

Black Mountain Symposium 2018

THE PAST 50 YEARS INFORMING THE NEXT 50

Background Paper Abstracts

Papers are listed alphabetically by author

Beveridge, L (2018) Friends of Black Mountain: golden threads in community awareness. Black Mountain Symposium 2018 Background Paper No. 18. Friends of Black Mountain, Canberra.
<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/18-Beveridge-history-BM-friends-final-7AUG18.pdf>

Black Mountain has been a defining element of Canberra since featuring in Walter and Marion Griffin's prize-winning design for the new national capital. Over the decades since, a large number of people and organisations — all 'friends' of Black Mountain — have actively advocated for its reservation, striven to minimise threats, worked to ensure its protection, helped document its biodiversity, become involved in its conservation and promoted its natural and cultural values through publications, walks, displays and talks. This paper describes the efforts of Black Mountain's friends from the 1910s to the present — who they were, what they did, when, and why — and raises a range of issues relevant to future management of the reserve. Their knowledge and keen interest in the natural and cultural values of Black Mountain, coupled with increasing community awareness of the iconic nature reserve, will continue to help protect this 'jewel in the crown' now and into the future.

Butz, M (2018) The Canberry Ranges, Black Hill, Black Mountain, 'the Golden Hill' and beyond. Black Mountain Symposium 2018 Background Paper No. 19. Friends of Black Mountain, Canberra.
<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/19-Butz-Canberry-Ranges-final-20Aug2018.pdf>

This paper outlines changes across time in valuing and use of the cultural landscape of Black Mountain, with reference to related landscape elements in central Canberra. The primary focus is on the period 1820–1970 to encompass the colonial and Federal phases of settlement. Reference is also made to prior and overlapping settlement by Aboriginal people and their antecedents, and to urban development after 1970. These stories revolve around the value of the area to Aboriginal people and pastoralists for their sense of place and for subsistence, to institutions for research and education, and to increasingly urbanised populations for materials and recreation. The storied landscape of Black Mountain has both shaped and reflected human use of the surrounding area. For centuries it resisted permanent habitation and dramatic change, even while it was being used actively by human populations. Over that time, it has been a persistent landscape while many things have happened and changed around it, until the past half century in which urban development decisions redefined and dissected the landscape, irreversibly and with scant regard for the area's non-use values. However, these later and disruptive developments did not extinguish, and may actually have amplified, many of the values we now ascribe to Black Mountain.

Doherty, MD (2018) Vegetation types and vegetation dynamics on Black Mountain. Black Mountain Symposium 2018 Background Paper No. 3. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/3-Doherty-Veg-Final-28Jun18.pdf>

Black Mountain Nature Reserve and adjacent protected areas contain representative examples of dry sclerophyll forest and grassy woodland communities typical of those found on the southern tablelands. Although the vegetation found on the mountain today is recovering from the impacts of a variety of land use changes over a period of over 150 years, it is floristically and structurally diverse. Five vegetation types which have been described on Black Mountain are summarised in this paper, and the factors affecting their distribution, composition and structure are detailed. Although the primary environmental drivers of climate, geology and landform have organised plant distribution on Black Mountain over long periods of time, short-term changes in structure and composition are driven by local disturbances resulting from fire; drought; storms, windthrow; dieback; thinning and clearing.

Doherty, MD (2018) Fire ecology on Black Mountain. Black Mountain Symposium 2018 Background Paper No. 11. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/11-Doherty-Fire Ecology-final-28Jun18.pdf>

Early research on the ecological effects of fire on vascular plant species in dry sclerophyll forest undertaken in and around Black Mountain in the 1970s has informed subsequent fire management both on Black Mountain and in other dry sclerophyll forest communities on the NSW tablelands. However, despite a very sound understanding of the effects of fire on plant species and their short-term responses, the long-term dynamics associated with different fire regimes is an ongoing research area, particularly with a recent refocus on planned burns for fuel management on Black Mountain. Long-term ecological monitoring is an essential component of sound fire management practice, so given the proximity of Black Mountain to Canberra's academic institutions and an engaged and interested community, the mountain remains a fertile ground for ongoing fire research.

Evans, M (2018) The mammal fauna of Black Mountain. Black Mountain Symposium 2018 Background Paper No. 7. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/7-Evans-BM Mammals-final-13Aug2018.pdf>

This paper provides a brief review of the mammal fauna of Black Mountain in Canberra, Australian Capital Territory. Information was sourced from fauna surveys and records held in various wildlife databases. The mammal fauna of the area is reasonably diverse and typical of the fauna of the woodlands and forests in the north of the ACT, with at least 26 native mammal species and 10 introduced mammal species having been recorded. Since gazetted as a nature reserve in 1970, it is apparent that Black Mountain still conserves a diversity of mammals, with arboreal species being particularly abundant. A conspicuous exception is the loss of small ground-dwelling native mammals from the area.

Fennell, P (2018) Birds of Black Mountain, 1964–2016. Black Mountain Symposium 2018 Background Paper No. 8. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/8-Fennell-Birds-final-28Jun18.pdf>

Bird observation records in the Canberra Ornithologists Group Database were used to compile a list of all species recorded in Black Mountain Nature Reserve and species present during the periods 1980–2005 and 2006–2016. A total of 124 species has been observed in the area since 1964 and are

typical of the land birds in the wider region. One hundred and seventeen species were recorded from 1980 to 2005 and 75 species from 2006 to the end of 2016. The 30 most frequently observed species were similar in both time periods, although the frequency rank of some species changed, with the rank of four species dropping by >5 places and that of at least five species increasing by >5 places. Twenty-nine species have not been recorded in the area since 2006 and include two vulnerable species (Hooded Robin and Brown Tree-creeper). Records of breeding activity in the periods 1982–2006 and 2007–2016 indicated the Australian Raven and Gang-gang Cockatoo had substantially increased breeding activity in the latter period, while that of the Australian Magpie and Magpie-lark had reduced. While increased human use of the area and management activities such as control burns could explain some of the above changes, the causes of most changes are not known and probably reflect human-induced effects in the wider Canberra area. A quarterly bird survey program in the reserve would help track shifts in the area's avifauna and possibly identify causes of them.

Finlayson, D. (2018) Geological evolution and features of Black Mountain Nature Reserve, Canberra. Black Mountain Symposium 2018 Background Paper No. 1. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/1-Finlayson-BM-geology-Final-28Jun18.pdf>

The Canberra region evolved as part of a much larger geological province called the Lachlan Fold Belt. About 485 million years ago huge amounts of sediment were deposited in a deep ocean basin during the Benambran Tectonic Cycle. The sediments were then consolidated and brought to near the surface about 444–440 million years ago (Ma). The Pittman Formation (464–458 Ma) and its associated Acton Shale Member (458–453 Ma) then formed the foundation to most of the Lachlan Fold Belt. Locally, these rock units now form the basement rocks of Black Mountain Nature Reserve. During the next 10 million years a prograding fan complex was deposited comprising Black Mountain Sandstone (435–433 Ma), estimated as being between 450 and >800 metres thick, and State Circle Shale (c.435 Ma). By about 431–428 million years ago, all the rock units now seen within the Black Mountain Nature Reserve had been formed. Black Mountain is the oldest hill of the present Canberra area topography and is surrounded by outcrops of younger volcanics. It exhibits a series of north-south trending faults, including the Black Mountain fault through the summit. Examples of all Black Mountain's geological formations are exposed in various parts of the reserve and adjacent areas.

Hogg, D (2018) Use of Black Mountain for orienteering and other competitive activities. Black Mountain Symposium 2018 Background Paper No. 12. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/12-Hogg-Orienteering-final-6Jul18.pdf>

Black Mountain has been popular for a range of competitive activities throughout the period of its gazettal as a Reserve. The open forest on the lower slopes has been popular for orienteering since 1971, with very detailed maps of the area prepared and parts of the reserve used for several events each year. The related sport of rogaining, which extends over longer periods, has used Black Mountain as part of the course on urban rogaines ('Metrogaines') every few years. Various running competitions, some going up the mountain or even up Black Mountain Tower, and some using the tracks on the lower slopes, have been popular over many years. Triathlons and duathlons have used some of the tracks for running or mountainbike riding as part of the course, and various adventure races have passed through the reserve. The pattern of use has changed over the years due to roadworks such as Parkes Way extension and upgrading of Caswell Drive affecting the assembly areas used for some events.

Hogg, D (2018) Black Mountain and the Gungahlin Drive Extension. Black Mountain Symposium 2018 Background Paper No. 13. Friends of Black Mountain, Canberra.
<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/13-Hogg-GDE-final-5Aug18.pdf>

The Gungahlin Drive Extension was chosen by the ACT Government as one of the preferred options for upgrading major road infrastructure between Gungahlin and the southern suburbs of Canberra. The road was highly controversial and generated strong community opposition because of concerns over its environmental impacts, including on Black Mountain Nature Reserve. This paper outlines the history of the road's development, government consultation and environmental impact assessment processes, the main environmental concerns of the community and how the impacts on Black Mountain were addressed.

Hotchin, J (2018) Black Mountain as a place of protest: tower, gondola and highway. Black Mountain Symposium 2018 Background Paper No. 20. Friends of Black Mountain, Canberra.
<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/20-Hotchin-Protest-Final-22Aug2018.pdf>

The strong attachment of sections of the Canberra community to Black Mountain is apparent in the opposition to perceived threats to this natural bush reserve and its visual integrity as one of the hills forming the capital's landscape setting. This background paper traces three local protests to preserve Black Mountain Nature Reserve: the opposition to the construction of the telecommunications tower on the summit in the early 1970s, the proposal to erect an aerial gondola to transport visitors to the summit in the late 1970s and early 1980s, and the protest against the encroachment of the Gungahlin Drive highway into the reserve in the early 2000s. These protests involved local residents, academics and scientists, community groups, conservation organisations and politicians, and met with varied success. Local opposition to what were perceived as unnecessary encroachments upon the summit and perimeter of the reserve reflected growing awareness of wider environmental concerns and the willingness of Canberra's citizens to challenge government plans and projects. These contests bring into sharp relief the conflicting values about the place of a natural bush reserve located so close to the city, pressures on the reserve within an increasingly urban city, and attitudes about the national capital and its landscape setting. Continued urban expansion and pressures upon the reserve will strengthen the perception, in many parts of the community, of the natural and ecological values of the area, increasing the likelihood of continued determined community action to protect it from perceived threats into the future.

Hotchin, J (2018) Quick guide to creative/artistic material relating to Black Mountain. Black Mountain Symposium 2018 Background Paper No. 21. Friends of Black Mountain, Canberra.
<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/21-Hotchin-Quick%20Guide-Artistic-creative-Final%2023Aug2018.pdf>

Black Mountain has inspired creative works from writers and artists since the Limestone Plains were selected as the site for the National Capital. This background paper presents a brief overview of selected creative and artistic works inspired by Black Mountain since the early 1900s. From the paintings commissioned to portray the landscape of the future capital, the imposing form of Black Mountain and the hills rising from the plains was also featured by artists from the 1920s to 1940s. The bulk of the mountain lent a sense of place and local identity to the site of the emergent capital. Writers have been inspired by the mountain and its scenic backdrop. Black Mountain has been the subject of verse and described as the setting or backdrop to fiction in works by local and national authors. Its flora and fauna have inspired a book for children and artworks in various visual media since the 1980s, including drawing, ceramics, photography and textiles. Composers and local musical ensembles have also drawn inspiration from the mountain. While most of these creative responses have been

produced locally, several of these writers, artists, photographers and musicians who lived or worked in Canberra have established national and international reputations. Black Mountain and its striking vistas have become a recognisable feature that evokes the 'Bush Capital' and the 'city in the landscape', expressing the natural and aesthetic values of its setting and the individual creator's responses to this place. More recently, Black Mountain and the telecommunications tower have been employed to convey ideas about a 'modern' Canberra, and stylised images of the tower feature prominently in popular culture. Despite the initial controversy over the tower's construction, it now holds great appeal as an icon of the city as reflected in diverse contemporary media such as film, souvenirs and pop art.

Mulvaney, M (2018) Rare plants on Black Mountain Sandstone. Black Mountain Symposium 2018 Background Paper No. 6. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/6-Mulvaney-rareplants-final-28Jun18.pdf>

A provisional list of 317 plant species considered rare or uncommon in the ACT was refined through consideration of about 8,750 location records. The process identified 280 species which are or may be rare in the territory, 34 of which occur on Black Mountain Sandstone geology, mainly on Black Mountain and Aranda Bushland. Twenty (59%) of the rare species are orchids, including seven species for which the Black Mountain Sandstone area appears to be a national stronghold. Black Mountain Sandstone is the only or one of only a few known ACT habitats of a further seven orchids. Non-orchid rare plants present on Black Mountain Sandstone tend to be at or close to a distribution limit there, and rare only in a local context.

Osborne, W & Hoefer, AM (2018) Frogs and reptiles found at Black Mountain: fifty years of records, from museum collections to community-based photo mapping. Black Mountain Symposium 2018 Background Paper No. 9. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/9-Osborne-Hoefer-herpto-Final-28Jun.pdf>

In this paper, we review all available records of reptiles and frogs of the Black Mountain area in order to describe its frog and reptile fauna, and to compare it with similar reserves in the north of the ACT. The earliest investigation conducted in 1975–1976 using pitfall traps to survey Black Mountain Reserve detected four species of frogs and eight species of reptiles. Records of a further nine reptile species were obtained from other reliable observers. Since 2009, the calls of frogs have been monitored each year at five sites in the reserve as part of the annual Frogwatch census. This has provided information on an additional four frog species not detected in 1975–1976. Because of its proximity to institutions like the Australian National University and CSIRO it was expected that other systematic surveys of frogs and reptiles would have been conducted in the Black Mountain area. Individual specimens have been lodged with museums from these institutions, and observations reported in a regional field guide, but there has been no more recent comprehensive survey. There has, however, been a substantial contribution to knowledge of the area's reptile and frog fauna from community-based records such as the ACT Wildlife Atlas, Canberra Nature Map and the Frogwatch program. Black Mountain's herpetofauna is now known to comprise eight frog species and 22 reptile species. Two species of monitor lizard, one skink and one frog previously recorded from the area no longer appear to be present. The contribution that the Black Mountain area makes to the conservation of frogs and reptiles in the ACT is significant, with the reserve supporting higher numbers of reptiles than have been reported from the Mt Ainslie – Mt Majura nature reserves (18 species) and Mulligans Flat – Goorooyarroo Nature Reserve (17 species).

Purdie, RW (2018) Non-vascular flora of Black Mountain: macrofungi, lichens, hornworts, liverworts and mosses. Black Mountain Symposium 2018 Background Paper No. 4. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/4-Purdie-non-vascular-final-28JUN18.pdf>

A list of non-vascular species recorded from Black Mountain was compiled largely from specimens held in the Australian National Herbarium. Since the first collections in the 1950s, at least 313 species have been recorded comprising 40% macrofungi, 36% lichens, 8% hornworts/liverworts and 16% mosses. The majority of species were located in habitats associated with the dry sclerophyll vegetation that covers most of the study area, and grew predominantly on soil or rock substrates. The number of species currently present in the area is not known, and the data do not allow changes in floristic diversity over the last 60 years to be assessed. While the area's total number of non-vascular species is much lower than the vascular species count, the numbers of native non-vascular and vascular species recorded are comparable. However, it appears that the native species recorded do not represent a comprehensive list of the area's non-vascular flora for the five groups. Black Mountain's native non-vascular species are an unappreciated component of the area's flora. Raising knowledge about them to a level comparable with vascular plants would enable Black Mountain to become a benchmark for assessing future changes in the area's total floristic diversity.

Purdie, RW (2018) Vascular plants of Black Mountain, 1969–2017. Black Mountain Symposium 2018 Background Paper No. 5. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/5A-Purdie-BMVP-Final-9Jul18.pdf> and <https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/5B-Purdie-BMVP-Final-9Jul18.pdf>

A current list of fern, conifer and flowering plant species occurring on Black Mountain was compiled largely from specimens in the Australian National Herbarium. Species' records to the end of 1969, 1980, 2012 and April 2017 allowed cumulative species presence to be tracked and changes in distribution and abundance of some species assessed. The total number of species recorded in the study area increased from 508 at the end of 1969 to 728 by April 2017. Over that time, the proportion of species indigenous to the area dropped from 63% to 54%, while introduced native species rose from 1% to 12% of the flora. Around 107 species recorded by the end of 1979 have not been relocated since, the most recent record of some species 63–82 years ago. For these taxa, data are available only to confirm two native and two exotic species have become locally extinct; each had a very restricted distribution in the area. The current flora (species with a verifiable record on Black Mountain over the last decade) comprises 593 species—17 ferns, 4 conifers and 572 flowering plants—of which 56% are native, 43% introduced and 1% of uncertain origin. The introduced natives include 33 shrub species used for road landscaping, 58% of which have naturalised (some into the reserve). Control of the major exotic and introduced woody species will remain a future management priority. Compared with other locations containing similar vegetation, Black Mountain has a high total number of species recorded, but this appears to reflect high search effort rather than intrinsic high floristic richness. The number of its native species per hectare (including orchids) does not appear to be unusually high in the ACT context. The current comprehensive knowledge of Black Mountain's vascular species provides a benchmark for tracking changes in its floristic diversity over future decades.

Purdie, RW (2018) Black Mountain plant collections and collectors, 1927–2017. Black Mountain Symposium 2018 Background Paper No. 14. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/14-Purdie-Collections & collectors-final-6Jul18.pdf>

The history of plant collecting on Black Mountain was constructed from information contained on

specimens held in the Australian National Herbarium. Over 4000 plant specimens have been collected from the area since the first in 1927 and represent the activity of at least 212 people. The majority of collections were made by staff from the herbaria at the Australian National Botanic Gardens and CSIRO, an outcome of these institutions' serendipitous location on the eastern foot-slopes of the mountain. The number of collections made each year is highly variable and accentuated by peak collecting periods related to the activity of 20 major collectors whose work appears to reflect their collecting interests and/or changing institutional priorities.

Purdie, RW (2018) Quick guide to biophysical research on Black Mountain: an overview of literature. Black Mountain Symposium 2018 Background Paper No. 15. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/15-Purdie-Quick-guide-final-6Jul18.pdf>

Considerable research has been carried out in the Black Mountain Nature Reserve area, and resulted in at least 93 published papers, 26 tertiary level theses and 13 unpublished reports. Over half the papers are related to bird and other fauna research, 31% to plants or vegetation, 11% to physical aspects of the area and 6% to fire research. A brief summary of each paper is provided to help introduce the research to those with an interest in Black Mountain. The summary includes the topic covered, the focus of the research, species studied and whether the research was carried out solely on Black Mountain or as part of a wider study.

Purdie, RW (2018) Scientific collecting, monitoring and research on Black Mountain. Black Mountain Symposium 2018 Background Paper No. 16. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/16-Purdie-Research-final-13Jul18.pdf>

Black Mountain has been the location of scientific endeavour since the 1920s, the earliest work related to collecting specimens of its biota. Over the last nine decades more than 4000 plant specimens from the area have been collected by around 212 botanists, most associated with the Australian National Herbarium, and tens of thousands of insect specimens by at least 184 entomologists, most associated with the Australian National Insect Collection. These collections have resulted in the area being the type locality for at least 197 species (2 lichens, 10 flowering plants, and the rest invertebrates). The first research reports relating to the area were published in the 1950s. Since then over 130 papers, theses or other reports have been written, more than half published since 1990. Just over half the papers relate to faunal studies, 31% to flora and vegetation, 11% to the physical environment and the rest to fire ecology. Around 80% of papers were by scientists from ANU, the University of Canberra and Commonwealth research institutions. ACT Government scientists commenced research and monitoring in the area in the mid-1970s, their work mostly relating to vegetation, vertebrate fauna and monitoring the impacts of management burns. Citizen science documenting the area's biodiversity has been prominent since the 1960s and includes the activities of community groups and many individuals. The collective efforts of professional and citizen scientists have resulted in Black Mountain's biota probably being more comprehensively studied and documented than any other area of comparable size in the ACT. This reflects a combination of key collecting and research institutions being located on Black Mountain's footslopes and its accessibility to local citizens. The area remains a fertile place for research to underpin its future management.

Purdie, RW (2018) Black Mountain recreational, educational and creative activities. Black Mountain Symposium 2018 Background Paper No. 17. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/17-Purdie-Education-recreation-final-2July.pdf>

Public use of Black Mountain for recreation and education was actively promoted after the area was declared a reserve in 1970, with the first management plan flagging the development of a system of walking tracks to showcase the area's natural features. In the decades since, walking, bird watching, mountain biking, recreational and competitive running and many other activities have been popular in the area, and facilitated by the publication of maps, leaflets and books by both government authorities and private individuals. Educational activities have included school and university student excursions, post graduate research studies and public walks to help people learn about the biota and other values. Community groups and individuals have played a prominent educational role, their activities including the long running Burbidge/Chippendale wildflower rambles, more recent spring orchid walks, publication of a range of booklets, pamphlets and display material, installation of interpretation signs to complement those erected by government authorities, periodic public talks, and art or other exhibitions featuring the area's plants and animals. While most activities have had little impact on the local environment, constant and sometimes illegal use of walking tracks has often exacerbated natural erosion and in some places led to increased habitat disturbance and fragmentation. Managing the reserve to meet the disparate public uses while protecting the area's integrity and biophysical values is likely to be an increasing challenge in coming decades.

Pullen, KR (2018) Invertebrate animals of Black Mountain, Canberra, ACT. Black Mountain Symposium 2018 Background Paper No. 10. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/10-Pullen-Inverts-final-28Jun18.pdf>

Some aspects of the insect fauna and a few other invertebrate animals of Black Mountain, a forested peak in Canberra, Australia, are discussed. Most of the peak is contained in a nature reserve containing high quality native vegetation, with a rich flora and a correspondingly rich invertebrate fauna. A checklist of approximately 2030 species in selected groups of insects, arachnids, millipedes and velvet worms recorded from Black Mountain is provided. The list is not complete and further work is required to obtain a full picture of the area's invertebrate fauna.

Tongway, D (2018) Landforms and soils of Black Mountain. Black Mountain Symposium 2018 Background Paper No. 2. Friends of Black Mountain, Canberra.

<https://friendsofblackmountain.org.au/sites/default/files/Symposium2018/2-Tongway-Land Units and Soils-Final-28Jun18.pdf>

Black Mountain comprises two main landforms, the ridges and steep-sided slopes of the Umbarra soil-landscape unit, and the gentler fan slopes of the Russell soil-landscape unit that form the mountain's footslopes. Black Mountain's soils have been developed by weathering of its sandstone rocks over millions of years. The ridges and their steep flanks are characterised by shallow lithosols. The footslopes have strongly duplex soils with a pale sandy loam A horizon overlying sodic, clay B horizons that are red where there is unimpeded drainage and yellow where the soil remains wet for long periods. These B horizons are highly erodible, but can be managed by careful infrastructure maintenance and/or development, and maintaining high woody and tree-leaf litter cover throughout the reserve. Both landforms are currently eroding at about the geological rate under present management which is minimising stress and disturbance, allowing biological processes to control erosive forces.