

Values
for a
new
generation

Greater Blue
Mountains
WORLD
HERITAGE AREA

ACKNOWLEDGEMENTS

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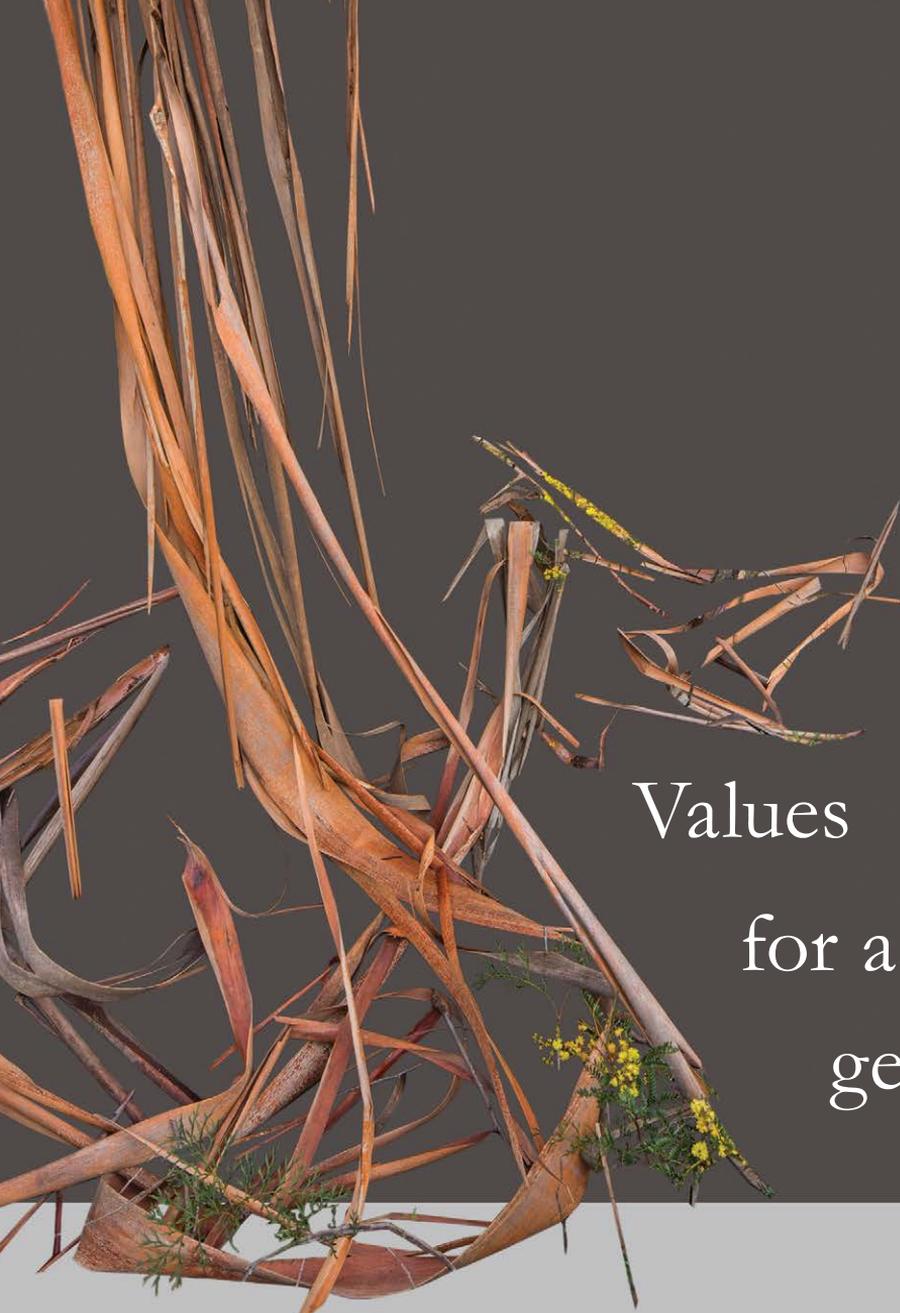
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Greater Blue
Mountains
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Values for a new generation

A series of papers on geodiversity, biodiversity, contemporary Aboriginal values, historical issues, nature-culture and scenic grandeur to support understanding of potential National and World Heritage values

AUTHORED BY MEMBERS AND FORMER MEMBERS OF THE GREATER BLUE MOUNTAINS
WORLD HERITAGE AREA ADVISORY COMMITTEE AND EDITED BY DOUG BENSON

World Heritage

The Greater Blue Mountains World Heritage Area only exists today because of a 70-year campaign by conservationists to achieve a chain of reserves across the region. This culminated in the year 2000 with the acceptance of 10,000 square kilometres of wild bushland onto the World Heritage List – the ‘best of the best’.

The eight connected conservation areas of Wollemi, Yengo, Gardens of Stone, Blue Mountains, Kanangra-Boyd, Nattai and Thirlmere Lakes national parks and Jenolan Karst Conservation Reserve make up Australia’s most accessible World Heritage Area. This 10,000 square kilometre area extends 220km from the Southern Highlands to the Hunter Valley, and from western Sydney to the farming tablelands of the Great Divide.

Six Aboriginal language groups treasure connections with the Country of the Greater Blue Mountains that reach back into ancient time. They are the Dharawal and Gundungurra people (in the south), the Wiradjuri (in the west and north-west), the Wanaruah and Darkinjung (in the north-east) and the Darug (in the east).

Landscapes

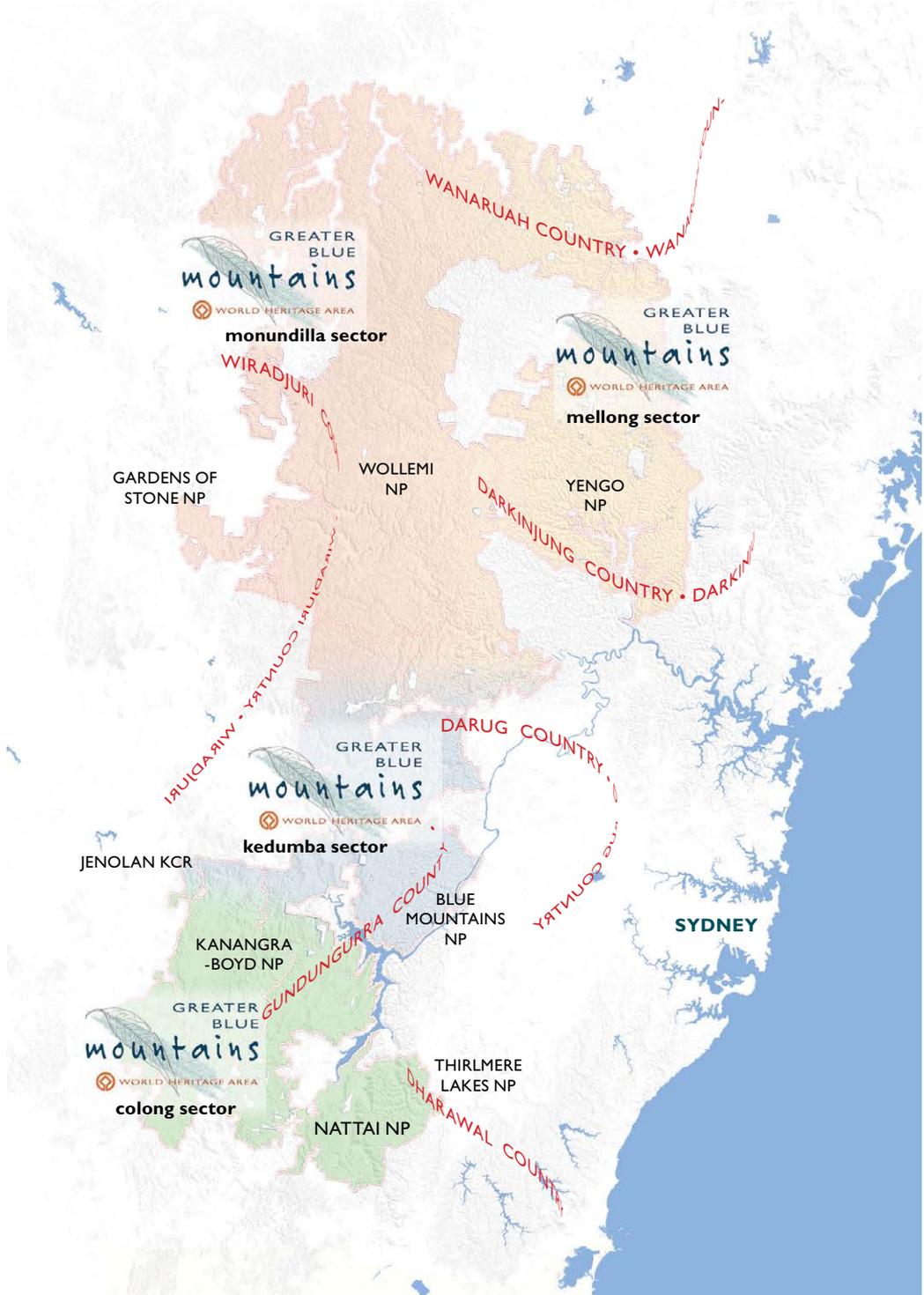
The World Heritage Area is divided into four geographical sectors reflecting changes in landscape and vegetation. Each is named after a local landmark with an Aboriginal name: Monundilla (north-west), Mellong (north-east), Kedumba (central) and Colong (south).

The Greater Blue Mountains World Heritage Area Advisory Committee

The Advisory Committee’s role is to advise on matters relating to the protection, conservation, and the presentation and management of the Greater Blue Mountains World Heritage Area, including strategic policies in relation to Australia’s obligations under the World Heritage Convention.

The Advisory Committee plays a crucial role in the provision of scientific advice and achieving conservation outcomes by facilitating the development of cooperative, constructive and innovative relationships between the National Parks and Wildlife Service (part of the NSW Office of Environment and Heritage); the Jenolan Caves Reserve Trust and the community.





Above: Conservation Reserves and Aboriginal Language Groups of the Greater Blue Mountains WHA

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want to read (New York, Palgrave, 2011). She has been an expert witness on Aboriginal land claims, and worked on The Royal Commission into Aboriginal Deaths in Custody and in the Gunner & Cubillo stolen children case, has curated exhibitions, and produced and co-directed films, including *A Frontier Conversation* (Ronin Films, 2006) and *Message from Mungo* (Ronin Films, 2014). She has worked at Monash University, the UNSW and the National Museum of Australia. Her current projects include the major digital history project *Deepening Histories of Place: Landscapes of National and International Significance*. With Mary Anne Jebb, she co-edited *Long History, Deep Time* (ANU, Canberra 2015) and serves on the Editorial Boards of Aboriginal History and the international journal *Public Historian*.

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Judy Smith has lived and worked in the Blue Mountains for over 30 years. She is a principal of P & J Smith Ecological Consultants and has undertaken many flora and fauna surveys within the Greater Blue Mountains as well as more widely across Australia. She is currently documenting the terrestrial fauna of the eight reserves that comprise the GBMWhA. She has been a member of the GBMWhA since 2006.

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Dr Haydn Washington has worked for 40 years as an environmental scientist, writer and activist. While originally a plant ecologist, he worked in CSIRO on heavy metal pollution, and in sustainability in local government. He is currently a Visiting Fellow and sessional lecturer in Interdisciplinary Environmental Studies (Science) at UNSW. His recent books include *Demystifying Sustainability* and *Human Dependence on Nature*. He is the Hon. Secretary for the Colo Committee, which led the campaign for Wollemi NP and Gardens of Stone NP. His interest in geodiversity came from hundreds of walks through the Wollemi and particularly the pagoda country of Gardens of Stone.

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Dr Robert Wray is a teacher at UOW College, and is a former Honorary Principal Fellow in the School of Earth and Environmental Sciences, University of Wollongong. He is a geomorphologist with a love of sandstone terrains and has published extensively on this topic. He has worked in natural heritage management in Australia and in China; including National Heritage assessment of sandstone areas across northern Australia, and has been a member of the IUCN international experts group for the Chinese Danxia World Heritage Listing.

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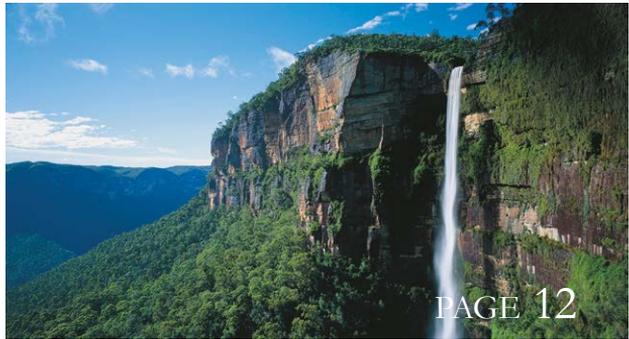
Richard Mackay



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**Recognising new values: the
geodiversity and geoheritage of
the Greater Blue Mountains**

Haydn Washington and Robert Wray



CHAPTER 2

**Protecting biodiversity values in
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Haydn Washington



Introduction



Above: Senator Robert Hill at Govetts Leap launching the GBMWhA in 2001

At the 2001 launch of the Greater Blue Mountains World Heritage Area at Govetts Leap, Blackheath, Blue Mountains, the then Federal Minister for the Environment, the Hon. Senator Robert Hill, committed that the Australian Government would subsequently re-nominate the Greater Blue Mountains to the World Heritage List for Indigenous cultural values. This announcement was in part responding to the decision by the World Heritage Committee, at the time of the inscription of GBMWhA on the World Heritage List, that there was insufficient evidence to support World Heritage listing for any cultural values.

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was subsequently amended to establish the 'National Heritage List'. In anomalous circumstances, the 'Greater Blue Mountains' was included on the National Heritage List in 2007 – but only for natural heritage values (even though Australia had previously nominated this area to the World Heritage List for both natural and cultural values). In accordance with current Commonwealth policy, it is necessary for a place to be included on the National Heritage List, before it can be nominated (or re-nominated) to the World Heritage List, for the same values.

The original World Heritage nomination documents, prepared by Joan Domicelj and an expert team, eloquently and authoritatively presented the natural and cultural values of the Greater Blue Mountains and made a strong case for World Heritage inscription. In the period since, there have been amazing additional discoveries, particularly superb Aboriginal rock art in galleries such as 'Eagles Reach' within Wollemi National Park.

There has also been a growing understanding of the importance of the Greater Blue Mountains area to the contemporary Aboriginal community, along with recognition of the historic cultural values associated with places like Echo Point and Jenolan Caves. Scientists have become more aware of the importance of the underlying geodiversity of this extraordinary area; satellite technology has allowed understanding and appreciation of natural and cultural landscapes on a global scale. New discoveries increase awareness of the rich biodiversity, but also highlight the fragility of the area, especially at its margins.



Above: Gangerang Range

During the same period, the boundaries of those sections of the national parks and reserves that comprise the Greater Blue Mountains World Heritage Area have been adjusted through acquisition and rationalisation and it has been realised some adjacent lands also contain World Heritage values. It is therefore entirely appropriate that these areas should be added to the area that is on the National Heritage List and included within a future World Heritage boundary adjustment – through a re-nomination by Australia (as the State Party to the World Heritage Convention).

A generation has passed since the inclusion of the Blue Mountains on the World Heritage List was first envisaged. The original World Heritage nomination was made before the widespread use of the internet, emails, mobile phones and instant access to information. It was perhaps at the beginning of our thinking of Australian landscape in a global context. Since that time there have been major changes in knowledge and understanding of the complex layered values of this extraordinary natural and cultural landscape.

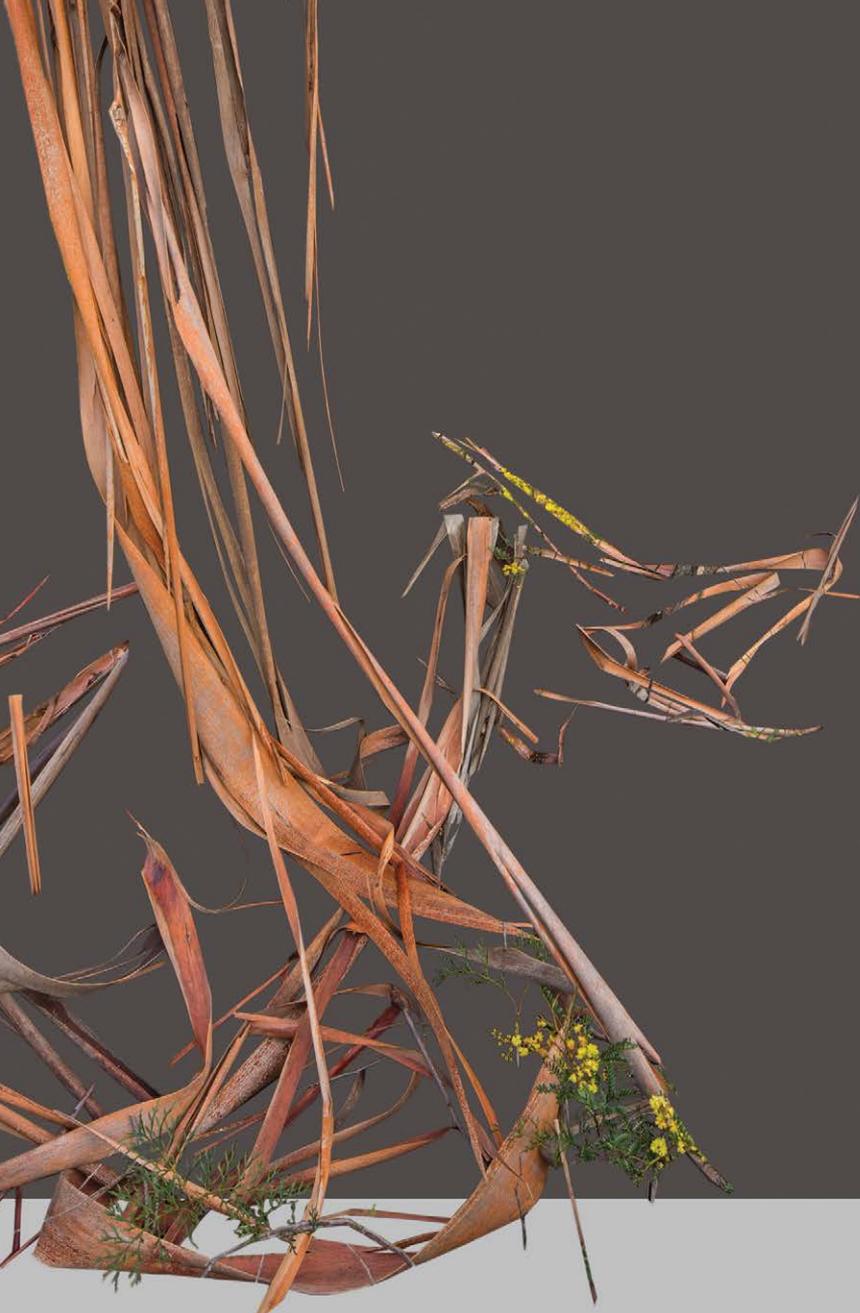
The following theme-based papers represent the collaborative effort of members and former members of the Greater Blue Mountains World Heritage Area Advisory Committee. They present data and perspectives on geodiversity, cultural and historic values, and scenic splendour, together with an explanation of boundary changes needed to provide long-term protection.

Originally prepared to support a well-informed understanding of the potential National Heritage values of this special area by the Australian Heritage Council, in time, they may also contribute to a re-nomination to the World Heritage List. In the meantime, the insights and information which follows will help to transmit an understanding of the Greater Blue Mountains to a new generation.

Prof Richard Mackay, AM

Chair, Greater Blue Mountains World Heritage Area Advisory Committee

2015



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Chapter 1

Haydn Washington
and Robert Wray

**Recognising new values:
the geodiversity and geoheritage of
the Greater Blue Mountains**

INTRODUCTION



Above: Mount Banks, one of the GBMWhA peaks capped by remnants of basalt lava flows. (Photo: Ian Brown)

In 1994 Brian Marshall, Adjunct Professor of Geology at UTS, summarised the international geological significance of the Blue Mountains: *The Blue Mountains presents outstanding examples of the Earth's evolutionary history in the southern hemisphere during the Permo-Triassic geological period, and of its geomorphological evolution subsequent to this period (Mosley 1989).*

It is an excellent example of shallow-water sedimentation in a basin developed immediately prior to the sea-floor spreading, which in the Tasman Sea area, accompanied break-up of Gondwanaland. Debate over the depositional mechanisms of the massive and cross-bedded sandstones of the quartz-rich Hawkesbury Sandstone (and to a lesser extent the Narrabeen Group) continues through to the present time, this being despite these well-exposed rocks providing the spectacular headlands of the Sydney region and weathering to form its internationally famous white-sand beaches. However, the over-riding international interest is in the uplift of this sandstone terrain at the edge of a passive continental margin, and of its ongoing dissection since early in the Tertiary period (Mosley 1989).

It is true that there are other examples of sandstone highlands undergoing erosion, and one of these (namely the Colorado Plateau and Grand Canyon) is already on the World Heritage List. Yet this spectacular scenery rapidly developed over the past 6 million years, whereas the Blue Mountains and its gorges reflect processes extending over closer to 60 million years and provide a different perspective of long-term landscape evolution.

It is also true that similarly aged uplands on passive plate margins occur in the Drakensberg of South Africa, and in the East Brazilian and Guiana Highlands of South America, but these apparently lack the post-uplift basalt flows that enable development of erosional chronology. Thus the Blue Mountains are the best example in the World of a sedimentary upland deeply dissected by rivers over tens of millions of years, and of the ongoing processes involved in sculpting these magnificent landforms (Mosley, 1989).

BACKGROUND TO WORLD HERITAGE LISTING

In 2000 the Greater Blue Mountains World Heritage Area was successfully nominated as World Heritage on biodiversity grounds; its plant and animal species richness, and in particular its diversity and evolutionary significance, as evidenced in the genus *Eucalyptus*, and the richness of its temperate eucalypt-dominated forests and woodlands, are



Above: Sandstone pedestal, Newnes State Forest. (Photo: Ian Brown)

DEFINING GEODIVERSITY

outstanding in international terms. It was also considered by many in Australia at the time to be of international significance in terms of geodiversity, scenic value and cultural heritage, but there was insufficient evidence to support World Heritage listing for these values.

In 2005 the Greater Blue Mountains was nominated for the Australian National Heritage list. However, the supporting material presented did not go into detailed reference to the geodiversity, and there was simply a straight transfer of the criteria for which it had been World Heritage listed in 2000. Accordingly, the Greater Blue Mountains was put on the National Heritage list *only* for biodiversity significance, not for geodiversity significance. Fifteen years later, and especially in light of other scientific research since the original nomination, many geologists and geomorphologists now consider that the Greater Blue Mountains is of both national and international significance for geodiversity).

This paper presents the increasingly strong case that the Greater Blue Mountains WHA and associated complementary areas have geodiversity and geoheritage significance, and that this should now be recognised for both *National and International Heritage listing*. Numerous geological and geomorphological sites within the Greater Blue Mountains such as the cliff line systems, scenic lookout features such as The Three Sisters, the pagodas and slot canyons, and Jenolan Caves, also have national, and potentially international significance, associated with their *aesthetic, scenic and interpretation* qualities. These issues are covered in Fallding Chapter 5 *Nature-Culture interaction*, and Washington Chapter 6 *Scenic Grandeur*.

In a report for the Australian Heritage Commission Yeates (2001) assessed the geology of the Greater Blue Mountains for significance, but this covered geology, rather than the broader 'geodiversity'. Just as *biodiversity* is a good term to cover various aspects of the richness in life, *geodiversity* is a useful one to describe geological, geomorphological and soil features of interest. Here we describe the geodiversity values. The term geodiversity is in common use, and is defined in the Australian Natural Heritage Charter (Cairnes, 1997) as *The range of Earth features including geological, geomorphological, palaeontological, soil, hydrological and atmospheric features, systems and earth processes*. Because the components of geodiversity have heritage value,

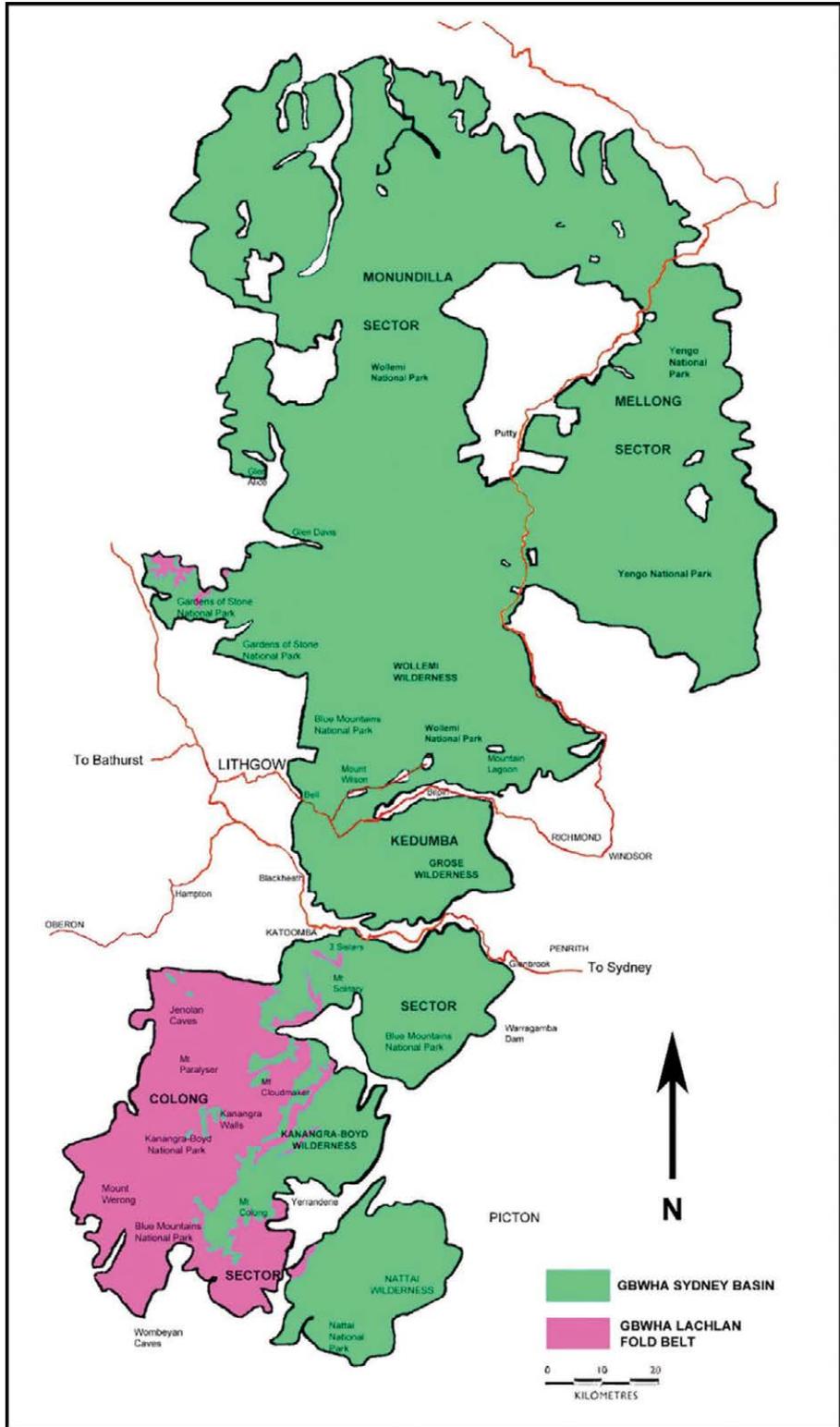


Above: View north from Kanangra Walls showing horizontal Permian sediments of the Sydney Basin (on right) unconformably overlying Lachlan Fold Belt metasediments. (Photo: Ian Brown)

geodiversity therefore has *geoheritage* significance and plays a role in *geoconservation*. The first National Conference on this topic was entitled *Geodiversity, Geological Heritage and Geotourism* and held in 2010.

SIGNIFICANT GEODIVERSITY COMPONENTS OF THE GREATER BLUE MOUNTAINS

We begin by describing the **Significant Geodiversity Components** of the Greater Blue Mountains and adjacent areas. In the following pages we then describe **Sites of International Geodiversity Significance** in the Greater Blue Mountains WHA and adjacent areas, followed by **Geodiversity sites and features of National Significance** within the Greater Blue Mountains WHA and adjacent areas. It is a Commonwealth Department requirement that National Heritage listing nominations include pertinent Australia-wide *comparisons*. We have provided this as context, but geodiversity is a very new field of research and the dearth of research is a limiting factor.



Above: Surface exposure of Permo-Triassic Sydney Basin sedimentary rocks and underlying Ordovician to Late Devonian Lachlan Fold Belt strata within the Greater Blue Mountains WHA.

The Greater Blue Mountains straddles two distinct geologic zones. First is the highly deformed flysch, limestones and volcanic and volcanoclastic sediments of the Ordovician to Late Carboniferous Lachlan Fold Belt. Second are the overlying sandstones and other sediments of the Permo-Triassic Sydney Basin, and the basalt flows that erupted across part of the area in the late mid-Tertiary. : Few such depositional sequences exist in Australia. Yeates (2001) noted that *This basin has tectonic significance as part of a "foreland" basin in eastern Australia, i.e. one formed between a stable area (Lachlan Fold Belt to the west) and a tectonically active area (New England Orogen to the east) (Korsch and Totterdell, 1995). In contrast, most Australian Permian – Triassic basins are epicratonic, i.e. deposited entirely on more stable crust (Yeates and Mulholland, 1991).*

THE PERMO- TRIASSIC SEDIMENTARY SEQUENCE

The Sydney Basin is composed of gently-dipping, largely undeformed, Permian to Triassic sedimentary rocks (Pickett and Alder, 1997) which unconformably overlie the older, often highly folded, pre-Permian rocks of the Lachlan Fold Belt. When discussing the age of such rocks we speak of 'millions of years ago', which is abbreviated to 'Ma'. This represents a virtually unbroken sequence of deposition from the Early Permian (around 290 Ma) until the end of the Middle Triassic (around 230 Ma). This deposition reflects a wide range of distinct differences induced by changes in palaeo-climate, intra- and extra-basin tectonics, depositional style and location, source material type and zone.

The predominating sandstone represents deposition from major rivers initially from the New England region (Caley and Narrabeen sediments) and later, when the basin tilted to the north, from the south, southwest and west (Geological Survey, 2013). Hawkesbury Sandstone is mainly derived from the south-west, with probably lesser westerly input. Branagan (2000, pp 24-25) noted: *While we can use the dip of the cross-bedding to recognise that much of the sandstone was derived from the south southwest (Standard 1969), there was clearly a western sand source as well. Recent popular articles (Flannery 1998; Sircombe 1999) have drawn attention to sources of the Hawkesbury sands as distant as Antarctica, when it was joined to Tasmania. Other sources were the older Palaeozoic rocks in the alpine region of southern NSW and NE Victoria. Standard (1969) emphasised the significance of graphite, derived from probable Ordovician rocks [to the south], as a marker mineral distinguishing the Hawkesbury Sandstone from Narrabeen Group sandstones.*



Above: Banks Wall, Mt Banks reveals the full sequence of Narrabeen Sandstone, capped by Tertiary basalt. (Photo: Ian Brown)

Context: The Sydney Basin sedimentary sequence in the Greater Blue Mountains is one of *the best studied large basinal sequences in Australia* due to its proximity to the first major settlement, and the economic values of the sandstone, as a construction material, and the coal for heating and power generation. Few regional sandstone sequences, except perhaps the West Australian iron ore areas, have been studied in such detail.

The Sandstone sequences in Western Australia are *much older* than the Permo-Triassic Sydney Basin which date from around 290 to 230 million years ago. For example, the sandstones of the Kimberley, Pilbara, and Arnhem Land regions range from the Proterozoic to Palaeozoic, that is from up to 2,600 million years ago to about 350 million years ago in the case of the Devonian Purnululu Bungle Bungle sandstones. Kimberley sandstones go back to around 1800 million years ago.

Similarly, those in the central and southern parts of the continent, including the Central Ranges, Uluru, the Flinders and the Grampians are Late Proterozoic to Palaeozoic, and much older than the Sydney Basin sequence. Conversely, Central Queensland sandstones around Carnarvon Gorge are Jurassic/Cretaceous and hence *younger* than the Sydney Basin sequence.

Structure - The bedding structure in the Sydney Basin is mostly flat to only gently tilted. Only in some localised areas (most notably along the Lapstone Structural Complex) is the sedimentary sequence tilted (dipping) or folded at more than a few degrees. Dips of only a few degrees were probably formed by syn-depositional warping, as the increasing build-up of sediment toward the middle of the Basin compressed the sequence and resulted in gentle eastward and basin-centred (the location of modern Sydney) dips in the sediments. There is some faulting, but again (except for along the Lapstone Complex), large-scale tectonic disruption is minimal. Post-depositional tectonic activity in the Sydney Region has been gentle, and is most probably related to vertical uplift.

In comparison with other sandstone sequences many of the older Australian sandstone regions have been highly folded and faulted during their histories. They are thus unlike the sandstones of the Greater Blue Mountains. For example the Finders Ranges, the Grampians, Uluru, the Central Ranges, and the ranges along the edges of the Kimberley region, are

all (for the most part) highly folded, deformed and eroded (Wray, 2013).

Some areas, however, remain relatively undeformed. The majority of the Kimberley plateau region, much of Arnhem Land (particularly the sandstones around Kakadu) the sandstone of the southern Arnhem Land area such as those around Nitmiluk-Katherine Gorge, the Cockburn Range and Victoria River sandstones of the east Kimberley, and the Purnululu-Bungle Bungle sandstones all remain relatively flat-lying to only gently tilted.

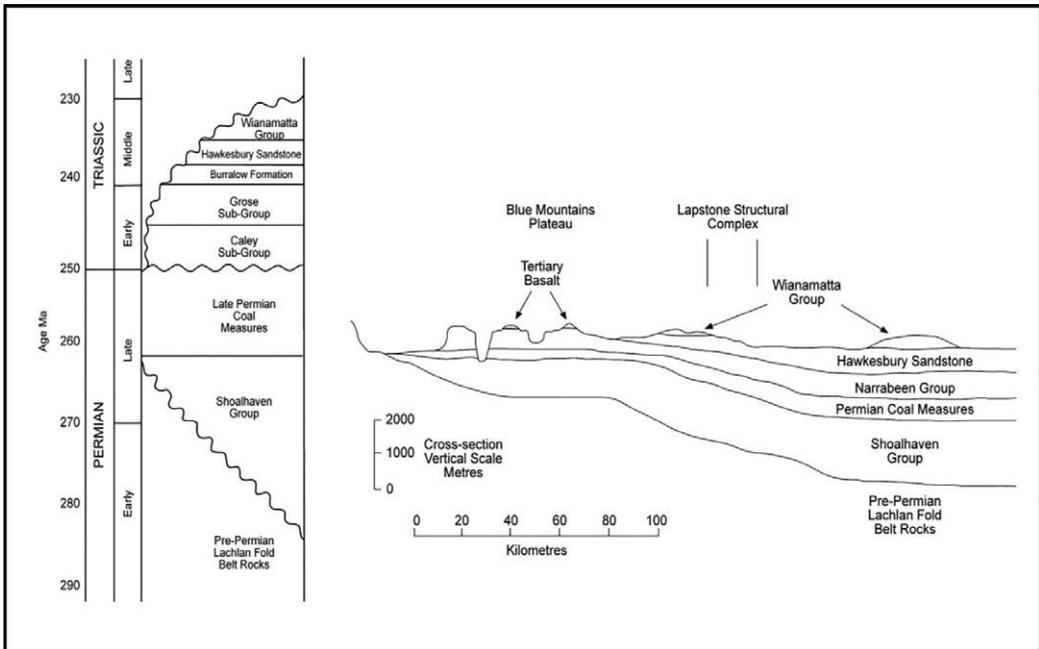
The sandstones of the Carnarvon region are possibly most like the Sydney Basin sandstones in terms of structure. They dip regionally southwards at only a relatively low angle, but unlike Sydney they are more gently folded. This dip, the folds and the different sedimentary layers are important controls on landscape formation (Young and Wray, 2000).

Depositional setting – many of the Australian sandstones are of shallow *marine* origin. However, the Sydney Basin sequence is clearly a mix of both marine *and* terrestrial origin. The basal Permian sandstones are shallow marine, the coal and Narrabeen Group sequences are marine to swamp to fluvial, and the Triassic Hawkesbury Sandstone (toward the top of the sequence) appears to be a large fresh-water fluvial system (Wray, 2013).

THE PERMIAN COAL MEASURES

Coal deposits in the Sydney Basin sedimentary sequence, are found from the Hunter Valley in the north, to Bundanoon south of Sydney. The coal resources have been of great economic importance to areas around the margins of the Blue Mountains; at Katoomba; north from Lithgow along the western escarpment; and in the Hunter Valley. The coal has played an important role in the development of the Sydney region for more than 100 years, and underpinned the development of Lithgow (the first 'steel' city), Newcastle and Wollongong.

Context: Little coal is found underlying most other Australian sandstone areas. Most sandstones of the west of the continent are too old; terrestrial plants, and other life (apart from bacteria) had not developed at the times most of these sandstones were laid down. In the east, the sandstone of Mt Mulligan in northern Queensland is underlain by extensive coal deposits that were mined in the early 20th century but these coal swamps were probably



Above: Simplified geology of the Sydney Basin section of the Greater Blue Mountains which is dominated by Permo-Triassic sedimentary sequences overlying the older rocks of the Lachlan Fold Belt. The sequence dips gently eastward, except near the faulting and monocline of the Lapstone Structural Complex where the dips are steeper. Isolated remnants of Tertiary basalt cap some of the higher peaks.

in an isolated sandstone structure, most probably a rift-graben feature, and not extensive regional swamps as in the Sydney Basin (Wray, 2013). The Mt Mulligan mines were of local economic importance, but nowhere near the scale of the Sydney-Hunter-Illawarra mines. In southern-central Queensland the Jurassic-Cretaceous Surat-Bowen Basins (of which the Carnarvon sandstones are a part) are the northward adjacent structures to the Sydney Basin. Coal and gas are regionally important there, but large deposits are not found in association with the sandstones that form the highlands around Carnarvon Gorge. Coal is not found (to our knowledge) in association with the Grampians sandstones of western Victoria, nor the Flinders Ranges sandstones of South Australia, nor the central Australian sandstones.

NEWNES-GLEN DAVIS SHALE OIL MINES

Layers of oil-bearing shale occur within the Permian Coal Measures. Although of limited quantity and neither as widespread nor as accessible as the coal, this shale has some of the richest kerogen levels of any torbanite in the world (Hutton, 1987) and was mined at places such as Newnes in the Wolgan Valley and nearby Glen Davis in the Capertee Valley during the late 19th and early 20th centuries. Extensive industrial developments at Newnes included a steep railway down into the narrow valley. Mt Airly in the Capertee valley was the site of another early major oil-shale mine; there are major historical ruins on its eastern side and



Above: The ruins at Newnes in the Wolgan Valley are reminder of the significant scale of the shale-oil mining operations there in the early 1900s. (Photo: Ian Brown)

A CHAIN OF BASALT CAPS AND FLOWS

is on the State Heritage Register for its historical value. Mt Airly and Genowlan Mountain are two prominent mesas, now part of Mugii Murum-ban State Conservation Area.

Joadja Nature Reserve near Mittagong is adjacent to the World Heritage Area and recommended for inclusion. Its ridge tops and upper slopes are Hawkesbury Sandstone, underlain by softer units of the Illawarra Coal Measures and Berry Siltstone exposed on the slopes. The lower slopes and valley floors consist of Silurian and Ordovician slate, phyllite and quartzite (Mills & Associates, 2002a). Joadja was a major oil shale mine site from 1870–1911 (similar to Glen Davis). Joadja Nature Reserve has a strong historical link with the former Joadja shale mining area (Knapman, 1988). Some of the mines extended under the reserve. The Joadja Ridge Trail was the first route used to transport shale oil from Joadja to Mittagong, and by early settlers to access nearby High Range and Wangenderry.

Context: Oil shale is found in other areas of Australia, but the scale of the development of oil shale mining at Newnes and Glen Davis, as well as Airly and Joadja, eclipses that found historically elsewhere in Australia.

Much younger (compared to the Lachlan Fold Belt and Triassic sandstones) are remnant Tertiary basaltic caps (inselbergs) found on high points in the Greater Blue Mountains. These remnant basalt caps include the northern high point (1254 m) of Mt Coricudgy, large flows such as Nullo Mountain, striking caps such as Mount Banks, Mount Hay and Mount Yengo, and the unusual basalt inselberg of Mt Colong, which overlies the Lachlan Fold Belt. Geochemical data show that most of the basalt (excluding Jurassic diatremes) erupted 15–20 million years ago (Van der Beek et al, 2001).

At Mt Tomah, immediately north of the Grose Valley, 81 m of Miocene age basalt (14.6 million years old) overlies Triassic shales and Hawkesbury Sandstone (Wellman and McDougall, 1974). Basalts of similar ages are also seen at nearby Mt Wilson). Basalt weathers to high nutrient soils, supporting rich plant communities such as rainforest, which contrasts with the dry sclerophyll woodland of the surrounding sandstone (Pickett and Alder, 1997).

To the north of the current Greater Blue Mountains WHA are the basalt residuals of Goulburn River National

Park, the most impressive being Mt Dangar which rises to 673 m from a base of around 180 m. Goulburn River National Park is located within the structural geology of the Gunnedah Basin, a major subdivision of the Sydney-Bowen Basin. The geological sequence exposed is one of Permian Coal Measures overlain by Triassic Narrabeen Sandstones, conglomeratic sandstones, red-brown and green mudstones, and in places capped by volcanics. As well as Mount Dangar at the eastern end of the Park (which also has botanical significance), volcanic outcrops include 'Murrumbo', 'Stony Pinch' and 'Poggy'. The intrusions at Wollar, Murrumbo etc are not basalts, but are uncommon examples of Tertiary sub-volcanic alkaline intrusive rocks, which fed volcanic lava flows (Meehan, 2013). Murrumbo is a large sill of sodic microsyenite that has pushed up the underlying Permian sediments (Day, 1961).

The geomorphology of the area is largely determined by erosion resistant volcanic deposits and the differential rates of erosion on the underlying sedimentary strata. The history of erosion and deposition cycles has resulted in an interesting variety of valley and landform characteristics as the sandstone plateau has been dissected by a complex pattern of creeks flowing within a spectacular valley with sheer cliffs flanking a flat sandy riverbed (NPWS, 2003). Landforms and gorges are more gentle than most of Wollemi NP to the south. Goulburn River National Park's inclusion in the World Heritage Area would extend the representation of sandstone and volcanic landforms at lower elevations and drier climatic conditions.

Context: These isolated, small, basalt caps allow an understanding of the development of the Sydney Basin landscape. By determining the age of many of these volcanic rocks, it is possible gain an appreciation of the landscape near these volcanoes at the time of eruption, and to calculate the rates of subsequent landscape-modifying processes. These rates are very slow. The data contribute to the understanding of Australia's continental movement northwards during the mid-Tertiary. They form parts of the East Australian volcanic sequence which stretches from northern Queensland to western Victoria. Relatively few Australian sandstone areas have this association of datable basalt flows over the pre-basaltic land surface (Wray, 2013). However, the Carnarvon region is a notable exception in that extensive Oligocene to Miocene (35-28 Ma) volcanics drape much of the area (Young and Wray, 2000).



Above: Basalt cap of Mt Colong with basalt talus slopes and a sandstone bluff on the left.
(Photo: Ian Brown)

These basaltic flows, which are more extensive than those of the Sydney Region, have allowed scientists to establish the pre-basalt land surface, and decipher landscape history and rates of change in the Carnarvon region. Nevertheless, the basalt inselbergs of the Greater Blue Mountains remain significant compared to most other sandstone landscapes.

LAPSTONE STRUCTURAL COMPLEX

The Lapstone Structural Complex is an intricate system of faults and monoclines extending for some 50 km in a north-south direction from the Colo River south past Warragamba (Branagan and Pedram, 1990). The physiographic expression of the Complex is an east-facing monoclinial step downward of some 150 metres from the surface of the Blue Mountains Plateau to the lower Cumberland Plain to the east. The Complex is a major feature of the landscape, as it defines the eastern edge of the Blue Mountains Plateau. It is best seen outside the Greater Blue Mountains in the stretch adjacent to the western bank of the Nepean River from south of Penrith to west of Richmond. Movement on this Complex (possibly during the Late Cretaceous-early Tertiary) probably influenced the formation of the bottleneck valleys, Thirlmere Lakes, Mellong Swamps, Mountain Lagoon, and several other landscape features.

Context: The Lapstone Structural Complex is an important feature controlling the development of the modern landscape. Much of the Greater Blue Mountains sandstone landscape would have been quite different had the Complex not formed. The Complex (disregarding the Sydney Basin itself) is the major tectonic feature of the Sydney region. We are unaware of any local, non-regional folding or tectonic feature of comparable importance in other Australian sandstone areas.

EXTENSIVE VALLEY LANDFORMS

The region displays a number of large, scenic valleys that are a major tourist attraction. Most of these valleys are surrounded by many kilometres of impressive, vertical, sandstone cliffs. The largest and deepest of these valleys are the Burratorang, Megalong, Jamison, Grose, Wolgan, Capertee and Colo Valleys. Unusually for a 'mountain' area, here you don't look *up* at the peaks, but rather you look *down* from the plateau into the valleys (Washington, 2013).

WATERFALLS

The region's largest waterfalls are major tourist attractions, but archaeological evidence shows they have also been important meeting places for local inhabitants for thousands of years. Govetts Leap Falls plunges around 160 m vertically into the Grose Valley, and Wentworth Falls has a total vertical drop of nearly 190 m into Jamison Valley. These and other smaller falls are visited by tens of thousands of people annually.

Context: The Blue Mountains lies in a moist temperate area, with many waterfalls that flow year-round draining the sandstone plateau. Views of these falls are generally *from the top*. Most Australian sandstone areas are in much more arid areas, or in seasonally-wet areas. Waterfalls in these regions may only be active for part of the year, and are generally viewed from the bottom. Kakadu is famous for its waterfalls – Jim Jim and Twin Falls, two fine examples, are impressive in the Dry season, when they are most easily accessible, and visited by large numbers of tourists and may be comparable to the larger Blue Mountains waterfalls.

However during the 'Wet' (the period of much more difficult access), these Kakadu falls are much larger, very spectacular and far superior to the Blue Mountains falls, in terms of water volume (though most visitors cannot gain access then to see them).

Waterfalls in other parts of monsoonal northern Australia include those on streams draining the Kimberley Plateau and sandstone areas around Katherine Gorge, and Litchfield National Park, south of Darwin (Wray, 2013). All these are impressive in the Wet, but much smaller or non-flowing in the Dry, and have shorter drops than waterfalls in the Blue Mountains. Waterfalls in the Grampians and Flinders Ranges are typically much smaller than those in the Blue Mountains; some are perennial, while some are more intermittent (Wray, 2013).

Below: Below: Govetts Leap Falls tumble over the edge of the cliffs at Govetts Leap, Blackheath. (Photo: Ian Brown)



Sites of International Geodiversity Significance in the Greater Blue Mountains and adjacent areas

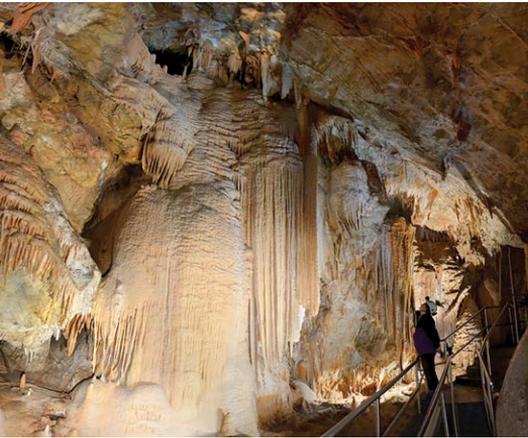
JENOLAN KARST CONSERVATION RESERVE

Jenolan with more than 250,000 visitors a year is Australia's most-visited and best-known karst area. The age span of karst and cave development is significant, and the range of geomorphic processes is *without equal in Australia*. The Jenolan karst and its caves have been referred to extensively in the karst literature (see Osborne, 2013; James, 2013).

Hundreds of caves have developed in a body of Silurian limestone approximately 250 m wide x 6 km long. It is the most significant impounded karst in the Eastern Highlands of Australia, and is the most important of the 18 impounded NSW karsts that intersect palaeokarst deposits (Osborne, 2013).

Context: Features of both international and national significance are:

- Vertebrate fossils of national and international significance (broadKarst News –May 2013). For example, the jaw-bone of the megafauna *Zygomaturus*.
- The *oldest open cave system in the world*, displaying passages that formed in the Carboniferous (Osborne et al, 2006).
- One of the most complex cave systems in the world. Osborne (1999) recognised ten phases of cave development; few caves worldwide are known to be this complex.
- The caves are both nationally and internationally known for their variety of passage morphologies, the size of their chambers and their blue-green pools and rivers.
- They are renowned for the variety, abundance and quality of their speleothems. Amongst the special speleothems that have not been reported elsewhere are the 'potatoes' groups of knob-shaped masses of ardealite and gypsum,



Above: World-renowned cave formations at Jenolan (Photo: Julia James)

and the 'lobsters' stromatolitic stalagmites (concretions formed by calcite in association with cyanobacteria). Internally, the latter resemble stromatolites in ancient rocks.

- Jenolan contains the *deepest cave on the Australian Mainland*.
- The Jenolan Cave System contains approximately 25 km of passage. It has a definite focal point where the drainage of three creeks penetrates the limestone. This has created a magnificent series of arches. There is no similar focus of drainage in Australia.
- The caves contain mineral deposits that are nationally significant.
- Eight kilometres of the passages in the Jenolan Caves System have been developed as show caves. Nowhere in Australia is there an equivalent length of cave that can be viewed by the general public.
- Thurgate et al (2001a,b) reports that Jenolan is a focal point for cave invertebrates (126 taxa including 11 obligate and 30 endemic species) and threatened species including:
 - Brush-tailed rock-wallaby (*Petrogale penicillata*) – listed Vulnerable under EPBC Act 1999 and Endangered under TSC Act 1995;
 - Sooty owl (*Tyto tenebricosa*) – listed Vulnerable under TSC Act 1995;
 - and Eastern bentwing bat (*Miniopterus schreibersii oceanensis*) – listed Vulnerable under TSC Act 1995.

YERRANDERIE VOLCANO AND BINDOOK COMPLEX

The Yerranderie volcano in the Southern Blue Mountains is a rare example of a large (around 40km²) Devonian volcanic caldera now being revealed by the erosion of overlying Late Devonian Lambie Group cover (Schön, 1984). The crater was around 4 km in diameter (Fergusson, 1980). It is of international significance due to its rarity. The complex, once important for silver, lead and gold mining, mined from 1898 to 1928 (NPWS, 2010) is in Yerranderie State Conservation Area, *currently not* in the WHA. Yerranderie State Recreation Area (12,192 ha) mostly consists of Devonian (390 million years old) sediments, granites and volcanic rocks.

Context: To our knowledge there is no other comparable feature in Australia but there is a lack of research on such features, and this site clearly merits further research.

SANDSTONE LANDFORMS - PLATY PAGODAS; SLOT CANYONS AND BOTTLENECK VALLEYS

Wray, Washington and Osborne have identified three sandstone landform features with international significance: **Platy pagodas; Slot canyons** and **Bottleneck valleys**.

Platy pagodas are the dissected, stepped sandstone towers that form around the cliff edges of many of the sandstone plateaus and are a very important geomorphic and geoheritage feature of the Greater Blue Mountains (Wilkinson et al, 2005; Washington and Wray, 2011).

These complex, intricate, ruin-like landforms are locally known as 'pagodas', and often resemble aesthetically beautiful 'lost cities' and 'temples' (Washington, 2013). They are poorly studied, but because they are unusual both in Australia and internationally, they hold important geoheritage significance.

Around half the pagoda heartland of 60,000 ha has World Heritage protection in Gardens of Stone, Wollemi and Blue Mountains National Parks (Washington and Wray, 2013); the other half is found in Muggii Murum-ban State Conservation Area (a major cluster of pagodas) and Newnes, Ben Bullen and Wolgan State Forests.

These areas are not currently in Greater Blue Mountains WHA, but are now recommended for addition. Newnes, Ben Bullen and Wolgan State Forests are major centres of geodiversity. Newnes covering 24 794 ha is the largest of the three and contains not only major pagoda clusters, but is also one of the highest (and most extensive) areas in the Greater Blue Mountains, with areas at 1180 m or above. Newnes State forest contains a large extent of highland swamps which have been recognised as an Endangered Ecological Community under the EP&BC Act. Ben Bullen and Wolgan State forests are major centres for both platy and smooth pagodas (the first of international significance, the second of national). Ben Bullen SF also contains the headwaters of the Cocks River, here called Long Swamp Creek, which contains botanically significant shrub swamps.

The extensive highland peat swamps of Newnes Plateau are of great significance for both geodiversity and biodiversity. These State Forests are clearly of national geodiversity significance and should be put on the National Heritage List and added to the Greater Blue Mountains WHA.



Above: The remarkable shapes of the Platy pagodas in Newnes State Forest.
(Photo: Haydn Washington)

Context: Platy pagodas are influenced by numerous layers of ironstone (the sandstone re-cemented and hardened by iron-based minerals), and are distinct and significant features, with no other rock formations in Australia or elsewhere mimicking their geomorphology (see Young, Wray and Young, 2009; Washington and Wray, 2011). While there are many other rock pinnacles and beehives around the world, and whilst ironstone formations are found in other places, the regular stepped-cone shape of platy pagodas is a distinct geomorphic feature. The ironstone banding of the platy pagodas is thus significant *in degree*, not in nature, as ironstone layers are found throughout many of the Sydney Basin sandstones.

However, the development of banding in platy pagodas forms a geomorphic landscape type that can be recognised as distinct and significant even by world standards (Washington and Wray, 2011). No other areas in Australia (or indeed the world) contain platy pagodas, making them unique internationally (Washington and Wray, 2011). Smooth pagodas do have equivalents elsewhere in Australia, though they are still of national significance.

Pagodas provide niche habitat for biodiversity. For example, the Pagoda Daisy (*Leucochrysum graminifolium*) only grows on pagodas (and associated rocky ledges) on Newnes Plateau and Mugji Murum-ban SCA (Washington and Wray, 2011), while the *Leionema scopulinum* is confined to the rocky ledges and clefts associated with predominantly smooth pagodas in the north-west edge of Wollemi National Park (Botanic Gardens Trust, 2010).

There are sandstone towers or pinnacles in other parts of Australia, particularly northern Australia. However, these are *all different* to platy pagodas in that they lack the *degree* of intricate ironstone development.

Below: Slot canyon. (Photo: Ian Brown)



Slot canyons: A very important geomorphic and geoheritage feature of the Greater Blue Mountains are the very large number of narrow and deep slot canyons cut by streams into the soft Narrabeen (mostly Banks Wall and Burra-Moko Head) sandstones of parts of the Blue Mountains, Wollemi and Gardens of Stone areas (Holland, 1973). The exact number of slot canyons in this area is unknown but has been estimated as more than 400 (Jamieson, 2001; Woodford, 2005). These slot canyons, with their protected, cool, damp and dark habitats, sustain important ecosystems. They constitute refugia for many species of plants and animals, including the unique Wollemi Pine (*Wollemia nobilis*) which is found in only one canyon system within the Greater Blue Mountains. Canyoning is a popular recreational activity and well-known sites include Empress, Claustral, Rocky Creek and Wollangambe canyons.

Context: Slot canyons are an important landscape feature, but are still poorly understood. The Greater Blue Mountains has *by far the most extensive and well developed sandstone canyon systems in eastern Australia*; it is most probable that these systems are amongst the foremost in the world, but bedrock canyons in general are not well studied worldwide, (see Wohl, 1993; Wohl, 1998). Wray (2013) has seen a small number of small sandstone canyons draining into Carnarvon Gorge (i.e. Wards Canyon, Amphitheatre, Moss Garden, and Boowinda Gorge). They are generally *short* and with intermittent streams and most are not of the scale of the Greater Blue Mountains WHA canyons (except perhaps Boowinda Gorge).

There are a few monsoonal canyons draining from the western edge of Purnululu-Bungle Bunge (e.g. Echidna Chasm, Mini Palms Gorge), and several from the eastern side

(e.g. the Cathedral Gorge, and many unnamed tributaries of Picaninni Creek) (Wray, 2013). Narrow gorges are often found in other sandstone areas (e.g. near Kings Canyon and in the Central Ranges) but these generally lack the number and complexity of those in the Blue Mountains. They also lack the length, deep water pools, depth and sheer narrowness of many Blue Mountains canyons (Wray, 2013). It is worth emphasising that relatively short slot canyons do form in many other locations due to streams flowing onto areas of greater rock resistance. However, the slot canyons in the Greater Blue Mountains have formed on *flat lying* sandstone, are of great length (up to many kilometres), and are often very narrow and deep.

One of the few international sandstone areas worldwide which could rival the Blue Mountains area is the sandstone 'Canyonlands' region of the Colorado Plateau in the central USA (Pearson, 2001). This has many hundreds of similar canyons to the Greater Blue Mountains WHA, but is presently semi-arid, with a high proportion of dry canyons and very different levels of biodiversity to the wet canyons of the Greater Blue Mountains.

Bottleneck valleys: Another unusual feature of the topography of the region are the 'bottleneck valleys' first noted by naturalist Charles Darwin in 1836 (Taylor, 1958; Young and Young, 1988). During his global voyage on the *Beagle*, Darwin visited Sydney and travelled inland to Bathurst. Whilst crossing the Blue Mountains, he noticed the unusual 'bottleneck valleys', and stopped at what is now Wentworth Falls where he described the view from the cliffs down into the Jamison Valley as **exceedingly well worth visiting**; he went on to visit Govetts Leap near Blackheath and the Wolgan Valley (Washington, 2013).

Normal valleys widen downstream. In contrast, some of these cliff-rimmed valleys in the Greater Blue Mountains, such as the Grose, Capertee, Wolgan, Kanimbla and Wollondilly valleys, are widest in their upper reach, yet downstream the cliff walls converge to narrow gorges; all material eroded from the upper valleys has been transported through these narrow gorges or bottlenecks. The landform termed Bottleneck valleys are wide and open in their upper reaches, but have narrow gorge-like constrictions further down for quite a distance. It is important to be clear on the phenomenon. Some creeks and valleys may have isolated 'crater-like' formations (some of them diatremes)



Above: The Grose Valley 'bottleneck'.
(Photo: Ian Brown)



Above: The Wolgan Valley 'bottleneck'.
(Photo: Ian Brown)

where the valley opens up briefly then closes in but are not bottleneck valleys.

In the Greater Blue Mountains 'bottleneck valleys' developed because the tributary rivers in their upper reaches have cut down and laterally through the Narrabeen sandstones and softer underlying rocks, creating broad, mature valleys between sandstone cliffs, that are kept steep by undercutting and rock-falls. In their lower reaches they encounter more resistant rocks that constrain the flow and impede lateral migration. For the westward flowing systems, the constraint results from down-cutting into the underlying, harder rocks of the Lachlan Fold Belt. However, for eastward-flowing systems the constraint relates to the down-folding of the Hawkesbury Sandstone at the Lapstone Monocline (Young and Young, 1988; Ollier and Osborne, 1998). The east-trending rivers reach the barrier posed by the more steeply dipping and resistant Hawkesbury Sandstone which reduces valley widening to a narrow gorge.

Context: Bottleneck canyons are another important consequence of the Lapstone Structural Complex. Wray (2013) knows of no other examples of bottleneck valleys in Australia.

WOMBAYAN KARST CONSERVATION RESERVE

Wombeyan Karst Conservation Reserve west of Mittagong adjoins the southeast edge of Greater Blue Mountains WHA. First reported in 1828 by Surveyor General John Oxley, Wombeyan Caves was the first reserve in Australia to be set aside (in 1864) specifically for the preservation of caves.

In 1994 it became a Karst Conservation Reserve (there are only four areas with this designation in Australia) and in 2003, was added to the NSW National Parks & Wildlife Service estate. Wombeyan Karst Conservation Reserve is not currently part of the Greater Blue Mountains WHA but should be added as it has both national and international heritage significance.

Context: The Wombeyan Caves karst is internationally significant for containing over 500 documented caves in the 6 square km area of marble. Its surface includes a diversity of karst features including karren (small solution pits, grooves and runnels), weathered rock comprised of coarse grained marble, natural arches, blind valleys, collapse dolines and an outstanding example of a canyon developed in marble.

The Wombeyan karst and its caves have been referred to extensively in the recent karst literature (e.g., Rowling 2004; Thurgate 2006; Osborne 2013; James 2013). The complex history of the limestone is exceptional and there is no equivalent in Australia. The surface karst geomorphology and the symmetrical domes and arches in the caves (generated by the unloading of massive marble) are unique and no comparable sites are known in Australia. Surface exposures of volcanoclastic palaeokarst of the type and size seen at Wombeyan have not been reported from elsewhere in Australia. After Jenolan Caves, it is clearly one of the most significant karst systems in Australia, and is of international significance

Specific geodiversity significance at the national level is based on:

- Being a significant impounded karst in the Eastern Highlands of Australia.
- Being the largest karst area in NSW that has developed in marble, and also being the **largest marble karst in Australia** that contains caves.
- The complex history of the limestone being exceptional and having no equivalent in Australia. Originating as a single lens of Silurian limestone, later in the early Devonian, the limestone was uplifted and the first caves formed. Soon after, the karst was covered, and in places filled by volcanic deposits, burying the limestone under a thick mantle of hot rock. The combination of hot rock covering the surface, and hot rock entering caves in places, heated the limestone and converted it to marble.

Specific geoheritage values are:

- The marble quarries, one of which has been developed for geotourism (of the hundreds of caves in the marble, ten have been developed for tourism).
- The quality of the four types of Wombeyan marble: Wombeyan white is a pure white marble with very large crystals; Wombeyan pink has only a tinge of pink colour; and Wombeyan honey, both light and dark versions, result from iron impurities in the marble. All four have been quarried for building materials and used in many heritage buildings. Cores of the homogeneous white marble were used in the rock mechanics laboratory at ANU to determine modes of rock deformation under a range of experimental conditions.

Below: The Wombeyan Caves karst is internationally significant for containing over 500 documented caves in the 6 square km area of marble. Its surface includes a diversity of karst features including karren (small solution pits, grooves and runnels), weathered rock comprised of coarse grained marble, natural arches, blind valleys, collapse dolines and an outstanding example of a canyon developed in marble. (Photo: Julia James)



- Wombeyan Caves intersects four or more types of palaeokarst deposit – on a national scale it is unusual to find palaeokarst deposits intersected by caves, and it is extremely rare to find caves which intersect more than two palaeokarst deposits. There are rare formations such as cave passages/caverns and dolines filled with extrusive volcanic rocks.
- Creek Cave which contains the most outstanding example of a vadose canyon in mainland Australia.
- Wombeyan Caves has speleothems of outstanding value (SPS, 1982, 2004) – they include:
 - o Outstanding deposits of blue aragonite speleothems
 - o An active stegamite (vertical shield)
 - o Chocolate Fringes, a startling white calcite deposit, overlain by a chocolate coating of decaying guano.
- The Broom Breccia at Wombeyan where the palaeontologist, Robert Broom (Broom, 1896; Hope, 1982), discovered the first fossil specimen of the mountain pygmy possum, *Burramys parvus* in 1894 (at that time the species was considered to be extinct).
- The rich source of palaeontological material in fossiliferous earth and a fossiliferous cave exposed in a Wombeyan Quarry. These deposits include the remains of at least 10 extinct species (including megafauna such as *Thylacoleo carnifex* ('marsupial lion'), *Macropus titan* ('giant kangaroo'), *Palorchestes azael*, *Progura gallinacea sthenurus occidentalis*, and *Zygomaturus trilobus*), as well as numerous modern day species (Hope, 1982). Such deposits provide valuable information on past species, their distribution and past environmental conditions.
- Wombeyan Caves has a diverse subterranean invertebrate communities and is considered a hotspot for this biodiversity i.e. stygofauna that are characteristic of, and endemic to, particular catchments and caves at Wombeyan (Thurgate et al, 2001b). The metamorphism of the limestone (marble) and periods of karstification have resulted in unique fauna assemblages.

Geodiversity sites and features of National Significance in the Greater Blue Mountains WHA and adjacent areas

LOW REGIONAL EROSION RATES, AS EVIDENCED IN BASALT FLOWS

The Greater Blue Mountains is highly significant for its *very slow rates of erosion and landscape change*, considerably slower than seen in most parts of the world (Young 1978, 1983; Young and McDougall, 1982, 1985; Young and Bishop, 1980; Wray et al., 1993; Nott et al., 1996; Van der Beek et al., 2001). Basalt flows on the surface of the plateaus show that the last major period of uplift was probably early in the Tertiary, and that subsequent valley erosion has proceeded very slowly (Van der Beek et al., 2001). The significance of the low erosion rates needs to be emphasised, and arguably the Greater Blue Mountains should have national heritage listing for geodiversity *just for this point* (Wray, 2013). Indeed, this aspect is possibly of international significance.

Context: More work needed, but the Greater Blue Mountains is one of the *slowest developing modern landscapes* in the world. There are some highly detailed regional studies of a few other sandstone areas in Australia, e.g. Young (1987) in the East Kimberley, and Young and Wray (2000) in the Carnarvon area, but erosion rates of the Greater Blue Mountains have been slower (Wray, 2013).

FOLDING EVENTS AND UNCONFORMITIES, KANANGRA WALLS

There is evidence in the Lachlan Fold Belt section of the Greater Blue Mountains for three major folding events (the Benambran, Tabberabberan and Kanimblan Orogenies) and their related unconformities. The most impressive unconformity site is at Kanangra Walls (Kanimblan) (Stevenson, 1981) where a sheer cliff of horizontally-bedded sandstone, the base of the Early-Permian Sydney Basin sequence, sits on a former erosion (land) surface cut in

folded Devonian Lambie Group strata. The unconformity represents a time-gap of about 20 million years (between the end of folding and erosion, and the beginning of Permian sedimentation), while the gap between deposition of the Lambie Group and the Permian is about 85 million years.

Context: There are two other unconformities, the Benambran and Tabberabberan, but the Kanangra Walls (Kanimblan) unconformity is the most impressive, and one of the best examples in Australia.

This site is a classical locality, and one of the best examples of such an angular unconformity in Australia. Indeed, Kanangra-Boyd NP contains geological structures and rock types which demonstrate the tectonic evolution of Australia during the Palaeozoic era (NPWS, 2001). The site is easily accessible/readily viewed from Kanangra Walls Lookout. It is of national significance.

SMOOTH PAGODAS

'Smooth pagodas ... resemble cones or beehive structures found in the Bungle Bungles, Budawangs and other areas around Australia and the world (Young, Wray and Young, 2009), such as the central-west USA where they would be called 'slickrock' slopes (Howard and Kochel, 1988)'

While Platy pagodas are significant on the international level, Smooth pagodas are more widespread but do have significance on the national level (Washington and Wray 2011).

Context: There are a number of smooth 'pagoda-like' towers in Australia, but these are not found in the same numbers or the same topographical settings as the Greater Blue Mountains pagodas (Wray, 2013). In northern Australia Grimes et al (2009) described several 'towered' sandstone areas including the well-known Purnululu-Bungle Bungle, but also ones in Keep River NP (NT-WA border), Litchfield NP (NT), Limmen NP (NT), Kakadu NP, Arnhem Land, and near Cape Crawford (NT). There are also small towers on top of Mt Mulligan (Qld), and at Salvator Rosa and Mt Moffat in Carnarvon NP (Qld).

Whilst there may be a number of tower-forms in Australian sandstones, the examples *differ* from each other and each is important, the differences reflecting small variations in rock properties, such as composition, weathering and erosion resistance, degree of weathering, topographic setting and

JURASSIC DIATREMES

degree of fracturing, etc. The smooth pagodas of Greater Blue Mountains are distinctive in their own right.

Some 90 Jurassic diatremes, often expressed as crater-like depressions in the landscape and interpreted as the eroded roots of explosive maar volcanoes, intrude the Sydney Basin geology (Crawford et al., 1980). Mapping by Crawford (1973) showed a small number of diatremes in the eastern part of the Blue Mountains near Springwood, and a larger concentration in northwest Wollemi NP near Mt. Coricudgy. Two of the few diatremes with natural exposures of breccias are 'Euroka Clearing' near Glenbrook and 'Lost World' crater in Wollemi NP, both in the Greater Blue Mountains WHA.

Apart from their mode of formation, the diatremes are important as a source of xenoliths and megacrysts (discrete crystals or crystal fragments 0.5 cm or more across) which provide information on the composition of the mantle. The Sydney Basin Jurassic diatremes are the *oldest known* occurrences of such xenoliths and megacrysts (Johnson, 1989). The diatremes are also of interest botanically for their specific vegetation related to the locally enriched soils.

Context: We consider the Sydney Basin Jurassic Diatremes are of national significance, and in conjunction with the broader work on the mantle composition and properties, may also have international significance. We are not aware of extensive areas of Jurassic diatremes elsewhere in Australia.

LONG CLIFF-LINES



Above: Long clifflines of Narrow Neck and Mount Solitary. (Photo: Ian Brown)

Undoubtedly the most visually striking landforms of the Greater Blue Mountains are the many hundreds of kilometres of sandstone cliff-lines that fringe the plateaus. These extensive cliff-lines are of national significance. These can range in height from tens of metres, to over 300 m near Glen Davis in the Capertee gorge.

The views from these cliffs out into the deep valleys attract hundreds of thousands of tourists annually, particularly the many famous vistas from Echo Point at Katoomba and Megalong and Grose valleys cliff-lines from Blackheath (Washington, 2013). Kanangra Walls is also a good example.

The most impressive long line of perched cliffs, called the 'Cliff Wall' by Cunningham (1996), runs down the western margin of the Blue Mountains, from the Broken Back Range

of the Hunter Valley area southwards, with many salients, re-entrants and isolated mesas, for about 280 km to near the Nattai and Wollondilly Rivers (Ollier & Osborne, 1998). The Cliff Wall reaches its maximum sheer height of just less than 300 m at the edge of Kings Tableland south of Wentworth Falls; it is almost the same height 60 km further south at the junction of the Nattai and Wollondilly Rivers.

Associated geomorphic features of interest include the gorges themselves, the sandstone landforms formed by erosion with joint control (e.g. The Three Sisters), vertical cliff faces (e.g. Dogface Rockfall), waterfalls (e.g. Wentworth, Leura and Katoomba Falls), and slope retreat due to collapse of vertically-jointed cliff wall sandstones (e.g. Narrow Neck Plateau) (Langford-Smith, 1976; Pickett and Alder, 1997). The Greater Blue Mountains WHA also contains numerous examples of extensive sandstone overhangs including the Wind-eroded Cave (Blackheath), Walls Cave (Blackheath), Kings Cave (Linden), Lyrebird Dell (Leura) and Blackfellows Hand (Newnes Plateau).

Context: Most flat-lying sandstone areas in Australia display long, impressive cliff-lines; many are many tens of kilometres long. Notably the Arnhem Land Escarpment of Kakadu, the Precipice Sandstone cliffs around Carnarvon, the sandstone cliffs of the east Kimberley Cockburn Range and Victoria River region, the cliffs of the western Purnululu-Bungle Bungle Range, Nitmiluk-Katherine Gorge or Kings Canyon (NT) (Wray, 2013). Some folded areas also display impressive cliffs – the Grampians, the Flinders Ranges (i.e. Wilpena Pound), Uluru, the highly folded Central Ranges near Alice Springs, and those of the sandstones in the fold-belt ‘mobile zones’ bordering the Kimberley. However, the cliffs of the Blue Mountains (also the Budawang area) are considered to be *more spectacular* because:

- The near-continuous length of the Blue Mountains cliff systems is very impressive, and longer and more extensive than other areas.
- The Blue Mountains cliffs are of impressive height which is relatively consistent along any valley side, and is generally controlled by structural and other rock-related features (Wray, 2013).
- There is little modern collapse. Apart from some minor rock-falls, the Blue Mountains cliff-lines are *remarkably stable*. The only major collapses appear to be directly related to subsidence impacts induced by coal mining.



Above: The Three Sisters at Katoomba provides an excellent example of differential erosion following weaknesses associated with vertical joints in the rock leaving the familiar pillar-like structure, one of Australia's best known and visited geological features. (Photo: Haydn Washington)

THE THREE SISTERS KATOOMBA

(Much is still to be learned about the cliff forms of this region (Young, 1986; Young and Young, 1988; Young and Wray, 2000; Washington and Wray, 2011).

- The plateaus have been dissected by numerous river systems, flowing both east and west. This has led to the formation of a number of valleys of several sizes and types. Valleys draining eastward have been influenced by the regional dip of the sandstones, changes in sandstone resistance, and the Lapstone Complex often forming bottleneck valleys. Valleys to the west are larger and have eroded into the basement rocks below the Sydney Basin sedimentary rocks.
- The Blue Mountains is virtually the *only place in Australia* where primary access to the cliff lines is from the plateau *above* the cliffs. There is access at Carnarvon to the upper plateau surface at Mt Moffat, but this is not the main tourist area, nor does it display a great vista of cliff lines. The cliffs of most other areas are generally viewed from the valley bottom. The top-down view from the Blue Mountains thus allows a better, more extensive vista.
- The cliff-lines of the Blue Mountains are much more accessible, and have the capacity to be appreciated by markedly greater numbers of people. Most of the other cliff escarpments are found in remote areas.

The *Three Sisters* at Katoomba is part of the cliff line system that deserves special discussion as one of Australia's best known and visited geological features. It provides an excellent example of where erosion has followed vertical joints (weaknesses) in the rock leaving the characteristic pillar-like structures.

Context: In 2001 Yeates noted: *The Three Sisters is one of Australia's best-known and regularly visited landmarks. The site also exposes a portion of the foreland Sydney Basin sequence. Cochrane and Joyce (1986) considered the site to be one of national significance on the basis of its geomorphic and historical significance. After cross-State comparisons, more consideration of its well-described geology (even though difficult for some people to see) and the tectonic significance of the Sydney Basin, this evaluation recommends an upgrading of the ranking now to international significance.*

CUT ROCK, KURRAJONG FAULT

It is significant that Yeates (2001) thought that the Three Sisters was not just of national significance, but actually of international significance. Yeates also noted of the Three Sisters that 'the site, though different, is comparable in significance to Wilson Bluff in South Australia and Port Campbell National Park in Victoria'.

Yeates (2001) noted: *At Cut Rock, the Kurrajong Fault is a fracture, which has displaced the Middle Triassic Hawkesbury Sandstone against the Middle Triassic Ashfield Shale of the Wianamatta Group. The shale unit is downthrown around 170 m and the Hawkesbury Sandstone has been dragged into a near vertical attitude in the fault zone (David, 1902, pl. XVI; Branagan and Packham, 2000, p. 159; Percival, 1985). The fault is in the hinge zone of the monoclinial Lapstone structural complex, a tectonic landform of probable Early Tertiary age (Branagan, 1969; Langford-Smith, 1976).*

Context: Yeates (2001) concluded: *This very clear exposure of the Kurrajong Fault makes it a very good site to examine displacement along a fault. It is related to the important Lapstone structural complex. There would thus seem to be few sites comparable that show major faulting and have considerable potential as a teaching site.*

THIRLMERE LAKES

Thirlmere Lakes near Picton are a series of unusual freshwater lakes associated with a sinuous former river valley incised in the Hawkesbury Sandstone.

They are an important consequence of the Lapstone Structural Complex. This river probably originally flowed westwards (Timms, 1992; Rose and Martin, 2007), and was beheaded by tectonic activity associated with the formation of the Lapstone Structural Complex, possibly during the Late Cretaceous-early Tertiary (Sherwin, 1986). The lakes also contain an unusual and diverse array of flora and fauna (OEH, 2011). Thirlmere Lakes are of national significance in that:

- They are unique in terms of their geomorphology and sedimentation history (Vorst, 1974; Pells, 2011).
- The probability that the Lakes are 15 million years old makes them a natural laboratory of considerable scientific importance (NPWS, 1997; Pells, 2011).
- Thirlmere Lakes have played an important role in Aboriginal and European culture and heritage. In 1863



Above: Thirlmere Lakes (Photo: Ian Brown)

when the railway reached Picton-Mittagong the Lakes became a popular focus for outings from Sydney – the Lakes remain a popular recreational area to the present day (Pells, 2011).

- One of the lakes, Lake Baraba is one of only 33 sites in the Australian, Southeast Asian and Pacific regions with a record of vegetation during the last glacial maximum, 18,000-25,000 years ago. It provides information on plant and tree types, and fire records to at least 43,000 years ago and marks the incoming of European influence based on pollen analysis (Black et al, 2006; Pells, 2011).

Context: Thirlmere Lakes are unique in the true sense of the word. There is very little or nothing to compare them with elsewhere in Australia.

NEWNES PLATEAU SHRUB SWAMPS

The Newnes Plateau Shrub Swamps formed during the end of the last glacial period around 10,000 years ago, and cover less than 650 ha (Hensen, 2010; Benson and Baird, 2012). They often have deep peat beds and provide a steady flow of water to streams in the Greater Blue Mountains WHA. They have been recognised as an Endangered Ecological Community 'Temperate Highland Peat Swamps on Sandstone' (THPSS) (under the Federal EPBC Act) and an Endangered Ecological community Newnes Plateau Shrub Swamps under the NSW TSC Act (NPWS, 2005). They are the key habitat of the nationally Endangered Blue Mountains Water Skink and the Giant Dragonfly, and are under stress from climate change (Ramp & Chapple, 2010). Although some of these swamps are found inside the Greater Blue Mountains WHA, a larger number occur in the adjacent Newnes State Forest, which is not currently in the Greater Blue Mountains WHA. . Swamps outside the Greater Blue Mountains WHA are currently threatened and impacted on by longwall coal mining, and associated subsidence of up to two metres.

Newnes State Forest has been proposed to become part of a State Conservation Area (BMCS, 2013); reserved as an SCA, the Newnes Plateau region would provide a substantial buffer along the western margin of the Greater Blue Mountains WHA. It could subsequently be added to Greater Blue Mountains WHA, after appropriate rehabilitation.

NEWNES PLATEAU AEOLIAN DUNES



Above: Woodland on remnant aeolian sand dune on Newnes Plateau; the now vegetated dunes provide evidence that during the last Ice Age they were bare and area was dry and windy with very little vegetation. (Photo: Doug Benson)

MELLONG AND MOUNTAIN LAGOON ALLUVIAL SWAMPS

Context: The Newnes Plateau Shrub Swamps are an uncommon geodiversity feature and are highly significant for geodiversity and geoheritage at the national level. They form part of the Temperate Highland Peat Swamps on Sandstone (THPSS), a nationally Endangered Ecological Community with a total remaining area of only 3,000 Ha (DEH, 2005). The Newnes Plateau Shrub Swamps include excellent examples of some of the extensive (in area), well-preserved swamps remaining.

High altitude aeolian sand sheets and dunes hundreds of metres long and 3 to 6 m high occur at several locations on the Newnes Plateau. Now vegetated with sclerophyll woodland, these dunes were active during the Last Glacial Maximum (Hesse et al, 2003) and indicate vegetation was very different from today; most probably comprised sparsely distributed scrubby ground cover above the then tree-line. The structure of the dunes poses questions about processes of sand dune formation in many other parts of south-east Australia, and requires further study (Hesse et al, 2003).

Context: These dunes are in fact the only known high altitude example in Australia of aeolian deposits formed in the last Ice Age. They therefore constitute an important indicator of the last Ice Age periglacial climate in the region. Because there are no other known high-altitude aeolian sand dunes formed on sandstone plateaus during the last Ice Age in Australia a meaningful comparison is not possible. Their uniqueness and climatic implications require that the dunes be assigned national geodiversity significance.

The Mellong Swamps along the Putty Road north of Windsor, are a significant area of Quaternary deep alluvial sand and clay plains dissected by sandstone ridges. These need further research, but seem to have been formed by uplift along an extension of the Kurrajong Fault, part of the Lapstone Structural Complex which reversed the drainage creating deep sandy wetlands (Colong, 1999). The same occurred at Mountain Lagoon near Bilpin (Grady & Hogben, 1926) and Buralow Swamp, south of Kurrajong Heights (Rawson & Clark, 2009).

Context: The Mellong swamps support a unique assemblage of plants and ecological communities and is of both geomorphological and botanical interest. The swamps are important for the conservation of reptiles and invertebrates (NPWS, 2002). While there has not been enough research on these features, Mellong are the only extensive highland swamps we are aware of in Australia that are found on sandstone plateaus and are formed by *reversal of drainage* caused by uplift along a fault-line. As such they are of national geodiversity significance.

SUMMARY

The Greater Blue Mountains World Heritage Area contains extensive and significant geodiversity of high geoheritage and geoconservation significance. It is an excellent example of the development of geological and geomorphological systems over time in Australia and contains features of international and national significance that compare extremely highly with other areas already recognised for national geodiversity significance.

In many cases they are the best, or only examples in Australia of these features. In several cases they are the likely *best in the world*. Areas adjacent to the Blue Mountains WHA contain a further site of international significance (Wombeyan Caves), while Newnes Plateau (Newnes, Ben Bullen and Wolgan State Forests) contain nationally significant highland swamps, Aeolian dunes and smooth pagodas (as well as internationally significant platy pagodas not in the Greater Blue Mountains WHA).

The additional areas proposed for the Greater Blue Mountains WHA would significantly add to the protection of geodiversity of international and national significance. These areas proposed for addition should also be put on the National Heritage List; allowing the boundaries of the Greater Blue Mountains WHA to be expanded to provide additional long term protection for the listed biodiversity values, when it is renominated for World Heritage for its geodiversity, scenic and cultural heritage values.

‘STATEMENT OF SIGNIFICANCE’

All places on the National Heritage and World Heritage Lists have a ‘Statement of Significance’ which succinctly describes their values. In relation to geodiversity values, a ‘statement of significance’ might be:

The Greater Blue Mountains are the best example in the World of a sedimentary upland, deeply dissected by rivers over tens of millions of years, and of the ongoing processes involved in sculpting these magnificent landforms’. The outcropping geology provides an outstanding illustration of the complex and long geological history of the east Australian coastal margin and highlights marine, terrestrial, volcanic and tectonic environments and processes through time. The geology also hosts exemplary erosional landforms/elements including karst, caves, cliff lines, slot canyons, bottleneck valleys, pagodas and other sandstone landforms of national and international significance.

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Above: Platy Pagodas in Ben Bullen State Forest. (Photo: Ian Brown)

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Greater Blue
Mountains
WORLD
HERITAGE AREA

Chapter 2

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**Protecting biodiversity values in
response to long-term impacts:
additional areas recommended
for inclusion in the Greater Blue
Mountains World Heritage Area**

INTRODUCTION



Above: Blue Gum Forest. (Photo: Ian Brown)

The Greater Blue Mountains was inscribed on the World Heritage List as a World Heritage Area in 2000 because of the international significance of its natural biodiversity. Its plant and animal species richness, and in particular its diversity and evolutionary significance, as evidenced in the genus *Eucalyptus*, and the richness of its temperate eucalypt-dominated forests and woodlands, are outstanding in international terms; many species are significant in terms of the evolution of southern hemisphere plant taxa and communities (e.g. Wollemi Pine *Wollemia nobilis*) (National Parks & Wildlife Service 1998).

In the decade and a half since 2000 the strength of these World Heritage values has been demonstrated by continuing research into the eucalypt species themselves (e.g. Hager & Benson 2010), and other taxa, particularly some of the endemic flora as well as the threatened species (e.g. Peakall et al. 2003, Crisp & Cook 2011). Recent developments in genetic research are disclosing biogeographic patterns for species e.g. *Telopea speciosissima* (Rossetto et al 2011) with implications for landscape connectivity as well as the conservation of isolated populations.

Other research is identifying the potential impacts and spread of invasive pathogens such as *Phytophthora cinnamomi*, feral animals such as deer and cats, and invasive weeds such as African Love Grass *Eragrostis curvula*. Many of these species are of relatively recent establishment and would not have been considered significant threats as recently as 30 years ago. They are of course in addition to longstanding and continuing threats posed by foxes, rabbits, and weeds such as Lantana (*Lantana camara*), Blackberry (*Rubus* species) and Privet (*Ligustrum* species).

There is also increasing recognition that adequate long-term management of the Greater Blue Mountains World Heritage Area (WHA) needs to consider the potential major impacts of climate change. This may be experienced through increases in severity and seasonality of bushfire, changes in rainfall and impacts on wetlands, drying out of mesic habitats, and decreasing availability of refuge habitats for migration of fauna and flora survival during threatening periods or events. Increasing scientific knowledge of the natural biodiversity in and around the Greater Blue Mountains, awareness of increasing threatening processes, and the potential impact of climate change, all indicate that long-term conservation effectiveness will be improved with targeted boundary changes.

These should incorporate areas of complementary habitat or areas not adequately conserved within the existing Greater Blue Mountains WHA, acquire inholdings and improve natural connectivity, or enhance more appropriate management on some adjacent lands. The impacts of climate change in particular are recognised as a major land management issue; conservation adequacy is considered most likely to be improved by extending and connecting the primary environmental and ecological gradients existing within the area.

The proposed National Heritage Listing (NHL) of the Greater Blue Mountains WHA provides the opportunity to reconsider the boundaries of the Greater Blue Mountains WHA in this broader context. In this paper we discuss boundary changes proposed for National Heritage and ultimately World Heritage listing; changes are therefore primarily based on actions that will provide necessary or potential improvements for biodiversity conservation in the Greater Blue Mountains WHA.

National Heritage listed areas should cover the Greater Blue Mountains WHA area as inscribed in 2000, subsequently gazetted additions (mostly small) made mainly to include inholdings and improve boundaries, and adjacent areas that are considered to provide necessary or potential improvements for long-term biodiversity conservation.

These areas may include adjacent conservation areas such as Goulburn River National Park which may also have other significant values such as geodiversity, scenic, historical or indigenous culture; these values have not been included specifically here, though for some areas there may be some passing reference to these values. These other values are discussed in the accompanying papers; see Washington & Wray Chapter 1 *Geodiversity*; Mackay Chapter 3 *Contemporary Aboriginal heritage*; McGrath Chapter 4 *Historic values*; Fallding Chapter 5 *Nature-culture interaction* and Washington Chapter 6 *Scenic splendour*.

A FOCUS ON MONTANE- RELATED LANDSCAPES

The Greater Blue Mountains WHA covers much of the Sydney Sandstone landscape (itself a major component the Sydney Basin Bioregion); this extends contiguously from the coast westward into the mountains. As a result, the Greater Blue Mountains WHA includes areas of low elevation; in some places (e.g. Yengo NP) it comes almost down to sea

Below: The occasional snowfall is an important part of the high elevation mountain ecology for both flora and fauna: such events are predicted to become less frequent .
(Photo: Ian Brown)



level. However it is essentially *montane focussed*, the main geographical focus being on the Mountain landscape, as its name implies.

The Greater Blue Mountains WHA incorporates much of the high elevation sandstone area of the Sydney Basin (up to 1200 m) and its biodiversity values largely relate to montane habitats and conditions. Montane areas are of relatively limited extent in the Australian context, but are over-represented in terms of biodiversity richness and are of very significant conservation value. They are also areas likely to be severely impacted by climate change through temperature and rainfall changes.

There are a number of high elevation montane areas contiguous with the Greater Blue Mountains WHA, mainly state forest lands; these have important and complementary biodiversity values and should be considered for National Heritage, and as potential areas for future addition to the Greater Blue Mountains WHA. Such areas include Coricudgy, Nullo, Newnes, Wolgan and Ben Bullen State Forests and Hassans Walls near Lithgow; these have landscape above 1000 m elevation, with some up to 1200 m or more. Their protection as National Heritage would considerably improve coverage of high elevation lands that are limited in extent and most vulnerable to changing climate conditions.

We do however include one area of low elevation that adds some estuarine landscape to the World Heritage Area, Parr State Conservation Area near Wisemans Ferry; this area is essential for its boundary continuity; the area also provides additional low elevational ecological gradient habitat, as well as a hillside to estuarine gradient. However coastal areas such as Dharug, Brisbane Water, Ku-ring-gai, Royal and Heathcote National Parks are considered primarily part of the coastal Sydney sandstone landscape. We consider that the Greater Blue Mountains WHA should maintain its montane focus and not include these coastal Sydney parks.

THE IMPORTANCE OF EXTENDING ECOLOGICAL GRADIENTS

With the increasing awareness of the potential impacts of climate change there is a need to ensure that the biodiversity of conservation areas is able to cope with likely changes. Current conservation management thinking is that the provision of areas of habitat along gradients that allow organisms (both flora and fauna) to move to some extent when subjected to slightly different climatic conditions, is an important need for conservation areas, if they are,

so to speak, to be pre-adapted for organisms responding to changing conditions. Such changing conditions may include loss of habitat through clearing or mining (hence the importance of corridors) but is also include impacts of climate change, particularly increased warming and drying and increased fire frequency.

Therefore adding land areas that extend and enhance the range of geographical gradients that occur in the Greater Blue Mountains WHA is an important and necessary consideration. The major environmental gradients relevant to biodiversity in the Greater Blue Mountains relate to elevation. However rainfall gradients are also significant to many plant and animal species and although these may relate to elevation, e.g. increasing elevation is broadly associated with increasing rainfall, in practice when individual habitats are considered, the situation is more complex.

While the inclusion of high elevation areas such as Coricudgy, Nullo Mountain and Newnes State Forests will include additional high rainfall areas, there is also a need to extend gradients into lower rainfall zones, as such areas in responding to altered climate change are likely to have a range of different fire regimes (perhaps with lower fire frequencies), not present in the higher rainfall areas. Important low rainfall areas that extend the current rainfall gradient in the Greater Blue Mountains are Goulburn River and Capertee National Parks and Mugii Murum-ban State Conservation Area are proposed for the National Heritage listing.

CONNECTIVITY IMPROVEMENT

Is the area contiguous and will it improve connectivity? The current boundary of the Greater Blue Mountains WHA is not a neat line, but a very ragged edge that may provide management difficulties often relating to catchment and water quality issues. As well there are a number of significant 'holes', where inholdings such as private lands and state forests are surrounded by the Greater Blue Mountains WHA, such as the 'Putty hole' in the Mellong area. Additions to the Greater Blue Mountains WHA are important to fill these holes and provide a more easily manageable edge. Important areas for including in the National Heritage Listing are Parr SCA, Putty SF, Burraborang SCA, Nattai SCA, Yeranderie SCA and Bargo SCA and Gaspers Mountain (privately owned).

RARE SPECIES AND COMMUNITIES

The biodiversity and evolutionary values are highlighted by the richness of eucalypt species in the area, but there are also a number of other species of significance. Some areas have been included because of the additional biodiversity value they provide to Greater Blue Mountains WHA. For example inclusion of Parr SCA will include additional areas of estuarine eucalypts and habitat.

Different geologies provide contrasting habitats and increase the range of biodiversity present. The addition of Wombeyan Caves provides additional Karst landscapes as well as important biodiversity including cave fauna and rare plants (*Acacia chalkerii*, mosses, liverworts). There are important sandstone geodiversity elements included in Goulburn River NP, Coricudgy SF and Newnes SF, and important areas of basalt in Goulburn River NP, Coricudgy SF and Nullo Mountain SF, all important for inclusion in the National Heritage listing.

Below: Plant species are still being discovered in the Greater Blue Mountains; Flower of *Epacris browniae* (family Ericaceae) on Mt Solitary, a species just described in 2015. (Photo: Lyndal Sullivan)



CONSIDERING
BOUNDARY
CHANGES
AND ADDITIONAL
AREAS FOR INCLUSION
IN NATIONAL HERITAGE
LISTING FOR THE
GREATER BLUE
MOUNTAINS WORLD
HERITAGE AREA

The factors discussed above, a focus on montane-related landscapes, the importance of extending ecological gradients, connectivity improvement, and habitat and protection of rare and endangered species and communities, have been considered in relation to natural areas adjacent or close to the boundaries of the Greater Blue Mountains WHA.

In this context we have listed a number of areas that would improve the long term conservation of the biodiversity and should be included within the boundaries of the area for National Heritage Listing, and potentially for World Heritage Listing (Table 1). The selections have been made only on biodiversity issues; most of the areas also have geodiversity, scenic and cultural heritage values that should be considered as well, for example Wombeyan Caves has international geodiversity significance.

Of the areas, 19 are considered to have high importance, providing substantial enhancement for biodiversity protection; a further four to have medium importance. Most of the large areas are currently National Park or State Conservation Area tenure. High and Medium importance areas are listed in north to south order, along with their major values in Table 1.

A number of other areas were considered, but not recommended for inclusion, as not providing substantial additional value to Greater Blue mountains WHA; they do have biodiversity value in other contexts (such as Dharug NP as a significant coastal sandstone area) (see also Table 1).

Table 1: High and Medium Importance areas proposed to be included with the Greater Blue Mountains WHA for National Heritage Listing, and nearby areas not recommended for inclusion

AREAS WITH HIGH IMPORTANCE	
North-South order	Summary of major biodiversity values
Goulburn River National Park and adjacent National Trust listing	Large sandstone landscape area NP (73258 ha) with significant gradient extension and connectivity. Mainly sandstone with some basalt residuals, elevation from 150-600 m, 500-600 mm rainfall. Threatened plant species and very high number of significant fauna.
Nullo Mountain State Forest and Flora Reserve	Basalt flow country and lowland sandstone forest (5370 ha) with an altitudinal range 780 to 1130 m; provides an important extended climatic gradient extension and connectivity with Wollemi NP. Includes large population of the Vulnerable <i>Derwentia blakelyi</i> . Nullo Mountain Flora Reserve protects an unusually large-fruited form of <i>Eucalyptus laevopinea</i> .
Coricudgy State Forest	Important disjunct high elevation (1254 m)/ high rainfall basalt cap (7582 ha) with eucalypt forest with <i>Eucalyptus laevopinea</i> , <i>Eucalyptus bicostata</i> , and <i>Eucalyptus cypellocarpa</i> . Coachwood/ Sassafras rainforest.
Putty State Forest	Putty SF (22252 ha) makes up a large part of the "Putty Hole" a large area between Wollemi and Yengo NPs, most significant inholding in GBMWH with significant biodiversity, upper catchment of Macdonald River. High number of significant fauna.
Capertee National Park	Gradient extension with Dry Capertee valley woodland, limited connectivity (2839 ha). Threatened plant species (eg <i>Grevillea obtusiflora</i> subsp <i>fecunda</i>) and high number of significant fauna.

Mugii Murum-ban State Conservation Area	Large dry sandstone area (3650 ha) with connectivity to adjacent to Gardens of Stone NP dry gradient habitats. Threatened plant species and communities; high geodiversity value in pagoda landscapes.
Finchley Aboriginal Area	Important Aboriginal Area but its small size of 4 ha contributes little specific additional biodiversity value.
Gospers Mtn inholding	Significant inholding (74 ha) in centre of, and with high connectivity on all sides, to Wollemi NP.
Newnes, Wolgan and Ben Bullen State Forests (part GOSII)	These three State Forests (Newnes 24794 ha, Wolgan 1205 ha, Ben Bullen 8252 ha) are all contiguously located on the Newnes Plateau and include very important areas of high level sandstone plateau with many restricted plant species and endangered plant communities not in currently represented in GBMWA. They have exceptional geodiversity value as a key part of platy pagoda heartland; makes up a substantial part of the Gardens of Stone II conservation proposal.
Parr State Conservation Area	Sandstone plateau (38121 ha) wedged between Yengo and Wollemi providing very important connectivity value. Elevations down to sea level include gradient with estuarine vegetation. High number of significant fauna.
Burratorang State Cons. Area	Large sandstone landscape area (17720 ha) with significant connectivity.
Nattai State Conservation Area	Good sandstone landscape area (3383 ha) with significant connectivity.
Yerranderie State Conservation Area	Large public inholding (12192 ha) with important connectivity and biodiversity and cultural values.
Bargo State Conservation Area	Large sandstone landscape area (4619 ha) with significant connectivity and biodiversity values.
Jellore State Forest	Small area (1409 ha) on current fringe contiguous with Nattai NP and Bargo SCA. . Important connectivity with Wingecarribee River.
Wombeyan Karst Conservation Reserve	Small area (569 ha) on current fringe with significant geodiversity and cultural values. Endemic species shrub <i>Acacia chalkerii</i> and limestone mosses, significant cave fauna.
Mares Forest National Park	Small area (2599 ha) adjoining Blue Mountains NP and Wombeyan Caves KCR. Dry gradients, Guineacor Creek drains to Wollondilly River.
Joadja Nature Reserve	Small area (830 ha) on fringe of GBMWA with significant cultural and geodiversity values but little specific additional biodiversity values.
Wollondilly River Nature Reserve	Small area (971 ha) on Wollondilly River with connectivity and endangered ecological communities. Low rainfall gradient extension.

AREAS WITH MEDIUM IMPORTANCE (NORTH TO SOUTH ORDER)

Putty Hole freehold land	Partly forested, partly cleared, less important than adjacent Putty SF.
Hassans Walls	Isolated high altitude sandstone plateau (245 ha) immediately south of Lithgow with heath and woodland and forest. Rich flora including many orchid species and rare species (e.g. <i>Leptospermum blakelyi</i>). No direct natural land connectivity with GBMWA.
Yerranderie Regional Park	Partly forested, partly cleared area (470 ha), less important than Yerranderie SCA
Bargo River State Conservation Area	Good sandstone landscape area (1970 ha) with significant connectivity and Biodiversity values

NEARBY AREAS CONSIDERED BUT NOT RECOMMENDED

Dharug National Park	Main geographical focus and connectivity is with coastal parks from Marramarra and Popran through Muogamarra to Ku-ring-gai and Brisbane Water NPs on coast.
Gulguer Nature Reserve	Small sandstone "landscape island" Nature Reserve on Nepean River with good biodiversity values but probably best considered as part of western Sydney landscape.
Upper Nepean State Conservation Area	Limited but important connectivity, but part of coastal parks landscapes and not essentially part of the montane-focused GBMWA.

NOTES ON THE AREAS CONSIDERED

General notes and references for individual areas are provided below in the order presented in Table 1. The areas are arranged in North-South order and numbered (1-19) for convenience; the numbering does not indicate any particular conservation priority.

Because of the wide range of areas covered, variations in size, geography, tenure and past histories, there is often limited documentation, and the information for different areas may be uneven and incomplete. For example biodiversity information on state forest and freehold areas may be relatively limited.

Tenures of areas include National Park (NP), Nature Reserve (NR), State Conservation Area (SCA), State Forest (SF), Flora Reserve (FR), Karst Conservation Reserve (KCR), Regional Park (RP), Aboriginal Area (AA), Local Government and Freehold. The sizes (in ha) of individual areas are summarised in tables 4 and 5.

There is a map of the Greater Blue Mountains WHA showing the additional areas at the end of the Chapter (Appendix 1).

Below: Montane heathland and Pantoneys Crown. (Photo: Ian Brown)



High importance areas proposed for addition

(NORTH TO SOUTH ORDER NUMBERING)

1. GOULBURN RIVER NATIONAL PARK

Goulburn River National Park is a large sandstone landscape area (73258 ha) with significant gradient extension and connectivity value. Geologically it is mainly sandstone with some basalt residuals; elevation ranges from 150-600 m, annual rainfall is 500-600 mm.

Goulburn River NP is botanically significant as it forms part of a transitional zone containing a mixture of plants from the south-east, north-west and western parts of the state (NSW National Parks & Wildlife Service 2003). The Great Dividing Range is at its lowest elevation in this region and the dry climate and low elevation has allowed the extension of many characteristically western plant species into the area. The biodiversity is associated with a number of physiographic factors as well as the low height of the Great Divide. The low local relief of the plateau (dissected by valleys that have broad river flats), cliff lines that are generally not as abrupt as they are elsewhere in the Sydney Basin, and surface outcrop contacts between the basalt flow deposits and underlying sedimentary rocks that form more indistinct boundaries than elsewhere, are all important. The significant basalt/sandstone geodiversity is discussed in Washington & Wray Chapter 1 *Geodiversity*.

Above: Habitats at the dry end of the rainfall gradient such as here in Goulburn River National Park include the characteristic Black Cypress Pine *Callitris enlicheri*. (Photo: Nicole Yabsley NPWS)



There are also pockets of nutrient-rich basaltic soils derived from basalt outcrops, the largest and most significant being Mount Dangar which supports plant communities which differ greatly from the surrounding sandstone areas. A number of rare and endangered plant species are found on this basalt peak, including *Acacia dangarensis*, which is endemic to Mount Dangar. Other rare and restricted species include *Cynanchum elegans*, *Kennedia retrorsa* and *Lasiopetalum longistamineum* (McRae & Cooper 1985). A number of localised flora surveys and species specific reports include Bell (1993, 1996). A previously unidentified species of eucalypt (*Eucalyptus aenea*) has recently been identified in the north-eastern section of the park. A variety of plant species endemic to the Sydney Sandstone reach their northern and western limits here.

Goulburn River National Park has a very high number of significant fauna and plays a major role in the conservation of the nationally-threatened Brush-tailed Rock Wallaby.

The land recently listed by the National Trust of Australia (NSW) as *The Drip and Corner Gorge and associated sandstone escarpments Goulburn River, NSW* should also be included as National Heritage. It is adjacent to the western end but not part of the Goulburn River National Park. The conservation zone takes into account the existing Aboriginal Heritage Information Management System (AHIMS) sites 36-3-0007 and 36-3-0009, associated with The Drip, prominent landscape features, cultural sites (e.g. anecdotal evidence for birthing caves), Brett Whiteley heritage site, The Drip Picnic Area R81766 and road access (National Trust of Australia NSW).

2. NULLO MOUNTAIN STATE FOREST

Nullo Mountain is the largest basalt flow in the northern Blue Mountains, and Nullo Mountain State Forest (5370 ha in area) covers part of this plateau to the north, and an area of lowland sandstone forest to the south adjoining Dunns Swamp in Wollemi NP. With an altitudinal range of 780 to 1130 m, it includes important gradients providing a range of habitats available to biodiversity vulnerable to climate change.

The northern basalt area includes *Eucalyptus laevopinea*, *Eucalyptus bicostata*, *Eucalyptus praecox* and *Eucalyptus viminalis*. The Nullo Mountain Flora Reserve was created to protect an unusually large fruited form of *Eucalyptus laevopinea* (Silver-topped Stringybark). Possibly the largest known population of the listed Vulnerable plant, *Derwentia blakelyi* is found on the basalt part of the State Forest.

3. CORICUDGY STATE FOREST

Coricudgy State Forest (7582 ha in area) provides significant gradient extensions of elevation and high rainfall in a generally low rainfall area. It is an important disjunct high elevation (1254 m) / high rainfall basalt cap adjoining the northwestern side of Greater Blue Mountains WHA (Wollemi NP) Forests of *Eucalyptus laevopinea*, *Eucalyptus bicostata*, and *Eucalyptus cypellocarpa*. *Eucalyptus laevopinea* and *Eucalyptus bicostata* are found mainly on isolated high altitude areas, with Coricudgy and Nullo Mountains being around the most southerly occurrence.

4. PUTTY STATE FOREST AND ADJACENT FREEHOLD LAND

The eastern side of Mt. Coricudgy is the western most extensive Coachwood *Ceratopetalum apetalum* and Sassafras (*Doryphora sassafras*) rainforest in NSW, and is currently a Flora Reserve.

In the Putty and Howes Valley area the Greater Blue Mountains WHA encloses a large area of State Forest and private land (the "Putty Hole"). This area drains to the McDonald River, which flows through Yengo National Park, and presents a large boundary to Wollemi and Yengo National Parks (both WHA). With the exception of the string of settlements along the highways in the Blue Mountains it is the most significant inholding of land within the Greater Blue Mountains WHA.

Putty State Forest (22252 ha in area) is a significant natural area bordering Wollemi NP. While the State Forest area has been logged it has substantial areas of native eucalypt forest and woodland vegetation. The eastern portions were covered in a classification and map of the Putty Valley for the Hawkesbury-Nepean CMA (DECC 2008). Some of the vegetation communities in this area are probably not well represented in the adjoining national parks, being open grassy country used for grazing. A large proportion of private land has native vegetation on it, provides habitat for threatened species and significantly contributes to maintaining the values of the surrounding national parks. The Putty area around Mellong supports an isolated population of the threatened *Grevillea parviflora* subsp. *parviflora*, confirmed to be within Wollemi National Park and possibly on private land (Bob Makinson pers. comm. May 2013).

There is a case for identifying all private land with natural vegetation within the "Putty Hole" as a buffer area with contributing values to the heritage values of the national parks (Martin Fallding pers. comm. 2014). The private land is subject to a range of land uses and development pressures which can impact on the national park values of the land, and should be a focus for dealing with boundary and buffer issues. At least one property in the Howes Valley area has been acquired by a mining company to offset biodiversity loss from a mine near Bulga. This is intended to protect habitat for nationally listed threatened species, including the Regent Honeyeater and Swift Parrot (Martin Fallding pers. comm. 2014).

There is a need for suitable planning controls in this area. In October 1983 Singleton Shire Council adopted Development Control Plan No. 1 - Land in the Putty and Howes Valley Area and in the vicinity of Wollemi and Yengo National Parks. This sought to address national park boundary issues and operated until about 4 years ago when it was replaced by a new DCP. The provisions of DCP No 1 were not carried forward into the new DCP, though during its operation it was very effective in limiting subdivision and development proposals, and ensuring consideration was given to national park issues and other environmental concerns (Martin Fallding pers. comm. 2014).

There have been recent development proposals and applications (such as for a large scale duck farm, a monastery, and coal seam gas exploration) on the private land within the "Putty Hole". These activities could all be expected to impact in some way on the world heritage values of the Greater Blue Mountains WHA over the long term, but have been either not considered in the assessment of the proposals, or discounted as being not significant.

5. CAPERTEE NATIONAL PARK

Capertee National Park provides important dry-end gradient extension with Dry Capertee valley woodland (2839 ha), and some limited connectivity through Mugii Murum-ban SCA. It contains threatened plant species and a high number of significant fauna including the Critically Endangered Regent Honeyeater and a large population of the vulnerable shrub *Grevillea obtusiflora* subsp. *fecunda*.

6. MUGII MURUM-BAN STATE CONSERVATION AREA

Mugii Murum-ban State Conservation Area is a large dry sandstone area (3650 ha) adjacent to Gardens of Stone NP with extensive dry-end gradient habitats, 340 plant species and the Federally and State listed Endangered Ecological Community Genowlan Point Dwarf Sheoak heathland and the critically endangered shrub *Pultenaea* sp. Genowlan Point. Also contains a number of rare plants such as *Banksia penicillata*, *Pseudanthus divaricatissimus*, and *Acacia asparagoides*. Records of the threatened fauna species include Tiger Quoll, Powerful Owl and lossy Black- Cockatoo.

7. FINCHLEY ABORIGINAL AREA

Finchley Aboriginal Area is an important sandstone landscape area with significant Aboriginal cultural associations but its small size of 4 ha contributes little specific additional biodiversity value.

8. GOSPERS MOUNTAIN INHOLDING

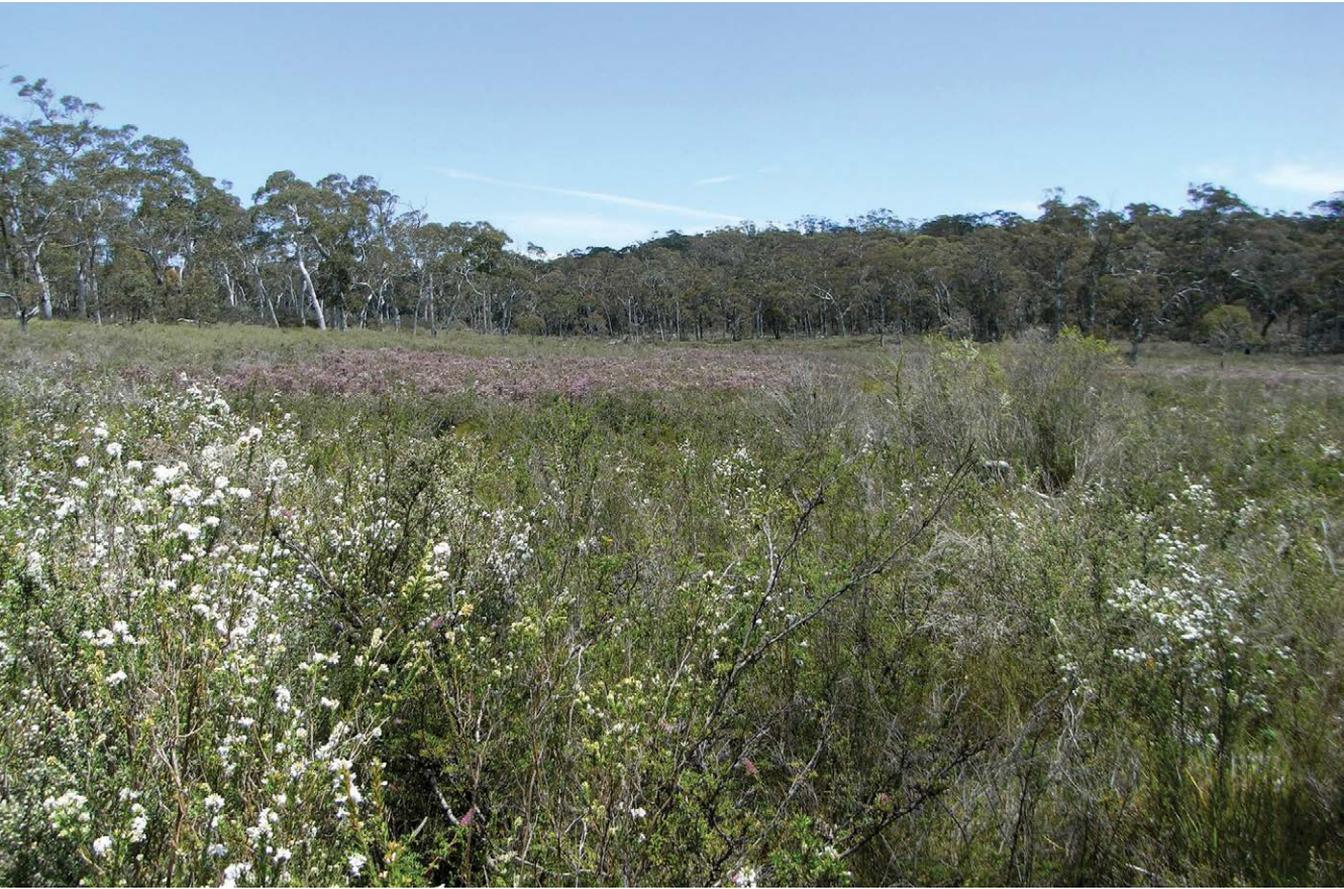
Gospers Mountain is a significant inholding (74 ha in area) in centre of the WHA, with high connectivity on all sides to Wollemi NP. Mostly cleared. 835 m elevation.

9. NEWNES STATE FOREST, WOLGAN STATE FOREST, BEN BULLEN STATE FORESTS (PART OF GARDENS OF STONE II PROPOSAL)

The three state forests, Newnes State Forest (24794 ha), Wolgan State Forest (1205 ha) and Ben Bullen State Forest (8252 ha) make up the major part of Gardens of Stone II conservation area proposal. This is a very important area of high level sandstone plateau with many restricted plant species (see Table 2) and Federally and State listed Endangered Ecological Communities (e.g. Newnes Plateau Shrub Swamps) not adequately represented in Greater Blue Mountains WHA. The area includes an extensive outcrop of the Buralow Formation; most of the typical groundwater dependent swamps are located on or just below the 1100 m contour, and it is likely that the 1100 m zone relates more or less to the perched unconfined aquifer supplying water to the main groundwater dependent swamps, particularly those in the Carne, Wolgan, Bungleboori, Budgary and Rocky Creek catchments.

The Endangered Ecological Community Newnes Plateau Shrub Swamps, mainly confined to Newnes SF, is a closely related group of swamps with extensive areas of gently sloping peatlands with subsurface topography determining local peat depth. This association makes them highly susceptible to threats of loss of groundwater, the major one being the impact of subsidence caused by longwall mining; though other impacts may come from changes to hydrology as a result of damming, mine waste water discharge, increased moisture competition from pine plantations, and climate change (Benson & Baird 2012).

As well as the swamp systems, the Newnes Plateau has particular geodiversity features that add to its scientific values. Below the swamps there are the geologically distinctive and unique sandstone pagoda formations



Above: The treeless expanse of one of the largest Newnes Plateau Shrub Swamps, showing a pink flowering patch of the shrub species *Boronia deanei* which is localised in the swamp habitat. (Photo: Doug Benson).

(generally occupying the 800–1050 elevation zone), where the platy pagodas are of international geodiversity significance (Washington & Wray 2011). As well, the relict sand dunes described by Hesse et al (2003) provide a strong indication of climatic conditions at the height of the Last Glacial Maximum (c. 20 000 years ago).

Benson & Baird (2012) have drawn attention to restricted high elevation vegetation in the Carne Creek catchments. Above the 1100 m contour (the general upper level of the swamps), the Plateau surface rises to nearly 1200 m (e.g. 1190 m on the catchment divide between Marrangaroo, Farmers and Bungleboori creeks; 1180 m at Bald Trig and 1181m at Birds Rock).

This 1100–1200 m cap includes a range of vegetation, primarily broadly mapped as Newnes Plateau Woodland map unit 10f (Benson & Keith 1990), but including areas of forest of *Eucalyptus dalrympleana*, woodland of *Eucalyptus dives*, *Eucalyptus radiata*, *Eucalyptus pauciflora* and *Eucalyptus mannifera*, and areas of heath with *Allocasuarina nana*.

This area also includes the dry swamps (e.g. West Wolgan, Sunnyside West) and the anomalous Junction Swamp.

The pattern of occurrence of these vegetation types is substrate-controlled (Wilkinson & Humphreys 2006, Wilkinson et al. 2005), which explains the occurrence of heath on relatively sheltered areas below woodland, rather than on exposed sites as around Katoomba or Blackheath. The high-level vegetation (given its relatively small overall area) is important habitat for a large number of rare plants, many with disjunct connections with other high-level montane sites, particularly on the Southern Tablelands (See Table 2).

Below: *Boronia deanei* (family Rutaceae), a listed Vulnerable species with a restricted distribution in the Newnes Plateau Shrub Swamps (Photo: Lotte von Richter)



Heath includes *Eucalyptus gregsoniana*, and woodland includes the locally endemic and listed Endangered shrubs *Persoonia hindii* (confined to 1100–1200 m), Endangered *Acacia meiantha* (1100 m) and restricted *Isopogon prostratus* (only above 1100 m). Other restricted plant species in the area include *Banksia penicillata*, *Acacia asparagoides*, and *Pseudanthus divaricatissimus*. Forest areas may include *Veronica (Derwentia) blakelyi*.

See the Royal Botanic Gardens website *Plants of the Newnes Plateau* https://www.rbgsyd.nsw.gov.au/science/Evolutionary_Ecology_Research/plants_of_the_newnes_plateau/flora2/flora

It is tempting to speculate that some of these species occurrences (and some of the prostrate species on the Plateau) are indicative of the prior flora of the site in colder drier conditions, during and following the Last Glacial Maximum, and subsequently invaded by taller growing eucalypts and shrubs. In a recent publication, Laurance et al. (2011) identify the top ten Australian ecosystems vulnerable to tipping points, in which modest environmental changes can cause disproportionately large changes in ecosystem properties. Elevationally restricted montane ecosystems are listed as the **most vulnerable**.

Table 2. Plant species essentially restricted to the highest elevation plateau (>1100 m) of Newnes Plateau, i.e. Clarence to Bungleboori, with conservation status (NSW TSC ACT, ROTAP) and notes on any disjunct occurrences elsewhere.

Species	Cons status	Occurrence on Newnes Plateau	Occurrence elsewhere
<i>Persoonia hindii</i>	TSC	Woodland and heath, >1100 m	Newnes Plateau endemic
<i>Leptospermum blakelyi</i>	2R	heath, Clarence, >1100 m	Newnes Plateau/Hassans Walls endemic
<i>Eucalyptus gregsoniana</i>	3RCa	Mallee heath, Clarence, >1100 m	Southern Tablelands, Wadbilliga
<i>Olearia quercifolia</i>	3RC-	wet places, >1000 m	confined to Blue Mtns, wet places
<i>Boronia deanei</i> subsp. <i>deanei</i>	TSC	NP Shrub Swamps, >1100 m	Kanangra-Boyd swamps
<i>Veronica blakelyi</i>	TSC	Woodland, Clarence	Nullo Mtn, Mt Horrible
<i>Dillwynia stipulifera</i>	3RCa	NP Shrub Swamps, >1100 m	Budawang
<i>Acacia meiantha</i>	TSC	Woodland, Clarence	Mullion Range, Orange
<i>Celmisia longifolia</i>		NP Shrub Swamps	Kanangra-Boyd swamps, Southern Tablelands, Kosciuszko, >900 m
<i>Scaevola hookeri</i>		NP Shrub Swamps	Blue Mountains Sedge Swamps, disjunct occurrences at high elevations south from Ebor
<i>Isopogon prostratus</i>		Woodland, heath >1100 m (Benson & von Richter 2010)	disjunct occurrences on Southern Tablelands, Mugii Murum-ban SCA
<i>Hakea microcarpa</i>		high elevation swamps, 1130 m	widespread on Tablelands, WL and heathy swamps
<i>Velleia montana</i>		NP Shrub Swamps, 1050 m	higher altitudes on Tablelands

10. PARR STATE CONSERVATION AREA

Parr State Conservation Area (38121 ha in area) is a large, relatively low elevation Sandstone plateau landscape wedged between Yengo and Wollemi NPs providing important connections on two sides – significantly reducing the Greater Blue Mountains WHA perimeter from about 65 km in this area to 25 km, a reduction of about 60%. A further 10% improvement in connectivity and perimeter length could be improved with the addition of Comleroy State Forest. Elevations down to sea level include a gradient with estuarine vegetation along Webbs Creek, with *Eucalyptus robusta*, also perhaps *Eucalyptus michaeliana*.

Taking Yengo NP and Parr SCA together NSW National Parks & Wildlife (2001) consider the drier north-eastern part of the two parks have particular biodiversity significance supporting plant communities with species typical of the Western Slopes of NSW such as ironbarks and cypress pines.

There are over 700 plant species recorded for the two parks (Bell et al, 1993), at least 20 plant species are at their limit of their known distribution, and 32 threatened plants have been identified within the two parks (NPWS Wildlife Atlas, Nov. 2000). The two parks protect threatened species such as the Brush-tailed Rock Wallaby *Petrogale penicillata*, which occurs only in very small disjunct populations in NSW and Queensland.

A major population of the Regent Honeyeater *Xanthomyza phrygia* a Critically Endangered species under the NSW Threatened Species Conservation Act 1995 and the Commonwealth EPBC Act is centred on the Capertee Valley-Capertee NP / Wollemi and Yengo NPs and Parr SCA.

11. YERRANDERIE STATE CONSERVATION AREA

Yerranderie SCA is a large inholding (12192 ha) within Greater Blue Mountains WHA with important connectivity including foreshores of Lake Burragarang, and cultural and biodiversity values, including a high number of significant fauna and *Acacia clunies-rossiae*, a plant listed as Vulnerable under the NSW Threatened Species Conservation Act 1995.

12. BURRAGORANG STATE CONSERVATION AREA

Burraborang SCA is a large sandstone landscape area (17720 ha) with significant connectivity. Ancient lands of the D'harawal and Gundangarra people, the land became important for European settlers as a coal-mining region and to a lesser extent, a source of lead and silver, from the 1820s to the 1960s. When Sydney's population began rapidly expanding, Warragamba River was dammed to create Lake Burraborang flooding most of the old villages. The park is home to a high number of significant fauna, including Koalas, Tiger Quolls and the Powerful Owl.

13. NATTAI STATE CONSERVATION AREA

Nattai SCA is a sandstone landscape area (3383 ha) in good natural condition with significant connectivity to Greater Blue Mountains WHA (Nattai NP) and a number of significant fauna and flora.

14. BARGO STATE CONSERVATION AREA

Bargo SCA is another sandstone landscape area (4619 ha) in good condition with significant connectivity to Greater Blue Mountains WHA (with Nattai NP). Biodiversity values e.g. Endangered *Persoonia bargoensis* (only occurs in Wollondilly LGA and a couple in Wingecarribbee LGA with much of the population in Bargo and Upper Nepean reserves. There are also Shale capping flora and a number of significant fauna.

The four SCAs above are considered together with Nattai NP as The Nattai Reserves by NSW National Parks & Wildlife Service (2001), which describes that the combination of a deeply incised topography, climatic variations and several soil types has resulted in a diverse flora in the Nattai Reserves with National Significance. The reserves protect pockets of warm temperate rainforest and for eleven species of rare plants; and provide habitat for nine species of threatened native animals.

Significant plants have been identified in the area of the reserves including *Acacia clunies-rossiae*, identified as Vulnerable under the NSW Threatened Species Conservation Act 1995 and *Bossiaea oligosperma*. *Eucalyptus benthamii* (Camden white gum) and *Eucalyptus hypostomatica*, have also been recorded from the district and may be protected within the park and state recreation areas. At least 15 threatened or otherwise significant plants have been recorded from the Nattai Reserves System.

Nine species of threatened fauna have been recorded from the Nattai Reserves System, including the Green-and-Golden Bell Frog *Litoria aurea*, Powerful Owl *Ninox strenua*, Glossy Black-Cockatoo *Calyptorhynchus lathami*, Brush-tailed Rock Wallaby *Petrogale penicillata*, Tiger Quoll *Dasyurus maculatus*, Long-nosed Potoroo *Potorous tridactylus*, Yellow-bellied Glider *Petaurus australis*, Squirrel Glider *Petaurus nofolcensis* and Koala *Phascolarctos cinereus*.

15. JELLORE STATE FOREST

Jellore State Forest is a small area (1409 ha) on the current southern fringe of Greater Blue Mountains WHA contiguous with Nattai NP and Bargo SCA providing important connectivity with Wingecarribee River.

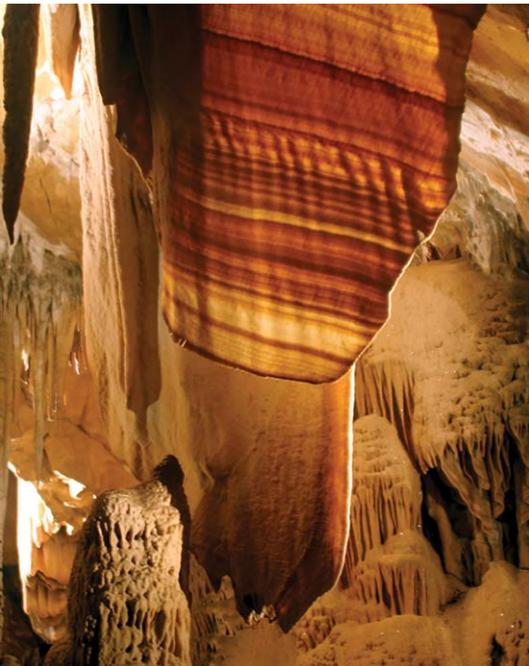
16. WOMBEYAN KARST CONSERVATION RESERVE

Wombeyan Karst Conservation Reserve is a small area (569 ha) on the current southern fringe of Greater Blue Mountains WHA with significant geodiversity and cultural values. In terms of Karst significance it is of international significance (see Washington & Wray Chapter 1 *Geodiversity*).

The Caves themselves contain diverse subterranean invertebrate communities and overall can be considered a hotspot for stygobite diversity. Stygobites are obligate aquatic faunas that are highly specialised and have developed a range of adaptations for life underground such as loss of eyes and pigment.

There are at least 25 subterranean aquatic species found at Wombeyan, of which at least 15 are stygobites, including 10 species of amphipods, many of which are undescribed. The distribution of these amphipods is extremely localised, most occurring within a single chamber within a cave system, and many are local endemics.

The distribution pattern of the stygofauna has the potential to yield information about the natural history of the Wombeyan Caves and the development of the complex hydrological system, and to provide information about the evolution of the amphipod Family Neoniphargidae, which is primarily found in New South Wales karsts in the Eastern Highlands (Thurgate *et. al.* 2001 a,b). The family is a distributional and phylogenetic relict with East Pangaeian affinities suggesting that Wombeyan Caves acted as an important refuge and centre of speciation.



Above: Splendid cave formations at Wombeyan (Photo: Julia James)

The woodland areas on limestone include the endemic wattle species *Acacia chalkerii* and restricted limestone mosses. The pseudoscorpion *Sundochernes guanophilus* and the mite *Neotrombidium gracilipes* are endemics restricted in distribution to Fig Tree Cave; both are entirely dependent on guano for food and reproduction. The interbedded layers of sand and charcoal in the Gunyah section of Fig Tree Cave have potential to yield information about the fire history of the area. The relict deposits of finely laminated mud and sand in Basin Cave contain an unusual suite of clays, phosphate, and aluminium phosphate hydrate minerals. This site has significant potential for further research in cave sedimentation and mineralogy.

17. MARES FOREST NATIONAL PARK

Mares Forest National Park is a small area (2599 ha) adjoining Blue Mountains NP and Wombeyan Caves KCR. It includes important dry country gradient extensions; Guineacoor Creek drains to Wollondilly River.

18. JOADJA NATURE RESERVE AND 19. WOLLONDILLY RIVER NATURE RESERVE

Joadja NR is a small area (830 ha) on the southern fringe of Greater Blue Mountains WHA (Nattai NP) with significant cultural values and important connectivity with Wingecarribee River. Wollondilly River NR is a small nearby area (971 ha). Joadja NR and Wollondilly River NR are considered together in NPWS (2010) which states that, along with Bangadilly National Park, State Forest, Crown lands and private lands, these two nature reserves are part of a major habitat corridor of naturally vegetated lands stretching from Morton National Park in the south, to Nattai and Blue Mountains National Parks in the north. Maintenance of natural vegetation on private lands within the corridor is vital to maintaining the value of these lands.

The planning area contains 12 native vegetation communities, plus cleared, modified or regenerating vegetation (DEC 2004, Mills & Associates 2002a). The Yellow Box Forest / Woodland here is a part of the complex of communities in the White Box - Yellow Box - Blakely's Red Gum Woodland community, an Endangered Ecological Community under the NSW TSC Act and a Critically Endangered Ecological Community under the Commonwealth EP&BC Act. Much of this community has

been cleared across the State and it is poorly represented within conservation reserves.

Also important are areas of mature Grey Gum - Stringybark forest, as Grey Gum is not well represented in conservation reserves and is a food species for some significant arboreal mammals. Six plant species and 16 fauna species listed under the NSW TSC Act have been recorded within the planning area which also has a high diversity of birds for a relatively small reserve area (DEC 2004, Mills & Associates 2002b).

This includes eight bird species listed as threatened under the NSW TSC Act. Many of the species present are uncommon within the South Eastern Highlands Bioregion. The high diversity in bird species is most likely due to the overlap between the South Eastern Highlands Bioregion and the Sydney Basin Bioregion.

Medium importance areas proposed for addition

(NORTH TO SOUTH ORDER NUMBERED)

1. PUTTY HOLE FREEHOLD AREA

Putty Hole Freehold Area is a partly forested, partly cleared area less important than Putty State Forest (see Putty SF above).

2. HASSANS WALLS

Hassans Walls (245 ha in area) is a relatively isolated sandstone plateau immediately south of Lithgow with heath, woodland and forest on sandstone pagoda outcrops, with southern aspect. Rich flora including many orchid species (Bob Coveny pers comm.) and the rare species *Acacia asparagoides*, *Philotheca obovalis*, *Pseudanthus divaricatissimus* and *Leptospermum blakelyi* (Lollback et al. 2014). There is no direct habitat connection with Greater Blue Mountains WHA.

3. YERRANDERIE FREEHOLD

The freehold area at Yerranderie is partly forested, partly cleared, and less important for biodiversity than Yerranderie SCA (see Yerranderie SCA above)

4. BARGO RIVER STATE CONSERVATION AREA

Bargo River SCA (1970 ha in area) in the upper catchment of Bargo River has limited connectivity with Bargo SRA to the west. However this connection is important as the Park is an integral part of the Bargo Linkage, one of the most important fauna habitat corridors in the Greater Southern Sydney Region (DECC 2007).

The Bargo Linkage is the only remaining connection between the large patches of extant vegetation on the Woronora Plateau and the Nattai Plateau, and ultimately the southern end of the Greater Blue Mountains WHA. It facilitates the movement of migratory and nomadic fauna species between these plateaus, but it also connects populations of a number of species that use sandstone habitats. The corridor is important for gene flow of fauna species that are sparsely distributed across the landscape, for re-population of areas when local extinction of a species occurs and for seasonal movements of wide ranging species.

Bargo River SCA contains a range of plant communities within a small geographical area, supporting a diversity of flora and fauna, including threatened species (NSW National Parks & Wildlife Service 2013).

There are two Endangered Ecological Communities, namely Shale/Sandstone Transition Forest and Southern Highlands Shale Woodlands. Threatened plant species include the small-flower grevillea (*Grevillea parviflora* subsp. *parviflora*), hairy geebung (*Persoonia hirsuta*) and Mittagong geebung (*Persoonia glaucescens*).

A number of other threatened and regionally significant plant species are known from the vicinity. Four species of threatened fauna have been recorded: the Gang-gang cockatoo (*Callocephalon fimbriatum*), Scarlet Robin (*Petroica boodang*), Sooty Owl (*Tyto tenebricosa*) and the Koala (*Phascolarctos cinereus*).

Predictive modelling indicates that there is suitable habitat for a much larger range of fauna, including the endangered Broad-headed Snake (*Hoplocephalus bungaroides*).

Table 3. The number of fauna species (frogs, reptiles, birds, mammals) recorded from areas adjacent to the Greater Blue Mountains World Heritage Area – summary of Bionet Atlas data June 2013 *Significant species are critically endangered, endangered or vulnerable under TSC Act and or endangered or vulnerable or a migratory species (included in CAMBA, JAMBA or ROKAMBA) listed in EPBC Act.

Reserve	*Significant Species	Frogs	Reptiles	Birds	Mammals	Total Species	**Regent Honeyeater records
Goulburn River NP	33	14	37	149	34	234	10
Newnes Wolgan Ben Bullen SFs	no data						
Coricudgy SF	no data						
Parr SCA	20	17	29	106	32	184	
Wombeyan Karst Cons. Reserve	7	3	11	46	23	83	3
Mugii Murum-ban SCA	4	0	2	21	6	29	
Putty State Forest	22	11	18	85	33	147	
Finchley AA	0	0	0	0	0	0	
Capertee NP	16	7	8	117	16	148	35
Nullo Mountain SF	no data						
Hassans Walls reserve	no data						
Burraborang SCA	16	10	23	97	28	158	
Nattai SCA	6	2	3	39	15	59	
Yerranderie SCA	24	8	17	146	31	202	16
Bargo SCA	10	9	11	57	20	97	
Bargo River SCA	4	0	4	40	7	51	
Joadja NR	7	4	5	42	17	68	
Mares Forest NP	10	8	14	66	25	113	
Jellore SF	2	0	0	1	3	4	

Table 4. Area (in hectares) of significant natural areas adjacent to the Greater Blue Mountains World Heritage Area proposed for associated National Heritage Listing.

AREA PROPOSED	Area in hectares (March 2015)
Bargo River State Conservation Area	1,970
Bargo State Conservation Area	4,618
Burrangorang State Conservation Area	17,720
Capertee National Park	2,839
Coricudgy State Forest	7,582
Finchley Aboriginal Area	4
Gospers Mtn inholding	74
Goulburn River National Park	73,258
Hassans Walls	245
Jellore State Forest	1,409
Joadja Nature Reserve	830
Mares Forest National Park	2,599
Mugii Murum-ban State Conservation Area	3,650
Nattai State Conservation Area	3,383
Newnes State Forest	24,794
Wolgan State Forest	1,204
Ben Bullen State Forest	8,252
Nullo Mountain State Forest and Flora Reserve	5,370
Parr State Conservation Area	38,121
Putty freehold lands	
Putty State Forest	22,252
Wollondilly River Nature Reserve	971
Wombeyan Karst Conservation Reserve	569
Yerranderie Regional Park	470
Yerranderie State Conservation Area	12,192

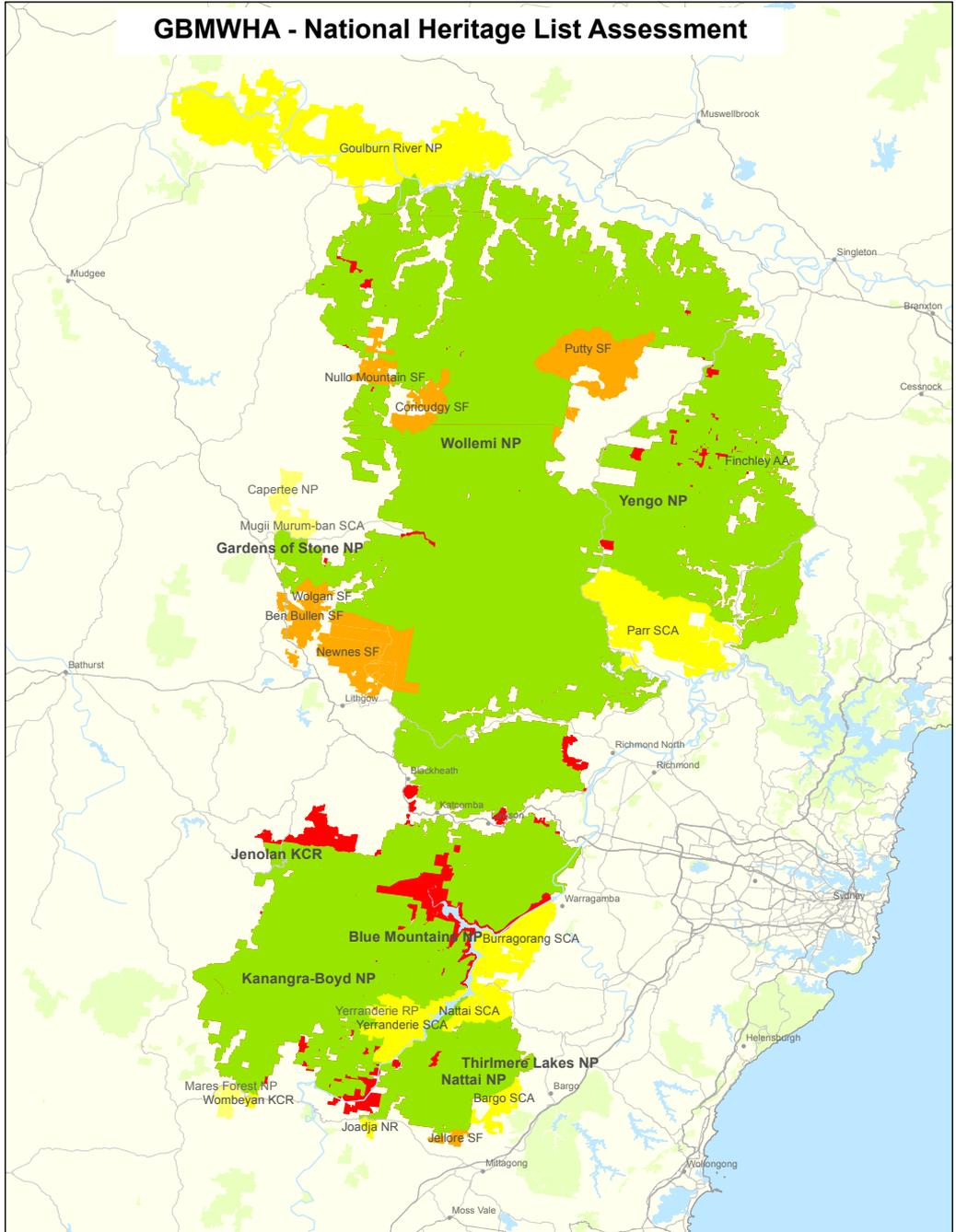
Table 5. Area (in hectares) of component conservation reserves making up the Greater Blue Mountains World Heritage Area at listing (in 2000) and currently (2015). Total acquisitions to reserves since listing: 29,869 ha.

RESERVE NAME	Areas (ha) at November 2000	Gazetted Areas (ha) at March 2015	Gazetted wilderness (ha) at March 2015
Blue Mountains NP	247,840	269,331	37,901
Gardens of Stone NP	15,150	15,080	N/A
Jenolan KCR	2,422	3,085	N/A
Kanangra-Boyd NP	65,379	74,712	121,945
Nattai NP	47,855	50,200	41,850
Thirlmere Lakes NP	641	666	N/A
Wollemi NP	499,879	494,890	361,170
Yengo NP	153,483	154,551	120,776
TOTAL	1,032,649	1,062,518	683,642

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Below: Map of Greater Blue Mountains WHA as listed in 2000 together with areas added, and National Park and State Forest proposed for addition.



<p>Legend</p> <ul style="list-style-type: none"> GBMWA listed in 2000 Additions since 2000 to reserves that comprise the GBMWA for consideration of nomination Other reserves adjoining the GBMWA recommended for assessment for National Heritage values State Forest adjoining the GBMWA recommended for assessment for National Heritage values 	<p>LOCALITY</p>	<p style="text-align: right;">Printed by RET 31 March 2015</p> <div style="text-align: center;"> <p>N</p> <p>0 5 10 20 Kilometers</p> </div>
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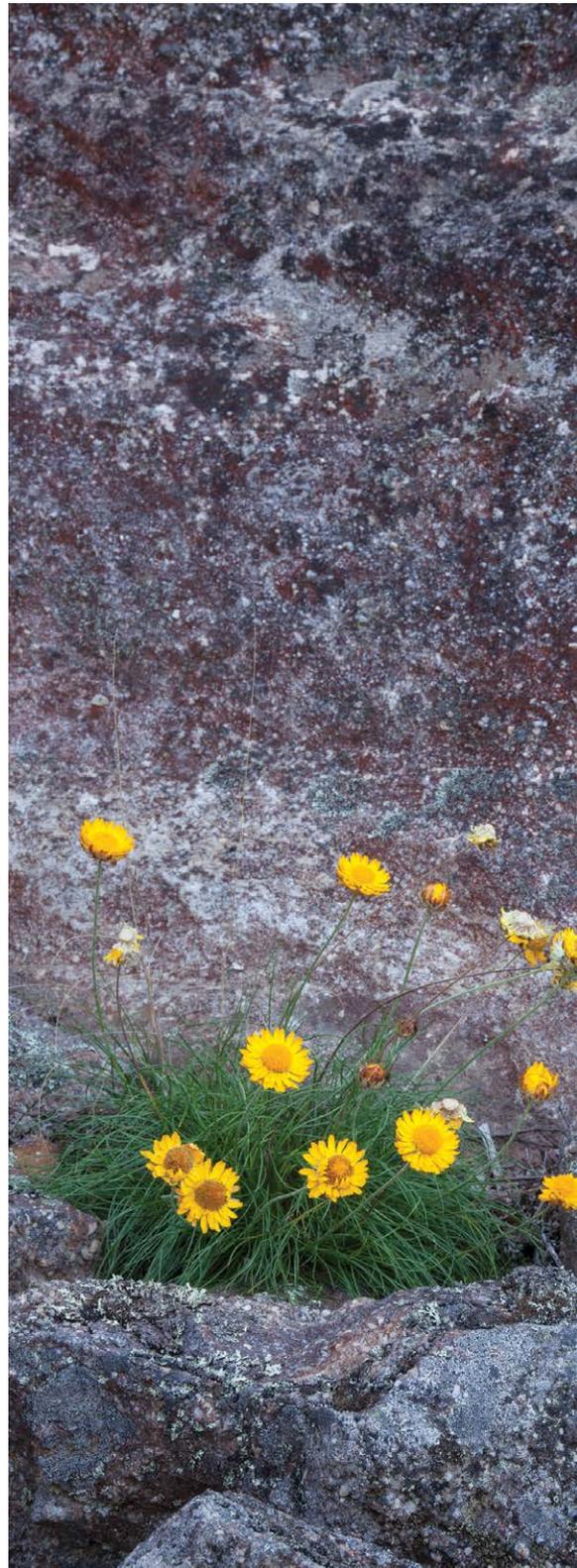
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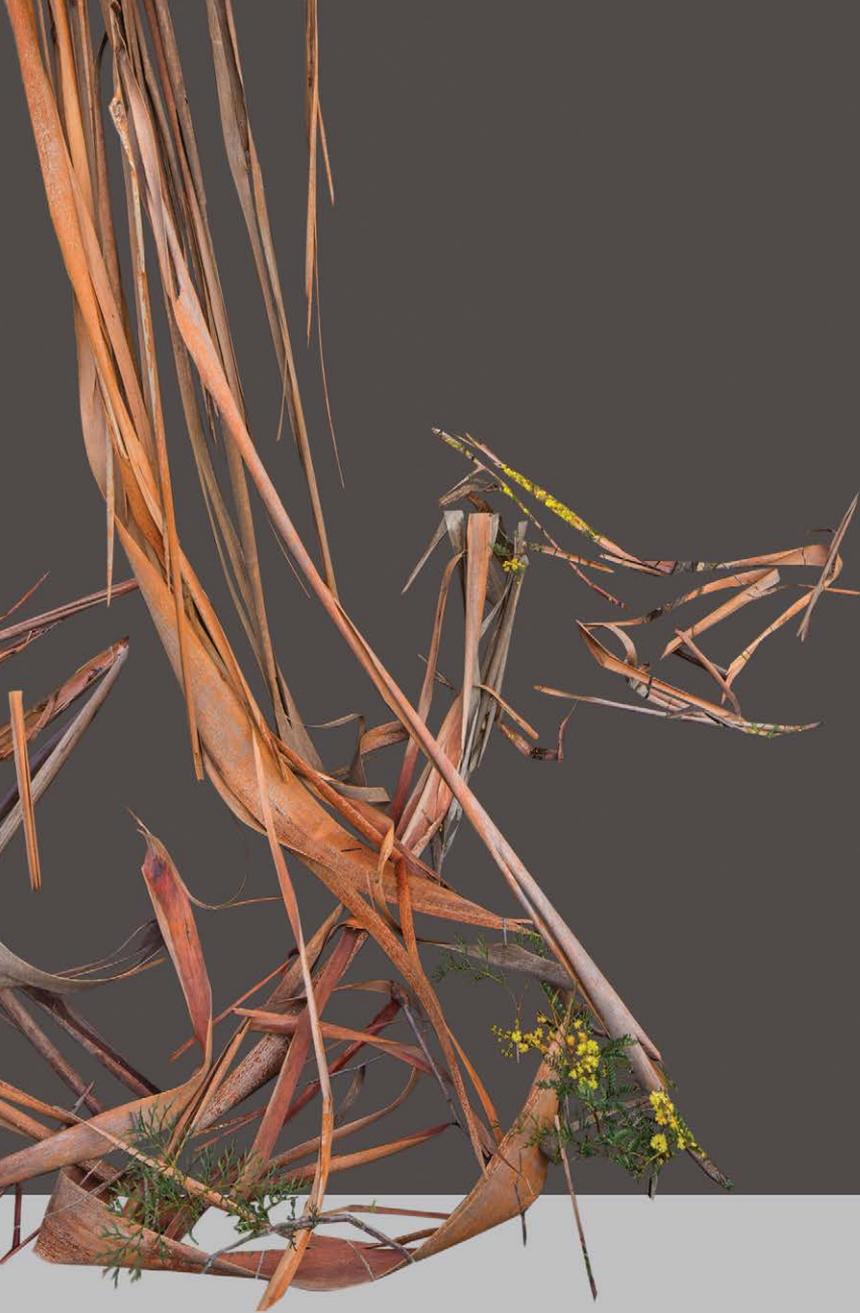
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Above: Pagoda Daisies are restricted to the rocky landscape of the western Blue Mountains. (Photo: Ian Brown)



Greater Blue
Mountains
WORLD
HERITAGE AREA

Chapter 3

Richard Mackay

**The contemporary Aboriginal
heritage value of the the Greater
Blue Mountains**

PREAMBLE

In the decade and a half that has passed since the inclusion of the Greater Blue Mountains World Heritage Area (Greater Blue Mountains WHA) on the World Heritage List, there has been a growing recognition that, if anything, the Indigenous cultural values of the place are more substantial and more extensive than presented by Australia's nomination in 1998.

The Greater Blue Mountains WHA was not included on the World Heritage List for any cultural values and this lack of recognition of both historic and Aboriginal cultural values was subsequently reflected in the criteria under which the same area was included in Australia's National Heritage list in 2007.

Over the ensuing years, great attention has been paid to tangible Indigenous sites within the Greater Blue Mountains; particularly following the re-discovery of amazing rock art at sites such as Eagles Reach (see Taçon et al 2007, Taçon et al 2008 and associated bibliographies). These sites are simply breathtaking in their creative and technical accomplishment and, in conjunction with engraved rock art, provide a largely unprecedented synchronous collection of two forms of Indigenous art of extraordinary creative achievement and heritage value in its own right.

These discoveries supplement and expand the Indigenous values of Greater Blue Mountains that were asserted at the time of the original World Heritage nomination, but in popular perception overshadow the importance of the Greater Blue Mountains landscape to the contemporary Aboriginal community and to wider understanding of Indigenous history, as a place which attests to, and is associated with, the impact of European settlement/invasion and the resilient cultural adaptation of Indigenous people and their continuing connection with Country.

This paper was originally written as part of the documentation to inform the preparation of an assessment report for the re-nomination and reconsideration of the Greater Blue Mountains area (including additional reserves and other lands) for Australia's National Heritage List.

It is a contextual piece, intended to assist in understanding of potential National Heritage values, and does not purport to be comprehensive or definitive, but rather to highlight some aspects of Indigenous heritage value that are not otherwise prominent in much of the key literature.



Synchronous occurrence of drawn / painted and engraved rock art is a distinctive feature of the Greater Blue Mountains. Eagles Reach (above). Photo: Paul Taçon, and Biame at Finchley Aboriginal Area (below). Photo: Richard Mackay.



It should therefore be considered in conjunction with other documents that address the Greater Blue Mountains' Indigenous heritage; particularly Taçon et al (2007), Stockton and Merriman (2009) and the leaflets provided in: *Aboriginal Pathways Across the Blue Mountains* published by NSW Office of Environment and Heritage in 2013 as part of the celebrations for the bicentenary of the first European crossing of the Blue Mountains.

CONTEXT

The Aboriginal places and people of the Greater Blue Mountains are what history has made them. The ancient landscape and people have responded to more than two centuries of post-colonial impact – nowhere in Australia is the interaction between 'Country' and 'People' more apparent – a resilient and adaptive culture: ancient art, historic association, oral history, songs and stories are connected through contemporary tradition and practice. These connections are dynamic.

Traditions and stories are transmitted from generation to generation, but the meanings and connections have been affected and changed by historic events and, more recently, informed and modified by new discoveries – both physical sites and information revealed through ethnographic or historic research.

The knowledge, traditional practices and beliefs of six Aboriginal language groups imbue the Greater Blue Mountains with associative values that attach to places that non-Aboriginal people see as natural phenomena and to sites with apparent archaeological evidence or Aboriginal rock art. Together, these places and associations present an unparalleled combination of important sites and continuing Aboriginal tradition.

Chris Tobin, a Darug man, eloquently sums up these cultural connections:

As Aboriginal people our identity is inseparable from our Country. We are the people of that Country. It holds our stories, provides food and medicine to our bodies and spirit and it has been home to our people for all recorded history, as it has been home to our ancestors for tens of thousands of years. It has been a shelter for our people for all this time; a refuge during the early frontier wars and a witness to the blood spilt during dispossession of her people from their Mother. For many Aboriginal people she is referred to as

the “mother” not just because she provides and protects but traditionally the land is seen as a holding place of the spirit babies as we wait for our earthly mothers to find us. To cut the earth is to cut your mother we are taught. To poison the waters is like poisoning your grandmother. (pers comm, 2014)

Of course, the Greater Blue Mountains WHA as a protected conservation area also plays an important role in conserving a great proportion of the Aboriginal cultural heritage sites of the Blue Mountains area and Sydney basin.

The Aboriginal archaeological record across the Greater Blue Mountains is remarkably diverse, with a wealth of occupation sites, pigmented and engraved art sites, meeting places, scarred trees and axe grinding grooves. These sites – many of which are scientifically, culturally and socially important in their own right – are woven into a large network across the landscape which indicates how the land was used – and continues to be used – by Aboriginal communities.

Below: Uncle Wayne Kraus, a Wiradjuri man, shares his heritage with visitors to Finchley Aboriginal Area. (Photo: Richard Mackay)



The pigmented and engraved art of the Greater Blue Mountains was already well-recognised as an important corpus of petrolyphic work, in an Australian context, at the time of the original World Heritage nomination in 1998:

The art of the Sydney Region, which includes the Greater Blue Mountains, is unique within Australia in that it contains two synchronous forms. Both pigment and engraved forms were being produced by the same groups of people at the same time. In no other area of Australia does this occur on such a grand scale. (Greater Blue Mountains Area World Heritage Nomination, section 2.5, page 46)

In the period since this nomination, two significant things have happened. Firstly, further investigative work, particularly in Wollemi National Park, has revealed many more amazing galleries of breathtaking painted art – of outstanding aesthetic and scientific value. Secondly and also important is the effect that these discoveries have had on Indigenous communities who have participated in the process of discovery, investigation and documentation, and who, through their re-connection with these dramatic sites, have re-established direct connections with their traditional lands, ancestors and creation beings.

Aunty Sharyn Halls has spoken of the powerful feelings of connection and responsibility towards Country and culture through her involvement in site recordings of the Kings Tableland area:

The Battleship Tops area has a great cultural and spiritual feel about it. A very special place (peaceful). It's hard to express connection to a place. It's happy and sad for me as Gundungurra people used the shelters and walked the land here for thousands of years before me. Now I'm here walking, eating and drinking rain water off the rocks as I know they did. I'm not here...to live our traditional ways. Instead I'm helping to record our past and work out a way to protect what is very important to Gundungurra families. To my family, it's all about not losing anymore of our past history and to look after what is still out there in our Traditional Lands. (Jackson, 2007)

ABORIGINAL SITES

Archaeological evidence suggests that human occupation of the Greater Blue Mountains has occurred for at least 22,000 years (see Stockton in Stockton and Merriman 2009). This timescale transcends periods of very major

climatic and geographic change, as well as significant prehistoric technological developments, which are evident in archaeological material culture. The technological developments are not only associated with prehistoric archaeology and changing tool manufacture techniques, but also in the changes evident in archaeological material culture after European invasion/settlement. (see Taçon et al 2007 and Stockton and Merriman 2009, for example).

There are more than 1,000 documented Aboriginal sites within the Greater Blue Mountains area (according to data held in the Archaeological Heritage Information Management System of the NSW Office of Environment and Heritage). However, in reality, there are many more - the remote and rugged nature of the landscape itself acts to conserve these sites, hidden from the eyes of the contemporary community and away from destructive effects of resource extraction and other development, but also, paradoxically, threatened by the very fact that they are sometimes not identified until the impact of a well-advanced development proposal is being assessed, by which time it can be too late.

Aunty Glenda Chalker has spoken of her great pain at the destruction of Aboriginal sites:

It is very hard for me to be part of the process which identifies sites with artefacts and to watch those sites or artefacts be destroyed or removed and stored in a box somewhere to make way for development. (pers comm, 2014)

CONTINUING ABORIGINAL ASSOCIATIONS

Aboriginal use of the rugged Greater Blue Mountains landscape was well-established at the time of European arrival. Early settlers' accounts note that Aboriginal people identified themselves as associated with particular bands or groups. In the Greater Blue Mountains, explorers and early commentators such as George Caley (1804) or Thomas Jones (1819) described encounters with Aboriginal groups and their use of the plentiful natural resources. They also made reference to Aboriginal engagement with the landscape; for example, the ephemeral stairways used to gain access up to places were colloquially known as "blacks' ladders".

The relationship between Aboriginal people and European arrivals was not always cordial or positive. Aboriginal communities endured progressive and cumulative impact; initially through activities such as road clearing

and small settlement, with its consequent land clearing and disruption to Aboriginal food supply and cultural practices, but ultimately leading to horrific conflicts and punitive expeditions. An expedition to the area authorised by Governor Macquarie in 1816 saw the massacre of 14 Aborigines. This incremental settlement and dislocation process forced Aboriginal people to adapt to new strategies for survival, including use of settlers' stock as a readily-available replacement food source:

Aboriginal people adapted new strategies for survival, utilising resources from the settlers' economy while maintaining, as far as possible, links with their traditional lands. (Greater Blue Mountains Area World Heritage Nomination, section 3.5 'Cultural Associations', page 154).

Settlement density and therefore impact on Aboriginal people increased dramatically after the Crossing of the Blue Mountains in 1813, and from the 1820s with the expansion of European agriculture into central NSW. The 1861 *Crown Lands Alienation Act* institutionalised such dispossession; and encouraged clearing of land, resulting in further impact on resources and loss of traditional Aboriginal lands within the Greater Blue Mountains area.

This process placed Aboriginal people under continuing pressure; some responded by re-locating, thereby creating new, more-recent associations with different places and establishing new links and traditions based on contemporary family experience.

An example is the Gundungurra people whose story evolved during a century of post-European life in the Burratorang Valley. Aboriginal people thereby developed a complex, almost dual, cultural heritage combining traditional beliefs, language practices with new experiences and stories – but always connected to Country.

There were also people who were displaced during the nineteenth century, but have subsequently returned to their ancestral places. The Gully in Katoomba was a fringe camp established on the upper slopes of the Kedumba Valley. Before 1788, this area was used as a meeting and camping place. Gundungurra and Darug people re-established settlement here circa 1894, when it was outside the jurisdiction of the Aboriginal Protection Board.

However, the residents of the area were subjected to forcible eviction in 1957 – an event which demonstrates the ongoing



Above: Indigenous Peoples' Gathering in The Gully 2014, held in conjunction with the World Parks Congress. (Photo: Richard Mackay)

impact of European settlement on culture and Aboriginal people, even into the second half of the twentieth century. The Gully is now recognised – culturally and legally – as an Aboriginal Place (see above).

ABORIGINAL CONNECTION WITH COUNTRY TODAY

Today, there is a strong continuing connection between the people of the six Aboriginal language groups of the Greater Blue Mountains: Darkinjung, Darug, Gundungurra, Dharawal, Wanaruah and Wiradjuri; and the places that they call 'Country'. These Aboriginal communities are strong, vibrant and involved, having continued, adapted or re-established their connections with Country.

The NSW National Parks and Wildlife Service (NPWS) promotes co-management of the Greater Blue Mountains WHA with the six Aboriginal language groups and beyond, acknowledging that as traditional custodians of the land, Aboriginal people have a unique role to care for and manage Country. This role overlaps with NPWS legislative responsibilities to manage the Greater Blue Mountains WHA. NPWS works with Aboriginal partners to ensure culture and heritage is protected and revitalised, and that Aboriginal participation in land, water and natural resource management and conservation are increased. This leads to the objectives of Aboriginal people being supported in the practice, promotion and renewal of their cultures, and an increase in Aboriginal community capacity to manage Country.



Sharyn Halls

The Gully became a home for displaced people; many had kinship ties there and fled here to their Gully families to seek refuge. People came from the Burragorang Valley after the valley was cleared in preparation for the Warragamba Dam, and from the Megalong Valley when Nellie's Glen closed down and from far afield as Blakney Creek when forced removal had people looking for a place to call home.

In recognition of its work in forming the Gully Traditional Owners Inc (GTO) with the Blue Mountains City Council partnership and represented by The Gully Co-operative Management Committee, the Gully Traditional Owners Inc was awarded the 2008 Inaugural Premier's Excellence Award Recognising Leadership in Aboriginal Communities.



GTO representatives were myself and Merle Williams and we received the award which was presented by the Hon. Paul Lynch MP, (Minister for Aboriginal Affairs, Minister for Ageing and Minister for Disability Services) on behalf of the Premier and Minister for Arts, Hon. Nathan Rees MP. The GTOs were given a handsome statue in etched glass which is on display in the Council Chambers.

Since its establishment, The Gully Co-Operative Management Committee has received a substantial share in a \$1.2 million grant from the Office of Environment and Heritage. An Interpretive Walk for the Gully was planned and delivered. With the first interpretive sign unveiled in 2009. The Committee has recently signed off on several grants involving ongoing bush regeneration and drainage issues in the Gully Aboriginal Place.

All members of the GTO are of Gundungurra descent and some Gully Elders overlap as members of the Gundungurra Aboriginal Heritage Association Inc. The two groups do not overlap in aims, objectives, functions or history.

The groups are made up of Garguree Swampcare in The Gully; Gibbergunyah at Hazelbrook and Lilly Pond at Faulconbridge. David King coordinates the three sites as a volunteer and Pete Christmas is the council worker on the three sites.

We are very proud of our achievements and plan to keep striving to enhance the heritage of the Gully and the Aboriginal heritage of the mountains.



Above: Aunty Sharyn Halls: *Aboriginal Pathways across the Blue Mountains.* (Reproduced courtesy of the Country, Culture and Heritage Division of the NSW Office of Environment & Heritage)

A contemporary example of continuing adaptation and connection is provided by the insights into special places and community connection chronicled in the *Aboriginal Pathways across the Blue Mountains* pamphlet collection (published by the Country, Culture and Heritage Division of the NSW Office of Environment & Heritage). These stories highlight the continuing connection with the Greater Blue Mountains by the Gundungurra and Darug peoples. The pamphlets share the stories of individuals, present special places, tell stories and show vividly how the contemporary Aboriginal culture of the Greater Blue Mountains is a composite evolved story that is inseparable from the place itself.

A highly significant aspect of the Aboriginal heritage of Greater Blue Mountains is the landform itself. What European eyes see as 'natural' is understood by Traditional Owners as a complex, cultural landscape forged by creation beings, some of whom remain embodied in the physical features of the places that are there today. Well-known examples include the Burratorang, Wollondilly and Coxs River valleys, the Three Sisters and Mt Yengo. The Gundungurra story about the creation beings, serpent Gurangatch and quoll-like Mirrigan, tells the tale of their fight across and under the landscape, resulting in the creation of the Wollondilly and Coxs River valleys, its waterholes and pools, and the caves of Jenolan (see Matthews in Stockton and Merriman 2009).

Right: Gurangatch and Mirrigan. Artwork by Kelsie King, a Gundungurra girl.



Below. The Three Sisters, Echo Point. Both Darug and Gundungurra people are custodians of stories that explain the meaning of this iconic feature. (Photo: Richard Mackay)



Below: The Three Sisters Aboriginal Place was dedicated in 2014, recognising the important associative cultural heritage values of the place for Aboriginal people. (Photo: Richard Mackay)

The Greater Blue Mountains contains, or is closely associated with a number of places that have received statutory recognition as 'Aboriginal Places' (under the NSW National Parks and Wildlife Act 1974) since World Heritage Listing in 2000. These include: the Three Sisters and The Gully at Katoomba, Maiyingu Marragu near Lithgow, Kings Tableland near Wentworth Falls and Mount Yengo near Wollombi. These places strongly evoke and evidence the continuing, adaptive connection between Aboriginal people and Country:

The Three Sisters – according to Gundungurra people, the three sisters, (Meehni, Wimlah and Gunnedoo) married three brothers, from the wrong marriage group and were therefore turned to stone. A different story suggests that it was the sisters' father who turned them to stone, seeking to protect them during a time of warfare. Both Darug and Gundungurra tribal groups have legends associated with this iconic site, which is also connected to the many versions of the Seven Sisters stories linked to the Pleiades, an important group of stars which form the basis of a similar myth all across Australia. These legends are important aspects of the cultural heritage for Aboriginal people, but also dramatically enhance its meaning for both Aboriginal and non-Aboriginal people, evidenced by the recent declaration (January 2014) of the Three Sisters as an Aboriginal Place.



Blackfellows Hand Cave – is a Wiradjuri place which was recently re-given its traditional name of 'Maiyngu Marragu'. The cave sits within a spectacular amphitheatre known as Marragu (which was a meeting place for the Wiradjuri, but also for the Gundungurra, Darug and Darkinjung). The valley contains rock shelters, painted art, and quiet places and continues in use as a teaching place. It has significance to both men and women and is regarded as providing an important spiritual link with ancestors. In 2008, this site was officially declared an Aboriginal Place.

Kings Tableland is an extensive sandstone platform containing grinding grooves, rock art shelters, camping and meeting places. Historically this area was used as a camping site by Aboriginal residents of Burratorang Valley, who went to Wentworth Falls and Katoomba for work. The citation supporting its declaration as an Aboriginal Place indicates:

Kings Tableland Aboriginal Place is significant to Aboriginal culture because it includes, but is not limited to, a sandstone rock platform with extensive grinding and other grooves, a shelter with rock art that has been recorded as being the oldest Aboriginal site in the Blue Mountains region and containing unique vertically engraved depictions of kangaroo and bird tracks.

It also provides the Gundungurra peoples with a traditional and historical connection to the Blue Mountains area. The area was used as a camping and meeting place where connections with neighbouring Aboriginal groups travelling through their Country and along the traditional walking tracks (now known as the Great Western Highway and the Ingar Fire Trail) occurred. The Kings Tableland was historically used as a camping site by Aboriginal residents of the Burratorang Valley Aboriginal camp who would walk to Wentworth Falls and Katoomba for employment purposes until the early 1900s.

The Gully, managed by the Blue Mountains City Council in a co-management arrangement with The Gully Traditional Owners, and adjacent to the current Greater Blue Mountains WHA was declared an Aboriginal Place on 18 May 2002. The citation for the Gully indicates:

Before white settlement the traditional owners of the Gully – the Gundungurra and Darug peoples – used the Gully as a summer camp. Settlement at the foot of the mountains forced many Gundungurra and Darug people to resettle permanently in the Gully well before 1950.

In 1957, their relatively peaceful co-existence was shattered. The traditional owners were forcibly removed from the Gully to make way for a racetrack organised by a group of local businessmen who were supported by the then Blue Mountains City Council.

The trauma caused to the land and to the community of people who were living in and around the Gully was profound – and still reverberates.

Despite the near total devastation that resulted from the construction of the racing circuit, meagre traces of the fringe camp and scattered stone artefacts remain.

Today, The Gully is a focal point for celebration and experience of contemporary Aboriginal culture. In 2011 The Gully was the venue for the 'Living Country Culture Camp' conducted by the Greater Blue Mountains WHA Aboriginal Reference Group, and NPWS in conjunction with Darug and Gundungurra people.

Euroka Clearing, 'Nye Gnorang', in Blue Mountains National Park, has always been significant to the Darug people because of their continued connection to the area. They have visited the area for many years for cultural ceremonies, and to pass on their cultural knowledge to their younger generations. They have carved burial trees, collected ochre, rejuvenated their sites, held smoking ceremonies for mourning and healing, and naming ceremonies for children and adults.

Red Hands Cave, named for the 45 hand markings made in red, yellow and white ochre, including both left and right hands, and children's hand markings, is culturally connected to Euroka; Aboriginal people still visit regularly. It is estimated that the stencils were painted between 500 and 1600 years ago, and appear as a vibrant, rich collage, visually distinctive, and highly evocative of the connections of Aboriginal people to this place over many generations. According to Aboriginal stories, the cave was used as a ceremonial cave for the initiation of young warriors and was the abode of Aboriginal ghosts that represented the children left there by the Great Spirit.

Mt Yengo is a place of highly spiritual and ceremonial importance that stands tall and is as significant for Aboriginal people of South Eastern Australia as Uluru is to the Central Desert people. The Aboriginal Place citation for Mt Yengo indicates that:



Above: Mt Yengo Aboriginal Place has special significance to many Aboriginal people. (Photo: Richard Mackay)

Mt Yengo is the place from which Baiame (Baayami or Baayama), a creational ancestral hero, jumped back up to the spirit world after he had created all of the mountains, lakes, rivers and caves in the area. Baiame flattened the top of Mt Yengo when he jumped skyward and the flat top is still visible today.

Mt Yengo Aboriginal Place has special significance to Wanaruah, Awakabal, Worimi and Darkinjung traditional owners and their descendants as well as to contemporary Aboriginal communities within the Greater Metropolitan, Central Coast and Hunter areas. Due to the sacredness of Mt Yengo, local Aboriginal people can only speak publicly of some of its cultural associations.

Mt Yengo is significant as a spiritual and religious natural feature and forms the central point of connection for major rock art sites from northern Sydney to the north of Newcastle and the upper Hunter Valley. Mt. Yengo area contains important wild resource sites for obtaining plant foods and medicines and materials used to make tools and weapons.

Mt Yengo Aboriginal Place is home to several cultural teaching and educational sites. Aboriginal cultural practice at these places supports intergenerational learning and cultural skills transfer to younger Aboriginal people.

Individually, these places hold important values for particular Aboriginal communities, but they also make a substantial contribution to the totality of the cultural landscape itself. Together they represent an extraordinary concentration of recognised Aboriginal associative values in a single cultural landscape.

GREATER BLUE
MOUNTAINS
ABORIGINAL
HERITAGE:
PAST – PRESENT –
FUTURE

The Greater Blue Mountains landscape is a place of creation beings and spirits in which the people nurture the land through their occupation, continuing use, and evolving ritual and ceremony.

The Greater Blue Mountains area was known to include the lands of at least three language groups (Darkinjung, Darug and Gundungurra) at the time of European arrival, but as a result of the movement of people since then, is now recognised as including the Country of six different Aboriginal language groups: Darkinjung, Darug, Gundungurra, Dharawal, Wanaruah and Wiradjuri. The Greater Blue Mountains thereby transcends Aboriginal cultural boundaries, and its places and traditions now reflect this new diversity. The place documents and conserves an important record of the art, cultural practices and places of these people. This relationship with Country was succinctly summarised in the original World Heritage Nomination in 1998:

The rugged upland country of the Greater Blue Mountains is not only of exceptional natural diversity, and of spectacular and ephemeral beauty, but is also closely tied to the lives of people who have occupied, visited, thought about it and cared for it over thousands of years. The property represents, in fact, the combined works of nature and man. (Greater Blue Mountains World Heritage Nomination: section 2.5, page 44)

Right: The Greater Blue Mountains has strong associations with traditional owners who have continuing connections that are part of the cultural significance of the place. (Photo: Jacqueline Reid).



NATIONAL HERITAGE VALUES

Determination of National Heritage values is a matter for the Australian Heritage Council. However, in the context of contributing to the forthcoming assessment report and ensuing evaluation process, the following conclusions, are drawn from this essay and some of the key documentation to which it refers. For convenience, each statement is referenced to a particular National Heritage criterion (see Box 1 McGrath Chapter 4 Historic values).

The Greater Blue Mountains is a place of outstanding importance in the Aboriginal cultural history of Australia, which maintains an ancient and continuing connection between people and Country, reflected in ancient art, historic associations and contemporary traditions which demonstrate a resilient and adaptive culture (criterion a).

The Greater Blue Mountains includes a rare and outstanding collection of painted and engraved Aboriginal rock art sites and places, which relate to well-known Aboriginal stories, have strong connections with Aboriginal language groups, and which provide a tangible basis for the link between Aboriginal people and Country today (criterion b).

The Greater Blue Mountains has outstanding research value in a national context arising from the landscape itself, which includes extensive undisturbed areas with great potential to reveal highly-significant information and more important sites, as research and exploration continue, as well as from an extraordinary suite of known Aboriginal occupation sites, rock-shelter paintings, rock-platform engravings and other Aboriginal places.

In addition to their physical attributes, these places have outstanding research potential for the study of social connection between Aboriginal people and Country, at both the site/community specific level and across language groups and the landscape itself (criterion c).

The Aboriginal rock art of Greater Blue Mountains is highly-valued by the six language groups that speak for Country, as an outstanding demonstration of Indigenous creative achievement, and is comparable with other outstanding rock art sites in Australia (criterion f).

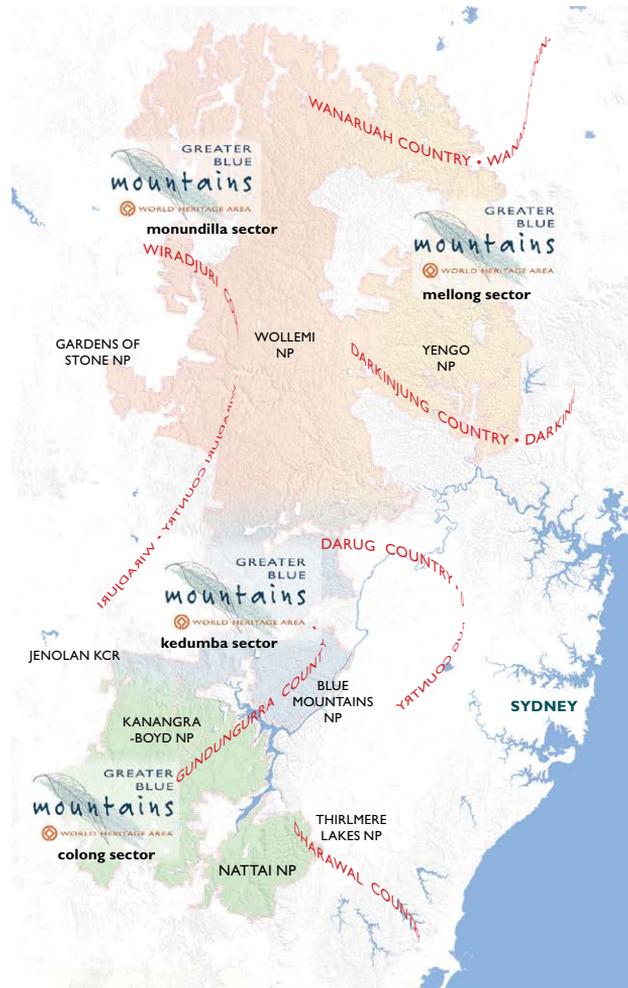
The Greater Blue Mountains has strong, continuing, and special associations with the Darug, Darkinjung, Gundungurra, Dharawal, Wiradjuri and Wanaruah language groups. The Greater Blue Mountains includes diverse

tangible and intangible evidence of past and continuing Aboriginal occupation and custodianship of this vast landscape, which juxtaposes with the highly-developed European landscape of the Sydney metropolis that it surrounds (criterion g).

ACKNOWLEDGE- MENTS

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Right: The six Aboriginal language group regions in the Greater Blue Mountains World Heritage Area.



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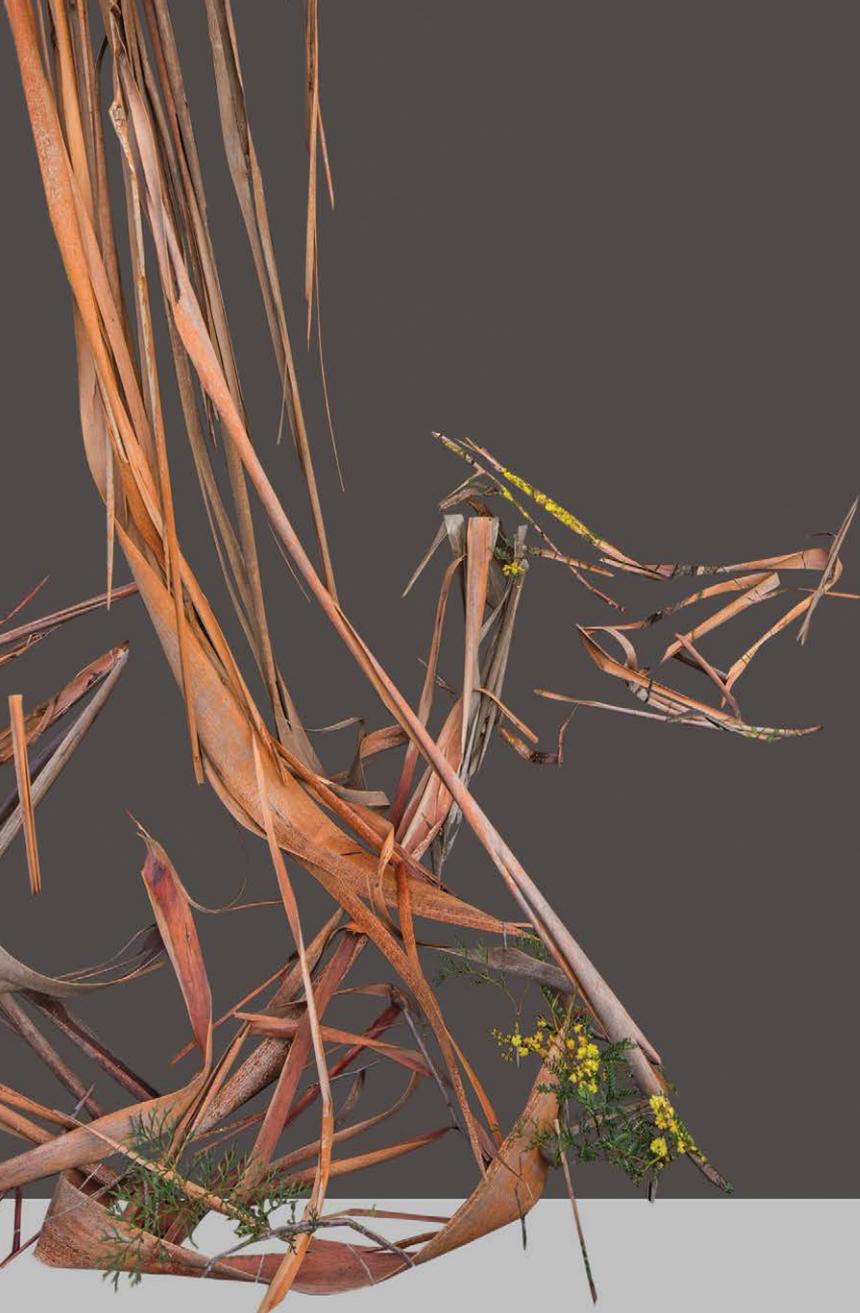
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Greater Blue
Mountains
WORLD
HERITAGE AREA

Chapter 4

Ann McGrath

**Crossing history's mountains:
the historic values of the Greater
Blue Mountains**

OVERVIEW

The Greater Blue Mountains holds a special place in the making of the Australian nation. It is a location of demonstrable and outstanding national historical significance. With its iconic profile and famous heritage, it has long been recognised as an area that was foundational to the building of the Australian nation.

The Greater Blue Mountains region is a place of outstanding Australian national heritage value and a unique repository that spans early convict and pastoral history, economic and technological growth, tourism, wilderness and political movements, science, culture and creativity.

The region has played an outstanding role in the conceptualization of Australia's national history and its national legends. As the location of prime historical events in Australia's early European history, it reflects the early convict settlement and early nationalist sentiments.

Its pivotal economic history is widely acknowledged and of enduring significance. Australia's most influential national historians have identified the European history of the Blue Mountains as a region where the nation's key historical 'turning points' have taken place.

The Blue Mountains Crossing of 1813 has become a mainstay of school history textbooks over Australia's first century of federated nationhood. Australia's best-known poets, novelists, artists and others have popularised its heritage.

Indicating its significance in Australian history, Australia's most prominent and highly regarded historians have detailed its historic significance, including Australia's premier Commonwealth historian, W.K. Hancock (1930), followed for example, by Manning Clark (1993), Russell Ward (1958), John Hirst (2000), and Martin Thomas (2004).

This paper discusses the historical significance of the Greater Blue Mountains following a number of historical themes from 1788, through the colonial and modern periods. The Greater Blue Mountains meets several, and possibly all, of the assessment criteria for National Heritage and historical values, and illustrates their inter-relatedness in drawing a rich picture of the national story.

For the significance of the Aboriginal history of the region or the history of Aboriginal/European interactions, see Mackay Chapter 3 *Contemporary Aboriginal Heritage*.

KEY THEMES

1. A theatre for a foundational national history

The Blue Mountains became a crucial site in the understanding of Australian history, the Australian people, and in the development of Australia's key national legends.

2. Fathers of Federation

The Blue Mountains played a key role in the federation movement and the foundation of the Australian nation.

3. Exploration and 'opening up the land'

The Greater Blue Mountains region played a pivotal and complex role in the *early convict and free settler expansion of European settlement in Australia*. The Blue Mountains is nationally significant in the early history of exploration, surveying, road-building and of *effectively 'opening up the country' for the land rush that eventually followed European colonisation*. The railway through the mountains was the turning point in the settlement of the land to the west and the development of NSW.

4. Gold, and the coming of the railway

The Gold discoveries and the railway through the mountains were turning points in the settlement of the west and the development of NSW.

5. The tourist industry: Jenolan Caves

The Blue Mountains were the site of Australia's first tourist industry and enhanced the national appreciation of natural places.

6. Bushwalking and the Conservation movement

The Blue Mountains played an important part in the development of both the Australian and international conservation movements.

Right: *View from the summit of Mount York, looking towards Bathurst Plains, convicts breaking stones by Augustus Earle (1793-1838).*
(National Library of Australia)
<http://nla.gov.au/nla.pic-an2818287>



1. A theatre for a foundational national history

HOW DID THE CROSSING GROW IN POPULAR AUSTRALIAN CULTURE?

By the late nineteenth century, the first successful European crossing of the Blue Mountains was widely recognized as an iconic moment in Australian history. Although only modestly reported at the time, the seventeen-day expedition in 1813, with its party of three European men, four servants, five dogs and four horses came to symbolise many things to the colony of New South Wales, and later to the Australian nation.

Historians saw it as one of the most important turning points of Australia's colonial history – flipping the colony from a convict to a free settlement, and from a coastal colony to one with potential for seemingly endless inland expansion.

More recent publications (for example Thomas 2004) have complicated this picture, but the Blue Mountains Crossing remains one of the best-known stories of early Australian history. Due to its prominent place in school textbooks throughout the twentieth century, the names of its appointed heroes, the wealthy young landowners Gregory Blaxland, William Lawson and William Charles Wentworth became widely recognised.

Their assistants were readily forgotten, if not left out of the story altogether, as were the various Aboriginal peoples who had made this crossing for millennia. These three European men acquired the title 'explorers', with all that this implied in terms of acquiring new lands in the British Empire. They are further memorialised in town names along the original route: Blaxland, Lawson and Wentworth Falls.

So why, and how, did the Crossing of the Blue Mountains become a key element in the development of Australian pioneer and national legends? It soon came to signify a great imperial breakthrough, the breaking of an impassable barrier, and a means of breaking out of the colony beyond convict walls.

In 1813, Blaxland wrote the first, albeit disappointingly bland account of the journey. Wentworth, studying at Cambridge in Britain, offered a more inspiring narrative; the homesick Australian-born Wentworth wanted to educate the ignorant

‘mother country’ about his native land. Publishing an information book on Australia in 1819, a few years later, he wrote a long patriotic poem entitled *Australasia*, which recalled the colony’s distinctive landscapes (Wentworth, 1822). Journeying from Sydney to the Hawkesbury (Richmond, Windsor), and to the inland plains, Wentworth imaginatively surveyed what he termed a ‘New Britannia’ in a southern land.

Because his phrases became so significant to the Australian imagination, Wentworth’s words have a familiar ring: from the ‘sea-girt shore’ and ‘new-born glory’ under the southern skies. Such imagery entered and remained in the national lexicon, seen today in the current national anthem ‘girt by sea’ and in the southern cross on the Australian flag. Of the mountains, Wentworth mused: ‘How dark thy caves, how lone they torrents’ roar.’ He introduced the fantasy of a ‘sleeping land’ supposedly awaiting the explorers’ arrival: ‘We dared to rouse thee from thy mountain bed!’ Surveying the plains beyond the crossing was thereby elevated to the grandiose. Not only that, it created a poetics that embraced an assumption of British sovereignty over the vast lands now within purview of William Lawson’s gaze, and via his scientific surveying equipment.

FREEDOM FOR THE WORKING CLASS MAN

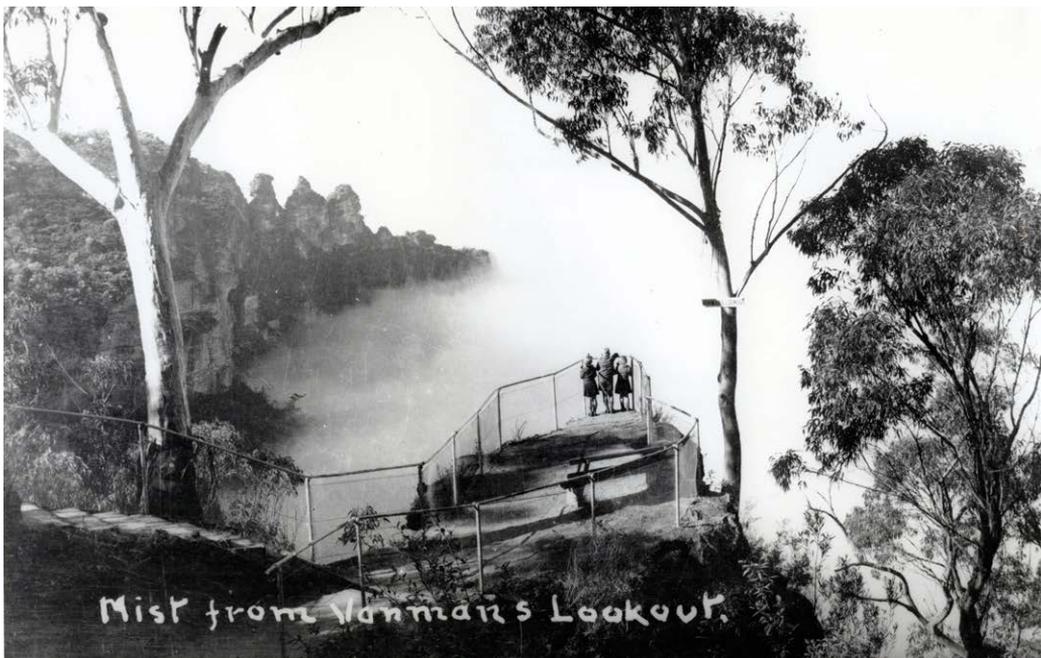
Even as early as 1823, these Blue Mountains went beyond Britain and Europe to stake out a New World claim that moved beyond convictism, and portrayed Australia as a special site of freedom for the working class man. Comparing the attractions of Europe, one writer to the newspaper rejected the appeal of the ‘gondola’ in favour of the exhilaration and aesthetic pleasure of riding his horse through the Blue Mountains.

In the lands beyond Sydney, unlike in Britain, horses were accessible to all classes, including the Australian-born or ‘currency lad’s, who, probably emulating the Aboriginal practice, took up the practice of calling out ‘cooee’ whilst riding. The Blue Mountains became a site for asserting ‘nativism’ – a unique sense of belonging to a distinctive landscape. Elements of the unique landscape, such as the poetic descriptions of the bellbird’s call as ‘silver bells’, were transposed onto a European imagining of a mystical ‘fairyland’.

Inspired by the unique wildlife and grandeur of the mountain landscapes, an important nationalist aesthetics was developing. In early nationalist narratives, talented nineteenth century poets such as Henry Kendall and Banjo Paterson immortalised the European mountain crossing as 'opening a path' for future colonisation. For Anglo-Australians, poetic renderings of this journey potentially connected the general public to a transcendent history of mountain conquest, ambition and achievement (Read 2000; White 1981). Circulating in newspapers, magazines and oral performances, the best poems became fixed in the consciousness of Australian children and their parents, inspiring a sense of collective identity. Taking place in specified Australian landscapes considered of national historical significance, their Blue Mountains setting was crucial (White 2001, p. 86). Learning and reciting these poems became a standard part of the historical education of Australian schoolchildren, creating a shared cultural experience for colonials, and later for the young nation.

Below: *Mist from Vaniman's Lookout, 1940* by Wallace Green. Clifftop walks and scenic lookouts have encouraged tourists to take in the Blue Mountains experience. Vanimans Lookout at Katoomba was named for American photographer, balloonist, inventor and artist Chester Vaniman (1866-1912) who visited the Blue Mountains in 1903. (Blue Mountains City Library image).

Firing the imagination of the developing Anglo-Australian nation, the mountain journey of Blue Mountains exploration heralded the beginnings of a deeply imagined, unlimited scope for expansion of landed pastoral and agricultural holdings within the reach of white colonisers – a goal they knew to be impossible in Europe, and that they believed augured well for the country's future.



MIDDLE CLASS ASPIRATIONS

From the late nineteenth through most of the twentieth century, the story of the Blue Mountains played an important role in the evolution of the family-oriented, middle-class 'pioneer legend'. Favoured by school curriculum designers, this conservative colonising narrative provided ideal history content for inculcating suitable values in young Australians and citizens of the British Empire. (Hirst 1978; Ward 1958) The word 'pioneer' suggests showing the way for others to follow. In 1880, at the beginnings of this tradition, the acclaimed poet Henry Kendall used the term the 'Blue Mountains Pioneers' for the three explorers (Hirst 2009, p. 195).

The easy access of the Blue Mountains to the city-based poets, artists and writers of Sydney's bohemian circles was another factor that enabled this region to become entrenched as a place of powerful resonance in an evolving national historical imagination (Davison 1978).

Banjo Paterson's poem 'Song of the Future,' about settlement beyond the Blue Mountains, was published in 1889 in the *Bulletin*, the magazine known as the 'bushman's bible.' The poem epitomized a nativist poetry tradition that drew upon experiences of the Australian bush. Historian John Hirst has labelled this historic poem - one reproduced in anthologies and school magazines throughout much of the twentieth century - as 'the classic statement of the pioneer legend' (Hirst 2009, p. 178; Hirst 1978).

In these verses, rather than emphasising individual explorer heroics, the Blue Mountains Crossing became a collective saga usable to the white colonisers as a whole, and especially to the later immigrants who arrived after the explorers. Rather than celebrating only the individual heroes, Banjo Paterson celebrated 'honest toil and valiant life' and the Crossing as 'a great saga of the people'. In 'Song of the Future' the mountains became animated as witnesses to a new people's history:

*'The mountains saw them marching by:
They faced the all-consuming drought,
They would not rest in settled land:
But, taking each his life in hand,
Their faces ever westward bent
Beyond the farthest settlement,
Responding to the challenge cry
Of 'better country farther out'. (Paterson 1895)*

While ‘marching’ evoked the feel of a military expedition, this happened supposedly with no ‘bloodshed reddening the land.’ It was a point of honour to take over land without the violent ‘victories’ required by other nations, such as the Revolutionary War of the United States.

Over recent decades, extensive research on frontier violence between convicts, settlers and Aborigines has disproved this lack of warfare hypothesis (Reynolds 2006; Reynolds 2013; Roberts 2013). However, for a coloniser people displacing others, pleasing stories that asserted white Australian sovereignty and brave actions, not in Europe but on home soil, had instant appeal.

Furthermore, in a quest to develop a new approach to landscape, Paterson turned the Blue Mountains into a testing ground for masculine courage and endurance. Many, many Australians read or recited this aloud:

*The strange capricious land they trod –
At times a stricken, parching sod,
At times with raging floods beset –
Through which they found their lonely way,*

Moreover, Paterson portrayed the Mountains as a space for a new historical imagination, explaining: ‘We have no tales of other days/ No bygone history to tell.’

*That nothing in the ages old
In song or story written yet
On Grecian urn or Roman arch,
Through it should ring with clash of steel
Could braver histories unfold
Than this bush story, yet untold –
The story of their westward march.*

According to John Hirst: ‘This poem, more than any other single piece, did bring about that new perception of Australia’s past which Paterson sought. He still had to defend his heroes against those of Greece and Rome, but the heroism of the pioneers was soon accepted without question and the reference to the classical tradition ceased.’

Rather than attempting to slavishly emulate its citizenry’s European past (Hirst 2009, p. 178), the evocative power of the Greater Blue Mountains landscape was thus effectively harnessed to serve as a ‘Song’ for a nation looking to the ‘future.’

As various writers have argued, exodus stories and a sense of displacement appealed to Australian colonizers (Docker & Fisher 2000, p. 16; Curthoys 1999, p. 17). The Greater Blue Mountains history was being mythologized as a grand white pioneer exodus. Paterson cast the pioneers as akin to the 'Israelites with staff in hand'. In highly gendered metaphors, the all-male explorers penetrated new lands: 'Before the pioneers broke through/ Your rocky heights and walls of stone, And made your secrets all your own.' These riches were also 'hid behind your sullen walls'.

This exodus out of Europe was towards what was imagined as a virgin, sleeping land previously 'enshrouded in a haze of blue'... Furthermore, Paterson was writing against 'The hard old world grown fierce and fond/ And bound by precedent and bond.' Although bursting with patriotism, the poet's lofty idealism went beyond nation, anticipating that such noble pioneer sentiments would inspire the whole world into an egalitarian land settlement, with people singing a new song as 'One vast united brotherhood.'

THE CENTENARY OF THE CROSSING: PATH-MAKERS FOR 'FREE MEN' TO FOLLOW

The Centenary of the Crossing in 1913 called for a fund-raising campaign and plans for great memorials and festivities. Only twelve years since Federation, a new nation was searching for heroes to obscure the embarrassing and disreputable history of convictism. This was especially so in New South Wales, where the colonizers were keen to replace a history where the nation's founding moment was that of a dumping ground for British criminals.

Although Australian history was not yet an academic subject, leading writers like Henry Lawson had already campaigned for school history lessons, arguing that they would play an important unifying role in the developing nation. An epic of symbolic and poetic significance, the Blue Mountains legend featured the cast of three white male heroes who rehearsed the role of path-makers for 'free men' to follow.

'The Crossing' opened up a relatively inclusive historical tableau for teaching moral lessons deemed suitable for children and for future nation-building. The 1913 brochure called for the memorialization of the 'First crossing of the Blue Mountains of N.S.W.', and placed at its masthead: 'Patriotism helps to hold the country'.

Under the heading 'Facts worth remembering', it promised that 'The celebration of the Centenary of this Great Event will

establish a lasting memorial to the three Western Pioneers.' Notably 'the Crossing' had already been designated as a 'Great Event' and the explorers elevated to institutional status and deserving of capital letters. It serves as a prime example of the early development of an historical tourism fuelled with what they termed 'patriotic' verve.

Beyond regional parochialism, the authors were confident that this history had already established its hold on the public, stating: 'Every inhabitant of Australia is interested in the work accomplished by Blaxland, Wentworth and Lawson a hundred years ago.' Its authors explained that such a history served a valuable purpose: 'Every country in the world is made or marred by its pioneers. AUSTRALIA HAS EVERY REASON TO FEEL PROUD OF HER HEROES OF THE PAST.' Engineered by the Blaxland Shire President, Councillor Berghofer, its call for lasting historical memorials had a powerful ally - the President of the Australian Historical Society, Frank Walker. He established a Sydney head office for the Centenary Committee that set about commemorating what they called the 'Greatest Centenary in Australia's History' (Walker 1913).

The 1913 Centenary saw a spate of popular publications, all of which reiterated the term 'the first crossing'. The daughter of George William Evans, the deputy surveyor-general of New South Wales, published a book entitled 'The First crossing of the Blue Mountains' in 1913 (Evans & Turpin 1913). J.H.M. Abbott wrote a piece for the *Lone Hand* entitled 'The first crossing of the Blue Mountains' (Abbott 1913). In the same year, Frank Walker wrote the *Official history of the first crossing of the Blue Mountains in 1813* (Walker 1913), publishing Blaxland's journal.

Various souvenir pamphlets were prepared for the event and public monuments, significantly funded by public donation, were erected. These included the obelisk at Mt York on 28 May 1913, and later the protection of the 'explorer's tree' – a marked tree that eventually died. (The remaining trunk was recently given more conservation attention.) Such monuments themselves became historical destination sites for tourists (Lavelle 2004).

As one of the 'key dates' taught to and constantly drummed into Australian primary school children in all states, 1813 became indelible. After 1770 and 1788, this date had prime place in the Australian history timeline as a key historical turning point. Unlike other famous stories such as James

Cook's 'discovery of Australia' or Governor Arthur Phillip's arrival with the 'First Fleet' (Healy 1997; Nugent 2009; O'Brien 2010), the Crossing did not emanate from the British Crown or the colonial office. It represented coloniser organisational acumen and agency, being linked to the later success of the pastoral industry and subsequently to greater economic certainty for the colony. Enabling transit by horses and wagons, the crossing certainly created a pathway for Europeans and their grazing enterprises to take up large areas of land previously inaccessible to them. (Today, Mt Victoria's signage dubs it the 'explorer's gateway to the West,' while other signage proclaims the Crossing's significance by attesting to the fact that these lands remain in pastoral use.)

Stories of the Crossing continued to attract interest as a romantic literary genre. For example, in 1936, Charles Strange wrote *Romantic yesterdays: an account of the first crossing of the Blue Mountains with illustrations and descriptions of places of historical interest*. Through such memorialising, the Blue Mountains became entrenched as a landscape of historical significance, certainly much written about and widely known.

Historians of the 1950s onwards further consolidated its significance. In his renowned study, *The Australian Legend*, Russell Ward cast the Blue Mountains in a leading role in 'the bush legend' and its aftermath. Rather than families, his radical legend featured the white working-class male rather than family enterprises. Significantly, Ward saw the crossing of the Blue Mountains as having 'foreshadowed the end of New South Wales as a predominantly convict colony' (Ward 1958, p. 66).

He asserted that it created a pathway to the goldfields that mustered rising nationalistic and independent sentiment. Celebrated historian Manning Clark (whose main works were published between 1962 and 1987), retold the story many times. In particular, he praised Wentworth, for 'he alone of the three had an eye for the majesty of the occasion' (Clark 1993, p. 101). Clark presented this event as heralding future promise for the colony of NSW, and - as if inevitably - for the rest of the nation. Clark explained how, after the crossing, Governor Macquarie established Bathurst and surrounds so that 'sober industrious men with small families from the middling class' could receive acreages of land, while upper class men could receive larger grants. Australia thus became an egalitarian land because it offered land-owning potential to all classes of white coloniser.

Clark wrote evocatively: 'Here, indeed, was the opportunity, and the man with the imagination to dream the great dream.' (Clark 1993, p. 56) No hyperbole was too strong; He borrowed from Wentworth's Cambridge poem to portray this momentous mountain moment:

*And, as a meteor shoots athwart the night,
The boundless champaign burst upon our sight
Till nearer seen the beauteous landscape grew,
Op'ning like Canaan on rapt Israel's view."*

(William Charles Wentworth 1823)

It is noticeable that Manning Clark's excerpt begins rather abruptly; Indeed he selectively chose to omit the preceding line 'We spied the cheering smokes ascend beneath' - the 'cheering smokes' probably being visible evidence of Aboriginal occupation. If so, Wentworth at once acknowledged the presence of Aboriginal people, yet imagined a land empty of humankind. For example, he relished 'tranquil scenes! Too long to man unknown' (Wentworth 1823). In keeping with Imperial thinking, he slipped into an exclusive definition of who was to be included in the grand term 'man'. By the time Clark wrote, however, national historians had fallen into a practice of denying aboriginal presence altogether (Attwood 2005).

CONTEMPORARY VIEWS: THE BICENTENARY 2013

In 2013, the Greater Blue Mountains region held a range of events and re-enactments to commemorate the 200th Anniversary. An academic symposium organised by the History Council of NSW entitled 'The Crossing Seminar' featured several of the nation's leading historians.

Demonstrating the strength of interest in the theme, it was sold out early.

The quality of the speakers and papers underlined the continuing historical significance of the Blue Mountains region. As its brochure asked: 'How did it happen that an event that was modestly reported at the time [in 1813], and which had limited immediate consequences, by the turn of the twentieth century came to be regarded as one of the most significant events in Australia's European history?' Richard Waterhouse briefly recounted the known facts, then traced the beginnings of its memorialisation. Historian David Roberts reassessed the settlement of the Bathurst region, pointing out its earliest history was a convict history of disorder and rebellion against British masters and soldiers and that the breakdown of relationships between Aboriginal

people and convicts led to a declaration of martial law, and the establishment of the mounted police (Roberts 2013). Despite much recent attention, this topic remains an understudied topic in Australian history.

The Blue Mountains region offers a rare example of the development of early historical narratives that served to shape a sense of national identity. There is much more research to be done; the Blue Mountains landscapes still hold outstanding evidence of this heritage for future historians.

We might yet ask why the term, and the event it denoted, so sparked the national imagination. Perhaps 'the Crossing' holds wider metaphoric meanings for the Australian nation: for people crossing from sea to plains, from Europe to Australia, from life to death, from the past to the future?

Or of a cross-cultural crossing, remaking and remarking the landscape as they did so? If we wish to understand this iconic moment as a first crossing on a national level, the obvious question is how we might appraise the repeated Indigenous travels that long preceded it?

Overall, the continuing preoccupation with these Blue Mountains stories demonstrates how this area became a historical site from which emanated one of Australia's most powerful national histories and historical legends associated with coloniser sovereignty and authority over the land.

In all its ambiguity, the preoccupation with the term 'the First Crossing' remains evocative, ready to be renegotiated for future historical meanings.

2. Fathers of Federation

The Blue Mountains have been a place where influential politicians explored the key values and aspirations of the new nation. To offer just two examples, founding Fathers of Federation, Alfred Deakin and Henry Parkes were both associated with the Blue Mountains.

In 1888, the Victorian politician Alfred Deakin, later an influential thinker in developing ideas for Federation and the new national polity, travelled by train with the Californian-born visiting Harvard philosopher Josiah Royce - first to Sydney then to the Blue Mountains. As the young American

intellectual was suffering exhaustion, he was particularly keen to take in some mountain air.

According to historians Lake and Reynolds (2008, pp. 41-2), the pair 'spent an intense week together in the Blue Mountains, walking and talking, about politics and government, metaphysics and religion, conversations that lay the basis for a passionate friendship that would last for more than twenty years.'

Deakin and Royce shared concern over issues of race homogeneity. They were mutually concerned about the Chinese presence, due in part to the gold rushes, and in the role of 'white man's countries' in shaping the futures of their 'modern' democratic nation-states.

The pair discussed immigration restriction and found common ground on the possibilities of republican manhood and noble democratic ideals. The highly accomplished Royce is now known for his work on the philosophy of religion and the history of the American West.

In a letter to Deakin, he wrote: 'Few memories stand out more clearly and encouragingly, and more pleasingly, in my life, than our meeting in 1888, our days together in the wonderland of your mountains, our talks, and your kindness and the gracious cheer of your hospitality' (Lake & Reynolds 2008). And possibly of global significance, Royce's Blue Mountains experience may have had an influence on shaping his ideas about the historical values embodied in the American West.

Another 'father of federation', Henry Parkes, the long serving Premier of New South Wales, relentlessly fought the unification cause for years, but died in 1896, before he could witness the fruits of his labours towards federation. Although his political, business and family life had endured many ups and downs, this great patriot and astute politician is forever associated with the Blue Mountains. He had a family residence in the Blue Mountains and is buried at Faulconbridge, alongside his first wife (Martin 1974). A central obelisk monument commemorates Parkes, who played a key role in establishing the cemetery. Henry Parkes' estate in Faulconbridge was gifted for public use.

In tracing the evolution of an Australian national history and historical sensibility, there is ample scope to explore more examples of the significant political, intellectual and cultural moments that took place in the Greater Blue Mountains region. Historians will continue to critique and revise the history of this region for future generations, but the above examples provide

strong evidence of its unique historical significance in the most influential tellings of Australian history and in popular historical consciousness.

The Blue Mountains has earned its place as a significant and somewhat glorified setting for key national events of enduring significance. Assisted by patriotic poets, the Blue Mountains played a role in the history of Australian nationalism, the unifying force that created the 'sentimental nation' and federation itself (Hirst 2000). As a dramatic natural venue, the Blue Mountains can claim a role in the global story of colonialism and in shared settler-colonizer narratives of westward expansion (Paterson 1889; Lake & Reynolds 2008, p. 101; Weaver 2003). Indeed, the Greater Blue Mountains region was both historical stage and theatre. Not only did highly significant events take place there, through poetry, art, literature and key scholarly histories, it also became a site for recreating some of the most evocative and enduring national narratives.

3. Exploration and 'opening up the land'

From an economic standpoint, the Greater Blue Mountains played a pivotal role in the development of European settlement in Australia, which commenced in Sydney in 1788 and over the next few years extended to Parramatta and the Hawkesbury River. Situated as a rugged hinterland around Australia's convict and free European settlements, the Greater Blue Mountains played a unique, foundational role in the colony's early development. This has left legacies of ongoing historical values with which visitors can engage. On the one hand, early governors considered the mountain barrier a useful geographical tool, providing the natural walls of an open-air gaol, while on the other hand, it presented a major physical obstruction for the future expansion and prosperity of the colony. The colony's sustenance was by no means assured, and within three months of arriving in Australia in 1788, Governor Phillip organised an attempt to reach the mountains.

Governor Phillip understood exploration as something to be done for 'scientific purposes', in order to understand a land unfamiliar to Europeans. Exploration was also a pragmatic venture to assure the future colony's expansion.



Above: The steep sandstone cliffs of the Blue Mountains were a barrier to the Colony's early expansion, and provided no worthwhile agricultural land, but were a source of inspiration to artists.

E. B. Boulton (Australia, b.1812, d.1895)
 Mount Victoria, New South Wales circa 1890
 watercolour, opaque white highlights, 65.5
 x 95.4 cm. Art Gallery of New South Wales.
 Purchased 1893. Photo: AGNSW. 5833

The influential botanist Sir Joseph Banks, who had visited Australia with Cook in 1770, was largely responsible for the drive to expand scientific knowledge of the Australian environment (Walker 1913, p. 30). He sent out botanist George Caley, who on his various journeys, including an epic expedition to Mt Banks, encountered numerous groups of Aboriginal people moving through the region. Nonetheless, Caley concluded that the mountains were 'impassable' - and in a memorable quote, proclaimed that they 'must forever remain an unsurmountable barrier to the extension of the settlement'.

In 1836, Charles Darwin travelled across the Blue Mountains during a stop-off on his voyage on the *Beagle*. The 1882 *Picturesque Atlas of Australasia*, a later guide for tourists in the mountains, frequently quoted Darwin as the scientific authority on the Blue Mountains on matters of geology and botany (Burke 1988, p. 103). The most famous scientist of his era, his visit still resonates in a global story of scientific curiosity. This trip played a part in his accumulation of knowledge, helping to substantiate path-breaking publications such as *On the Origin of Species* (1859).

Historian Manning Clark summed up the view of the Blue Mountains as a 'barrier'. By 1811, 'Expansion west of Penrith was blocked by the Blue Mountains, and all attempts to



Above: Parts of Coxs Rd down Mt York still survive and are part of popular walking tracks at Mt Victoria today.(photo D Benson)

cross them had failed.' A hunger for expanded grasslands is often cited as a prime reason given for the explorers' quest. (Clark 1993, p. 56). Although, with only about 13,000 British residents, Sydney in 1813 was by no means 'full', graziers looked for greener pastures and more land on which to run their cattle and sheep (Thomas 2004, p. 43).

As historian John Weaver explains, this was the era of the great imperial land rush; land was a subject of speculation and takeover throughout the British colonies (Weaver 2003). Sydney's waters had been overfished and land around Sydney had become overstocked. The soil had been trampled and impoverished by deforestation and the Tank Stream polluted. Settlers were eager for more land (Thomas 2004, p. 23).

In Europe and North America, the best routes inland had usually been along river valleys. Yet all European attempts to cross the Blue Mountains using this strategy failed, because in this unfamiliar landscape the rivers emerged from the mountains in narrow gorges (Mosley 1989, p. 4). Blaxland, Lawson and Wentworth finally crossed the Mountains in 1813 by following the ridges (Foster & Duffy 1997, p. 41). Their route was in fact an existing Aboriginal route through the mountains (Thomas 2004, p. 149). From the summit of Mt Blaxland near Lithgow their party saw country 'sufficient in extent...to support the stock of the colony for the next 30 years' (Mosley 1989, p. 4).

The 'discovery' of routes to pastoral lands signified a moment of colonial expansion beyond the coast and beyond the Sydney river system. Beyond the convict areas, it promised areas for free immigrant colonisation. Their journey ensured the expansion of the colony and fed into colonialism's ideal of discovering great vistas of supposedly free land for colonial profit.

Later that year, the government surveyor George Evans reached the Bathurst Plains and in 1815, using gangs of convict men, William Cox completed the road from the Nepean to the site of Bathurst on the Macquarie River. The roadworks included stone retaining walls and bridges (Karskens 2010, p. 91), some of which still survive.

The road followed the route taken by Blaxland, Lawson and Wentworth across the Mountains, the route still more or less followed by the Great Western Highway. In 1815, Governor Lachlan Macquarie crossed the mountains, inspecting the road and examining the newly accessible land. The town

of Bathurst became a springboard for further European exploration, facilitating settlements along the Lachlan and Macquarie Rivers (Walker 1913, p. 33).

In 1823, Archibald Bell, only a teenager at the time, found an Aboriginal trail that became the second route for Europeans travelling through the Mountains: Bell's Line of Road. With the crossing and such subsequent roads, the Western plains could now be used for sheep grazing, which would become the primary industry of the young colony.

John Howe's 1820 expedition to the Hunter Valley north of Sydney gave the colony an overland route to the northern farmland (Macqueen 2004, p. 116). Built by convicts victualled at what is now Wisemans Ferry, this route later became the Great North Road, (Macqueen 2004, p. 129) and allowed drovers to bring their cattle down to Sydney. Solomon Wiseman, an ex-convict entrepreneur, established a shipping business and ferry on the Hawkesbury River (Karskens 2010, p. 134). The area around the Colo River, along South Creek and down to Richmond became the breadbasket for early Sydney, with the Hawkesbury River and its rich alluvial plains dubbed 'The Nile of the Colony' (Karskens 2010, p. 122).

The 'Greatness' and awe-inspiring nature of the Blue Mountains vistas, and of the considerable journeys required to cross them, are signified in the revealing names - 'Great' North Road and the 'Great' Western Highway. Stories of exploration reveal the conceptualisation of Blue Mountains as a unique national symbol of European Expansion and coloniser pride, especially regarding success in identifying, accessing and using vast areas of land.

The notion of the route as breaking through the expansion 'barrier' of the Blue Mountains continues to hold power over the Australian imagination. It evokes a sense of inevitability and entitlement, like opening a door that someone had unfortunately locked. The 'great land rush,' with its practices of exploration, discovery, surveying and mapping the land in straight lines, and then settlement – though not always in that order – represented an ideological takeover by the British and other Europeans. In later anniversaries, these narratives allowed for celebrations of moments of sovereignty that led to a more secure sense of entitlement and legal authority over the new domain.

Exploration and discovery narratives are especially important to colonizing governments and peoples because

the act of 'discovery' conveyed legal title to, and ownership of the soil by the European nation. It can sometimes imply that the government becomes owner of the land or it can be more 'absolute' and equated with conquest, 'conquering' and taking over absolute rights to the land and its occupation. As American legal scholars Wilkins and Lomawaima argue, the doctrine of discovery became a legal principle that exerted property rights over tribal lands. (Wilkins & Lomawaima 2001, p. 12).

This 'expansive' idea of sovereignty reduced Indigenous peoples to mere tenants who were considered incompetent to manage the lands themselves and stripped them of property rights altogether. In 1986, in the US courts, and then repeated in the High Court of Australia's Mabo judgement, the *terra nullius* doctrine was judged to be a 'legal fiction' without basis in law. While the notion of discovery as conquest, as benevolent paternalism, or as an exclusive right to purchase, became important legal debates, the British refusal to negotiate treaties with Australian Indigenous landowners made Australian colonization peculiar on the world stage. (Reynolds 1992).

This leads us to reassess just why the 'first crossing' narrative was considered so important. Firstly, as previously mentioned, it inscribed a more appealing story than the colony's 'convict beginnings' that so tarnished claims to colonial respectability. Secondly, this journeying narrative undermined the longer and deeper associations of the Aboriginal occupants, with their long established narrative traditions, and biographical and kinship relations to specific sites in the landscape.

Furthermore, it omitted the warfare incidents that had gone on for many years between Aboriginal clans and colonisers. It also overlooked the co-operation and entanglements that had taken place. For example, Aboriginal people gave food to the hungry road gang members; squatters and farmers intermingled with local Aboriginal women; intermarriages took place and children of combined descent were born.

Motifs of 'discovery', exploration, crossing and heroism created a history that supplanted the *longue duree* of Indigenous Australian history in the region – evidence in rock art, engravings and archaeological sites was not understood as historical data. Discovery narratives also denied histories of entanglement between the various groups. Europeans were engaged in a lot of 'firsting' actions,

the crossing being a classic example (O'Brien 2010).

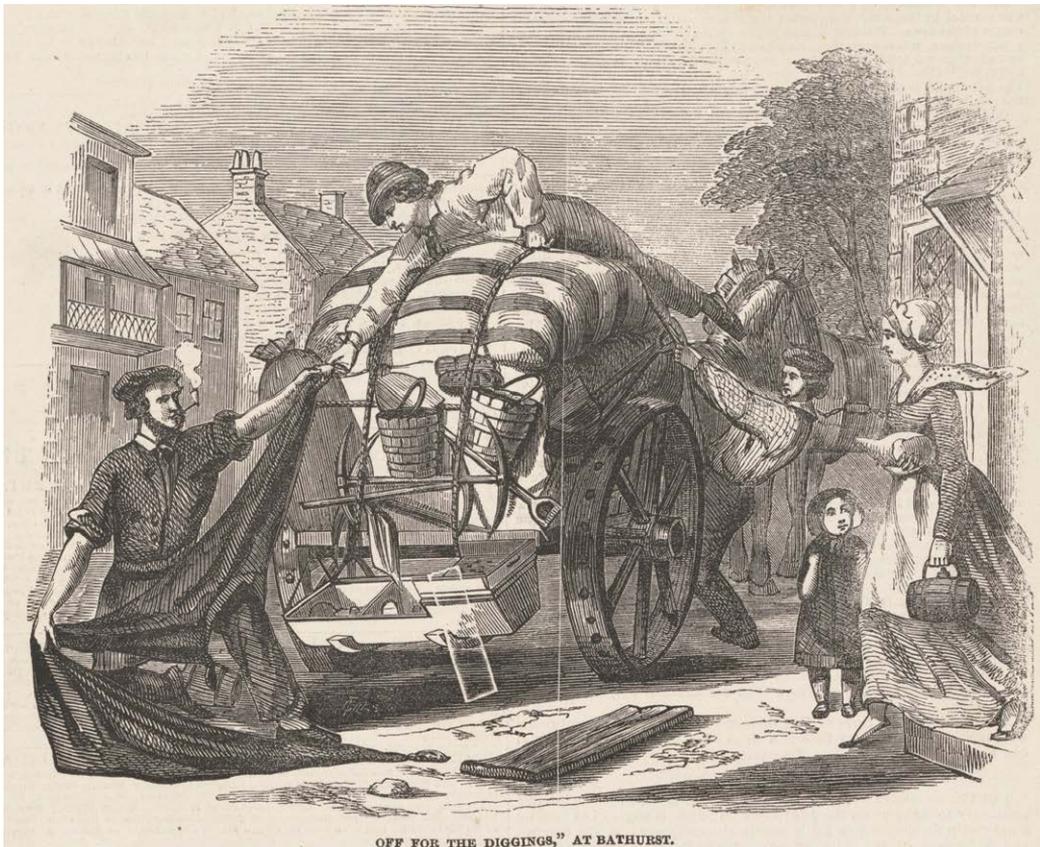
Emphasising stories that involved European heroes, especially as 'the first' to do something, effectively expunged the deeper epic creation stories developed by Aboriginal tribal groups over millennia. Europeans were creating and popularising a new history that imaginatively expunged the old, rendering it a 'non-history', associated with a people without history. Aboriginal people were relegated to an idea of 'the last of' – as a 'disappearing' or an already-disappeared race.

The Blue Mountains, in being imagined as the 'impassible barrier' that posed a natural obstacle to a British convict settlement becoming an expanding free colony, and a crucial aspect of an internal discovery narrative, therefore grew to be of high historical significance to the Australian nation. While visitors wish to connect with a magnificent natural and aesthetically appealing environment, they also wish to connect with an important national story.

By (re)discovering the route, Europeans could imagine how their own kind, unfamiliar with this landscape, could achieve the impossible – to pass the impassable. The sheer cliffs and outstanding splendour of the Blue Mountains enhanced the story of Blaxland, Lawson and Wentworth as even more awe-inspiring to white Australians, helping them to feel better about themselves and their future.

Gold, and the coming of the Railway

In W.K. Hancock's influential history *Australia* (1930), he stresses the Crossing's role in economic development. This book is often considered the first academic study of the nation's history as a discrete topic, and the fact that it was by an internationally recognised practitioner further elevated its status. In a chapter pointedly entitled 'Beyond the Mountains', he explains: 'The road through the mountains opened a period of real expansion. During the first quarter-century, the colony had been penned by the Blue Mountains to a narrow strip of coast. Attempt after attempt was made upon the ranges, broke and fell back.' Even in this pragmatically oriented, economic history, Hancock becomes enamoured with the sublime, referring to the 'unearthly blue of the vast valleys' (Hancock 1930, p. 140).

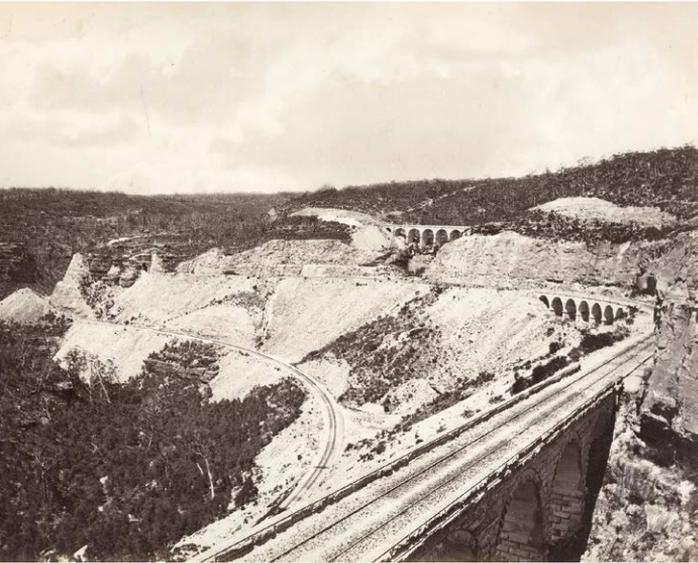


Above: *Off for the diggings at Bathurst*; Thomas Gilks active 1840-1876
National Library of Australia
PIC U5956 NK4182/81 LOC 911-A

The Gold discoveries signal another historical value regarding a vital aspect of Australia's national history, the minerals industry. This history continues to re-enter the histories of the Greater Blue Mountains, especially along the boundaries. The 'gold rush' of the mid-nineteenth century was seen as another beginning of a free settlement as opposed to a convict settlement (Hancock 1930; Clark 1993; Ward 1958). Gold discoveries led to the diversification of coloniser population and economic enterprises.

After gold was discovered near Bathurst in 1851, the Blue Mountains became a well-travelled route for hundreds of hopeful prospectors. The non-indigenous population of Australia doubled in the 1850s and people from diverse nationalities passed through the Blue Mountains (Walker 1913, p. 38). Roadside inns and military posts sprung up along the Western Road for the travellers. Springwood became a campground for hundreds of Chinese prospectors as they crossed the mountains.

Nonetheless, until the construction of the railway in the 1860s, the movement of Europeans across the mountains



Above: The construction of the Zig-Zag Railway near Lithgow in 1868, was a great feat of railway engineering and facilitated agriculture and closer settlement in western New South Wales.
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was limited. The 'Fish' train began its service from Sydney to the Blue Mountains in 1866; Katoomba railway platform opened in 1874; by 1868 the famous 'Zig Zag Railway' was under construction. With its series of viaducts and tunnels bringing the line from the top of the sandstone plateau at Clarence down into the Lithgow Valley, it was considered a great feat of railway engineering.

The Great Western Railway reached Bathurst in 1868. As people and goods could pass through the mountains en masse at speeds previously impossible, the railway through the mountains was considered a turning point in the settlement of the land to the west and to the development of NSW (Walker 1913, p. 40).

The tourist industry: Jenolan Caves

Australia's earliest tourist industry developed in the Blue Mountains at Jenolan Caves, now part of the Greater Blue Mountains World Heritage Area. European tradition identifies and attaches special recognition to the discoverers of natural features such as caves, and the convict James McKeown, by default and legend has been attributed as discoverer. Unfortunately there is no contemporary written record, and the researcher D.H. Catchpoole (2008) concluded that McKeown did not actually discover the caves.

The first European visits to Jenolan Caves took place from the late 1830s when the colonists' interest in geology and natural science was exploited by a local settler family, the Whalans, who acted as unofficial guides, exploring the Caves to find new sites to show their increasing numbers of visitors.

From these early days, Jenolan Caves were set to become a premier cave tourist attraction in Australia. However, by removing natural features or 'decorations', and leaving signatures on walls, the uncontrolled early visitors were seriously damaging the Caves. Limestone was a rare

resource in the colony, and the possibility of quarrying at Jenolan was being considered.

The need for protection of the Caves was recognised as a matter of urgency. In 1866, after years of agitation by regular cave visitors and by a Member of Parliament, John Lucas, the Jenolan Caves area was gazetted as a caves reserve. This official protection predates the establishment of the World's first national park by more than five years.

A second important step in the protection of the caves was the appointment of a full time "keeper of the Caves". The protection of the caves has been always been foremost in any development at Jenolan. Its management has led the way in the novel and green use of materials and energy for tourism; many of these ideas have spread throughout Australia and the World of caves.

Another European 'first' was the use of chicken wire to protect the delicate decorations, and the 'keeper of Caves' wove the first wire by hand. The government of that time had refused to fund the enterprise. The original wire is still shown on adventure tours. In the tourist caves today, a modern stainless steel wire protects the decoration. Another early advance was made when candles and magnesium flares were replaced by the first use of battery powered electric cave lighting in the world. In a later innovation, a Vertical Steam Dynamo supplied the electricity for lighting the caves from 1887 until 1889.

Eventually, this was replaced by a water-driven Leffel wheel located on the Jenolan River. Another exemplar of technological innovation was the first hydroelectric scheme in Australia. Today the Caves are lit by a combination of hydroelectricity and mains supply, and the light sources in the Caves are energy-saving light emitting diodes. Such innovations demonstrate some of the ways by which Jenolan has been at the forefront of tourist cave development.

Transport improvements facilitated greater use of the mountains. The completion of the railway in 1867 meant that the Blue Mountains were within easy reach of Sydney. Rather than a barrier or an obstacle to be crossed, the Blue Mountains could become 'an object of beauty and contemplation to a greater populace' (Thomas 2004, p. 41). The roads or the railway across the Blue Mountains were not built specifically to service the Caves; they were part of a colonial works program to improve land transport west of the Great Dividing Range and initially access to the Caves



Above: The extraordinary world-class formations at Jenolan have attracted visitors since the 1830s despite its inaccessibility. (Photo: Julia James)

Reserve was from Oberon. However, as tourism increased, there was demand for access from the east and in the 1880s, a track leading from Katoomba to the Reserve was created.

The Jenolan Caves Historical and Preservation Society archives contain much illustrative material – sketches, paintings, engravings and photographs and artefacts associated with the development of tourism at Jenolan. These archives, together with oral stories from workers and guides, make Jenolan Caves amongst the best-documented sites of this kind in the nation, if not the world.

The literature of the Jenolan Caves Reserve illustrates how travellers and tourists were accommodated since the 1890s in romantic, purpose-built accommodation. The main accommodation, Caves House, is in a valley, its buildings dwarfed by the surrounding cliffs. The House was designed by the Government Architect Walter Vernon and features distinctive early Federation Arts and Craft architectural style. In the late 19th and early 20th century, the Director of the Sydney Botanic Gardens, Joseph Maiden, supervised remodelling and terracing of the slopes around Caves House to provide a park-like setting.

The bohemian guests who stayed at Caves House, and the adventurous male and female cavers, warrant studies in themselves. Caves House, built in 1896, is on the State Heritage Register for its aesthetic, historical and social significance (The History of Jenolan Caves 2012). The names of the caves, for example, Imperial and Chifley Caves also evoke different eras in Australian history, in these cases a Royal visit in 1927 and a Prime Ministerial visit. Caves named the *Temple of Baal* and *The Orient* reveal the craze for orientalism and archaeological innovation.

The historic landscapes and plantings in the Reserve are now considered of local and State heritage significance. The Jenolan Caves have been awarded the Australian Tourism Gold Medal for Culture and Heritage in 2012, 2013 and 2014 and have been included in the Australian Tourism Hall of Fame.

HOTELS, RESORTS AND MOUNTAIN TOURISM

By the mid-1870s, the death rate from disease in Sydney was rising, particularly during the hot, wet summers. Sydney was prone to epidemics of cholera, typhoid and smallpox and it was believed that the mountain air could be a remedy to such diseases (Walker 1913, p. 51). By the 1880s, the Blue Mountains had become a popular health and recreation area for wealthy Sydney people, particularly in the summer months.

The Queen Victoria Hospital at Wentworth Falls opened in 1903 to treat tuberculosis patients. The most famous health resort was the Hydro-Majestic in Medlow Bath, which opened in 1904. It became an important venue for social life over the decades, including large dances and parties.

Just as their British counterparts in India sought out the cooler climates in the hills of Darjeeling, Sydney's political and business elite established country homes in the mountains or spent their summers in fashionable hotels (Walker 1913, p. 22). The Blue Mountains were, to the 'refined gentlemen' of the 1870s and 1880s, 'a majestic landscape wherein contemplation of nature uplifted the soul' (Burke 1988, p. 99). It was thought that nature, through its beauty and impressiveness, could teach humanity moral values.

As part of their contemplative response to the landscape, the mountain visitors from the educated elite studied the mountains' geological formations and botany (Burke 1988, pp. 102-3). The spectacular landscapes intrigued scientists and inspired artists and photographers whose images in turn helped create the recognisable identity of the mountains.

In 1881 the Royal Hotel Springwood was established and in 1882 the Great Western Hotel in Katoomba. Later renamed "The Carrington" after the Governor, this was a premier tourist resort in its day. Wealthy families also built their own retreats; the Fairfax family built a mountain home at Mount Victoria, and Henry Parkes, the NSW Premier, purchased extensive landholdings across the mountains. Wealthy landowners even constructed their own private platforms along the railway line to reach their retreats. Public railway platforms were established at Wentworth Falls, Katoomba, Blackheath and Mount Victoria.

By the 1890s, the local Blue Mountains community had responded to the growing tourist industry by making the beauty of the mountains more accessible to the general public. They cleared tracks and built lookouts. Isaac Barrow

at the NSW Dept of Lands prepared the first tourist map of the Katoomba area (Fox 2015). With Jenolan Caves the first viewing cave to be lit by electricity, attractions were there for all to see and marvel (Burke 1988, p. 106).

Govetts Leap and Wentworth Falls were akin to 'the Harbour Bridge and Opera House of their Day' and steps and pathways were cut into the steep hillsides to make the vistas more accessible. Katoomba developed as a mountain township catering for tourists, and attractions like the Paragon Café signalled opulence, luxury, privacy and levels of comfort comparable to cafes in Europe. European migrants from Italy and Greece often established and ran these cafes.

In the early twentieth century, tourists included more middle class relative to elite visitors. Young men could buy a cheap fare to the mountains and camp under the stars (Burke 1988, p. 99). By 1917, there were sixty boarding houses in Katoomba and the price of a week's stay in a Blue Mountains boarding house had come more affordable (Burke 1988, p. 109). After the First World War, renting out homes as boarding houses provided a secure income for widows and lone mothers (Horne 1994, p. 118).

In the 1920s and 1930s, middle-class honeymooners and holidaymakers toured the mountains in caravans (Walker 1913, p.23). Amongst such visitors was author Eleanor Dark (1901-1985) who moved to Katoomba in 1922, where she and her husband Eric enjoyed shared interests in literature, history, tennis, bushwalking, mountain climbing and gardening. Dark published in a range of journals, including the *Woman's Mirror*, and her early novels explored the plight of career women. She is best known for her evocative trilogy on the early settlement of Sydney and its impact on the aboriginal occupants. The first volume, *The Timeless Land*, was lauded in Australia and in the United States (Wyndham 2007). The family gifted her home, *Varuna*, to the nation as a national writer's centre; many of the state's leading fiction and non-fiction writers have developed significant works there.

From 1920, May Gibbs wrote and illustrated children's books that drew upon Australia's unique plants, creating the much-loved gumnut babies and the feared Banksia men. Her books included *Little Ragged Blossom* (1920), *Two Little Gum-nuts* (1929) and the cartoon books *Bib and Bub* (1925). Eventually settling in Sydney, she made visits to the Blue Mountains



Above: The Hydro-Majestic Hotel at Medlow Bath opened in 1904 as a health resort and became an important venue for social life over the decades, including large dances and parties.

Hunt, C. H. (Charles Henry), 1920s
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for inspiration for her characters (Walsh 2013). Her work familiarized Australian children with native plants and gave them an intimate connection with the botany of the Blue Mountains region.

Aesthetic appreciation of the Blue Mountains is another big theme of visitor engagement. The ruggedness of the landscape and poor soils had impeded agricultural and pastoral development, yet it preserved a rich natural heritage. Early artists depicted this as a landscape of the sublime (Horne 2005). In early nineteenth century landscapes, Aboriginal people were often included.

One of the best-known popular illustrators and artists of his day, Norman Lindsay, lived and worked in the Blue Mountains. His home, decorated with his drawings and paintings, and its gardens - replete with nubile statuary - have been preserved as a historical site, attracting film crews and numerous tourists. The Blue Mountains were the 'honeymoon capital' of NSW in the 1930s (Walker 1913, p. 117).

Mountains became popular honeymoon spots, and notably at least one natural feature, 'Bridal Veil Falls,' was named with this theme in mind. The Blue Mountains continued as a tourist destination through the twentieth century.

The Scenic Railway was created in 1957 out of shale-mining equipment and was called 'the world's steepest' railway (Thomas 2004, p. 151).

The Greater Blue Mountains have a unique place in tourism history and popular appreciation of the Australian environment. They have long been understood and appreciated as 'a must see' tourist destination, with increasingly easy transport access from Sydney for local residents, interstate visitors and international tourists.

Bushwalking and the Conservation movement

Bushwalking paths are inscribed with historical significance. Their names alone indicate their outstanding national values. Charles Darwin Walk recalls the famous scientist who visited Australia. Others indicate changing aesthetic fashions alluding to romance, fairylands and the Greek and Roman classics; Sublime Point Lookout, Lyrebird Dell, Pool of Siloam, Fern Bower.

Popular contemporary musicals and American imports are suggested by Minnehaha Falls, while political moments are remembered with Federal Pass, National Pass and Dardanelles Pass, and a royal nod given with Prince Henry Cliff Walk. Explorers Tree walk, Cox's Road and Govetts Leap inscribe their significance in exploration history. Bushrangers Cave recalls less reputable, albeit later romanticized characters, while the 1913 Centenary of the Crossing are remembered with Centennial Glen and Berghofers Pass.

If the explorers' crossing 'opened the land,' we need to reflect more on how the rugged terrain of the Blue Mountains continued to 'lock' and protect them from rampant development. Furthermore, as the Blue Mountains became a popular place of recreation, an appreciation of the value of its natural beauty and a desire to conserve it, grew.

Along with other popular meanings, Blue Mountains and its early tourist industry played a critical role in the development of conservation and wilderness values in Australia.

In the 19th Century, there was a notable change in attitude among Europeans towards 'wild' areas, which can be attributed in part to the growing appreciation of the natural beauty of the Blue Mountains for those who travelled there for their health. As cities expanded and industrialised in the twentieth century, people became more concerned to preserve 'wild' places and natural scenery for recreation (NSW National Parks & Wildlife Service 1998, p. 51). During the 1930s Great Depression, as cars were no longer an affordable way to tour the mountains, there was a resurgence of popularity for bushwalking (Walker 1913, p. 60). Mosley called the bushwalking movement the 'the real discovery of the Blue Mountains by Europeans' (Mosley 1989, p. 11).

The health retreat movement had established the first walking tracks in the Blue Mountains in the 1870s and when the railway was completed, the number of walking tracks increased dramatically. These walking tracks spread to link public recreation reserves and parks. The agencies responsible for the creation of the tracks included trustees of the reserves, community associations, hoteliers and local authorities. Jenolan Caves was gazetted as a public recreation reserve in 1866.

A number of other reserves were established along the railway line. The public was increasingly concerned about the extent of development in the mountains and the resulting environmental stress (Walker 1913, p. 23).

In 1880, hundreds of concerned citizens petitioned the government to set aside Katoomba Falls as a reserve for the sake of the health, morale and intellectual advancement of the people of NSW (Australian Heritage Database, 2013). The string of scenic reserves known as the Blue Mountains Sights reserves was consolidated in 1917, passed into the control of the Blue Mountains City Council in 1947 and eventually incorporated into the Blue Mountains National Park in 1987 (NSW National Parks & Wildlife 1998, p. 172).

The Blue Mountains are of outstanding historical value for their association with cultural movements to protect the natural environment from the depredations of modern industrial society. Individuals such as Myles Dunphy, who came to love the natural beauty of the Blue Mountains after his first bushwalks in the area in 1912, were pivotal in the Australian conservation movement (Meredith 2005, p. 42).



Above: The campaign to save the Blue Gum Forest with its magnificent stands of *Eucalyptus deanei* was an important conservation victory in the 1930s.

Dunphy began agitating for the conservation of wild areas in the mid-1920s. In 1932 a campaign to save the Blue Gum Forest in the Grose Valley was won by bushwalkers and conservationists (including Dunphy). This group was also active in promoting a scheme for the creation of a Blue Mountains National Park (Walker 1913, p. 60).

The Greater Blue Mountains National Park itself began with the gazettal of a reserve in the Kanangra-Boyd area in 1937, followed by the establishment of the Blue Mountains National Park in 1959 and Kanangra-Boyd National Park in 1969. Action by conservation groups in the 1960s to the 1990s led to the protection of other parts of the park scheme (NSW National Parks & Wildlife 1998, p. 176).

For example, threats from limestone quarrying at Colong Caves in 1967, pine planting on the Boyd Plateau in 1970 and a proposal to dam the Colo River in the 1970s each drew the attention of the wider public, and made the creation of national parks a political issue. In 1979 a much expanded area to the north, centred on the Colo River, was included in Wollemi National Park. Nattai National Park was established in 1991 and Gardens of Stone National Park in 1994, both after long struggles by conservation groups against competing interests.

By 1998 the area in the six parks related to the 1932 scheme had almost doubled the size of the original proposal (NSW National Parks & Wildlife 1998, p. 177). In 2000 these parks were combined and inscribed as the Greater Blue Mountains World Heritage Area. Currently the Blue Mountains National Park, part of the World Heritage Area, has the highest visitor numbers of any national park in NSW.

The Blue Mountains holds a unique place in Science, Art and Literature, but there is not time to go into the many outstanding activities in these fields in this chapter. However, it is worth noting that the Blue Mountains Institute continues to conduct original research, in collaboration with several NSW universities.

Conclusion

This paper has only scratched the surface of an outstandingly rich heritage of outstanding National Significance to Australia. The Greater Blue Mountains region was the location of prime historical events in Australia's early European history. It reflects its early convict settlement and early nationalist sentiments. Its pivotal economic history is widely acknowledged. Australia's most influential national historians have identified the European history of the Blue Mountains region as the site of the nation's key historical 'turning points'.

The Blue Mountains Crossing of 1813 has become a mainstay of school history textbooks over Australia's first century of federated nationhood. The Greater Blue Mountains region is a unique repository of a rich heritage that spans early convict and pastoral history, economic and technological growth, tourism, wilderness and political movements, science, culture and creativity. The region has therefore played an outstanding role in the conceptualisation of Australia's national history and its national legends, consolidating the status of the Greater Blue Mountains region as a site of national heritage significance.

Box 1: National Heritage List Criteria

- a. The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history
- b. The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.
- c. The place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history.
- d. The place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:
 - a class of Australia's natural or cultural places; or
 - a class of Australia's natural or cultural environments;
- e. The place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.
- f. The place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period.
- g. The place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.
- h. The place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.
- i. The place has outstanding heritage value to the nation because of the place's importance as part of indigenous tradition.

BOX 2: Summary of how Blue Mountains meets National Heritage assessment criteria for historical significance

(The Greater Blue Mountains meets criteria (a), (b),(c),(d),(e),(f),(g), (h), and (i) It was not the intention of this paper to demonstrate relevance to each and every criterion, but in a place of such rich national heritage as the Greater Blue Mountains, there is much to work with.

A theatre for a foundational national history

The Blue Mountains became a crucial site in the understanding of Australian history, the Australian people, and in the development of Australia's key national legends. Australia's best-known poets, novelists, artists and others have popularized its heritage. Indicating its significance in Australian history, a number of Australia's most prominent and highly regarded historians have detailed its historic significance, including Australia's premier Commonwealth historian, W.K. Hancock (1930), followed for example, by Manning Clark (1993), Russell Ward (1958), John Hirst (2000), and Martin Thomas (2004). The evidence supports criteria (a) 'outstanding heritage value to the nation' because of the 'place's importance in the course, or pattern, of Australia's natural or cultural history'.

Fathers of Federation

The Blue Mountains played a key role in the Federation movement and the foundation of the Australian nation. The evidence supports criteria (a) 'outstanding heritage value to the nation'

Exploration and 'opening up' the land and gold

The Greater Blue Mountains region played a pivotal and complex role in the *early convict and free settler expansion of European settlement in Australia*. The Blue Mountains is nationally significant in the early history of exploration, surveying, road-building and of thus *effectively 'opening up the country' for the land rush that eventually followed European colonization*. This supports criteria for (a) 'outstanding heritage value to the nation' because of the 'place's importance in the course, or pattern, of Australia's natural or cultural history'. It also pertains to (b) because of rarity. Many regions of early British colonization have become densely developed and unable to be preserved. This region's relative underdevelopment due to rugged

terrain has the capacity to yield much further information, therefore relating to criteria (c). The role of early European explorers pertains to criteria (f) regarding 'technical achievement' and (h) regarding 'an outstanding heritage value to the nation' because of 'special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.' This includes for example, the explorers, early founding fathers, pastoralists and poets.

Early tourist industry

The Blue Mountains were the site of Australia's first tourist industry. This has special relevance to criteria (d) 'outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of: - a class of Australia's natural or cultural places'. The region also addresses (e) regarding the recognized 'aesthetic characteristics, with its association with a history of the sublime and dramatic landscapes'. The Jenolan caves and the Blue Mountains are outstanding in this regard. The Greater Blue Mountains enhanced the national appreciation of natural places supporting criteria (a).

Bushwalkers and Conservation movement

The Blue Mountains played an important part in the development of both the Australian and international conservation movements. This supports criteria (e) 'The place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.' This supports criteria (a) 'outstanding heritage value' because of importance in the 'course, or pattern, of Australia's natural and cultural history' and (g) 'special association with a particular community' and (h) regarding 'an outstanding heritage value to the nation' because of 'special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.'

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Appendix 1.

HISTORIES OF THE BLUE MOUNTAINS: A SELECT BIBLIOGRAPHY DEMONSTRATING ITS ENDURING HISTORICAL SIGNIFICANCE

Ann McGrath and Laura Rademaker

There are at least thirty histories of the Greater Blue Mountains. These include numerous histories of crossings (both recent and historic publications) as well as local histories of regions such as the Colo Valley or Lithgow.

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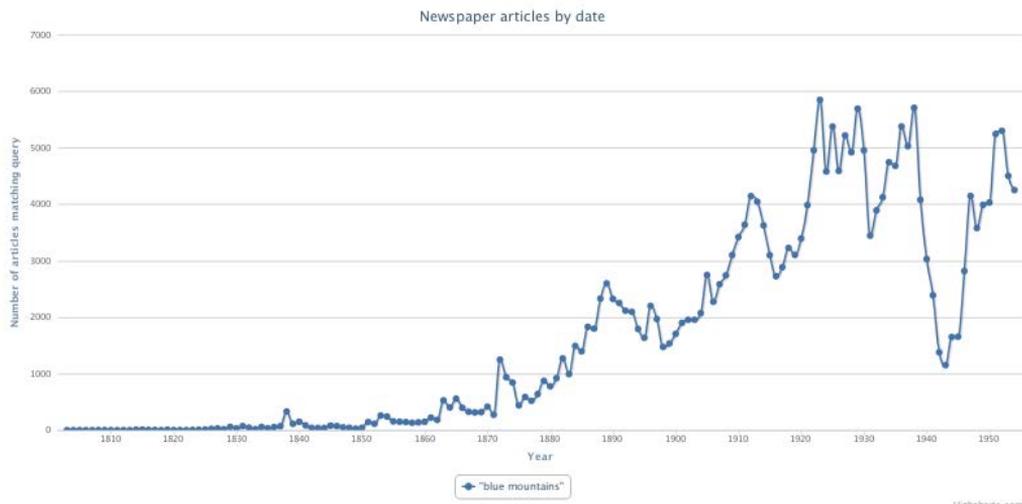
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Below: This Querypic reveals the frequency of the term 'Blue Mountains' appearing in Trove's digitalised Australian newspaper collection (created 7/10/2015 <http://dhistory.org/querypic/>). The graph peaks at 5,848 articles published in 1923 alone and represents a total of 264,875 articles.



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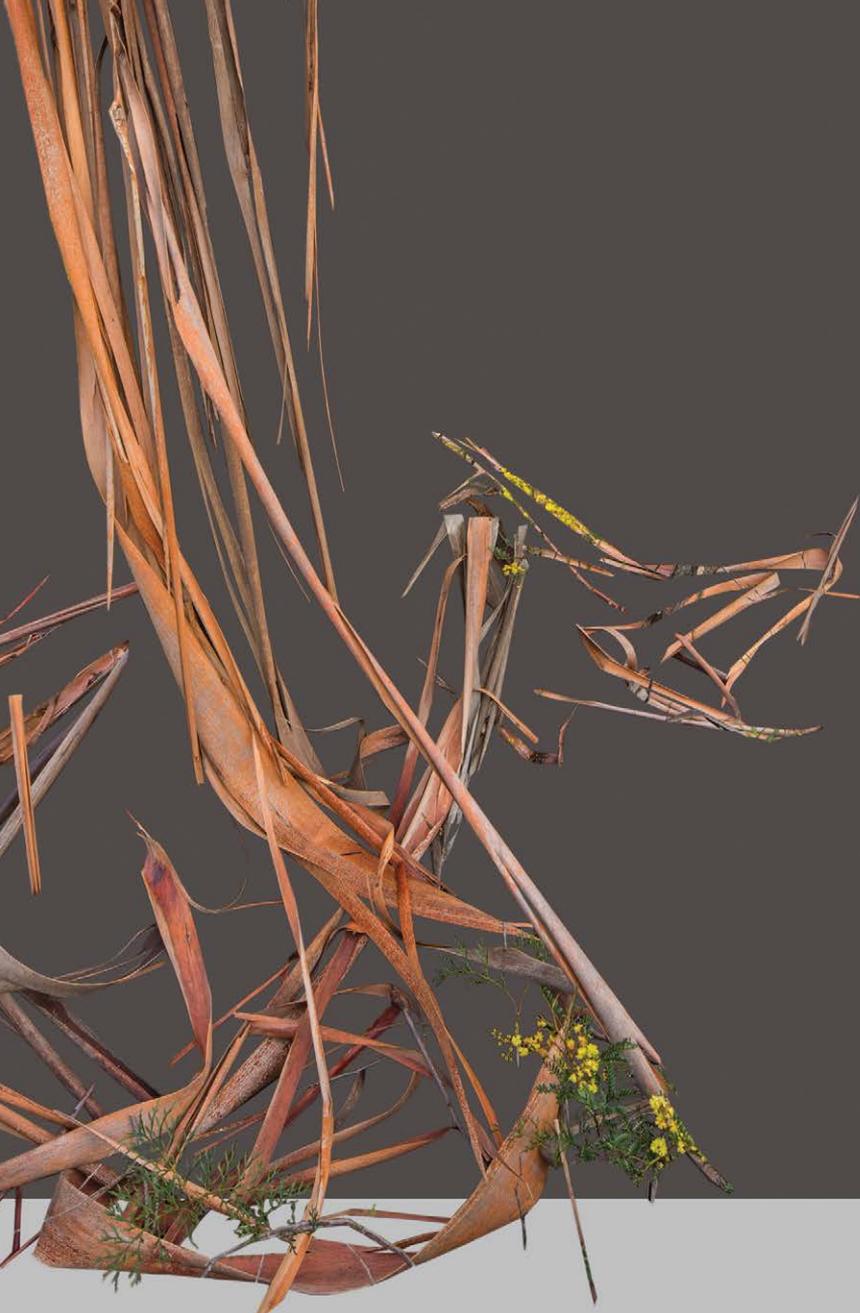
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Greater Blue
Mountains
WORLD
HERITAGE AREA

Chapter 5

Martin Fallding

**Sydney and the bush:
the nature–culture interaction**

INTRODUCTION

The identity of the Greater Blue Mountains is a creation of people. Their responses to adventure, exploration, scenic grandeur, biodiversity, climate and economic survival have created stories and cultural values. Many of the values of the area directly result from the ways in which natural characteristics or attributes interact with people.

Nature and culture interaction refers to the relationship between people and nature (such as biodiversity, or scenery) and the cultural responses and values that result. While these values are directly related to other values documented elsewhere (i.e. geodiversity, aesthetics, history, Aboriginal culture) they represent separate values. This paper relates to contemporary nature and culture interaction and is distinct from Aboriginal culture which is the product of such interaction over tens of thousands of years.

The Greater Blue Mountains World Heritage Area (WHA) is a large, natural area with development directly adjacent, and easy accessibility from the oldest and largest urban area in Australia, Sydney.

It is the place where many people experienced nature in a natural setting for the first time, and where they overlooked gorges and valleys that took their breath away. Cool fresh air and a healthy environment replaced the heat and dust of the city and the plains and urban ordinariness was left far behind for a while. It is also a place where people farmed, mined and lived within a distinctive natural landscape.

In documenting the significance of the Greater Blue Mountains, cultural values arising from the response of people to place are important. This paper describes the Greater Blue Mountains as a place where natural and cultural values interact, and explains these values in an Australian context. It is a statement of values that support National Heritage listing of the area. Nature-culture interactions were not considered when the Greater Blue Mountains was listed for World Heritage in 2000, but like geodiversity (Chapter 1), indigenous heritage (Chapter 3) and national history (Chapter 4) are now recognised as having significance for current and future generations of Australians.

The way in which these values are interrelated is presented in ten themes. Each theme presents stories describing the background and values, and examples of the importance of these values to contemporary Australian culture.

THEMES

- 1 Creating an identity - Sydney's sandstone barrier
- 2 Making a living – Land use and production
- 3 Recreation – A natural getaway
- 4 Conservation – The beginnings of a movement
- 5 Tourism – An international profile
- 6 Cultural expression – Art, music, literature and film
- 7 Wilderness – A place of vision and reflection
- 8 Bush fires – Living with natural extremes
- 9 Water catchments – Supplying Sydney's needs
- 10 Research and science – Curiosity and a place to explore

Below: Eugene Von Guerard's magnificent painting shows the sandstone cliffs that were such a barrier to development.

Eugen von Guérard 1872-73
Govetts Leap, the Blue Mountains
 National Library of Australia
 PIC T404 NK1287 LOC SC16

The information presented in this paper provides only a brief overview of a deep and complex collection of individual and community experiences expressed in literature, art and many other forms.



1. CREATING AN IDENTITY - SYDNEY'S SANDSTONE BARRIER

In many respects, the identity of the Greater Blue Mountains is defined by its relationship with the progressively expanding Sydney metropolitan area. At first seen as the edge of civilisation, the sandstone landscape became a barrier to transport and to development, and is now its green backdrop.

The national parks comprising the Greater Blue Mountains limit the development of urbanisation to the north, west and south west, and this physical barrier provides a natural area arcing around Sydney, yet within relatively close physical proximity to a global city. Nowhere else in Australia, except possibly in Hobart, does a city have such a relationship with its physical setting or is so geographically constrained.

The barrier is only penetrated by a small number of transport routes, each with a distinctly different character defining the identity of the place. These include the Putty Road, Bells Line of Road, the Western Railway, and Great Western Highway. Accessibility from urban Sydney especially by public transport also makes parts of the Greater Blue Mountains WHA very attractive to visitors at both metropolitan and national scale.

These factors combine to create a place which provides a unique setting for urban development as well as an identity as a backdrop, and a place providing context – a unique interaction between people and landscape. This has resulted in a wide range of social and cultural responses.

2. MAKING A LIVING – LAND USE AND PRODUCTION

The evolution of the interaction between natural areas and cultural values within the Greater Blue Mountains has evolved through a number of phases.

For Aboriginal people, the sandstone country was a deep and complex amalgamation of stories, paths of travel, meeting places, a source of food and shelter, and a physical connection between ancestors and present and future generations. For Europeans, it initially provided a place to explore, and to exploit natural resources such as timber or minerals. Suitable areas were soon farmed and grazed as settlement expanded; the rugged landscape also provided many places for those wishing to hide from society.

In this way, the land provided an economic existence to generations of families, although mostly not an easy life as a harsh natural environment often prevailed over European desire and order. Many current landowners surrounding



Above: Remains of the old ruins of the school, village of Newnes, in the Wolgan Valley contrast with the outstanding natural setting. (Photo: Ian Brown)

the national parks of the Greater Blue Mountains WHA have intergenerational links with this land, having used tracks through the area for moving cattle, grazed or cultivated small, fertile inholdings, or having leased hill country and used the land as a boundary or backdrop. The sandstone hills have been a neighbour, a water source, and sometimes a threat as bushfires approached.

3. RECREATION – A NATURAL GETAWAY

Probably the most important interaction between nature and cultural values is as a result of the evolution of recreational use of natural areas. The value of the Blue Mountains and Jenolan Caves for recreation was recognised in the gazettal of the first reserves to protect these areas in the 1860s.

These were managed by volunteer trusts and separated reserves gradually merged over time in response to community pressure. Currently, the Blue Mountains National Park (only one of the 8 reserves that make up the Greater Blue Mountains WHA) has the highest visitor numbers of any national park in NSW with over 4 million visitors annually.

Of particular note is the density and craftsmanship of the many walking tracks giving access to the sandstone escarpment which has developed over a long period of time and is unparalleled in Australia.

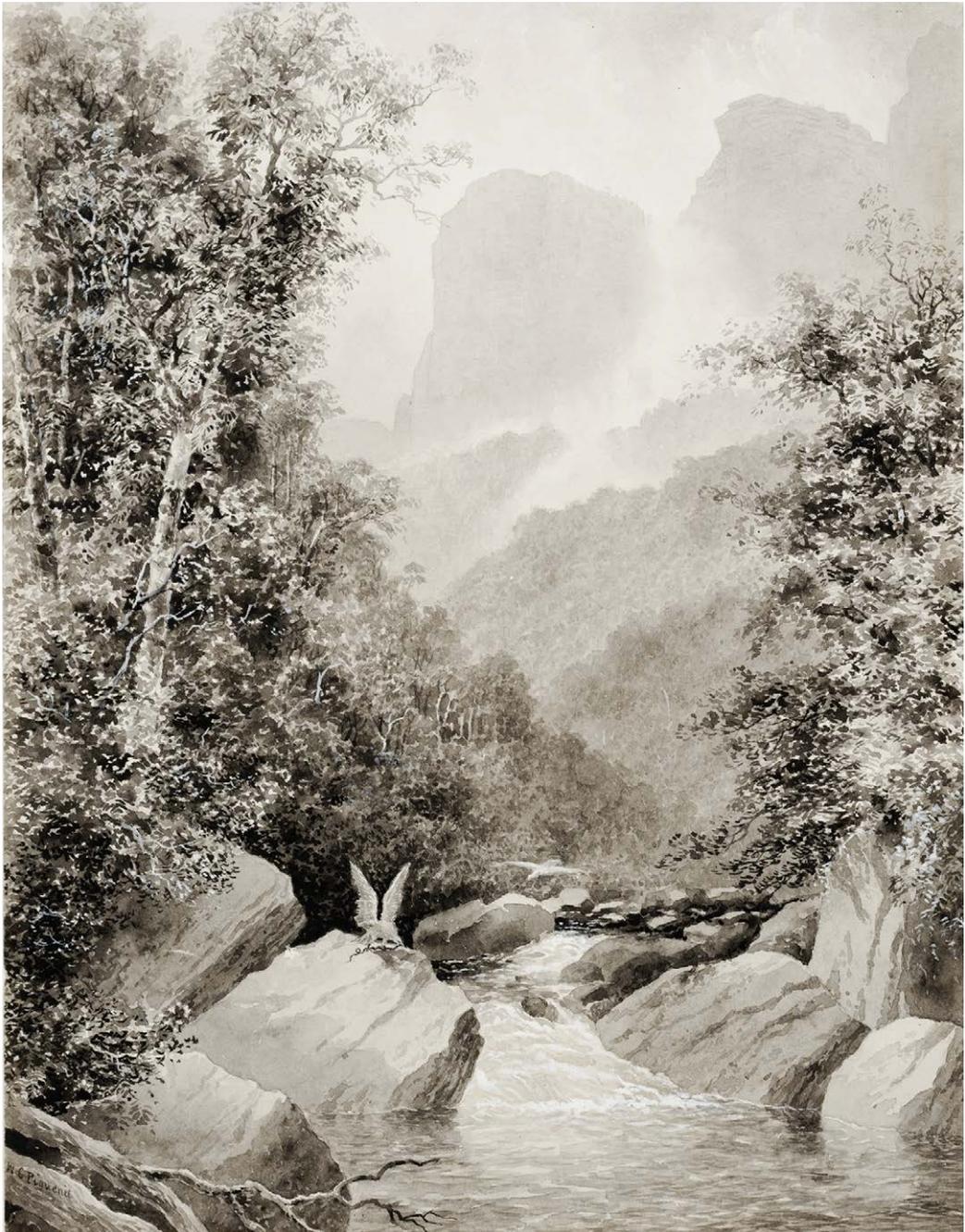
Recreational use has been strongly influenced by the nature of transport. From initial remoteness and lack of any transport, the construction of the railway in the 1860s made the scenery of a narrow band of the area accessible to city dwellers for day-trips and holidays. More recently, particularly since World War II, the ubiquity of private motor cars has given accessibility to remote areas.

Recreational activities in the Greater Blue Mountains evolved over time, with three major stages.

- 1 As a hill station getaway accessible by public transport, mainly rail, providing coolness in summer with grand scenery, waterfalls and cliffs, and tourist attractions such as Jenolan Caves. This was usually associated with the provision of look-outs and walking tracks, and accommodation, either in hotels, guesthouses, or holiday houses.
- 2 The evolution of lightweight camping equipment and self-reliant bushwalking in the twentieth century enabled small groups to undertake walks which might be some days or weeks long. Exploration of remote areas by small groups travelled further and deeper as the area became better known and car transport cheaper and easier.
- 3 More recently, since about 2000, adventure extremes and events have increased in popularity including using cliffs for rock climbing, canyoning, mountain-biking and other organised events.

Within the Greater Blue Mountains WHA the evidence of these stages of recreational use are evident in both the walking tracks through the area, facilities such as Jenolan Caves, and as part of a continuing culture of national park users.

This is evidenced by the large number of walking maps, books and guides produced over time about the area. The number of outdoor recreational clubs (especially bushwalking, canoeing and caving) can be closely related to the area. Within NSW the "Blue Mountains" has always been regarded as the first (and usually, best) place to go bushwalking.



Above: WC Pigenit (Australia, b.1836, d.1914) *In the Grose Valley, Blue Mountains circa 1882*. pencil, grey watercolour, opaque. white highlights, 40.6 x 31.5 cm. Art Gallery of New South Wales Purchased 1895 Photo: AGNSW 9954

4. CONSERVATION – THE BEGINNINGS OF A MOVEMENT

Use of the area for recreation created a bond between people and place and a demand for the protection of its natural values that arguably resulted in the flowering of a conservation movement which reached across the Australian continent. The Greater Blue Mountains WHA has played a key role in inspiring individuals to protect natural areas. Conservation has been a community driven activity, with proposals coming from community groups and committed individuals, not from government.

The Greater Blue Mountains WHA has been protected by a number of generations of dedicated conservationists with the key phases being the proposal of the concept for a large protected wilderness area by Myles Dunphy in the 1930s resulting in the protection of the Kanangra and Colong area, and a later campaign for the Colo/Hunter wilderness area commencing in the 1970s.

It can be argued that the campaign to save Blue Gum Forest in the Grose Valley Wilderness of the Blue Mountains National Park was the cradle of conservation in NSW, and subsequently led to a large number of community campaigns to protect natural areas. This was largely the result of bushwalkers who used natural areas for recreation and enjoyment.

The index to Volumes 1 – 10 of the annual magazine *The Bushwalker* in 1947 shows that of 134 articles, around 25% were directly related to areas within the Greater Blue Mountains WHA. An article in *The Bushwalker* (No 2 1938) by C. D. Roberts entitled *A Fine Record: Bushwalkers' Work for Conservation* notes that "Bushwalkers have, during the few years of their existence as an organised force, achieved an extraordinary record in the realms of conservation.

Their efforts have in that time probably been more successful in obtaining reservations of lands for public purposes than have the joint endeavours of all other bodies. As a result of their foresight, Bluegum Forest, Garrawarra, Bouddi National Park and the Southern Blue Mountains, to mention some outstanding examples, have been set aside for the enjoyment of the people, we hope, for ever."

Further, it was added that "In accepting the task of saving the gifts which nature has bestowed on us, the bushwalker has undertaken a service to the community. We live in an age which is, belatedly becoming conscious of the need to preserve, and, though our ideas are in advance of general thought (as those of any progressive movement must be),

we have in the main the support of a sympathetic public. We need not doubt that our efforts will be appreciated even more in the future than they are to-day.”

Not only concerned with scenery, early conservationists were acutely aware of the importance of protection of nature for its own sake, as discussed in *Our Attitude Towards Nature*, in 1948 in *The Bushwalker* No 11 by Marie Byles.

The political culture of conservation has endured for over half a century, and is the direct result of an urban connection to natural areas. This also has extensively influenced the protection of urban bushland within cities, to other states, especially Tasmania, and overseas. It is an important legacy which can be directly traced to the inspiration of places within the “Blue Mountains” and which were outside the direct economic interest of the tourist sector.

Aboriginal culture teaches that the landscape or Country holds stories. One story of culture held in the Blue Mountains is the Bulgamatta story, telling of “early white Australian bushwalkers who in developing a love for country and connection to the natural world embarked on an inspired project to raise monies to buy some land to be set aside for cultural pursuits; a beautiful blue gum forest which had been earmarked to be cleared. This was during the scarce years of the Great Depression in the 1930’s and yet people gave anyway. It is a story of faith and sacrifice that paid off. The land was purchased, the forest was saved.” (Chris Tobin, pers comm.).

Importantly, in relation to conservation the Greater Blue Mountains WHA has substantially contributed towards changing the way Australian’s think about nature, especially influencing the national understanding of nature as valuable.

5. TOURISM – AN INTERNATIONAL PROFILE

The Blue Mountains is one of a handful of iconic Australian tourist destinations, both within the country, alongside Uluru and Kakadu, and especially internationally. This is demonstrated in visitor numbers, the range of tourism products available, and the images used to market tourism. Its inclusion as one of Australia’s National Landscapes by Tourism Australia recognises this international profile.



Above: Katoomba Railway Station with the Carrington Hotel about 1890 at the beginning of the tourist era that continues today. (Blue Mountains City Library image)

While most of the tourism economy infrastructure is not within the Greater Blue Mountains WHA itself, it nevertheless relies on the image of a scenic landscape and a natural setting. The cluster of tourism activities within and associated with the national parks provides the distinction with other tourist locations.

Importantly, tourism in the Blue Mountains shows a long heritage and evolution quite unlike other major natural destinations in Australia that have only been easily accessible over the last 20 to 30 years because of their relative isolation from markets.

The economic importance of tourism in the area is significant in a national context, and a prominent destination for international visitors. For example, a 2010 study by the University of Western Sydney found that the value of tourism to the Blue Mountains, Lithgow and Oberon was \$489 million per annum and employed over 5,000 people in the region (Groth 2011).

6. CULTURAL EXPRESSION – ART, MUSIC, LITERATURE AND FILM

Nature and scenic landscapes have provided the setting for a great deal of creative expression. It has always been a place of inspiration with its relative accessibility making the “Blue Mountains” a strong point of reference for artists and writers.

For example, environmental and landscape themes are strong in Australian music and there are at least 15 Australian works catalogued by the Australian Music Centre as having “Blue Mountains” or localities in the area within their title (<http://www.australianmusiccentre.com.au>). An example of music inspired by landscape and history is the “The Blue Mountains” song using a poem by Alfred Noyes set to music by Edward Elgar to praise the mountains and first performed at the British Empire Exhibition in London in 1924.

Many paintings and photographs feature Greater Blue Mountains landscapes, and a sample of prominent examples (Table 1) shows that artists have consistently been attracted to the area over a long period of time.

Right: Arthur Streeton (Australia; England; Australia, b.1867, d.1943). *Fire's on 1891* oil on canvas, 183.8 x 122.5 cm
Art Gallery of New South Wales
Purchased 1893 Photo: AGNSW 832

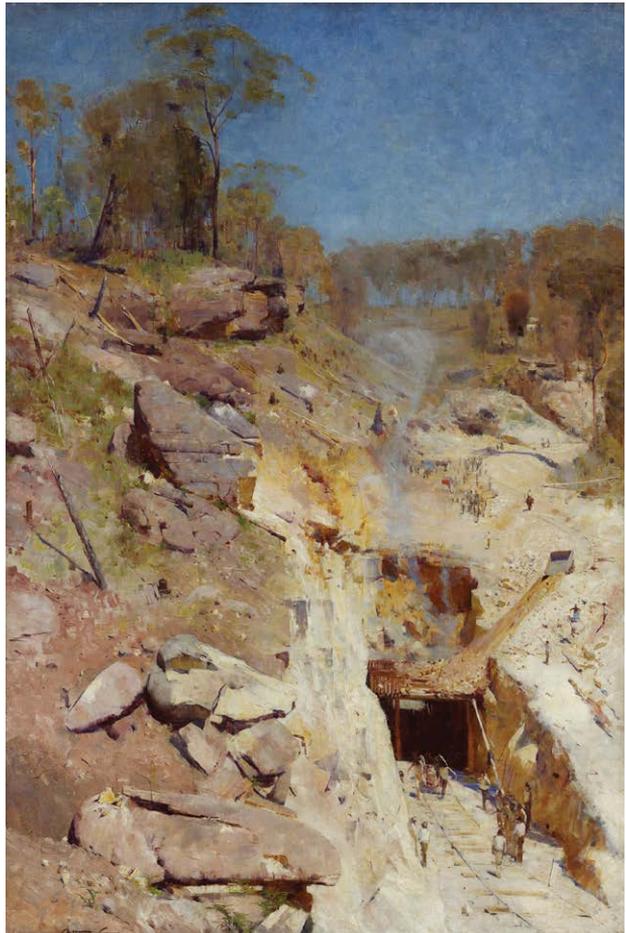


Table 1: Some of the significant art work that has been inspired by the Blue Mountains

Artist (year)	Title	Reference
John Lewin, (1815)	Coxs River, Blue Mountains watercolours	http://www.hyperhistory.org/index.php?option=display-page&Itemid=571&op=page&printpage=Y
John Lewin (1815 – 1816)	Blue Mountains	http://acms.sl.nsw.gov.au/album/album-View.aspx?acmsID=421660&itemID=823892
Augustus Earle (1826)	View from the summit of Mount York, looking towards Bathurst Plains, convicts breaking stones, NSW	http://nla.gov.au/nla.pic-an2818287
Conrad Martens (1835)	'Govetts Leap'	http://www.sl.nsw.gov.au/events/exhibitions/2009/darwin/images/4.html
Thomas Gilks, Thomas, (1851)	Off for the diggings at Bathurst; Ascending a pass in the Blue Mountains	http://nla.gov.au/nla.pic-an735557-1
Eugene von Guerard (1862)	Weatherboard Creek Falls, Jamieson's Valley, New South Wales, 1862	http://www.ngv.vic.gov.au/learn/schools-resources/eugene-von-guerard/weatherboard-creek-falls
Illustrated London news, May 2, 1868.	His Royal Highness the Duke of Edinburgh at the Weatherboard Waterfalls in the Blue Mountains, New South Wales	http://nla.gov.au/nla.pic-an10262398
Eugene von Guerard (1873)	'Head of the Grose Valley'	http://nga.gov.au/Exhibition/oceantoOutback/Detail.cfm?IRN=22939
W.C Piguénit (about 1882)	'In the Grose Valley, Blue Mountains'	http://www.artgallery.nsw.gov.au/collection/works/9954/
W.C Piguénit (1889)	'The Upper Nepean'	http://www.artgallery.nsw.gov.au/collection/works/5934/
Arthur Streeton (1891)	Fire's on (Lapstone Tunnel) & Blue Mountain Tunnel	http://nga.gov.au/exhibition/turnertomonet/Detail.cfm?IRN=165173 http://www.artgallery.nsw.gov.au/collection/works/6416/
Arthur Streeton (1920's)	The Blue Mountains	http://www.carrickhill.sa.gov.au/australian_streeton.html
Kerry and Co, Sydney, Australia, (c. 1884-1917)	'On the Narrow Neck, Katoomba'	http://www.powerhousemuseum.com/collection/database/?irn=28879
E.B Boulton (1890)	'Mount Victoria, New South Wales'	
Penleigh Boyd (1914)	'The Three Sisters'	
Howard Ashton (1926)	'Mountain Steeps'	
Howard Ashton (1931)	'Jamieson Valley'	
Wallace Green (1940)	Mist from Vaniman's Lookout	http://www.flickr.com/photos/blue_mountains_library_-_local_studies/2715814890/
Colin Lanceley (1983)	'Where three dreams cross between blue rocks'	

The area continues to be home to many artists and galleries including the recently established Cultural Centre at Katoomba, and World Heritage exhibition space at the Blue Mountains Botanic Gardens at Mt Tomah. Galleries show the work of local artists and the connection with the World Heritage values of the area is recognised in contemporary art; an example being the recognition of the natural beauty of the area and artists living and working in the area (World Heritage Art 2015).

Many works of fiction have either been written in, inspired by, or use the natural setting provided by the Greater Blue Mountains. May Gibb's Snugglepot and Cuddlepie series inspired by the flora and fauna of the region and has been appreciated by generations of Australian children. Novels include Eleanor Dark's the Timeless Land and Kate Grenville's The Secret River (see Table 2).

Table 2: Some works of fiction with a Blue Mountains connection

Paterson, A. B. <i>Song of the Future</i> . Angus & Robertson, 1902.
Gibbs, May. <i>Little Ragged Blossom, & More About Snugglepot and Cuddlepie</i> . Sydney: Angus & Robertson, 1920.
Gibbs, May. <i>Bib and Bub : Their Adventures</i> . Sydney: Cornstalk Pub, 1925.
Gibbs, May. <i>Two Little Gum-nuts</i> . Sydney: Cornstalk, 1929.
Dark, Eleanor, <i>The Timeless Land</i> Angus & Robertson, 1941.
Cusack, Dymphna, and Florence James. <i>Four Winds and a Family</i> . Angus & Robertson, 1966.
Brinsmead-Hungerford, Hesba. <i>Longtime Dreaming</i> . Angus & Robertson, 1988..
Llewellyn, Kate. <i>The Waterlily</i> . Australian Large Print, 1988.
Pierce, Todd James. <i>The Australia Stories: A Novel</i> . MacAdam/Cage Pub., 2003.
Grenville, Kate. <i>The Secret River</i> . ReadHowYouWant.com, 2011.

The area has also been a popular filming location or setting for films (see Table 3); the Greater Blue Mountains was the location of the event that inspired the 1985 film *Robbery under Arms*.

Table 3: Some of the films that have used locations in the Blue Mountains

Year	Title	Reference
1926	The Sealed Room	(Arthur Shirley, 1926)
1926	Sunrise	(F Stuart-White, Raymond Longford, 1926)
1934	When the Kellys Rode	(Harry Southwell, 1934)
1947	Bush Christmas	(Ralph Smart, 1947)
1949	Sons of Matthew	(Charles Chauvel, 1949)
1955	Jedda	(Charles Chauvel, (1955)
1960	The Sundowners	(Fred Zimmerman, 1960)
1963	The Land that Waited	ABC
1977	Dot and the Kangaroo	Yoram Gross -director
1980	The Earthling	(Peter Collinson, 1980)
1982	A Dangerous Summer	(Quentin Masters, 1982)
1983	The Return of Captain Invincible	(Phillipe Mora, 1983)
1984	Peach's Explorer's – The Prison Walls	ABC
1985	The Coca-Cola Kid	(Dusan Makavajev, 1985)
1985	Mad Max – Beyond Thunderdome	(George Miller and George Ogilvie, 1985)
1998	In the Winter Dark	James Bogle- director
2004	Sirens	(John Duigan,2004)

7. WILDERNESS – A PLACE OF VISION AND REFLECTION

An expanding vision of the value of nature and its relationship to people has co-evolved with the growth of the conservation movement. This represents wilderness as a place of value in its own right, not simply for recreation and human use.

The Greater Blue Mountains previously regarded only as useless unproductive country, has increasingly been valued for its wilderness, and as a place helped contribute inspiration to community organisations that were instrumental in the enactment of legislation to protect wilderness in NSW. Over 65% of the Greater Blue Mountains is declared wilderness. Parts of the Greater Blue Mountains feature in books on wilderness in Australia that have contributed to the recognition of wilderness values as special and worth protecting, and led to the concept being adopted more widely throughout the nation.

8. BUSH FIRES – LIVING WITH NATURAL EXTREMES

The Blue Mountains is one of the major fire areas in the world (along with Eastern Victoria and California). The fire prone nature of the landscape and vulnerability of adjoining development to wildfire has had significant impacts on the culture and social responses of the communities surrounding the national parks.

Volunteer bushfire brigades were established early on to protect life and property, and reflect the Australian cultural characteristic of self-help in response to threats. This was a response to an external threat, quite unlike traditional urban fire brigades (which are concerned primarily with fire in buildings).

It is very significant that after the 1957 Blue Mountains fires, it was recognised that an organised response to periodic fires was needed and directly led to the creation of the NSW Rural Fire Service. This legacy has subsequently adapted over time and led to the introduction of world leading emergency responses by both the Rural Fire Service and National Park managers.

Periodic major bush fire events in the Greater Blue Mountains influence surrounding development and have contributed to the evolution of bush fire hazard reduction and control practice throughout Australia. The evolution of bushfire management practice has strongly influenced environmental management nationally, how natural areas are viewed, and the science of ecology; bushfire ecology is

now a distinct discipline. Bushfire management practice developed in the Greater Blue Mountains has influenced the way the wider community values natural areas, and responds to the economic and social impacts of bushfires.

9. WATER CATCHMENTS – SUPPLYING SYDNEY’S NEEDS

A significant proportion of the Sydney metropolitan area’s water supply comes from protected water catchments within the national parks of the Greater Blue Mountains, principally Warragamba, but also smaller catchments at Blackheath and Katoomba. Reserves managed by the National Parks and Wildlife Service represent about 80% of the special areas protected by the Sydney Catchment Authority for water supply purposes. The protected catchments recognise the concept of a social need for safe water supplies, to maintain ecosystem services, and provide for Sydney’s well being, health and functioning; this coincides with the protection of natural areas for their other values.

10. RESEARCH AND SCIENCE – CURIOSITY AND A PLACE TO EXPLORE

Since it was first explored, the natural areas of the Greater Blue Mountains have aroused scientific curiosity and have provided a laboratory for research. The natural characteristics and diversity of the area, combined with accessibility to the largest urban area in Australia have supported to make it of high value for research and science. This is especially the case for geology and biology as demonstrated by a range of over 55 university theses identified by Ian Baird (pers. comm.) which have a direct connection to the area. For example the Blue Mountains World Heritage Institute fosters scientific endeavour to inform management and decision making on issues including bushfire ecology, conservation biology and rare and threatened species recovery planning.

FUTURE EVOLUTION OF CULTURAL VALUES

The Greater Blue Mountains has touched and influenced many people. How its influence will change and develop into the future is interesting to ponder. Recent trends include competitive outdoor recreation, nature-based tourism, and short stays in luxury hotels for time-poor city people. Changing fashions, the rise of ecotourism, and urban development all suggest that the value of natural areas will not diminish, and probably increase further over time.

Below: Extensive areas of wild country on the Gangerang Range, Kanangra. (Photo: Ian Brown)



NATIONAL SIGNIFICANCE OF NATURE-CULTURE INTERACTIONS

To qualify for national heritage listing, a place must have 'outstanding' heritage value to the nation. Whether a place has 'outstanding' heritage values can only be considered by comparing the nominated place to other, similar types of places. This enables determination if one place is more or less significant compared to other similar places, or if it is unique.

The National Heritage list criteria that appear relevant to the nature and culture interactions of the Greater Blue Mountains WHA are a, g, and h.

- (a) It has value because the place is important "in the course, or pattern of Australia's natural or cultural history"
- (g) It has value because of "the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons".
- (h) It has value because of the special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history".

The combination of values expressed above is unique in an Australian context. In particular, the following values stand out:

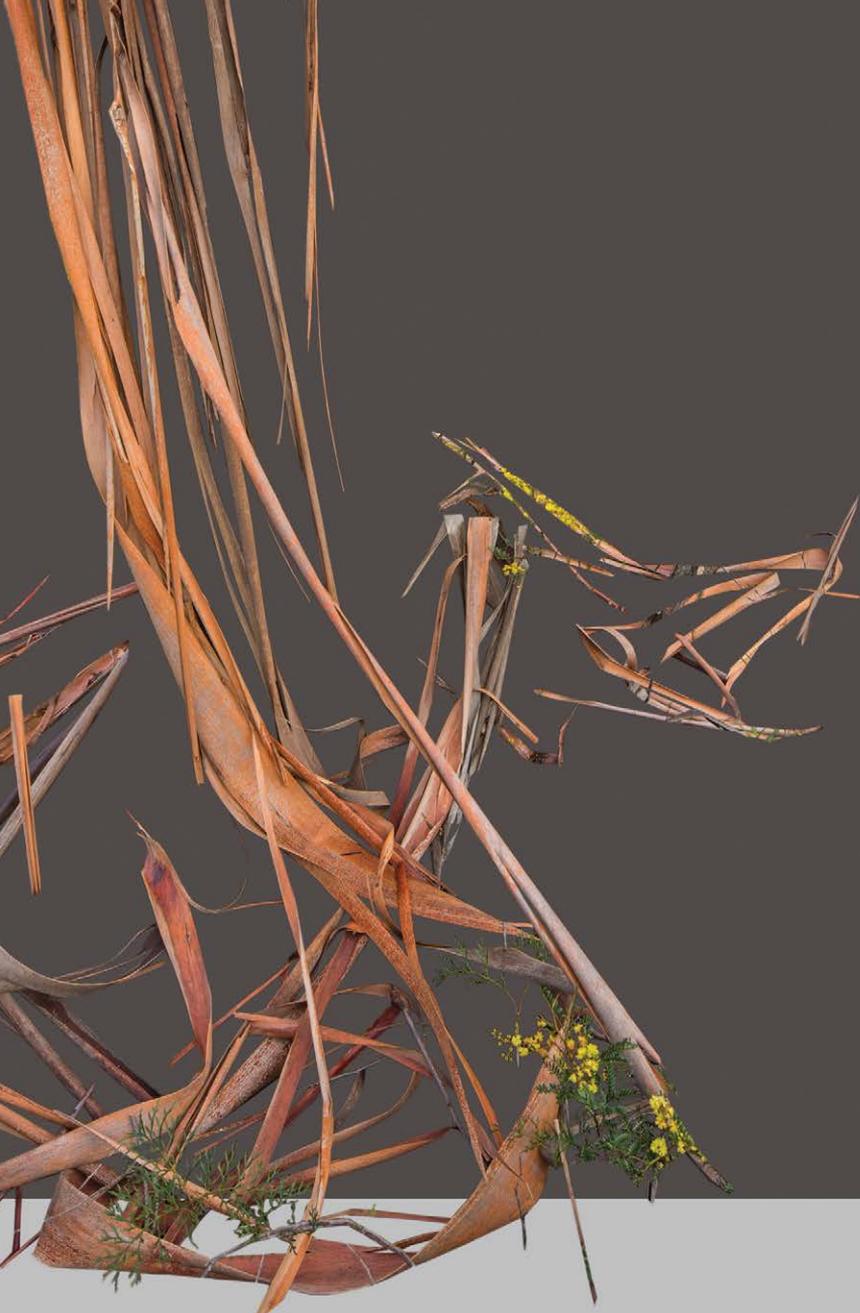
1. An extremely large and diverse natural area very close to a major city. Most Australian cities have some natural areas within 1 – 3 hours drive of the city centre, but not on the scale of the Greater Blue Mountains WHA. Comparisons can be made with Hobart and Mt Wellington, and Newcastle and the Barrington Tops. This has been a centre of outdoor recreation for generations.
2. An accessible mountain getaway from the city, with a relatively cool climate. Similar Australian situations exist with Melbourne and the Dandenongs, and Adelaide and the Adelaide Hills, but these are not on the same scale as the Greater Blue Mountains.
3. A long history demonstrating the evolution of popular tourism in natural areas. Again, there are some parallels with the Dandenongs in Victoria, but not on the same scale as the Greater Blue Mountains. The fact that Blue Mountains National Park is the most visited national park in NSW (with over 4 million visitors per year) highlights its cultural values to a wide audience.
4. The various community campaigns to protect natural areas of the Greater Blue Mountains over at least 80 years give the area a reasonable claim to be the cradle and focus of the conservation movement in NSW, the vision of which has had flow on impacts in other Australian states, and is of national heritage value. These are expressed in both the current boundaries of the area, its management, and visitor attraction. The only other well-known symbol of conservation nationally would be the Franklin River in South West Tasmania, the site of campaigns in the 1970s-80s, a relatively recent event compared to the lengthy and continuing campaigns that have resulted in the national parks of the Greater Blue Mountains.
5. The influence of the values outlined above on the Australian creative arts and music, where the place has an iconic status, probably rivalling Uluru, Kakadu and the Great Barrier Reef. However, none of the others also provide a residential setting in a similar way to the Greater Blue Mountains with its proximity to metropolitan Sydney.

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Above: Wolgan Valley. (Photo: Ian Brown)



Greater Blue
Mountains
WORLD
HERITAGE AREA

Chapter 6

Haydn Washington

**Time to value the scenic grandeur of
the Greater Blue Mountains**

INTRODUCTION

The scenic grandeur of natural places has been acknowledged throughout history. The nineteenth century European Romantic movement led by the poets William Wordsworth and Samuel Coleridge loved the 'sublime' in the landscape. British artist JMW Turner explored the natural landscape and pioneered outdoor painting, which later led to the 'en plein air' movement in Australia of Tom Roberts, Arthur Streeton and others. Romanticism celebrated the sublime mystery of wilderness; the living chaos in wild landscapes came to be cherished.

There was an 'enthusiasm for the strange, remote, solitary, and mysterious'. For example John Muir said: *When I entered this sublime wilderness the day was nearly done, the trees with rosy, glowing countenances seemed to be hushed and thoughtful ... and one naturally walked softly and awe-stricken among them. I wandered on, meeting nobler trees where all are noble, subdued in the general calm, as if in some vast hall pervaded by the deepest sanctities and solemnities that sway human souls.* (Oelschlaeger, 1991)

The very name of the 'Blue' Mountains derives from their visual character. The significant visual 'blue haze' is due to the fine droplets of volatile *Eucalyptus* oil dispersed into the atmosphere by the eucalypts which also have light-scattering properties which cause the blue light rays to be scattered more effectively (Mosley, 1989). Known as 'Rayleigh Scattering' the effect is why the sky is blue and is common to most mountains seen in the distance, but the volatile eucalypt oil on a warm day seems to accentuate the colour. Hence the term 'Blue Mountains' used by the early Europeans who saw them distantly from Sydney across the Cumberland Plain.

The sheer scenic grandeur of the Greater Blue Mountains has been recognised since humans first arrived in the region. It was recognised by the first Australians; 'country' was seen as special and sacred to its Aboriginal custodians and encompassed many song-lines and sacred sites. For example sites at Lawson and on Kings Tableland may have been significant because of views to the coast.

With regard to the hundreds of Aboriginal sites in rugged locations throughout the Wollemi, Taçon et al (2005) state that 'Contemporary Aboriginal opinion is that many of the rock-art sites were teaching places and that the Wollemi was long recognised as a very special place'.

Explorer Singleton had a singular encounter with large group of people near Mt Monundilla presumably on ceremonial business. (Macqueen, 2004). Important creation stories such as the Gurangatch and Mirragan story relate to the landscape of the southern Blue Mountains.

Scenic grandeur is now the bedrock of the tourism industry. Lookouts near Katoomba, such as the cliff formation known as the Three Sisters are a major attraction, attracting over half a million people per year from all over the world (NPWS, 2009). Visitation for major lookout sites in Blue Mountains National Park in 2012-2013 was: The Three Sisters 350,000; Wentworth Falls 400,000; Govetts Leap 300,000; Heritage Centre Blackheath 35,000 (NPWS HC, 2013).

Because of the tremendous scenic and tourist value of the Greater Blue Mountains, it has been recognised by the Commonwealth as a 'National Landscape' (http://www.tourism.australia.com/documents/corporate/NL_Greater_Blue_Mountains.pdf). Australia's National Landscapes are 'places that capture the essence of our country - our most inspirational environments offering world class natural and cultural experiences' (<http://www.environment.gov.au/parks/national-landscapes/>). Scenic grandeur should clearly be a major component of the Heritage Listing of the Greater Blue Mountains, but to date is not formally acknowledged in National or World Heritage listing.

This paper discusses the significance of the scenic grandeur of the Greater Blue Mountains, for both the existing Greater Blue Mountains World Heritage Area, and adjacent areas that have similar and complementary values (see also Washington & Wray Chapter 1 *Geodiversity* and Benson & Smith Chapter 2 *Protecting biodiversity*). This is part of the discussion of the way that we now see the current national and world heritage values of the Greater Blue Mountains; they are not just restricted to the currently recognised biodiversity values, but now include geodiversity, cultural heritage and scenic grandeur.

AN INSPIRATIONAL LANDSCAPE

*By channels of coolness the echoes are calling,
And down the dim gorges I hear the creek falling:
It lives in the mountain where moss and the sedges
Touch with their beauty the banks and the ledges.
Through breaks of the cedar and sycamore bowers
Struggles the light that is love to the flowers;
And, softer than slumber, and sweeter than singing,
The notes of the bell-birds are running and ringing.*

Henry Kendall 'Bellbirds' (1889)

*Above the ashes straight and tall,
Through ferns with moisture dripping,
I climb beneath the sandstone wall,
My feet on mosses slipping.
Like ramparts round the valley's edge
The tinted cliffs are standing.
With many a broken wall and ledge,
And many a rocky landing.*

Henry Lawson 'The Blue Mountains' (1900)

*Have you seen your own Blue Mountains
That put galleries to shame,
Galleries of art and sculpture
That are proudest in their fame?
For the art of fern and flower,
And the sculpting of the stone,
Is an art no skill can master
But the Mountains' skill alone.*

Denis Kevans 'The Leura Golf Club Blurbs' (1985)

The scenic grandeur of the Greater Blue Mountains has inspired many artists, photographers, authors, film-makers and poets including Kendall and Lawson.

Inspirational landscapes are places that inspire emotional, spiritual and/or intellectual responses because of their meanings, associations, stories, aesthetics and history (Context, 2003, Crocker and Davies, 2005a). The Greater Blue Mountains are such a place.

EARLY RECOGNITION

In 1875 Eccleston Du Faur, of the Sydney Academy of Art, organised camps for artists and photographers, firstly at Govetts Leap and secondly in the Grose Valley, the latter a more adventurous undertaking, lasting a month. Among the party was photographer Joseph Bischoff, and artists William Piquenit, James Carse and Henry Lloyd. Du Faur had hoped that Bischoff's work would advertise the Blue Mountains at the 1876 Philadelphia Exposition.

He was only partly successful in that endeavour, but the Grose Valley expedition had a more enduring outcome. Later in 1875, the Crown land in the Grose Valley and its catchment was reserved from sale - the first extensive Crown Reservation in the Blue Mountains and ultimately the core of the Blue Mountains National Park.

The parliamentary records concerning the reservation include the remark by Lands Department Surveyor John Deering (an associate of Du Faur's) that 'The Grose Valley is a national spectacle'. This is a remarkable statement, given that in 1875 there was no national park in the Australian colonies, nor was Australia a nation. (Macqueen, 1997)

The Strategic Plan for the Greater Blue Mountains WHA (NPWS, 2009) notes:

The wild and rugged landscapes, diverse flora and fauna, and opportunities for solitude and quiet reflection are attributes that promote inspiration, serenity and rejuvenation of the human mind and spirit. Such feelings are valued by individuals and society, and lead to contributions in the fields of philosophy, painting, literature, music and photography. The Greater Blue Mountains WHA has inspired such contributions and these have promoted a sense of place for all Australians who then want such places protected. Existence values derive from the community's pleasure from simply knowing that places such as the Greater Blue Mountains WHA exist and are protected, even though they may never visit them.

The Greater Blue Mountains has been a source of 'wonder' that has inspired many, the author included (e.g. Washington, 2002). But the visual splendour goes beyond massive cliffs. There are the perched bright green hanging swamps, and deep narrow slot canyons with waterfalls. Here are the deep Jamison and Megalong Valleys, and the mighty sandstone gorges of the Grose, Wollangambe and Colo Rivers, with rock piles, rapids and deep serene pools.

TESSELLATED PAVEMENTS AND 'LOST CITIES'

Here are the serene closed drainages such as the Thirlmere Lakes and the Mellong Swamps. Here are the tessellated sandstone pavements of Mount Irvine and Kings Tableland, looking like close-fit Inca stonework. Here are the high basalt caps of the northern Blue Mountains with their broken scree slopes, and columnar basalts.

The hundreds of slot canyons are 'hidden cathedrals', where shafts of light lance down to the deep green depths and form ripple reflections from pools; where chock-stones form dark tunnels and glow-worms shine; where roots hang from the chock-stones above as living decorations. The water is crystal clear and cold even in summer, full of crayfish and native trout. Smooth scalloped curves turn the walls into an artwork, produced by the constant action of former boulder mills as the canyon was cut. So narrow can they be that sometimes one has to squeeze through narrow splits less than half a metre wide (Wray, Washington and Armstrong, 2013).

The 'pagoda' rock formations are like ancient step pyramids or lost cities. Their red and purple ironstone-banded forms rise above flowering heathland in spring, giving them their name, the 'Gardens of Stone'. The ironstone sculptures form shapes reminiscent of winged birds, pipes, tables and pulpits, and also massive nestled whorls or massive ironstone reefs. Algae can turn damp faces on the side of pagodas a deep rich red, while lichen on their tops can turn them almost white as a snowfall. Large sandstone overhangs are often found below them, some over 50 m long. These can contain red, white and black Aboriginal stencils and paintings.

To the south one enters a different and older geology. Here is Kanangra Walls, with Permian sandstone cliffs hundreds of metres in height towering above the great unconformity to the older rocks underneath. All this perched high above deep kilometre-long pools of the Kowmung River ringed by water gums and river oaks, where long dipping ridges drop to the river. Granite (in the river valleys and on the Kanangra Boyd Plateau) forms rounded domes and boulders. Limestone areas form karst and cave landscapes, typified by the Jenolan Caves with its world famous flowstones, stalactites, calcite crystals and caverns which make these a visual paradise (Wray, Washington and Armstrong, 2013).

EUROPEAN IMPRESSIONS

The Greater Blue Mountains has been acknowledged for its scenic grandeur since Europeans first arrived. From high places on the 'north shore' of Sydney, a long line of hills could be seen occupying the full length of the horizon to the west, a mere 50 km from Sydney Cove (Mosley, 1989). In 1804 the botanist and plant collector for Sir Joseph Banks, George Caley, came close to a successful crossing of the mountains when he reached Mt Banks on the north side of the Grose River. He called the Grose Valley the 'Devil's Wilderness'. Caley wrote to Banks; 'I cannot give you a more expressive idea than travelling over the tops of the houses in a town'.

In 1813 the first Blue Mountains crossing was made by Blaxland, Lawson and Wentworth, who followed a narrow ridge that proved to be the divide between the Grose and Cox Rivers, and which the geographer Griffith Taylor described as a 'winding military parapet' (Mosley, 1989) (see the development of The Crossing mythology in McGrath, chapter 4). Cox's Road followed this route, and travellers could now look down on the amazing gorges, bask in the area's beauty, and ponder the scientific questions its appearance raised.

The origin of the deep valleys of the Blue Mountains became a matter of international dispute. Anyone who has seen the valleys can hardly avoid speculating about their origin. Gregory Blaxland, describing the terrain to the western side of the Cow Pastures (near Camden): *All of which country appears to have been formerly an earthquake or some dreadful Convulsion of Nature at a much later period than the mountains;* the Polish explorer Paul Strzelecki, wrote of the 'endless labyrinth of almost subterranean gullies of Mt Hay and the River Grose', and as 'stupendous rents in the bosom of the earth' (Mosley, 1989).

In 1836, naturalist Charles Darwin, on a journey to Bathurst, during his round the world voyage on the *Beagle*, described his first sight of one of these views near the Weatherboard (now Wentworth) Falls):

By following down a little valley and its tiny rill of water, an immense gulf is unexpectedly seen through the trees which border the pathway at the depth of perhaps 1500 feet.



Above: Eugen von Guérard's Weatherboard Falls, NSW, 1867 (now Wentworth Falls) sought to capture the size and extent of the landscape. (National Library of Australia) <http://nla.gov.au/anbd.bib-an7744602>

Further along the sandstone platform he stayed at Blackheath and described Govetts Leap as 'being of even perhaps more stupendous character than that near the Weatherboard'. Darwin's visit came at a time when travellers in Europe and North America were finding beauty in wild mountain peaks whereas in the previous century they had been considered ugly, and even menacing.

Mountain climbing and the view from the summit became popular later in the century but here in the Blue Mountains was a new experience of natural beauty. Darwin's comments captured the feeling of all who have suddenly been confronted with the abyss at their feet:

It is not easy to conceive ... a more magnificent spectacle than that presented to a person walking on the summit plain, when, without any notice, he arrives at the brink of one of these cliffs which are so perpendicular that he can strike with a stone (as I have tried) the trees growing at a depth of between one thousand and one thousand five hundred feet below him. (Mosley, 1989)

Not all travellers were as objective as Darwin. The interest in the picturesque, which had dominated eighteenth century landscape observation, was being replaced by nineteenth century romanticism.

Describing Hassans Walls, a sandstone feature near Lithgow, Louisa Ann Meredith, compared the rock forms as though they were man-made features:

Had I been travelling in an old country, I should at once have decided that they were truly the ruins of some misty mountain-fortress of former days; loop-holes, arches, battlements, and buttresses were, it seemed, so clearly remaining, and extending far along the airy heights of these genii-haunted crags.

For Mrs Meredith the lack of legend deprived the area of poetry and imagination. The development of a true appreciation of the Australian environment by Europeans was in its infancy; it would be half a century before the colonists began to develop a close affection for the Blue Mountains landscape based on its intrinsic qualities, rather than similarity with somewhere else.

ARTISTS

The scenic grandeur of the Greater Blue Mountains has inspired painters since the first view of the Blue Mountains, an 1802 watercolour by William Westall, was painted from the direction of Sydney. Since then, artists who have depicted the Blue Mountains have included John Lewin (1770-1819), Joseph Lycett (1774-1825), Major Thomas Mitchell (1792-1855), Augustus Earle (1793-1838), Conrad Martens (1801-1878), John Skinner Prout (1806-1876), Eugen von Guerard (1811-1901), S.T. Gill (1818-1880), William Piguenit (1836-1914), E L Montefiore (1820-1894), Howard Ashton (1877-1964), Will Ashton (1881-1963), Penleigh Boyd (1890-1923), Lloyd Rees (1895-1988), Arthur Streeton (1867-1943), Grace Cossington Smith (1892-1984), Arthur Murch (1902-89), Fred Williams (1927-82), Jeffrey Makin (b. 1943) and Ray Crooke (b. 1922)..

Major Mitchell's coloured lithograph, *Valley of the Grose*, illustrated the book describing his journeys of exploration in the 1830s. Eugen von Guerard visited the area in 1859 and later depicted Weatherboard Falls (now Wentworth Falls) in both oil and lithograph. His painting 'Weatherboard Creek Falls, Jamieson's Valley, New South Wales' sought to capture the size and extent of the landscape. Even his sketches for the painting were considered to be inspiring.

James Smith, an art critic of the time, stated:

Among the sketches ... are several he made in the Blue Mountains; and for sublimity, majesty and eeriness, I should imagine this scenery can scarcely be surpassed in any part of the world.

This painting, the largest von Guerard ever painted, was 'seemingly intended as his magnum opus' (Pullin, 2011) and was exhibited in London and Paris in the 1860s. It has been widely reproduced, in a range of media from books to fridge magnets.

Other significant paintings of the Blue Mountains landscape include 'Govetts Leap' (Conrad Martens, 1835), 'Head of the Grose Valley' (Eugene von Guerard, 1873), 'In the Grose Valley, Blue Mountains (W C Piquenit, 1882), 'Fire's On' (Arthur Streeton (1891) and Colin Lanceley 'Where three dreams cross between blue rocks' (1983) (see also Table 1 in Fallding *Nature-Culture* for a more extensive list).

FILM AND PHOTOGRAPHY

The scenic grandeur of the Blue Mountains has been the set location for all or part of many feature films. These include *When the Kellys Rode* (Harry Southwell, 1934), *Bush Christmas* (Ralph Smart, 1947), *Jedda* (Charles Chauvel, 1955), *The Sundowners* (Fred Zimmerman, 1960), *A Dangerous Summer* (Quentin Masters, 1982), *The Return of Captain Invincible* (Phillipe Mora, 1983), *The Coca-Cola Kid* (Dusan Makavajev, 1985), *Mad Max – Beyond Thunderdome* (George Miller and George Ogilvie, 1985) and *Sirens* (John Duigan, 1904) (see also Fallding Table 3 Chapter 5 for a more extensive list).

'Stealth', a Hollywood blockbuster film, was partly filmed in the Blue Mountains landscape in 2004. Controversy surrounding the location of filming, in an area zoned as wilderness, involved a blockade of the Mt Hay Road, and a Land and Environment Court case that was won by conservationists.

The photogenic nature of Greater Blue Mountains landscapes was recognised early in the history of landscape photography. Robert Hunt photographed in Blue Gum Forest in 1859 while on the Engineers Survey for a railway line through the mountains. Other photographers include, Joseph Bischoff, who organised artists' camps in the Blue Mountains in and Charles Bayliss who photographed the area in the 1870s.

Many of Frank Hurley's images, including views of the Three Sisters, are held at the National Library of Australia and many were reproduced in his 1952 book, 'Blue Mountains and Jenolan Caves– a Camera Study'. His photo of Grose Valley during a flash of lightning is particularly fine.

An important Blue Mountains photographer was Harry Phillips (1873-1944) (see <http://www.powerhousemuseum.com/library/2012/04/clouds-and-surrounds/>). He found inspiration in the landscape of the mountains, and moved with his wife and daughter from Sydney to Katoomba in 1908. He set up his business there and soon began to photograph, print and publish books of views of the local area.

By 1919, 100,000 copies of his best-selling 'Blue Mountains Wonderland 81 Views' had been printed and Phillips became well known: *One of the greatest advertisers of the Blue Mountains is Mr Henry, (sic) Phillips, the Mountain photographer. The books of views he publishes, printed and bound with his own plant, are circulated all over the world. They have even been found in German dug-outs in Flanders. The value of his work is undoubted..*(Smiths Weekly, March 21, 1919)

In the last 40 years photographs by Henry Gold, Leo Meier, Ian Brown and Rob Jung have been widely reproduced in books, magazines, periodicals, calendars and conservation campaign publications (e.g. Prineas and Gold 1978, 1983). Large format coffee-table style books of photos such as Colley and Gold (2004) and Brown (2003), and large format calendars such as Brown (2011, 2012, 2013) authoritatively portray the outstanding natural beauty and very high aesthetic values of the Greater Blue Mountains.

Two iconic posters were done by Henry Gold for the Colong Foundation for Wilderness, one on the pagodas in Gardens of Stone NP (Gold, 1989a), the other on Kanangra-Boyd (Gold, 1989b). There is also a large number of publications of a more populist nature, such as NPWS (1992), Meredith (1999) and Woods (2005) that rely heavily on photographs to illustrate the natural beauty of the Greater Blue Mountains.

More recently, high quality web sites on the World Wide Web (such as <http://www.worldheritage.org.au/> and <http://www.ianbrownphotography.com.au>) have made the beauty of the Greater Blue Mountains WHA easily accessible to anyone connected to the Internet.

Postcards or photos of the Greater Blue Mountains for the tourist trade, mostly taken in the Blackheath and Katoomba areas, have been produced since the earliest days of photography in types and numbers too large to document, a trend that continues with no sign of diminishing.

The renowned bushwalker and conservationist Myles Dunphy wrote: *A great carpet of loveliness stretched illimitably. Waves of verdure clothed the great ranges; great bastions of warm, colourful rock bounded the blue green basins and valleys. Verdant lands fringed limpid streams flowing everywhere. Great peaks noble in their grandeur, arose above all, the hubs about which the ridges and the rivers were ordered. I was amazed with the wonder.* (Myles J. Dunphy, Private Notebook, 1922, provided by his son Dexter Dunphy, pers. comm., July 2013)

In 1998, as a result of innovative work to develop a cultural vision for the City of the Blue Mountains (Berry and Dillon, 2005), the Blue Mountains was recognised as the inaugural 'City of the Arts' in NSW. The Blue Mountains Cultural Centre (bluemountainculturalcentre.com.au) incorporates 'a City Art Gallery and Interpretive Centre, reflecting the community's strong attachment to the arts and its identity as a City within a World Heritage National Park environment'; *We are committed to promoting our contemporary culture, World Heritage environment and history within an Australian and international context by supporting and showcasing regional artistic and cultural activity.* Clearly the Greater Blue Mountains has been an inspirational landscape for all those who have visited and lived there.

Inspiring Topography: What is there to see!

LOOKING DOWN TO PROFOUND DEPTHS

The scenic attractiveness of the Greater Blue Mountains relates strongly to the deeply dissected sandstone plateau landscape. There are few outstanding peaks, and the region's grandeur mostly becomes apparent when one looks *into and across* the mighty valleys. As geologist Joseph Carne (1855-1922) noted, it is:

not in impressive heights but in profound depths lies the chief claim of the Blue Mountains scenery.

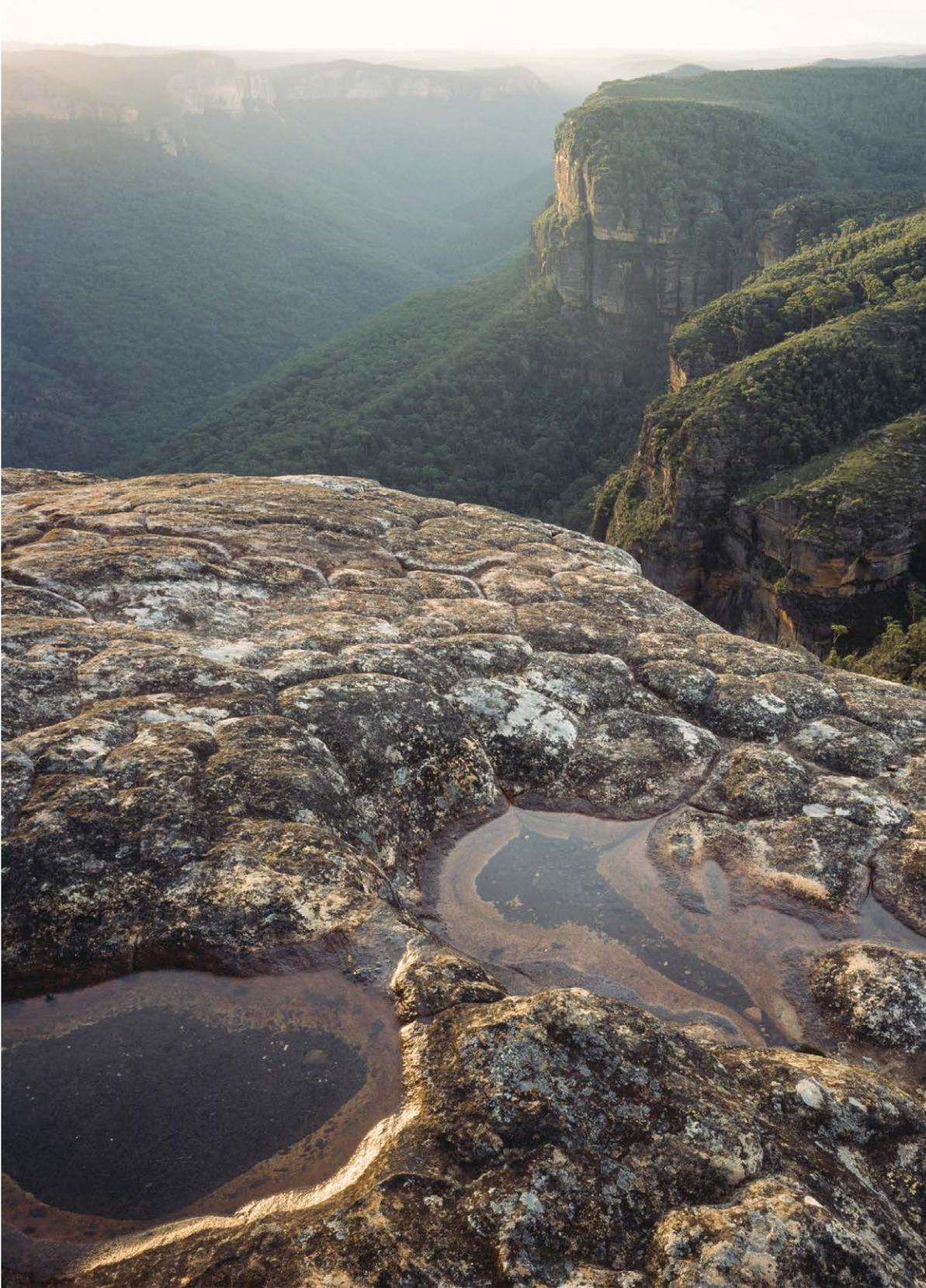
The dissected plateau gives rise to the great surprise travellers have experienced when, after a toiling along a non-descript ridge, they are suddenly confronted with a view down into a huge valley or a canyon; in 1804 botanist George Caley described one as a 'Ha Ha', the unexpected sudden drop found in landscaping.

There are of course places in the Greater Blue Mountains where one looks up at cliffs and mountains particularly along the western escarpment (e.g. in the Wolgan and Capertee valleys), but most visitors experience the scenic grandeur of the Blue Mountains through looking out and down into deep sandstone gorges.

THE RIM OF THE ESCARPMENT: THE CENTRAL BLUE MOUNTAINS

The scenery of the Central Blue Mountains is also the best known; road and railway permit ready access to the escarpment edge. Joseph Carne's 'magnificent canyons and precipitous ravines' and the cliff edges above them are the most visited parts. The rim of the narrow plateau, on which the Blue Mountains townships is situated, is particularly important in this respect.

The most accessible vantage points are above the Southern Escarpment overlooking the Jamieson valley, where there is an excellent view of the scenery formed from rocks of the Narrabeen Group geology. The main cliff-line here is up to 223 m high. From various appropriately named lookouts such as Inspiration Point, Sublime Point, Echo Point and Cyclorama Point, visitors can see the outstanding erosion features of the Three Sisters and Orphan Rock, the Dog-Faced Rock Fall of 1931, the mesa of Mt. Solitary,



Above: Looking down into the deeply dissected landscape of the Grose Valley. (Photo: Ian Brown)

the promontory of Narrowneck and the long encircling Kedumba Walls stretching away towards Kings Tableland. There are major waterfalls including Katoomba, Leura, Gordon, and Wentworth Falls, which drops 297 m in two stages).

Below the cliffs the Permian measures of the lower slopes are obscured by a skirt of boulder debris (talus) which has fallen from the cliffs. Steps and ladders give access to tracks below the cliffs, where the scenic highlights are the waterfalls, boulder-filled streams and tree-lined fern glens. Further around the plateau edge to the northwest there are views of the broad Megalong and Kanimbla Valleys, with contrasting scenery on the Carboniferous granite and folded Devonian rocks. In the distance are the wild peaks of the Kanangra Wilderness.

Popular lookouts on the northern side of the main central Blue Mountains ridge, are from the cliffs that fringe Govetts Leap, and from these vantages the wild 750 m deep Grose Valley, completely walled by sandstone cliffs, can be seen. The cliffs under Mt Banks and Mt Caley on the north side of the Grose are amongst the finest examples of their kind in the entire Blue Mountains.

The terrain around Blue Gum Forest, at the junction of the Govetts Leap Creek and the Grose River, where the Permian measures are exposed, is much gentler. The Grose River valley, by virtue of its depth, extent and unmodified character is wilderness (*George Caley's Devil's Wilderness*) and even today few walkers traverse the full length.

KANANGRA, KOWMUNG AND NATTAI: THE SOUTHERN BLUE MOUNTAINS

For Myles Dunphy, bushwalking promoter of the rugged Kanangra landscape and author of many maps, the Kanangra-Boyd wilderness contained 'the greatest declivities of the Blue Mountains'. His names such as *Cyclops Pit*, *Cara Beanga Steeps*, *The Pookan Hole*, and *Thurat Spires* indicate the powerful impression made on Dunphy, and today help cast the spell of the place on walkers (Mosley, 1989). The steepest and deepest parts of this generally rugged area, Whalanian and Kanangra Deeps, are on the eastern edge of the Boyd Plateau and are up to 900 m deep.

The Kowmung River, the major valley feature, flows through the heart of the wilderness. Not as deep as the headwater gorges, the great sweep which the river makes around the

Boyd Plateau and then north eastwards, and the sight of its forested interlocking spurs stretching unbroken towards the horizon, gives the Kowmung valley distinctive majesty (Mosley, 1989).

The fall of around 1100 m from Mt Guouogang to Coxs River is the greatest topographic relief in Greater Blue Mountains. The most remote parts of the wilderness are the Blue Breaks and the High Gangerang, a cliff-lined plateau complex between the Kowmung and Kanangra Creek. A natural walking route between Katoomba and the Boyd Plateau by way of Narrow Neck and Coxs River traverses the Gangerang range, including peaks with such evocative names as Cloudmaker and *The High and Mighty*.

South across the Wollondilly River is the Nattai wilderness where the Nattai River and its tributaries run through major gorges with long stretches of skirting cliffines. Access is difficult and the centre of the area has relatively few visitors.

The adjoining Yerranderie and Nattai State Conservation Areas are not currently World Heritage listed, but have significant scenic value, as well as biodiversity value, and should be recognised for this. Similarly, Joadja and Wollondilly River Nature Reserves should be added as World Heritage. They too have significant visual grandeur.

COLO RIVER GORGE

The Capertee and Colo rivers wind sinuously 100 km through gorges 500 m deep in the Capertee, down to 150 m in the downriver Colo. Cliffs in places are up to 300 m high, a mosaic of purple-gray and orange sandstone. There are dozens of rapids, rock piles and kilometre-long pools. The Colo River Gorge has been called NSW's 'Grand Canyon' and was the key feature in the 1970s campaign that led to the creation of Wollemi National Park (Washington, 2004).

SLOT CANYONS: WOLLANGAMBE WILDERNESS

Near Mt Wilson, is the Wollangambe Wilderness, a maze of tributaries of the Wollangambe River, with many slot canyons in upper Yarramundi and Bungleboori Creeks. Some are only a metre wide. Often part of the cliff above has collapsed into the canyon to form 'chock stones' and sometimes tunnels. Some canyons terminate at high hanging waterfalls that cascade into the deeper valleys and pools. Extensive exploration shows that there are more than 300 streams, large and small, that contain more than 100 m of slot canyon (D. Noble pers. com. 2012).

This is by far the most extensive and well developed sandstone canyon system in eastern Australia, and must be amongst the premier slot canyon areas in the world (Wray, Washington and Armstrong, 2013).

Biologically, the slot canyons are also very important habitats often with their own protected, cool, damp and dark ecosystems. They are often refugia for many species of plants and animals. In a remote canyon the Wollemi Pine (*Wollemia nobilis*) was discovered in 1994 (Jones et al, 1995; Woodford, 2005), a tree whose close ancestors span back to the Jurassic.

As a visual feature, slot canyons are often described as 'cathedrals' and their visitation is so popular it has led to the creation of the term 'canyonier' for canyon visitors.

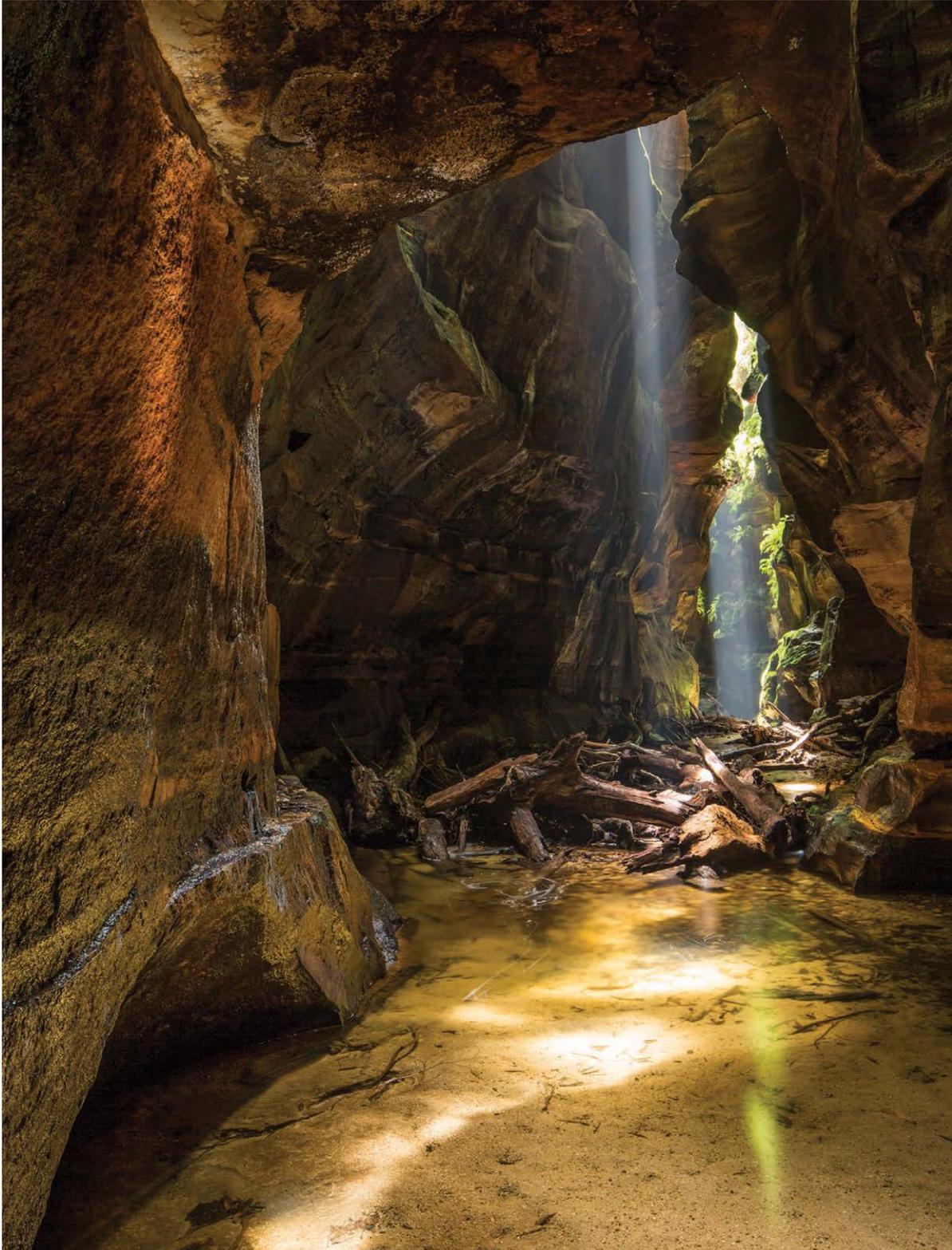
Many slot canyons are found in areas outside the World Heritage Area in Newnes, Ben Bullen and Wolgan State Forests and in Mugii Murum-ban State Conservation Area. These areas have great scenic grandeur and are recommended for National and World Heritage Listing.

NORTHERN BLUE MOUNTAINS: CAPERTEE AND NEWNES

Wollemi and Gardens of Stone National Parks are the largest part of the Greater Blue Mountains WHA and some of the more spectacular scenic features of the northern Blue Mountains are easily accessible from Glen Davis on the Capertee River and Newnes on the Wolgan River. In both valleys over 800 m of strata is exposed and there are prominent cliff-lines; near Glen Davis one of the cliff-lines is over 300 m high.

PAGODA COUNTRY: GARDENS OF STONE, NEWNES PLATEAU AND WOLGAN

Along the edge of Newnes Plateau and the Wolgan-Capertee divide, 'pagoda' rock formations rise above the olive-green bush with a multitude of shapes and hues. The pagoda landscape is a visual feast for the human eye. The colours, reflecting differences in rock type and the presence of algae and lichen, range from chocolate and orange to pink white and grey. Pagodas can be smooth or 'platy'. The latter are stepped cones with many protruding ironstone bands and have been recognised as being *distinct and significant* on the international level (Washington and Wray, 2011).



Above: A highly scenic feature of the Greater Blue Mountains are the narrow slot canyons cut by streams into the Narrabeen sandstones of parts of the western Blue Mountains. These narrow canyons generally display steep, often vertical or overhanging, cliff walls, and can be up to 60 m or more deep. (Photo: Ian Brown)

RARE SWAMPS
AND PAGODAS:
NEWNES PLATEAU,
BEN BULLEN AND
WOLGAN STATE
FORESTS

They are unique aspects of scenic grandeur found *nowhere else in Australia*. The 'pagoda' rock formations are like ancient step pyramids or lost cities. Their red and purple ironstone-banded forms rise above flowering heathland in spring, giving them their name, the 'Gardens of Stone'. Less than half of the pagoda landform heartland of 60,000 ha is World Heritage listed; more is located in adjoining Muggii Murumban State Conservation Area and adjacent Newnes, Wolgan and Ben Bullen State Forests; these should be added to the World Heritage Area.

The Newnes Plateau in Newnes State forest, reaches 1180 m in altitude, the highest extensive Burrell Formation sandstone plateau in the Blue Mountains. While part has *Pinus radiata* plantation forest, the rest of the plateau remains in a natural condition. It contains many extensive high quality 'Threatened Highland Peat Swamps on Sandstone', a listed Endangered Ecological Community (under the Commonwealth EPBC Act and NSW TSC Act). These swamps are visually spectacular as they follow creeklines across the plateau.

Newnes, Ben Bullen and Wolgan State Forests also contain many excellent pagoda clusters and slot canyons and form a key western extension to Wollemi and Gardens of Stone National Parks. The visual significance of these State Forests is immense and they should have National and World Heritage Listing.

SPECTACULAR BUT
OF MORE HUMAN
SCALE: GOULBURN
RIVER NATIONAL
PARK

The characteristic sandstone plateau of Goulburn River National Park, unlike Wollemi to the south, is less rugged and precipitous, with lower (though still spectacular) cliffs and wider valleys. It is thus easier for human access; this is reflected in the many Aboriginal occupation sites found there. A distinct feature are its basalt flows; Mt Dangar, rising from a base of 180 m to 673 m is the most visually striking. This basalt cone dominates the nearby Goulburn River and is visible from many vantage points. Goulburn River National Park was the key northern part of the Blue Mountains in the original nomination for World Heritage, but was not subsequently nominated by the Commonwealth Government. However we now consider it has significant biodiversity and geodiversity value, as well as a distinct scenic grandeur; Goulburn River should be added to the World Heritage Area.



Above: One of the many platy pagodas in Newnes State Forest. (Photo: Ian Brown)

SYDNEY
SANDSTONE AND
SACRED SITES:
YENGO PLATEAU
AND MACDONALD
RIVER

The easternmost part of the Greater Blue Mountains is the Hawkesbury Sandstone Yengo plateau and the catchment of the south-flowing Macdonald River. The Yengo area contains the high basalt cap of Mt Yengo, a sacred site of great significance to all coastal Aboriginal people, for it is here that Baiame (the Sky Father) is said to have returned to the sky. There are many spectacular carvings on sandstone ledges throughout the area, such as at Finchley Aboriginal Area.

The Macdonald River has impressive volumes of sand moving downstream and it is possible to walk barefoot from Sandy Creek on the Putty Road through to St Albans. The northern extension of the Kurrajong fault has uplifted drainage to form the unusual sandy Mellong swamps along the Putty Road which runs between Wollemi and Yengo National Parks.

VOLCANIC BASALT
PEAKS AND
'HOLES'

Rising some 100-300 m above the general level of the Blue Mountains plateau are characteristic basalt-capped peaks, the major ones, south to north being Mt Colong, Mt Banks, Mt Hay, Mt Wilson, Mt Irvine, Mt Yengo, Mt Coricudgy, Mt Monundilla, and the largest, Nullo Mountain. Basalt flows form scree slopes and sometimes columnar basalt. Nullo Mountain State Forest has spectacular views, scree slopes, interesting lowland swamps, such as Hopping Harrys Hollow, and sandstone outcrops with some smooth pagodas.

It is not in the World Heritage Area, but is recommended for addition. Mt Coricudgy, in Coricudgy State Forest, at 1254 m is the highest point in the northern Blue Mountains. It is a visually spectacular hog's back mountain visible from many areas, and has views to many areas.

There are also dozens of volcanic diatremes or 'holes'. One of these is believed to have been the inspiration for the 'Terrible Hollow' of Rolf Boldrewood's famous Australian novel 'Robbery under Arms' (Prineas 1976). Mt Coricudgy, Mt Coriaday and Mt Monundilla are the dominant features in the northern third of the Wollemi wilderness. The difficulties of moving through this region were legendary, and some mistakes in the NSW Department of Lands topographic maps, made before air photos were available, have persisted until recently.



Above: Colo Gorge. (Photo: Ian Brown)

CAVES AND KARST COUNTRY: JENOLAN AND WOMBEGAN CAVES

Jenolan Karst Conservation Reserve Australia's most visited and best-known karst area, with more than 250,000 people visiting each year. The age span of karst and cave development is significant and the range of processes acting at Jenolan is without comparison in Australia (Osborne, 2013; James, 2013). (Washington & Wray Chapter 1 *Geodiversity*). It is the most significant impounded karst in the Eastern Highlands of Australia. The visual splendour of all these features adds to the strong case for National Heritage listing for scenic grandeur of the Greater Blue Mountains.

Wombegyan Caves south of Jenolan was the first area in Australia to be reserved for the protection of caves. Today Wombegyan Karst Conservation Reserve boasts some of NSW's most impressive show caves, including Figtree Cave, widely regarded as one of the state's best self-guided cave experience (OEH, 2013).

The complex history of the limestone is exceptional and there is no equivalent anywhere else in Australia. Wombegyan Karst Conservation Reserve is the largest karst area in NSW that has developed in marble, and the largest marble karst in Australia that contains caves. Wombegyan Caves are not currently World Heritage listed but are recommended for addition based particularly on geodiversity significance (See Washington and Wray Chapter 1 *Geodiversity*).

WILDERNESS

Undoubtedly, an outstanding scenic feature of the Greater Blue Mountains WHA is its extensive wilderness. The scenic grandeur and beauty of large natural areas has been championed by the wilderness movement for centuries (Nash, 2001; Washington, 2006). In fact the Greater Blue Mountains gave birth to the wilderness movement in Australia when Myles Dunphy started the National Parks and Primitive Area Council in 1932.

Declared Wilderness makes up 65% of the Greater Blue Mountains World Heritage Area, demonstrating the central importance of the wild and visually spectacular aspect of the region. It contains five wilderness areas – Wollemi, the largest wilderness in NSW (NPWS, 1997), Kanangra-Boyd (NPWS, 1991), Yengo (NPWS, 2001), Grose (NPWS, 1999) and Nattai (Crust, 1990).



Above: Wollemi Wilderness. (Photo: Ian Brown)

They make up about 650,000 ha of the one million hectares of the Greater Blue Mountains WHA. Other areas of wilderness outside these declared wilderness areas have been identified, as well as areas of high wilderness quality that are not large enough to qualify as wilderness.

The fact that Sydney is the birthplace of the 'bushwalkers' clubs is in no small measure due to the unrivalled opportunities for wilderness recreation in the Blue Mountains. International recognition of wilderness conservation means that these wilderness areas now have a *more than local significance*. The IUCN (2008) Guidelines for applying Protected Area Management Categories defines wilderness (Category 1b) as:

Wilderness areas are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

Wilderness offers a distinct recreational experience, namely the opportunity to live in, and move freely through, natural country, unassisted by aids to travel such as formed tracks, bridges, and fixed shelters. That this can meet a deep felt need in human beings seems highly likely when one considers that this was everyday experience of our ancestors.

In very large natural areas of this kind, where cultural influences on the environment are at a minimum, the ecosystems have their best chance of interacting and evolving naturally. The wilderness condition also provides protection for specific features of conservation importance such as the habitat of an endangered species. The ecosystems are more likely to be in a healthy state in such circumstances because of the distance from centres of human activity. Because wilderness areas are now very few, their value to science now and in the future is immense (Washington, 2006). Helman (1976) and a Wild and Scenic River Committee (DWR, 1987) also recognised the Colo, Grose, Cox, Kowmung, Abercrombie and Wollondilly as *wild and scenic rivers*. The Colo, Kowmung and Grose rivers are now declared as Wild Rivers under the National Parks and Wildlife Act 1974.



Above: View to Grose Wilderness. (Photo: Ian Brown)

The Commonwealth Wilderness Program conducted specifically to identify wilderness for heritage listing, identified wilderness areas generally larger than those protected by NSW wilderness legislation for the Greater Blue Mountains WHA (Environment Australia 1999). The outstanding wilderness quality of the Greater Blue Mountains has been identified by every study that assessed it.

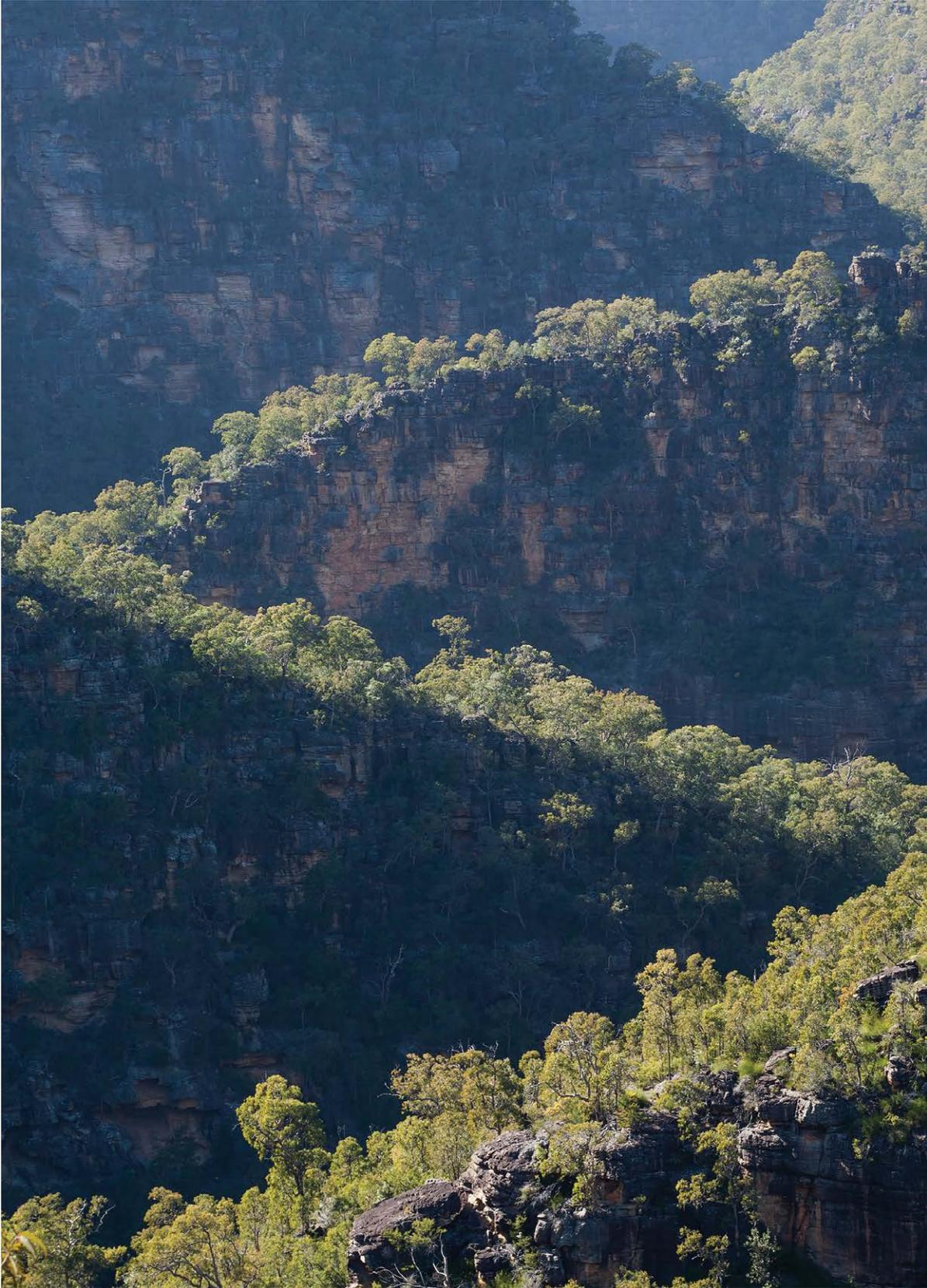
CONCLUSION

Currently, the Greater Blue Mountains is only recognised formally for World Heritage for its biodiversity, not for geodiversity, cultural heritage or scenic grandeur. Increasing evidence however indicates a strong case for considering all these aspects, both on a National and World Heritage basis, and for considering an extension of boundaries for the current World Heritage Area. It is important to remember that the Greater Blue Mountains WHA was nominated by the Australian Government (with the agreement of the NSW government) under (amongst others) the natural beauty criterion, when the Greater Blue Mountains WHA was first nominated to UNESCO, a generation ago.

The Australian Government at that time clearly considered the Greater Blue Mountains to be of *outstanding universal value for natural beauty* and aesthetic values (NPWS and EA, 1998). In its evaluation of the World Heritage nomination document, IUCN stated "The GBM are clearly significant at the national level" (IUCN, 1999).

The Greater Blue Mountains were identified in the provisional list of inspirational landscapes in Australia (Crocker and Davies, 2005a), the closest one comes to an Australia-wide comparative assessment of landscapes of high aesthetic/ inspirational value. The beauty and high wilderness quality of the Greater Blue Mountains were acknowledged in the Retrospective Statement of Outstanding Universal Value for the Greater Blue Mountains WHA that was adopted by the World Heritage Committee in June 2013 (WHC, 2013).

The Strategic Plan for the Greater Blue Mountains WHA (NPWS, 2009) notes: *The Greater Blue Mountains WHA includes some of the most dramatic scenery in Australia, with its best known landscapes dominated by striking vertical cliffs and waterfalls. With many vantage points on ridges and escarpments, the Greater Blue Mountains WHA offers outstanding vistas, from uninterrupted views of forested*



Above: Wollangambe Gorge. (Photo: Ian Brown)

wilderness covered by natural vegetation to the contrasts of steep forested slopes surrounding cleared valleys. The Jenolan Karst Conservation Reserve provides a different but still dramatic scenic landscape, and the outstanding aesthetic values associated with its extensive caves have attracted a large number of visitors since the early days of tourist activity. In more recent times, the spectacular complex of narrow sandstone canyons and pagoda rock formations found largely in Wollemi and Gardens of Stone National Parks have become more widely known and appreciated.

It goes on to note that the scenic and aesthetic values of the Greater Blue Mountains are demonstrated in a variety of ways by:

- the large body of contemporary art (visual, performance and written) inspired by the landscape;
- the significant levels of visitation to scenic vantage points and its increasing popularity as a scenic backdrop for weddings (including those of international tourists);
- the diverse scenic landscapes and natural features that have been the subject of photographers for a period of more than a century and they feature prominently in Australian wilderness, wildlife and natural history books; and
- the increasing visitation to well-known and publicly accessible indigenous rock art sites.

The sheer beauty of the Greater Blue Mountains has made it an inspirational landscape for as long as humanity has interacted with (and bonded to) this place (and certainly for over 20,000 years). Some of its characteristic scenic features are found nowhere else in Australia. These include its extensive sandstone gorges and slot canyons, its bottleneck valleys, its platy pagodas, its highland swamps, the scenic grandeur of Jenolan and Wombeyan Caves, and its outstanding wilderness and wild rivers. The Greater Blue Mountains and its scenic beauty are so profound that they simply defy superlatives.

ACKNOWLEDGE- MENTS

Input from Geoff Mosely, Ross Scott, Andy Macqueen, Judy Smith, Dexter Dunphy, Win Jones, Keith Muir, Joan Domicelj and Ian Brown is acknowledged.



Above: Pantoneys Crown, Gardens of Stone National Park. (Photo: Ian Brown)

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