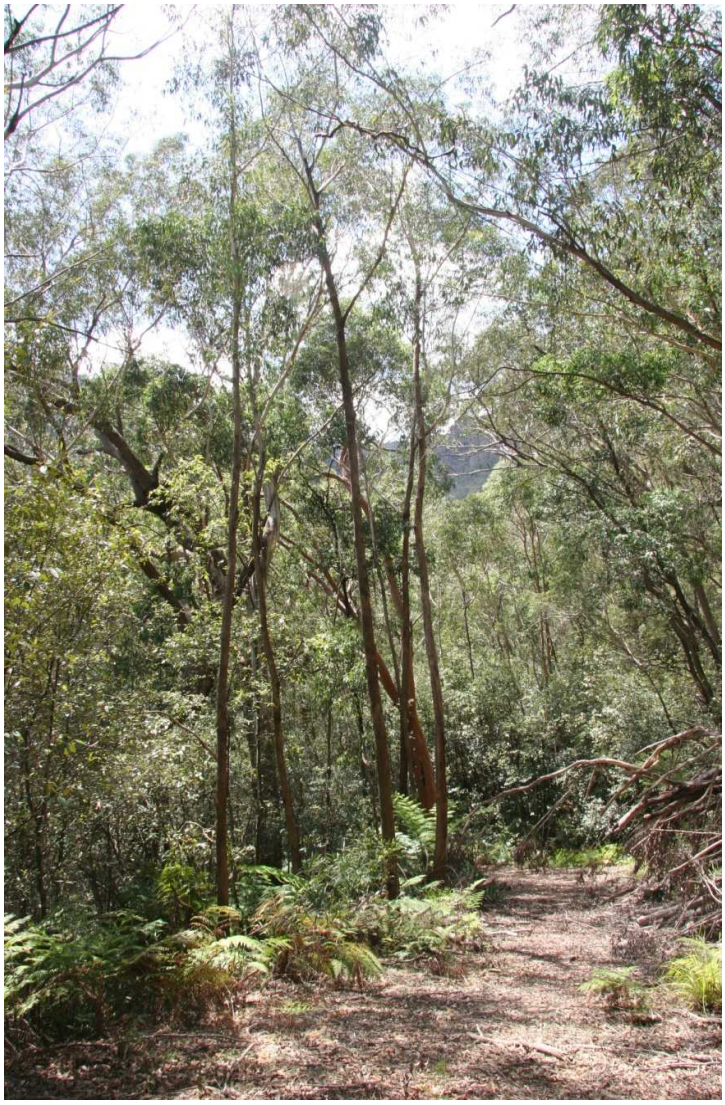
Blue Mountains World Heritage Institute

Natural and Cultural Heritage Program



Six Foot Track Archaeological Assessment

A Report for the Six Foot Track Heritage Trust
by Shaun Boree Hooper and Teekee Marloo

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Cultural Warning

Aboriginal people are warned that this work may contain the names and images of Aboriginal people who may have since passed away or information of a culturally sensitive nature.

Disclaimer

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Introduction

The Blue Mountains World Heritage Institute was asked to survey the Six Foot Track and produce a Geographic Information System (GIS) layer of Aboriginal sites along the track. Also, to produce a predictive model of potential sites along the Six Foot Track that can be used to guide management. As part of this work a separate GIS layer was produced showing zoning of the Six Foot Track and an associated risk assessment made for each zone along the track to guide planning and maintenance work.

The Six Foot Track runs from Katoomba at the Explorers Tree on the Great Western Highway to the Jenolan Caves west of the Cox's River. It passes through the Country of Darug, Gundungurra and Wiradjuri people.

Figure 1: Uncle Greg Simms, Gundungurra Elder, at Megalong Cemetery

Survey Strategy for the Six Foot Track

To complete this survey the Six Foot Track was divided into zones based on the outcome of the predictive model, and the track was surveyed to check the accuracy of the predictive model. A large percentage of the track was heavily disturbed with parts cut over a metre into the soil profile. This should have aided the discovery of artefacts, but can also disguise artefact location through erosion and soil movement. Where possible the full width of the track was surveyed to attempt to pick up artefact scatters that were not visible on the track. This was hampered in part by farm-based disturbance and natural vegetation.

The Jenolan Caves end of the track presented an interesting problem as few or no sites were found in this section. A GIS based analysis of possible movement patterns was used to try and identify why this area had little evidence of use, despite availability of raw material for artefacts and suitability of the area for camp sites. The findings from this analysis indicate that the site was probably visited rarely due to there being alternative tracks for movement through the area.

Predictive Models and Site Distribution

The Blue Mountains World Heritage Institute (BMWHI), in conjunction with the Department of Environment and Climate Change (DECC), the Blue Mountains City Council (BMCC) and the Hawkesbury-Nepean Catchment Management Authority (HNCMA) has developed a series of predictive models for the Greater Blue Mountains World Heritage Area (GBMWHA). The models developed do not predict the actual occurrence of archaeological evidence but instead, describe the relative likelihood of a feature occurring in any 25 m square of the grid (Ridges 2006).

To interpret the model, the values in each square of the grid describe a scale between the lowest and highest likelihood of a site occurring. So where a square in the grid is at the higher end of the scale, it is more likely that a feature will be found at that location. There are many factors which may influence a feature not occurring on a given grid square, such as visibility, conservation, land use and cultural issues restricting access (Hooper 2006; Ridges 2006).

The models developed do not take post-European land impacts into consideration. It is important to take this into account when interpreting models, as features exist in depositional and re-depositional environments (Hooper 2006). Nonetheless, the method provides a useful tool by which the location of significant new indigenous heritage sites might be found. For example, the recently discovered Eagle's Reach rock art site is one of a number of important sites in the Wollemi region of the GBMWHA, where the model predicts a high probability of cultural heritage sites.

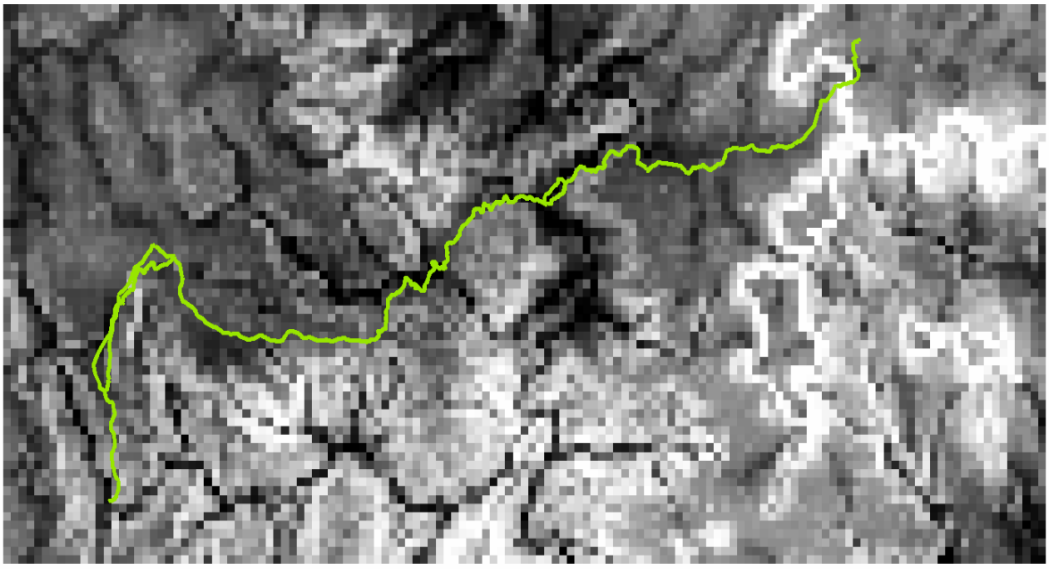
The data set used, the Aboriginal Heritage Information Management System (**AHIMS) (**See Appendix 1) takes into account all the issues identified. In the data the

feature class “Artefact” is representative of both isolated finds and camp sites. The model is simply predicting the likelihood of an occurrence of this type of feature Artefact. The same applies to the “Rock Art” Feature class as it includes both open and closed art sites (in shelter and on sandstone platforms).

Artefact Feature

Within the modeling process, different variables used will have different effects on the prediction of feature likelihood. This can be analysed within the model. In the Artefact model, the variable proximity to water was one of the main contributors to predicting site likelihood within the model, with rainfall and temperature also major influences. For example, this may reflect that ideal camping places on average are warm and dry.

Mitchell’s landscape data is the next major driver, and is important as an indicator of key plant species (Ridges 2006). An analysis of Mitchell Landscapes found that the Lapstone Slopes, the Blue Mountains Plateau and the Hawkesbury - Nepean Channels and Floodplain ranked similarly. It could be concluded, therefore, that there is a similar likelihood of an artefact feature occurring in either landscape type.



Map 1: Example of models - artefacts with track in green

Eleven variables were used in the development of the model. These variables were chosen as potential influences on the choice Aboriginal people made to undertake the modeled activity (Ridges 2006):

1. Elevation
2. Slope
3. Aspect
4. MDS dimensions 1-3
5. Stream proximity weighted by Shreve stream orders
6. Stream proximity weighted by Strahler stream orders
7. Stream proximity
8. Average annual temperature
9. Average annual rainfall
10. Visibility
11. Geology

The choice of variables used within each model is summarised in **Table 1**

Variable	AFT	ART	GDG	STA	TRE
Elevation	X	X	X	X	X
Slope	X	X	X	X	X
Aspect	X	X	X	X	X
DIM1-3	X	X	X		X
Shreve	X	X	X	X	X
Strahler	X	X	X	X	X
Stream cost	X	X	X	X	X
Temperature	X	X	X	X	X
Rainfall	X	X	X	X	X
Visibility		X	X	X	
Geology		X	X		

Table 1: Variables used for each model

It should be noted that no clear guidelines exist in the archaeological predictive modeling literature about what are the most appropriate variables for describing the distribution of hunter-gatherer archaeological features (Ridges 2005, 124). Generally speaking however, the most common variables seen in the literature involve terrain, proximity to water, vegetation and related resources, and geology. There have been criticisms of an over-dependence on environmental variables at the expense of variables relating to social factors (eg Ebert 2000), with others suggesting that social factors cannot be described spatially (Gaffney and van Leusen 1995). Although, this

probably has more to do with limitations on conceptualising the spatial implications of relevant social processes, as Ridges (2005) has argued. For this reason, along with the expected variables, an additional variable, visibility, was employed to incorporate a less tangible factor determining the location of Aboriginal activities: perception of the environment (Ridges 2006).

Interpreting the Predictive Models

Below are some guidelines for interpreting the products described in this report.

Predictive models

It is important to emphasise how the models should be interpreted, and what they are actually describing. This is summarised in the points below:

- The models do not represent the probability of finding a given Aboriginal feature. The scale is a relative one, describing relative likelihood. At the highest value, the model indicates that there is a high likelihood of that feature occurring in a particular place, but does not guarantee that it will be found there. Other factors such as land use history and less tangible factors (eg social taboos on using particular places) are also considered.
- The GIS layers produced for each feature type are ESRI grid layers. This is a raster format, where each grid cell value describes the likelihood of finding that feature. The cell values range in value from 0 to 1000, where 1000 indicates the greatest likelihood.
- The models are not directly comparable in terms of the relative likelihood of different features. For instance, it is possible that the area of highest likelihood for stone arrangements is the same value as the highest likelihood for stone artefacts. However, this does not mean that in these areas, a stone arrangement is as equally likely to be found as a stone artefact. Stone arrangements are much rarer in the landscape than stone artefacts. It therefore indicates that in the landscape, these are the areas with greatest likelihood to contain these respective features, not that they are equally likely to occur.
- While predictive models cannot be used to quantify how many sites are in the landscape they can, however, indicate the capacity of one part of a landscape to contain a given feature, compared to another part of that landscape.
- The cell resolution of the derived models is 25m. This means that the capacity of the models to differentiate likelihood in areas less than 1 Ha will be limited. It will however give a reliable measure of likelihood over that 1Ha lot.
- The models have not been modified to reflect likely current distributions. That is, the models reflect likelihood prior to substantial land disturbance. Interpreting whether a place contains a given feature must take into account the relative rarity of that feature) and the land-use history of that place and wether that has impacted feature occurrence.
- It is also important to bear in mind that the models have not been tested in any way, and have only undergone limited validation. The next phase of the project will be to undertake systematic testing of the models.(Ridges 2006)

Models Developed for the Study Area

Modeling of the distribution of Aboriginal occupation areas has many advantages and issues (see Ridges 2006 Vol 3). The investigation of the archaeology of an area is a difficult, costly, time consuming and sometimes destructive process. In the past, archaeological predictive modeling has been used to investigate the relationships of sites to the landscape and used this to predict the likely extent of the archaeological resource. They have also played a role in the development and testing of research questions.

The prediction of the location of archaeological sites is a complex process. The two main types of modeling methods use different sources of information. The **deductive** or theory-driven method draws on theories developed about the spatial distribution of sites, while the second method is an **inductive** or data-driven model sometimes referred to as a correlative model (Wheatley and Gillings 2002).

While a lot of research has been done in the Blue Mountains, very little has been systematic (Lennon 1983), with some of the work having been conducted by interested amateurs (Johnson 1979). To ensure better management and conservation of Aboriginal sites across the region a systematic survey needs to be completed.

The following is a summary of the models developed for the Mountains in the past.

Johnson's Model (1979)

Johnson developed his model of occupation of the Blue Mountains region from work conducted in the Capertee Valley area. He suggests that the occupation of the Mountains was sporadic due to the lack of food and lithic resources and possibly centered only around swamps, rainforest areas and outcrops of tertiary volcanics. He suggests that these areas would have maintained medium groups for small periods of time only.

He notes the importance that "topographic situation" plays in the intensity of usage of sites. Johnson identifies access to good water supplies, grassy relatively flat areas and the Illawarra Coal measure and its rich lithic resources as drivers of high-intensity occupation off and below the sandstone plateau, but with limited art.

This model for low sandstone plateau occupation, he argues, is supported by the fact that large sandstone shelters on the plateau tend to have larger art galleries, but little evidence of stone assemblages. Smaller sites tend to have fewer engravings or stencils and generally poorer stone assemblages than their valley-based counterparts (Johnson 1979).

On the plateau there are large expanses of sandstone platforms, Johnson contends, with waterholes being surrounded by axe grinding grooves and the occasional

engraving. The plateau also has stone arrangements but Johnson doubts the Aboriginal origins of most of these (Johnson 1979).

Bowdler's Model (1981)

Bowdler put forward a model of occupation based on "Aboriginal Resource Zones". Developed from her earlier work (Bowdler 1977), she identified a relationship between staple foods and hunter/gather ability to occupy a region.

Lennon's Model (1983)

During field work being done in the Newnes Plateau area (Gollan 1987), Lennon's attention was drawn to the fact that the sites they were finding did not fit the existing models of site occupation in the Mountains. He observed that the location of dense sites on the plateau did not fit Johnson's model (Lennon 1983).

Lennon suggested that "home based subsistence campsites" were associated with the exploitation of sedge grass or Gahnia in swampy areas (Lennon 1983). He identified that swampy areas in the Blue Mountains would have offered abundant food resources and hence a focus of activity in the Mountains.

Lennon identified critical issues with other models that had been developed to explain Aboriginal occupation as:

- Models rely on untested assumptions particularly that un-surveyed areas do not contain sites.
- Disregard for standard sampling procedure
- Tendency to assume too much from too limited sample.

Conyers' Model (1985)

Conyers produced a plan of management for Aboriginal sites in the Lithgow area, while the regional archaeologist for the then National Parks and Wildlife Service. From her research work in the region it was identified that:

- The greatest number of occupation sites will be associated with resource rich zones and or localised sources of raw materials.
- Art sites will be found in higher, less accessible sections of the Mountains. These areas are likely to be the focus of ceremonial activity.

McIntyre's Model (1990)

McIntyre's model (Summarised in Kelleher 2002) was developed as part of work for the Kariwara Longwall coal mine. In McIntyre's model, sites are divided between major site complexes, small sites, and site complexes.

McIntyre's major site complexes are found at the heads of gullies and valleys which are resource rich and have access to permanent water. Smaller site complexes are related to travel between major sites, hunting and resource collection. McIntyre

identifies the importance of permanent water sources, vantage points and specialist resources (Kelleher 2002, 104).

Stockton's Model (1993)

Stockton developed a model for the distribution of sites in the Blue Mountains based on field survey, maps of site distribution and excavation of both open and closed sites. This model has two elements, a temporal element and a spatial element.

The spatial component of the occupation model

Stockton compiled a list of sites in the Blue Mountains from various sources including the records of the Durrabin Local Aboriginal Land Council[1], the then National Parks and Wildlife Service Sites Register, a list compiled by Stockton from Australian Museum records and "reliable informants" (Stockton 1993).

In analysing the distribution of sites "parallels patterns of settlement today except that it reached out further along the secondary ridges"(Stockton 1993 pg 58). Stockton identifies the "main" ridge as the east/west ridge or central plateau and the "secondary" north/south ridges are the spurs and ridges running off the main ridge. Stockton put forward the observation that sites in the central Mountains were more numerous, but the central sites have lower numbers of artefacts (Stockton 1993 pg 59).

Stockton observes that sheltered camp sites seem to occur more frequently in the higher altitudes while open sites are less frequent at higher altitudes, and that slope is a main driver for open camp sites, such as plains and broad valleys. He also noted that open campsites in both the upper and lower Mountains varied in number, usage, with artefact density reflecting that level of usage (Stockton 1993, p26).

Stockton surmised that the central area of the Mountains was an area of ceremonial activity. The evidence provided for this includes the large number of sites with a high level of religious orientated art and stone arrangements, but a significantly smaller volume of stone material.

Stockton noted also that this area was potentially a transit area with people moving seasonally through it to the more hospitable upper and lower Mountains, as the existence of The Wells at Gloria Park would suggest.

Stockton observed that "others", while not identifying who, consider the central area as neutral area between the Darug and Gundungurra, used for ritual purposes.

He noted that both open and sheltered camp sites exhibited either Small Tool or Large Tool Assemblages. He related this to the level of activity being undertaken at that location. He noticed that some sites had been used for long periods and had at their base Large Tool Assemblage with the covering deposit containing Small Tool

[1] This list was compiled by Ian Johnson in 1985 from NPWS sites register

Assemblages. This suggested that the initial use of the site was for a specific resource gathering activity, and that having been identified, was used as a location for more sedentary occupation (Stockton 1993).

Sites which had a small number of artefacts were predominantly Large Tool Assemblages.

Base camp

This is the area preferred by the band for long-term occupation, with more time being spent on stone tool production, and the maintenance and production of other wooden artefacts. This represented a Small Tool Assemblage, with the tool types taking a longer to produce.

Satellite or special activity areas

Stockton identified these as sites related to specific resource requirements, containing stone tools crudely manufactured for the activity being undertaken, and used only for the duration of the activity, with elements of Stockton's Large Tool Assemblages (Stockton 1993).

Summary of Stockton's Model

- There are more sites in the central Mountains than in the upper and lower Mountains
- Central Mountains sites have lower numbers of artefacts
- Sheltered camp sites occur more frequently in the higher altitudes
- Open sites decrease with higher altitudes
- Slope is a main driver for open camp sites
- Open campsites at both upper and lower Mountains varied in number and usage level, with artefact density reflecting this
- The central Mountains were an area of ceremonial activity
- The central Mountains have a higher number of sites, but a significantly smaller volume of stone material
- The central Mountains contain other evidence of occupation such as axe grinding grooves, stone arrangements and art sites
- The central Mountains were potentially a transit area with people moving seasonally through it to the more hospitable upper and lower Mountains
- Sites that had been used for long periods sometimes have at their base Large Tool Assemblage with the covering deposit containing Small Tool Assemblages. This suggests that the initial use of the site was for a specific resource gathering activity, and then became a suitable location for more sedentary occupation
- Base camps were areas used by the group for longer term occupation, with more time being spent on stone tool production for maintenance and production of other wooden artefacts. This is represented by the Small Tool Assemblages.
- Satellite or special activity areas are related to specified resource requirement and contain stone tools crudely manufactured for the specific activity being undertaken and used only for the duration of the activity and represent Large Tool Assemblages

Stockton's Temporal Model of the Blue Mountains

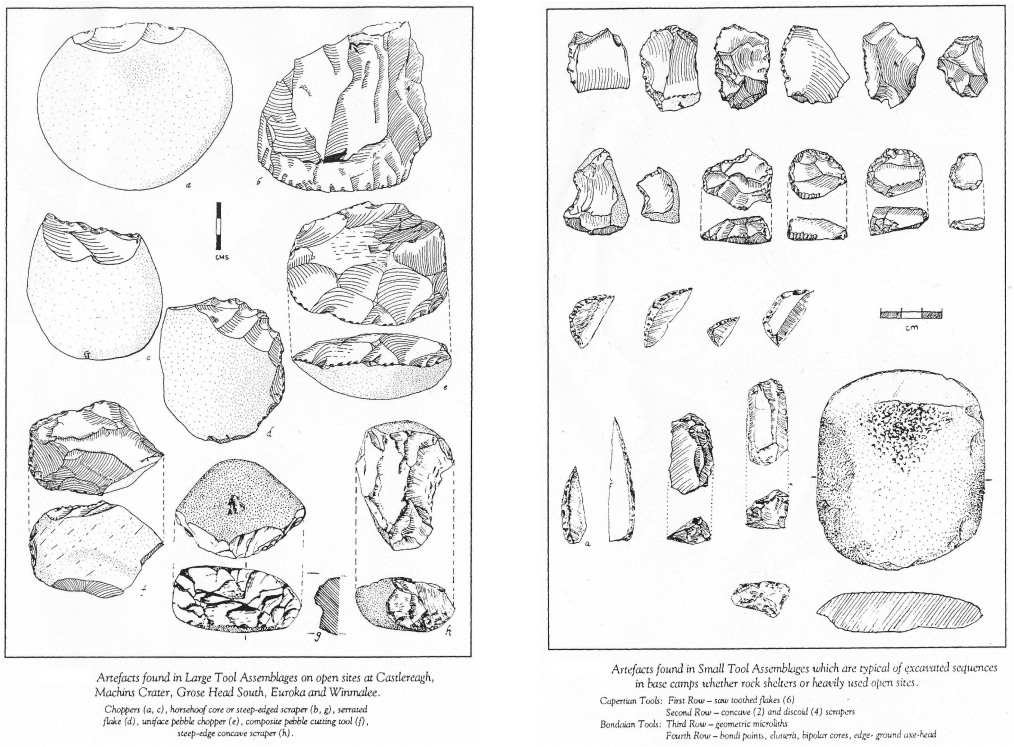
Attenbrow (Attenbrow 1994) noted the contribution that Stockton and his associates made to the understanding of Aboriginal adaptation to climate change in the Blue Mountains. In *Blue Mountains Dreaming*, Stockton provides a summary of this work.

40,000 years ago people were living along the Nepean River (Nanson, Young et al. 1987; Stockton 1993). The Mountains region was less vegetated, having limited resources and was being lashed by severe storms and erosion (Stockton 1993) with people making only short forays into the area. Aboriginal presence in Kings Tableland 22,000 years ago was possibly the result of a foraging expedition. Occupation of the Mountains had not yet become established.

Occupation of the Mountains began to increase just over 12,000 years ago, driven by the arid conditions to the west and rising water levels. The higher rainfall in the mountainous regions created "havens" for flora, fauna and man.

Approximately 12,000 to 10,000 years ago, there was an increase in both new sites and site use - possibly a result of increased migration due to improved climate.

About 4000 years ago a dramatic change occurred in activity level of stone tool production driven by changes in technology.



Artefacts found in Large Tool Assemblages on open sites at Castlereagh, Machins Crater, Grose Head South, Euroka and Winmalee.
Choppers (a, c), horsehoof core or steep-edged scraper (b, g), serrated flake (d), uniface pebble chopper (e), composite pebble cutting tool (f), steep-edge concave scraper (h).

Artefacts found in Small Tool Assemblages which are typical of excavated sequences in base camps whether rock shelters or heavily used open sites.
Capertian Tools: First Row – saw toothed flakes (6)
Second Row – concave (2) and discoid (4) scrapers
Bondaian Tools: Third Row – geometric microliths
Fourth Row – bondi points, eloueria, bipolar cores, edge- ground axe-head

Figure 2: Stockton's Large and Small Tool Tradition

Kelleher's Model (2002)

In 2002 Kelleher completed his thesis on the Archaeology of "Sacred Space" in the Blue Mountains. This model deals specifically with the spatial relationships of sacred behaviour, and attempts to identify religious behaviour in the archaeological record.

This model purports to identify "the often latent connections between places in the Blue Mountains, by understanding religion as a process (a behaviour) not a specific set of elements" (Kelleher 2002:275). Based on statistical significance, the thesis data are interpreted as showing that five particular sites relate more strongly to the fundamental principles of religious behaviour than the region's normal range of activities (Kelleher 2002:276).

The model consists of four steps that Kelleher defines as giving archaeologists a useful template to reconstruct religious behaviour.

1. Behavioural model

This model assumes that the "organization of space becomes increasingly formal in approaching a sacred focus point".

2. Regional database

Constructed from a range of location and archaeological features, that identifies variables such as spatial proximity, homogeneity and geographic features.

3. Indicator model

Examines the regional archaeological data matrix for anomalies, as religion is a distinct process and will at times reveal anomalous patterns. The anomalies can then help to understand how religion shapes culture.

4. Assessment

Examines the places that contain anomalies and identifies differences, patterns and correlations with the model and what their distribution indicates about past organisation of activities.

Therin's Model (2005)

Therin developed a model for distribution of sites in the landscape which can be summarised as:

- The presence of rock shelters where suitable sandstone outcrops occur primarily along the steeper valley sides
- The presence of grinding grooves where sandstone outcrops occur in creek lines
- A low probability for the presence of scarred trees. There is a low possibility that suitable old growth trees have survived in or around the study area.
- Moderate to high density artefact scatters on low gradient elevated areas in proximity to drainage lines or swamps or on flat ridge tops, and
- Low density artefact scatters through out the landscape.

Implications for Site Distribution in the Study Area

Camp site locations

Making predictions about where Aboriginal people were likely to have camped is a difficult process. There are many variables that influence people's decisions as to what is a good site to camp, produce art or engage in some other activity. These choices involve environmental, social and cultural variables that change over time.

How people have used the landscape also varies in relation to the type of activity they were undertaking. Several authors describe different site types as evidence of differing activity levels. **Table 2** summarises the descriptions of site types:

Author	Camp	Description
Therin (2005)	Moderate to low density sites	Close to drainage lines or swamps on flat ridge tops
	Low density sites	Throughout the landscape
Lennon (1983)	Home base subsistence campsites	Associated with swamp areas
McIntyre (1990)	Major sites and complexes	Heads of gullies and valleys with resource zones and permanent water
	Small sites and complexes	Associated with pathways between major sites. Also related to hunting and resource collection
Stockton (1993)	Base camps	Identifiable by presence of "small tool assemblage"
	Satellite or special activity areas	Identifiable by presence of "large tool assemblage"

Table 2: Camp site descriptions

The archaeological record represents the remains of different types of activity at discrete spaces. Camp sites were constructed and used as either short term or long-term camps. Campo activity determines the signature of the archaeological record.

Resource Zones

Most agree that "resource zones" (both food and resource) were one of the major drivers for activity (Johnson 1979; Bowdler 1981; Conyers 1985; McIntyre 1990; Stockton 1993). The relationship between food availability and occupation is identified by Bowdler (1981) and Johnson (1979) and reinforced by Stockton (1993) as being a driving force in camp site selection.

Resource zones identified include swamps (Lennon 1983; Therin 2005), heads of gullies and valleys (McIntyre 1990) and valleys and gullies away from plateau (Johnson 1979). McIntyre (1990) notes resources, water sources, vantage points and specialist resources are important.

An analysis of potential resources in the Mountains found the whole region to be reasonably rich in food and resources. Further work is required to better understand this aspect of Aboriginal occupation of the Mountains particularly in regards to temporal availability of resources.

Landscape Position

The position in the landscape was also a major driver for selection of activity sites. Slope is identified by Stockton (1993) as the major driver for open sites in the Mountains.

An analysis of the location of artefact features from AHIMS shows that 76% of artefact features are located roughly within the upper, mid, flat and lower slopes, with only 9% on ridges and 15% in valleys. As we cannot separate sheltered and open campsites, it is possible that the upper to mid slope represents that band of sandstone shelters occurring at about the upper to mid slope on most sandstone ridges.

Topographic Position	AFT
Ridge	9
Upper Slope	25
Mid Slope	38
Flat Slope	5
Lower Slope	7
Valley	15

Table 3: Topographic Position of Artefact Features

Shelter or open camp site choice

The distribution of artefacts in the region is partly driven by the choice of rock shelters or huts constructed of bark. There is some ethnographic evidence for the selection of shelters above hut or open camps. Barrington (1985) and Tench (1996) noted that people generally prefer rock shelters over open camp sites. However, this would be driven by the status of the group. Given that the creation of a hut based camp took some time, they may have only been used for long-term camping.

Site Features identified during survey and desktop survey

Both the field survey and desktop survey identified a range of site features that had previously been documented along with new site features that have been included.

TYPE	SITE FEATURE	SITE ID	EASTING	NORTHING
Megalong Creek Campsite Complex	ARTEFACT	MC 1	243704	6263534
Megalong Creek Campsite Complex	ARTEFACT	MC 2	243912	6263514
Megalong Creek Campsite Complex	ARTEFACT	MC 3	243932	6263518
Megalong Creek Campsite Complex	ARTEFACT	MC 4	244144	6263639
Megalong Creek Campsite Complex - Stone Arrangement	STONE ARRANGEMENT	MC 5	244211	6263668
Megalong Creek Campsite Complex	ARTEFACT	MC 6	244214	6263685
Megalong Creek Campsite Complex	ARTEFACT	MC 7	244370	6263835
Megalong Creek Campsite Complex	ARTEFACT	MC 8	244392	6263869
Megalong Creek Campsite Complex	ARTEFACT	MC 9	244427	6263966
Megalong Creek Campsite Complex	ARTEFACT	MC 10	244492	6264071
Megalong Creek Campsite Complex	ARTEFACT	MC 11	243666	6263520
Megalong Creek Campsite Complex	ARTEFACT	MC 12	243639	6263539
Megalong Creek Campsite Complex	ARTEFACT	MC 13	243607	6263550
Megalong Creek Campsite Complex	ARTEFACT	MC 14	242982	6263688
Megalong Creek Campsite Complex - grindstone	ARTEFACT	MC 15	242932	6263641
Megalong Creek Campsite Complex	ARTEFACT	MC 16	243083	6263633

Megalong Creek Campsite Complex	ARTEFACT	MC 17	243330	6263545
Alum Creek Campsite	ARTEFACT	AC 1	238542.5	6262583
Campsite	ARTEFACT	Site 18	234941.7	6260826
Campsite	ARTEFACT	Site 18	234951.5	6260824
Campsite	ARTEFACT	Site 19	224575.1	6256713
Campsite	ARTEFACT	Site 20	224433.7	6253853
Lynch's Land	Aboriginal Ceremony and Dreaming	ACD 1	238411.5	6262817
Megalong Cemetery	BURIAL	Burial 1	243551.1	6263502
Megalong Cleft	Aboriginal Ceremony and Dreaming	ACD 2	248642.3	6266441
Mini Mini Campsite complex	ARTEFACT	MM 1	236302.9	6262371
Jenolan Caves	Aboriginal Ceremony and Dreaming	ACD 3	224321.7	6253686
Devils Hole	Aboriginal Ceremony and Dreaming	ACD 4	248801	6264873

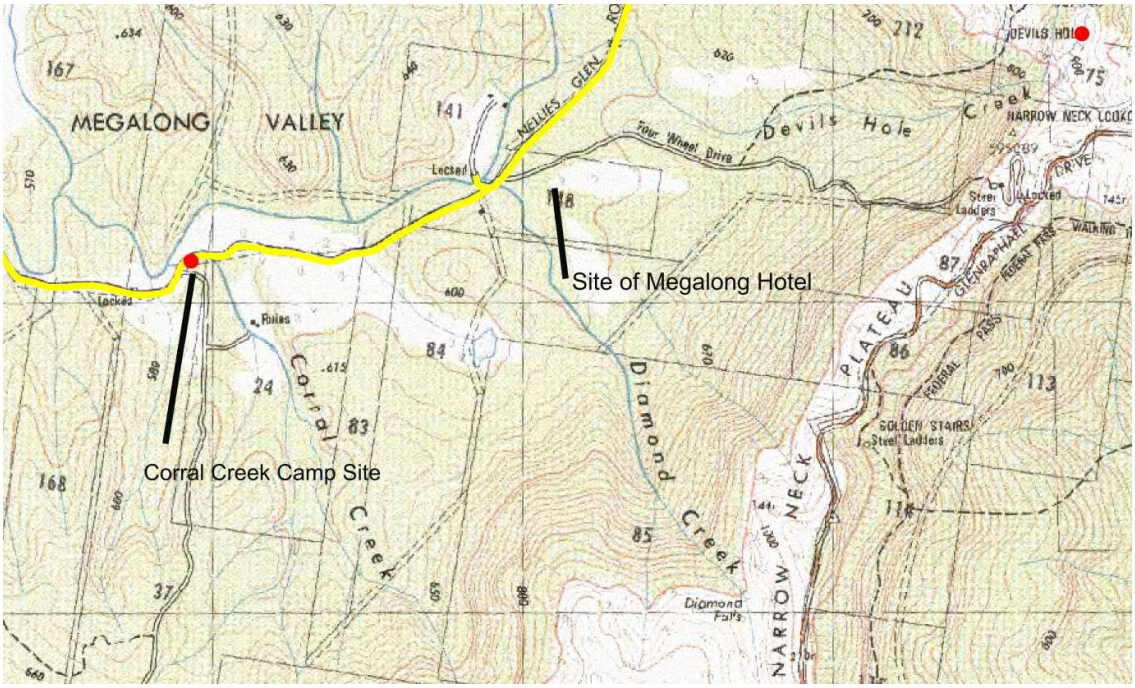
Corral Creek Camp

Corral Creek is a tributary of Megalong Creek. It is possible that this is the fringe camp associated with the Nellies Glen Shale Mining settlement. The history of this fringe camp has been documented by Johnson (2004). During his survey, evidence of stone tool usage was noted but little evidence of modern material such as glass, metal, or ceramic was found. It may be that the actual fringe camp existed outside the track and lack of visibility or access made identification of modern material impossible.

This site was disturbed by track work and is subject of a separate report for Blue Mountains City Council (see **Appendix 2**)

This report identified a large camp site along the track on Corral Creek. Raw material for artefacts found in this site could possibly have come directly from Corral Creek as it contains quartz and chert cobbles suitable for artefact production (see **Figure 2**)

Figure 2: Cobbles of suitable raw material for artefacts, Corral Creek



Map 2: Location of Corral Creek Camp Site

Brief history of Nellies Glen Fringe Camp

The Nellies Glen Fringe camp formed Circa 1894. Noted in a local paper was a funeral held at the Nellies Glen settlement of a local Aboriginal woman *(The Mountaineer* 23/11/1894: Johnson 2004). By 1895 the settlement was experiencing problems due to an influenza epidemic. The local Megalong Progress Association in that year wrote to the Aboriginal Protection Board, and extra rations were provided to one of the families in the camp. In August 1896 a two-hour performance by local Aboriginal people was held in the Megalong Hall (Shaw 1988). By the following year, the Nellies Glen Shale Mine had closed and the Aboriginal people at the fringe camp had moved to Kurranburrak Reserve on Pulpit Hill Creek (Johnson 2004). By 1900 most Aboriginal people in the area of the track had moved to the Gully in Katoomba (Johnson 2004).

Devils Hole Dreaming Site

Devils Hole is one of the passes from Katoomba down into the Megalong valley. The use of this pass to access the valley probably contributed to location of both the Corral Creek and Mitchell Creek campsites.

Megalong Creek Camp site Complex

This series of camp sites is located on the slopes to the south of Megalong Creek. While the artefacts appear in erosion scares and tracks the distribution is likely to cover the entire southern bank of the creek in this section of the track. Sites were recorded where artefacts were visible. There are several sites listed on AHIMS for this section of the track. These are listed in **Table 3**. During the survey a series of sites were found along the track to the east of the Megalong Road. This is essentially an extension of the Megalong creek site complex. The road and track have disturbed this site complex where it passes and artefacts are visible in parts.

Noted during the survey was the occurrence of “graderfacts” which are flakes created by the blade or tracks of either a grader or bulldozer. These then move down the track when eroded by water and traffic movement, giving the impression of a scatter of artefacts as shown in **Figure 3:**

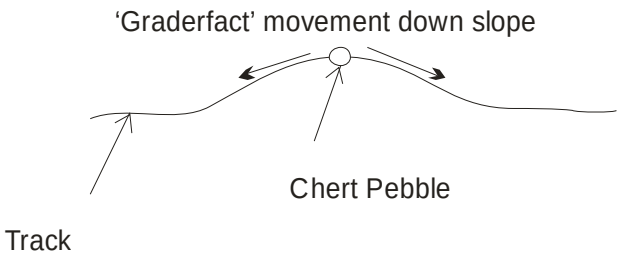


Figure 3: 'Graderfact' movement down slope on track

The pebbles have been introduced into the track from base material used to form the roads. An example is shown in **Figure 4**. This pebble shows a scar that can produce a flake that could easily be identified as an artefact.

Due to disturbance of the area along the Megalong Creek, visibility was low to medium beyond the track. In this instance, the predictive model can assist in the identification of areas that may contain evidence of certain activities.

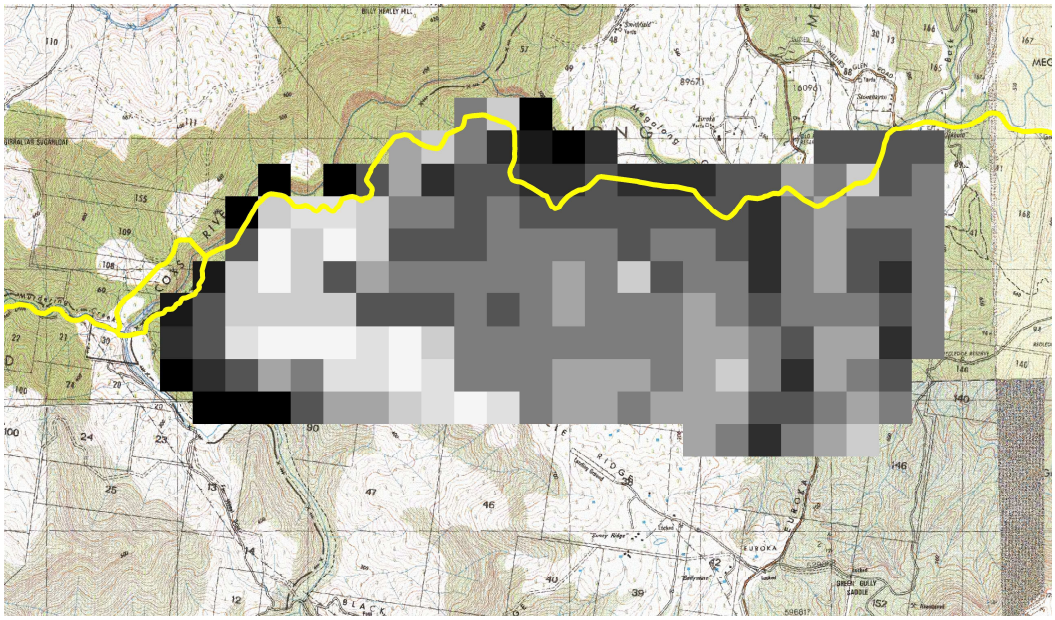
Figure 4: Chert pebble found on side of track

SITE_ID	SITE_NAME	EASTING	NORTHING	SITE_FEATU	SITE_RECOR
45-4-0119	Megalong Creek 1	243777	6263359	AFTEFACT	ASRSYS
45-4-0120	Megalong Creek 2	243321	6263259	AFTEFACT	ASRSYS
45-4-0121	Megalong Creek 3	243135	6263438	AFTEFACT	ASRSYS
45-4-0122	Megalong Creek 4	242677	6263429	AFTEFACT	ASRSYS
45-4-0123	Megalong Creek 5	242400	6263607	AFTEFACT	ASRSYS
45-4-0124	Megalong Creek 6	241761	6263503	AFTEFACT	ASRSYS
45-4-0979	DR1	242050	6263450	AFTEFACT	Corkhill
45-4-0981	Billy and Fanny Lynch Graves	243550	6263500	BURIAL	Allen
45-4-0982	Billy and Fanny Lynch Graves	243550	6263500	BURIAL	Brennan
45-4-0984	DR2	242250	6263670	AFTEFACT	Corkhill

Table 4. AHIMS sites associated with Megalong Creek

SITE	TYPE	East	North
MC1	ARTEFACT	243704	6263534
MC2	ARTEFACT	243912	6263514
MC3	ARTEFACT	243932	6263518
MC4	ARTEFACT	244144	6263639
MC5	STONE ARRANGEMENT	244211	6263668
MC6	ARTEFACT	244214	6263685
MC7	ARTEFACT	244370	6263835
MC8	ARTEFACT	244392	6263869
MC9	ARTEFACT	244427	6263966
MC10	ARTEFACT	244492	6264071
MC11	ARTEFACT	243666	6263520
MC12	ARTEFACT	243639	6263539
MC13	ARTEFACT	243607	6263550
MC14	ARTEFACT	242982	6263688
MC15	ARTEFACT	242932	6263641
MC16	ARTEFACT (grindstone?)	243083	6263633
MC17	ARTEFACT	243330	6263545

Table 5: Sites found associated with Megalong Creek



Map 3: Megalong Creek extract of predictive model (John need to explain)

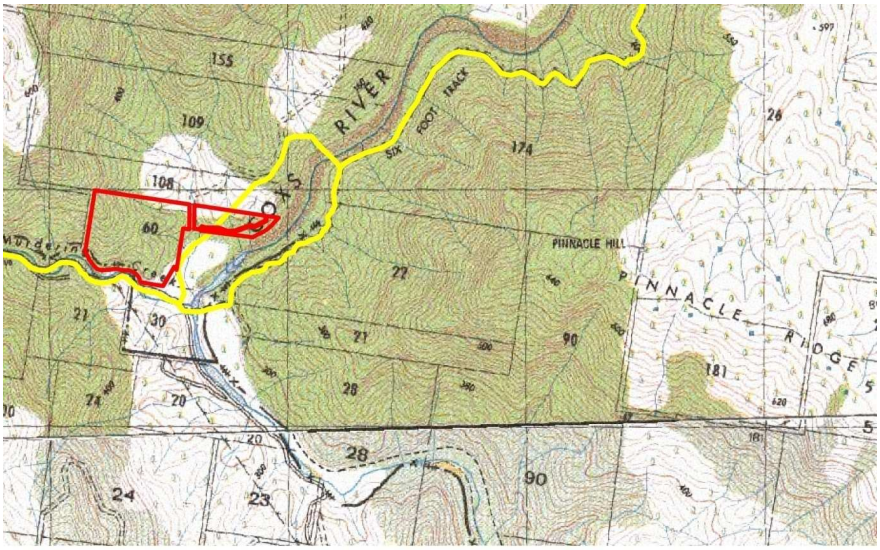
Megalong Cemetery

Megalong cemetery on the track contains the burials of Gundungurra people. A plaque at the front lists several families. Only one identified grave exists in the cemetery which is of Fanny Lynch, the wife of Billy Lynch. The Lynch were a prominent family in the Megalong in the late 1800's living on the Cox's river on a selection of land made by Joseph Lynch (see Lynch Land) (Integrated Site Design 1997; Johnson 2004)

Figure 5: Fanny Lynch Grave stone

Lynch Property

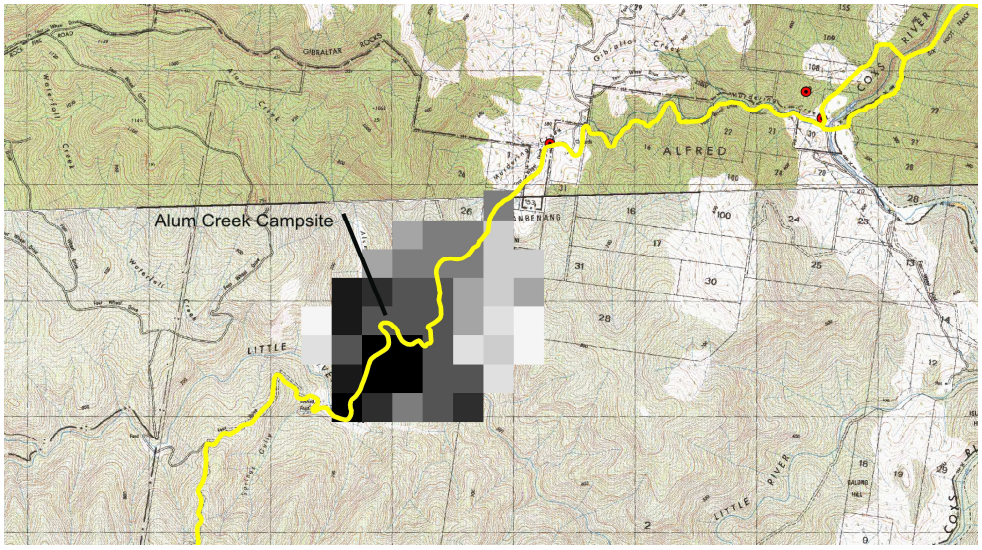
In 1888 Joseph Lynch made a selection of land on the Cox's River. Billy Lynch, Josephs father moved the after he retired. In 1903 the selection was sold to another settler.(Intergrated Site Design 1997; Johnson 2004)



Map 4: Lynch Selection

Alum Creek Campsite

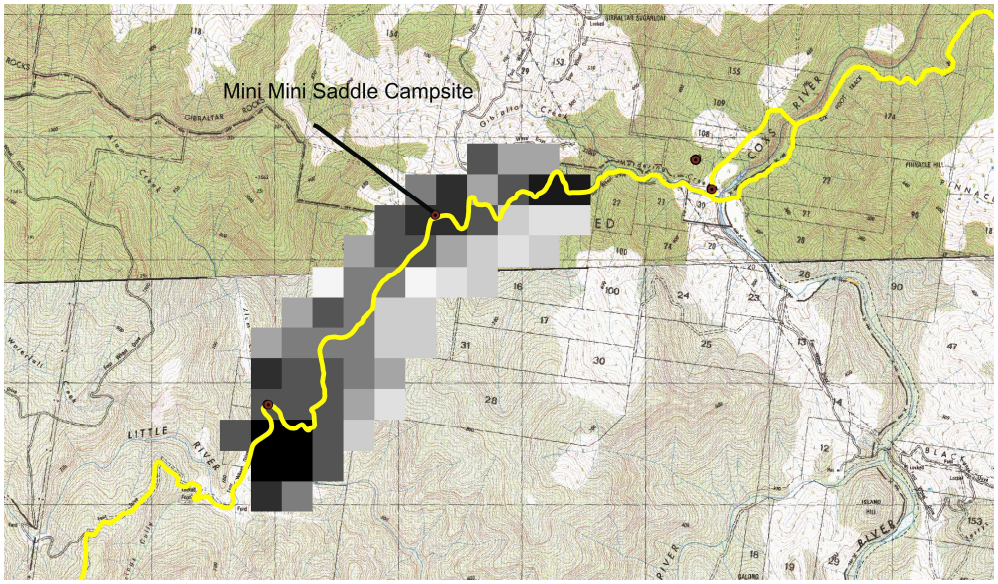
The Alum Creek campsite is located on Mini Mini Saddle just off Alum Creek. Artefacts were found at the road where the track slopes down to the camp ground passes. The predictive model shows this to be an area of high likelihood for campsites as shown in **Map 5**:



Map 5: Alum Creek Predictive model extract

Mini Mini Campsite

William Cooper when surveying the track noted in 1884 a “Black’s Camp” that was at that time still being used. There are artefacts reported surrounding this site by Smith in (Intergrated Site Design 1997). The predictive model again shows this area to be high likelihood of the occurrence of sites as shown in **Map 6**:



Map 6: Mini Mini Saddle extract of predictive model

Conclusion

Summary of the Archaeology of the Six Foot Track

The Six Foot Track covers a variety of terrain types between Katoomba and the Jenolan Caves. The Megalong Valley through which it passes before climbing into the Black Range is a resource-rich area that has significant evidence of occupation by Aboriginal people, both in traditional times and more recently. The valley has received little archaeological attention, but what has been done reveals the value of this area as a living place.

The cliffs around the Megalong Valley are rich in raw material for artefacts, and the creeks to the east of the valley contain cobbles of this material which were utilised to manufacture a range of tools. There is evidence of weapon making in the number of remaining shield trees in the valley. A toe-hole tree that has fallen on the Megalong Road remains as evidence of the collection of resources.

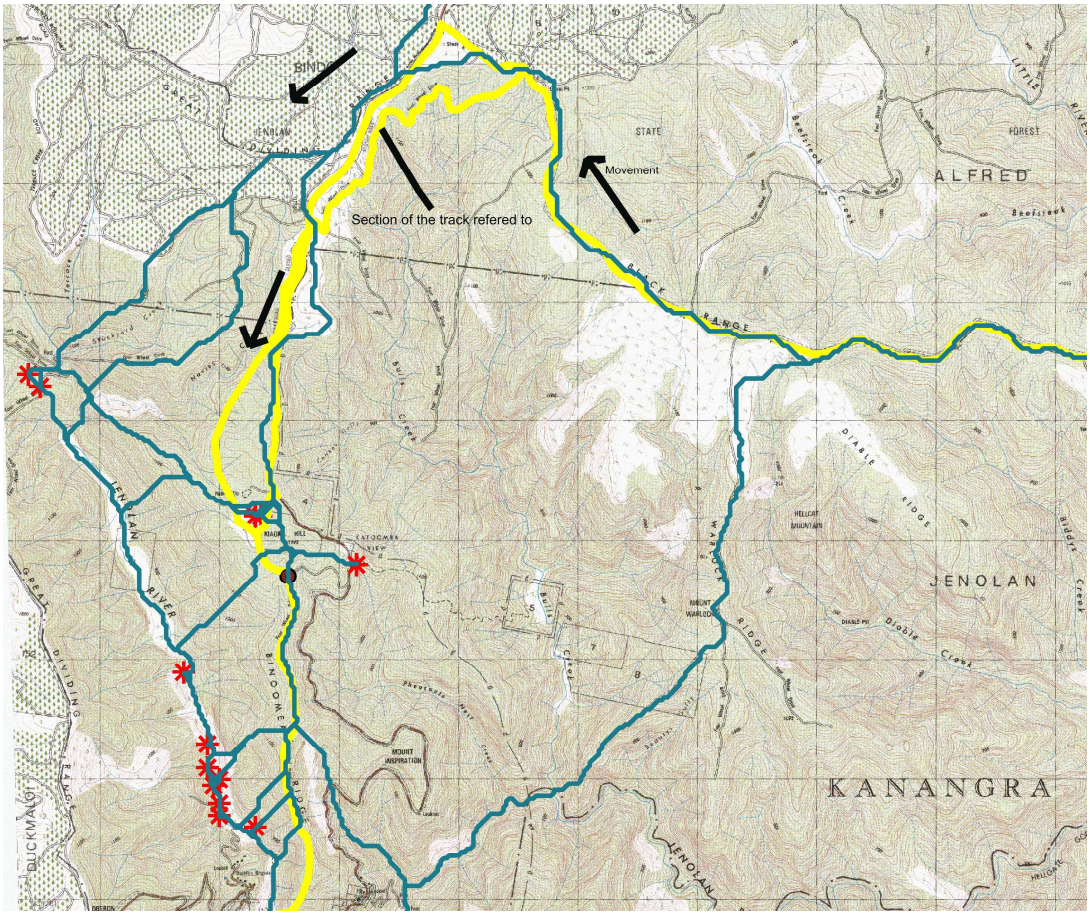
Swamp and creek lines surveyed by the authors and others show a concentration of activity in these areas. Barrett (1993) believes that the Six Foot Track forms part of a traditional travel route across the valley. This would explain the type of sites and activity found at the Megalong creek complex, which runs almost the full length of the Megalong Creek. This area would have provided easy access to the Wild Dogs Range to the south, the Black Range to the west and the Blue Mountains Plateau to the east. Historical records of Aboriginal people living in the valley documented this use of the passes up the cliff face to access the plateau (Barrett 1993; Integrated Site Design 1997; Johnson 2004).

The Megalong Valley and surrounding valleys were the location of many Gundungurra Dreaming stories which are related to the dramatic cliffs and valleys we see today (Smith 1992; Johnson 2004). These stories provide a rich insight into the Aboriginal way of thinking about the world.

As you cross the Cox's River you climb out of the valley to the Black Range. This region is not well known archaeologically. A lack of research has left a gap in the knowledge of the Aboriginal use of this region. With the relative ease of access across the Black Range it must have formed part of Barrett's pathway (Barrett 1993). The slopes up to Black Range provide evidence of access at Mini Mini camp ground and Alum Creek camp ground. This survey failed to provide any further evidence of use by Aboriginal people across the Black Range, and with the small window the track provided into the archaeology of the area, this is of little surprise. The actual paths used and areas preferred may lie outside the survey area of this study.

One interesting part of the investigation was the section of the track between the Black Range Camp ground and where it crosses the Jenolan Caves Road. No evidence of occupation was found despite suitable access to the ridges, swamps

and creeks below along with ample raw material for tools in the quartz that is found on most of the ridges in this area. A pathway analysis was used to find the least-cost path through a grid of resistance to movement. This mapped the path for easiest movement through the area. The results of this analysis are shown in **Map 7**.



Map 7: Pathway analysis of Jenolan Caves end of Track (Shaun explanation)

The results of this analysis show that the area between Black Range Camp Ground and the crossing at Jenolan Caves Road was potentially not used as an access way, as moving along the ridges to the west of the Jenolan Caves Road and down the Jenolan River was an easier route. This pathway also shows evidence of use with numerous camp sites along its length. Access from the east seems to have been blocked to some extent by Bulls Creek and Warlock Ridge providing a greater ease of access through this western route.

This type of analysis only indicates the ease of access through the landscape and cannot replace a landscape wide survey, but it does provide a level of understanding of the potential movement patterns through the landscape.

The Binoomea Ridge shows evidence of being an access route, with Jenolan Caves being the focus destination. The potential of the water in the caves as a healing

resource (Integrated Site Design 1997) would have brought people to the area to utilise this resource.

There is significant evidence of the historical use of the track by Aboriginal people living in the Megalong Valley. Associations with the Nellies Glen settlement, Megalong Cemetery, the Lynch Family selection, and the numerous camp grounds show Aboriginal people using the Six Foot Track (Johnson 2004) until most people had moved to the Gully in Katoomba following the fire and rabbit plague in the early 1900's (Johnson 2004).

Management of Aboriginal Cultural Heritage on the Six Foot Track

To allow for the continued maintenance and development of the Six Foot Track while conserving the Aboriginal cultural heritage or the area requires some specific management strategies to be put in place. These need to be based on a sound knowledge of the cultural heritage of the area and best practise in terms of indigenous heritage conservation

The use of a Risk Assessment for Aboriginal cultural heritage has been applied in wildfire suppression in the Blue Mountains (Hooper 2007) and is applicable in the management of the Six Foot Track. The process essentially looks at the activities being undertaken and the risks associated with undertaking these activities and developing mitigation strategies to deal with the risks. They provide essential guidance both to planning staff as well as field staff in how they go about their work.

The risk assessment should be developed in consultation with local Aboriginal community and planning and field staff to ensure that the outcomes are able to practically be implemented. A draft risk assessment is attached see Appendix 5

The recommendations of this report are as follows:

- Development of a risk management strategy for Aboriginal cultural heritage. This will allow field and planning staff to undertake work in the area with appropriate awareness of the issues that need to be considered, and actions that need to be taken to conserve Aboriginal cultural heritage along the track.
- Training for field and planning staff in site identification, Aboriginal heritage management and cultural awareness. This will provide a sound basis for implementation of the risk management strategy.
- Increased interpretation of Aboriginal heritage values along the track. This will raise awareness with walkers and visitors to conserve Aboriginal heritage while using the track.
- Development of a strategy to conserve exposed artefacts along the track. This needs to be done in consultation with the relevant Aboriginal community. Options for this could include development of a display at Jenolan Caves which could exhibit collected artefacts and provide information to the general community about the history and cultural heritage of the track.

Appendix 1: AHIMS

What is the AHIMS?

The Department of Environment and Conservation in New South Wales is charged with the regulation of destruction of Aboriginal sites and places. This is controlled by section 90 of the National Parks and Wildlife Act (1974)[2]. The Aboriginal Heritage Information Management System (AHIMS) is the central repository for Aboriginal site reports in NSW. It is maintained by the Cultural Heritage Branch of the Department of Environment and Conservation.[3] For a site to be issued with a "consent to destroy" it must be registered with the DEC on their AHIMS. AHIMS is described as "a database recording all Aboriginal objects, Aboriginal places and other Aboriginal heritage values in NSW that have been reported to the NPWS and a database index of archaeological reports and a library of these reports"[4]

AHIMS is a register of known Aboriginal sites and has no criteria for registration except that item being registered is either Aboriginal object [5] or Aboriginal Place under the National Parks and Wildlife Act. It is different in this way to other state and national heritage registers that have criteria for listing. There is a requirement under section 91 of the National Parks and Wildlife Act[6] to notify DEC of the existence of an Aboriginal site within a reasonable time.

AHIMS has undergone several major changes over the years[7] which have had an impact on its value as a research tool. Most of this work has been done to facilitate the extraction and provision of site locations to developers.

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[2] National Parks and Wildlife Act 1974 No 80 (NSW)

[3] See NSW DEC (2005) "Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit." DEC Hurstville for a comprehensive history of AHIMS

[4] http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Aboriginal+Heritage+Information+Management+System accessed 10/18/2006

[5] "**Aboriginal object** means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains." And "**Aboriginal place** means any place declared to be an Aboriginal place under section 84." National Parks and Wildlife Act 1974 No 80 (NSW)

[6] Section 91 "**Notification of sites of Aboriginal objects** -" National Parks and Wildlife Act 1974 No 80 (NSW)

[7] See NSW DEC (2005) "Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit." DEC and social significance paper for mode description

Definitions – places, objects and the like

The National Parks and Wildlife Act has specific definitions that it uses as well as the AHIMS database.

New site Features	Code	AHIMS Definition
Artefact	AFT	Objects such as stone artefacts (pieces used as tools as well as waste products) including fish-hook files, grindstones, ground-edge hatchets/axes and Manu ports; wood implements such as spears, boomerangs, clubs and shields; shell implements such as shell fish-hooks, 'scrapers' and shells hafted onto the end of spear-throwers; and glass, metal and ceramic artefacts made or used by Aboriginal people in the historic period.
Earth Mound	ETM	Raised earth platforms that functioned as cooking ovens, plant processing and habitation sites associated with inland NSW and Victorian river systems. In AHIMS, commonly applied to a mounded shell midden deposit.
Shell Artefact	SHL	Places where shell from beach, estuarine or river species have accumulated as a result of Aboriginal gathering and food consumption. Shell middens vary in size from a few scattered shells to extensive shell deposits, which may include artefacts, hearths, animal bones, other organic material, ochre and burials.
Hearth	HTH	A fireplace or camp site, represented archaeologically by concentrations of charcoal, ash and/or hearth stones or discoloured/burnt earth or other materials such as heat treated stone fragments.
Habitation Structure	HAB	Structures produced by, or for, Aboriginal people for short or long-term shelter. Include structures, or remains of structures, at historic living places such as missions, reserves and fringe camps.
Potential Archaeological Deposit	PAD	An area where surface artefacts may or may not have been identified and where sub-surface artefacts and/or other cultural materials are likely to occur.

Non-human Bone/Organic Material	BOM	Objects most commonly found within Aboriginal archaeological deposits including bone tools, faunal remains (such as fish, bird or mammal bones), and plant remains (charcoal, resin, twine and plant food). Also includes fishing lines and nets, net bags, and ornaments such as armbands, belts, necklaces and pendants.
Aboriginal Resource and Gathering	ARG	Relates to places/landscapes where food gathering, hunting, or collection and manufacture of materials and goods for use or trade were undertaken. Wild resource places are those locations where people have obtained wild foods, medicines and materials in the historic past and during the current day (English 2002:2).
Modified Tree	TRE	Locations where either carved or scarred trees occur or were known to have occurred. Trees into which designs were carved are usually associated with burials, ceremonial grounds and/or territorial markers. Scarred trees have a scar(s) where a section of bark or wood was removed in order to make a canoe, shield or container, or where footholds were cut into the tree trunk to gain access to resources such as possums or honey.
Fish Trap	FSH	Constructed stone or brush weirs or walled enclosures designed to trap fish. May be situated on coastlines or along water courses.
Grinding Groove	GDG	Grooves formed by rubbing stone, wood or bone pieces on a rock surface during implement manufacture or re-sharpening. Also includes circular or oval shaped ground areas formed during food processing or powdering ochre.
Ochre Quarry	OCQ	Source of earth used as a pigment for art (drawing, painting or stenciling images on rock surfaces, as well as decorating bodies, tools and weapons), for ceremonial occasions, burials and trade. Usually comprise clays coloured by red, brown and yellow iron oxides or white clay pigments.

Stone Quarry	STQ	Location from where stone has been removed by Aboriginal people from a stone raw material source for use in the production of stone tools. Includes locations where pebbles or cobbles where obtained from, for example, gravel beds or eroded conglomerate sediments. Also termed 'stone source' or 'extraction site'.
Water Hole	WTR	Natural or human-made cavities where fresh water could be obtained. Waterholes may have been a source of water for Aboriginal groups which may have ceremonial or spiritual significance and/or may also be used to the present day as a rich resource gathering area (eg waterbirds, eels, clays, reeds, etc).
Art	ART	Visual images created on rock surfaces - in rock shelters or on rock platforms. Includes images created using pigments and charcoal (paintings, drawings and stencils) or engraved images created by pecking, pounding, abrasion and/or scratching.
Aboriginal Ceremony and Dreaming	ACD	Spiritual/story places/landscapes where no physical evidence of previous use of the place may occur. Such places include natural landscape features, ceremonial locations, men's/women's places, creation stories and tracks, and may include birth, marriage and burial places.
Ceremonial Ring	CMR	'Bora grounds' comprise a single or double raised-earth circle with or without a connecting pathway. Usually these are places for male initiation ceremonies.
Stone Arrangement	STA	Humanly arranged stones or rocks, which form lines and circles as well as cairns and piles (heaps), sometimes in complex groups. Stone arrangements are associated with ceremonial activities, or used as markers for territorial limits or to mark/protect burials.
Burial	BUR	Location(s) where Aboriginal people were buried and/or where human remains have been found. Burials may be either pre- or post-contact in age and may occur in shell middens, in sandy soils, in caves or in historic cemeteries and may or may not be marked by carved trees, stone arrangements or headstones.

Conflict	CFT	Places where confrontations occurred between Aboriginal and non-Aboriginal people, or between different Aboriginal groups.

Aboriginal Place

An Aboriginal Place is defined as "any place declared to be an Aboriginal place under section 84." (National Parks and Wildlife Act, 1974. No. 80). Section 84 of the same act sets out how an Aboriginal place can be created. The Minister for the environment can declare an Aboriginal place that "being a place that, in the opinion of the Minister, is or was of special significance with respect to Aboriginal culture, to be an Aboriginal place for the purposes of this Act."[8]

Aboriginal Object

An Aboriginal object is defined under the National Parks and Wildlife Act 1974 No 80 (NSW) as any "deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains."

Aboriginal Remains

Aboriginal remains are defined in the National Parks and Wildlife Act 1974 No 80 (NSW) as:

"the body or the remains of the body of a deceased Aboriginal, but does not include:

(a) a body or the remains of a body buried in a cemetery in which non-Aboriginals are also buried, or (b) a body or the remains of a body dealt with or to be dealt with in accordance with a law of the State relating to medical treatment or the examination, for forensic or other purposes, of the bodies of deceased persons."

What data does AHIMS contain?

For a site to be registered on AHIMS a site card is required to be submitted by the person recording the site. Over the years the type of site card has changed and site cards from other registers and projects have been incorporated into the database. The level of information and types of data collected varies between these site cards.

The information provided in the extract from AHIMS currently contains a set of attributes for each site card. The ones made public include:

SITE_ID	This is a unique code that gives some information about the location of the site
SITE_NAME	This is a name given by the person who records the site. It is usually

[8] Section 87 of the National Parks and Wildlife Act 1974 No 80 (NSW)

	the identification code used in the recorders notes/report prior to being given an AHIMS code.
GRID_REFER	
ZONE	
EASTING / NORTHING	Australian Map Grid (AMG) co-ordinates identifying the location[9] Geographic co-ordinates identifying the location. This information provides coordinates from the 1:25000 topographic map. The Australian Map Grid is a special type of mapping projection.
LATS	
LONGS	
NAME	Name of the recorder
ABLC	Aboriginal Land Council
DIR_NAME	DEC Directorate Name
VALIDITY_S	Validity of record
GENDER_RES	If a gender based restriction is on the record
GENERAL_RE	If a general restriction is on the record
SITE_FEATU	This is the code for each different feature type: ACD Aboriginal Ceremony and Dreaming ARG Aboriginal Resource and Gathering ART Art AFT Artefacts BUR Burials CMR Ceremonial Ring CFT Conflict ETM Earth Mound FSH Fish Trap GDG Grinding Grooves HAB Habitation Structure HTH Hearth TRE Modified Tree

[9] This is sometimes denatured so to conceal site locations

	BOM Non Human Bone and Organic Material OCQ Ochre Quarry PAD Potential Archaeological Deposit SHL Shell STA Stone Arrangement STQ Stone Quarry WTR Waterhole
SITE_RECOR	Who recorded the site
X_COORD	Grid coordinate
Y_COORD	Grid coordinate

Aboriginal Site Types

AHIMS uses 20 different site features[10] to describe Aboriginal cultural heritage registered in AHIMS.

- Aboriginal Ceremony and Dreaming
- Aboriginal Resource and Gathering
- Art
- Artefact
- Burial
- Ceremonial Ring
- Conflict
- Earth Mound
- Fish Trap
- Grinding Groove
- Habitation Structure
- Hearth
- Non-human Bone/Organic Material
- Ochre Quarry;
- Potential Archaeological Deposit;
- Shell
- Stone Arrangement
- Stone Quarry
- Modified Tree
- Water Hole

[10] DEC 2005, "Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit" A repost prepared for DIPNR, Hurstville, NSW pg 65

Issues with AHIMS Data

A review of literature revealed an array of issues with data accuracy:

Issue	Comments	Effect on Accuracy	Mitigation Strategy
Use of records from other agencies and external researchers to start the Sites Register.[11]	AHIMS inherited the issues with each of these databases.	Location details may not be correct and information incomplete	Field check sites
Lack of detail about sites	Original site cards held little information other than basic location details. [12]	Location details may not be correct and information incomplete	Field check sites
No field checking of site cards when deposited.[13]	This has led to duplication of sites and issues of accuracy of recording	Location details may not be correct and information incomplete	Field check sites

[11] DEC 2005, "Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit" A repost prepared for DIPNR, Hurstville, NSW

[12] NPWS 2001, "Blue Mountains Special Areas: Background Research for SACHAMP" Produced by the Regional Studies Unit, Cultural Heritage Division, NSW NPWS, Hurstville, NSW.

DEC 2005, "Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit" A report prepared for DIPNAR, Hurstville, NSW

Conversion of sites records from Imperial map sheets to metric map sheets[14]	In the 1980s site coordinates were converted form the imperial 1:63k to 1:250k metric and then to 1:25k metric map sheets.	Location details may not be correct Most evident in pre 1980s site cards	Field check sites
Typographical errors[15]	The original site register did not have the capacity to identify typographical errors such as map sheet numbers or grid references. Data entered in the system between 1986 and 1998.	Location details may not be correct	Field check sites
Migration to AHIMS[16]	In 2001 the sites register was integrated into AHIMS. As part of this process the 36 site type categories of the sites register were mapped to 20 site feature categories. This process introduced an estimated 20 % error in the data.	Some site feature types may be incorrect	Field check sites
Site destruction (both natural and man made causes)	Sites are not static through time. There are a large number of impacts that affect the integrity of a site. Erosion can for example	Sites may be registered but no longer exist	Field check sites

[14] DEC 2005, "Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit" A report prepared for DIPNAR, Hurstville, NSW
and NPWS 2001, "Blue Mountains Special Areas: Background Research for SACHAMP" Produced by the Regional Studies Unit, Cultural Heritage Division, NSW NPWS, Hurstville, NSW.

[15] DEC 2005, "Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit" A report prepared for DIPNR, Hurstville, NSW

[16] ibid

	redeposit a site or it may have inadvertently been destroyed.		
New site feature types	New site feature types were created and the old types merged into the new set	merging without checking card may lead to errors	Field check sites
Recording errors	These errors in the initial recording of the site are essentially out of the control of DEC or the end users of the AHIMS records. Skills at map reading and use of a GPS, correct identification of what is an Aboriginal object, understanding what the Site card is asking for and general archaeological knowledge all contribute to how well a AHIMS site card is filled out and the accuracy of the information.		Field check sites
Data accuracy	Very little opportunity exists for field checking every site that is entered into AHIMS, so errors will occur.		Field check sites

Analysis of AHIMS Data

The data received from AHIMS was analysed to assist in the survey design. The analysis was GIS based.

Introduction

The study area for this survey was set as a 16 km by 30 km rectangle to cover a sufficient variety of landscapes. A search of the AHIMS records for the study region found that there are 50 sites listed. The largest number of these sites are Artefacts (30), followed by Grinding Grooves (9), and Burials (6).

Several site types are not represented in the AHIMS database and include:

- Aboriginal Resource and Gathering
- Ceremonial Ring
- Conflict
- Earth Mound
- Fish Trap
- Habitation Structure
- Hearth
- Non Human Bone and Organic Material
- Ochre Quarry
- Shell

It should not be interpreted that they are absent from the area, but examples have not yet been recorded in the region. (Holdaway 2005)

No	Code	Site Feature
30	AFT	Artefacts
9	GDG	Grinding Grooves
0	ART	Art
0	STA	Stone Arrangement
0	TRE	Modified Tree
0	WTR	Waterhole
1	PAD	Potential Archaeological Deposit
6	BUR	Burials
0	STQ	Stone Quarry
1	ACD	Aboriginal Ceremony and Dreaming
0	ARG	Aboriginal Resource and Gathering
0	CMR	Ceremonial Ring
0	CFT	Conflict
0	ETM	Earth Mound
0	FSH	Fish Trap

0	HAB	Habitation Structure
0	HTH	Hearth
0	BOM	Non Human Bone and Organic Material
0	OCQ	Ochre Quarry
0	SHL	Shell

Table 6: AHIMS Data Breakup

Topographic Position Relationships (position in the landscape)

An analysis was carried out to assess the location of sites found in the landscape. As the study area is so large, a simplified landscape analysis technique called Topographic Position was used. In this project a simplified 6 class topographic position index was used to identify key landscape elements(Weiss 2001). **Table 7** shows the results for this for the study area:

Topographic Position	ART	ACD	AFT	GDG	BUR	PAD	STA	TRE
Ridge	18		9	18			6	3
Upper Slope	26		25	25		1	8	1
Mid Slope	61	1	38	38			7	2
Flat Slope	1		5	5	2			
Lower Slope	10		7	7			1	1
Valley	1		15	15		2		2

Table 7: Topographic results of the study area

This was then broken up between the different site feature types and **Table 8** shows the outcomes:

No Sites	Name	Code
55	Ridge	Ri
100	Upper Slope	Us
187	Mid Slope	Ms
25	Flat Lower	Fs
46	Lower Slope	Ls
56	Valley	Va

Table 8: Topographic position of features

Appendix 2:

Nellies Glen Rd

Archaeological and Aboriginal Cultural Heritage Report

Appendix 3: Threat Analysis Template

Threat/activity	Risks to Aboriginal Cultural Heritage	Mitigation Strategy	Notes
Track maintenance work			
Bush regeneration			
Erosion			
Tree removal			
Track usage			
Bushfire hazard reduction			
Wildfire			

Bibliography

(1974). National Parks and Wildlife Act No 80. (NSW).

Anon (1910). Aborigine Legends: Mountain Rock Dogs. Blue Mountains Echo, 23 April. Katoomba.

Anon (1910). Another Legend: The Gobungs. Blue Mountains Echo, 11 June. Katoomba.

Attenbrow, V. (1994). The Aboriginal Cultural Environment. in An assessment of the World Heritage Values of the Blue Mountains and surrounding Plateaux Unpublished report to NPWS. T. James.

Barrington, G. (1985). A voyage to New South Wales : to which is prefixed a detail of his life, trials, speeches, etc. Sydney, (original 1803 M. Jones: London)View Productions.

Bowdler, S., Ed. (1977). The coastal colonisation of Australia. Sunda and Sahul; prehistoric studies in Southeast Asia, Melanesia and Australia London, Academic Press.

Bowdler, S. (1981). "Hunters in the highlands : Aboriginal adaptations in the eastern Australian uplands." Archaeology in Oceania **16**: 99-111.

Bowdler, S. (1981). "Hunters in the highlands: Aboriginal adaptations in the eastern Australian Uplands." Archaeological Oceania **16**: 99-111.

Conyers, B. (1985). Plan of Management Project Blue Mountains, Kanangra-Boyd & Wollemi National Parks Cultural Resource Management Aboriginal Sites. NPWS - Central.

Ebert, J. I. (2000). The state of the art in "inductive" predictive modeling: seven big mistakes (and lots of smaller ones). Practical applications of GIS for archaeologists. A predictive modeling kit. K. L. Westcott and R. J. Brandon. Philadelphia, Taylor and Francis**:** 129-134.

Gaffney, V. and M. van Leusen (1995). Postscript- GIS, environmental determinism and archaeology: a parallel text. Archaeology and geographic information systems: a European perspective. G. Lock and Z. Stancic. London, Taylor and Francis**:** 367-382.

Gollan, K. (1987). Archaeological Investigations On Newnes Plateau; A Report To The National Parks And Wildlife Service New South Wales. Sydney, NSW, National Parks And Wildlife Service.

Holdaway, S. (2005). "Absence of evidence or evidence of absence ? understanding the chronology of Indigenous occupation of western New South Wales, Australia
" Archaeology in Oceania **40**(2): 33-49.

Intergrated Site Design (1997). Six Foot Track Conservation and Management Plan Vol 1 and 2. Ultimo, NSW.

Johnson, D. (2004). Report to the Gundungurra Tribal Council concerning Gundungurra Native Title Claim. Katoomba, Gundungurra Tribal Council.

Johnson, L. (1979). The Getting Of Data. Canberra, Unpublished Ph.D. Thesis, Department Of Prehistory, Research School Of Pacific Studies, Australia National University, Canberra.

Kelleher, M. (2002). Archaeology of Sacred Space : The spatial nature of religious behaviour in the Blue Mountains National Park, Australia, unpublished thesis University of Sydney.

Lennon, R. (1983). The Great Wolgan Site Mystery: A Site Location And Exploitation Model Of The Blue Mountains. Department of Anthropology. Sydney, University Of Sydney.
McIntyre, S. (1990). Archaeological survey of the proposed Kariwara Longwall coal mine, Report for Electricity Commission of NSW.
Nanson, G. C., R. W. Young, et al. (1987). "Chronology and palaeoenvironment of the Cranebrook Terrace (near Sydney) containing artefacts more than 40,000 years old." Archaeology In Oceania **22**(2): 72-78.
Ridges, M. (2005). Regional dynamics of hunting and gathering. An Australian case study using archaeological predictive modeling. GIS and Archaeological Predictive Modeling. K. Westcott and M. Mehre. Boca Raton, Florida, Taylor and Francis.**:** 123-143.
Ridges, M. (2006). Mapping Country - Aboriginal Sites predictive Modeling. Katoomba, Blue Mountains World Heritage Institute.
Shaw, M. (1988). Historic Megalong Valley. Megalong Valley, Megalong Progress and Shooting Association.
Smith, J. (1992). Aborignal Legends of the Blue Mountains. Wentworth Falls.
Stockton, E. D. (1970). "An archaeological survey of Blue Mountains." Mankind **7**(4): 295-301.
Stockton, E. e., Ed. (1993). Blue Mountains Dreaming - The Aboriginal heritage of the Blue Mountains. Winmalee, N.S.W., Three Sisters Publication, .
Tench, W. (1996). Watkin Tench 1788. Melbourne, The Text Publishing Company.
Therin, M. (2005). Section 90 Consent to Destroy with Salvage Excavations for the Upper Kedumba River, 'The Gully' Sewerage Amplification Works. Therin Archaeological Consulting.
Weiss, A. (2001). "Topographic Position and Landforms Analysis. Poster presentation, ESRI User
Conference, San Diego, CA."
Wheatley, D. and M. Gillings (2002). Spatial technology and archaeology: The archaeological applications of GIS. New York, Taylor and Francis.