their ecological interdependence with the landscape (e.g. ACT Government 2005a; 2006a). Assessment of status and value takes into account regional distributions and patterns of habitat and populations. Management seeks to maintain broader landscape and ecological functionality to safeguard any spot locality. The loss of one will reduce the significance and/or the resilience of the other.

The multilayered quality of cultural landscapes is an important attribute, with elements which were created or used by people at different historic periods, and which may illustrate a number of historic themes at once. Part of the significance of a cultural landscape may arise because it demonstrates a number of themes and historic periods simultaneously, especially if they are connected. The significance of an individual element may arise not from its qualities in isolation but from what it contributes by demonstrating continuity of use or adding a further layer of historical meaning (Lennon & Mathews 1996).

In like manner, significance for biophysical elements may accrue from the number or diversity of species, communities or other elements of concern in a given area, particularly if they inter-relate, rather than from any one element taken in isolation. Similarly, the value of an area for water quality may derive from ecosystem services functions

which in turn arise from the interactions of biotic and abiotic elements across their catchment landscape. The value of the contribution made by the elements in combination may exceed the sum of their values if taken in isolation. In management terms, singling out any one element for optimisation may ignore or actually damage these interactions and compromise the resilience of the system as a whole (Walker & Salt 2006).

A key concept in a cultural landscape approach is that the cultural evolution of a landscape does not stop, so new layers of cultural meaning and natural form are being created all the time (Lennon & Mathews 1996). This is analogous to notions of continuity and change in the biophysical domain, to the effect that 'everything is on its way to becoming something else', and that 'something else' may be significantly affected by human agency.

Accordingly this Plan addresses:

- cultural elements which represent layers of history and biophysical elements which indicate change in the landscape
- elements which demonstrate the dependence of historic activities on biophysical systems
- linear landscapes which relate to regional connectivity
- thematically linked elements; and
- elements representing multiple themes or multiple values.

Although the Plan acknowledges that biophysical elements and cultural elements are inter-related, it begins by presenting these separately.

Following sections, which deal with management issues, conservation policy and works, begin to integrate these elements within their respective landscape settings.

Sections dealing with interpretation and education seek to integrate further all the elements and their stories in the broader landscape context.

Sources

Documentary, secondary and oral sources which are cited in the text are listed in *References* at the end of the plan.

Many of these were made available through the assistance of staff and/or volunteers of:

- National Library of Australia, Parkes
- National Archives of Australia, Parkes
- Canberra & District Historical Society, Civic
- ACT Heritage Library, Woden
- Library, Australian Government Department of Environment & Heritage, Parkes
- Library, Australian National Botanic Gardens, Acton
- ACT Land Information Centre and Plan Room, ACT Planning & Land Authority, Lyneham
- former ACT Forests, Stromlo
- Wildlife Research & Monitoring Unit, Environment ACT, Gungahlin
- Heritage Unit, Environment ACT, Lyneham
- Parks & Conservation, Environment ACT, Lyneham
- Australian National University, Acton
- University of Canberra, Bruce
- Edith Cowan University, Joondalup WA
- CSIRO Forests & Forest Research, Yarralumla
- CSIRO Entomology, Acton
- Heritage Division, Australian Government Department of Environment & Heritage, Parkes
- National Trust of Australia (ACT), Civic
- National Parks & Wildlife Service, Department of Environment & Conservation NSW, Queanbeyan
- Library, Heraldry & Genealogy Society of Canberra, Hughes
- Library, National Capital Authority, Parkes

Authorship

The Plan was prepared by Mark Butz of *Futures by Design*.

After graduating from Macquarie University with a degree in Environmental Sciences, he worked for 26 years in government environment and heritage agencies in NSW, ACT and Commonwealth jurisdictions.

His roles ranged from on-ground resource management through resource investigation and development of policy and management plans to legislation review and development.

Since 2002 he has worked as an independent consultant and facilitator in the areas of environment, heritage and community development.

He is a Member of the Environment Institute of Australia & New Zealand, Associate Member of the ANU Institute for the Environment, and member of the Australian Institute of Alpine Studies.

His association with the Southern Tablelands and Australian Alps began in 1973 at Kosciusko National Park. His active interest in the Brindabella Range dates back to 1977 when he prepared the investigation for the proposed Scabby Range Nature Reserve, and continued during his investigation of the proposed Brindabella National Park and Bimberi Nature Reserve up to the early 1980's.

He continues to research the natural and cultural heritage of this area.

For enquiries or to provide additional information:

Phone +61-2-6251-2923
Mobile +61-418-417-635
Email mark.butz@bigpond.com
Web www.MarkButz.com

Acknowledgements

The author wishes to thank the Australian Forest History Society Inc. for supporting this work, and the ACT Heritage Council and ACT Government for assisting the work through a Heritage Grant. The work took considerably longer than was anticipated at the time of making of the grant and their patience with the process is greatly appreciated.

During the preparation of this Plan, land managers were required to make numerous decisions affecting the area within its scope.

The author is grateful to staff of the former ACT Forests, other parts of the ACT Department of Territory & Municipal Services, and Greening Australia (Capital Region) for their diligent checking of consistency with the intent of this Plan in designing and implementing on-ground works.

Support and encouragement, as well as valued historic and professional input, were provided by a wide range of individuals, including representatives of:

- former ACT Forests
- Heritage Unit, Environment ACT
- Wildlife Research & Monitoring Unit, Environment ACT
- Friends of ACT Arboreta (FACTA)
- Institute of Foresters Australia (ACT)
- Friends of Grasslands
- Conservation Council of the South East Region and Canberra; and
- National Trust of Australia (ACT).

Personal Communications at the end of this Plan lists people who provided information or guidance used in preparation of the Plan.

PART B UNDERSTANDING THE PLACE

The foundation of a Conservation Management Plan is documented understanding of the heritage place which it addresses.

This Part deals with:

- definition of the place
- biocultural (biophysical and historical) contexts
- administrative and legal contexts
- investigation of the biophysical environment and its elements and themes
- community understanding of the place
- investigation of past development and use, particularly in relation to surviving fabric
- reasons for and context of changes in the place
- the way the place relates to frameworks for conservation and management
- historical themes which apply to the place
- any other aspect, quality or association which is useful for assessing significance.

Investigation of the environment and history has made use of:

- documentary evidence such as published material; reports and correspondence; maps, plans and surveys; aerial photographs; ground photographs
- oral information; and
- physical evidence gathered during field inspection from 2003 to 2006.

Cited documentary and oral sources are listed at the end of the Plan.

DEFINITION OF THE PLACES

Note: The definition below cites Forest Compartment numbers used in current forest maps, as an aid to reference by land managers. Current compartment numbers differ in places from those used in Figure 1, which is based on 1999 (line drawing) forest maps. The older maps have been used as a base because they are more easily read.

Blundells Flat

The *place* is edged in solid black on Figure 1, and is defined as follows:

In the District of Cotter River

The area shown on Map 'Uriarra Map 51 Blundells Camages 17 January 2005', defined by Forest Compartments 415, 418, 420, 422 and un-numbered areas comprising the riparian zones of Condor Creek, Musk Creek and Coree Creek lying between these and the area defined below as the curtilage of the place.

The *curtilage* of the place is the setting or area which surrounds a place and which is relevant to its conservation and management.
This is edged in dotted line on Figure 1, and includes all areas between the place defined above and:

- in the north and west, the boundary of Namadgi National Park (NNP)
- in the south and east the divide between the catchments of Condor Creek and Wombat Creek

This includes:

- Forest Compartments 410, 411, 412, 413, 414, 417, 418, 419, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432 and 440
- part Compartment 408 [previously 409], west of a line projected from the junction of Namadgi National Park with Condor Creek (near the southern tip of Compartment 417) to the westernmost corner of Compartment 406.

The place and curtilage comprise lands managed by the former ACT Forests, now within Parks, Conservation & Lands, ACT Department of Territory and Municipal Services (TAMS), and do not include lands within Namadgi National Park.

The *broader setting* of the place referred to in the plan is essentially those parts of the Condor Creek catchment upstream of the Condor Creek bridge near Thompsons Corner.

The broader setting includes:

- (within the ACT) lands within Namadgi National Park and the Special Purpose Reserve west of Thompsons Corner; and
- (within NSW) lands within Brindabella National Park.

Shannons Flat

The *place* is edged in solid black on Figure 1, and is defined as follows:

In the District of Cotter River

The area shown on Forests Map 'Uriarra Map 52 Shannon's Condor 17 January 2005', defined by:

- Forest Compartment 404; and
- un-numbered areas adjacent to Condor Creek bounded:
  - in the north by Namadgi National Park;
  - in the west by a line projected due north to Namadgi National Park from a point 150m north-west from the northern tip of Compartment 404 (Wombat Creek road crossing); and
  - in the east by a line projected due east to Namadgi National Park from a point 150m to the south from the northern tip of Compartment 404 (Wombat Creek road crossing).

The *curtilage* of the place is the setting or area which surrounds a place and which is relevant to its conservation and management.

This This is edged in dotted line on Figure 1, and includes:

- Compartments 405 and 406 [part of the latter previously 407]; and
- un-numbered areas adjacent to Condor Creek bounded:
  - in the north by Namadgi National Park; and
  - in the west by a line projected due north to NNP from the junction between Compartments 406 [previously 407] and 408.

The *broader setting* of the place referred to in the plan is essentially the Wombat Creek catchment, in particular the Special Purpose Reserve to the west of Thompsons Corner.

The place, curtilage and broader setting comprise lands managed by the former ACT Forests, now within Parks, Conservation & Lands, ACT Department of Territory and Municipal Services (TAMS), and do not include lands within Namadgi National Park.

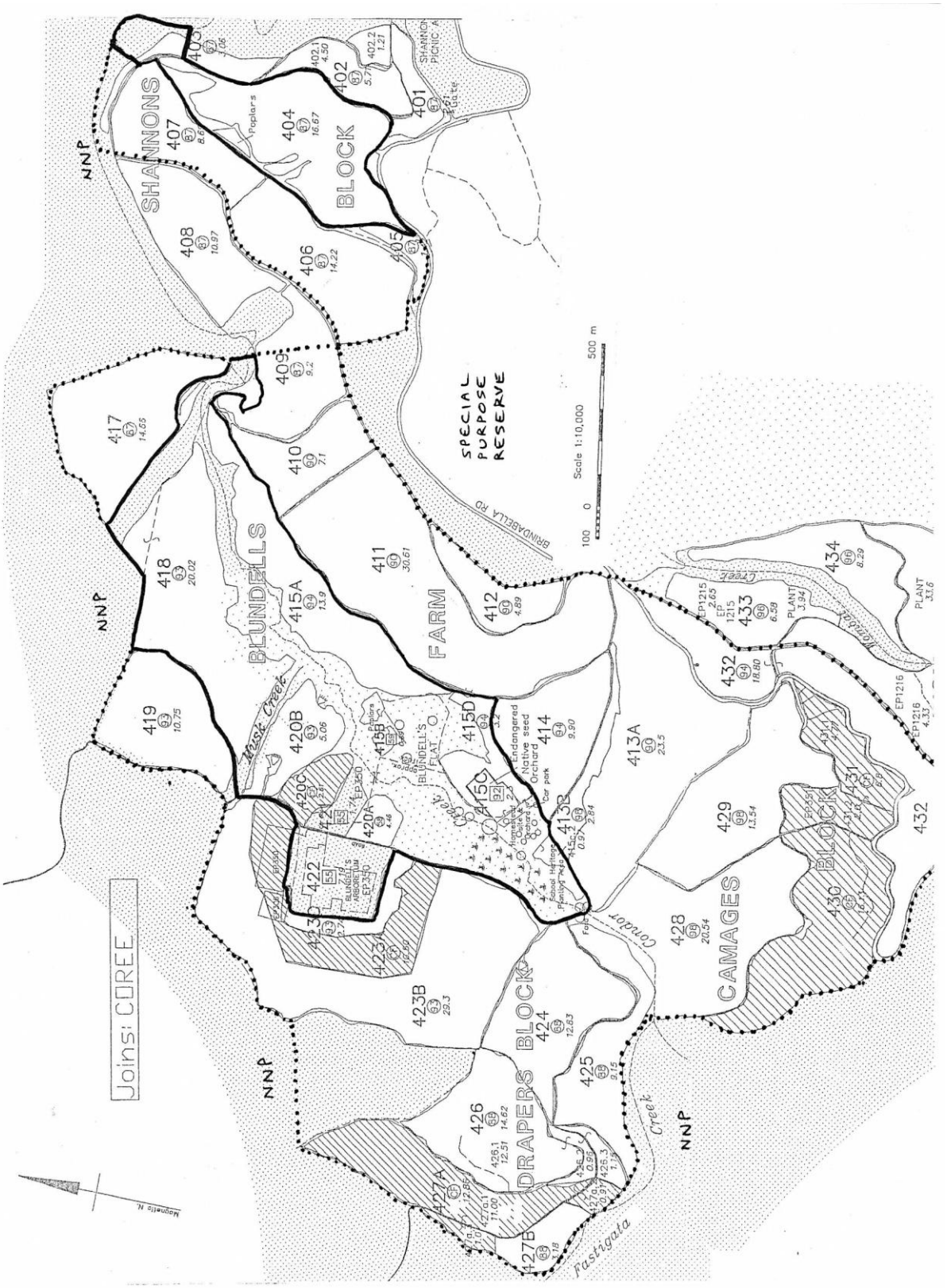


Figure 1 – Blundells Flat and Shannons Flat – definition of places

BIOCULTURAL CONTEXT

This section describes the way the place relates to elements of the natural and cultural history of the surrounding region and adjacent localities.

LOCATION AND ACCESS

Blundells Flat is located 27 km west of Canberra city, at c.740-780 m asl, just below Mount Coree.

Shannons Flat is located in a valley adjacent to and east of Blundells Flat, at c.720-760 m asl.

Both areas are accessed from the Brindabella Road. The only direct westward route from Canberra, this road has remained largely undeveloped. In the ACT parts have been sealed (almost to the Blundells Flat turnoff) with upgraded construction and maintenance to the ACT border at Piccadilly Circus. In NSW the road has been sealed in the softwood forests near Tumut. In between these sections, however, the road is unsealed, and in parts very narrow and winding as it descends steeply into the Brindabella Valley.

The historic lack of development of major access routes from the Canberra plain to parts west reflects the upland topography of the western parts of the ACT.

Over decades, several proposals were made for a significant upgrading of the Brindabella Road to create a more direct and reliable link to Tumut for commercial purposes (transport of timber) and for recreational/tourism interests. One of several options considered but not favoured was a route crossing Condor Creek and passing between Blundells Flat and Mount Coree (NCDC 1978). The preferred route in this direction was via Wee Jasper (NCDC 1985). No such development has eventuated, mostly for financial reasons.

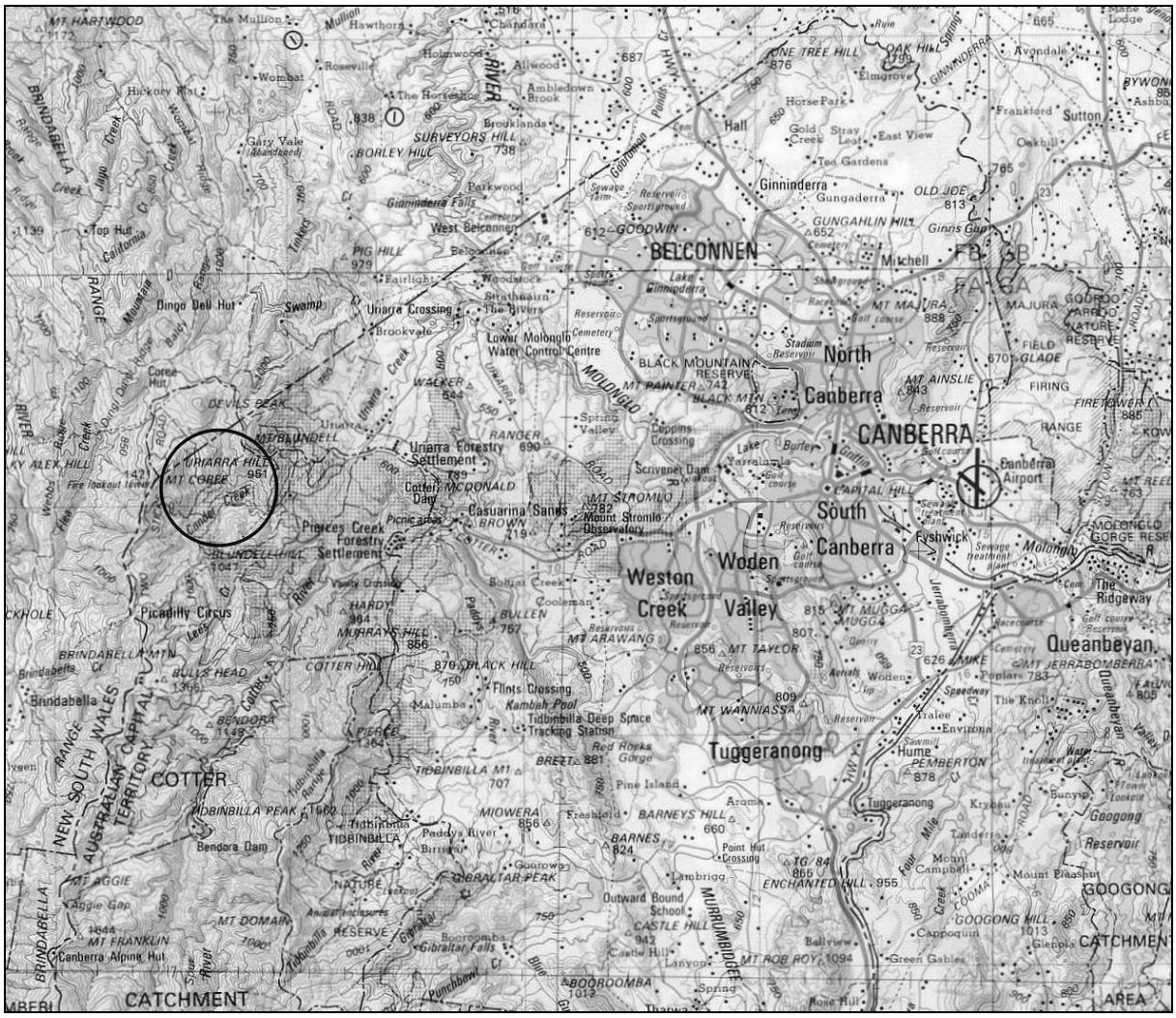


Figure 2 - Location and topographic context of Blundells Flat and Shannons Flat

TOPOGRAPHIC CONTEXT

The north-west corner of the ACT is marked by Mount Coree (1,421 m asl) on the Brindabella Range. This is the northernmost end of a mountainous upland region extending south into Victoria through the Australian Alps.

The Brindabella Range extends about 70 km from Mount Narrangullen (1,041 m asl) in the north to beyond Mount Gingera (1,855 m asl). Beyond this the Bimberi Range, topped by Mount Bimberi at 1,913 m asl, completes the western boundary of the ACT.

The steeply dissected country here rises from undulating terrain of the Southern Tableland of NSW, characterised by low rounded hills and some prominent ridges interspersed with sediment-filled valley land and rolling plains.

Canberra city is sited on the area formerly known as Limestone Plains (Canberra plain) at about 550-650 m asl. Urban development is on undulating areas of low relief below intervening hills and ridges. The plain is separated from the uplands of the Brindabella Range by the valley of the Murrumbidgee River which bisects the ACT from south-west to north-west.

Blundells Flat is encircled by hills and ridges:

- Brindabella Range to the west, from the gap at Piccadilly Circus (c.1,250 m asl) northwards to Mount Coree (1,421 m asl)
- in the north a prominent spur of Coree, and beyond this Devils Peak (1,310 m asl) in NSW is visible from higher points
- Blue Range to the east, dominated by Mount Blundell (1,225 m asl) and a spur from Uriarra Hill (951 m asl); and
- to the south an un-named ridge which passes Blundell Hill (1,047 m asl) and extends to Brindabella Mountain (1,320 m asl) in NSW beyond Piccadilly Circus.

Shannons Flat, like the larger Blundells Flat, is almost encircled by hills and ridges:

- to the north and east Mount Blundell, the Blue Range, Uriarra Hill and a spur descending to Thompsons Corner
- to the west the un-named ridge which separates it from Blundells Flat; and
- to the south an un-named dissected ridge rising to Blundell Hill (1,047 m asl).

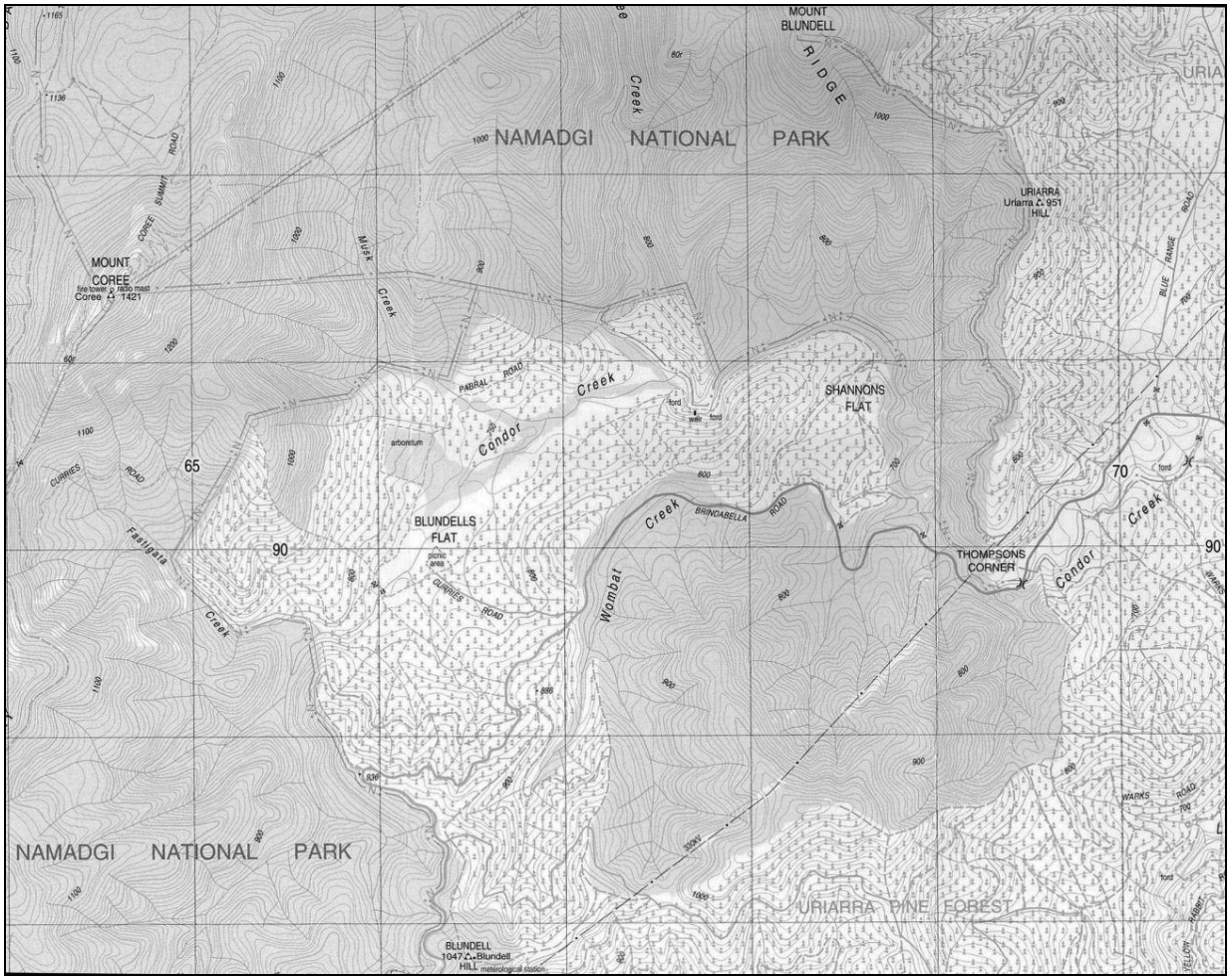


Figure 3 - Topographic detail of Blundells Flat and Shannons Flat

CATCHMENT CONTEXT

The ACT lies entirely within the catchment of the Murrumbidgee River, a significant part of the Murray-Darling Basin. The Murrumbidgee has its origins in high country to the south-west of the ACT. In a circuitous route which is a product of geology it first flows south-east to near Cooma before turning sharp north and then bisecting the ACT to emerge through the north-west border flowing to Burrinjuck Dam near Yass. It then continues in a westerly direction through the Riverina to be joined by the Lachlan River before becoming part of the Murray River.

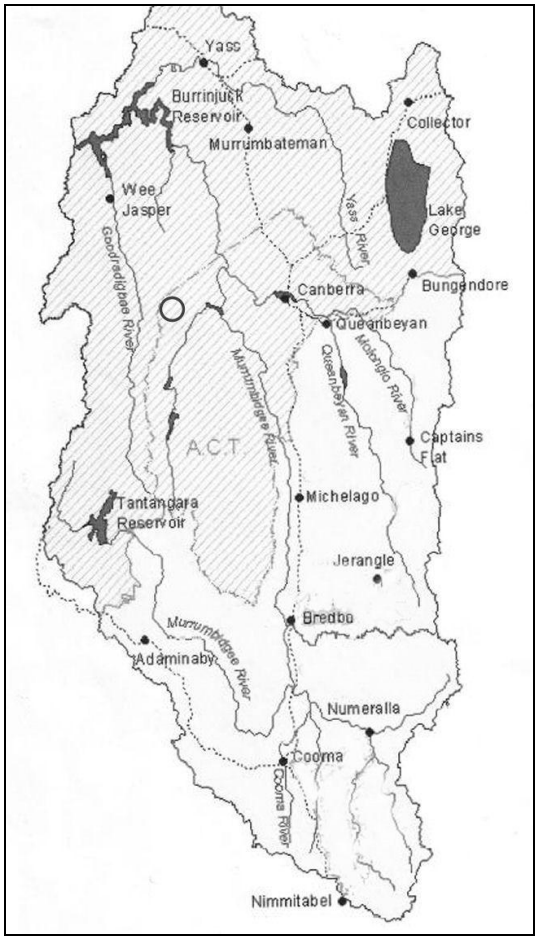


Figure 4 - Location in
Upper Murrumbidgee Catchment

Within the ACT the Murrumbidgee is joined by a major tributary in the Molonglo River, itself bolstered by the Queanbeyan River. Both these rivers drain large areas of undulating land, mostly under rural holdings. The Queanbeyan River supplies the Googong Dam while the ornamental Lake Burley Griffin in Canberra is fed by the Molonglo.

Before its confluence with the Molonglo, the Murrumbidgee is joined by the Cotter River which drains a small mountainous, mostly naturally vegetated and unoccupied catchment, and supplies the Corin, Bendora and Cotter Dams.

Blundells Flat is formed on Condor Creek, which is sourced near Piccadilly Circus. It flows north-east to be joined by Fastigata Creek before flowing through the Flat. It is joined by Musk Creek draining from the north-east spurs of Mount Coree, and then by Coree Creek draining from Coree Flats in NSW and the flanks of Devils Peak via the obscure Coree Falls. This part of the catchment appears to be reliably supplied by springs which, together with the effect of wet forest structures on higher elevations, sustain flows even in drought conditions. A variety of wetland systems in the valley floor at Blundells Flat serve to slow and absorb surface flow, providing a reducing environment which filters the water, and then allowing sustained release of water into the creeks below.

From its junction with Coree Creek, Condor Creek turns eastwards to cut its way through rocky country between the Blue Range to the north and an unnamed ridge to the south. It is then joined by Wombat (formerly Shannons) Creek draining from Blundell Hill.

Shannons Flat is formed on Wombat Creek, with small wetland systems reducing and filtering surface and ground water flows from the slopes.

Further details of wetland systems are included in *Ecological Elements* below

Condor Creek is crossed by the Brindabella Road at Thompsons Corner, and turns to the south-east past the site of Condor Camp. It meets the Cotter River downstream from Vanitys Crossing, shortly after being joined by Lees Creek, which drains from Lees Springs near Piccadilly Circus.

The Condor Creek catchment thus forms a significant part (about one-third in area) of the Lower Cotter water supply catchment.

BIOLOGICAL CONTEXT

Further (more localised) details are included in *Ecological Elements* below.

Bioregions

Bioregions represent a biologically based framework for aspects of natural heritage management (Thackway & Cresswell 1995). They assist a coordinated and integrated regional approach to biodiversity conservation, including assessment of habitat linkages which have the potential to mitigate the detrimental effects of habitat fragmentation on biota.

The north-west corner of the ACT is within the South Eastern Highlands (SEH) bioregion, while the south-western parts are within the Australian Alps (AA) bioregion (ACT Government 1997b).

This indicates that these areas share environmental and ecological characteristics with upland areas in adjacent New South Wales.

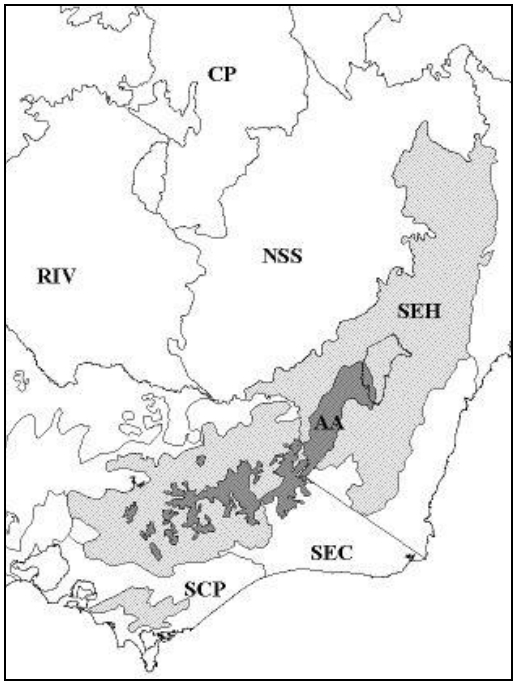


Figure 5 – Bioregional context

Habitat corridors

The value of a regional approach to conservation of natural assets is recognised in planning for the ACT and Sub-region. In particular, the concept of a regional network of linked habitat corridors and increased cooperation between adjacent jurisdictions on nature conservation matters are seen as key elements of a regional planning strategy (ACT Government 1997b).

A major north-south habitat corridor along the Brindabella Range is contained in Namadgi National Park (ACT) and the adjoining Brindabella National Park (NSW), lying to the south-west, west and north of Blundells Flat and Shannons Flat.

By themselves, formal reserves are unlikely to satisfy conservation requirements for all ecosystems or all species. 'Off-reserve' or 'tenure-blind' conservation' aims to:

- safeguard those species and communities not adequately reserved
- link reserves and vegetation remnants with habitat corridors so that the total landscape survives as a functional ecological unit
- support management of free-ranging wildlife; and
- assist management of the environmental impacts of land development and use.

A block of native timber (approx. 400 ha) runs from Condor Creek at Thompsons Corner to within less than a kilometre from Blundell Hill. The area is identified as a Special Purpose Reserve in the Territory Plan and is managed for protection of existing and future water supply, natural and cultural heritage conservation and appropriate recreational use (ACT Government 2006c).

This area provides the major part of another north-south corridor which lies at several hundred metres lower elevation than the Brindabella Range to the west, and which consequently supports drier forest types (see *Vegetation types* below).

In this way, Blundells Flat and Shannons Flat are links in some notable corridors, being almost encircled by native forest, and also bisected by contiguous native riparian and wetland vegetation along Condor Creek and Wombat Creek respectively. Other riparian corridors provide additional (upslope) connectivity, linking the Brindabella Range corridor with the corridor to the east.

Vegetation types

The north-west corner of the ACT is essentially a montane forest and woodland environment with elements of sub-alpine vegetation at higher elevations.

Forests and woodland structures from the highest to lowest elevations include:

- a woodland of Snow Gum (SG) *Eucalyptus pauciflora* on the summit of Mount Coree, down to c.1,300 m asl
- below this, a band of Brown Barrel (BB) *Eucalyptus fastigata* with Ribbon Gum *E. viminalis*. In the Cotter valley *E. fastigata* has a relatively narrow altitudinal range from 820 to 1,310 m, most commonly at 1,070 to 1,160 m on south-east aspects. It is favoured by soils derived from the volcanic rocks around Mount Coree, where it replaces Alpine Ash *E. delegatensis* below the Snow Gum belt.
- below the Brown Barrel on sites not derived from volcanics, an association (UP) of Narrow-leaved Peppermint *E. radiata*, Broad-leaved Peppermint *E. dives*, and Mountain Gum *E. dalrympleana*, with *E. dives* more common on drier sites, and *E. radiata* on more sheltered sites. Brittle Gum *E. mannifera* tends to replace *E. radiata* in more exposed or lower sites (LP), and *E. dalrympleana* may give way to *E. viminalis* in more sheltered or lower sites and in riparian zones
- on flats with cold air drainage, a forest or woodland of Black Sallee *E. stellulata* and Candlebark *E. rubida* (LSG), with Mountain Swamp Gum *E. camphora* on flats that are waterlogged in winter
- on lower drier sites, associations or pure stands of Brittle Gum *E. mannifera*, Red Stringybark *E. macrorhyncha* or Scribbly Gum *E. rossii* (SR). Also present are *E. dives*, Red Box *E. polyanthemos* on northern aspects, and occasional Apple Box *E. bridgesiana*.

(ANU 1973).

Ecological diversity within these types is increased by:

- dense wet gully vegetation in sheltered aspects with reliable water, such as Fastigata Creek, Lees Creek, Blundells Creek, gullies on Blue Range, and parts of Condor Creek
- heaths and scrubs on steep rocky faces on Mount Coree, Devils Peak and Mount Blundell; and
- complex wetland systems of aquatic and semi-aquatic communities, grasslands, herbfields, heaths and scrubs.

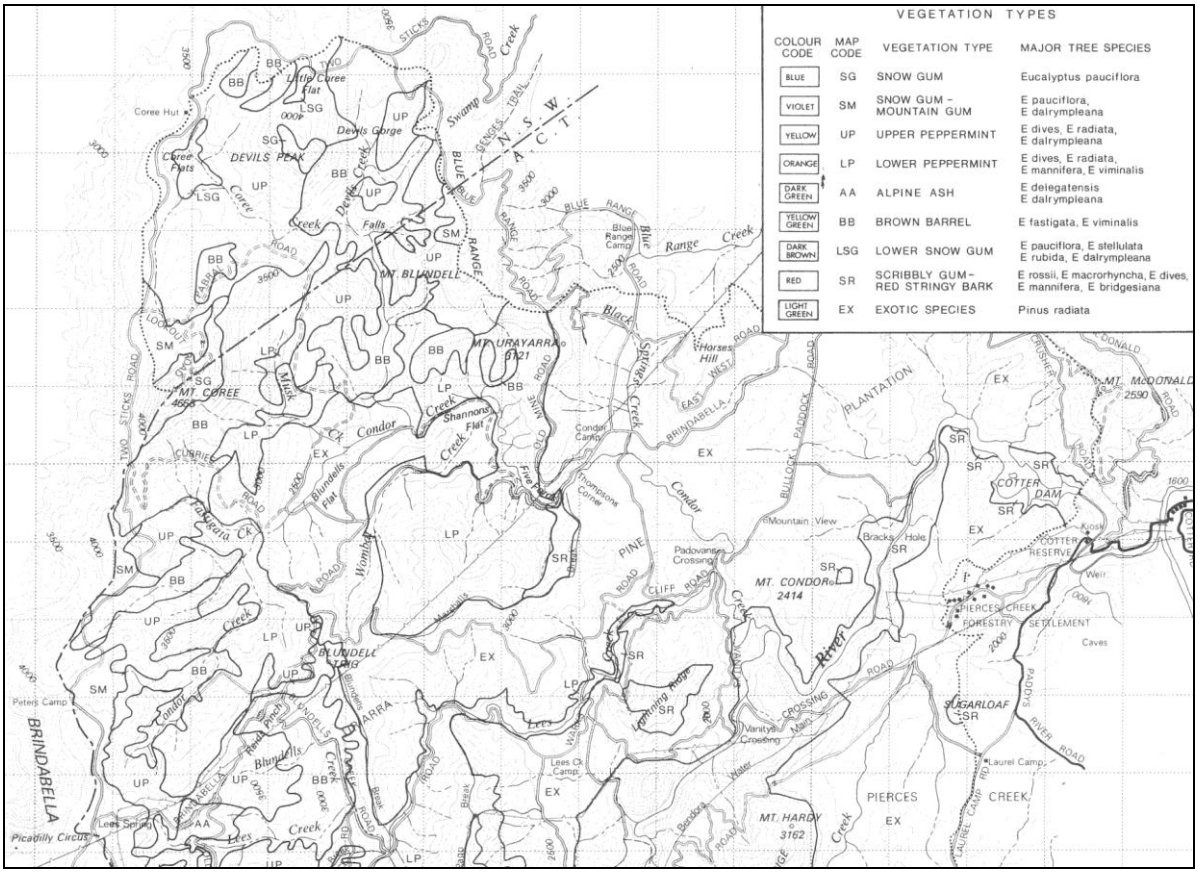


Figure 6 – Vegetation of north-west ACT (Cotter catchment) 1973

These forest and woodland types, and a number of other communities, may be approximated with 'ecological communities' modelled and defined in NSW Comprehensive Regional Assessment (CRA) mapping and subsequently refined by Environment ACT.

Data in the three right hand columns of the table below are extracted from England et al (2004). Correspondence between types is an approximation only, and details in 'Description' do not necessarily reflect the actual occurrence of types in the lower Cotter in terms of elevation, aspect and substrate.

The presence in the lower Cotter area of the specified grassland, fen and heath types is largely speculative, and should not be relied upon until flora surveys have been carried out.

Type (ANU 1973)	Sub-formation/ Community	Dominants/ Sub-communities	Description
Snow Gum SG	C51 Subalpine White Sallee Woodlands	*E.pauciflora-E.debeuzevillei*	Moderately deep soils at elevations between 1400 & 1550m
Snow Gum-Mountain Gum (SM)	C43 Mountain Gum Cold Moist Forest	*E.dalrympleana-E.pauciflora*	Moderately deep soils on sediments
Brown Barrel (BB)	C45 Tablelands & Escarpment Brown Barrel Forest	*E.fastigata-Dicksonia antarctica*	Deep soils on easterly and southerly sheltered aspects
Upper Peppermint (UP)	C46 Montane Sheltered Moist Forest	*E.viminalis, E.robertsonii, E.dalrympleana*	Moderately deep soils on sediments
Lower Peppermint (LP)	C67 Central St Peppermint Mountain Gum Forest	*E.dives, E.dalrympleana, E.pauciflora*	On shallow soils in sheltered aspects
Lower Snow Gum (LSG)	C28 Montane Frost Hollow Snow Gum Woodlands	*E.pauciflora-E.stellulata*	Shallow-moderate humic soils in frost hollow valleys
Scribbly Gum-Red Stringybark (SR)	C39 Tablelands Brittle Gum Dry Grass/Shrub Forest	*E.mannifera-E.rossii-E.polyanthemos*	Widespread on skeletal soils derived from sediments
	C34 Tablelands Riparian Ribbon Gum Woodland	*E.viminalis*	Alluvial soils on river flats and lower broad creek valleys
	C2 Tablelands Moist Tussock Grassland	*Themeda australis*	Moist drainage areas on valley floors in native grassland areas
	C3 Tablelands Wet Tussock Grassland	*Poa labillardieri, Carex appressa*	Wet drainage areas on valley floors in native grassland areas
	C10 Montane and Subalpine *Carex* Fen		Soils with impeded drainage on flat valley floors
	C15 Montane Swamp Heath		Raised peaty soils, in narrow drainage lines and creeks
	C18 Montane/Subalpine Moist Heath	*Hakea macrocarpa-Baeckea utilis*	Impeded drainage on humic soils on flats at elevations above 1500m

Wetland types

Nine wetlands in the ACT have been listed in the Directory of important wetlands in Australia (Environment Australia 2001), five in the Australian Alps bioregion and four in the South Eastern Highlands bioregion. Most of the wetlands listed are >1,000 m asl and are within Namadgi National Park, with two lowland types at Jerrabomberra Wetlands (a nature reserve) and Horse Park Wetland.

In nearby parts of New South Wales, the directory lists Coree Flats and Micalong Swamp, both in the South Eastern Highlands bioregion, and both >1,000 m asl.

In the subalpine and montane zones of the ACT, wetland communities generally comprise *Sphagnum* bog or *Carex* fen (or swamp), interspersed with wet heath and wet herbfield. The bogs are generally acidic, dominated by hummock-forming mosses, and have a low nutrient content. By contrast, fens lack hummock-forming mosses and contain mainly sedges or rushes (Hope & Southern 1983).

The subalpine zone is considered to be >1,400 m asl, with the montane zone below this but >500 m asl (Hope et al. 2003).

Blundells Flat is a discrete flat and wetland system within otherwise steep and heavily forested terrain. At 740-780 m asl, its wetland systems are 'montane', and are located about 100-200 m higher in elevation than most of the Canberra plain, including the two wetlands described in the directory as 'lowland'.

Most of the wetland vegetation is that of a fen, although hummock-forming mosses are present, suggesting that it may be intermediate (in parts at least). The peatland, compared with other studied mires in the region, is relatively young and contains relatively more inorganic fill and less peat (Hope et al. unpubl.).

In addition to 'ecological communities' used in the NSW CRA process, Environment ACT have identified types described as 'alpine and subalpine communities' (England et al 2004). Those which may relate to Blundells Flat and Shannons Flat are shown in the table below.

The ascribed 'Bioregion' may not accurately indicate the likely occurrence of these or similar types in the lower Cotter area. The presence in this area of the specified communities is speculative only, and should not be relied upon until flora surveys have been carried out.

Sub-formation/ Community	Dominants/ Sub-communities	Description	Bioregion
C6 Montane Grassland (Sod Tussock Grassland)			SE Highlands
C13 Subalpine *Sphagnum*/ *Carex* Bog (Valley Bog)		Fairly widespread in subalpine tracts. Level and gently undulating situations, permanently wet. Independent of rock type. Valley bog peats.	Alpine
C14 Subalpine and Montane *Sphagnum*/ Heath Bog (Raised Bog)		Widespread in alpine and subalpine tracts, occasional occurrences in montane tract. Sloping situations, permanently wet. Independent of rock type. Raised bog peats.	Alpine
C17 Eastern Tablelands Damp Heath (Moist Heath)	*Epacris microphylla –Schoenus apogon*	Impeded drainage on humic soils in narrow flat areas adjoining small creeks	SE Highlands

HISTORIC CONTEXT

Further (more localised) details are included in *Cultural Elements* below.

In terms of regional historic context, the ACT is largely surrounded by the Southern Tableland region of NSW, with its southern parts contiguous with the Monaro region (Jeans & Jack 1996).

Aboriginal people

Aboriginal people have played a major role in the evolution of regional landscapes through long established land use and management practices. In the Southern tablelands region this began at least 21,000 years ago. All resource zones were likely to have been utilised, leading to deposition of cultural materials in camp sites, rock shelters and quarry sites, as well as the evidence of rock paintings, stone arrangements, burial sites and scarred trees (Lennon & Mathews 1996).

Early European accounts state that the undulating country of the tableland supported mobile groups of Aboriginal people, exploiting seasonal food sources. These included daisy yam tubers, wattle seed and orchid tubers; fish in major rivers; crayfish, yabbies and platypus in streams; waterfowl on open water; and terrestrial mammals such as kangaroos, wallabies and possums. In December and January large numbers from different groups converged on the high country to exploit bogong moths. This seasonal existence followed natural patterns, in contrast with the approach of most white settlers (Jeans & Jack 1996).

These Aboriginal groups have been variously described and named. NSW regional histories (Jeans & Jack 1996) refer to the Ngarigo and Walbanga in the south and the Ngunawal and Gandangara in the north. More specifically, the local group has been referred to as the Kamberri or Kgamburry (Bluett 1954) or Ngambri (Jackson-Nakano 2005). The home territory of this group has been described as extending from Lake George (Weereewaa) and Gourock Ranges in the east to the Goodradigbee River on the west, and from south of Yass to the headwaters of the Murrumbidgee (Jackson-Nakano 2001).

When the first white settlers arrived at Canberra in the 1820's, the Aboriginal population was estimated by Bluett at about 500, in bands of 20 to 30. His major informant on the Aboriginal people of the district had been John Blundell, who went fishing and possum hunting with native boys as a child in the 1840's and had learned to speak some of their language (Bluett 1954).

The arrival of settlers in the tablelands from the 1820's had a significant effect on Aboriginal life, disrupting natural resource availability and seasonal mobility, and introducing exotic diseases. Aboriginal traditional life had effectively ceased on the tableland by the 1850's, marked by the cessation of Bogong Moth harvests and the large inter-tribal meetings and corroborees which had been observed and recorded by early settlers (Jeans & Jack 1996).

Towards the end of the 19th century Aboriginal families had adapted their way of life to the realities of European settlement. Some lived in huts or fringe camps near towns like Queanbeyan and Yass (often in a state of poverty); some lived on small farm blocks; while others were being moved into reserves and Government managed 'missions' (Kabaila 1997).

Despite the breakdown of much of Aboriginal society and the dispersal of people over time, Aboriginal people have been reasserting their identity and their intrinsic interest in the landscape as a continuing tradition.
One outcome of this has been the increasing acceptance of Aboriginal representation in advisory and decision-making bodies associated with land management.
For example, the ACT Government is developing agreements with local Aboriginal people regarding joint management of Namadgi National Park (ACT Government 2005b).

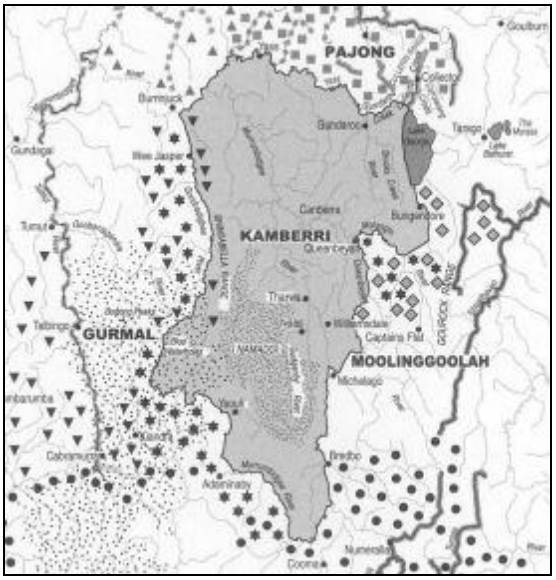


Figure 7 – Home territory of the Ngambri group

Exploration and pastoral settlement

The southern tableland was first settled shortly after the explorations in the period 1817-1821 of Hamilton Hume, Charles Throsby, James Meehan and John Oxley, which identified the potential of the region for grazing or agriculture. Through the 1820's and 1830's settlement radiated steadily out from the key centre Goulburn (marked out as a town in 1828). This was focused on the choicest land and water frontages, encouraged by land grants (Jeans & Jack 1996).

Overseers and assigned convicts moved sheep and cattle into unalienated land to develop outstations for their existing properties, establishing a claim to the land by dint of occupation and development. This enabled owners to move stock between land holdings, which could be a vital strategy to avoid periodic drought (Fitzgerald 1987).

Settlement on the Limestone Plains (now the site of Canberra) began in this way when servants of Joshua Moore cleared a site on Canbury (now Sullivans) Creek in 1824, followed the next year by the establishment of 'Duntroon' station for Sydney merchant Robert Campbell. By the time of the 1828 Census, 60 men were employed on six stations, of whom all but the five Superintendents had arrived as convicts (Fitzgerald 1987).

In 1829 the occupied lands of the Colony had been drawn up into Nineteen Counties, which defined the (official) limits of settlement, with County Murray marking the south-west limit, defined by the Murrumbidgee River. The system of free grants virtually ceased in 1831 under Gov. Darling, who replaced it with sale by auction, coupled with introduction of a rental charge and other restrictive regulations (Lea-Scarlett 1968).

As a result, in the 1830's land was increasingly being purchased by prosperous settlers such as Terence Aubrey Murray, who acquired 'Yarralumla', and John Lanyon, James Wright and William Wright who acquired 'Lanyon' (Fitzgerald 1987).

Particularly in the Monaro region, some landholders followed the practice of transhumance grazing, moving their stock to higher country in summer and driving them back into the valleys in autumn. This provided a degree of protection from periodic drought as well as resting lowland pastures. The practice became more common after land reforms in the 1860's which allowed for closer settlement. By breaking up larger runs and delineating small portions without water frontage, these reforms made some landholders more vulnerable to drought (Jeans & Jack 1996).

Town development and mining

Country towns tend to evolve in a series of stages (not in strict sequence) marked by: original survey; essential services such as an inn, store and smithy; a church with resident clergy; educational facilities; community self-help organisations; a local newspaper; a pastoral and agricultural show; and a municipal council (Jeans & Jack 1996).

This pattern is observable at the Limestone Plains. In the 1830's substantial village settlements were being established by the Campbells at 'Duntroon' and George Thomas Palmer at 'Ginninderra', with Campbell funding construction of a stone church (St John's) in 1841, an adjacent school house, and cottages to house free emigrant labour, many of them Scots (Fitzgerald 1987).

Following establishment of post offices at Yass and Strathallan (Braidwood) in 1835, there was pressure to extend postal services to the Lake Bathurst and Limestone Plains areas. This was supported by statements that the area between Lake Bathurst and the Monaro supported one-third of the total sheep and cattle in NSW. Queanbeyan emerged as an administrative centre for County Murray following establishment there in 1836 of the Limestone Plains Post Office, reflecting its location at the convergence of roads to the Monaro. This was reinforced by establishment there of a resident Police Magistrate from 1837 (Lea-Scarlett 1968).

From 1841 to 1846 Queanbeyan grew from 72 to 208 in the town, rising by 1851 to 372 in the town and 2,526 in the Police District (Lea-Scarlett 1968).

The discovery of gold in NSW in the 1850's stimulated further growth, particularly following the significant find at Kiandra in 1859. Further gold finds dotted the region, including those at Bywong, Mac's Reef, Brooks Creek and Brindabella. This also favoured establishment of a newspaper, *The Golden Age*, by John Gale in 1860 (Lea-Scarlett 1968).

Mining was pursued to the end of the 19th century for gold in the Braidwood area, and until the 1960's for copper, lead, gold and silver at Captains Flat (Jeans & Jack 1996). Heavy metals continued to be sought in various pockets throughout the region during the 20th century. Sand mining was also pursued at various times at Lake George and along the Murrumbidgee River. These activities stimulated population and economic growth throughout periods when grazing and agricultural activity proved unreliable. The establishment of the Queanbeyan Municipal Council came in 1885 (Lea-Scarlett 1968).

Federal Territory

A distinctive aspect of the history of this area is the decision in 1908 favouring the Yass-Canberra site for the new Federal Capital. Surveyor Charles Scrivener then narrowed the selection to what we now refer to as the Canberra plain, with its water supply needs to be served by the Cotter catchment. This in turn was followed by survey of the boundary of the Federal Capital Territory (later Australian Capital Territory, or ACT).

The Territory was separated from NSW from 1 January 1911 over an area of 2,360 sq km which was occupied by 1,714 non-Indigenous people on pastoral properties grazing some 224,764 sheep (CDHS Web site).

Land was compulsorily acquired to establish a leasehold system in the Territory, and former surveyed boundaries were re-drawn over ensuing decades as urban development and other 'Federal Capital purposes' displaced pastoral land use over large areas. John Blundell was one of the small landholders who lost their entire property in the resumption process. Subsequent growth of the urban area has continued this transformation in surrounding areas of NSW by encouraging small rural residential subdivision.

In the north-west corner of the ACT, 'Federal Capital purposes' included protection of Canberra's water supply in the lower Cotter catchment, hardwood forestry in the 1940's to 1960's, softwood forestry from the 1930's, and forestry research and education from the 1920's. Adjacent parts of NSW were leased from 1944 by the Federal Government to carry out bush fire protection measures.

Commercial softwood plantations became a prominent element in the landscape from the 1950's when planting was extended to wet forest types in the Cotter catchment (ANU 1973). By the end of 1972 c.5,000 ha or one third of the area planted to *Pinus radiata* was in the Cotter catchment (Bartlett et al 2005).

In NSW, extensive softwood plantations were established in what became the Buccleuch State Forest between Tumut and Canberra, extending to within about 25 km of the western boundary of the ACT (although a greater distance away by road).

Proximity to the emerging national institutions in Canberra tended to focus the attention of scientists on the ranges to the west of the city, with notable biological collection and research being undertaken from the 1940's and 50's, while significant continuing programs monitored rainfall and hydrology of the Cotter catchment through the 1960's to 80's.

Catchment protection

Following Commonwealth acceptance of the Yass-Canberra district for the new capital, Surveyor Charles Scrivener was tasked with determining the best site for the city and associated water catchment. Scrivener suggested a boomerang-shaped territory of 1,015 sq miles (2,630 sq km) which was determined by catchments of the Cotter, Queanbeyan and Molonglo Rivers. This was unacceptable to NSW. However the choice of the Canberra valley for the city was upheld, and the Cotter valley was within the Federal Territory. Instead of the Queanbeyan and Molonglo catchments, NSW ceded the Naas-Gudgenby catchment, now largely occupied by Namadgi National Park. Special arrangements were made to ensure access to water supply also from the Queanbeyan River catchment, later achieved through construction of the Googong Dam.

The Cotter water supply was protected from 1914 by legislation which restricted use in the catchment. Authorities resisted proposals for relaxation of controls on recreational use, grazing and mineral exploration. This vigilance was relaxed in time, and hardwood logging and clearing of native forest for softwood plantations were permitted, until they were prohibited due to concerns for catchment protection in 1960 (Higgins 1994b) and 1961 (ANU 1973) respectively.

When additional dams were completed higher in the Cotter catchment, Bendora in 1961 and Corin in 1968, the emphasis on catchment protection shifted to the middle and upper sub-catchments (ACT Government 2006c).

Extensive wildfires in January 2003 burned all of the Cotter catchment, with a significant loss of water quality. The ACT Government reviewed land use and management practices over much of the north-west of the ACT, with particular emphasis on the Cotter catchment e.g. the 'Shaping our Territory' reports (ACT Government 2003a; 2003b). Other studies focused on water supply options and protection e.g. 'Think water, act water' (ACT Government 2003c; 2003d; 2003e).

The Lower Cotter Strategic Management Plan (ACT Government 2006c) established protection of water resources as the dominant objective. It set out to restore the catchment to a stable condition that would support delivery of clean water and allow for a range of compatible activities. It proposed an end to commercial or broad-acre pines in the catchment, ultimate conversion of pine planted areas to primarily native vegetation cover, and favouring of regeneration of native species in the catchment (ACT Government 2006c).

Fire protection

Little is known of traditional fire practices of Aboriginal people prior to European settlement. It is likely that fire was used to some extent to stimulate grass and shrub growth, facilitate hunting and to keep open routes for travel (Flood 1980). Lightning was presumably also a major cause of fire. Research indicates a significant increase in fire frequency in the Brindabella Range from 1860 (Banks 1989), presumably started by graziers and stockmen, who would have burned the mountain forests regularly to encourage palatable growth for stock, maintain accessibility and to mitigate large wildfires.

As Canberra grew and the value of assets in the north-west of the Territory increased, concern about protection from bush fires also increased. Severe and extensive wildfires in 1920, 1926 and 1939 all resulted from careless use of fire. After the 1939 fires, measures were taken by the Commonwealth to provide greater protection for the Cotter catchment and associated pine plantations from fires entering the Territory from NSW (ANU 1973).

Measures included improved vehicle access, construction of water storage dams, a program of control burning, grazing in pine plantations, construction of fire lookouts, cooperation with NSW fire authorities to stop fires before they entered the Territory; and leasing of a large area in NSW adjoining the border for systematic control burning.

The lease for bush fire protection came into effect in 1944 (ANU !973).

In 1996 a cross border agreement on fire management and suppression was signed between the ACT Rural Fire Service and the NSW National Parks & Wildlife Service. The Agreement defined working arrangements between the two Services and contained specific agreements for reserve closures, entering lands for fire suppression, detection, communications, information exchange, training and a system to co-ordinate incident control operations (NSWNPWS 2003).

In January 2003, fires which began as a series of lightning strikes in NSW and the ACT joined to form a severe fire complex. The wildfires caused severe damage to the outskirts of Canberra. When the fires entered the suburbs, four people died, and more than 500 homes were destroyed with hundreds of others damaged, as they burned across 160,000 ha (about two-thirds of the ACT). This included 27,000 ha of farmland, 110,000 ha of nature reserves and national parks, and 11,000 ha of plantation forestry (ACT Government 2003b).

In addition, as fires continued through January and February 2003, 600,000 ha in NSW (including 468,000 ha of Kosciuszko National Park), and 1.04 million ha of the Victorian Alps were burnt (ACT Government 2003b).
The burnt area represented 68% of the Australian Alps national parks (Gill et al. 2004).

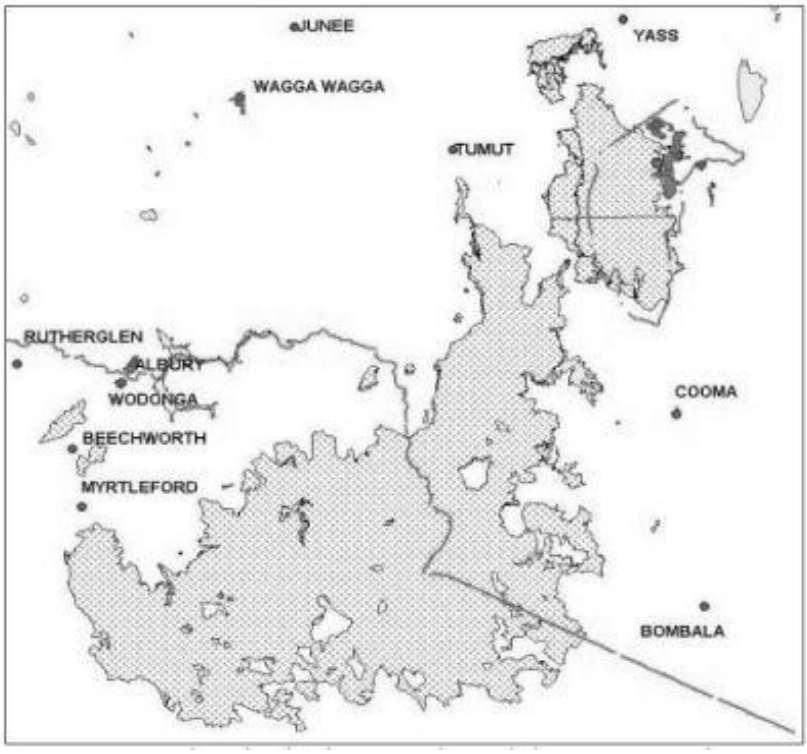


Figure 8 - Area burnt in ACT, NSW and Vic in Jan-Feb 2003

Tourism and recreation

In common with parts of NSW, the mountain areas at the western edge of the ACT proved attractive to 20th century visitors seeking recreational pursuits such as trout fishing, bushwalking and snow sports. As early as 1904, writers were extolling the virtues of the Goodradigbee River for trout-fishing, its relative remoteness seen as an asset working against depletion of fish stocks (Gale 1904).

The growth of the Federal Capital, its relative isolation from larger metropolitan areas, and its proximity to the Brindabella Range together encouraged use of the mountainous backdrop to the city for a range of outdoor recreational pursuits.

The Cotter Recreation Reserve associated with the Cotter Dam was a popular destination in the 1930's, with opportunities for picnicking and accommodation.

By this time there was a growing enthusiasm for more ambitious pursuits, including hiking into the mountains beyond the Cotter, and organised outings are documented from 1928 (Allen et al 1977). The Canberra Alpine Club was formed in 1934, and this group successfully lobbied for construction of a road along the Brindabella Range. In 1937 the road reached Mount Franklin, where a ski chalet was opened in the following year. After a pause during the years of the Second World War, alpine skiing on the Brindabellas became a popular pursuit, with its heyday in the late 1950's (Higgins 1994a).

As people became more mobile, the demand for, and range of, recreational pursuits expanded. For example, in 2005 the draft management plan for Namadgi National Park specifically addressed vehicle-based camping and pack-based camping; recreational driving; picnicking and sightseeing; walking; road cycling and mountain biking; motorised biking; horse riding; snow play and ski touring; mechanically assisted skiing; rock climbing and abseiling; fishing and hunting; boating, canoeing, kayaking and rafting; and flying (powered and non-powered) (ACT Government 2005b).

Additional to these, activities identified as occurring in the lower Cotter catchment included swimming; car rallies; dog exercise (including dog sledding events); running (including fun runs and similar events); and rogaining and orienteering events (ACT Government 2006c).

Conservation

Increasing concern about the deteriorating condition of highland catchments in NSW led to the initial establishment of Kosciusko State Park in 1944. This was later significantly extended as Kosciusko National Park, now Kosciuszko and covering c.675,000 ha (NSWNPWS 2000). This park adjoins a small part of the western boundary of the ACT.

Within the ACT, the Gudgenby Nature Reserve was established in the 1970's. In 1984 this was subsumed into Namadgi National Park (ACT Government 2005b), to total c.94,000 ha in area (Butler 1994). A national park in this area had been first proposed in 1901 by wheat scientist William Farrer of 'Lambrigg' near Tharwa (CDHS Web site).

Also in 1984 the Northern Brindabellas area was entered in the Register of the National Estate (Place ID 13400). This encompassed an area of about 2,500 ha within the ACT, north of Bulls Head. Blundells Flat and Shannons Flat were excluded from this listing.

Namadgi National Park was further extended in 1991, taking in most of the Cotter valley (ACT Government 2005b). This brought the total area of the park to c.105,000 ha (Butler 1994)

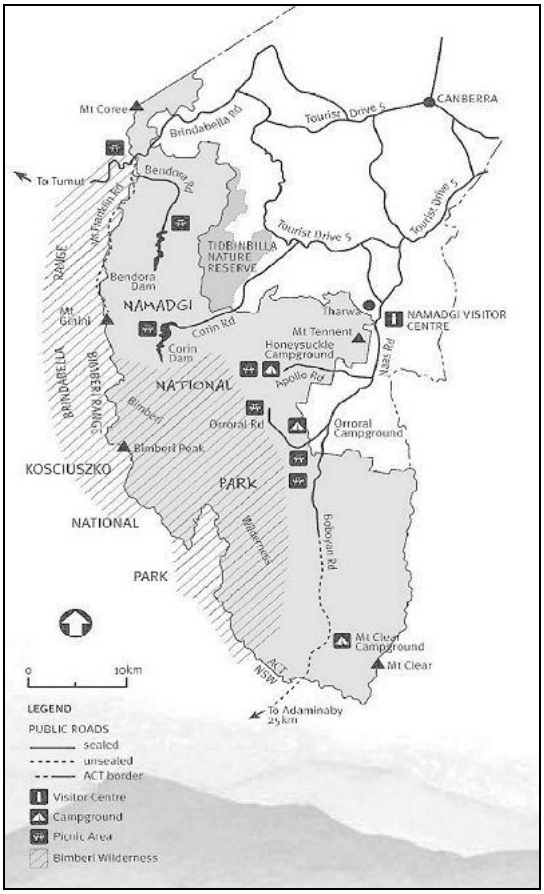


Figure 9 – Namadgi National Park area

The gazetted area of the northern extension of Namadgi National Park was defined by the edges of the Uriarra pine plantations. This resulted in the exclusion of Blundells Flat. The report which put the conservation case for that extension (Fraser 1988) advocated the inclusion of Blundells Flat for its intrinsic conservation values. It also advocated inclusion of the native timber area around Wombat Creek to the south-east, arguing that inclusion of these would improve both the boundary-to-area ratio of the Park and the scenic and landscape quality of the Brindabella Road traverse.

The conversion of such a big area to national park was not acceptable at the time to ACT Forests, and in the way of compromise the inclusion of Blundells was not advanced vigorously (Ian Fraser *pers.comm*.). The first rotation of pines at Blundells was harvested, and a second rotation planted, in the period between delivery of the report and gazettal of the Namadgi extensions.

In NSW, from the mid-1970's to 1980 potential new protected areas were being investigated around the border with the ACT. A series of gazettals established the Scabby Range Nature Reserve (4,983 ha) in 1982), Bimberi Nature Reserve (10,886 ha) in 1985, and the Brindabella National Park (18,472 ha) in 1996, 1999 and 2001 (NSWNPWS Web site; NSWNPWS 2003).

The last part of the Brindabella National Park was gazetted as an outcome of the Regional Forest Agreement for the Southern Region of NSW in 2001, when approximately 8,990 ha was added in an area between the Goodradigbee River and Brindabella Range (NSWNPWS 2003).

The gazettals in NSW resulted in protected areas adjoining the full length of the western boundary of the ACT and extending for about 10 km along the north-western boundary and along the south-western boundary.

Cross-border links were strengthened by the gazettal of the Bimberi Wilderness Area within Namadgi and parts of Kosciuszko, and the Scabby Range and Bimberi Nature Reserves (ACT Government 2005b; NSWNPWS Web site).

These reserves form part of a chain of protected areas comprising more than 1.6 million ha in the ACT, NSW and Victoria, which are recognised as the Australian Alps national parks.

These include:

- ACT - Namadgi National Park and Tidbinbilla Nature Reserve
- NSW - Kosciuszko and Brindabella National Parks and Bimberi and Scabby Range Nature Reserves
- Victoria - Alpine, Mount Buffalo, Snowy River and Baw Baw National Parks and Avon wilderness.

(Australian Alps Web site)

The parks are managed under a cooperative agreement between the four State, Territory and Australian governments. In order to address demand for recreation and tourism and to mitigate its impact on values of the reserve system and associated areas managed for conservation, managers have also pursued cooperative programs for education, interpretation and research (ACT Government 2005b).

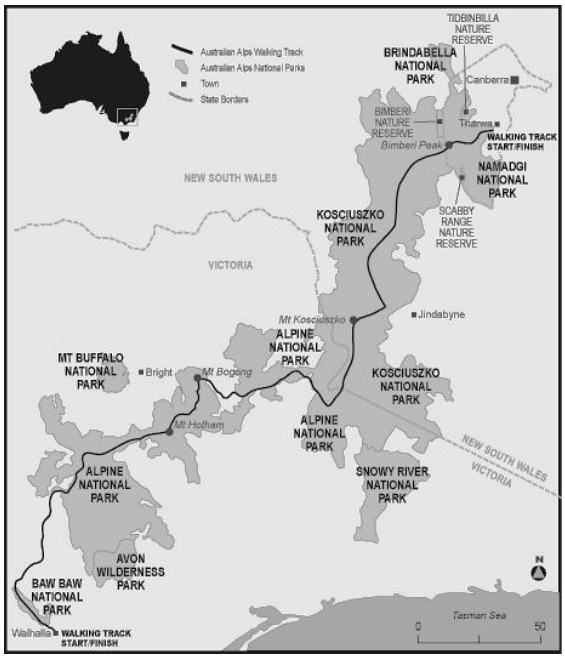


Figure 10 - Australian Alps national parks

This includes the Australian Alps Walking Track (also known as the Alps Track) which extends 650 km through the high country of Victoria, New South Wales and the ACT (Australian Alps Web site). Within the ACT this track extends from the Brindabella Range to near Mount Tennent and the Namadgi Visitor Centre.

ADMINISTRATIVE AND LEGISLATIVE CONTEXT

This section describes the way the place relates to frameworks for management, in terms of organisations which have an interest in the area.

Land Use and Management

The Ngun(n)awal people are the traditional owners of this area.

The ACT Department of Territory and Municipal Services (TAMS) manages many of the areas within or associated with the place.

Parks, Conservation & Lands (PCL) manage Uriarra Forest, including Blundells Flat, Shannons Flat and associated arboreta and plantations.
This is guided by the ACT Code of Forest Practices which requires that forestry operations address environmental values.

PCL also manage Namadgi National Park, which abuts the plantation area to the west and north, including Mount Coree and Mount Blundell. Parks and reserves are dedicated under the *Land (Planning and Environment) Act 1991*, but managed under the *Nature Conservation Act 1980*.

Namadgi is part of the Australian Alps national parks system. A draft management plan has been released for Namadgi National Park (ACT Government 2005b).

The Wildlife Research & Monitoring Unit within TAMS exercises responsibilities for biodiversity conservation across tenures under the *Nature Conservation Act 1980*. This includes action plans and recovery plans for threatened species and communities, and the policy framework of the ACT Nature Conservation Strategy.

ACT Heritage within TAMS has responsibilities for heritage places and objects across tenures under the *Heritage Act 2004* and provides support to the ACT Heritage Council.
The Council advises on natural and cultural heritage matters, and has statutory responsibilities relating to (for example) the ACT Heritage Register, conservation of Aboriginal places and objects, and approval of conservation management plans. The Heritage Act imposes specific responsibilities on public authorities who are responsible for heritage places. Heritage Guidelines prepared under the Act provide mandatory conservation requirements for heritage places. The Council is also responsible for the ACT Heritage Grants Program.

Other parts of TAMS administer provisions for pest plants and animals, land management agreements, and planning and investments under the ACT Natural Resource Management Plan 2004-2014, including community engagement such as Landcare, Waterwatch and the Land Keepers program.

The Natural Resource Management Advisory Committee provides advice on operational and policy matters such as integrated catchment management. It also provides a forum for community consultation and advice on management of protected areas and nature conservation issues generally, including Management Plans and the Bushfire Fuel Management Plan.

The ACT Natural Resource Management (NRM) Board is a non-statutory body responsible for prepraration of the ACT Natural Resource Management Plan for accreditation by the ACT and Australian Governments; development of the ACT NRM Investment Strategy; and oversight of implementation and review of the ACT NRM Plan including joint Government programs such as Natural Heritage Trust, National Action Plan for Salinity & Water Quality and National Landcare Program. It also administers the ACT Environment Grants Program.

The ACT Flora & Fauna Committee is established under the *Nature Conservation Act 1980*. It provides independent scientific advice on nature conservation issues, particularly in relation to threatened species and communities and ecologically threatening processes.

The NSW Department of Environment & Climate Change (Parks Division, formerly NSW National Parks & Wildlife Service) manages Brindabella National Park in NSW, which adjoins Namadgi National Park to the west and north, including Mount Coree (western face), Coree Flats and Devils Peak. The local area office is at Queanbeyan, and the regional office is at Tumut. Brindabella National Park is part of the Australian Alps national parks system.

The National Capital Authority has an interest in the area, since the Commonwealth remains the owner of land in the Territory, including that managed by the ACT Government. The National Capital Plan is prepared under the (Commonwealth) *Australian Capital Territory (Planning and Land Management) Act 1988* and provides policies for permitted uses of Territory Land under particular land use categories, including 'Mountains and bushlands', as well as policies on catchment protection, and the Cotter catchment in particular.

The ACT Planning and Land Authority (ACTPLA) is established by the *Planning and Land Act 2002* as an independent authority, replacing ACT Planning and Land Management which existed within the Department of Urban Services.

ACTPLA is responsible for preparing the Territory Plan under the (Commonwealth) *Australian Capital Territory (Planning and Land Management) Act 1988*. This provides a range of policy frameworks which are to be consistent with the National Capital Plan, but which may not be specific to some of the values of the area considered in this report. The Territory Plan establishes Special Purpose Reserves, which are relevant to the area. ACTPLA also manages environmental impact provisions of the *Land (Planning and Environment) Act 1991*, and naming of geographical features under the *Public Place Names Act 1989*.

The water supply catchment values of Blundells Flat, Shannons Flat and Condor Creek are relevant to the *Environment Protection Act 1997*, *Water Resources Act 1998*, and related statutory instruments administered by the Environment Protection Authority. This includes the ACT Water Resources Management Plan and ACT Environmental Flow Guidelines.

In line with these, ACT Electricity & Water (ACTEW) has responsibilities for water resources and catchment condition. TAMS have responsibility for catchment condition in plantation areas, and for aquatic and riparian zone biota across tenures.

The ACT Emergency Services Authority is responsible under the *Emergencies Act 2004* for the ACT Strategic Bushfire Management Plan, which provides the framework for fire risk assessment and fire management.

Where transmission lines cross the area (southern and northern extremities of the upper Condor Creek catchment), the energy carrier TransGrid has an interest.

The Australian Government Department of Environment and Heritage has responsibilities for the *Environment Protection & Biodiversity Conservation Act 1999*. Under this Act an action requires approval of the Commonwealth Environment Minister where it has, will have or likely to have a significant impact on a matter of national environmental significance (including such matters as nationally listed threatened species, listed migratory species, places on the National Heritage list and Ramsar Wetlands). The Act also applies to actions taken in a Commonwealth area or by the Commonwealth where these actions have a significant impact on the environment.

Further details of relevant legislation are in Rawson (2003) [Note that this predates the *Heritage Act* 2004].

BIOPHYSICAL ENVIRONMENT

This section sets out:

- investigation of the biophysical environment and its elements and themes
- aspects of past development and use
- reasons for and context of changes in the place

Biophysical elements are presented in terms of:

- Landscape
- Geology, geomorphology and hydrology elements
- Ecological elements

These elements are functionally inter-related, and Parts dealing with issues, constraints and opportunities, conservation policy and works address these elements in a more integrated fashion within their respective landscape contexts.

Summary

[C] – within the curtilage but not the place; [S] - within the setting but not the curtilage or place

Element	Physical evidence	Documentary evidence
Ecotones for dual habitat species – Blundells Flat	Ecotone structure	Air photos Contemporary photographs Historic record of dual habitat species
Wetland complex - Blundells Flat - Shannons Flat	Wetland soak, meadow areas, hillslope seeps	Portion and parish plans Valuation reports and fieldbooks Air photos Historic record Contemporary photographs Photographs post-2003
Peatland – Blundells Flat	Peat in wetland soak	Unpublished report
Riparian zone vegetation - Blundells Flat	*E.viminalis* forest; dense native regeneration	Contemporary photographs Photographs post-2003
Eucalyptus fastigata forests [C]	Dense regeneration	Historic record Photographs post-2003
Wet gully vegetation - Coree/Fastigata Creek [C] - Condor Creek (parts) - Wombat Ck/Shannons Flat [C]	Dense regeneration	Historic record Photographs post-2003
Eucalyptus camphora - Shannons Flat	Dense regeneration	Historic record Photographs post-2003
Montane rocky heaths - above Blundells Flat [S]	Heath and scrub complexes regenerating	Historic record
Northern Corroboree Frog *Pseudophryne pengilleyi*	Not known	Historic record
Burrowing land crayfish *Engaeus cymus*	Not known	Historic record
Key's matchstick grasshopper *Keyacris scurra*	Not known	Historic record

LANDSCAPE ELEMENTS

The Blundells Flat area has high aesthetic value as an upland flat in otherwise steep and mountainous terrain. Its horizon is circumscribed by timbered hills and ridges, offering a strong sense of remoteness, with prominent rocky peaks, cliffs and gorges on Mount Coree, Mount Blundell and Devils Peak.

Prior to the January 2003 wildfire, the visual amenity offered by the arboreta, plantations and adjacent tall wet forests attracted a high level of recreational use for relatively passive uses such as picnics and bushwalking. This was bolstered by its convenience as a starting point for more active pursuits in the surrounding landscape, including bush driving and bike riding, rock climbing and orienteering.

Shannons Flat is a much smaller place. Because plantations covered most of the area, with more difficult access and no recreational facilities provided, it was rarely visited and its aesthetic value and sense of enclosure was not readily appreciable until after the wildfire and subsequent debris removal.

In *Part D Issues, Opportunities & Constraints* below, Landscape Units are illustrated, with analysis of attributes, elements of significance, threats, current condition and protective measures to be taken.

These Landscape Units include:

For Blundells Flat:
• WS Wetland Soak/Peatland • EM Eastern Meadow • RZ Riparian Zone • WM Western Meadow • ET Eastern Terrace • EF Eastern Foothills • ES Eastern & Southern Slopes • WS Western Slopes • NS Northern Slopes
For Shannons Flat:
• A Five Fords (Condor corridor) • B Wetland (Shannons Flat); and • C Wombat Creek.

Some parts of *Biophysical Elements* below allude to landscape function (or ecological function in the landscape). This relates to the ability to retain resources such as soil, water and nutrients within the landscape system (or ecological system) rather than losing these to flux or having them 'leak' out of the system.

The *Landscape Change* section at the end of Part B sets out aspects of changes in landscape appearance in response to occupation and use, derived from a variety of records.

Historic phases of occupation and use described in that section include:

- pre-settlement (pre-1860's)
- pastoral occupation (1860's to 1917)
- research and educational use (1920's to 1990's)
- softwood forestry production (1956 to 2003)
- post-2003 fires to present

Further details of occupation and use during these phases are included below in *Cultural Elements.*

GEOLOGY, GEOMORPHOLOGY AND HYDROLOGY ELEMENTS

See also *Topographic context* and *Hydrological context* above.

BLUNDELLS FLAT AND CONDOR CREEK

Geology

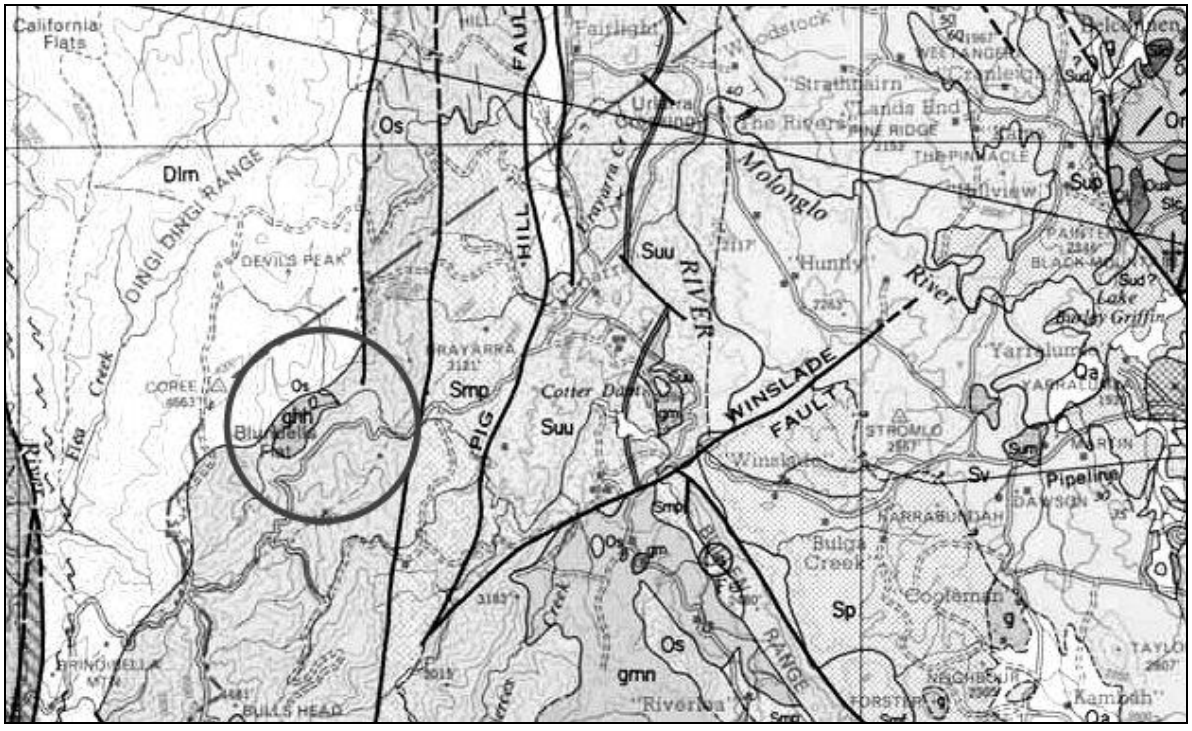
As the area is approached from the Canberra plain along the Brindabella Road, a low escarpment to the west of 'Uriarra' marks the line of the Pig Hill Fault and landforms derived from the Paddys River Volcanics of Middle Silurian age. The terrain alters again near Thompsons Corner where another fault separates the Paddys River Volcanics from the oldest rocks in the area, the Ordovician age Nungar Beds of fine quartz arenite, siltstone and slate (Owen & Wyborn 1979). This formation continues to outcrop along the road to the top of the Brindabella Range.

The particularly rugged nature of the north-west corner of the ACT and the continuation of the Brindabella Range to the north, including the rocky profiles of Mount Coree and Mount Blundell, are based on the youngest rocks in the area. These are the Devonian age Mountain Creek Volcanics of rhyolitic lava and ignimbrite, tuff, agglomerate and sediments rich in feldspar (Owen & Wyborn 1979).

Below this mountainous landscape, the areas upstream and downstream and to the east of Blundells Flat are based on the Ordovician Nungar Beds. Most of Blundells Flat itself is developed on the Condor Granodiorite which was emplaced within the Nungar Beds probably during the late Silurian period (Owen & Wyborn 1979).

This is a small outlier of granitic intrusion, with relatively inconspicuous outcrops in the valley floor. This distinguishes it from the large areas of Devonian age granodiorites of the Murrumbidgee Batholith which form the rounded mountainous country of the southern ACT in Namadgi.

The contact between the volcanics and granite has led to some mineralisation, which was exploited late in the 1890's at the Mount Blundell base metal prospect. This was a small operation exploiting lead, silver, gold and zinc within the Mountain Creek Volcanics (Gilligan 1975; Owen & Wyborn 1979). The track past the site is named Old Mine Road.



Dlm – Mountain Creek Volcanics (Devonian)
ghh – Condor Granodiorite (Upper Silurian?)
Suu – Uriarra Volcanics (Upper Silurian)
Smp – Paddys River Volcanics (Middle Silurian)
Os – Nungar Beds (Ordovician)

Figure 11 - Geology

Hydrology

Although Musk and Coree Creeks are today considered to be tributaries of Condor Creek, on some early portion and parish plans Condor Creek is drawn as a tributary of Musk Creek, which then flowed to Coree Creek, which in turn flowed to the Cotter River. The same confusion translated into maps used by early bushwalkers from Canberra from the late 1920's, with the observation that the lower part of Condor Creek, including the five crossings (between Thompsons Corner and Blundells), was shown on these maps as Coree Creek (Allen et al 1977). This persisted into the 1970's when the road bridge was built to replace the crossings, with works plans being labelled as 'Coree Creek bridge' (ms NAA).

Upstream from Blundells Flat, Condor Creek follows a single confined channel on sedimentary rocks but once it reaches the granites it becomes multi-branched in a broad soak. Below this, the creek takes a serpentine course between granite outcrops, with well-developed alluvial flats.

The stream banks are generally less than 1m in height, and less than 3m apart, and reveal fine material below large waterworn pebbles. Waterworn pebbles are found in terraces above the confining banks and may indicate either higher former baseflow levels or the peakflow of occasional storm events.

Beyond the granite substrate, downstream from the flat, Condor Creek takes a sharp turn to the east and is deeply incised in sedimentary rocks, forming large alluvial flats on bends which suggest a substantially larger radius of curve than is evident in the current course. This pattern is also evident at the junction with Wombat Creek below Shannons Flat. This might indicate that historic flow was larger (and/or or slower) than at present. In some places the creek has abandoned the large curves altogether to take a more direct route, and this may have been assisted by human agency.

Two concrete weirs are in place across Condor Creek in this vicinity: one above the wetland and the intersection with Fastigata Creek, accessible by a track from the Brindabella Road; the other below the Flat and just above the first ford on the access track. These were put in place as part of hydrological studies carried out by the Forest Research Institute in the 1960's and 70's.

Soils

The metasediments here generally produce freely draining krasnozems and shallow red earths with a large stone fraction but also with porous silt and fine sandstone (Talsma 1983).

The most dispersible soils are those derived from granites, ranging through those on volcanics to less dispersible soils on metasediments (ANU 1973).

Studies indicate that the krasnozems and red earths are relatively resilient to infrequent control burning (although nitrogen is lost in frequent burning) and to compaction by machinery in forest operations. They may contribute to diminished water quality between plantation rotations, although this declines as pines become established (Talsma 1983)

Other studies indicate that:

- runoff and soil loss in all types are greatly increased if litter cover is reduced and more so if soils are dry
- cover of less than 7 tonnes/ha allows increased runoff, erosion and turbidity
- soils under pine litter become water-repellent when dried out, and are particularly prone to erosion in intense storms
- streamside alluvium is extremely dispersible and prone to erosion and contributes most of the turbidity in streams

(ANU 1973).

Following the January 2003 wildfire and subsequent rain events, water yield from the catchment increased due to loss of litter cover and reduced transpiration. Images show that Condor Creek carried a high load of debris, ash and suspended solids, probably derived from both the catchment and the riparian zone. Field inspection in 2003 recorded evidence of higher than normal flow rates, undercutting and slumping of banks. Some breaching of necks between meanders had allowed the stream to take a more direct course for a time, and this is likely to have increased sediment loads and lowered water levels in the soak.

At October 2006, regeneration of vegetation cover appeared to have halted further incision of the soak, undercutting of the banks and breaching of meander necks, while woody debris in the stream appears to be slowing flow and causing settling of suspended sediment.

Mechanical removal of pine debris from surrounding slopes up to mid-2006 perpetuated delivery of sediment to the creek, followed by works on forest road drainage.

Environmental history

Hope et al (unpubl.) document the outcomes of studies using Quaternary reconstruction techniques such as stratigraphy, dating and biological analyses of cores taken from the Wetland Soak at Blundells Flat in 2005.

They observe that Quaternary landform development in the Blundells Flat area includes fans of debris on lower slopes and forming valley infill. The fans and infill have been incised by stream channels which have in turn deposited sorted gravels and sands in places. Around the Wetland Soak the fans are composed of red gravelly clays, with gravel analysis suggesting that these are derived mainly from the Ordovician substrate to the east rather than from the Devonian volcanics to the west.

Hope et al. suggest that during the latter phases of glacial times, with colder temperatures, drier climate and reduced vegetation cover, periglacial slope debris (scree, talus and sediment) contributed to extensive alluvial fans at the base of the hills. The resultant valley floor floodplain was affected by the granite outcrops which blocked the stream and led to a build-up of sediments from about 2,600 years before present.

The impeded stream then became braided and stream sediments were deposited on the floodplain. These conditions would have enabled development of a sedgeland which became increasingly peaty. Dating suggests that the present fen developed within the last 200 years or so.

Studies of the soak indicate a maximum depth of sediments of 205cm at a point about 60m from the eastern edge. These comprise about 30cm of peat derived from sedges overlying 90-170cm of sandy peaty silts, in turn overlying cemented gravels.

Charcoal and fine sand in the lower levels suggest that following fires debris from the catchment washed over the flat during floods. An apparent decline in this process may have been due to development of a fen which filtered sands and sediment, or these may have been removed by enhanced drainage.

Analyses of pollen and macrofossils (seeds, insects and wood) indicate several changes in environmental conditions.

Through the entire sedimentary profile, it is apparent that sedges have been present, with *Sphagnum* spores indicating some bog development on the margins at times. However, other species characteristic of lower altitude bogs e.g. *Empodisma* and Epacridaceae are absent or uncommon. Over time, some of the herb species became more common while sedges were replaced by grasses. Changes are noted in the levels of eucalypt pollen, probably related to clearing following settlement and later for pine plantations. Tree ferns are also seen to have declined following settlement, presumably due to reduction of canopy cover.

The reduction in sedge pollen may be related to deliberate drainage of the soak and consequent drying out of the fen. The soak may have become more peaty due to spring feeds which also favoured the sedge *Cyperus* sp. over *Carex* sp. *Cyperus*, in company with the bulrush *Typha* sp., suggests a higher level of inundation.

Analysis of charcoal indicates a long history of fire at the flat, with major erosion/deposition events associated with charcoal. Charcoal occurs throughout the profile, although the record suggests fairly regular burning of the fen itself, with larger fires in the catchment more evident following European settlement.

Recent history

Beyond the palaeoreconstruction work, documentary evidence and field observation also imply changes in hydrology and landform.

It is likely that Condor Creek is entrenched relative to its former flow level at Blundells Flat. Although the Wetland Soak does not appear to be diminished in size relative to its portrayal in portion plans from the 1870's, there are at least three points at which Condor Creek drops a metre or so below the surface of the soak. The valuation report for portion 1 (McDonald) described the soak as a '*swampy flat now well drained by creek*'. The insertion of '*now*' in the description suggests human modification, whether deliberate or inadvertent. There is also a series of parallel drains clearly visible in the Eastern Meadow.

The section on *Landscape Change* at the end of Part B sets out further observations and speculations on:

- effects of human modification, drainage, fire and erosion
- changes in vegetation structure and floristics; and
- changes in hydrology.

SHANNONS FLAT AND WOMBAT CREEK

The landform of Shannons Flat has much in common with the eastern foothills at Blundells Flat, since both are developed on the Ordovician Nungar Beds of fine quartz arenite, siltstone and slate (Owen & Wyborn 1979).

Shannons Flat was settled three decades later than Blundells Flat, so it was occupied (officially) for less than two decades, although valuation reports and aerial photographs indicate that the surveyed portions were extensively cleared.

The area of pastoral development was confined to just the northern half of the area which was subsequently cleared for plantations between the Brindabella Road and Condor Creek. Pastoral development extended only a short distance beyond the range to the west of Shannons Flat, whereas clearing for plantations extended all the way back to Blundells Flat.

Wombat Creek differs from Condor Creek in several ways:

- the upstream catchment is smaller and has a more sheltered aspect
- the stream course is more confined by the topography and follows a slightly steeper gradient, with no barrier landforms, all of which inhibit development of extensive flats; and
- the stream course becomes sinuous (without deep incision) for only a short distance (above the point at which it is crossed by the access track, which would have modified the gradient).

Shannons Flat does show a pattern similar to Blundells Flat in having hillslope seeps and swampy meadows developed on the more gentle eastern slopes of its valley.

ECOLOGICAL ELEMENTS

See also *Biological context* above.

Ecological elements of the area noted in published sources include:

- vegetation of Blundells Flat, Shannons Flat and Condor Creek
- native forests and woodlands around and above the flats (including wet gullies and rocky heaths)
- the only known stand in the ACT of *Eucalyptus camphora* at Shannons Flat
- the threatened Northern Corroboree Frog *Pseudophryne pengilleyi*
- the unusual burrowing land crayfish *Engaeus cymus*; and
- the uncommon morabine grasshopper *Keyacris scurra*.

These are discussed below as individual elements. However, because threatening processes arise on a landscape scale, and conservation efforts need to be directed at that scale, a more integrated (landscape unit) approach is followed in subsequent sections.

Vegetation structures

The Blundells Flat area encompasses several distinct vegetation structures, including:

- diverse vegetation of the wetland soak and peatland
- grassland, herbfield and heath on open meadows and flats
- riparian forest
- native forests on adjacent areas
- wet gully vegetation
- rocky heaths and scrubs on peaks above the flats
- former pine plantations
- remains of a softwood arboretum
- remains of a poplar arboretum; and
- a plantation of endangered eucalypts.

The complex boundaries between some of these offer numerous and diverse transition zones. Such ecotones can be significant for the diversity and population density of fauna species, which may include species of adjoining communities plus species found only in transition zone.

Of particular interest are opportunities offered to species which require two or more adjacent communities of different structure as part of their life history (e.g. the Corroboree Frog and burrowing crayfish – see below). Population densities generally increase with increased length of 'edge' per unit area, so are enhanced by complex shapes.

The ecotones at Blundells Flat would have been altered by pine plantation development, and this may obscure understanding of which parts were naturally open.

Ecotones of this sort or extent have not survived plantation development at the smaller Shannons Flat.

Communities in wetland and meadow areas

Montane flats

Blundells Flat (at c.740-780m asl) is unusual as a discrete flat with a range of wetland systems within otherwise steep and heavily forested terrain.

Shannons Flat is considerably smaller than Blundells Flat and lies at a slightly lower elevation at 700-720m asl.

Most attention has been paid to flats in the ACT and immediate surrounds which are at elevations greater than 1,000m asl and are sub-alpine ecosystems. The closest in NSW are Coree Flats 4km to the north, at about 1,050m asl, and Dingo Dell Flats 10km to the north in NSW at 850m asl.

No comparative study of the various montane and sub-alpine flats in the region has been located. However, it is reasonable to consider the Blundells Flat wetland systems as intermediate between high altitude bogs, which tend to be acidic and dominated by *Sphagnum* moss, and fens of the lowlands and coastal escarpment, which tend to be more basic and dominated by *Carex* sedges. Blundells Flat wetlands are dominated by sedges but there are hummock forming mosses (and possibly *Sphagnum*) present, even in relatively exposed hillslope seeps. It may therefore be of value as a benchmark to assess biological changes in wetlands at both higher and lower altitudes.

The same observation has been made of Micalong Swamp 28km to the west in Buccleuch State Forest (Butz 1981). Micalong Swamp is a significant peatland, and the Blundells Flat Wetland Soak, although smaller and younger, also contains peat (Hope et al. unpubl.).

Vegetation recovery since 2003 fires

There has been no detailed assessment of vegetation in any of the valley floor wetland systems at Blundells Flat.

The Wetland Soak is diverse in vegetation, has multi-branched channels and seepages, and shows seasonal variation in wetting and surface water. A wide range of species has regenerated in the soak since the January 2003 wildfires, including areas of reeds, sedges, other macrophytes, ferns and mosses.

An equally diverse range of heath, herb and grassland species is re-establishing in the Eastern Meadow and Western Meadow areas, with areas of tussock grassland, herbfield and heath. Several areas slow and retain surface water flow and the vegetation reflects this function. The meadows show considerable seasonal variation in waterlogging and surface water. Ponds and seeps at the downslope end of the meadows support areas of reeds, sedges, other macrophytes, and various hummock forming mosses (and possibly *Sphagnum*).

Hillslope seeps in the Western Meadow are characterised by mosses, with seepage flowing downhill through sedges and macrophytes.

Former (or flood) channels and flats of Condor Creek at the downstream end of Blundells Flat support highly sheltered sedgelands with reliable (non-flowing) water.

Also of interest is a series of soaks in drainage lines and seeps on hillslopes in the Eastern Foothills area, draining into the upper (south-eastern) reaches of the Wetland Soak. These have become relatively exposed due to removal of burnt pines. However, reeds, sedges, other macrophytes, and spongy clumps of hummock forming mosses have managed to regenerate. The presence of *Typha* suggests that some of these areas are very wet at times. Debris removal has compromised some of these areas.

Shannons Flat includes a series of hillslope seeps and soaks on different gradients draining from the east to Wombat Creek. These are dominated by a mix of grassland and herbfield vegetation. Wombat Creek itself shows significant variety in in-stream vegetation, and there is extensive regeneration of *Eucalyptus camphora* throughout the area (see below), despite damage incurred by machinery during debris removal and by burning of windrows. Vegetation here has not yet been assessed in detail.

Wetland Soak Sep 2003

Seepage in hummocky grassland, Eastern Meadow

Wet tussock grassland, Western Meadow

Hillslope seeps at Shannons Flat

Wetland in Wombat Creek at Shannons Flat

Wetland communities and classification

For descriptive purposes, ahead of detailed flora surveys, the Wetland Soak at Blundells Flat is considered to be a fen with some bog elements; the meadows have elements of fen, bog and minor ponds; and hillslope seeps have fen and bog elements, as may former (or flood) creek channels. These terms are understood as follows (after Hope et al. 2003):

- Fen: simple vegetation with some open water; groundwater is moving and mineral matter often present, giving better nutrition. The widespread sedge *Carex gaudichaudiana* usually dominates above scattered herbs such as *Ranunculus* spp. Streams lack coherent channels or flood out frequently. Fens may colonise pond areas within bogs.
- Bog: characterised by complex vegetation with little free water surface; stagnant water; usually acidic and of low nutrition as it usually depends on rainfall for minerals. At lower altitudes *Epacris paludosa* is common and *Baeckea utilis* is also present. *Empodisma minor* is always present together with other sedges and grasses. Bogs are sometimes transitional to well-drained areas with sod tussock (grass bog). *Phragmites australis* is occasionally the dominant macrophyte in low altitude *Sphagnum* bogs.
- Pond: peat growth may impede drainage and cause flooded areas along streams or amongst the bog. Weathering in granite, old horse wallows or fire depressions may also form ponds. Many of these basins are probably near-permanent as they support a diverse flora of aquatics, including *Utricularia dichotoma*, *Myriophyllum amphibium*, *Nymphaea montana*, *Elaeocharis acuta*, *Juncus* sp., *Hydrocotyle* sp. *and Limosella australis*.

These vegetation formations can be further divided in terms of topographic setting reflecting their water supply, indicating the risk of loss of mire integrity (Hope et al. 2003).

At Blundells Flat the following types appear to be present:

- Valley floor bog and fen: *Sphagnum*-shrub bog and small pools or *Carex* fens on the floor of valleys, often with meandering incised streams dammed by peat and ponds. May be restricted to a narrow zone along stream banks.
- Valley floor fen: extensive stands of *Carex* sedgeland with few other species, usually flooded, and absent or indistinct stream channels.

The wetland areas may also be categorised using the wetland classification system (B - Inland wetlands) applied by parties to the Ramsar Convention on internationally important wetlands (Larmour 2001). The elements applying to this area include:

1	Permanent rivers and streams (Condor Creek & tributaries; Wombat Creek)
10	Seasonal/intermittent freshwater ponds and marshes on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes (Eastern and Western Meadows, hillslope seeps in Eastern Foothills at Blundells Flat; hillslope seeps at Shannons Flat)
15	Peatlands; forest, shrub or open bogs (Wetland soak at Blundells Flat)

At present this is of limited value for comparison purposes because there is no comprehensive inventory of wetlands in the ACT, and the draft Wetlands policy does not address wetlands outside Namadgi National Park or the lowland urban area (ACT Government 2006b).

It was noted in *Biological context* above that ecological communities used in the NSW CRA process and additional grassland, bog and heath types defined by Environment ACT (England et al 2004) do not accurately describe vegetation in the lower Cotter area. This will only be resolved through flora surveys.

Grassland communities

A number of temperate native grassland community types have been identified in the ACT (ACT Government 2005a; ACT Government 2006a). Assessment by agencies to date has focused on Tablelands types occurring below 625m asl and Montane types occurring above 1000m. Between these elevations, most of the ACT is slopes and ridges, and relatively unusual occurrences of grassland vegetation in a montane setting, such as Blundells Flat and Shannons Flat at around 700-750m, appear to have been overlooked, even though it is reasonable to assume that such 'transitional types' would be of considerable interest for biodiversity.

At least two of the ACT tussock grassland communities (ACT Government 2006a) are on the face of it very similar to those found in both meadow areas at Blundells Flat. These are among associations defined for endangered temperate grassland in the ACT.

However, no assessment has been made and they have not been recognised in any conservation strategy or action plan to date.

Ecosystem functions

All the wetland systems at both Blundells Flat and Shannons Flat are likely to play important roles as:

- wildlife habitat, including in places potential habitat for specialised species such as Corroboree Frog and land burrowing crayfish (see below), with their value enhanced by ecotones formed at Blundells Flat with remaining and regenerating adjacent forest, and at Shannons Flat with regenerating *Eucalyptus camphora*; and
- a water-retarding (flow-reducing) and filtering system in an upper catchment, improving duration of water release, reducing turbidity and erosion and, in turn, downstream water quality.

The role of the Blundells Flat complex in extending duration of water release may be significant. For example, by April 2008 Condor Creek above the Wetland Soak had ceased to flow, as had the normally reliable Fastigata and Musk Creeks, whereas surface water was visible in the soak, and Condor Creek was flowing well below the soak.

Previous recognition of values

The wetland at Blundells Flat was indicated on a map of plant communities of the ACT in 1984, and it is notable as the only such community mapped in the far north of the ACT (NCDC 1984) and in today's terms the only occurrence outside Namadgi National Park.

The significance of Blundells Flat as an upland swamp was recognised in an environmental analysis of the Cotter catchment, noting implications for uncommon birds, reptiles and amphibians (NCDC 1986).

Beyond these, until recently (ACT Government 2006c), no references were located which acknowledge any value in the wetland community at this site, and no flora or fauna survey has been located.

The wetland at Blundells Flat was considered for inclusion in the Directory of important wetlands at the time of its revision in 1992. In this the wetland was classified as a seasonal marsh and its maximum area estimated at approximately 31 ha (Evans & Keenan 1992).

The report stated: '*Apart from the eucalypts beside the creek, little original vegetation cover remains. The grassland and exotic trees of the flat are surrounded by pine plantations*'. Also: '*The site has already been extensively altered, and very little of the native vegetation remains. Continued disturbance is likely to occur through forestry and recreational activities*' (Evans & Keenan 1992).

This report misinterpreted the open meadows, underestimated the extent of remnant native vegetation, did not describe the different elements of the wetland complex, and did not make any observations about the presence of a peatland. On the basis of the report, the inclusion of the Blundells wetland was not advanced, despite the report having noted the presence there of a small breeding population of Corroboree Frog (Evans & Keenan 1992).

Riparian communities

The well-developed (and rapidly expanding) forest of *Eucalyptus viminalis* along flats flanking Condor Creek at Blundells Flat may be of more interest than has previously been acknowledged. It appears to be a distinctive occurrence in this particular area, presumably due to the low relief established on the granite substrate. Within the ACT, this structure is known from riparian and floodplain areas along the Murrumbidgee River e.g. near Tharwa and Lanyon (at about 550-600m asl).
The *E. viminalis* on the Murrumbidgee is considered to be a relict stand of a former climax community developed on old river terraces (ACT Government 2006a).

Air photos from the 1940's suggest that the stand at Blundells Flat is strongly recovering from earlier clearing, and field inspection shows that dense seedling regeneration is occurring over a wide area. The stand at Blundells Flat may, in time, provide an indication of the form of the community which existed on the Murrumbidgee alluvial flats before pastoral development.

The riparian communities at Shannons Flat are complex and diverse, as is the form of Wombat Creek. The area has regenerated strongly since the 2003 wildfires and release from close planting of pines. Vegetation here has not been assessed in detail.

See also comments below regarding *Eucalyptus camphora* as a critical part of the riparian zone at Shannons Flat.

Adjacent native forests and woodlands

The forests and woodlands lying adjacent to Blundells Flat and Shannons Flat and former pine plantation areas are fairly typical of those found elsewhere in the Cotter valley (ANU 1973), and these types are described above in *Biophysical Context*. In this area the age structure of the trees and the species composition of the understorey have been modified by past grazing, logging, and varying intensities of burning (NCDC 1986).

All of these communities were burnt in the January 2003 wildfire, those in exposed, drier sites at high to very high intensity, and those in more sheltered sites at moderate to high intensity (ACT Government 2006c). Most eucalypt species sprouted from lignotubers and some from epicormic buds, while some eucalypts and some wattles regenerated strongly from seedlings (Carey et al 2003).

The table below lists dominant eucalypts and indicative understorey species (small trees and large to medium shrubs) from the major forest and woodland associations in the Lower Cotter area, based largely on historical record (e.g. Pryor 1939, 1954; ANU 1973).

No comprehensive survey has been carried out in the area. An inaugural 'Biodiversity Blitz' at Blundells Flat in October 2006, initiated and undertaken by community volunteers, generated a preliminary list of plant species which will be supplemented and refined in future surveys.

Among the forest and woodland types adjacent to Blundells Flat and Shannons Flat, the belt of Brown Barrel *Eucalyptus fastigata* is of particular interest because:

- it is the largest single occurrence of this association in the ACT and clearly shows replacement of *E. delegatensis* on volcanic substrate (ANU 1973)
- this is an outlier at the western range limit for *E. fastigata* in south-eastern Australia, and this may be crucial to the species diversity of the area (Fraser 1988)
- this association and forest structure has been shown to be one of the richest communities in the ACT for both arboreal mammals and birds (NCPA 1986).

Eucalypt overstorey	Indicative understorey species
Brown Barrel *Eucalyptus fastigata* Ribbon Gum *E. viminalis*	*Acacia melanoxylon, A.rubida, Lomatia myricoides, Olearia lirata, O.argophylla, Pomaderris aspera, Leptospermum lanigerum, Grevillea victoriae, Prostanthera lasianthos, Derwentiana derwentiana, D.perfoliata, Poa* sp.
Narrow-leaved Peppermint *E. radiata*, Broad-leaved Peppermint *E. dives*, Mountain Gum *E. dalrympleana*, Brittle Gum *E. mannifera,* Ribbon Gum *E. viminalis*	*Bursaria spinosa, Dodonaea viscosa, Exocarpos cupressiformis, Acacia dealbata, A.rubida, Daviesia mimosoides, Derwentiana derwentiana, D.perfoliata*
Black Sallee *E. stellulata*, Candlebark *E. rubida*, Mountain Swamp Gum *E. camphora*	*Acacia melanoxylon, Bossiaea buxifolia, Hibbertia obtusifolia, Hydrocotyle sp., Ajuga australis, Asperula* sp., *Poa* sp.
Brittle Gum *E. mannifera*, Red Stringybark *E. macrorhyncha* Scribbly Gum *E. rossii*, Broad-leaved Peppermint *E. dives*, Red Box *E. polyanthemos*, Apple Box *E. bridgesiana*	*Exocarpos cupressiformis, Acacia dealbata, A.falciformis, A.buxifolia, A.rubida, Daviesia mimosoides, Indigofera australis, Poa* sp.

Wet gully vegetation

Above Blundells Flat, the area of Brown Barrel forest includes a wet gully along Fastigata Creek, from which several plants uncommon in the ACT have been recorded. These include the ferns *Asplenium bulbiferum*, *Pteris tremula* and *Dicksonia antarctica*. *Blechnum* species commonly form a ground cover.

Other wet gullies in the area are found at Blue Range, Lees Creek and Blundells Creek (NCDC 1984) and on Wombat Creek (Fraser 1988). These gullies are characterised by plants such as Blanket Leaf *Bedfordia salicina* and Native Mulberry *Hedycarya angustifolia* (the latter being marginal and uncommon to rare in the ACT), along with *Olearia argophylla*, *O. lirata* and *Pomaderris aspera*.

Parts of the Condor Creek riparian corridor as far downstream as Thompsons Corner have been recognised as having values of wet gully structure (NCDC 1986), supporting significant fern communities, including tree ferns, with some parts also notable for mosses.

These gullies are of interest because:

- they may provide important feeding areas for up to a dozen bat species (Fraser 1988)
- the rainforest elements in the gullies are close to their westernmost limits at this latitude (Fraser 1988)
- they are the habitat of greatest importance to fungi, of which the ACT has about 2,000 species (NCDC 1984).

All of the wet gully areas mentioned above were burnt in the January 2003 wildfires.

Wet gully on Fastigata Creek

Montane rocky heaths and scrubs

Steep rocky faces on Mount Coree, Devils Peak and Mount Blundell, and in the gorge between the latter two peaks, are fringed by a scrub or heath dominated by *Leptospermum brevipes*. Other associated species are *Calytrix tetragona*, *Kunzea parvifolia*, *Acrotriche serrulata* and *Phebalium lamprophyllum* (uncommon in the ACT) (NCPA 1989).

Those in the ACT are within Namadgi National Park and comprise part of the setting of Blundells Flat. All of these sites were burnt in the January 2003 wildfires.

Mountain Swamp Gum *Eucalyptus camphora* subsp.*humeana*

Mountain Swamp Gum *Eucalyptus camphora* is a small to medium sized tree. It is listed in Schedule 3 to the *Nature Conservation Act 1980* as a plant protected in the ACT. It is not listed as a threatened species in the ACT.

Eucalyptus camphora in close-up

The range of *E. camphora* subsp.*humeana* extends from north-east of Melbourne to the Brindabella Range. In the vicinity of the ACT it is regionally uncommon and close to the limit of its range, which extends northwards only to near Wee Jasper (Brooker & Kleinig 1999).

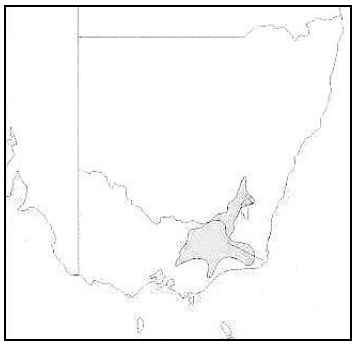


Figure 12 - Distribution of *E. camphora* subsp. *humeana*

Another subspecies (*camphora*) is known from small disjunct populations on the tablelands of NSW, from Penrose State Forest north to the Qld border (Brooker & Kleinig 1999).

The only locality of *E. camphora* in the ACT is at Shannons Flat (Carey et al 2003). This is likely to be the site described on Condor Creek by Fraser and McJannett (1991). Although Cambage (1918) stated that the species is: '*seen only on Coree* [now Condor] *Creek, near S A Shannon's*', at one time Blundells Flat was recorded as the only ACT occurrence (Burbidge & Gray 1979; NCPA 1989). It seems likely that Shannons Flat was the original site recorded but that this was ascribed to Blundells Flat to avoid confusion with a locality called Shannons Flat near Adaminaby (Peter Ormay *pers.comm*).

Whatever the precise location of that original recording, it was certainly burnt in the January 2003 wildfire. Carey et al. (2003) reported lignotuber regrowth and possible seedling regeneration shortly after the fires.

E. camphora seedlings are regenerating strongly on broad areas along Wombat Creek at Shannons Flat, including areas that had been under pine plantation for several decades. In 2005, uncontrolled burning of windrows of felled pines also led to burning of *E. camphora* regeneration but most of this has since resprouted from lignotubers.

The regeneration on Shannons Flat appears to be of sufficient vigour and coverage to have potential to form an extensive, almost monospecific *E. camphora* woodland. Such a structure is now uncommon in this region because of rural clearing, and such stands are now found only in places such as Woomargama National Park towards Albury.

Woodland of *Eucalyptus camphora*, Woomargama

Field inspection suggests that *E. camphora* is an element of the riparian forest along Condor Creek for at least 100m either side of its junction with Wombat Creek, with its dominance decreasing with greater distance from that junction. Dense regeneration makes it difficult to ascertain whether it is present in other parts of the Condor Creek corridor.

Other sites in the vicinity where the species has been recorded include Coree Flats (c.1,050m asl) and Dingo Dell Flats (c.950m asl), 4km and 10km respectively to the north in NSW (Burbidge & Gray 1979). Both of these sites (in Brindabella National Park and private land respectively) were burnt in the January 2003 wildfire. The status of *E. camphora* regeneration in those areas is not known.

It is noted that the Australian Tree Seed Centre (CSIRO Forestry & Forest Products) cites seed availability sourced from Dingo Dell, Coree Flats and the Wee Jasper-Tumut road (Australian Tree Seed Centre Web site). These are listed as subsp.*camphora* but would almost certainly be subsp.*humeana* based on distribution (Brooker & Kleinig 1999).

Northern Corroboree Frog
Pseudophryne pengilleyi

Pseudophryne pengilleyi (Family Myobatrachidae) is the Northern Corroboree Frog, declared 'vulnerable' under the *Nature Conservation Act 1980*.

P. pengilleyi has a restricted distribution in high country of the ACT and adjacent NSW, in the Bimberi, Brindabella and Fiery Ranges and the Bogong Mountains, cited as ranging from 800m to >1,800m asl (Carey et al. 2003).

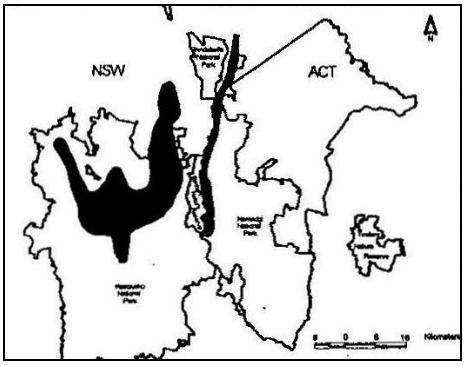


Figure 13 - Distribution of Northern Corroboree Frog

It is distinguished from *P. corroboree* the Southern Corroboree Frog which is found in the Snowy Mountains in NSW.

Blundells Flat in the late 1980's had a breeding population of the Northern Corroboree Frog, making this the lowest altitude record of the species in the ACT (NCPA 1989).

The frogs at Blundells would have been part of the northern subpopulation which extends along the Brindabella Range into NSW. The southern subpopulation extends from Ginini Flats to the summit of Mt Bimberi (ACT Government 1997a).

Northern Corroboree Frog

Adult frogs are 25 to 30mm long and are characterised by yellow and black stripes on their backs, flanks and legs. The pattern and colouring of stripes is one of the primary distinguishing factors between *P. corroboree* and *P. pengilleyi*. The northern subpopulation is also characterised by having greener (even lime green) stripes (ACT Government 1997a).

Corroboree Frogs crawl rather than hop. Their main diet is small invertebrates, particularly ants such as the Sphagnum Ant *Iridomyrmex* sp. which builds nests of fallen leaf sheaths of mountain cord-rush above the waterlogged soil (Fraser & McJannett 1993)

The Corroboree Frog is a dual habitat species, relying on both:

- autumn breeding habitats in moist to wet grass or bog, with shallow pools and seepages or sheltered depressions in wet heath, sedge and *Sphagnum* bogs; and
- non-breeding (over-wintering) habitat of moist forests, woodlands and heathlands with abundant ground litter, rocks, logs, and moist sheltered ground cover.

(ACT Government 1997a).

Although these characteristics were certainly present at Blundells Flat, in recent years the species has not been abundant there. Will Osborne (*pers.comm*.) reports having heard the species calling in the upstream part of the Wetland Soak over a number of years, but to a maximum of three calling males. He considers that Blundells Flat was at no time a particularly good breeding site and that the population there was probably an overflow from the much larger population in the Coree Flats area (the type locality) 4km to the north in NSW (and 300m higher in elevation).

Adult male frogs move into breeding areas in January and February, calling from small chambers made in moss or soft vegetation next to breeding pools and seepages. In a brief visit to the pools from females, breeding occurs during February and early March, after which the females lay their eggs and leave. A clutch of about 25 eggs is laid out of water, in moss or vegetation at the edges of the breeding pools. The males leave the pools in late February or March and return to adjacent woodland and tall moist heaths (ACT Government 1997a; Lintermans & Osborne 2002).

The embryos grow to about 15mm in the egg jelly until the nests are flooded due to winter rains. Once hatched, they move back into the pools where they may spend more than six months. Juveniles appear to remain in moist vegetation near the breeding pools for several months until they grow larger and move into the adjacent non-breeding habitat where they will stay until they are adults and ready to breed (ACT Government 1997a; Lintermans & Osborne 2002).

The specialised life history of the species places it at considerable risk from disturbance. It has a low clutch size, only one breeding per season, and slow rate of tadpole development in shallow pools. The species has limited

ability to make good use of favourable seasons and is vulnerable to disturbance of breeding sites. There is a risk that eggs or tadpoles will dry out, or that pools will dry up while the juveniles are developing (six month period).

Of particular concern are disturbances which reduce flow into the breeding habitat, such as earthworks and road construction. Sediment transport may fill in shallow pools and exotic weeds, particularly blackberries, may smother the pools. Feral pigs or horses may alter drainage and cause incision of bog areas, reducing their capacity to retain water. Fire may have a significant impact, both directly and indirectly, with autumn burning in woodland and heath adjacent to breeding pools reducing cover and making frogs more vulnerable to predation, dehydration or freezing (ACT Government 1997a).

Populations of the species declined significantly over decades despite conservation efforts, and there has been increasing concern about the effects of climate change on higher altitude areas to which it is restricted, and about increased levels of UV-B radiation due to ozone depletion (ACT Government 1997a). The species has declined dramatically since the late 1990's (Lintermans & Osborne 2002).

It is then most significant that following a protracted drought, all known over-wintering habitat and all known breeding sites in the ACT were burnt with moderate to high intensity in the January 2003 wildfire. Numbers of calling males detected at sites both pre- and post- fire were extremely low and offered no reliable comparison. Post-fire searches located 22 nests containing eggs, some of which were collected for captive husbandry (Carey et al. 2003). Blundells Flat was not included in this monitoring.

In NSW, the closest known locations for Northern Corroboree Frog are Coree Flats in Brindabella National Park (burnt in January 2003) and Micalong Swamp in the Buccleuch State Forest towards Tumut (not burnt at that time).

Recommended conservation strategies in the ACT include:

- no use of heavy machinery within 500m of breeding sites
- no deliberate burning within 500m of breeding sites
- control of feral animals in breeding areas
- minimising impact of management and visitor activities
- research into life histories and impacts of climate change and UV-B radiation
- new searches in potential habitat not previously surveyed
- population monitoring
- captive husbandry (rearing and breeding)

(ACT Government 1997a).

One of the proposed areas of research is the interaction between hydrology and vegetation in formation of suitable and sustainable breeding pools. The variety of wetland and meadow habitats available at Blundells Flat is of interest in this regard, and its lower elevation may also offer lower levels of UV-B radiation (Will Osborne *pers.comm*.).

Other frog species

Other frog species are noted here because of broad concern at the rate and extent of decline in frog populations in parts of Australia and internationally.

Nearly 20 species of frog are recorded in the ACT, with the highest densities frequently found in grassland associated with permanent water (NCDC 1984). Environment ACT recorded the Common Eastern Froglet *Crinia signifera* at Blundells Flat in spring 1997 (Peter Ormay *pers.comm*.). An inaugural Frogwatch visit in October 2006 recorded *Crinia signifera* and Whistling Tree Frog *Litoria verreauxii* (Rachelle McConville *pers.comm*.). The relatively widespread Eastern Froglet is found in upland bogs, upland rivers, montane creeks and montane seepages, as well as lowland sites. The Whistling Tree Frog is a terrestrial species found in montane seepages and lowland sites. It is relatively common after suffering a decline in the 1980's (Lintermans & Osborne 2002).

It is likely that the Brown Toadlet *Pseudophryne bibroni* and the less common (and apparently declining) Southern Toadlet *Pseudophryne dendyi* would have occurred at Blundells Flat. Both are found in upland bogs and montane seepages (Lintermans & Osborne 2002), and both are known from Condor Creek, with Thompsons Corner a key site for *P. dendyi* (Carey et al 2003). Frogs were heard calling in Condor Creek in March-April 2003, within a few months of the fires (Peter Ormay *pers.comm*.).

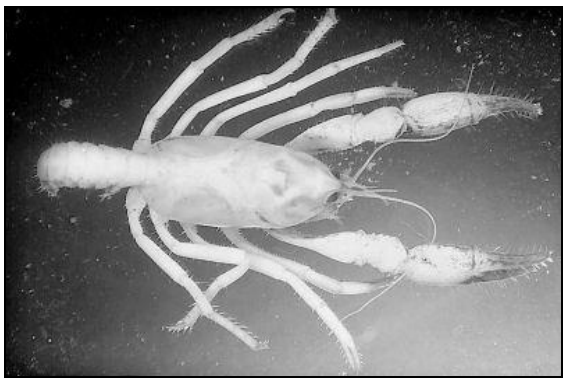
During fieldwork in late October 2003, a call was heard at Blundells Flat which was most likely that of the widely distributed and common Eastern Banjo Frog (Pobblebonk) *Limnodynastes dumerii*, although it was early in the season for this species to be calling. The Pobblebonk is known from upland rivers and montane creeks, as well as from lower altitudes (Lintermans & Osborne 2002).

Burrowing land crayfish
Engaeus cymus

Engaeus cymus (Family Parastacidae) is a crayfish which inhabits damp areas, where it creates large chambered burrows. It is omnivorous, grows to about 45mm long and is characterised by a greatly reduced abdomen (Hawking & Smith 1997). The burrows end in a lower water-holding chamber at the water table. They are often recognised by mud chimneys formed at the entrance (PWS nd).

Because it frequently constructs its burrows some distance from permanent waters, *E. cymus* is considered to be a land crayfish, although it may use swampy ground or tunnels in banks of small streams. It lives in family communities, with a mature pair and offspring of two age groups. The juveniles leave the burrow at the end of two years to start their own burrow. They continue to grow throughout their lifespan, and larger ones may be around 20 years old (DCT 1975).

Engaeus exhibits specialised adaptations to spending its entire life cycle in an enclosed space, including reduced size of overall body, abdomen, eyes and antennae (PWS nd).



Engaeus cymus

Blundells Flat was known as a habitat for *Engaeus* from at least the 1950's: '*In the swampy areas bordering Condor Creek* [it] *throws up high mounds of earth at the entrances to its burrows'* (Ratcliffe & Calaby 1954). This was still the case in the 1970's: *'There is a good colony of land crayfishes at the old Blundell's Farm on Condor Creek, below Mount Coree, now recovered from the marked disturbance of its habitat brought about by the planting of pines. During wet periods they are known to move overland, and have been observed at the top of the range along the Two Sticks Road on the western boundary of the ACT on the slopes of Mount Coree. The mature specimens are distinctly red, even in life.'* (DCT 1975).

This was at one time distinguished as *Engaeus parvulus*, with the type locality given as 'Blundells, Condor Creek ACT'. It was also known from the Goodradigbee River and its tributaries (Riek 1969). In a later taxonomic review it was returned to *Engaeus cymus*, described on the basis of specimens from Condor Creek. This recombined species has one of the largest geographic ranges of all *Engaeus*, and is one of only three found above 1,000m asl. It exhibits considerable variation in some characteristics, rarely attributable to geographic variation (Horwitz 1990b).

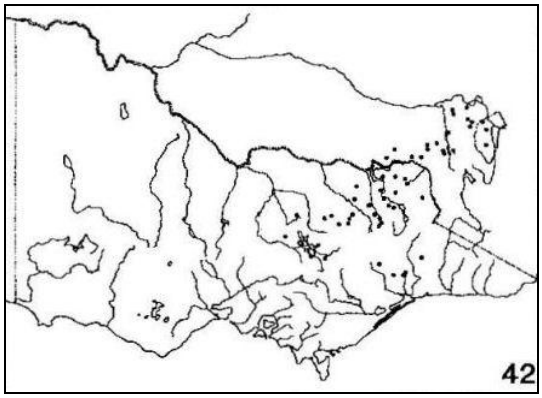


Figure 14 - Distribution of *Engaeus cymus*

Although featured in natural histories of the ACT (Ratcliffe & Calaby 1954; DCT 1975), and noted in later reports (NCDC 1984; NCPA 1989), and despite being at the limit of its geographic range in the ACT (Horwitz 1990b), this species has more recently received little recognition. It is noted in passing in a field guide to freshwater animals of tablelands and high country of the ACT & NSW (Lintermans & Osborne 2002), and receives a one-line mention in a recent conservation strategy for aquatic species and riparian zone communities (ACT Government 2006a). Although a land crayfish, its use of stream banks and other wet areas suggests that it has a place among freshwater animals of this region which is not being recognised.

ACT populations have been recorded only at Blundells Flat, Piccadilly Circus and along Two Sticks Road (NCDC 1984). This suggests that the species is uncommon, if not rare, in the ACT.

Seventeen other Australian *Engaeus* are listed as species of conservation significance, and some are listed as threatened species (Yen & Butcher 1997) because of limited distribution and sensitivity to disturbances (e.g. PWS n.d.). There is no such listing for *Engaeus cymus*, nor is there any indication of investigative work in the ACT or region relating to this species or its conservation status. There is no provision in the *Nature Conservation Act 1980* to list invertebrates as protected fauna in the ACT.

It is not known how the species was affected by the January 2003 wildfire in the ACT. It was not targeted by post-fire monitoring

(Carey et al. 2003), even though all of its known locations were in severely burnt areas.

Burrows with mud chimneys, which are likely to belong to *Engaeus,* have been located at Blundells Flat in 2006. Testing of burrows would be needed to confirm the identity and assess the status of this population. This is possible through examining assemblages of invertebrates in the water of crayfish burrows, termed the 'pholeteros' (Horwitz et al. 1985). The fauna present indicate what type of crayfish has created a burrow, as *Engaeus* burrows have a pholeteros quite distinct from the taxa found in burrows of *Cherax* or *Euastacus* (Pierre Horwitz *pers.comm.*). These taxa may themselves be regionally endemic (Horwitz & Adams 2000)

Efforts to locate further burrows of *Engaeus* should be focused on:

- thick sedge areas with seepages
- hillslopes where seeps indicate a high watertable
- gullies and swamps which are shaded, with high organic content, cooler vegetation and ferns.

(Pierre Horwitz *pers.comm*.).

In the Blundells Flat area, the most likely potential habitat includes:

- the Wetland Soak
- the Riparian Zone of Condor Creek, Fastigata Creek and Musk Creek
- Eastern Meadow and Western Meadow
- 'backwater' sedgelands in sheltered locations with forest adjacent such as those in Compartments 417 and 409; and
- hillside seepage areas such as those in Compartments 418 and 413.

Threatening processes for *Engaeus* include those which affect water quality and quantity, soil, and food (wood/plant) availability. All crays are very susceptible to any alteration of their environment during mating, moulting, nurturing their young, and at times when they are on the surface. Such alterations include:

- agricultural processes, including stock grazing which churns and compacts soil, dam construction, clearance of riparian vegetation and ploughing, or drainage of peatlands and swamps
- forestry activities (e.g. clearing, burning, conversion to plantation) which impose physical disturbance on stream headwaters and seepage channels
- use of fire in or around wetlands with organic rich soils; and
- general road and drainage activities impacting on seepage, wetland and stream bank habitat quality, and any activities which degrade river bank integrity and accelerate erosion.

(PWS n.d; Horwitz & Adams 2000)

E cymus may be vulnerable in some of its potential habitats in this area. For example:

- in organic deposits and in seeps on hillslopes where they are likely to be closer to the surface and hence more vulnerable to compaction; and
- in hillside seep habitats which have been left exposed by debris removal.

This implies that the Riparian Zone and lower parts of meadow areas are likely to be the core of relict *E. cymus* habitat in this area. However, over time the range of potential habitat would be greatly enhanced by paying attention to restoring shelter in debris and vegetative cover around the hillside seeps, and avoiding further machinery compaction.

Horwitz (1990a) emphasises that habitat for *Engaeus* species requires protection by:

- discouraging any activity which might lead to an alteration in the nature of the streamside water table; and
- providing buffer strips which include stream/gully banks and creek flood plains.

Attention also needs to be paid to avoiding compaction (e.g. by machinery), particularly in spring when water levels are likely to be high (closer to the surface) and *Engaeus* are most active in cleaning out their burrows (Pierre Horwitz *pers.comm*.). This consideration led to a decision during removal of burnt pines in Compartment 415 adjacent to the Eastern Meadow to 'track-roll' the area, running over the debris and leaving it on site rather than pushing up and burning windrows. This was also carried out at a drier time of year when water tables would be lower.

Studies of parastacid crayfishes in the eastern highlands of NSW:

- state that knowledge of all highland crays is inadequate for sustainable management
- recommend that research includes baseline data on all aspects of life cycle, habitat preferences and the impact of introduced salmonid fish; and
- recommend that riparian strips of natural vegetation are at least 100m wide

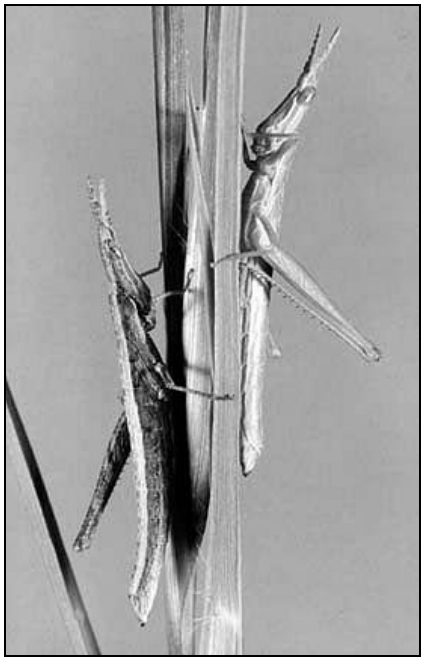
(Merrick 1995).

Key's Matchstick Grasshopper *Keyacris scurra*

Blundells Flat was at one time a site for the morabine grasshopper *Keyacris scurra*, formerly *Moraba scurra* (Rehn 1952). The species is now uncommon in the ACT region, having formerly been common in grasslands and grassy woodlands in south-eastern Australia (ACT Government 2005a).

There is no provision in the *Nature Conservation Act 1980* to list invertebrates as protected fauna in the ACT.

Although no longer considered to be threatened, there is considerable interest in this species for cytological research. It represents a primitive Australian insect group which is said to correspond broadly with marsupials among mammal groups (NCPA 1984).



Key's Matchstick Grasshopper

This flightless species is dependent on grassland and grassy woodland containing abundant Kangaroo Grass *Themeda triandra* for 'shelter' and patches of the daisy species Yellow Buttons *Chrysocephalum apiculatum* for food and Clustered Everlasting *Chrysocephalum semipapposum* for both food and 'shelter' (these species were previously under *Helichrysum*). Other known food plants include native species *Scirpus* sp., *Acaena ovina*, *Plantago varia*, *Podolepis acuminata* and *Craspedia uniflora*; and introduced species *Acetosella vulgaris*, *Rosa rubiginosa*, *Lavandula stoechas*, *Salvia verbenacea* (Rowell & Crawford 1995). A number of these species occur at Blundells Flat.

Unlike most grasshoppers, *Keyacris scurra* is a 'winter' species. Its eggs hatch in February, males are adult by May, and females over-winter as nymphs and mature in spring. Mating takes place in September-November, followed by egg-laying and the death of the adults. One generation is produced per year, with a maximum 21 eggs (under laboratory conditions) (Rowell & Crawford 1995).

The Australian National Insect Collection at CSIRO lists a paratype collected at Condor Camp in October 1942 (Ken Key) and in April 1943 (Key and Lindsay Pryor). The next specimens were noted from Blundells Flat on four dates from May 1950 to August 1954 (all by M J D [Michael James Denham] White). The nearest other sites noted were Paddys River [uncertain location] and Hall Cemetery (Rowell & Crawford 1995).

The 1950's collections at Blundells Flat were made shortly before pine plantation development. Key was unable to locate the species there in 1992, nor was it found in any of the former localities in the Cotter area, or in a remnant *Themeda* area at Vanitys Crossing (Rowell & Crawford 1995). The original collection at Blundells was from a small patch of *Chrysocephalum semipapposum*, thought to have subsequently been planted to pines (Mark Dunford *pers. comm*.).

The species is likely to remain uncommon. Its limited range of host plants for food and shelter, and the timing of its life cycle, make it vulnerable to total population loss from even light grazing or mowing, burning or traffic. Its flightless habit and low mobility, and fragmented populations, may preclude it from recolonising areas from which it has been eliminated (ACT Government 2005a; Rowell & Crawford 1995).

Management requirements for *Keyacris scurra* habitat include:

- monitoring of vegetation structure to optimise habitat
- slashing to leave a minimum 15cm for food and cover; slash removed; a mosaic of treatments over time; and no slashing of *Chrysocephalum semipapposum*.
- using fire with caution, noting that the species could be vulnerable most times of the year; small sites not to be burned at all; larger sites to be burned in a mosaic.
- ensuring that grazing is light, with timing related to conditions of vegetation and soil.
- very careful weed control
- monitoring extent and density every one to two years.

(Rowell & Crawford 1995)

CULTURAL ENVIRONMENT

See also *Historic context* above.

This section sets out:
- investigation of the cultural environment and its elements and themes
- aspects of past development and use
- reasons for and context of changes in the place

Cultural elements are related to a range of themes, including:
- use by Aboriginal people
- early exploration, development of economic routes and settlement
- establishment and survey of the Federal Capital Territory
- water supply catchment protection
- forestry activity and fire protection; and
- research and education.

Summary

[C] – within the curtilage but not the place; [S] - within the setting but not the curtilage or place

Element	Physical evidence	Documentary evidence
Aboriginal use	Artefact scatters	Heritage Register entries Historic record
Early exploration and routes	Early routes identifiable; association	Contemporary accounts Air photos (remains of routes)
Settlement – McDonald family	Nil – site only; association	Portion and parish plans Valuation reports and fieldbooks
Settlement – Blundell family	House site – fruit trees and other exotics, fragmented traces	Portion and parish plans Valuation reports and fieldbooks Contemporary photographs
Settlement – Shannon family	Nil at house site; possible traces at site of school house	Portion and parish plans Valuation reports and fieldbooks
Establishment/survey of Federal Capital Territory	Remains of border survey markers - Coree area [S] Association with Pulver survey	Historic record Heritage Register entries Contemporary photographs
Catchment protection	Dams and banks	Files
Hardwood Forestry	Nil	Historic record; oral sources Contemporary photographs
Softwood forestry	Debris and standing dead pine Roading, dams and banks Drains in Eastern Meadow	Planting plans and maps; files Air photos
Forestry camps	Nil – site only; association	Historic record Contemporary photographs
Research & education – Aust Forestry School camp	Nil – site only; association	Contemporary photographs
Research & education - conifer arboretum	Boundary road Remains of interpretation Regeneration from seed	Planting plans; files Air photos Oral sources
Research & education - poplar arboretum	Remains of boundary fence Standing dead trees Regeneration from suckers	Planting plans; files Air photos Oral sources
Research & education - endangered eucalypt seed orchard	Trees resprouted, with rows visible	Oral sources Air photos
Research & education Uriarra school planting	Trees resprouted Detached sign on site	Oral sources Air photos
Other research & education	Weirs on Condor Creek	Historic record
Fire protection [S]	Nil	Historic record

ABORIGINAL USE

The traditional Aboriginal owners and custodians of the area are today generally referred to as the Ngunnawal people.

In the past, the local Aboriginal people have been referred to as the Kamberri or Kgamburry (Bluett 1954). This has numerous alternative expressions including Ngambri, Ngambra, Nganbri, Nganbra and others (Jackson-Nakano 2005).

The home territory of this group has been described as extending from Lake George (Weereewaa) and Gourock Ranges in the east to the Goodradigbee River on the west, and from south of Yass to the headwaters of the Murrumbidgee (Jackson-Nakano 2001).

When the first European settlers arrived at what is now Canberra, the Aboriginal population is estimated to have been about 500, in bands of 20 to 30 (Bluett 1954). Bluett's major informant on the Aboriginal people of the district was John Blundell, who had been fishing and possum hunting with native boys as a child in the 1840's and had learned to speak some of their language (Bluett 1954).

There are traces of past use of Blundells Flat by Aboriginal people, with a large surface campsite recorded here (Flood 1980). Since the January 2003 wildfires a number of additional surface scatters of artefacts have been located in the area.

All Aboriginal places in the ACT are protected under the *Heritage Act 2004*, providing for: registration of places; compulsory reporting of discovery of an unregistered place; consultation with Indigenous groups and other parties; offences relating to the damage or disturbance of a place; and possible restrictions on publication of information about the location or nature of a place in accordance with Aboriginal tradition.

The Register of the National Estate notes that the Northern Brindabellas area has significant Indigenous values. However, the amount of information placed on public record will be determined after consultation with relevant Aboriginal communities (AHC 2003).

There are sensitivities in discussing and interpreting the cultural heritage of Aboriginal people from a non-Aboriginal perspective. The only previously published description of a site at Blundells Flat (Flood 1980) interpreted this as a montane valley camp associated with seasonal exploitation of Bogong Moths (*Agrotis infusa*) as a food source.

These moths make an unusual annual two-way migration. They breed across wide areas of NSW and southern Queensland and migrate in spring to early summer to higher elevations in southern NSW and Victoria. This may be related to seasonal domination of breeding grounds by plants unpalatable to the larvae, but may equally be a response to seasonal heat. The moths return northwards in late summer and early autumn, to begin their breeding cycle (Flood 1980).

Bogong Moth

Very large populations of the moths descend on the mountains of the ACT from September to November, occupying temporary 'camps' in the Brindabella Range before moving to higher altitude camps > 1,300m asl. In temporary 'camps' the moths cluster among rocks of scree slopes and on the underside of logs, whereas permanent 'camps' are made mostly in clefts and small caves in rocks on peaks. The moths mass in compact formations, tucked underneath each other and going without food for several weeks (Flood 1980).

Blundells Flat lies about 700 metres below Mount Coree, which is recorded as a regular temporary moth 'camp'. This is reached after a climb of about two hours from the Flat, and another surface campsite is noted about halfway to the summit (Flood 1980).

Bulls Head ('Brindabella Mountain' in Flood) is also noted as an occasional moth 'camp', as are the peak above Bendora arboretum (c.1,550m asl) and Mount Franklin (1,644m asl), further south along the Brindabella Range. Regular moth 'camps' are recorded at Mount Ginini (nearly 1,800m asl) and Mount Gingera (c.1,850m asl) (Flood 1980).

The 'Uriarra' property is documented as the site of Bogong moth 'feasts' in the period following European settlement. The name of the property and district is Aboriginal in origin, as 'Urayarra'. This spelling was retained for the Parish but rejected for the district by postal authorities because of potential confusion with another place (Gale 1927).

The McDonald family, who established the property, reported that a large flat rock out by the stables was known to Aboriginal people as Urayarra, said to mean 'running to the feast', referring to the practice of bringing Bogong moths to be cooked on the rock which had been heated by fires built on it (Gale 1927). This site ('Uriarra Moth Stone') is the subject of another study (House 2006 unpubl.)

Mount Coree is the closest moth 'camp' to Uriarra. There is an easy grade for access by foot between the two. From Uriarra to Condor Creek, the terrain rises only 50m to 650m asl over about 6km. A surface campsite is noted near Thompsons Corner where the route from Uriarra intersects with Condor Creek (Fraser 1988). The route alongside Condor Creek up to Blundells Flat similarly rises only about 70m in elevation over about 4km. A 10km walk involving a climb of only about 120m in elevation would be manageable for many people.

More challenging would be a two hour climb of 650 to 700 metres from Blundells Flat to Mount Coree, via the reported intermediate campsite 300 to 400m above the Flat to the north (Flood 1980). It is possible that a fairly steep spur south of the Flat was also used to gain elevation, rising about 300m to the site of Blundell Trig. Following the ridge westward to what is now called Piccadilly Circus gained another 200m elevation over about 4km.

Another surface campsite is recorded close to this point at Lees Springs (Flood 1980), which was the only reliable source of water after leaving Blundells Flat (Gale 1903a), and lies below one of the lowest points in a 40km length of the range. Just 4km to the south, at a similar elevation, was an occasional moth 'camp' at Bulls Head, labelled 'Brindabella Mountain' in Flood (1980).

Whichever path was used, once the crest of the range was reached, several moth 'camps' were readily available.

Although opinions may differ on the relative importance of Bogong Moths to historic patterns of use of the landscape by Aboriginal people, there is ample evidence that moths were a seasonal food source exploited by Aboriginal people. This has inspired installation of large Bogong Moth sculptures between the National Museum of Australia and the Institute of Aboriginal & Torres Strait Islander Studies at Acton. And it is apparent that Coree and 'Uriarra' were associated with moth aestivation and consumption respectively

Bogong Moth sculptures at Acton

The Blundells Flat Aboriginal site was considered notable for its extent and large number of artefacts, which suggested occupation by larger groups of people (Flood 1980). But the proximity of the Flat to more than one source of Bogong Moths may have been just a bonus. It is a rarely encountered environment, as an upland wetland below the sub-alpine, sheltered in the lee of the Brindabella Range, of low relief among steep terrain, with an easy and well-watered grade connecting it to the Murrumbidgee and the plains beyond.

Relatively open flats with diverse vegetation and tall wet forest adjacent would have offered an abundance and variety of food sources throughout the year (Flood 1980).

Animals probably included kangaroos, wallabies, wombats, possums, parrots, waterbirds, reptiles, fish and crayfish. Plants probably made up most of the daily diet, including tubers of orchids, lilies, and yam daisy *Microseris scapigera*, bulrushes, fern roots, tree ferns, geranium, wattle seeds, and berries, supplemented by native bee honey collected from hollows in tree branches (ACT Government n.d.; Flood 1980; Fraser & McJannett 1991).

Physical evidence: The ACT Heritage Register includes a number of Aboriginal artefact scatters at Blundells Flat. The site reported by Flood (1980) has previously been mentioned, and this was visited and recorded on a field trip by Canberra Archaeological Society (CAS) in 1989, taking advantage of increased exposure. The area examined in detail was a narrow strip of about 880 square metres and yielded nearly 300 artefacts.

The field notes recorded that other artefacts were observed 50 to 300m distant from this area, and stated that the extent of the area used by Aboriginal people in the past is potentially much greater (Raath 1989). This is borne out by subsequent observations made after clearing of pine plantations adjacent to the site in 1990, in a cultural resources survey for ACT Forests (Winston-Gregson 1993) and in field inspections since the 2003 fires.

EARLY EXPLORATION AND DEVELOPMENT OF ROUTES

Early survey and description

The first feature in the area to appear on an official map was what we now call Mount Coree. A recognisable landmark from several directions, it was referred to as the '*peak* [or *pic*] of *Pabral*' by Surveyor-General Thomas Mitchell in 1829 in his instructions to Surveyor Robert Dixon for survey of the Molonglo and Murrumbidgee (Andrews 1992).

The course of the Goodradigbee was plotted by Surveyor Granville (G W C) Stapylton in 1833. Mitchell referred to the river as the 'Cooradigbee', Stapylton as the 'Coodradigbee' (Andrews 1992).

In 1834 Mitchell published the first map of the Colony of New South Wales compiled by trigonometrical survey. In the south-west, hachures showed Pabral as an isolated peak between the Murrumbidgee and Goodradigbee Rivers, beyond the Nineteen Counties and the official limits of settlement.

Pabral peak was included within County Cowley when that county, together with County Buccleuch to the west, was delineated by Surveyor Thomas Townsend (by 1848).

Travels by Murray and Mowle

The earliest written description of what we now call Blundells Flat and its environs was in accounts of early exploration of the area by Terence Aubrey Murray of Yarralumla, which Murray had acquired in 1837 with Thomas Walker (Wilson 1968).

Murray's first land holding was near the north-west corner of Lake George where he quickly learned to speak fluently with the local Aborigines, a skill extended at Yarralumla (Wilson 1968). Both Murray and his friend Stewart Mowle formed close friendships with Aboriginal people and learned the language local to their properties and outstations (Jackson-Nakano 2001). This would have served them well in exploring the region.

Murray records that in 1838 he followed the bed of the Cotter and the steep, winding, narrow course of Condor Creek to the crest of the mountain range. He would have passed through the area now known as Blundells Flat and almost certainly followed the route taken for many generations by Aboriginal people. From the crest of what we now call the Brindabella Range (near Piccadilly Circus), Murray made the extremely steep descent to his outstation at 'Berindabella' on the Goodradigbee River, and then returned to Yarralumla (Wilson 1968).

On New Years Day 1839 Murray set out from Yarralumla to locate alpine pastures for his stock. His party headed to Brindabella, following '*the marked tree line*' (Wilson 1968).

Again this would have led them along Condor Creek and through what is now Blundells Flat. They travelled up the Goodradigbee River to Cooleman, along the Fiery Range, down Mount Talbingo to the Tumut River, and back up again. Murray let his horses go at Cooleman, where he decided to establish an outstation, and set off on foot with local Aboriginal people heading for Uriarra (Wilson 1968), probably via Condor Creek.

T A Murray

Stewart Mowle

Murray and Mowle went to the mountains again in April 1839 (Wilson 1968), probably following the same route as on their previous journeys. This is reinforced by a letter from Murray in November 1839 (among Mowle's papers) referring to the fact that he '*went up to Condore, Berindabella, Coolalamine…*' (Jackson-Nakano 2001).

On 4 February 1841 Murray departed Yarralumla to travel to Melbourne on business. Murray records his route up the Cotter and up the course of Condor Creek, reaching the crest of the range after 9 or 10 hours in the saddle. They rested at Haunted Springs (later Lees Springs after one of Murray's overseers) and began the descent to Brindabella. After leaving the Goodradigbee River, they pushed on to Cooleman Plain, and down Long Plain to near Lobs Hole. Murray then proceeded to Mannus and Melbourne (Wilson 1968). This saved a few days on the route which had been opened in 1824 by Hume and Hovell (Jackson-Nakano 2001).

On 7 March 1841 (two days after the Census) Murray set out again, this time to climb the peak of Pabral. He records that they camped at Condor [now Blundells] Flat. On the next day the party reached the peak, and Murray wrote that he looked over the steep northern side '*with a strong feeling of pleasure, which was excited by the thoughts suggested by the scene. Then for the first time the eye of civilized man looked upon the spot.*'

This ascent took place three days before the foundation stone was to be laid for St John's Anglican Church on Canberry Plain (Wilson 1968).

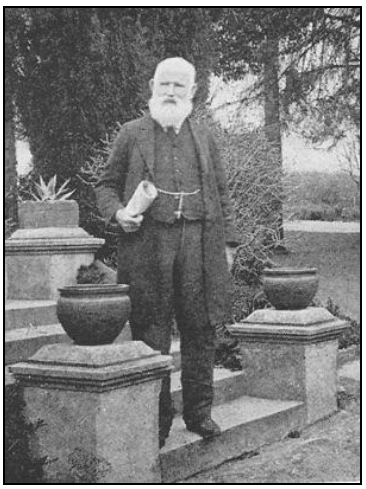
Most of Murray's explorations probably included local Aboriginal people, although they appear to be mentioned specifically only for the journeys of January 1839 and March 1841 (Wilson 1968).

Having ascended Pabral peak, Murray was to go even higher, becoming a Member of the NSW Legislative Council in 1843; Member of the Legislative Assembly from 1856 (including Speaker 1860-62); and President of the Legislative Council 1863-73. He was knighted in 1869 and died in 1873 (Fletcher 1993).

Stewart Mowle had joined Murray at Yarralumla in 1838 (when he was about 16) and lived on related properties until moving to Eden in 1852 where he was Collector of Customs. He was in Sydney by 1857, becoming a Clerk in the Legislative Council after Murray became the President in 1863; he served also as Usher of the Black Rod (Fletcher 1993). Mowle was an active campaigner for Canberra as the site for the Federal Capital and lived to see his wish fulfilled when the Yass/Canberra area was selected (Knowles 1990). He died just two weeks later, on 20 Nov 1908 aged 88 (Fletcher 1993).

Travels by John Gale

Five years before Canberra's selection and Mowle's death, journalist John Gale, founder of *The Golden Age* newspaper (later *Queanbeyan Age*) published a notable early 20th century account of the area. Part of this referred to a journey undertaken in 1875 from the McDonald homestead at 'Urayarra' (his preferred spelling) to Brindabella, with others.



John Gale

Gale wrote that after leaving 'Urayarra': '*we pursued our way through a tortuous glen, in the course of half a mile crossing a mountain stream four or five times…we wended our way along slippery sidelings, and through deep gullies, till another hour's ride brought us to the mountain homestead of Mr. John Blundell.*'
The homestead lay at the foot of one of the spurs of Mount Coree (Gale 1903a).

The mountain stream with many crossings is certainly Condor Creek, the reach above Thompsons Corner long being referred to, and shown on maps, as Five Fords.

Gale noted that after departing from the Blundell home, the road lay up a mountain track, probably to the un-named range and what is now Blundell Hill. He also noted that the track was '*originally cleared by Mr John McDonald* [of Uriarra]…*as the most direct route to Kiandra, in the days when the* auri sacra fames ['cursed hunger for gold' - Virgil] *of the Alpine regions and the Snowy River had reached its highest pitch*' (Gale 1903a).

Gale later published an account of a trip to the Brindabella area which promoted the values of the Goodradigbee as a trout stream (Gale 1904). He was 74 years old at that time.

Gale was an active campaigner for Canberra as the site for the Federal Capital. He died in 1929 aged 99 (Daley 1994).

Repeated use of routes

A travelling stock route was defined in 1887 along the un-named ridge from Condor Creek (Thompsons Corner) via Blundell Trig, to cross the Brindabella Range just north of what is now Piccadilly Circus.

Parts of the same route would have been used in association with mining at the Brindabella alluvial gold workings which began in 1881 and continued intermittently until 1914, and at the Mount Blundell base metal prospect (lead-zinc-silver-gold) which operated in the late 1890's and again in the 1920's (Owen & Wyborn 1979).

This suggests repeated use of an established Aboriginal route between the plains and the mountains. It was adopted by Murray in the 1830's-40's, became a marked tree line; was cleared by McDonald for gold seekers in the 1860's; and was used by settlers, miners and other travellers into the final quarter of the 19th century.

This is reflected in dotted routes on early portion plans, county and parish maps, with subsequent editions marking the shift of increasing traffic to avoid a flood-prone creek in favour of a drier ridge-top, or to avoid passing too close to a residence.
For example, on the plan for portion 2 (1871) a route parallel to Condor Creek past the Blundell farmhouse is labelled '*track not used now*'.

In 1927 a report into a possible upgrade of the road Between Canberra and Tumut noted that: '*The portion of the road between Uriarra and the Condor is little better than a bush track'*. It went on to say that: '*Near Condor Creek a relocation will be necessary to eliminate some very steep grades and creek crossings*'. Nothing happened quickly, as the bridge over Condor Creek to eliminate the Five Fords appears to have been constructed in about 1972.

Physical evidence: The current Brindabella Road uses bench-and-batter engineering to provide a more gentle grade than would have been the case in the 19th century and the first half of the 20th century.

A number of lengths of earlier constructed routes are still visible, as are ridge-top routes now used as forest tracks or fire breaks.

EARLY SETTLEMENT

Selections and survey

Through a series of legislative reforms in the 1860's ('the Robertson Land Acts'), extensive areas of land which had been the exclusive domain of wealthy squatters were made available to small settlers for selection.

The earliest map located for County Cowley (1871) shows one portion in Parish Tidbinbilla, situated at the end of a spur from Pabral (or Coree), and at the end of a dotted track from 'Uriarra'. By the 1881 version, a second and larger portion was added but these small squares remained isolated in the mountains. Portion 1 (40 acres) was held by John McDonald of Uriarra. Portion 2 (100 acres) was the earliest holding of John Blundell. Both of these portions were at what we now call Blundells Flat but which was shown as 'Corndoo Flat' on the earliest parish map located. Blundell later also had portion 3 (40 acres) and portion 5 (420 acres), the last dated 1886.

Blundell's selections were geographically separated from the rest of the Uriarra area, where his neighbours included Joseph Webb, William Webb and John McDonald, who between them held most of the land in Parish Urayarra (Moore 1999).

In the 1880's pastoral maps show this area within the Middle Cotter North Run No.50, held by J and W Webb. The Run covered about 25,600 acres and extended from the Tidbinbilla Range to the Brindabella Range, north to Coree peak and to the eastern side of the Cotter River. The western boundary was shown as having been fenced by the lessees of the adjacent Brindabella Run.

A Forest Reserve was established north of the Blundell holdings in 1882.

A Travelling Stock Reserve was declared in 1887 between Condor Creek (Thompsons Corner area) and the Goodradigbee River at Brindabella, passing along an un-named ridge. This formalised a long established route leading from the Canberra area across the Brindabellas to the mountain pastures of the Snowy Mountains.

The remainder of the portions in this area were taken up in the 1890's by John Blundell jr (Jack), a total of 320 acres in portions 11, 12, 14 and 15, and in the early 1900's by Samuel Adolphus Shannon, a total of 103 acres in portions 16 and 17, Parish Tidbinbilla.

In 1904 David Perrott took up about 640 acres in Parish Urayarra adjoining Condor Creek to the east of the Shannon holdings.

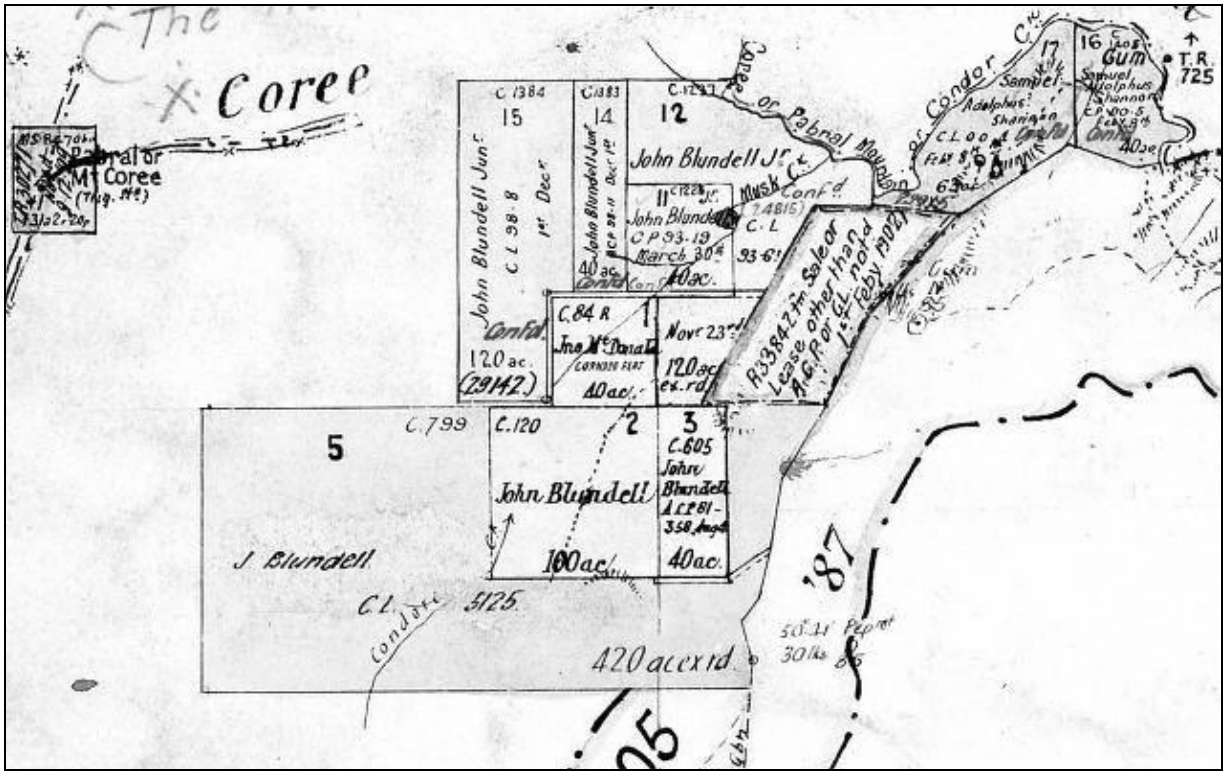
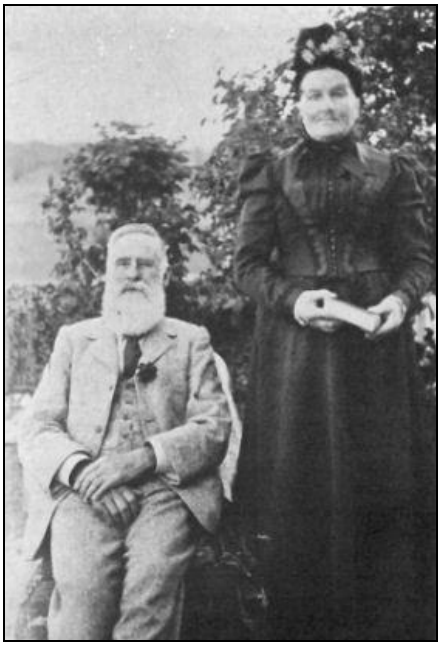


Figure 15 - Extract from plan of Parish Tidbinbilla (annotated 1904)

McDonald family

Archibald McDonald emigrated from Glenburn, Inverness in Scotland when he was aged 53, arriving in Sydney in 1838. He had married Margaret (née Ross) in 1823 and they had four sons and three daughters. Archibald first worked as a shepherd at the Duntroon estate under Charles Campbell before becoming the overseer of the Campbell run which would later become known as 'Urayarra'. In 1854 he purchased the property from Campbell and in 1860 also purchased 'Booth's Flats' near Royalla. After the death of Margaret in 1861 and Archibald in 1872, 'Urayarra' passed to their sons John and Alexander (Moore 1999; Fletcher 1993).

John McDonald had been born in 1830 and in 1850 married Eliza Webb, also born in 1830, the eldest daughter of George Solomon Webb of 'Tidbinbilla'. John and Eliza lived at 'Urayarra' where their family of thirteen children were all born. John built 'Urayarra' into a property of about 10,000 acres, and was a Justice of the Peace and a leading personality of the district (Moore 1999; Fletcher 1993).



John McDonald and Eliza McDonald (nee Webb)

His older brother Alexander, who was a partner with John in 'Urayarra', married Janet Kinlyside in 1843 and held 'Glenburn' in the Kowen area. Their brother Donald married Christina Finlayson in about 1853 and settled at 'Ashton', Round Hill near Weetangera. The youngest brother Coll married Ellen Connelly in 1853, held property near Royalla, was a hotel proprietor at Queanbeyan, and was the Uriarra mail contractor (Moore 1999; Fletcher 1993).

In 1866 George Solomon Webb sold ''Tidbinbilla' and moved to 'Urayarra' with his three sons, shortly before he died in 1868. George Graham Webb married Elizabeth McDonald (of a different family) in 1864 and selected the 'Woodstock' property. Joseph Webb married Grace Ledger (whose parents owned 'Mullion Forest') in 1869 and selected 'Brookvale'. William Webb married Jane Ledger (younger sister of Grace) in 1871 and selected 'Fairlight' (Moore 1999; Fletcher 1993; Salisbury 2000).

The Robertson Land Acts enabled the Webbs and John McDonald to select most of Parish Urayarra and vicinity, in addition to their Occupation Leases for thousands of acres west of Uriarra and on the Cooleman Plain, along with John and Alexander McDonald (Moore 1999).

John McDonald died in 1908 aged 79, while Eliza died in 1917 age 85. Both were buried in a family grave at St Johns, Canberra (Fletcher 1993; Salisbury 2000).

McDonald property

The first property selected in the Blundells Flat area was portion 1, Parish Tidbinbilla, held by John McDonald of 'Uriarra'. This location gave him ownership of most of the Wetland soak and most of the open flats of the Eastern Meadow area.

In 1885 McDonald was recorded as occupying a total of 2,210 acres, supporting 35 horses, 60 cattle, 5,963 sheep and 20 pigs (NSW Legislative Assembly Votes & Proceedings).

There is no indication that John McDonald or any of his family ever resided at the Condor Creek property. It seems more likely that this was established as an outpost of 'Uriarra', and early County maps show a track leading to it from that property.

Figure 16 - Detail of map County Cowley (1871)

At the time of valuation in 1913, the property of 40 acres (Holding 92), recorded as 'Condore', was part of the estate of John McDonald. The executors were John William McDonald, William Coll McDonald, William Webb and Edwin Charles Harris (an agent of Queanbeyan).

The valuation report noted a small bark hut on the western bank of Condor Creek between the downstream end of the wetland and the junction with Musk Creek. This hut was '*bad, makeshift, small*', with bark sides and roof, slab chimney and earth floor. It stood within about 26 to 30 acres which was '*well killed and cleaned up*', with '*abundant springs and creeks*'.

The map accompanying the report showed on the southern edge of the portion, adjoining John Blundell's house block, a large area enclosed by a mixed wire and barb fence and sown to '*potatoes, etc*.'.

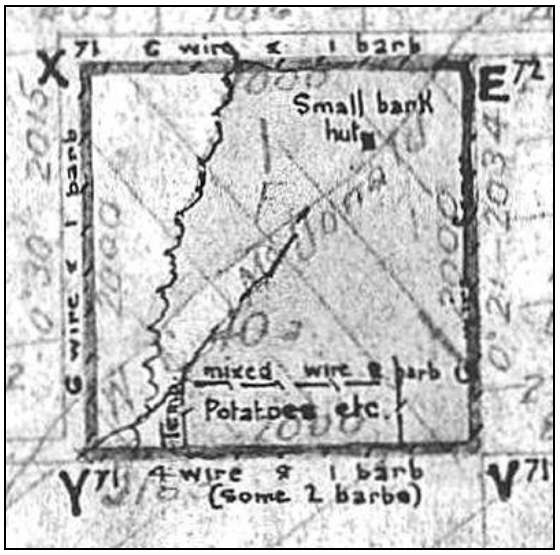


Figure 17 - Valuation map (1913) – Holding 92 (estate of J McDonald)

The valuer considered that the McDonald property would be good second class to first class cultivation land but for its distance from rail transport (about 30 miles). Although being '*too wet for sheep*', it was '*first class grazing, high class cattle fattening and carrying*' and was *'suitable for dairying under improved carriage facilities*'.

Physical evidence: The site of the 'hut' appears to have been located directly opposite the area occupied later by the poplar arboretum and close to the area occupied by the conifer arboretum. This site was extensively disturbed in the 1950's, and no trace of any structure has been located.

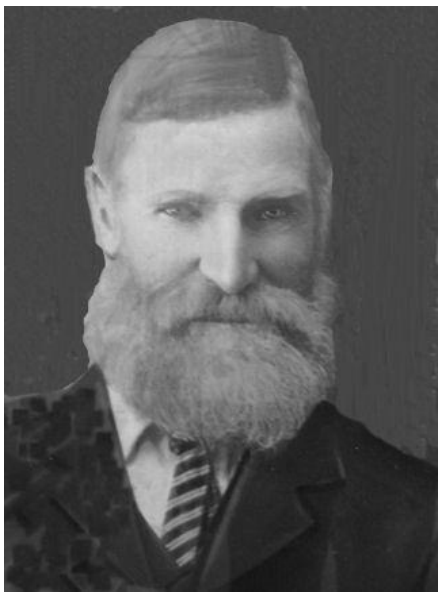
Blundell family

John Blundell was the eldest of eleven children born to Joseph and Susan Blundell. Joseph was born in 1786 in Maidstone, Kent and married Susan Osborne in 1840 (Fletcher 1993). Susan was born in England in about 1812; her father was Abraham Osborne or Rossburn (Salisbury 2000) or Ossenburn/Ossenbaun (Teague 2004).

Some accounts have Joseph and Susan arriving in New South Wales in about 1840 (Fletcher 1993). In other accounts, Joseph arrived as a convict in 1826 on the *Marquis of Huntly*, having been convicted of assault on a gamekeeper and sentenced to death, later commuted to transportation for life. He received a Certificate of Freedom in 1834 and a Certificate of Pardon in 1842 (Teague 2004).

No record of a marriage between Joseph Blundell and Susan Osborne has been located in the CD-ROM Index to NSW Registers or by researchers in England. There has been speculation that Susan too had arrived as a convict, but no evidence for this has been located, complicated by diverse spellings of her surname (Teague 2004).

Joseph died in 1874 aged 76 and Susan in 1892 aged 80. They were buried in the family plot at St John's, Canberra (Salisbury 2000).



John Blundell

John Blundell was born in 1843 at the Liverpool Plains in NSW and in December 1844 his sister Susan was born at 'Canbury' (Hawke unpubl.). Joseph joined the 'Duntroon' estate in 1845 as a stock handler and bullock driver for Charles Campbell. He had a cottage close to the boundary between 'Duntroon' and 'Canbury' station, known for a time as Blundells Hill, now Regatta Point (Knowles 1990).

John Blundell was married in 1862 at St John's, Canberra to Sarah Ann McKenzie, when they were both 19 years old. Sarah was the elder of two children born to Alexander and Elizabeth McKenzie, who were married at 'Lanyon' in 1842. Alexander had been born in Dundee, Scotland in 1817 and had arrived as a convict in 1835 (Fletcher 1993). He was assigned to James Wright of 'Lanyon', and became Wright's trusted house servant and 'Man Friday' (Moore 1982).

Elizabeth Louisa Bass had been born in Dublin in about 1820 (Salisbury 2000). She had arrived in NSW in 1840 and worked as head nurse in the home of Chief Justice Sir Alfred Stephen. After his death, she had been persuaded to come to 'Lanyon', where she was engaged from 1841 as nurse to the two Wright children. She was the first nurse in the Queanbeyan district and was later the district's leading midwife (Moore 1982)

Sarah Blundell (nee McKenzie)

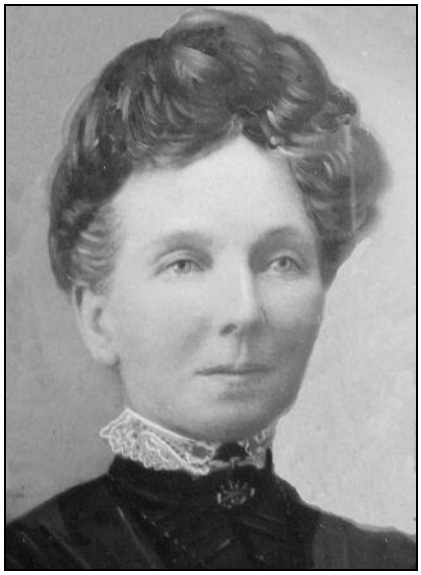
After Wright left the district in 1856, Alexander McKenzie worked with George Campbell at the Duntroon estate (Moore 1982). This brought Sarah into proximity with John Blundell. After their marriage they had seven daughters and four sons. The first two were born in Canberra, but by September 1866 the Blundells had moved to 'Condor', Uriarra, where the birth of their third child was registered, as were those of eight subsequent children to this couple (Hawke unpubl.).

The last birth to John and Sarah was registered in August 1884. Two months before this, John's brother Abraham had died aged 37 at Weetangera where he was living with his wife Phoebe Anna (Hawke unpubl.). Phoebe had been born in 1857 at 'Duntroon', the fifth of eight children of Richard and Ann(e) Shumack (or Shoemack) and the first to be born following their emigration from Limerick,

Ireland as free settlers. They arrived on the *Bermondsey* in 1856, and first worked on the 'Duntroon' estate under George Campbell before moving to 'Emu Bank' and later to 'Springvale', Weetangera. Richard and Anne Shumack died in 1887 and 1873 respectively and both were buried at St John's, Canberra (Procter 2001; Salisbury 2000).

Phoebe's brother Samuel (born 1850) was the author of a well known diary which formed the core of a published autobiography (Shumack & Shumack 1967).

In 1877 Phoebe married Abraham Blundell at 'Springvale' (Fletcher 1993), and his death seven years later left her widowed with four daughters when she was aged 27 (Hawke unpubl.).



Phoebe Anna Blundell

Although the circumstances are unclear, John Blundell appears to have fathered two sons and four daughters by his brother's widow. This meant that Sarah had eleven children by John, while Phoebe had ten children altogether, four by Abraham and six by John (Hawke unpubl.).

The first four children to John and Phoebe were born at Weetangera and the remaining two were born at Condor, the earliest in January 1899. By this time it is assumed that Sarah had left Condor to go and live in Sydney, where she died in 1920 aged 77 (Hawke unpubl.).

John and Phoebe are listed as resident at 'Condore, Uriarra district' in the Electoral Roll for 1903. They were apparently still at Condor in April 1916 when the death occurred of a 17 year old daughter, the only child for whom John had been registered as the father (Hawke unpubl.).

Blundell property

How John Blundell came to select his land in such a remote place is unclear. It is recorded that in his early years he had a lot to do with local Aboriginal children, fishing and hunting possums with them and learning some of their language (Bluett 1954). It is possible that Aboriginal people showed him the way to the area that he would later select.

In 1885 John Blundell is recorded to have held 140 acres at Condor Flat supporting 9 horses, 20 cows, 52 sheep and 6 pigs (NSW Legislative Assembly Votes & Proceedings). This 140 acres would have been on portions 2 and 3 only, and he later also held portion 5 of 420 acres.

The plan for portion 2 (1871) shows the homestead of Blundells Farm as a 'hut' on the eastern edge of the wetland soak. The site was on the rise at the southern end of the picnic ground.

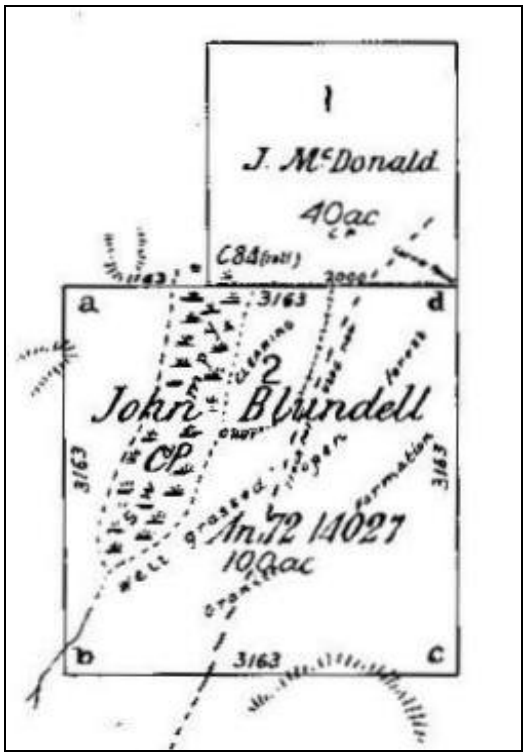


Figure 18 - Extract from plan of portion 2 Parish Tidbinbilla (Blundell)

The property valuation report in 1913 described the 'homestead' as consisting of:

- house 18ft x 38ft, with slab walls, iron roof, slab and iron chimney, stone fireplace, wooden floors, and hessian lining
- kitchen 14ft x 33ft, with slab walls and floor, bark roof, slab and iron chimney and stone fireplace; and
- meat store 9ft x 9ft with slab walls, shingle roof and earth floor.

A later report (1914), required after John Blundell disputed the earlier valuation, described the buildings as '*all very old and out of repair*'.

Adjacent to the house a cultivation paddock, garden and orchard were all fenced, and there was a '*small rich flat in the Creek growing vegetables*'.

In 1913 the orchard had been described as having 120 trees including apples, quinces, pears, cherries, peaches and others, '*old established bearing*'. Some 20 willows were also noted and valued.

From the 1890's John Blundell jr (Jack) began to hold portions next to those of his father below Mount Coree. His 320 acres (portions 11, 12, 14 and 15 Parish Tidbinbilla) brought the total holdings of Blundell family members at Condor to 880 acres.

Another 'hut' is shown on the plan for portion 14, but within portion 11, on a spur south-west of the junction of Musk and Condor Creeks. This was the first holding (1893) of John Blundell jnr (Jack). The valuation report described the hut as having rough slab walls and chimney with a bark roof, in bad condition.

Views of the Blundell homestead c1910

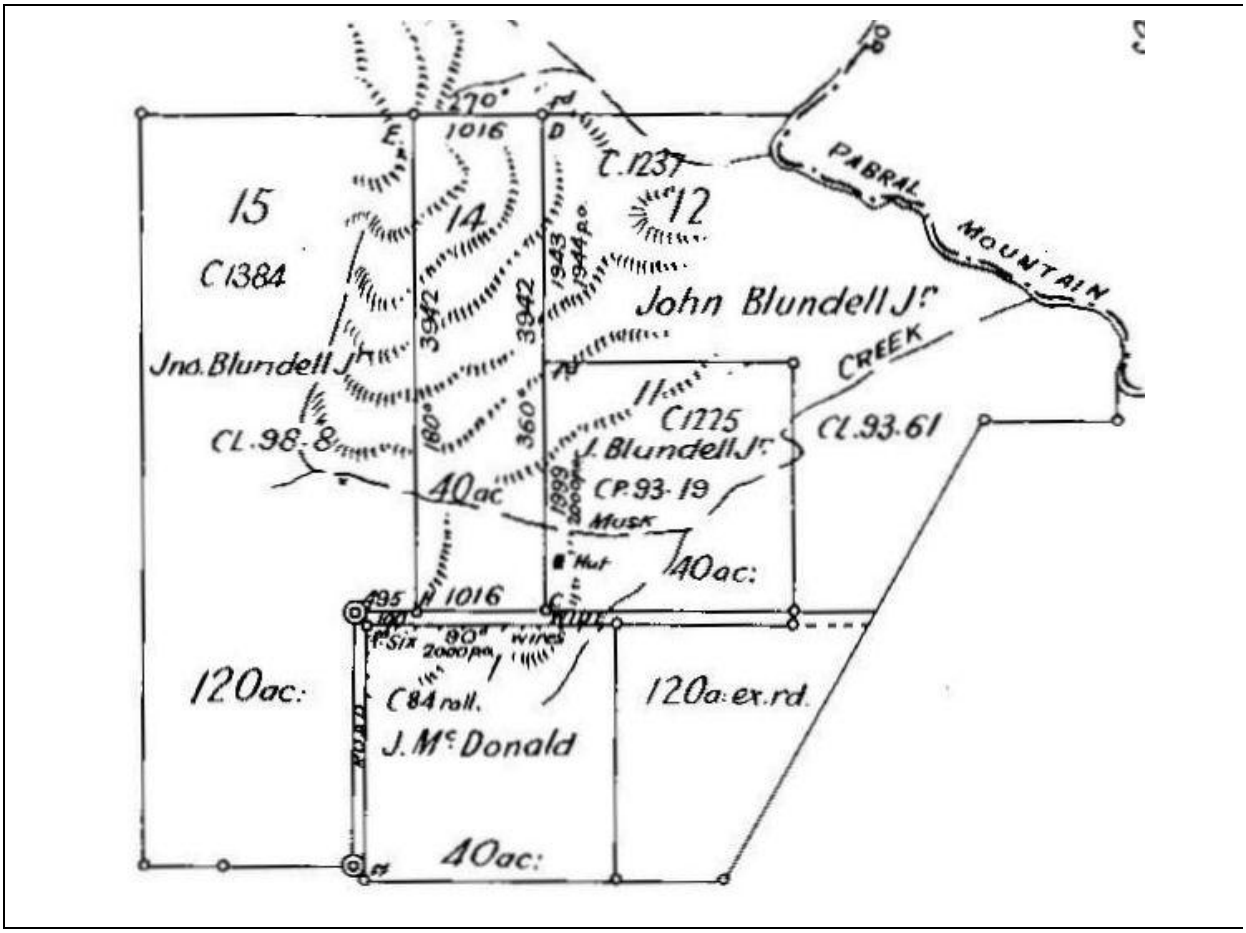


Figure 19 - Extract from plan of Portion 14 Parish Tidbinbilla (J Blundell jnr)

By 1898 John Blundell was seeking to expand his holdings, with approval of an annual lease of 640 acres in Parish Tidbinbilla (*Queanbeyan Observer* 13 Dec 1898). The location of this area relative to his other holdings is not known.

Sands Directory in 1884 listed John Blundell as a carrier of Condon [sic], Uriarra. John Gale too noted that John was supplementing his farm income with work as a carrier, which also involved his eldest son (Gale 1903a). This would have made use of skills likely learned by all the Blundell boys from their father Joseph. Bullock and horse teams played key roles in transport in the district during the 19th century, with the railway not reaching Bungendore until 1885 and Queanbeyan until 1887 (Lea-Scarlett 1968).

It would later be said of John Blundell that he '*could take a wagon where many others could not*' (newspaper clipping, Tumut 1927). Some of his descendants recall being told that he worked his bullock team as far afield as Sydney, in a three week round journey (Roy Bush *pers.comm*.)

John Blundell with his bullock team

John Gale commented on the remoteness of the Blundell property. He records that on one of his journeys from Urayarra to the mountains the party included the Rev. P G Smith of St John's, who wished to make a pastoral call on the Blundell family at their '*solitary homestead*'. He notes that Mrs Blundell (Sarah) and the children '*seldom saw or travelled beyond the circumscribed horizon which girts their home in the quiet and lonely glen*' (Gale 1903a).

The Blundell property was to remain remote for decades. A punt operated at Uriarra, at the junction of the Molonglo and Murrumbidgee from around 1858. It carried foot passengers, horses and drays en route to Kiandra through Brindabella, saving about 100km on the route via Cooma. Gale would have used this punt in 1875, but it apparently ceased for a time in the 1880's. A new punt was in place in 1890 but was wrecked in a flood, and re-launched in 1897 (Lea-Scarlett 1968).

There was no bridge over the Murrumbidgee until Tharwa Bridge was opened in 1894-5 (Lea-Scarlett 1968). The first low level bridge at Uriarra was opened (upstream of the Molonglo confluence) in 1901 by Mrs John McDonald, a fitting choice since she had lived west of the Murrumbidgee since 1834. The road around the foot of Mount McDonald to the high level bridge at the Cotter pumping station was built in 1913 (Moore 1999).

It seems likely that the Blundell operation at Condor was never particularly profitable. Files at the Australian Archives show that at the time of resumption, John's 560 acres of holdings were mortgaged to Arthur Brassey of Acton, due to be paid out by December 1913. John jnr (Jack) had all of his 320 acres mortgaged to the Government Savings Bank of NSW.

The family's view turned to the west in the early 1900's, when some of John's sons acquired land west of the Goodradigbee in the Nottingham Creek area, in 1902, 1903 and 1907. John jr (Jack) and Joseph between them held about 10,000 acres, south of High Cone and north of Limestone Creek (Parishes Wee Jasper & Clive, County Buccleuch).

The Condor property was remote from that direction also. In 1904 Gale described access between Urayarra and the Goodradigbee as lying over *'the roughest of mountain tracks…where it is impossible to make anything but the slowest of headway'* (Gale 1904).

Gerald O'Hanlon recounted his memories of the Brindabella Road in the early 20th century: '*It was in parts nearly too steep to walk over. I remember as a lad driving a buckboard with a very sturdy pony to the top of the Mountain from the Condor side, the pony literally clawing her way up some of the 'pinches' with the buckboard empty and myself walking. To get down some of the hills required dragging a small tree behind with brakes on and the pony well back in the britching*'. (O'Hanlon 1956)

In 1885 Phoebe Blundell is recorded as occupying 240 acres at Weetangera, supporting 4 horses and 7 cattle (NSW Legislative Assembly Votes & Proceedings). It is unclear whether this ultimately passed directly to the children she had by Abraham Blundell.

Physical evidence: Mortlock & O'Loghlin (1977) state that the old homestead and outbuildings were destroyed by fire to prevent their use after the Blundells departed.

No recorded policy of this sort has been located. Photographs of the remains of Phil Hardy's house taken in 1931 (Whelan MS 1931) demonstrate that not all were burned down. The images show a structure without roof cladding, doors or windows, and it may be that the policy was to render the structure uninhabitable but leave it standing.

L D Pryor did not recall seeing remains of the Blundell farmhouse or buildings during his visits to the Flat in the 1930's (Higgins 1995). If they had survived that long, it seems likely that timber buildings would have been lost in the 1939 wildfire, noting that this burned the arboretum area.

Blundell descendants state that there was little evidence left of the homestead group when they visited the site in 1948, with a few posts and rocks from the chimneys (Roy Bush *pers.comm*.).

There was at least one building on the eastern side of Condor Creek in 1955, when it fell victim to a clearing fire which burned through the Flat (Alan Brown *pers.comm*.).

The adjacent orchard trees and some hawthorns were visible until about 1990, when they were 'cleaned up' (Fraser & McJannett 1991). Some fruit trees remain after the January 2003 wildfires, although many of these may be of indeterminate variety.

Willows had been planted by the Blundell family and were a prominent feature of the landscape at the Flat. Most of the large willows and other larger exotic trees in the homestead precinct were killed in the January 2003 wildfires and these have since been felled for safety reasons. A number of willows remain in the wetland area and some exotic plants such as periwinkles, hawthorns and elms have survived in the homestead precinct.

Near the site of the homestead, two heaps of debris have been liberally supplemented with the rubbish of visitors. These piles contain rocks of limestone, which does not outcrop in this vicinity. The stones are not dressed, so may have been used as decoration such as in a garden. Edging of this kind is visible in contemporary photographs of the homestead group, and in later photographs of the forestry camp at Blundells Flat. It is possible that the limestone may have been brought from Canberra, where the Blundell family first lived, or from the north-west near Nottingham (Limestone Creek), where some of John's sons later held land.

There is a record of remains of a 14 gallon iron cauldron being found here, and this was probably used to boil washing (Sekavs 1989).

Increased ground visibility following the January 2003 wildfire revealed a wide spread of small items not far from the piles of debris, including pieces of iron bedstead, and fragments of decorated china and glass. These have since become obscured once again.

The site of the 'hut' on Jack Blundell's holding has been extensively disturbed by pine planting and earthworks such as banks and dam excavations, and no traces of occupancy have been located.

There are no known remains of any of the fencing or yards recorded in the valuation reports and shown in contemporary photographs, noting that most of these were of timber construction and unlikely to survive fires.

Shannon family

Samuel Adolphus Shannon was born in 1875, registered at Wagga Wagga. He was the eldest of two children, and the only son, born to Abraham Shannon and Emily Kate (or Katie) (née Allen), who had been married in 1872 at Cooma (CD-ROM Index to NSW Registers).

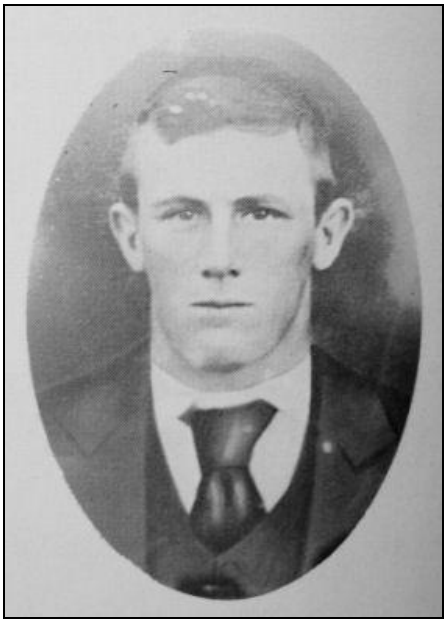
In 1899 Samuel Adolphus married Martha Southwell, who had been born in 1878 at Yarralumla to Thomas Southwell and Mary Ann (née Cooper) (Fletcher 1993). From 1900 to 1914 Samuel and Martha had eight children (one twin dying in infancy), all of these being registered in Queanbeyan (CD-ROM Index to NSW Registers).

Samuel Adolphus's father Abraham in turn had been born in 1843 at Bunyan near Cooma, the eldest son of Samuel Shannon and Amelia or Emelia (née Abrahams) (Fletcher 1993). Abraham moved to the Canberra district in the 1870's and worked as a labourer (Quince 2001). In 1890 he took up 'The Valley', 200 acres in Parish Urayarra (Fletcher 1993), which was surrounded by, and later subsumed within, McDonald holdings.

Abraham died in 1925 at 'The Valley', while his wife Kate predeceased him by about 40 years (Quince 2001).

Abraham's father Samuel had been born in London in 1802, and was transported for 14 years in 1821 (Monaro Pioneers Web site). Land transactions in his name began as soon as his sentence had expired in 1835 (AGCI). He married Amelia Abrahams in 1841 in Sydney and became a pioneer Jewish businessman of the Monaro district (Monaro Pioneers Web site). He had land transactions in the 'Maneroo' in 1841 and 1842 (AGCI), and in 1843 he operated a store and hotel at Reids Flat (or Jews Flat, now Bunyan). In 1854 he operated a store in the town that became Cooma (Neal 1976). He later also operated a hotel, built cottages and a bakery, and helped to establish a non-denominational school. He died in 1868 in Cooma (Monaro Pioneers Web site).

It is not clear whether this is the same family for whom Shannons Flat near Adaminaby is named.



Samuel Adolphus Shannon

Martha Shannon (née Southwell)

Shannon property

In 1900 Samuel Adolphus Shannon officially took up portions 16 and 17 Parish Tidbinbilla (103 acres in total) adjoining Condor Creek immediately downstream from John Blundell jr.

Their holding became known as Shannons Flat and the creek draining from Blundell Trig to join Condor Creek was for a time known as Shannons Creek (later Wombat Creek).

Portion plans of the Shannon holdings (surveyed in 1900) describe these as 'fair grazing land of slate formation thickly timbered with Gum, Peppermint and Stringybark'. A flood channel is shown in the flat next to the creek ('Coree or Pabral Mountain or Condore Creek'), with a small yard located between the channel and the creek. A track is shown leading into the Blundell holdings to the west.

Although the portion plans do not show the location of a dwelling, the valuation report (1913) describes a homestead group on portion 16 comprising:

- house 12ft x 24ft, with slab walls, shingle roof, wood floor, slab chimney and stone fireplace, in fair condition
- skillion of 12ft x 24ft with slab walls and floor, slab chimney, stone fireplace and iron roof
- verandah 9ft x 15ft with wood floor and iron roof, with an enclosed room 9ft x 9ft with slab sides
- hut 9ft x 12ft, with slab sides and floor, bark roof, rough and in fair condition
- shed (inferior) 10ft x 14ft with rough slab sides, bark roof, sapling door; and
- garden of six good young mixed fruit trees at the house.

The valuer's field book notes a hut which was used as a school house, located at the northern end of the same portion, close to the creek traversing the property. The report describes the school house as 13ft x18ft x 8ft, with slab walls, slate floor, stone chimney and bark roof, in fair condition. An orchard at the school had 35 trees of cherry, plum, peach, pear and apple, and an additional plantation of five quinces and six willows was noted on the creek.

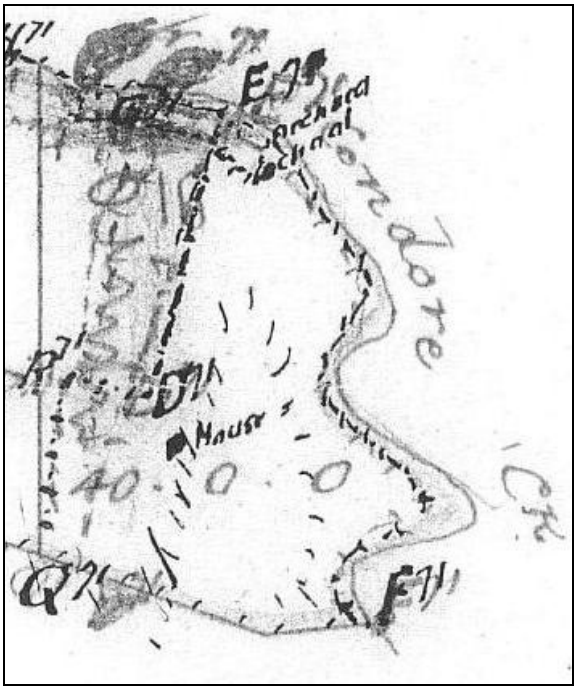


Figure 20 - Detail of valuation sketch (1913) - Holding 97 (S A Shannon)

Physical evidence: The Shannons occupied only the northern part (about one-third) of the area since cleared for forestry purposes north of the Brindabella Road and south of Condor Creek.

The area of the Shannon homestead has been extensively disturbed by pine planting and earthworks, and no traces of occupancy have been located.

The site of the school house can only be estimated but is likely to be on a flat area immediately north of the access track parallel to Condor Creek and above the floodplain of that creek. This site has been disturbed by heavy machinery and the native forest is regenerating very densely.

No remains of the orchard have been located.

Blundells following resumption

In June 1913 all the land in the vicinity of Blundells Flat was acquired to become part of the Federal Capital Territory. The portions held by McDonald (estate), Blundell snr and Blundell jnr were labelled Holdings 92, 96 and 93 respectively.

At the time of the Census on 1 January 1914, there were three males and four females still present at Blundells Farm (Williams n.d.). Shortly after this, between 1915 and 1924, John Blundell sr secured 160 acres near Tumorrama and 160 acres near Wee Jasper (Parishes Tumorrama and Cowrajago, County Buccleuch). He and Phoebe relocated in 1917, initially to 'Brookvale' (Roy Bush *pers.comm*) and by 1919 to Couragago, Tumorrama, where they were recorded as 'previously from Condor, Uriarra, ACT' (Bongongo PS 1986).

John died in 1927 at 'Forest Lodge', Tumorrama aged 84. The local newspaper noted that: *'Up to about a fortnight before he died he even drove his bullock team to plough his new ground which had just been cleared.'* and that he had attended the Tumut Hospital the following day. *'He always attended the vegetable and flower garden, where he used to work every morning, and which is a picture and was a great tribute to the old man who was a lover of Nature's gifts. Persons who came in contact with him have often remarked that he was one of the most unselfish and kindly men they had ever known.'* (newspaper clipping, Tumut 1927).

Bluett (1954) referred to him as '*that fine old battler "Count" John Blundell*', and affirmed that *'No better man walked or rode these mountains, in health and safety, than John Blundell'.*

Blundell graves at Tumut (2004)

Phoebe died aged 85 in 1943, a century after John and his first wife Sarah had been born. She was buried with John at Tumut, along with their son who had died in 1920 as a result of exposure to mustard gas during the First World War (Hawke unpubl.).

Shannons following resumption

When the land was resumed for the Federal Capital Territory in 1913, the portions held by Shannon were labelled Holding 97.

According to the valuation file, Samuel Adolphus Shannon remained in occupation until December 1913. A maintenance man (Michael Dunne) was allowed temporary occupation and depasturing of two horses in exchange for ensuring no trespass by unauthorised persons and no destruction of improvements.

S Shannon (probably Samuel Thomas, eldest son of Samuel Adolphus) and M Dunne were the only people resident at Condor Creek at the time of the Census on 1 January 1914, another two males and five females being listed under S A Shannon at Uriarra at that time (Williams n.d.). This indicates that following resumption the Shannons had moved from Condor Creek to 'The Valley' near Uriarra. This is supported by a record that Abraham Shannon's death there in 1925 took place '*at his son's residence*' (Quince 2001)

Samuel Adolphus and Martha were living at Dodsworth Street, Queanbeyan at the time of their deaths in 1959 and 1948 respectively (QCC 1984).

Records suggest that Samuel was buried at the Queanbeyan Tharwa Road Cemetery, while Martha was buried at Queanbeyan Riverside Cemetery, and that no monuments are extant, with the location of their burials unknown (QCC 1984). A contrary record notes the interment of Samuel Adolphus '*in the family grave, Tharwa Road Cemetery*' and indicates existence of a photograph of the inscription to both Martha and Samuel Adolphus on a single headstone (Monaro Pioneers Web site).

Other settlers

In 1904 David Perrott took up Conditional Leases on portions 14, 58, 134, 135 and 195, Parish Urayarra, totalling 641½ acres. This holding was a narrow strip of land on the ridge forming the western boundary of the McDonald property 'Uriarra', and dominated by Uriarra Hill. It also included a broad wedge of land extending to the south-west from that hill, falling to Condor Creek. The holding also adjoined two sides of the Travelling Stock Reserve declared in 1887 in the vicinity of what is now Thompsons Corner.

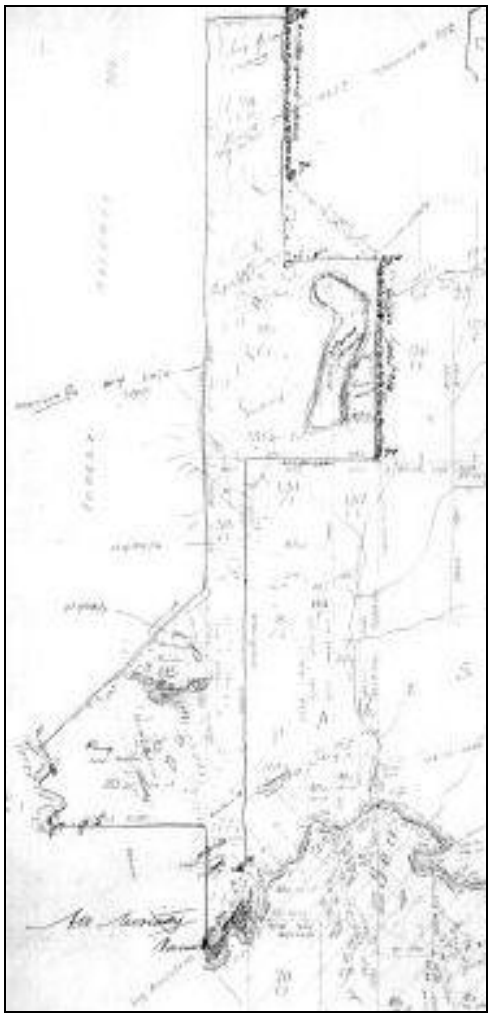


Figure 21 - Valuation sketch of Holding 90 (1913)

Perrott was thus a neighbour to both the Shannons, directly adjoining their north-eastern boundary at Condor (or Coree) Creek, and the Blundells, who adjoined the TSR on its western side.

The valuation report in 1913 (Holding 90) noted areas of ringbarking, some '*well killed and cleaned up*' and some suckering again, noting that this wants attention '*probably for many years otherwise will grow up dense scrub*'. The steep country in portion 195, dropping from the ridge to adjoin the Shannons was described as '*rung well killed*'.

An area of 5 acres was cleared for cultivation on the alluvial flat of Condor Creek, south-east of the main road. Here there was a house next to the road, with slab walls, chimney and floor, bark roof, and an unfloored verandah on two sides. The house was described as being '*small crooked*' and in '*bad condition*'. Adjacent were yards, small outbuildings and a cowshed, as well as an orchard of cherry, apple and plum totalling 35 trees, some on the opposite side of the road.

This may be the house depicted in an image in Higgins (1994a), said to be '*David Perrott's slab and bark home on Condor Creek, photographed only a few years before the resumption of the Cotter valley properties in 1913*'. There is some confusion on this point, as the same image has also been labelled as the '*McKeahnie home at Boboyan occupied by Dave Perrott c.1900-1910*' (CDHS catalogue).

Settler's house thought to be that of David Perrott, Condor Creek

Like several of his neighbours, Perrott disputed his valuation and a second report was prepared. Following Court settlement of his claim and subsequent resumption of his land, he departed in November 1914, just a decade after first taking up the land.

Little has been located regarding the origins and family of David Perrott or his movement following the resumption. He appears to have died in Queanbeyan in 1946 aged 84.

NCDC (1986) records nearby a school house, referred to as 'Condor Creek school'. No other written reference to this site has been located. However it was situated close to the bridge over Condor Creek, with the school house site marked by two oak trees and the site of the toilet marked by a clump of tree-of-heaven (John Banks *pers.comm*.).

Further downstream on Condor Creek, and flanking its junction with the Cotter River, several other holdings adjoined those of Perrott and McDonald. Those in Parish Urayarra were taken up from 1886 to 1888 and those in Parish Tidbinbilla from 1890 to 1907. At the time of resumption they were Holdings 94, 95 and 105.

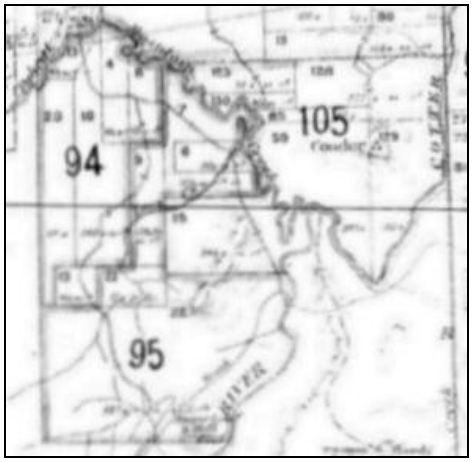


Figure 22 - Federal Capital Territory holdings, lower Condor Creek

Holding 94 comprised portions 4, 8, 10, 13 and 20 Parish Tidbinbilla, a total of 621 acres held by the estate of Philip Hardy snr. These had earlier been held by William McLaughlin.

Philip (Phil) Hardy snr. (Philip Henry Hardy) was born in 1835 to George and Mary Hardy. He was married in 1857 to Mary Ellen Webb (born Kilkenny, Ireland) and they had six children (Fletcher 1993; Salisbury 2000; Moore 1999). In 1857 he was a stockman for James McCarthy at 'Glenwood', and by 1863 was employed at Uriarra as a bullock driver and farm hand. From 1885 Phil Hardy held the Middle Cotter South Run of 21,800 acres (Moore 1999). NAA files show that by 1911 he also held 580 acres in Parish Congwarra. His sons Philip jnr and Charles occupied large tracts of land between the Murrumbidgee and Cotter Rivers (Moore 1999). NAA files show that in 1911 Charles held an Occupation Licence for 22,400 acres in the northern part of the Cotter Valley. Philip Hardy jnr (born 1864) married Margaret Whelan in 1892, and they lived at 'Congwarra'. Charles Hardy (born 1865) married Marion Charlotte Webb (daughter of Joseph Webb of 'Brookvale') in 1905 (Moore 1999; Salisbury 2000).
Phil Hardy snr died at his home on the Uriarra Road in 1912 aged 77. He was buried at St John's Canberra (Salisbury 2000).

William McLaughlin was born c.1853 to Patrick McLaughlin and Isabella (née McMahon). He married Mary McCafferty in 1881 and they had nine children. William lived at Uriarra and worked as a mail contractor (Fletcher 1993). Philip Hardy and William McLaughlin, along with John McLaughlin, were thrown into the Murrumbidgee River as the new punt capsized in midstream in 1890 (Lea-Scarlett 1968).

Remains of Phil Hardy's house (1931)

Holding 95 comprised portions 6, 7, 9, 21 and 22 Parish Tidbinbilla totalling 1,280 acres. Like portion 1 at Condor, these were then held by the estate of John McDonald. These portions had been previously owned by:

- Sarah Jane O'Connor who held portion 6 Parish Tidbinbilla of 50 acres.
- Thomas O'Connor who held portion 7 Parish Tidbinbilla of 150 acres.
- Herbert Charles Alexander Reid who held portions 9 and 21 Parish Tidbinbilla, totalling 182½ acres (and at one time also portions 6 and 7 to a total 232½ acres).

Holding 105 comprised portion 18 Parish Tidbinbilla of 897½ acres, and portions 59, 85, 123, 128, 129 and 130 totalling 937 acres. These were held by John McDonald, who had acquired them from James O'Connor.

James O'Connor was born in c.1833 in Limerick, Ireland. He arrived in the district in about 1850 and lived at 'Mountain View', Bulga Creek for 40 years. He married Bridget Keating in 1864 and they had nine children. These included Thomas O'Connor born in c.1868, and Sarah Jane O'Connor born in 1874. Sarah Jane married John Francis Lawler in 1900 and they had seven children. James died in 1915 in Victoria and Sarah Jane in 1944 at Michelago (Fletcher 1993).

H C A (Bert) Reid was born in 1879, the third of ten children born to William Reid and Sarah (née McDonald). His father was a farmer and miner in the Brindabella Valley from the 1870's, while his mother was the eldest child of John and Eliza McDonald of 'Uriarra'. Bert married Florence Evelyn (Flo) Oldfield in 1910. They had three children and lived at Tidbinbilla (Salisbury 2000). Bert, along with William Flint, was described as one of '*the last of the old time cattlemen who ran their herds in the Cotter valley*' (Moore 1999). Bert Reid died in 1945 aged 66 years and he was buried at St John's Canberra (Salisbury 2000). .

NAMING OF GEOGRAPHIC FEATURES

Local Aboriginal names

Pabral

The peak of 'Pabral' was the name used by Surveyor-General Thomas Mitchell in 1829 for what we now call Coree (Andrews 1992).

Although Mitchell favoured use of Aboriginal names, research indicates that Pabral was not the original Aboriginal name for this peak. This was instead Gori or Goree, so this may be an example of Mitchell applying a name derived from his experiences in the Peninsular Wars (Jackson-Nakano 2005).

It is today found in reference to Pabral Road, a forest track linking Blundells Flat with Two Sticks Road and Coree, and to Parish Pabral immediately to the north of Parish Coree, both in County Cowley (NSW).

Coree

It is uncertain precisely when or why Pabral peak came to be also called 'Coree'. A gazetteer of 1848 lists only 'Pabral Peak' (Wells 1970). Baillieres Gazetteer of 1866 refers to the peak as 'Pabral (or Goree) Mount' and describes 'Pabral (or Goree) Creek' as '*a tributary of the Cotter river, rising in mount Pabral, the N. extremity of the Bimberi range*' (Whitworth 1866). Baillieres 1870 edition added reference to 'Coree Mount' with information under 'Pabral Mount', and the map showed the peak as 'Pabral or Coree'.

Both names are shown on early published maps e.g. the 1871 map for County Cowley. 'Coree' was the name ascribed to the trig station gazetted in 1899 although dual naming of the peak persisted for some decades into the 20th century.

An old plan for Parish Tidbinbilla contains a 1904 pencil annotation stating that 'Coree' was the name to be adopted for the creek previously also called Pabral Mountain Creek or Condor Creek.

In his account of travels, Gale refers only to 'Mount Coree' (Gale 1903a).

'Coree' appears to be derived from 'cori', said to be a southern Aboriginal name for the moth called 'Bogong' by the Yass group. This attribution then goes on to refer to Aboriginal people exploiting '*the grubs of this moth*' as they hatch out in the mountains (Wilson 1968).

This is confused natural history – the moth is in its larval stages in northern NSW and Queensland, and flies to the mountains in its adult (but sexually immature) stage. This has led some to doubt Wilson's attribution of the name Coree (e.g. Fraser & McJannett 1991).

However, even the learned John Gale referred to Aboriginal people feasting on '*the grubs (before they matured into the pupa stage)*' (Gale 1927). Regardless of incorrect entomology, there is no doubt that Aboriginal people ate the moths, and more recent research into Aboriginal names in the ACT confirms that the original name of 'Gori' refers to the moth (Jackson-Nakano 2005).

The Geographical Names Board of NSW suggests that the origin of the name of Parish Coree is an Aboriginal word meaning charcoal. This is based on information from the Jerilderie area (GNBNSW Web site) and more likely applies only to the historic property of that name in the Riverina.

Condor(e)

The name 'Condor' is derived from an original Aboriginal name. It appears as 'Condore' in a letter from Murray to Mowle in November 1839 referring to his travels '*to Condore, Berindabella, Coolalamine*' (Jackson-Nakano 2001), and also as 'Condore Creek' on the plans for portions 5 (1886) and 16 (1900) Parish Tidbinbilla, later parish plans and county maps, and on published maps at least as late as 1959.

In 1834 a Return of Aboriginal Natives referred to groups being associated with the Limestone Plains, Condore Mountains and Murrumbidgee regions (Jackson-Nakano 2001).

Gale (a stickler for orthography of Aboriginal names) perpetuates use of this spelling in referring to 'Condore Creek' as a trout stream (Gale 1903b). He also describes in the view from Brindabella Mountain ('*the highest peak over which our road lay*' before the descent to Brindabella): '*to the north-west stands towering to a height of 5000 feet or more the inaccessible razor-back crown of Mount Coree, and close by his lesser neighbour – but still a giant, head and shoulders above the surrounding elevations – Mount Condore.*' (Gale 1903b).

This is likely to refer to Mount Blundell or (less likely) Devils Peak, however the name 'Mount Condore' does not appear on any map located to date.

Gale also says that Lees Spring is '*the first water the traveller comes to after leaving Condore*' (Gale 1903a). This most likely refers to what is now Blundells Flat, noting that on an early plan for Parish Tidbinbilla (1885) portion 1 (John McDonald) is labelled 'Corndoo Flat', while the Features Map of c.1915 labels the spur east of Coree as 'main ridge to Condor Flats'.

The spelling appears to have been altered to 'Condor' (as in the bird) after responsibility for mapping this area moved to the Commonwealth in about 1913. This was not universal, however, with some images of the AFS Forestry Camp in 1927 being labelled as 'Condore Creek' (National Archives).

It should also be noted that use of 'Condor' was common in 19th century records such as birth/death records for Blundells, where it was probably phonetic. This continued into the 20th century e.g. the residence of Joseph Blundell (son of John and Sarah) was recorded as 'Condor', Shaw Street, Yass (Procter 2001).

Additionally, transcription or typographic errors almost certainly play a role, with one reference to John Blundell having selected land at 'Condon', and living at 'Condon House' (newspaper clipping Tumut 1927).

The 1885 reference to 'Corndoo Flat' was presumably an attempt at phonetics. However, Mowle records that 'Condore' should be pronounced 'Condhoware', while G A Robinson, Chief Protector of Aborigines, referred in 1844 to members of a group he met as belonging to 'Kunde-warre'. This was apparently applied to the mountainous area above Yaouk and at the head of what we now call the Cotter River (Jackson-Nakano 2001)

Recent research indicates that 'Condore' or 'Condhoware' or 'Kunderwarre' or 'Goondawarra' (and similar) was the native name for a large area which probably included the Brindabella Range, the Cotter River and Mounts Coree and Blundell, generally the area between the Murrumbidgee and Goodradigbee Rivers (Jackson-Nakano 2005).

Dual naming

Based on research into Aboriginal names of the ACT and consultation with Ngambri descendants, it has been suggested that any dual naming of geographic features include:

- dual naming of Condor Creek as 'Goondawarra Creek'
- dual naming of the Cotter River as 'Goondawarra River'
- dual naming (or replacement) of Mount Blundell as 'Mount Condore' or preferably 'Mount Goondawarra'
- recognition of Coree as 'Goree' or more accurately 'Gori'
- rendition of Uriarra as 'Yuriyarra'
- rendition of Goodradigbee as 'Gooradigbee'
- rendition of Murrumbidgee as 'Murrumbeeja'

(Jackson-Nakano 2005).

Other geographic features

Mount Hardy south of the confluence of the Cotter River and Condor Creek is named for the family of Phil Hardy (Moore 1999).

Reids Pinch on the Brindabella Road near Mount Blundell is believed to be named for William Reid, farmer and miner of Brindabella.

Thompsons Corner is said to be named for a mail contractor who lost control of his motor vehicle and tipped it over the bank of the creek at that point (Margules in Higgins 1995).

A longstanding name for the section of Condor Creek upstream from this point is Five Fords, a reference to the five crossings required before the Condor bridge was built in the 1970's.

Other Blundell names

Blundells Flat, Mount Blundell, Blundell Hill and Blundells Creek) are all associated with John Blundell. Other locations in the region are named for related members of the family:

Blundells Cottage was erected in 1858 by George Campbell of 'Duntroon' for his head ploughman William Ginn (National Trust 1982). He lived there until he moved to his own holding in 1874, at which point newlyweds George Blundell (brother of John) and Flora (née McLennan) took over the cottage (National Trust 1982). They called it 'Poplar Grove', and five sons and four daughters were all born there, as were some grandchildren (Dept of Interior n.d.).

In 1927 when the first sitting of Parliament had taken place, descendants of pioneer families were among those invited to a reception held at Government House. The list included George Blundell (then aged 84), who had lived for half a century in the cottage on the opposite side of the Molonglo River (Fitzgerald 1987).

Other commemorations of the name include Blundell Street and Blundell Park in Queanbeyan. These relate to the arm of the family from Joseph Blundell via Jacob (brother to John of the Flat and George of the cottage).

Jacob's son Richard (or Dick) was born at 'The Oaks' in 1877. A well-known carrier, he worked with bullock teams in his youth, later horse teams, and in c.1918-20 purchased a Dennis truck with iron wheels and solid tyres. He stated in 1910 that he had carried the first telephone line and the first building to the site of the Federal Capital (Williams 1997).

The home of his son (Richard or Dick jnr) and Mary (née Warner) still stands in Mountain Road, Oaks Estate, a sandstock brick house called 'Alabama' (later 'Cooee') built in 1912 to the same design as the house at 11 Blundell Street (Williams 1997).

ACQUISITION AND SURVEY OF THE FEDERAL TERRITORY

Following Federation of the Australian colonies in 1901, the decision to build the Federal capital at Yass/Canberra was made in 1908. The land was formally ceded by NSW in 1910, and 'Canberra' was announced as the name for the capital in March 1913.

Three months after this latter event, lands in the vicinity of Coree were acquired as part of the Federal Capital Territory This included holdings of J Blundell jr. (320 acres) and J Blundell sr (560 acres), W C McDonald (40 acres) and S A Shannon (103 acres), and an area north of these which was being grazed under licence by M & A J McDonald (2,352 acres) (ms - ACTPLA).

The first part of the Territory border to be surveyed was the straight line from Coree to the Murrumbidgee River set by the *Seat of Government Acceptance Act*. While carrying out this survey in 1910, Surveyor Percy Sheaffe would have been surprised to find that not all of the Cotter catchment was within the straight line boundary. He crossed a small stream running from left to right (Musk Creek), and then came across the larger Coree (or Pabral Mountain) Creek (Higgins 1996).

Some maps were vague on detail around Coree and suggested that Coree Creek was sourced on the east of Coree. If this had been correct, the straight line would have taken in all of the water supply catchment. However, as early as 1871 a map of County Cowley had clearly shown this was in error. Coree Creek begins some 4km to the north on the western and eastern flanks of Devils Peak, with the western head passing through Coree Flats.

Because of this oversight, the part of the Cotter catchment lying outside the Territory had to be reserved from sale or occupancy in 1917, with an estimated area of 1,400 acres. In early 1922 the Commonwealth sought to purchase the land unencumbered. The matter was then caught up in High Court proceedings until late in 1924 when NSW agreed to sell the land to the Commonwealth without compensation for mineral rights (mss NAA).

Surveyor Astley Pulver was tasked in 1926 with surveying the head of the catchment from Coree to the straight line border (Pulver 1981). A start was made early in 1926 but bush fires forced their withdrawal (mss NAA). When field work resumed, the surveyors' gear was trucked to 'Uriarra' station, and then carried by packhorse to a camp at higher elevations. Pulver's photographs suggest that they camped at Blundells Flat, and also at a higher elevation. The previous summer had brought bush fires; this year they had snow (Pulver 1981).

Field work was completed early in 1927 despite '*the extremely rough nature of the country*' and the rigours of surveying about 12 miles of mountain ridge (Pulver 1981).

Surveyor Pulver at Coree trig 1926

Pulver records that one night their cook went missing after trying to climb Coree. He was found the next day by Mr Blundell, who was bringing up their weekly supplies. Blundell also assisted the surveyors to bring their gear down from the mountains, along about 3 miles (5km) of rough track, dropping about 2,000 feet (600m) (Pulver 1981). This is likely to have been Norman Blundell who acquired the 'Brookvale' property north of Uriarra in the late 1920's, having previously leased it (Welch 1986). Photographs clearly show that this descent was made to Blundells Flat.

Pulver's packhorses at Blundells Flat (1927)

Once survey plans were completed, the Commonwealth acquired an area of 2,561 acres 1 rood 20 perches for Federal Capital Purposes, gazetted in October 1927 (Higgins 1996).

Physical evidence: ACT border survey markers were comprehensively recorded (Higgins 1996) but most or all of the wooden markers on the western and north-western borders were destroyed in the January 2003 wildfire (Higgins 2003).

CATCHMENT PROTECTION

The Cotter catchment was a significant determining factor in selection of the Canberra site for the Federal Capital. Instructions given to Surveyor Charles Scrivener in 1908 regarding selection of the site included the requirement to locate a water supply '*of sufficient magnitude to place the question of volume at all seasons, and purity, beyond doubt'*. Scrivener forecast a '*supply of perennially clear and pure water in the Cotter River*', and work commenced on the dam and associated works in 1913 (Daley 1994).

At least as early as 1911 Commonwealth health officials were urging that lands in the Cotter valley be 'depopulated'. In 1912 Dr J H L Cumpston inspected the area and noted the location of residences. He recommended specifically that those owned by Blundell, McDonald and Perrott be completely removed, or at least removed to a greater distance from watercourses (mss NAA).

Scrivener was concerned also about the impact of complete removal of supervision of improved (cleared) lands, and particularly impacts from rabbits. He favoured continued occupation by lease, but without residential occupation, and he proposed retention of the right to undertake tree planting. Cumpston insisted on complete depopulation, so the land was resumed and landholders removed, among the last being the Blundells in 1917. Cumpston also favoured entry by permit and supervision by rangers or similar officials (mss NAA). From 1914 the Cotter water supply was protected by legislation which restricted use in the catchment (Higgins 1994b). Scrivener declared that: '*The acquisitions have been made in the interests of the water supply and future action should make that the dominant feature*' (mss NAA).

In 1919 drought relief grazing was permitted on lands more than 10 miles from the Cotter reservoir, with sparse stocking, and as a '*temporary expedient*' only. In the face of opposition, it was noted that this would have been hard to prohibit with properties adjoining the catchment remaining unfenced. Several applications were refused, including one from Charles Handy who wished to take up again 22,400 acres of his former Occupation Licence from Tidbinbilla to Coree (mss NAA).

From 1914 Scrivener was advocating urgent action to exterminate rabbits before the reservoir was finished. He saw this, coupled with fencing, destruction of harbour and planting of trees, as beneficial for employment and as '*a permanent improvement of great value*'. The rabbit proof fence was to extend both sides of the dam, roughly joining up the trig stations of Urayarra, Coree, Blundell and Hardy, a distance of 30 miles. Scrivener hoped to cover the catchment '*with such a dense growth of trees that grass would not grow; thereafter there would be no trouble with rabbits'*. Early in 1914 T C G Weston of the Afforestation Branch for the Federal Territory conducted a field inspection of the Cotter to report on this measure (mss NAA). Progress was delayed by the 1914-18 War but by the 1920's reafforestation had begun, with pines planted on slopes near the Cotter reservoir to address erosion due to over-clearing, over-grazing and rabbits (ANU 1973).

The Cotter protection legislation was enforced by resident rangers, the first being Jack Maxwell (late 1920s-53), then Jack Silk (c1953-56) and Tom Gregory (1956-84) (Higgins 1994b). Pressure grew over the years for relaxation of restrictions on use of the catchment for fishing and camping. Through the 1930's health authorities remained opposed to these uses, and also to proposals such as rabbit trapping during the Depression, mineral leases at Mount Blundell, and controlled grazing to reduce grass fire hazard in pine plantations.

C E Lane Poole of the Commonwealth Forestry Bureau weighed into the debate on the latter issue late in 1937, querying (tongue firmly in cheek) whether native animals would also have an impact on the catchment that warranted their exclusion. He challenged the consistency of opposing short term grazing while continuing '*to permit very large flocks of sheep to camp all night at Lees Spring and to pass through the five Condor crossings*'. This referred to continued use of Travelling Stock Reserves which were used by thousands of stock annually. Cumpston held firm and argued that the agistment would create a need for expensive water treatment, thus ensuring high level support for his position (mss NAA).

In much the same way authorities fastidiously resisted siting of any toilet facilities in any part of the catchment, leading to the siting of such infrastructure at places like Bulls Head forestry settlement and Franklin Chalet short distances across the border in NSW (Higgins 1994b).

The initial reafforestation (pine planting) to control erosion was extended to include areas of native forest from 1931-32. Concern was expressed about the impact of forestry operations on turbidity in the untreated water supply as early as 1930 and increased at intervals after 1934 (Teakle 1962a). In 1925 Lane Poole had reported rapid silt deposition at the head of the reservoir after the Cotter Dam had been in operation for just 10 years. The level of the dam was raised in 1951, and within 5 years an estimated

170 acre feet (about 210,000 cu m) of sediment had been deposited at the head of the reservoir, with additional fine material in lower and deeper parts of the impoundment (Teakle 1965).

In 1955 a '*turbidity "crisis"*' lent weight to a concerted effort on the part of the Commonwealth departments for health and public works to have forestry activity recognised as the major source of turbidity, to have those operations curtailed and practices changed, asserting primacy of water quality in the catchment over any other uses (mss NAA).

An inter-departmental committee met from 1956, and through the ensuing decade a debate raged about catchment protection. Health and Works wanted no further clearing in the catchment and sought greater attention to reducing erosion, while forestry managers were pushing on with pine planting and reporting on measures proposed to reduce any contribution from this to turbidity (mss NAA).

The National Archives hold a set of photographs taken in 1958 which illustrate forestry practices of the time, including clearing, burning and roading on steep slopes and beside streams. It is unclear who commissioned these photographs and how they were to be used, although they would appear to cast forestry practices in a poor light in relation to catchment protection.

In 1959 questions were asked in both Houses of Federal Parliament about the discolouration of Canberra's water. Three years later M R Jacobs, head of the Forestry & Timber Bureau, declared publicly and emphatically that forestry operations had not added to the problem of turbidity in the Cotter catchment, even though this contrasted with the views of some of the forest managers. Notable at this time was the independent input of L D (Lindsay) Pryor, who reported on an aerial inspection of the catchment in late 1961. Pryor was clear that roads and firebreaks were the primary and major source of turbidity and that no serious effort was being made to mitigate their impact (mss NAA).

The National Capital Development Commission (NCDC) brought in an external expert L J H Teakle, Professor of Agriculture at the University of Queensland. He produced several reports (Teakle 1962a; 1962b; 1965) which reflect a gradual recognition that forestry operations would continue to contribute to turbidity in the catchment unless strict control measures were implemented.

During this period, considerable effort went into reducing perceptions of the culpability of forestry operations. Claims were made that pines would actually be better than native forests in terms of runoff and turbidity, and had improved water quality. At times during the debate no clear distinction was being drawn between:

- the original pine plantings to control erosion on overgrazed land versus those for which native forest was now being cleared for a standing crop
- impacts from the plantations themselves versus the roads and firebreaks which accompanied them
- impacts from mature plantations versus those from establishment of a new area.

(Butz 2007)

Throughout this debate there was a strong tension between those who wanted forestry to continue to enable development of a viable local timber industry (to which there was no return for control of runoff) and those charged with protecting the water supply without the need for filtration. The former became advocates of a water treatment plant, promoting this as inevitable and a means to enable multiple use of the once tightly controlled catchment, and this latter angle appealed to the NCDC (Butz 2007).

The Blundells Flat area was part of the debate over catchment protection. Clearing of native forest here began in 1956-57 and by 1959 its extension was being stridently opposed in the press. Opposition of this sort led to soil conservation measures in the form of dams and banks to intercept sediment before it could enter Condor Creek. This practice had not previously been employed in the catchment, and it was of sufficient interest to warrant an inspection of the dams at Blundells Farm (among other places) by the interdepartmental committee in 1962 (mss NAA).

Early in 1956 it was forecast that over the following four years pine plantations and hardwood logging near Blundells Flat and Shannons Flat would be extended. A map showed proposed plantations along the steep northern side of Condor Creek and up Coree Creek to low relief areas around Coree Flats in NSW, coupled with logging of hardwood in upper Musk Creek (mss NAA).

However, time was running out. It has been stated that concerns for catchment protection led to the cessation of hardwood logging in 1960 (Higgins 1994b) and clearing of native forest for softwood plantations in 1961 (ANU 1973). However, hardwood logging above Bendora Dam was still being proposed up to the end of 1961. And in 1962 the Forestry & Timber Bureau were saying only that they had no early plans for further extension of pine plantations in the catchment

area or for hardwood logging beyond the general limits already established (mss NAA).

It appears that the cessation of new forestry operations was not so much a definitive policy decision but a quiet (and probably reluctant) response to increasing pressure from a growing Canberra for a high quality and economical water supply (Butz 2007). This timing coincided with some significant developments. When the Bendora Dam was completed higher in the Cotter catchment in 1961, the emphasis on catchment protection shifted to the middle and upper sub-catchments. This was partly because water was supplied to the city by a gravity main from Bendora Dam, which was considerably more economical than pumping from the Cotter Dam. Then in 1963 NCDC announced that an additional dam and a water treatment plant would be built. The new Corin Dam was completed in 1968 (ACT Government 2006c).

These developments might reasonably have been expected to allow the expansion of forestry operations in the catchment, but this did not occur, presumably because the debate was by no means over. In the period 1915 to 1965 the estimated sediment deposition was up to 500 acre feet, or 13% of the total storage (Teakle 1965). Most of this was attributed to storm events, however in 1965 (some years after expansion of forestry had ceased) the Department of Works estimated that during a period without irregular storms 1 or 2 cubic feet of soil was taken into suspension per day per cusec of stream flow, causing turbidity of the order of 30 (excessive). This was attributed to more than 100 miles of roads and breaks in the forestry area. Pryor was moved to report after an aerial inspection in 1967 that failure to control sediment input from roads and firebreaks had largely defeated the often cited objectives of reafforestation to control erosion (mss NAA).

The focus had shifted from the Cotter Dam to higher parts of the catchment, and water quality was considered to be a treatment issue rather than a land use and management issue. Second rotations of plantations were planted, some over reduced areas due to exclusions for excessively steep land, riparian zones and the like. Plantations in the Cotter catchment were now apparently a *fait accompli* (Butz 2007).

The extensive wildfires in January 2003, which burned all of the Cotter catchment and resulted in significant loss of water quality, prompted several reviews of land use and management practices e.g. the 'Shaping our Territory' reports (ACT Government 2003a; 2003b) and of water supply options and protection e.g. 'Think water, act water' (ACT Government 2003c; 2003d; 2003e). 'Shaping Our Territory' concluded that '*future use of the plantation lands should be determined primarily by consideration of water quality, fire protection, ecology, recreation and landscape*'. It considered that revegetation to native species would be too costly, and proposed replanting of pines in much of the catchment with increased attention paid to excluding steep/inaccessible and riparian areas, reducing internal roads, and better treatment of erosion 'hot spots'.

Significant deterioration in water quality after the fires prompted investment in a new and significantly more sophisticated treatment plant at Stromlo. From 2004 this allowed water to once again be drawn from the Cotter Dam for domestic supply. From 2005 water was also able to be pumped from Cotter Dam to Googong Dam to augment storage. During this period forestry operations resumed with prompt re-establishment of some plantation areas, totalling 1,215ha in the Lower Cotter catchment (ACT Government 2006c).

In 2006 the Lower Cotter Strategic Management Plan re-established protection of water quality and yield as the dominant objective (ACT Government 2006c). This was what water supply managers had sought half a century earlier, and echoed Scrivener's assertion of forty years before that (mss NAA). The Plan proposed an end to additional commercial or broad-acre pines in the catchment, ultimate conversion of pine planted areas to primarily native vegetation cover, and favouring of regeneration of native species in the catchment (ACT Government 2006c).

After some debate, it was broadly accepted that there would be no further forestry development in the catchment and that a viable local softwood industry would not be possible. Policy on management of the water supply catchment had come full circle over a period of just under a century (Butz 2007).

Physical evidence: A number of soil conservation dams and earth banks remain, dating from the late 1950's and early 1960's, notably on the western side of Condor Creek below Coree.

From mid-2006 further works were undertaken in the Blundells Flat and Shannons Flat areas included erosion control measures on roads (mainly culverts and drains) and road decommissioning.

COMMERCIAL FORESTRY

Hardwood forestry

Hardwood forestry in the ACT had the following objectives:

- production of hardwood to supplement plantation grown softwood
- preservation of an efficient catchment cover where plantations were not established
- provision of future fuel (firewood) supplies for Canberra
- maintenance of native forests as flora and fauna reserves and for aesthetic value.

(Pryor 1939)

Logging began in the Brindabella Range in 1930, supplying Rayner's Sawmill at Lees Creek (Higgins 1994b) until it closed in 1938 and was replaced in 1947 by a mill in Canberra, processing timber for post-war building (Rodger & Jacobs 1954).

In the late 1930's a forestry ranger was established at Bulls Head. This grew into a small settlement after the Second World War, established to house workers engaged in hardwood forestry and fire protection (Higgins 1994b).

Logging of native forests below Mount Coree is recorded in the periods 1930-38 and 1947-62 (NCDC 1986). This involved selective felling of mainly Brown Barrel *E. fastigata*, but also Alpine Ash *E. delegatensis*, Mountain Gum *E. dalrympleana* and Ribbon Gum *E. viminalis* in the area from Two Sticks Road in the north to about 10km south of Mount Coree. This was carried out by Colless Bros. (of Victoria), with the timber taken to the Colless mill at Weston Creek and the government mill at Kingston (Higgins 1995).

In 1954 the extent of the '*better-quality hardwood forests*' of the Territory was estimated as 51,000 acres (c.20,635ha), some exceeding 90ft (27m) in height. Of this, about 16,000 acres (c.6,500ha) were considered '*accessible for economic utilization*'. At the same time it was reported that hardwood forestry in the Territory was accompanied by construction of roads, which aided fire protection, and silvicultural treatments to regenerate cut-over hardwood forests and boost their future timber yield. The projected annual cut was 2 million super feet of hardwood logs (Rodger & Jacobs 1954).

Between 1947 and the early 1960's, when the operation ceased, an estimated 47 million super feet of hardwood timber had been logged (Higgins 1994b).

Hardwood logging in the Brindabella Range 1951

Softwood forestry

Commercial softwood forestry in the ACT grew out of the establishment of the Federal Capital at Canberra and an associated program of landscape enhancement by planting of trees, including conifers at Stromlo and Green Hills (ANU 1973). The earliest planting was done in 1915 (Pryor 1939) and by the 1920's trees were being used to control soil erosion in some areas. Pines were planted on slopes near the Cotter water supply reservoir where the combined effects of over-clearing, over-grazing and rabbits had accelerated erosion (ANU 1973).

A report submitted by the Commonwealth Forestry Advisor in 1925 led to appointment of G J Rodger as Chief Forester in 1926. Rodger formulated and implemented a forestry program which included planting of conifers on a commercial scale, anticipating an annual planting of 500 acres (c.200ha) on a forty-year rotation (Rodger & Jacobs 1954).

The plantations had the following objectives:

- production of softwood mill timber and creation of a rural industry in the ACT
- replacement of inferior eucalypt forest of low economic value with plantations of high economic value
- minimising erosion and siltation of the Cotter reservoir induced by former clearing for grazing and establishment of an efficient catchment cover
- improvement of the Canberra environs by covering bare hills with trees, and by improved climate

(Pryor 1939).

Exploitation of the plantations commenced in 1930 and increased steadily. By the 1930's *Pinus radiata* had been shown to be clearly the most successful species at altitudes up to 4,000ft (1,300m), although experimental plantings had also been undertaken of Ponderosa Pine *P. ponderosa* and Corsican Pine *P. laricio*. Although these species did not display the same vigour as *P. radiata* (Rodger & Jacobs 1954) they were under consideration to replace *P. radiata* at higher elevations (where it is prone to snow damage), when plantations were extended into wetter forest types (Pryor 1939).

During the Depression the program was extended considerably. Plantations were begun at Kowen in 1927, Pierces Creek in 1932 and Uriarra in 1933. By 1940 more than 400 ha of pines were being planted each year (ANU 1973), although the program slowed again during World War II and sustained losses in the wildfires of 1939 and 1952. By 1954 the plantation estate of the Territory totalled 16,500 acres (6,675ha) and was anticipated to grow to 40,000 acres (16,200ha) (Rodger & Jacobs 1954).

Preparation for planting was described in 1939 as a process of fencing, eradicating rabbits and wombats, felling and burning eucalypts, preparing with plough or rotary hoe if possible, and digging holes by mattock into which trees were planted at 12ft (3.5m) spacings. Repeat treatment of eucalypt regeneration was usually required for up to three years, followed by pruning of the pines and thinning if required (Pryor 1939).

The control of forestry activities was initially undertaken by Lands Branch of the Federal Capital Commission, which was transferred to the Department of the Interior in 1950 and attached to the Forestry & Timber Bureau (Rodger & Jacobs 1954).

In the mid 1950's normal production was about 9 million super feet of logs per year, boosted by an additional 25 million super feet salvaged from pines up to 37 years old which were killed at Stromlo by the 1952 wildfires. The forecast from the anticipated estate of 40,000 acres (16,200ha) was an annual cut of at least 80 million super feet. About half of the timber produced in the plantations comprised logs suitable for making weatherboards, linings, mouldings and other building timbers for use in Canberra, with the remainder exported, mainly for case timber. In the 1950's this was diversified with establishment of a mill to produce woodflour from sawdust and edgings (Rodger & Jacobs 1954).

Prior to the 1950's, most planting had been undertaken in dry forest types but in 1954 it was forecast that future expansion of plantations in Uriarra would be '*towards areas of better rainfall and better soils*'. At that time the process for clearing eucalypts in higher rainfall areas generally involved two bulldozers with 500ft (150m) of heavy wire between them, with debris being burnt *in situ* (Rodger & Jacobs 1954). Most of the slopes around the Blundells Flat and Shannons Flat areas were divided into compartments bounded by roading, and initial clearing of these for pines took place in 1956-57 (mss NAA).

In the early 1960's, due to concerns about impacts on water quality, soil conservationists were engaged in this area, installing a number of dams and earth banks between upper slopes and Condor Creek. This practice had not previously been employed in the catchment (mss NAA). Despite such measures, concern at increased turbidity in the water supply due to forestry operations led to cessation of new planting in the catchment in Pierces Creek Forest in 1958 and

Uriarra Forest in 1961, and later plantings were concentrated on Stromlo and Kowen. As a result, by the end of 1972 about one third of the total area planted to *Pinus radiata* was in the Cotter catchment (ANU 1973).

The pines at Blundells and Shannons were harvested after about 35 years and replaced with a second rotation planted in (variously) 1992 to 1994. In this latter period, boundaries to some compartments were adjusted to provide better protection for riparian areas and to avoid excessively steep or inaccessible slopes.

The wildfires in January 2003 killed 10,500ha of the 16,000ha of pine plantations in the ACT (ACT Government 2006c).

Physical evidence: All timber in the pine plantations was killed in the January 2003 wildfires and has been removed except for a very few areas where protection of steep slopes or riparian areas has required its retention.

A number of soil conservation dams and earth banks remain, notably on the western side of Condor Creek below Coree (Compartments 420 and 424).

Traces of rabbit proof fencing can be found at Blundells Flat (not standing – wire only).

Forestry camps

Williams, J. (n.d.) lists a number of camps housing forestry workers near Uriarra:

- Blundell's Camp - on Condor Creek; in use 1936
- Uriarra - '*approximately 40 yards off Condor Stream* [sic]'; in use 1923 by men engaged in clearing and digging up rabbit burrows; later moved closer to Uriarra Homestead
- Bullock Paddock Camp – '*approximately one and half miles from Cotter River…near the Brindabella Road approximately one mile from the Uriarra Homestead and two point one miles from Conder River* [sic] *and edge of fall to Cotter River*'; in use 1929 and 1932
- Condor Creek [also known as Perret's Camp so most likely on Perrott family land near Thompsons Corner] – in use 1927, 1929, 1932; moved June 1932 '*to the right side* [?] *of the Brindabella Road'*.

It is unclear whether any of these relates to Condor Hut (or Condor Camp), which is recorded as being used as a forestry camp in the early 1930s and for immigrants in the later 1940s (Mortlock & Hueneke 1979). On a 1959 Tourist Map of the ACT (CDHS) this building is labelled as 'Forester's House'.

Condor Camp (Condor Hut)

Williams' list does not include Blue Range Camp east of Mount Blundell, established in 1943 to house Italian men during World War II. These 'persons of enemy origin' were required to engage in forestry operations that would otherwise have been starved of 'manpower' (Fraser & McJannett 1991). It is not known whether personnel 'detained' at Blue Range Camp were engaged in works at Blundells.

Williams' list also does not include Peter's Camp, located in a saddle on the Brindabella Range about halfway between Coree and Piccadilly Circus (L D Pryor in Higgins 1995).

Australian Archives has images of tents and huts at 'Forestry Camp, Mount Coree' dated October 1927. These postdate the images of the camp associated with the Australian Forestry School (AFS) in September 1927 (see section below).

Forestry workers Forestry Camp
Mount Coree Oct 1927

It is likely that the same site was used for the forestry camp listed as 'Blundell's Camp' on Condor Creek; in use in 1936. This camp may have used some of the structures shown in images of the Mount Coree camp, including portable timber huts known as 'cubicles'. This inference has some support in an account of the earliest organised mixed hiking to Mount Coree in 1932, which notes that '*The cubicle at Blundell's was available for the girls, and the boys slept out as they often had before*' (Allen et al 1977).

Physical evidence: There are no traces of any forestry camps at Blundells Flat.

Condor Hut (or Condor Camp) was destroyed by the January 2003 wildfires, leaving only the two chimney bases.

The former galley remaining from the 'detention' period at Blue Range Camp survived the January 2003 wildfires and this area has been the subject of a separate study.

FORESTRY RESEARCH AND EDUCATION

Australian Forestry School

The Australian Forestry School (AFS) was formally created in 1925 by Federal legislation and opened in Adelaide the following year. It moved in 1927 to temporary premises in Yarralumla (then called Westridge). The first director chose to stay in Adelaide, and was succeeded by C E (Charles Edward) Lane Poole, who was encouraged to move to Canberra by erection of a substantial residence next to the school (Gibbney 1988).

C E Lane Poole

Lane Poole served as Principal of the Australian Forestry School from 1927 to 1944, being succeeded by M R (Max) Jacobs from 1945 to 1959. The school transferred to ANU in 1965 (Carron 2000).

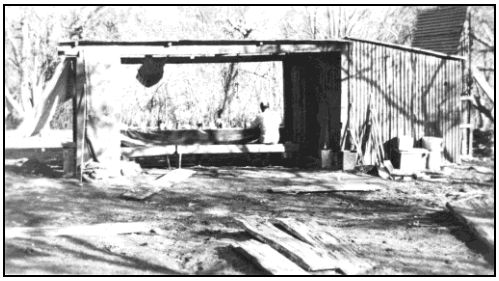
The National Archives of Australia (NAA) hold a series of nearly 30 images relating to the activities of the Australian Forestry School at Blundells Flat and environs. These include landscape views and images of 'the Forestry Camp' and people engaged in activities. Some are dated September 1927 and others October 1927. No information is provided on the source of the images.

Together these provide a valuable glimpse of the nature of the place at that time and its use by the AFS students.

Some of the images of activity include students with a motor car, measuring or processing timber, a group 'off duty', skiing or playing in snow (probably in *E. fastigata* below Coree).

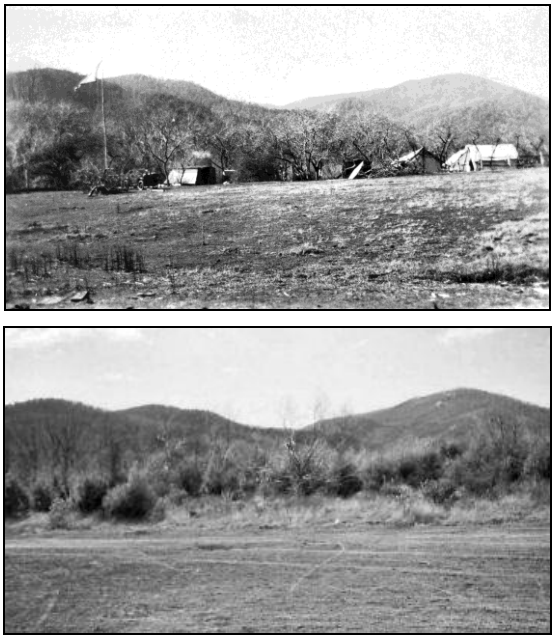
Of particular interest are a series of views of the camp, variously labelled the 'AFS Camp', 'Forest Survey Camp' or 'Forestry Camp', with location given as 'Mount Coree' or 'Condore Creek'.

These images show tents, timber cubicles, white painted rocks delineating access, a substantial galley, a 'swimming pool' and a flagpole flying the school colours.



AFS Camp 1927

The landscape context visible in some of the images enables confident location of the camp site on the Eastern Terrace, now occupied by the endangered eucalypt planting. The galley appears to have been located on the western edge of this area before it drops away steeply to the swimming hole developed on the creek/wetland area immediately below.



Site of AFS camp – 1927 (top); 2005 (bottom)

It is known that much of the work carried out on the first plots at the Blundells Arboretum in was carried out by students from the Australian Forestry School (Fielding; Hamilton; Pryor in Higgins 1995). Practical field work was a vital part of the AFS curriculum, with several camps included in the school year, two of these being of one month each. The 1927 Calendar for the AFS records 15% of working hours were to be spent in lectures, 20% in laboratory and demonstrations, and 65% in practical forest work. In that year camps were part of the courses Sylviculture, Sylvicultural Systems, Management, Logging and Milling, and Surveying. Arboreta were an integral part of the teaching resource. This declined somewhat after the functions of the AFS were transferred to the ANU in 1965, although the University continued to make occasional use of the arboreta (Terry 1993).

The portable timber cubicles shown in the NAA images are notable. It is thought that they were originally used as worker accommodation for the building of Canberra in the 1920's (John Gray *pers.comm*.). This is supported by images from the Mildenhall Collection at Australian Archives which show a 'hutted camp' consisting of dozens of these structures.

Louis Margules thought that these originated from the Cotter Dam site (Higgins 1994c). A tourist brochure from 1932-33, describing the Cotter Reserve states: '*There are also ideally situated camping grounds provided with cubicles which may be rented.*' A 1933 map of the Reserve shows a number of green huts with red roofs. These are likely to be those described by Margules, who notes that most of the forestry camp sites '*were made out of green cubicles*'.(Higgins 1994c).

Timber cubicles at the Mount Coree Forestry camp Oct 1927

Similar cubicles were used at the AFS at Yarralumla as student housing, being referred to by C E Lane Poole in papers as '*hutments*'. AFS students occupied these from the late 1920's in the area which is now Solander Place (John Gray *pers.comm*.) The cubicles were adjacent to three cottages erected for use as a mess, recreation block and ablution block for the students, with a Nissen Hut added later, being affectionately known as *The Waldorf.* They were replaced in 1952 by a new hostel in what is now Wilf Crane Circuit. A number of AFS graduates have supplied first hand accounts the cubicles, also nicknamed '*spruce cubes*' (Alan Brown *pers.comm*.).

In addition to those placed in forest areas at Pierces Creek and Mount Stromlo (Kim Wells *pers.comm*.), at least one remained at Blundells Flat, as indicated by reference to '*the cubicle at Blundell's*' in accounts of hiking to Mount Coree in 1932 (Allen et al 1977).

It has been suggested that some of the huts from Coree (probably those at Blundells Flat) were relocated to the Scout Camp at the Cottermouth, with others distributed throughout the ACT Forests estate (Sam McKay *pers.comm*.).

Physical evidence: There is no physical evidence remaining of the AFS camp.

All of the locations to which the timber cubicles are said to have been moved were lost in the January 2003 wildfires.

There are two surviving cubicles of this kind (but of unknown origin) in the grounds of Pialligo Wines.

Conifer arboretum

C E Lane Poole was appointed Forest Advisor to the Commonwealth in 1925, and Inspector-General of Forests in the Commonwealth Forestry Bureau from 1927 to 1945, (ACT Government 1992). One of the functions of the Bureau was to establish experimental stations for the study of silviculture, forest management and forest protection (Carron 1985). To this end, 34 arboreta were established in and near the ACT in the period 1928 to 1969, to test various species for possible introduction into Australia for timber production, with a view to reducing imports of timber, particularly softwood. Most of the species planted were conifers and most were sited to the west and south-west of Canberra on the Brindabella Range at elevations from 640 to 1,700 metres asl. These elevations were tested because it was felt that lowland areas would not be available for forestry due to urban development or would be less suitable climatically.

Although these arboreta demonstrated the clear superiority of *Pinus radiata*, this species had already been planted widely since the 19th century. There was concern, however, that heavy reliance on one species made the emerging softwood industry vulnerable to a pest or disease which could affect that species. It was prudent to seek alternative species, and the arboreta were part of such an 'insurance policy' (Turnbull in Higgins 1995).

Lane Poole was the driving force behind these arboreta (Fielding in Higgins 1995). The first rural arboretum was established at Laurel Camp in 1928 (Chapman & Varcoe 1984), but this was a poor site based on granite (Pryor in Higgins 1995). The next to be established, and the first 'upland arboretum', was at Blundells Flat, 6.1ha in area. It is variously referred to as 'Blundell's Flat Arboretum' (National Trust 1982), 'Coree (Blundell) Arboretum' (Forestry & Timber Bureau), 'Blundell Farm Arboretum' (Chapman & Varcoe 1984) or 'Condor Farm Arboretum' (NCPA 1989), but most commonly 'Blundells'.

By the time the arboreta were numbered, Laurel Camp had slipped to No.17 and Blundells became No.1. It remained as the largest and most diverse of the arboreta to be established by the Bureau. The first plots were planted there in 1929, with much of the work carried out by students from the newly established Australian Forestry School (Fielding; Hamilton; Pryor in Higgins 1995). Many of the original plots were destroyed in a wildfire in January 1939 (Turnbull in Higgins 1995), and were subsequently replanted, mostly with different species.

Other arboreta established nearby included Reids Pinch and Piccadilly Circus in 1932, and Bendora in 1940 (Higgins 1994a).

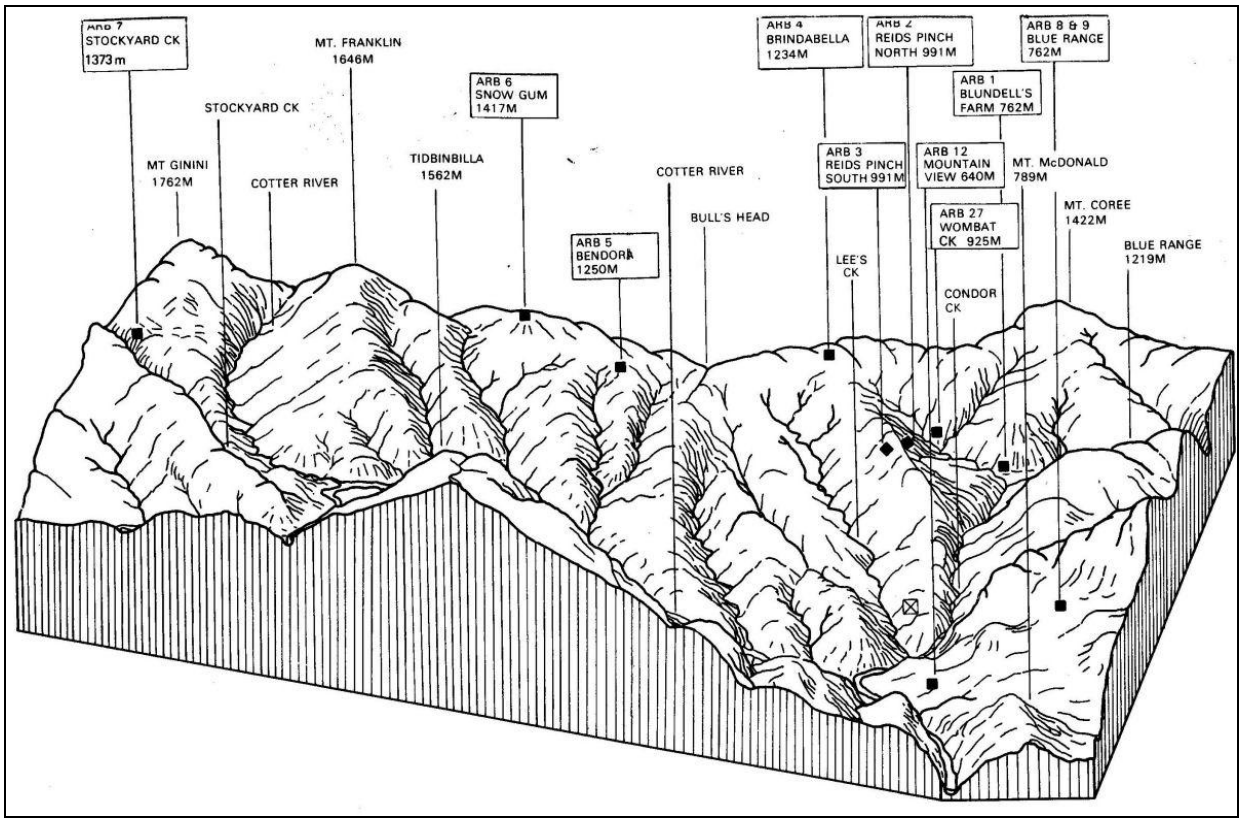
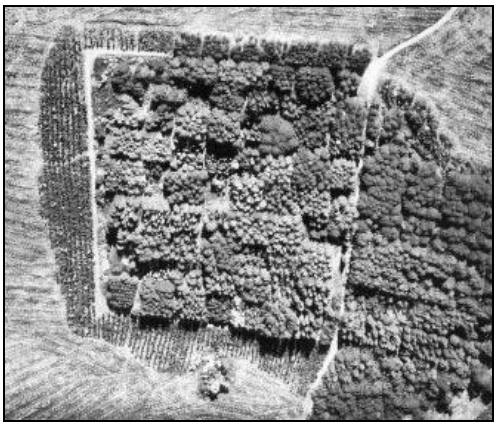


Figure 23 - Block diagram of western ACT showing scheme for development of arboreta

From 1955, the Blundells arboretum was extended to the east with other plantings of conifers, as well as pinoak *Quercus palustris*, a claret ash *Fraxinus oxycarpa* variety and some poplar and aspen *Populus* varieties. From 1958 a few conifers were planted on the eastern side of Condor Creek (Forestry & Timber Bureau plan n.d.).

In the 1990's facilities were established at the arboretum to assist interpretation and education. Plots were labelled, and a marked trail led through the arboretum and by a footbridge over Condor Creek to the site of Blundell's farmhouse and the picnic area (Fearnside 2002).



Blundells Arboretum aerial Sep 1999

In 2002 a detailed draft citation was prepared for entry on the ACT interim Heritage Register of Blundells Arboretum plots 1-82, 101-106 and 117-122. As at February 2000, the arboretum contained 76 species from 18 different genera, in 97 plots. Some of the conifers were rare, uncommon or unusual in Australia. These included Atlantic cedar (*Cedrus libani* var. *atlantica*), incense cedar (*Calocedrus decurrens*), two pines from China (*Pinus tabulaeformis* and *P. massoniana*), spruces (*Picea* sp.) and Spanish fir (*Abies pinsapo*), several white pines from North America and the Himalayas, Lawson's cypress (*Chamaecyparis lawsoniana*), Durango pine (*Pinus durangensis*), scots pine (*Pinus sylvestris*), juniper (*Juniperus communis*), several hybrids bred by the world's leading forest geneticists of the time, some Mexican species, and black pine (*Pinus nigra*) from different provenances. One plot had been re-planted with Tasmanian blue gum (*Eucalyptus globulus*) (Fearnside 2002).

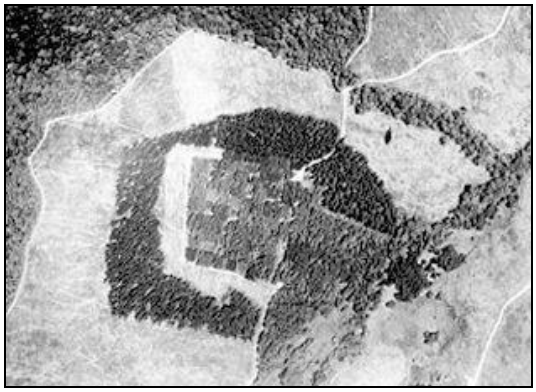
As a result of the January 2003 wildfire nearly all of the trees in the conifer arboretum were killed, although *P. canariensis* and two other species were observed to re-sprout from the trunk, and numerous seedlings were germinated. The fire also destroyed all the interpretive signs and the bridge on the walking track leading from the picnic area.

Increased ground visibility for a time enabled location of some traces associated with forestry research use, such as remains of rabbit proof fencing and terra cotta potsherds (the latter collected by ACT Heritage).

Growth measurements had been made in the arboretum plots until 1972 (Terry 1993), and were completed by Friends of ACT Arboreta (FACTA) volunteers before any of the burnt trees were removed. FACTA made recommendations to retain as much fabric as possible from the lost arboretum, to be enabled by careful salvage logging and debris removal.

Some timber was selected for salvage on the basis of species and this was extracted with minimal disturbance to regeneration. There were hopes that this would be used extensively as internal finish in the new ACT Forests headquarters being constructed near Stromlo to replace the infrastructure destroyed in January 2003. This optimism was short-lived, although some timber from the Blundells Arboretum was able to be used in display cases in the new building.

The time lag involved in further debris removal meant that, despite best endeavours, much of the regenerating seedlings or suckers would inevitably be affected by machinery. This casts doubt over the structure which might now be expected to regenerate naturally in the arboretum area.



Blundells Arboretum and its distinctive 'collar' c.1991

Physical evidence: Following debris removal, the only tangible traces of the arboretum are some sign posts and brackets, the track which marked out the original square to be planted, and the differential regeneration pattern in the former cleared area which formed a 'collar' around the arboretum. Over some decades the track and the 'collar' provided readily recognisable markers which have assisted location and navigation in air photographs and similar images. This remains the case at April 2008.

Poplar arboretum (populetum)

In the late 1950's an arboretum dedicated to poplars, initially about 70m square, was established on a flat on the eastern side of Condor Creek. The south-eastern half was planted in 1959, and the remainder by 1963. Sources of material include the USA, Canada, New Zealand, UK, South Africa and local cultivars (Forestry & Timber Bureau plan n.d.). A second part of the arboretum to the north of the original square was commenced in 1959 and continued until at least 1966. Cultivation or slashing by tractor was carried out between rows to control weeds, fertiliser was applied and trees were pruned. Height measurements were recorded (ms – FRI 2112).

These poplars were trialled by Prof. L D Pryor among others as part of an extensive research program to improve availability of matchsticks (splints) in Australia (John Banks *pers.comm*.). A statement from Australia to the International Poplar Commission in 1965 noted that in the previous six years demand for poplar timber for use in the match industry had stimulated planting in this country. By 1970 the estimated volume required annually for matches would be about 7 million super feet (Brown 1965).

The report noted that 782 acres of plantations were established near Tumut, Grafton and at Cobram in Victoria, with another 300 acres proposed in 1965 and continuing to a total of 4,600 acres. It recommended that plantations be developed on good, well-drained bottom lands which would otherwise be used for agriculture (Brown 1965).

Other reports noted that the populetum at Blundells Flat experienced a number of setbacks, including defoliation due to dry conditions (1960), damage to leaves and shoots by honey bees (1965) and damage by wallabies (1967) to new clones planted in the previous year (ms FRI 2112).

Other poplar plantings were undertaken by the Forestry and Timber Bureau in the ACT from 1948 to at least 1969, at Paddys River, Westbourne Woods and Uriarra Forest, using clone material from a large variety of overseas and Australian sources (ms FRI 2112). None of these other plantings appear to have been as carefully prepared, maintained and monitored as the arboretum at Blundells.

Demand for match splints, and consequently funds for research, waned over later decades (not assisted by the onset of cheap butane lighters). This may help to explain why this trial tended to receive less attention than the conifer arboretum. Another factor may have been that, despite the considerable effort expended on the Blundells poplar arboretum, its clones never became part of the mainstream poplar growing industry. This may be partly due to the arrival of poplar leaf rust in about 1972, and partly due to availability of cheaper supplies of match splints from Scandinavia and more recently Indonesia (Colin Matheson *pers.comm*.).

Potential new niche markets for poplar timber as veneer are now emerging, and varieties formerly established at Blundells Flat may yet prove to be of economic value. Material from the best performing clones was gathered in the 1990's and grown on at the Australian National University. However, an alternative site will be required due to proposed redevelopment of the ANU site (John Banks *pers.comm*.).

Poplar arboretum below Mount Coree 2006

Physical evidence: In the January 2003 wildfires all trees in the poplar arboretum were killed. Although numerous suckers have arisen following the fire, it is unclear whether these can be true to variety or whether their variety can be identified. Timber posts, wire and mesh in parts of the fence around the poplar arboretum survived the fires and serve to delineate the original area of planting (showing also that poplar suckers have spread well beyond that area).

Other forestry research

Prior to the second rotation of pines, forestry maps indicate that part of Compartment 411 at Blundells Flat was used for 'spacing plots'. No further documentation has been located.

Other trials at Blundells Flat involved application of boron to counteract effects of poor drainage in Compartment 414. Areas where boron was applied showed much improved growth rates compared with untreated sites (Neil Cooper *pers.comm.*).

See also 'Other Research and Education' below for forest hydrology and catchment studies.

Physical evidence: None

Endangered eucalypt seed orchard

The area referred to here as the Eastern Terrace includes several rows of eucalypts planted at set spacings, immediately north of the picnic area. This is shown on forest management maps as an 'Endangered Seed Orchard'. After being cleared of pines after a first rotation, the site was allocated for a 'gene preservation stand' of Small Leaved Gum *Eucalyptus parvifolia* Cambage (Neil Cooper *pers.comm*.).

This species is now within *E. parvula* L A S Johnston & K Hill. It is endemic to tablelands east and south-east of Cooma in NSW at elevations >1000m asl (Brooker & Kleinig 1999).

The species was selected because it was considered to be endangered, due to restricted distribution and impact of grazing. It is naturally found on wet to swampy sites at about 1,100m asl in shallow valleys to the south-east of Nimmitabel, and grows to 8-12 m in height. Apart from its very limited distribution, Interest in the species arises from its high level of resistance to cold when planted in the northern hemisphere (Pryor 1981).

The gene preservation work at Blundells Flat was undertaken in 1992 (Terry 1993). It was a joint project of ACT Forests and CSIRO (through Tim Vercoe) and was directed at developing a suitable source of seed to ensure the survival of the species (Neil Cooper *pers.comm*.).

It was noted that interspecific hybrids with either *E. rubida* or *E. viminalis* are common at the periphery of natural stands, and that this must be taken into account in a reproduction program (Pryor 1981). The Blundells site was favoured because it was distant from eucalypts flowering at the same time. The technique involved planting of six specimens of each tree from which seed had been collected, with the intention of selecting the two best forms from each parent. A similar approach was employed at a site in the Kowen Forest with a different endangered eucalypt species (Neil Cooper *pers.comm*.).

The eucalypt planting was also used for educational purposes, being visited by Forestry students and by others as part of the interpretive trail leading from the picnic area to the arboretum (Neil Cooper *pers.comm*.).

It is interesting to note that *E. parvifolia* was one of the cold-tolerant eucalypts planted in the 1950's close to Pryors Hut near Mount Ginini as part of a field trial testing frost resistance. This species was labelled as part of the foundation for an 'alpine annexe' to the National Botanic Gardens (Lindsay Pryor *pers.comm.*). It is not known whether there was any link between the genetic source material used at Pryors Hut and that used at Blundells.

Physical evidence: All trees in the seed orchard were affected by the January 2003 wildfires, but have resprouted from epicormic buds and/or lignotubers, with most recovering strongly. The planting rows, spacing patterns and variant forms remain clearly visible.

Farm forestry trials of eucalypts

The *E. viminalis* at Blundells Flat were examined for their potential for commercial forestry in a joint project involving CSIRO Forestry and Forest Products and ACT Forests, commencing in 1984. In trial plantings at Uriarra the Blundells Flat provenance was found to be a well performed subject for farm forestry plantation, although prone to defoliation by beetles and sawfly larvae. It was promoted for pulp production (Australian Tree Seed Centre Web site).

Physical evidence: None

School planting of eucalypts

More related to education than research, a planting of eucalypts was undertaken in 1992 south of the Blundells Flat picnic area by ACT Forests with students of Uriarra Primary School. The site had been harvested after its first rotation but was not to be replanted to pine. Yarralumla Nursery grew tubestock for the planting from seed which was collected from Blundells Flat by CSIRO (Neil Cooper *pers.comm*.).

This school was a natural choice for a 'planting partner'. First located on 'Uriarra', north of the homestead, the school existed sporadically from 1897 to 1936. After its move to the Uriarra Forestry Settlement in 1937 it became intimately linked with ACT forestry, and had numerous Blundell descendants on its rolls. It became a public school in 1940 (Welch 1986).

The planting commemorates a school which no longer exists in its own right, having been amalgamated with Weston to form Weston Creek Primary School at the end of 2000 (Dave Jamieson *pers.comm*.).

Physical evidence: Following the January 2003 wildfires eucalypts in this area have resprouted from epicormic buds and/or lignotubers, with most recovering strongly.

A routed timber sign commemorating the planting was extant in 2006 but has since been removed.

OTHER RESEARCH AND EDUCATION

The Blundells Flat area features frequently in localities cited for a range of biological collections based in Canberra. These have not been searched systematically for references.

One notable association is with the field of entomology. Blundells is a locality cited for a number of insect species with records in the Australian National Insect Collection, dating from the late 1920's through to late 1940's at least. There may be in the order of 40 insect species for which Blundells is cited as the type locality (Kim Pullen *pers.comm*.).

Most of these records predated the establishment of pine plantations in the area. However, some published works (e.g. Fuller 1936 and Mackerras & Fuller 1942) record collection of specimens in the Wetland Soak and Eastern Meadow areas, and it should not be presumed that the plantations extinguished habitat for all species.

André Léon Tonnoir was a notable insect taxonomist and collector who joined CSIR (later CSIRO) Entomology in 1929. Tonnoir frequently spent his weekends collecting insects in the bush. When he failed to return from his camp at Blundells after one such weekend in January 1940, he was located '*lying in the shade of a tree in an attitude of peaceful sleep*', having presumably died of heart failure (Upton 1997).

André Léon Tonnoir

In the 1980's it was noted that the Cotter catchment was used extensively by numerous organisations for research. It was stated that there were no equivalent alternative areas in the ACT or surroundings for these uses. Cited examples of research included vegetation stand dynamics, fauna, fire ecology, nutrient cycling, and hydrology and water quality responses to burning and other management treatments (NCDC 1986).

Educational use of the catchment was said to involve students from preschool to postgraduate, as well as many special interest groups relating to birdwatching, nature interpretation and archaeology, with these activities often associated with bushwalking (NCDC 1986).

The same report noted that the CSIRO Divisions of Water & Land Resources and Forest Research were continuing projects established by the Forest Research Institute (NCDC 1986). This included a series of instrumented catchments established in the Cotter catchment between 1964 and 1972 to obtain data on water chemistry and examine the impacts of different management treatments. Some catchments were paired for immediate treatment and others subject to long term measurement before treatments were applied. Data on a wide range of water quality parameters were still being collected from 1974 to 1977 at 19 sampling sites, including:

- Sunshine – an experimental catchment of 4.2 sq km at the head of Condor Creek, on a mix of volcanics and metasediments. from 850 to 1,300m asl
- Two Sticks – a permanent groundwater spring, on Devonian volcanics near the top of the range at 1,150m asl
- Condor Creek– a station at 1,000m asl on Devonian volcanics on an ungauged creek (actually Fastigata Creek)

(Talsma & Hallam 1982)

Physical evidence: Two concrete weirs on Condor Creek relate to the experimental catchments established by the Forest Research Institute in the 1960's and 70's. The higher of these was the Sunshine sampling station (also known as Sunny Corner on 1999 forest maps), which was accessed by a track from the Brindabella Road. The other lies below Blundells Flat and just above the first ford on the old access track. Its relationship to sampling sites used in the 1970's is unclear, and it may postdate the Sunshine weir.

BUSH FIRE PROTECTION

Documented fire history (ANU 1973) shows repeated burning of this area by wildfire in the first half of the 20th century. This included at least the following (areas cited are within Cotter catchment only):

- 1906 – Coree Flats to 'Mountain View', with 700 ha burnt
- 1915 – Devils Peak gorge to north-east Uriarra, with 850 ha burnt
- 1917 – from Coree Flats to Uriarra Forest via Mt Blundell, 450 ha burnt
- 1918 – Mount Coree to Bulgar Creek, with 2,600 ha burnt
- 1926 - three large fires in the Cotter, including Condor Creek, the Coree area and the Bulls Head–Tidbinbilla area, with 25,000 ha burnt (due to careless use of fire)
- 1929 - Mount Coree via Blue Range to Swamp Creek, north of catchment; and
- 1939 - three fires in extreme weather, spotting up to 24km, with about 14,000 ha of bush and 1,200 ha of pine plantation burnt (careless use of fire).

This records that Blundells Flat was burnt by wildfire on at least three occasions following the departure of the Blundell family from the area - in 1918, 1926 and 1939. A similar picture is likely for Shannons Flat. Note that this record is much more detailed than that included in Carey et al (2003) which might suggest that the area has not experienced a major fire since 1920, with particular variance evident in the mapped extent of the 1926 fires.

Following the extensive 1939 wildfires, measures were taken by the Commonwealth to provide greater protection for the Cotter catchment and associated pine plantations from fires entering the Territory from NSW. Some of these had been recommended following fires in 1920 and 1926, but had not been implemented.

The response after the 1939 fires included (ANU 1973):

- formation of the Bush Fire Council (August 1939) to coordinate resources
- improved vehicle access
- construction of water storage dams
- a program of control burning
- grazing in pine plantations
- construction of fire lookouts
- cooperation with NSW fire authorities to stop fires before they entered the Territory; and
- leasing of a large area in NSW adjoining the border for systematic control burning.

The lease for bush fire protection was not effected until 1944, but the other measures appear to have commenced prior to this. Forest rangers Maxwell and Oldfield were based at Bulls Head from 1939 to about 1950, carrying out fuel reduction across the area and watching for fires from lookouts established in trees on the Brindabella Range (Maxwell in Higgins 1995).

From about the 1970's a system of fire towers was established in the ACT, at Mount Coree, Mount Tennent near Tharwa, and Kowen to the east, supplemented later by Mount Stromlo and Mount McDonald. While these were focused on forest protection, a new tower was established in 1994 on One Tree Hill near Hall to monitor the rural-urban interface and areas north-west of the Territory. The Coree tower was destroyed in the January 2003 wildfires, but a replacement was commissioned in January 2004.

Physical evidence: Few tangible traces remain of the period 1939-50. The fire lookout trees have not survived and only one of the huts used by forestry rangers in the bush fire lease area remains.

The closest hut to Blundells Flat was Coree Hut, just north of Coree Flats in NSW, originally built in about 1945 for the use of forestry rangers. It was later renewed as a weatherboard hut, removed in the 1980's following vandalism.

Bag Range Hut, further north in NSW, was also used by rangers as a fire lookout (Maxwell in Higgins 1995), and still stands in Brindabella National Park.

TOURISM AND RECREATION

The earliest association of the Blundells Flat area with tourism dates back to the period of residence of the Blundell family.

A newspaper article recorded that: '*During* [John Blundell's] *residence at Condon* [sic], *particularly of later years, 'Condon* [sic] *House' was a very favourite place for tourists, and Mr & Mrs Blundell made their home 'a home away from home' for all who sought their hospitality, and even the man who humped 'Matilda' was always given the best of treatment'.* (newspaper clipping, Tumut 1927).

This suggests that John Blundell was one of the first in the district to act as what would now be called a nature based tourism operator.

His capacity was at least partly due to his early upbringing and half a century of establishing his property in the remote valley below Mount Coree. Of his foundation years, Bluett (1954) recorded that John Blundell's early playmates were Aboriginal children: *'They taught him all the…lore of the bush, and in particular how to use it in the production of his day's needs should other sources fail.'*

Roy Bush, a descendant of John Blundell, holds photographs taken by one of his clients, Mr A G H Lovell of London, in about 1910. These record the kind of experiences that a visitor could gain by a few days in the bush with John Blundell, showing packhorses, a camp at Sandy Flat on the Goodradigbee, and cleaning a catch of fish.

John Blundell guiding in the bush c.1910

Other photographs held by the Bush family show John Blundell in company with John Gale trout fishing on the Goodradigbee near Brindabella in 1910. Rainbow trout had been introduced to the Goodradigbee in the 1890's, and Gale was an ardent promoter of its value as a trout stream from the early 1900's (Gale 1904).

John Gale, John Blundell and fishing party near Brindabella (1910)

It is recorded that John Blundell guided botanist R H Cambage to the summit of Coree in 1911, also traversing wet gullies in the area (presumably Fastigata Creek). John Blundell was also able to provide information on Aboriginal use of some plant species (Cambage 1918).

John Blundell and tree ferns below Coree (1911)

Several references have been made in sections above to the use of Blundells Flat by early hikers from Canberra, in particular the earliest organised mixed hiking to Mount Coree in 1932. The five crossings (or 'five fords') of Condor Creek were referred to in numerous accounts of walkers and skiers in attempting to get vehicles to the Brindabella Range in the 1930's and 40's (Allen et al 1977; Higgins 1994a), as they had been in Gale's account of the trip on horseback in 1875 (Gale 1903a). The name 'Five Fords' appears on a number of maps, including tourist maps from the 1920's to the late 1950's and, despite re-routing of the Brindabella Road away from the crossings, this name remained on the base map used in ANU (1973).

Bushwalkers helping cars through one of the Five Fords of Condor Creek (1933)

A few decades after the early bushwalks from Canberra, Coree was a focus for rockclimbers. In 1963 Bryden Allen of the Sydney Rockclimbing Club compiled 'Rock Climbs of NSW', the first climbing guide produced in NSW (and probably Australia), which included climbs on Mount Coree (Gleeson 2001). It remains an attraction to climbers, with Dale & Gome (nd) noting some 51 climbs on Coree.

In the 1970's Blundells Flat had been considered as a prime candidate for development to help cater for such a demand for recreation:

This area has attractive vistas of the surrounding ranges and has great potential for development as an intensive picnic area. The upper slopes of the Flat are capable of immediate development for picnicking, and associated walks through the pine forest and along Condor Creek could be developed. There are some excellent stands of brown barrel and ribbon gum immediately adjacent to the pine forests to the north of the Flat, and walking trails could be developed here. The lower areas of the flat are swampy and, at some future date, may require drainage or possibly development as a small ornamental lake.
It is recommended that a detailed plan to encourage the use of this site be prepared including access requirements, facilities to be provided and phasing of development.'
(ANU 1973).

Despite such enthusiasm, the Flat was not drained or converted to a lake.

However, the general area was becoming popular with visitors and was being promoted in a number of guidebook publications.

Mortlock & Hueneke (1979) promoted '*day adventures by car from Canberra to the Brindabella Mountains and beyond*'. These included 'Mount Blundell', 'Condor Creek and the Six Fords' and 'Two Sticks Road to Mount Coree'.

Mortlock & O'Loghlin (1977) provided details and a map of a two and a half hour duration walking route around the Flat:
'*Blundells Flat is worth a visit any time of the year, but autumn is perhaps best since the deciduous hardwoods* [sic] *in the valley are in colour and the blackberries in fruit.'*

ACT Forests developed and managed recreational facilities at Blundells, including several fireplaces, picnic tables and an interpretive walking trail from the picnic area via a timber bridge across Condor Creek to the conifer arboretum, which also had numbered posts and interpretive signs.

Blundells picnic area (?late 1980's)

Fraser & McJannett (1991) described a short excursion for drivers and walkers at Blundells:
'Historically and biologically a very interesting area, although the pines and associated works have covered much of the obvious fascination. The Arboretum however is worth a visit as a sort of international 'tree zoo', and one of the largest collections of exotic trees species in Australia. It is well pathed and sign-posted.'

Because of the proximity of the plantation areas to Canberra, and because of the kinmd of recreational opportunity they provided, the pine areas of the ACT were very heavily used for recreation, with an estimated usage of one million visitors each year (Mackay 2003).

Blundells Flat was a logical and popular 'jumping off' point for forays into the northern part of the Brindabella Range, and this pattern has continued to the present.

An Internet search reveals records and images of diverse recreational use in this area, including rockclimbing, canyoning, walking, bush driving and mountain running (8km from , from Blundells Flat to the top of Mount Coree). These range from small groups to large organised events, and nearly all make reference to Blundells Flat as a meeting place or start/finish point for the activity.

Physical evidence: Traces of interpretive sign brackets and track posts survive at Blundells Flat.

HISTORIC THEMES

The Australian Historic Themes Framework (AHC 2001) has been developed by the Australian Heritage Commission as a tool to assist in:

- emphasising historical processes and connections in assessing places
- emphasising historical values of places rather than a fabric based assessment
- structuring research and preparing interpretive texts
- explaining how particular elements of a place are significant because of their ability to illustrate important aspects of its history.

In particular, themes assist building of storylines on layers of history, some of which may no longer be evident in the places themselves.

The NSW Heritage Office has issued State Historical Themes relevant to that State.

Some relevant themes for Blundells Flat, Shannons Flat and environs include:

Peopling Australia	
Related NSW Historical Themes: *Aboriginal contact*	
Living as Australia's earliest inhabitants *Adapting to diverse environments*	Evidence of use by Indigenous people for camping Association with harvesting of Bogong moths, linked to 'moth feasts' at Uriarra Association of local Aboriginal people showing pathways to European settlers
Related NSW Historical Themes: *Convict; Migration; Persons*	
Coming to Australia as a punishment *Migrating* *Promoting settlement*	Name association with early families (Blundell, McKenzie, Shumack, McDonald), in turn with notable landholders (Campbell of Duntroon, Davis & Wright of Lanyon) Some families with convict origins (Blundell, McKenzie, Shannon) Noted in early recorded journeys of exploration and trade (Murray & Mowle)
Developing local, regional and national economies	
Related NSW Historical Themes: *Exploration; Pastoralism; Land tenure; Mining*	
Surveying the continent *Looking for overland stock routes* *Prospecting for precious metals* *Looking for land with agricultural potential* *Laying out boundaries*	Association with Coree (Pabral) and Mitchell map 1834 Associations with development of stock routes from Uriarra/Yarralumla to Brindabella and mountain outstations (e.g. Coolamine) Associations with goldseeker routes to Kiandra 1860s and Brindabella 1880s-90s
Related NSW Historical Themes: *Mining; Environment; Science; Fishing; Persons*	
Utilising natural resources *Mining* *Making forests into a saleable resource*	Base metal prospect at Mt Blundell (1890s; 1920s) Hardwood logging (1940s to 60s) Commonwealth Forestry – first upland arboretum and most diverse; association with pine production trials (Forestry & Timber Bureau) and poplar clone trials; association with notable foresters (e.g. Lane Poole, Pryor) and notable international geneticists

***Developing local, regional and national economies* (continued)**	
Related NSW Historical Themes: *Communication; Transport*	
Establishing communications *Establishing postal services*	Association with mail route Uriarra to Brindabella (and from Queanbeyan via Uriarra punt)
Moving goods and people *Moving goods and people on land* *Building and maintaining roads*	Blundell family notable in district as carriers through several generations Successive changes to grade/route of Brindabella Road
Related NSW Historical Themes: *Pastoralism; Persons*	
Struggling with remoteness, hardship and failure *Dealing with hazards and disasters*	Noted in descriptions 1875 (Gale) for remoteness as a place to live, including pastoral visits (P G Smith) History of bushfire up to January 2003 Place of Coree area in Jan 2003 wildfires
Related NSW Historical Themes: *Environment; Utilities*	
Altering the environment *Clearing vegetation* *Establishing water supplies*	Conflict over forestry activity and catchment protection Protection of Condor Creek as part of catchment for Cotter Dam Resumption of holdings and depopulation of catchment Rabbit control and reafforestation strategies
Related NSW Historical Themes: *Leisure*	
Catering for tourists	Early nature-based tourism based on 'bush experiences' Early bushwalking and rock climbing from Canberra Early trout fishing in Goodradigbee and Cotter (Gale)
Educating	
Related NSW Historical Themes: *Education*	
Establishing schools *Training people for the workplace*	Association with Australian Forestry School in late 1920s and emergence of forestry as a profession in Australia Use of arboreta for forestry education Association with Uriarra School, planting of eucalypts School houses at Shannons Flat, Condor Creek
Governing	
Related NSW Historical Themes: *Land tenure; Government and administration*	
Federating Australia	Federal Territory establishment and subsequent border survey (Sheaffe; Pulver)
Developing Australia's cultural life	
Related NSW Historical Themes: *Leisure*	
Organising recreation *Enjoying the natural environment*	Established pattern of nature-based recreation, continuing to diversify

CHRONOLOGY

1820 Charles Throsby Smith, Joseph Wild & James Vaughan locate Limestone Plains
1821 Charles Throsby locates Murrumbidgee River
1823 Capt Mark Currie & Capt John Ovens pass through Limestone Plains to locate Monaro Plains
1824 Hume & Hovell travel from Lake George to Port Phillip via Wee Jasper valley
1824 Allan Cunningham at Limestone Plains; crosses to west side of Murrumbidgee
1824 Joshua Moore's workers establish 'Canbury' station
1825 James Ainslie establishes 'Duntroon' station for Robert Campbell
1826 George Thomas Palmer establishes 'Palmerville' on Ginninderra Creek
1828 Goulburn laid out as a town
1829 Surveyor-General Thomas Mitchell refers to peak of Pabral (later Coree)
1829 Surveyor Dixon charts course of the Murrumbidgee to Yass plains
1829 NSW Nineteen Counties define Limits of Settlement, County Murray the south-west limit
1829 T A Murray takes up his first holding at Ajamatong, NW corner of Lake George
1831 System of free grants virtually ceased; replaced with sale by auction
1832 Macphersons of 'Springbank' become first resident landholders in district
1833 Surveyor Stapylton charts the course of the Goodradigbee (Coodradigbee) River
1834 Mitchell publishes the first map of the Colony of NSW (showing Pabral peak)
1834 John Lhotsky notes all land at Limestone Plains held by a few settlers; describes Brindabellas
1834 Wright Bros & Lanyon establish 'Lanyon' station
1834 Tharwa settled
1835 Post offices established at Yass and Strathallan (Braidwood)
1836 Limestone Plains post office established at Queanbeyan
1836 Charles Sturt selects land at 'Belconnen'
1837 Resident Police Magistrate established at Queanbeyan
1837 Surveyor Robert Dixon's map published showing landholders on Molonglo and Murrumbidgee
1837 T A Murray acquires 'Yarralumla' with partner Walker
1837 Thomas McQuoid establishes 'Tuggeranong'
1837 Dr William Foxton Hayley first medical practitioner in district at Queanbeyan
1838 Severe drought begins (lasting four years); Murrumbidgee and Molonglo Rivers dry up
1838 Surveyor James Larmer lays out Queanbeyan town
1838 Stewart Mowle joins T A Murray at Yarralumla; Murray goes to Brindabella via Condor Creek
1839 James Wright establishes 'Cuppacumbalong' at Tharwa
1839 T A Murray travels to Coolamine and beyond; establishes outstation at Coolamine
1841 T A Murray travels to Mannus and Melbourne
1841 T A Murray 'conquers' Pabral; Foundation stone laid at St John's church
1841 Assignment of convicts ceases in NSW
1842 George Webb establishes 'Tidbinbilla'
1843 John Blundell born Liverpool Plains/Sarah McKenzie born Lanyon
1844 Blundell family arrive at 'Canbury'
1845 Joseph Blundell joins Campbell property of 'Duntroon'
1845 St John's Church consecrated
1847 Andrew Cunningham purchases 'Lanyon'
1848 Wells gazetteer lists Pabral Peak
1848 Joseph Franklin purchases land in Brindabella valley
c.1849-50 Joseph Franklin family occupies hut near Condor Creek, 12 km WSW of Urayarra
1850 John McDonald married Eliza Webb, daughter of George Webb of Tidbinbilla
1851 Gold discovered in Bathurst district
1834 Webb and McDonald families settle at 'Urayarra'
1855 Rev. Pierce Gaillard Smith becomes Rector at St Johns (until 1906)

1856 Alexander McKenzie joins Campbell property of ‘Duntroon’
1858 Blundell’s Cottage erected for William Ginn
1858 Punt operating at Uriarra (until 1880’s)
1859 Payable gold discovered at Kiandra
1859 Post office established at Ginninderra
1860 T A Murray becomes district’s first Parliamentary representative
1860 Post office established at Lanyon
1860 John Gale founds *Golden Age* newspaper at Queanbeyan
1860s Robertson Land Acts; John McDonald selects at Blundells Flat
1862 Tharwa proclaimed
1862 John Blundell marries Sarah Ann McKenzie at St John’s (both 19)
1864 Gold exploited at Brindabella
1866 John and Sarah Blundell move to ‘Condor’
1866 George Webb sells ‘Tidbinbilla’ and moves to ‘Urayarra’ with three sons to join McDonalds
1867 Railway reaches Goulburn
1871 County Cowley map names Coree (also as Pabral)
1874 George and Flora Blundell take over cottage ‘Poplar Grove’, Church Lane
1875 John Gale records travels from Uriarra to Brindabella via Blundells
1875 Samuel Adolphus Shannon born (eldest to Abraham and Emily Kate Allen)
1878 Mail service begins to Yarralumla and Uriarra
1881 Brindabella alluvial gold workings by William Reid (intermittent until 1914)
1884 Abraham Blundell dies/last birth to John and Sarah Blundell
1884 Uriarra Road officially opened (had been a track only)
1885 Railway reaches Bungendore
1885 Middle Cotter North Run held by Joseph & William Webb 27,400 acres
1887 Railway reaches Queanbeyan
1887 TSR gazetted from Uriarra area, along range and down to Brindabella
1889 Snow Lease system introduced in NSW high country for grazing during drought periods
1890 New punt at Uriarra (wrecked in flood)
1890 Abraham Shannon takes up ‘The Valley’ at Uriarra (200 acres)
1893 John Blundell jr (Jack) formalises portions at Blundells Flat
1895 Tharwa bridge opened (first bridge over Murrumbidgee)
1897 New punt at Uriarra
1890’s (late) Mount Blundell base metal prospect (lead-zinc-silver-gold) operating
1899 John and Phoebe Blundell fifth child (first registered Condor)
1899 Samuel Adolphus Shannon marries Martha Southwell
1900 Samuel Adolphus Shannon formalises holdings (103 acres)
1901 Federation; Commonwealth of Australia comes into being
1901 First low level bridge over Murrumbidgee at Uriarra opened
1902-1907 Blundell sons formalise holdings at Nottingham c.10,000 acres
1903 John Gale records journeys into Brindabella Range and beyond
1904 Coree Creek adopted as name for previous Pabral Mountain Creek or Condor Creek
1904 John Gale publishes account of trout fishing in the Goodradigbee River
1906 Wildfire burns from Coree Flats to ‘Mountain View’ (700 ha)
1908 Yass-Canberra formally selected as site for Federal Capital
1908 Grazing leases in Cotter valley revert to 12 month term
1908 John McDonald dies age 79
1908 John Blundell mortgages all holdings at Condor to Arthur Brassey of Acton
1910 Land ceded by NSW for Federal Capital Territory (FCT)
1910 FCT border survey begun by Sheaffe on Coree to One Tree Hill section

1911 Federal Capital Territory formally established
1911 Census population of 1,714 persons in FCT
1911 Grazing leases in Cotter catchment terminated
1911 Health authorities recommend permanent reservation of Cotter catchment from occupation
1912 Construction begins on Cotter Dam water supply for Canberra
1912 J H L Cumpston inspects Cotter catchment; urges depopulation or relocation of residences
1912 Walter Burley Griffin design wins national capital competition
1913 Valuation reports for Blundell, McDonald, Shannon and Perrott holdings (valuer Moriarty)
1913 Land holdings acquired for Federal Territory
1913 Canberra announced as name for the Federal Capital
1913 Road built around Mt McDonald to high level bridge at Cotter
1913 Shannon family leaves Cotter catchment
1914 Second valuation report for Blundell holdings
1914 T C G Weston inspects Cotter to advise on reafforestation
1914 Proposals for 30 mile rabbit proof fence around and above Cotter Dam
1914 Cotter River Ordinance regulates access and use to protect water supply catchment
1915 Second valuation of Perrott holdings; compensation dispute settled in Court
1915 Early pine plantings at Stromlo by T C G Weston
1915 Wildfire burns from Devils Peak gorge to north-east Uriarra (850 ha)
1915 Cotter dam completed
1916 Mining lease in Mount Blundell area cancelled
1917 Northern part of Cotter catchment reserved from sale in NSW
1917 Wildfire burns from Coree Flats to Uriarra Forest via Mt Blundell (450 ha)
1917 John and Phoebe Blundell family leave Cotter catchment and move to 'Fairvale'
1918 – Wildfire burns from Mount Coree to Bulgar Creek (2,600 ha)
1919 Severe drought – temporary agistment of stock permitted in parts of Cotter catchment
1919 John and Phoebe Blundell family move to Tumorrama near Wee Jasper
1920 Sarah Blundell dies Sydney
1922 Commonwealth seeks purchase of part Cotter catchment in NSW estimated 1,400 acres
1923 Commonwealth and NSW in High Court dispute over acquisition of part Cotter catchment
1924 NSW agrees to acquisition of part Cotter catchment without compensation for mineral rights
1924 First Federal Cabinet meeting to be held in Canberra
1925 Australian Forestry School established
1925 C E Lane Poole appointed Forest Advisor to Commonwealth
c.1926 First pines planted Cotter dam to control erosion from overgrazing and rabbits
1926 Australian Forestry School opens in Adelaide
1926 Regular pine plantings commence in Uriarra and Pierces Creek forests
1926 Large wildfires in Cotter at Condor Creek, Coree, Bulls Head –Tidbinbilla (25,000 ha)
1926 First attempt to survey Cotter catchment area in NSW thwarted by bushfires
1926 Pulver surveys Cotter catchment in NSW – total of 2,561 acres
1927 First sitting of Parliament in Canberra using provisional Parliament House
1927 Commonwealth acquires northern part of Cotter catchment from NSW
1927 Australian Forestry School moves to Canberra (C E Lane Poole Principal to 1944)
1927 C E Lane Poole appointed Inspector-General of Forests in Commonwealth Forestry Bureau
1927 Australian Forestry School camp at Blundells Flat
1927 John Blundell dies 'Forest Lodge', Tumorrama; buried Tumut
1928 First rural arboretum at Laurel Camp
1929 John Gale dies aged 99
1929 Large wildfire burns Mount Coree via Blue Range to Swamp Creek
1929 Blundells Farm Arboretum established (first upland arboretum)

1930 Commonwealth Forestry and Timber Bureau established by legislation
c.1931 Earliest complaints about impacts of forestry operations on Cotter water supply catchment
1931 Federal Highway completed Goulburn to Canberra
1931 First clearing of native forest for pines in Cotter catchment
1932 Account of earliest organised mixed hiking to Mount Coree; camp at Blundells
1932 Arboreta established at Reids Pinch and Piccadilly Circus
1933 Uriarra pine plantation begun (Pierces Creek 1932; Kowen 1927)
c.1934 Rayner's Sawmill at Lees Creek begins operation
1934 Canberra Alpine Club formally established
1935 Work begun on Mount Franklin Road (C E Lane Poole among its advocates)
1936 Tidbinbilla Nature Reserve established
1936 Forestry camp at Blundells Flat in use
1936 Airfield established at Duntroon
1937 Road reaches Mount Franklin
1938 Federal Capital Territory becomes Australian Capital Territory
1938 Franklin Chalet erected and opened
1938 Proposals to re-open Mount Blundell mine rejected due to concern for catchment
1939 Severe wildfires burn c.14,000 ha of bush and 1,200 ha of pine in Cotter inc Blundells
1939 Bush Fire Council established; Forest rangers established at Bulls Head (to c.1950)
1940 Bendora Arboretum established
1940 Andre Leon Tonnoir, early insect taxonomist and collector with CSIRO, dies at Blundells
1940s Hardwood logging below Coree (until early 1960's)
1942 Blue Range camp established for 'persons of enemy origin'
1943 Phoebe Blundell dies; buried Tumut
1944 Max Jacobs Principal of Australian Forestry School
1944 Initial gazettal of Kosciusko State Park; protects 75% of catchments for Snowy Scheme
1944 Lease for fire protection in NSW established
1945 Coree Hut built near Coree Flats in NSW
1946 David Perrott dies; buried Queanbeyan
1948 Martha Shannon dies; buried Queanbeyan
1949 ACT gains representative in Federal Parliament
1950 Cotter Dam wall raised 7.5m
1952 Pryors Hut erected and initial plantings undertaken for alpine annexe of the Botanic Gardens
1955 Blundells Flat arboretum extended east of road
1955 Quality of Canberra water supply questioned in turbidity 'crisis'; forestry operations curtailed
1956 Initial clearing of native vegetation for pine plantations at Blundells Farm
1956 Plantations proposed in Coree Creek-Coree Flats area and north side of Condor Creek
1956 A B Costin consulted on value of native forest to resist soil erosion in Cotter
1957 First plantations installed at Blundells Farm
1958 Trial conifer plantings east of Condor Creek at Blundells Flat
1958 New pine planting ceases in Pierces Creek Forest due to concern for Cotter catchment
1958 Upper Tumut-Yass 330kV transmission line across Cotter - Piccadilly Circus to Condor bridge
1958 Grazing ended in Kosciusko National Park at altitudes above 1,350m
1959 Earliest poplar clone trials east of Condor Creek at Blundells Flat (more to 1966)
1959 Soil conservation measures in Coree area to reduce impact from clearing for plantations
1959 Questions in both Houses of Federal Parliament about discolouration of Canberra water
1959 Samuel Adolphus Shannon dies; buried Queanbeyan
1959 NCDC proposes loop road to link Mt Franklin Road to Naas via Upper Cotter; rejected
1960 Hardwood logging ceases in Brindabella Range/Cotter catchment
1961 Bendora Dam completed

1961 Lindsay Pryor criticises impact of forestry operations on Cotter water quality
1961 New pine planting ceases in Uriarra Forest due to concern for catchment
1962 Interim Teakle report on Cotter Dam catchment (Prof L J H Teakle, University of Qld)
1965 Australian Forestry School moves to ANU
1965 Draft Teakle report on Canberra water supply catchment control related to water quality
1967 Lindsay Pryor again criticises impact of forestry operations on Cotter water quality
1967 Gravity water main from Bendora Dam completed
1968 Corin Dam completed
1969 Kosciusko becomes National Park under NSW NPWS
1970s Fire towers established in ACT including at Coree
1973 ANU resource and management survey of the Cotter catchment
1978 Proposals for upgraded road to Tumut via Brindabella (one option through Blundells Flat)
1979 Gudgenby Nature Reserve established
1979 Googong Dam completed
1980 Dr Josephine Flood records Blundells Flat Aboriginal site; publishes *The Moth Hunters*
1984 Namadgi National Park gazetted (including former Gudgenby Nature Reserve)
1984 Northern Brindabellas entered on Register of the National Estate
1985 Bimberi Nature Reserve (NSW) gazetted
1985 NCDC Cotter Catchment draft Policy Plan
1986 Australian Alps national parks cooperative agreement established
1988 ACT gains self-government
1988 Inclusion of Blundells Flat in north extension of Namadgi National Park recommended
1990 Remains of Blundells farmhouse site and orchard removed
1991 Namadgi National Park extended north along Brindabella Range to Coree-Mount Blundell
1992 Harvesting of first pine rotation at Blundells Flat
1992 CSIRO endangered eucalypt plantation/seed orchard established at Blundells Flat
1992 Eucalypt planting with Uriarra Primary School at Blundells Flat
1992 to 94 Planting of second pine rotation at Blundells Flat and Shannons Flat
1996 Brindabella National Park (NSW) initial gazettal
1996 ACT-NSW cross border agreement on fire management and suppression signed
1999 Mount Coree area (NSW) added to Brindabella National Park
2001 Goodradigbee River section added to Brindabella National Park (NSW)
2002 Draft citation prepared for Blundells Arboretum entry in ACT interim Heritage Register
2003 Severe and extensive wildfires affect much of ACT including Blundells and Shannons
2003 'Shaping Our Territory' report reviews land use options over the area affected by fires
2004 Cotter Dam recommissioned as source of drinking water
2004 Replacement fire tower on Mount Coree
2004 Background study on Blundells Flat area (upper Condor Creek catchment)
2005 ACTEW Future water options study emphasises primacy of water quality in Cotter
2006 Lower Cotter Strategic Management Plan

LANDSCAPE CHANGE

This section sets out investigation and interpretation of changes in landscape appearance resulting from past development and use

Phases of occupation and use described here include:

- pre-settlement (pre-1860's)
- pastoral occupation (1860's to 1915)
- research and educational use (1920's to 1990's)
- softwood forestry production (1950's to 2003)
- post-2003 fires to present

Summary

Element	Physical evidence	Documentary evidence
Pre-settlement landscape	Unclear; deduced	Nil
Pastoral occupation landscape	Some fruit trees from orchard Exotic trees and other plants Homestead site debris	Portion plans; valuation reports Contemporary photographs of Blundell Farm
Research & educational use landscape - Blundells Flat	Conifer arboretum remains; Poplar arboretum remains; Eucalypt seed orchard	Planting plans; files Oral sources Contemporary photographs of Aust Forestry School camp Air photos
Softwood forestry production landscape	Debris or standing dead pine, roading, dams	Planting plans Air photos
Post-fire 2003-present landscape	Debris Physical management interventions	Air photos Photographs post-2003

Pre-settlement landscape (pre-1860's)

Biologist John Calaby speculated in the past that Blundells Flat was probably kept open by use of fire by Aboriginal people (Flood 1980). However, the combined effects of waterlogging and cold air drainage would probably be sufficient to explain the relative openness of the Flat.

The pattern of native regeneration since the January 2003 wildfires may provide the strongest indication of the pre-settlement landscape, although this is likely to take some decades to stabilise.

Pastoral occupation landscape **(1860's to 1917)**

Original portion plans for the Blundells Flat area were compiled in a succession of surveys from 1871 to 1899, and include contemporary descriptions of the landscape, although caution is required in interpreting botanical descriptions by surveyors.

In 1871 the large wetland area on Condor Creek (clearly shown) was flanked to the south-east by '*well grassed open forest*' on granite, with survey marks cut into peppermints, messmate (most likely Brown Barrel *Eucalyptus fastigata*) and gum. Further east (along the current access road) in 1883 '*undulating*' country lay below a '*steep densely wooded peppermint and gum ridge*'.

To the south along Condor Creek were '*steep stony and barren ridges*' while along Fastigata Creek '*very steep ridges*' were '*heavily timbered*' with '*gum and peppermint timber*'. To the north, in 1893-99 Musk Creek and Coree Creek drained '*lightly grassed mountainous country*', '*heavily timbered with gum, messmate and a little peppermint*".

There is some information in these plans about the practices of European settlers at the Flat, with about 10 acres of '*clearing*' shown in 1871, corresponding to the current picnic ground, and an area of ringbarking shown in 1883 on steeper country to the east.

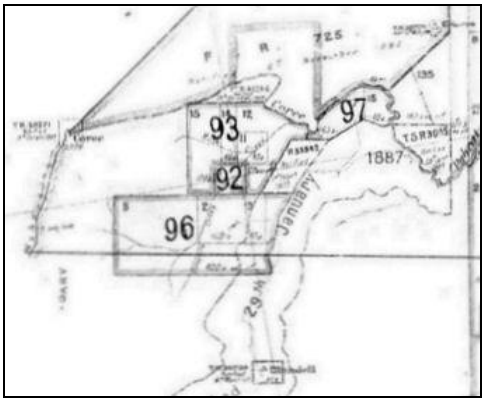


Figure 24 - Federal Capital Territory Holdings

Valuation records date from 1912 to 1914, and offer further descriptions of the landscape. The report for Holding 92 (estate J. McDonald) noted ringbarking of messmate, gum, box and apple, with about 26 to 30 acres (of 40 acres) '*well killed and cleaned up*'. It noted '*some flat devoid of timber*' and '*swampy flat now fairly drained by creek*'.

The report for Holding 96 (J. Blundell snr) of 560 acres noted 40 acres cleared at the house with '*a small rich flat at the creek*'. The valuer's field book recorded of this block (portion 2) that water was abundant in creeks and springs, with a patch of several acres of springs along the creek. Some 100 acres of the holding was partially cleared, leaving 420 acres (portion 5) running up the slopes of Coree and the ridge to the south, described as '*rough mountain land, quite unimproved*' with '*a fair amount of messmate timber*' (probably *E. fastigata*).

A subsequent valuation noted that '*nearly all* [of portion 2 of 100 acres] *has originally been dense forest*', now cleared and grubbed, and ringbarking and burning off, affecting mountain gum, stringybark and white gum. It also noted 20 willows '*fairly well grown along the creek*' and an orchard of 120 fruit trees. To the east (portion 3 of 40 acres) the hillside was '*originally dense gum and stringybark forest with undergrowth and bracken, now fairly well killed and partially burned off*', with '*access to springs and creeks*'. To the south (portion 5 of 420 acres) was '*heavily timbered with well grown mountain timber*'.

The report for Holding 93 (J. Blundell jnr) of 320 acres to the north of the Flat noted extensive ringbarking, burning off, clearing and grubbing of just over 100 acres which was '*originally mountain gum, stringybark and undergrowth, now killed*'. Of the remaining 220 acres, most was rung, with about 40 acres suckering again, noting that this is '*bad country to kill*'. Also noted were '*good narrow grassy and springy creek flats*' with '*abundant creeks and springs*', and indication of '*draining*' which had been '*dug out through boggy land*'.

A series of parallel drains is clearly visible in the Eastern Meadow. These are narrow and up to about 80cm deep. It is presumed that they relate to efforts to expand the area suitable for pine planting because:

- they are not visible on aerial photographs from the 1940's but are clearly visible on aerial photographs from the 1990's; and
- they are clearly evident in an overview photograph of the fledgling plantations taken from the ground in 1958.

Heavy ringbarking on the hills to the east and willows along the creek at Blundells Flat c.1910

Although they appear to have been unsuccessful in expanding the planting area, the drains almost certainly lower the water table in this area, contribute to exposure and desiccation of humic soils, and may contribute sediment loads to ponds at the base of the meadow area during peak flows.

Such indications in the historic record and field observations of human modification of hydrology, suggest that the landscape of today is very likely to have been altered from that of the pre-settlement phase.

Studies in the Upper Murrumbidgee catchment indicate that prior to the 20th century most upland valleys were '*swampy meadows with water flowing through what is now commonly termed wet tussock areas*', with defined channels confined to the slopes above the valley floor (Starr et al n.d.). This is broadly the kind of structure evident in the Eastern Meadow and Western Meadow at Blundells Flat, and it is possible that it formerly extended over more of the valley floor below the Wetland Soak.

On Condor Creek this may have taken the form of a 'chain-of-ponds', circular or oval basins of water separated by organic-rich alluvial soil and fed by springs and valley floor aquifers (Starr et al n.d.). The unconsolidated nature of some of the alluvial flats along the sinuous course of the creek is consistent with early descriptions of how soft such channels were to cross. The potential for a 'chain-of-ponds' structure is also suggested by descriptions in the valuation reports of 1913 which noted numerous springs in the valley floor downstream from the soak.

One indication to the contrary is that 'chain-of-ponds' systems characteristically have a dense fringing or covering vegetation, but few large trees (Starr et al n.d.), whereas the riparian zone of Condor Creek now supports vigorous stands of *E. viminalis* and *E. stellulata*. The value of this as an indicator depends on how much time has elapsed since the compromise of any 'chain-of-ponds' structure which may have previously existed. An increase in eucalypt pollen noted in the study of the soak (Hope et al. unpubl.) appears to approximate the period of settlement. It is possible that this reflects a shift in dominant vegetation to large trees as the form of drainage changed.

In the Upper Murrumbidgee catchment, evidence suggests that significant gully and channel erosion took place in the period between initial white settlement and the mid to late 1800's, with most gullies appearing to reach their maximum depth and width during that time (Starr et al n.d.). At Blundells Flat any human-induced erosion would most likely have commenced between 1870 and 1917, although it may have continued in later phases of use.

Valuation reports describe the extent of ringbarking and clearing, some on moderately steep slopes, to the east and north of the flat, borne out by contemporary photographs. Also notable is a reference to drainage which was '*dug out through boggy land*' on the line of what is now the decidedly straight channel of Musk Creek. If this was indeed excavated, it may have stopped Musk Creek from terminating in an extensive soak of which the Western Meadow is a remnant.

The Western Meadow is developed behind a significant granite outcrop with a lower outcrop on the opposite bank which terminates the Eastern Meadow. It is conceivable that historically these combined with alluvium to form a barrier or flow retarding structure of the same sort which retained the Wetland Soak. This point marks the downstream limit of valley floor soaks and seeps, beyond which Condor Creek follows a relatively straight course.

It is possible that much of the valley floor of upper Condor Creek, particularly on the area underlain (and confined) by granites, was formerly a series of swampy meadows, with a degree of ponding on the creek line and adjacent. This may have been compromised (up to a century or more ago) by erosion due to clearing, and to draining of water holding areas. Wildfires and deliberate application of fire (noted in valuation reports in association with clearing) may also have reduced litter cover and allowed slope soils to become drier and more dispersible.

Based on patterns noted by Starr et al (n.d.), it seems likely that the Condor Creek alluvium was exposed in the past by increased overland flow and sediment transport, and possibly fire as well, whether human-induced or natural in origin. The highly dispersible nature of the alluvium would have allowed the creek to cut a defined channel, entrenching its former course. Above the presumed barrier point, the low gradient of the valley floor would have caused lateral shifting and deposition of sediment overbank or in swampy areas between incised reaches, resulting in a sinuous course. Incision would have exposed poorly consolidated alluvial deposits that had previously formed floodplains. Below the barrier point, the creek would have entrenched in its straighter course.

If this interpretation is correct, as the creek channel incised and the groundwater of the valley floor dropped, there may have been up to 100 years available for the nature of riparian vegetation to change to include the eucalypts which already characterised the riparian zone upstream from the soak. It is notable that 1940's aerial photographs show the sinuous course of Condor Creek below the soak, marked by stands of *E. viminalis* at very much lower density than is evident today. It is also notable that the tall and dense stand of *E. viminalis* and other forest eucalypts now found immediately south of the site of the conifer arboretum, and the landmark stand in the middle of the Eastern Meadow, were barely visible in a photograph taken from the ground in 1958, indicating a capacity for rapid growth of this forest formation.

The original portion plans for Shannons Flat (portions 16 and 17) were compiled from surveys undertaken in 1900, and note that the land was '*thickly timbered*' with gum, peppermint and stringybark. The valuation report for Holding 97 (S. Shannon) from 1913 noted that the '*messmate and gum, stringybark and undergrowth*' had originally been very dense, but was '*now thoroughly killed and well cleaned up*'.

These reports suggest that prior to pastoral occupation dense forest grew on the slopes and foothills around Blundells Flat and Shannons Flat, probably right to the edge of swampy flats, which were extensive. This is also indicated since the 2003 wildfires by the pattern of native regeneration where no machinery has been used, with high densities of forest eucalypt and acacia seedlings initially establishing themselves in wetter areas but subsequently succumbing to impeded drainage.

The reports also make clear that the pastoral phase saw significant clearing take place to the east and north of the main wetland and flat area at Blundells Flat, and right across Shannons Flat. Indications of drains at Blundells Flat suggest attempts to reduce the area of swampy flats there to allow use for cultivation and/or to provide more open water for stock, while establishment of willows and other exotic trees near the Blundell homestead is also noted.

The end of the pastoral occupation phase did not signal an end to grazing of this area, with consequent impacts on landscape. It seems likely that, due to their relative proximity to the Cotter Dam, Blundells Flat and Shannons Flat were not grazed by stock during temporary drought relief agistment in 1919. However, both were almost certainly grazed over several decades by stock using the Travelling Stock Route between Canberra and Brindabella, and passing through the Five Fords across Condor Creek. Although it is unclear when this latter practice ceased, in 1937 C E Lane Poole observed that the Stock Route was still being traversed by '*thousands of sheep annually*'. In 1956 a Ministerial briefing advised that Condor Creek drained '*the areas previously used for the agistment of sheep*', and tests consistently showed pollution of this catchment (mss NAA).

Physical evidence: The strongest element remaining of the pastoral occupation landscape at Blundells Flat is likely to be the open Eastern Meadow area.

No evidence remains of the pastoral occupation phase at Shannons Flat.

Research and educational use landscape (1920's to 1990's)

Photographs of Blundells Flat dating from 1927 (a decade after the departure of the Blundell family) show the valley floor with open swampy areas and large dead trees with woody weeds and fruit trees.

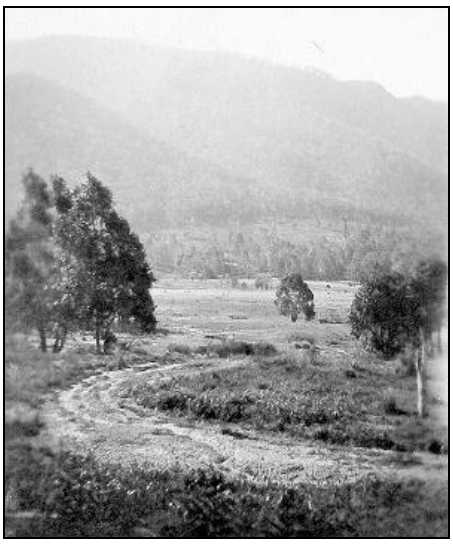
Blundells Flat 1927

In the early part of the research and educational use phase there is likely to have been clearing of native regrowth to establish the conifer arboretum (within the former holdings of J. Blundell jnr) on the lower slopes of Mount Coree. Images dated 1927 and 1931 taken from the access road shows these lower slopes as sparsely vegetated with regrowth.

Mt Coree in snow 1927

A scientific paper (Fuller 1936) about biology of a species of fly collected at Blundells Flat describes the area of collection in the following terms: *'the soil…was never dry nor saturated; in general it was moderately damp….The surface of the ground was covered with grasses and a small group of willows was close by…Between the willows and Coree* [Condor] *Creek, which was 65 yards distant, the ground was slightly lower and was covered with marsh grasses, being in places saturated'*. The images accompanying the text allow confident identification of this site as the Eastern Meadow immediately upslope from the later poplar arboretum.

This confirms other records and photographs (e.g. MS FRI 2112) which indicate that no significant landscape change was required to establish the poplar arboretum in 1959-64, as this took place in an area of tussock grassland (probably *Poa* sp.) with a few reeds (probably *Phragmites* sp.). This vegetation prevails near the remains of the poplar arboretum today.



Blundells Flat 1931

A later paper (Mackerras & Fuller 1942) describes the area in October 1934 as: '*a small mountain plain, known as Blundell's, at the foot of Mount Coree, A.C.T. A creek running along this valley widens into a small swamp*' [where fly larvae were collected]. In August 1935 '*the swamp at Blundell's was under water and the creeks running high as a result of snow and rain during the winter…* [A] *small area on the bank of the main creek opposite to the swamp was examined. The area was from one to four feet from the water, and consisted of saturated black mud with no vegetation.'*

This and associated descriptions confirm that the Wetland Soak area was largely similar in form to what we see today, with associated humic soils waterlogged for at least some of the year. The description of the swamp being under water is not a common event today, and this may suggest that water levels have been lowered, possibly by incision of Condor Creek.

Establishment of the endangered eucalypt plantation and seed orchard on the Eastern Terrace area did not involve any significant landscape change, since it followed harvesting of a rotation of pines in 1992, as did native species plantings with the Uriarra school in the same year.

Physical evidence: Surviving landscape elements from this phase at Blundells Flat are discussed in more detail above in *Forestry Research and Education*.

The research and education phase is not relevant to Shannons Flat.

Softwood forestry production landscape (1956 to 2003)

Starting in the 1950's this phase saw very significant landscape change at both Blundells Flat and Shannons Flat, with removal of all standing native vegetation in delineated forest compartments and construction of associated roading.

Some native vegetation bands were retained, such as the band between compartments 408 and 409, linking the spur from Uriarra Hill across Condor Creek to the ridge separating Blundells Flat and Shannons Flat (but not continuing beyond this or connecting directly with any other native vegetation to the south).

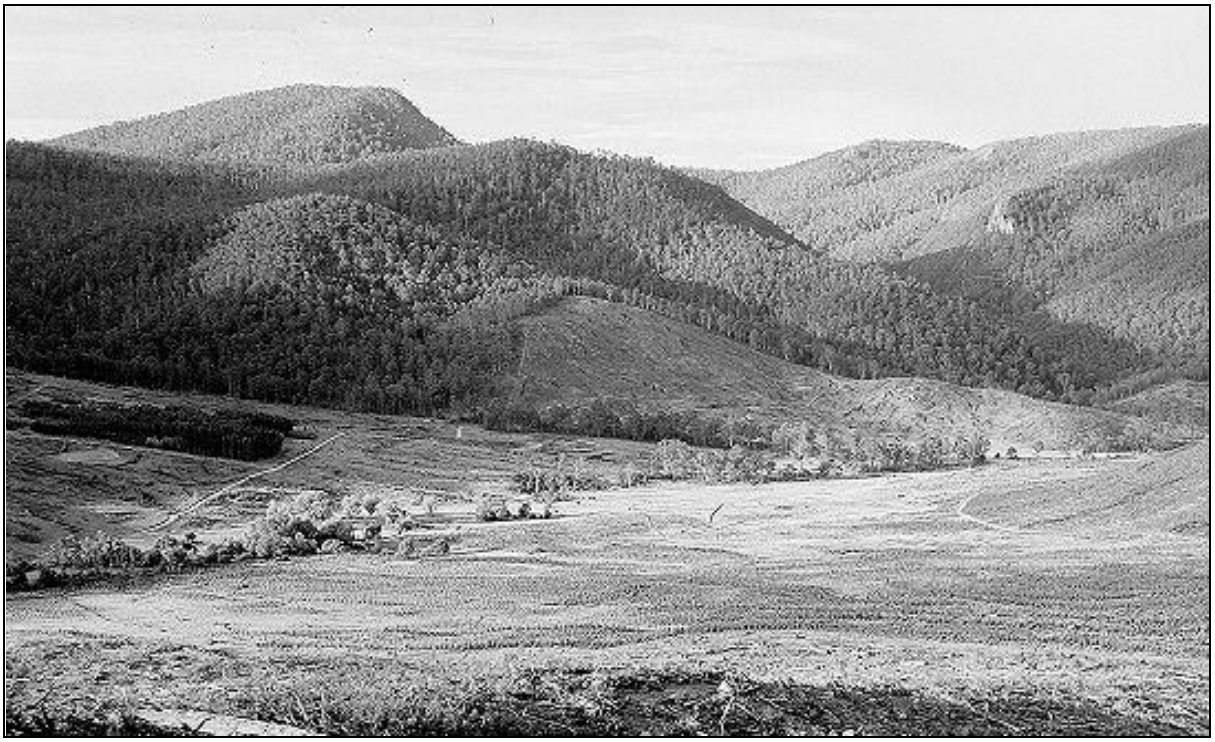
An image of Blundells Flat dated 1958 shows windrows from native forest cleared on foothills and slopes but a valley floor that would appear to have already been largely clear. This image also shows that the patch of native forest on the western side of Condor Creek just south of the conifer arboretum was clear in the 1950's. Despite appearances, the tall dense forest there today represents less than five decades of regrowth. Similarly, the landmark stand of *E. viminalis* in the middle of the Eastern Meadow has emerged over the same period.

This phase of plantation development was notable for the introduction of dams and roll-over banks installed by soil conservation officers due to concerns for catchment protection. Some of these are visible in the 1958 image on the Western Slopes below Coree and above Condor Creek.

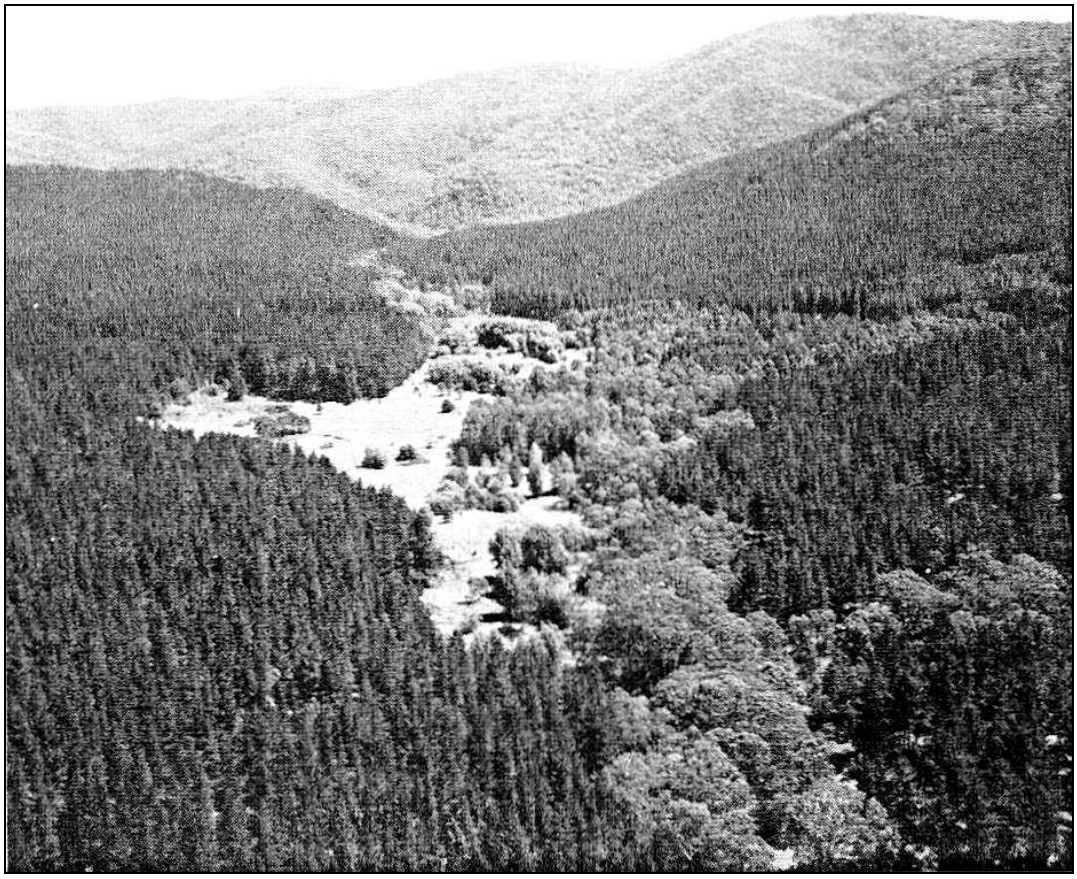
Second rotation plantations Blundells Flat 2001

The swampy areas at Blundells Flat appear to have inhibited plantation development, just as they appear to have previously inhibited native forest. Mapping from the 1960's of several compartments indicates with dotted lines the extent of planting to the edge of the swampy flats, such as in 415 (Eastern Meadow) and 418 (Western Meadow). Drains are visible in the Eastern Meadow in the 1958 image.

Photographs from the late 1980's show riparian buffers on major streams such as Condor Creek, and Musk Creek. Mapping from the 1990's shows a riparian buffer also on Coree Creek, and removal of part of the plantation area in a protective 'collar' around Blundells Arboretum and on steep southern slopes of Mount Coree. These are also evident in 2001 aerial photography.



View from the south; detail from 'Mt Coree Pine plantation 1958', shortly after pine establishment (Blundells Arboretum visible at left of image)



Blundells Flat from the north c.1989, shortly before harvesting of first rotation plantations

At Shannons Flat, aerial photography from 2001 shows that the swampiest ground remained unforested or only thinly forested, i.e. by inference it had inhibited establishment of pines. Mapping from the 1990's indicates that swampy areas here had not been replanted in the second rotation in 1987. A block of poplars was mapped on Wombat Creek. The density of plantations would have greatly limited views of these open areas.

Because of their proximity to Canberra and because of the particular forms of recreational opportunity they provided, the plantation forests were very heavily used for forest recreation, with an estimated usage of one million visitors each year (Mackay 2003).

ACT Forests developed and managed recreational facilities to support this use. At Blundells this included fireplaces, picnic tables and an interpretive walking trail from the picnic area via a timber bridge across Condor Creek to the conifer arboretum, which also had interpretive posts and signs. There was no infrastructure at Shannons Flat, although the name 'Shannons Flat picnic area' is ascribed, curiously, to a small area near Thompsons Corner.

Physical evidence: Surviving elements of the softwood forestry landscape include:

- limited areas of dead pine which have been left standing or have been track-rolled only, due to environmental or heritage management concerns
- soil conservation dams and roll-over banks at Blundells Flat.

Second rotation plantations Shannons Flat 2001

Landscape post-fire 2003-present

In January 2003 extensive wildfires began in the Brindabella Range and burnt about two-thirds of the ACT, resulting in the deaths of four people and the destruction of nearly 500 houses (McLeod 2003). They also destroyed about 10,500 ha of the 16,600 ha of softwood (*Pinus radiata*) plantations managed by ACT Forests. The burnt plantations included all of the Uriarra, Pierces Creek and Stromlo Forests (Bartlett et al 2005).

A number of images record the landscape at Blundells Flat within days before the passage of the 2003 wildfire.

The intensity of fires in the Blundells Flat and Shannons Flat areas on 18 January 2003 was high to very high (ACT Government 2006c) and the landscape impacts were consequently significant. All softwood plantations and both arboreta were killed, native ground cover was removed, and management infrastructure destroyed, with significant input of ash and debris into streams.

Further details of specific impacts are included in relevant sections of this Plan.

Efforts to stabilise the landscape and restore control of public access in the first year following the fires were delayed by the significant scale of damage inflicted on ACT Forests resources and infrastructure, well beyond the capacity of management to address promptly.

Hydrology was affected, with elevated water tables across the area, and significant amounts of soil were being mobilised. In the lag time before management effort became apparent once again, the area experienced episodes of significant vandalism, including severe littering and dumping of cars, and baring of regenerating ground surfaces due to uncontrolled vehicle access.

Following the fires, ACT Forests undertook salvage logging at Blundells Flat in the conifer arboretum, followed by an extensive program of debris removal from slopes above and within the area of flats. Debris removal techniques were modified in response to natural and cultural heritage values identified prior to this Plan (Butz 2004) and in response to additional information generated during preparation of this Plan. As a result, in some areas dead pines were left standing with no machinery access, while others were carefully treated (some being track-rolled only) to minimise disruption of ground cover and native regeneration, and to reduce soil compaction.

At Shannons Flat, natural values were less understood at that time. Debris removal did not intentionally avoid *Eucalyptus camphora*, although avoidance of riparian sites led fortuitously to protection of some regeneration. Heavy machinery broke open humic soils and activated surface water flow in hillslope seeps, while windrow fires wandered and burned a sizeable area of regenerating *E. camphora*.

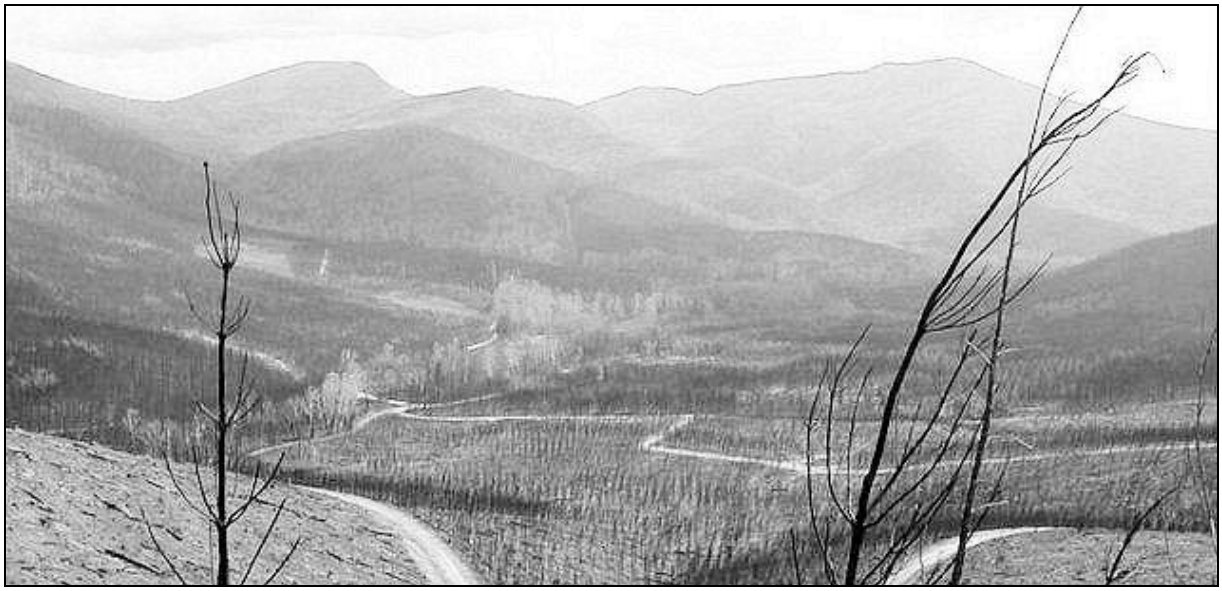
Following salvage logging and debris removal at both Blundells Flat and Shannons Flat in 2005 and 2006, ACT Forests also undertook a program to close and rehabilitate roads which would no longer be required. These efforts were partly successful although they focused visitor traffic on a smaller range of roads, which intensified impact in those areas, including some archaeologically and ecologically sensitive areas.

Access remained largely uncontrolled and episodes of vehicle damage, littering and car dumping continued to affect the landscape regularly until 2007, when some access was permanently removed, and other tracks were blocked by large earth/rock banks or by gates.

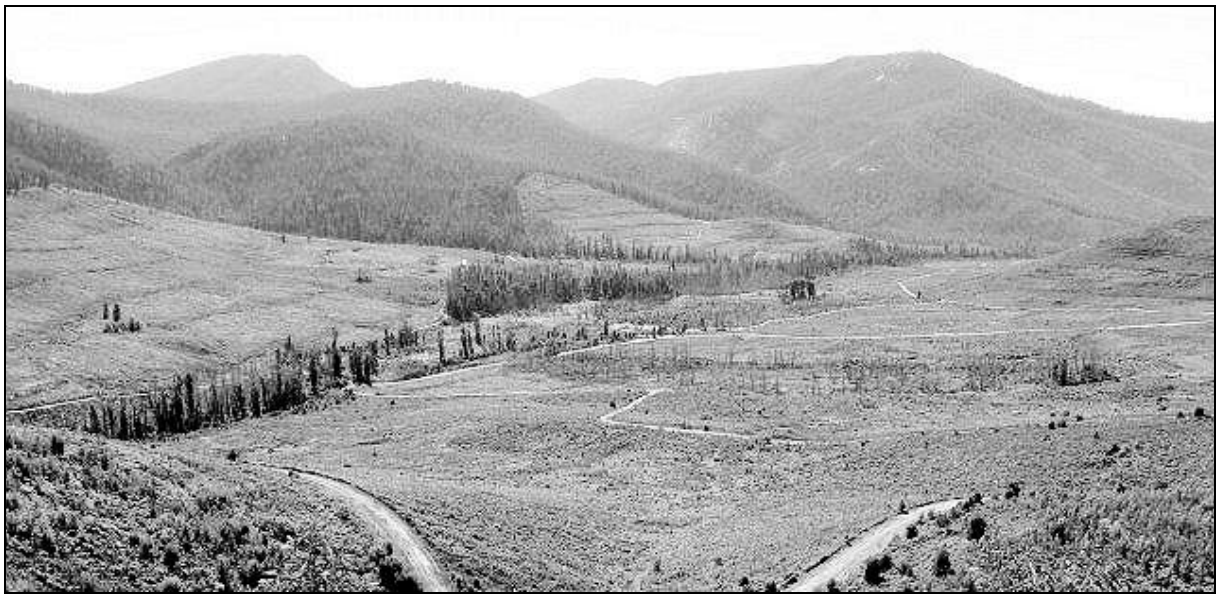
In 2006 initial works were undertaken to fell the significant woody bulk of fire-killed willows, poplars and other exotic species between the picnic area and the wetland soak. This was successful in felling timber across the line of surface flow to retard water flow through the wetland, while at the same time improving visibility of the wetland, and improving public safety. This work was extended in 2007, along with works to control blackberry in the meadows and pine wildings on surrounding hillslopes.

At April 2008, some pine wildings, poplar suckers and willows remained to be controlled.

Blundells Flat from Brindabella Road 17 Jan 2003, the day before the wildfires



Blundells Flat after the fires



Blundells Flat August 2006 after salvage and other timber removal

Future landscape

In May 2006 the ACT Government released a draft Strategic Management Plan for the Lower Cotter catchment. This plan effectively set out a 100-year vision and re-imagined the lower Cotter landscape in the post-fire period, with guidance on land use and management decisions in pursuit of a new landscape form broadly analogous to that which prevailed prior to, or early in, the phase of pastoral settlement.

Under the plan, water yield and quality are now to be the primary objectives for management, and plantations and associated roading and operations are seen to be incompatible.

The plan (ACT Government 2006c) proposed that:

- No additional commercial or broad-acre pines would be established in the catchment.
- Some 1,285 ha of existing pine plantations would be managed on a non-commercial basis but retained until it becomes feasible to convert these areas to primarily native vegetation cover. Some plantations may grow for a full crop cycle (30–35 years). Areas with pine would most likely be converted to eucalyptus woodlands with an exotic grassy understorey.
- The regeneration of native species in the catchment would be favoured.
- Restoration measures such as weed management, direct seeding and planting with native species would be implemented where necessary.
- Non-native species such as exotic grasses could be planted in highly degraded areas to stabilise soils.
- Weeds would be managed and reduced over time.
- The area zoned for commercial pine plantations in the Territory Plan would be rezoned to be consistent with the rest of the Cotter Catchment and re-zoned as ‘Mountains and Bushlands’.
- A commitment to adaptive management and research and monitoring would provide opportunities for partnerships between government, the scientific community and community groups and foster community involvement in catchment restoration programs.
- The natural and cultural heritage of the catchment would be identified, conserved and interpreted.

A vision for the future landscapes of both Blundells Flat and Shannons Flat is described below in Part E.