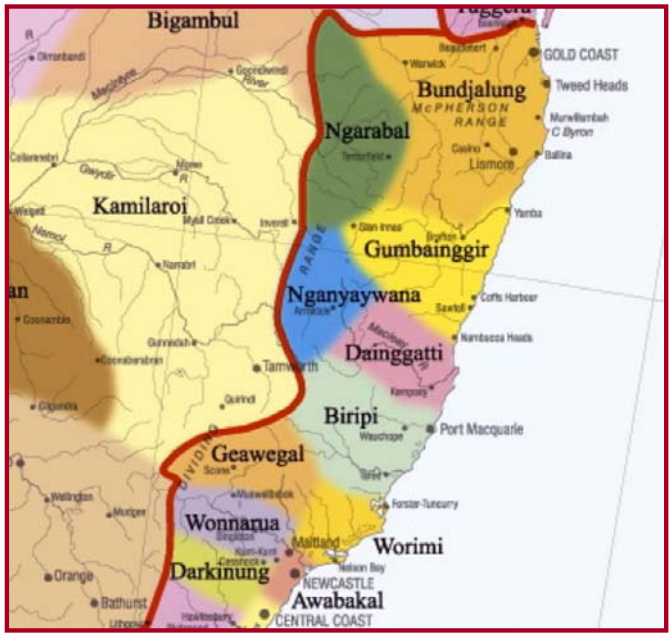
Queensland Hunter
Gas Pipeline

Appendix E
Aboriginal heritage assessment

QUEENSLAND HUNTER GAS PIPELINE.

ENVIRONMENTAL ASSESSMENT - ABORIGINAL HERITAGE ASSESSMENT.



ON BEHALF OF MANIDIS ROBERTS.

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AUGUST 2008

PLEASE NOTE: THIS REPORT CONTAINS IMAGES OF ABORIGINAL PEOPLE

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Appendices 1-5 to the Aboriginal Heritage Assessment report have not been included in the documentation for public exhibition as they contain culturally sensitive information. These appendices have been provided to NSW Department of Planning and NSW Department of Environment and Climate Change for assessment purposes.

1 INTRODUCTION

1.1 Preamble

Manidis Roberts engaged *Archaeological and Heritage Management Solutions (AHMS) Pty Ltd* to undertake a strategic preliminary Aboriginal heritage assessment of a proposed high-pressure gas pipeline between the Queensland/NSW border and Newcastle. The assessment was commissioned in support of a Part 3A Major Project (Environmental Assessment) application (#06_0286) to the NSW Dept of Planning to assess the impact of proposed development on Aboriginal sites, objects and Aboriginal cultural values. The assessment also supports the Environmental Assessment (EA) prepared by Manidis Roberts.

1.2 Proposed development

Hunter Gas Pipeline Pty Ltd proposes development of a Environmental Assessment (EA) for construction and operation of a high pressure natural gas transmission pipeline from the NSW – Queensland Border near Boomi to Newcastle (for connection to the Queensland component of the pipeline connecting the Wallumbilla Gas Hub in South Central Queensland), including a short pipeline lateral to the Maitland area (refer to Figure 1). The Queensland Hunter Gas Pipeline would have an initial capacity of approximately 65 petajoules per annum. The project includes:

- Construction and operation of pigging stations, valve stations and connection points (to other pipelines and facilities);
- Erection of perimeter security fences, security and service lighting and signage;
- Installation of communication and telemetry towers;
- Installation of cathodic protection devices;
- Excavation, drilling and interim spoil storage, replacement, remediation or disposal;

- Erosion and sedimentation control works;
- Construction of access tracks for the pipeline;
- Rivers and creek crossings;
- Road and railway crossings;
- Temporary fencing around work sites and open excavations;
- Pipe storage with loading facilities;
- Clearing of native vegetation;
- Transport of pipes and associated equipment by road or rail and temporary storage sites;
- Establishment and removal of construction camps; and
- Provision and disposal of water for pipeline hydrostatic testing.

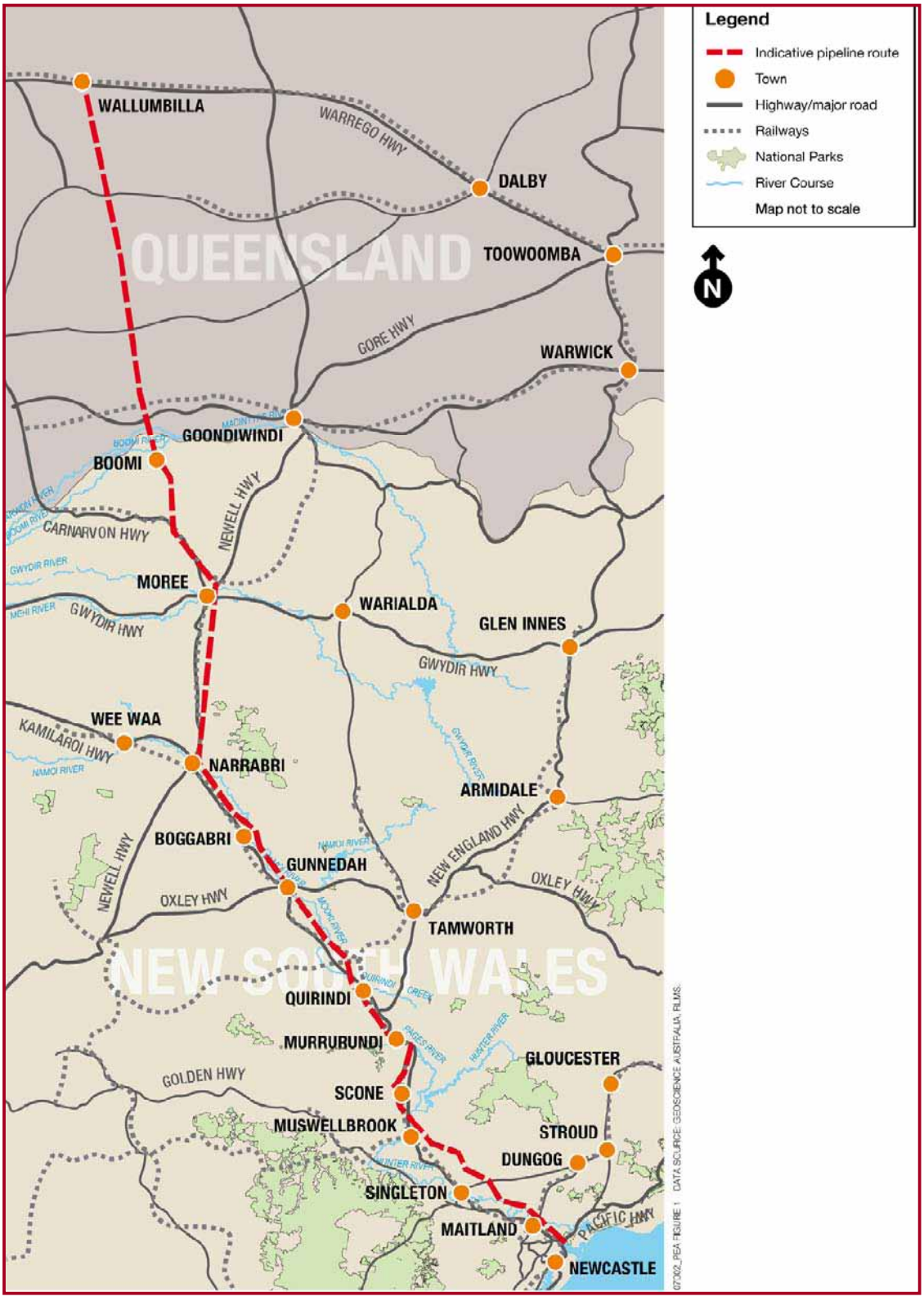


Figure 1. Map of the Study Area [2007]. (QHGP Route Map 20 Dec 2007)

1.3 Reason for Current Study

The purpose of the study is to assess the impact of proposed development on Aboriginal sites, objects and Aboriginal cultural heritage values. The objective of the study is to provide recommendations for management and mitigation of impact on Aboriginal heritage prior to and during development. The study is also designed to satisfy the Dept of Planning (DoP) Director-General's Requirements (DGRs) for assessment of Aboriginal heritage as part of the Part 3A Major Project assessment. DGR's specifically relating to Aboriginal heritage are as follows:

> *"Heritage Impacts – the Environmental Assessment must include sufficient information to demonstrate the likely impacts on Aboriginal heritage values/items and outline proposed mitigation measures in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC, 2005). The Environmental Assessment must demonstrate effective consultation with Aboriginal communities has been undertaken in determining and assessing impacts, developing options and selecting options and mitigation measures.[1]"*

1.4 Statutory controls

1.4.1 Statutory protection

The National Parks & Wildlife Act (1974) provides statutory protection for Aboriginal sites, objects and places in New South Wales. The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* and the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* also provide heritage protection at a Federal level. The implications of these statutes are described below.

1.4.2 National Parks & Wildlife Act 1974

The provisions of the *NP & W Act (1974)* provide blanket protection for Aboriginal objects (material evidence of indigenous occupation) and Aboriginal places (areas of cultural significance to the Aboriginal community).

[1] *Director General's Requirements, MP 06_0286, 3rd March 2008. NSW Dept of Planning*

The following sections are particularly pertinent:

- Section 91 states that anyone who discovers an Aboriginal object is obliged to report the discovery to the Department of Environment and Climate Change (DECC);
- Section 90 states that it is an offence to knowingly destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of, an Aboriginal object or Aboriginal place;
- Section 86 and 87 state that it is an offence to collect or disturb objects or excavate, or in any way disturb land for the purpose of discovering objects without a permit authorised by the Director-General DECC;
- Section 84 makes provision for protection of 'Aboriginal Places' or locations of special significance to Aboriginal culture.

Under the provisions of Part 3A of the *Environmental Planning & Assessment Act 1979***, development applications deemed to be 'Major Projects' do not require Part 6 approvals from the DECC**. Under the Part 3A provisions, the Minister for Planning is the consent authority and has ultimate responsibility for determining matters relating to Aboriginal heritage.

The Department of Planning's DGRs regarding Aboriginal heritage assessment have been described in Section 1.3 of this report. Essentially, the project-specific requirements form the framework for assessing Aboriginal heritage during the project.

The DECC released draft guidelines for Aboriginal cultural impact assessment of Part 3A Major Projects in July 2005. They form a guide for procedures to be included in Aboriginal heritage assessments that accompany Part 3A applications.

The draft guidelines state that:

> *'all project applications must state whether or not the project is likely to have an impact on Aboriginal cultural heritage and must include information about how this assessment was made.*

This assessment must demonstrate that input by affected Aboriginal communities has been considered, when determining and assessing impacts, developing options, and finalising the application.'

More specifically, the draft DECC guidelines outline the following steps that should be undertaken as part of the Aboriginal cultural heritage assessment process. These include:

- Undertaking a preliminary assessment to determine if the project is likely to have an impact on Aboriginal cultural heritage;
- Identifying the Aboriginal cultural heritage values associated with the area through consulting with Aboriginal people with cultural knowledge or responsibilities for country in which the proposed project occurs, written and oral research and field investigations;
- Understanding the significance of the identified Aboriginal cultural heritage values;
- Assessing the impact of the proposed development on Aboriginal objects and Aboriginal places;
- Describing and justifying the proposed outcomes and alternatives; and
- Documenting the Aboriginal cultural heritage impact assessment and the conclusion and recommendations to afford appropriate protection of Aboriginal cultural heritage.

This assessment report includes the results of steps described above.

As part of the Aboriginal community consultation, the procedures set out in the DECC *Interim Community Consultation Requirements for Applicants 2004* were adopted to notify any interested Aboriginal individuals or parties and ensure they are consulted in accordance with standards accepted by DECC. *The Consultation Requirements* establish a series of formal Aboriginal community consultation and notification procedures, as set out below.

1. Notification and Registration of Interests: The consultant must actively seek to identify stakeholder groups by:

(a) providing written notification to Local Aboriginal Land Council(s), Registrar of Aboriginal Owners, Native Title Services, Local Council(s), and DECC; and

(b) placing an advertisement in the local print media.

The closing date for registration of interest must allow at least 10 working days for groups to respond.

2. Preparation of the Assessment Methodology: The consultant must present and/or provide Registered Stakeholders with a proposed methodology for the assessment / testing methodology. The stakeholders must be allowed at least 21 days to review and provide feedback to the consultant.

3. Drafting, Review and Finalisation of the Assessment Report: Following completion of the survey a draft Aboriginal Heritage Impact Assessment (AHIA) report on the cultural and archaeological significance of the study area should be made available to all Registered Stakeholders and the Local Aboriginal Land Council for comment. After considering comments received, the consultant must then finalise the report and submit to DECC for consideration with their application.

1.4.3 Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth)

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* was enacted at a Federal level to preserve and protect areas (particularly sacred sites) and objects of particular significance to Aboriginal Australians from damage or desecration. Steps necessary for the protection of a threatened place are outlined in a gazetted *Ministerial Declaration (Sections 9 and 10)*. This can include the prevention of development.

As well as providing protection to areas, it can also protect objects by *Declaration*, in particular Aboriginal skeletal remains (Section 12). Although this is a Federal Act, it can be invoked if a State is unwilling or unable to provide protection for such sites or objects.

There are no Aboriginal sites or places within the study area currently subject to a Declaration.

1.4.4 Environment Protection & Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act provides protection for natural and cultural heritage places at a Federal level. The Act established three heritage registers: World heritage, Commonwealth heritage and National heritage. World heritage items are those listed for outstanding international heritage values. National heritage items are assessed as having natural or cultural significance at a national level. The World and National lists may include items on private or State crown land. The Commonwealth list only includes items on land owned by the Commonwealth.

Items on the registers described above are protected under the terms of the EPBC Act. The Act requires approval before any action takes place which has, will have, or is likely to have, a significant impact on the heritage values of a listed place. Proposals for actions which could affect such values are rigorously assessed. The EPBC Act is administered by the Australian Heritage Council.

There are no items within the study area currently listed as items of National or World heritage. The former Euraba Mission site, Boomi NSW (Place File # 1/02/191/0006) is included on the Register of National Estate.

1.5 Project aims and objectives

Specific aims of the study were as follows:

- Identify known Aboriginal sites, objects and places on or near the proposed pipeline study area;
- Consult with Aboriginal knowledge holders to identify places and values of cultural significance to the Aboriginal community;
- Undertake detailed desktop research to develop models that predict where various Aboriginal archaeological site types are likely to be located within the pipeline study area;
- Categorise known and likely impacts as moderate, high or low depending on the degree of physical impact proposed and the likely level of significance of Aboriginal sites, places and objects;

- Specifically identify and provide management recommendations for 'high-impact' sites, places and objects; and
- Provide generalised management recommendations and contingency procedures for moderate and low impact sites, places and objects.

The assessment was undertaken in accordance with the:

- Dept of Planning DGRs regarding assessment of Aboriginal heritage;
- DECC *Interim Community Consultation Requirements for Applicants* 2004;
- DECC *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* 2005; and
- Australia ICOMOS 'Burra' Charter for the conservation of culturally significant places and associated guidelines regarding significance assessment, conservation policy and processes.

1.6 Report Outline

The remainder of the report is set out as follows:

- Chapter 2 describes the methodology and rationale for the assessment;
- Chapter 3 provides a general history of patterns of Aboriginal use and occupation of the broader study area;
- Chapter 4 describes the results of Aboriginal community notification and consultation;
- Chapters 5 – 9 present summaries of environmental and archaeological context for the five bio-regions represented within the study area. These chapters also include a generalised predictive model for each bio-region;
- Chapter 10 includes an impact evaluation and shows sites and areas of sensitivity that may be affected by the proposed pipeline; and

- Chapter 11 presents our proposed recommendations for further investigations and management and mitigation of impacts on Aboriginal sites, objects, places and cultural values.

1.7 Limitations

This preliminary assessment report has adopted a regional strategic approach to desktop assessment of Aboriginal heritage. As such, it has largely relied on regional environmental and archaeological studies.

Data sources used in mapping have been provided by *Manidis Roberts Pty Ltd* and/or sourced directly by *Archaeological & Heritage Management Solutions Pty Ltd* from data providers such as DECC. These data sources have limitations and constraints that will have consequences for the quality and integrity of the constraint and impact mapping.

In particular it should be noted that the registered Aboriginal site data provided by DECC is known to be incomplete[2]. There are also issues with the spatial accuracy of the registered sites, which in some cases have been found to be several hundreds of metres in error[3].

Detailed modelling and mapping, ground-truthing of known sites, archaeological survey and detailed consultation[4] was beyond the scope of this preliminary assessment. The purpose was to meet the DGRs for the Environmental Assessment, namely to provide sufficient information to demonstrate the likely impacts on Aboriginal heritage values/items and outline proposed mitigation measures. As a strategic assessment, the focus of the study is identifying known and likely constraints and mapping out a plan for further investigation, mitigation and/or management of those constraints.

[2] *particularly in the Narrabri area where Aboriginal groups have not disclosed where their sites are located*

[3] *For example, as found in analyzing the location of the Euraba Mission, Moree.*

[4] *Consultation with elders in areas where sites have not been registered has been commissioned by Manidis Roberts for AHMS to conduct in parallel with the preliminary assessment and is currently ongoing.*

1.8 Authorship

This report was written by Jim Wheeler, Laura Matarese and Dan Tuck. GIS mapping was undertaken by Laura Matarese and Michael Andon.

1.9 Acknowledgements

We would like to acknowledge the assistance and valuable input provided by Marcus Sainsbury, Sandi Shrimski and Barbara Campany of Manidis Roberts. In addition, we would like to thank Evelyn Crawford, Graham Wilson, Laura Farquharson and Lisa Campbell for their advice and contributions to the project and Bernadette Allen for formatting the report. We would especially like to acknowledge the many Aboriginal stakeholders who assisted us in improving the assessment and providing valuable feedback. Individuals and community groups who were involved in consultation are listed in Chapter 4 and Appendix 3.

2 ASSESSMENT METHODOLOGY

2.1 Preamble

The methodology adopted for this assessment is deliberately strategic in focus. It is designed to marry in with the methodology designed by Manidis Roberts for the Environmental Assessment and for the other supporting environmental and heritage studies. The strategic approach is also the most practicable and effective means to identify and assess key Aboriginal heritage issues within a study area that is in excess of 500 kms in length and to a level commensurate with the requirements of an EA approval.

The strategic approach has allowed us to consider the broader issues of cumulative impact on Aboriginal heritage values, both scientific and cultural, which facilitates holistic management of Aboriginal heritage values that may be affected by the development rather than simple site by site 'tick-box' management approaches used in the past. Our approach is informed by current trends in management of Aboriginal cultural heritage and recent management approaches advocated by the Dept of Environment & Climate Change (DECC). The rationale and methods used during the assessment are elaborated in the following sub-sections of this chapter.

2.2 Approach

The strategic assessment is essentially a detailed desktop study designed to identify known Aboriginal sites and heritage issues and to develop robust generalised predictive models that identify Aboriginal occupation, use and site patterning.

A combination of archaeological literature and database review, historical research and Aboriginal community consultation has been used to:

1. Identify known Aboriginal sites, places, issues and values; and
2. Develop robust generalised predictive models

This information has been be used to assess impact, identify issues that require further detailed investigation and ultimately to develop management measures and

contingency measures that minimise and/or mitigate impact on Aboriginal heritage. To achieve this we have used bio-regions as our basic unit to identify sites and areas of archaeological sensitivity. Bio-regions have been used because they share common environmental and topographic characteristics. Given the importance of environmental factors in influencing past Aboriginal use and occupation of the land, the shared environmental features of a bio-region provide a good basis for managing the assessment of the large study area. A predictive model has been prepared for each bio-region.

Known sites and areas of Aboriginal archaeological sensitivity have been mapped within the proposed pipeline study area using a Geographic Information System (ArcGIS 9.0). These maps identify and graphically show known and potential impacts of the development. The predictive models have identified environmental factors associated with particular site types. In the Predictive Model tables, the Environmental Context describes where it is *possible* to find a particular Aboriginal site type. The Area of Sensitivity describes where it is *likely* to find a particular Aboriginal site type in the Environmental Context. For example, Modified Trees are located in environments of remnant vegetation and are sensitive in areas associated with areas of trees that are greater than 100 years old and Stone Artefact Scatters and Deposits are located in all areas containing topsoil but are sensitive in areas located within 150 metres of a water source. These associations have allowed us to map areas of sensitivity for various site types using geology, soil, vegetation and water course data within and in the vicinity of the pipeline study area. The list of data sources used is in Appendix 1. The maps are located in the Impact Evaluation Chapter.

For the purposes of the impact assessment, we have adopted the categories used project-wide for historical heritage, flora, fauna, bio-diversity etc. These are High, Moderate and Low impact. For the purposes of Aboriginal heritage assessment, the categorisation will use degree of physical impact of proposed development and the level of likely significance as the basis for determining whether known impacts and potential impacts are high, moderate or low. The assessed impact level is then used as the basis for making appropriate management recommendations that are suitable to the type of site, its level of cultural and archaeological significance and nature of potential impact.

The strategic approach was successful in identifying the key issues and providing the information required to determine how they should be managed through further investigation, mitigation, contingency measures or avoidance.

2.3 Methods

2.3.1 Identification of Known Sites

- A search of Aboriginal Heritage Information Management System (AHIMS) database was undertaken to identify known sites on or near the pipeline route;
- Consultation with Aboriginal community to identify cultural sites and places in accordance with the procedures set out in 'DECC Interim Community Consultation Requirements for Applicants 2004';
- Review of previous archaeological reports and strategic studies to identify any other sites that may not be registered on AHIMS;
- Historical research to identify the general pattern of Aboriginal use and occupation, including the early contact period and to identify any particular sites that may have cultural significance; and
- Use GIS to plot all known Aboriginal sites and areas of sensitivity on 'tiles' showing the pipeline study area to determine whether or not they are within the area of potential development impact.

2.3.2 Aboriginal Community Consultation

- Undertake Aboriginal Community consultation in accordance with the procedures set out in 'DECC Interim Community Consultation Requirements for Applicants 2004';
- Stage 1 – Notification & Registration of Interest – included notification advertisements in local print media along the study area and notification letters to Local Aboriginal Land Councils (LALC), Local Councils, DECC, NSW Native Title Services and the Office of the Registrar;

- Stage 2 - Preparation of the Assessment (Design) – presentation of the proposed methodology at a series of meetings. All registered stakeholders were invited and hard copies of the presentation provided to all registered stakeholders. A period of 21 days was allowed for responses on the proposed methodology. Information about cultural sites, places or values was also requested from knowledge holders;

- Draft copies of the assessment report were provided to the registered stakeholders. 21 days were provided to receive written comments on the assessment report;

- Comments received from the Aboriginal stakeholders were included in the assessment and considered in identifying sites, assessing likely significance and developing appropriate management recommendations; and

- Aboriginal consultation specialist Evelyn Crawford was engaged to undertake additional consultation with specific knowledge holders who were thought may have additional information not contained in published reports, heritage schedules or the AHIMS database.

2.3.3 Predictive Modelling

- The pipeline study area was divided into 'Bio-regions'. Bioregions are large land areas characterised by broad landscape-scale environmental features (eg geology, vegetation, soils etc). They form a good unit for predictive modelling because each bio-region shares the same broad environmental features. The pipeline crosses 5 bio-regions which include the Darling Riverine Plains, Brigalow Belt South, Nandewar, NSW North Coast and the Sydney Basin;

- A review of archaeological reports, regional studies and AHIMS site distribution data was used to develop a predictive model for each bio-region;

- The predictive models describe the site types that may exist within each Bio-region. In the predictive model, the environmental context describes where it is *possible* to find a particular Aboriginal site type and the Area of Sensitivity describes where it is *likely* to find a particular Aboriginal site type

in the Environmental Context – e.g. Modified Trees are located in environments of remnant vegetation and are sensitive in areas associated with areas of trees that are greater than 100 years old;

- Data provided by Manidis Roberts and sought by AHMS includes information regarding geology, soils, vegetation and water courses/bodies. The data was utilised to plot areas of archaeological sensitivity using the criteria from the predictive models to a degree of specify that the data would allow.

2.3.4 Impact Assessment

- The impact of development on known sites was categorised as High, Moderate, Low or Nil;
- The assessment of impact was based on the likely significance of the site type and the degree of direct impact that would be caused by development works;
- The GIS system was used to identify and map known sites and areas of sensitivity; and
- A series of 17 'tiles' covering the whole pipeline study area was used for constraint mapping.

2.3.5 Management of Moderate and Low Impact Sites

In the past, archaeological investigations for linear developments such as pipelines, power lines and roads have involved survey of areas with low ground visibility, followed by dispersed test pitting programmes in many areas defined as 'Potential Archaeological Deposits'. This approach was time consuming and had limited value from an archaeological research point of view because stone artefact samples were often too small to adequately characterise the archaeological site[5] and too small to make any meaningful conclusions about past use and occupation. The testing programmes also identified settlement patterns that were already well understood and failed to identify intra-site variation and patterning – issues that are critical in gaining a meaningful understanding of Aboriginal use and occupation of the broader landscape and particular parts of the landscape.

[5] *Hiscock 2001*

For the QHGP project we have developed a more strategic and holistic approach to management of the many moderate to low impact artefact scatter / deposit sites. The reasoning behind this approach is that impact will be fairly minor in each area the pipeline passes through, but the overall cumulative impact along the whole pipeline route may be substantial. Using this approach, we have recommended larger research-focused open-area excavations as a mitigation measure designed to investigate research questions that may provide meaningful information about how Aboriginal people lived and used the land in the past. The archaeological research recommended would be done as mitigation of generalised impact on the many low and moderate impact artefact scatter / deposit sites along the pipeline route. The benefits of the management approach we have adopted for this assessment is it will:

- Provide better mitigation of the cumulative impact of the development;
- Identify rare artefact types, providing a much better understanding of how the landscapes and places were used. The relationship between activities at the site and local resources can be more thoroughly examined;
- Facilitate comparisons with other excavated sites, which may provide information about the types of activities that occurred on particular landforms and near particular resources; and
- Provide more meaningful mitigation outcomes rather than lots of smaller investigations.

2.3.6 Management of High Impact sites

High impact sites require specific management procedures developed to mitigate, minimise or avoid impact. Specific management measures are established on an individual site-by-site basis because it depends on the nature of the impact and the type of site.

2.3.7 Additional Investigations and Contingencies

Additional investigations such as survey, recording or monitoring are also recommended prior to development as a means to avoid or minimise impact. The actual impact width of the pipeline will be approximately 30 metres (the ROW). There is an opportunity within the 200 metre wide study area to avoid many sites,

such as scarred trees, by ensuring the 30 metre impact zone avoids the individual site. There is also the ability for the construction to be substantially narrowed to achieve a much smaller disturbance footprint, for example near the crossing or riparian areas, the pipeline study area may need to be narrowed to less than the 30m standard. This management approach obviously requires survey, identification and recording prior to development works. Monitoring and standard management contingencies would also be required for sensitive site types that can only be identified by monitoring, such as burials within soft alluvial sands.

3 ABORIGINAL HISTORY

This section presents an introductory history of the Aboriginal use and occupation within and in the general vicinity of the study area (the 'broader study area') based on documentary evidence including early ethnographic records and oral tradition. Its purpose is to provide a contextual background to the broader report and to aid in the prediction and assessment of Aboriginal cultural heritage sites along and adjacent to the proposed pipeline route.

3.1 Study Area

The QHGP study area commences near Boomi in south central Queensland and ends at Newcastle on the lower north coast of New South Wales (Figure 1). The pipeline route extends for approximately 820 kilometres with the majority (a 600 kilometre stretch) set within NSW (73%). The proposed easement crosses a broad swathe of the eastern and central part of the state and passes through five bioregions, twelve local council areas and nine Local Aboriginal Land Council areas.[6]

In an effort to provide a straightforward and comprehendible narrative, the study area - for the purpose of this history - is divided into two broad land areas:

- **Coast & Hinterland** (taking in Newcastle and the Hunter Valley);
- **Central Slopes & Plains** (running from around Quirindi to the Queensland boarder – historically the 'Liverpool Plains').

This section is oriented around these broad land areas with reference to other regional descriptors and specific locations where appropriate.

3.2 People

Prior to European 'discovery', incursion and settlement the Australian continent was the sole domain of Aboriginal people who occupied the land according to a complex and poorly understood system of social organization that is most

[6] *The bioregions are Sydney Basin, NSW North Coast, Brigalow Belt South, Nandewar & Darling Riverine Plains. The council areas are Moree Plains, Narrabri, Gunnedah, Liverpool Plains, Upper Hunter, Muswellbrook, Singleton, Cessnock, Dungog, Maitland, Port Stephens & Newcastle. The LALCs are Mungindi, Toomelah, Moree, Narrabri, Red Chief, Walhallow, Nungaroo, Wanaruah & Mindaribba.*

commonly described in terms of 'nations' - broad collectives of people sharing a common base language.

The use of traditional language descriptions in discussions pertaining to the nature, territory and range of specific Aboriginal groups is however inherently problematic for a multitude of reasons including the following:

- Language group areas and boundaries have often been defined by colonial diarists, missionaries and proto-anthropologists - methodologies were variable and accounts were often conflicting;
- Most recordings were 'snap shots' by colonial observers that took place in the 19th century – in many instances well after traditional groups had been broken up and reconfigured by European settlement activity;
- Traditional Aboriginal knowledge and oral tradition is often discontinuous as it was heavily impacted by European settlement processes; and
- Language area boundaries are thought to have been variable, discontinuous, 'permeable', and sometimes overlapping.

Not surprisingly, given scholarly and community interest and the importance of 'hard' boundaries for use in Native Title claims, there is considerable ongoing debate in relation to the range of traditional groups.

Limitations aside, the following information relating to the Aboriginal people of the broader study area is based on generally accepted information.

3.2.1 Language & Social Organization

The pipeline route passes through the traditional territory of a number of Aboriginal nations – the principal among which are presented in Table 1 and shown at Figure 2.

Table 1: Principal Aboriginal Nations in the broader QHGP study area

Aboriginal Nations in the broader QHGP Study Area	
Group	**Location**
Kamilaroi	Southern Queensland south to approximately Quirindi; west as far as Walgett; east as far as Tamworth Alternate names include Kamilarai, Kamilari, Kamilroi, Kamilarai, Kamu-laroi, Kaamee'larrai, Kamileroi, Koomilroi, Komleroy, Gamilaroi, & Gamilroi
Wonnarua	Upper Hunter River from above Maitland; south to the divide north of Wollombi; west to the Dividing Range. Alternate names include Wonnuaruah, Wannerawa, Wonarua, & Wonnah Kuah
Awabakal	Lower Hunter River/ Newcastle area (with a particular focus on the Lake Macquarie area)
Worimi (Kattang)	North side of the Hunter River to Foster (near Cape Hawke); west to around Maitland Alternate names include Warrimee, Warramie, Gadang, Kattang (language name), Kutthung, Guttahn, Cottong, Wattung & Watthungk
Geawegal	Northern tributaries of the Hunter River to Murrurundi
Sources: Tindale 1974; O'Rourke 1997; Brayshaw 1987; Horton 1994; Gunson 1974	

Figure 2. Aboriginal Language Areas of Southern Queensland & Northern NSW. (AITSIS map from Encyclopaedia of Aboriginal Australia – Horton 1994)

3.2.1.1 Organization

In practical terms, Aboriginal nations were generally organized around smaller sub-groupings differentially referred to as hordes, bands, clans or local descent groups. These smaller groups were often based on descent and spiritual/totemic associations to 'country'.

A further language group subdivision was the 'tribe' - essentially a European construct first applied in America and later imported elsewhere by colonialists. In the Australian context, tribes referred initially to small traditional clan groups. Dr John Dunsmore Lang, an early principal of the Sydney College, provided a general overview of the 'tribe' in the 1830s:

> *The whole race is divided into tribes, more or less numerous, according to circumstances, and designated from the localities they inhabit; for although universally a wandering race, their wanderings are circumscribed by certain well defined limits, beyond which they seldom pass, except for purposes of war or festivity. In short every*

> *tribe has its own district, the boundaries of which are well known to the natives generally.*[7]

At around the same time, Robert Dawson (who oversaw the early holdings of the Australian Agricultural Company which extended north along the coast from Newcastle) provided further description based on his experience in the Port Stephens area. His observations may be broadly applicable to the Newcastle and Hunter Valley portion of the broader study area:

> *Each tribe is divided into independent families which acknowledge no chief, and which inhabit in common a district within certain limits, generally not exceeding above ten or twenty miles on any side. The numbers of each tribe vary very much, being greater on the coast, where they sometimes amount to two or three hundred, and I have known them in other quarters not to exceed one hundred.*[8]

As time passed however, European colonization and settlement processes broke down and dispersed traditional groups, with the term thereafter referring to non-traditional aggregations of Aborigines from various clans who banded together 'to provide mutual protection and to maintain viable social and economic units'.[9] These reconstituted tribes were generally described in terms of the location they most often resided, or alternately, were named after a significant individual within the group.

Table 2 lists some of the sub-groups associated with the major nations of the broader study area.

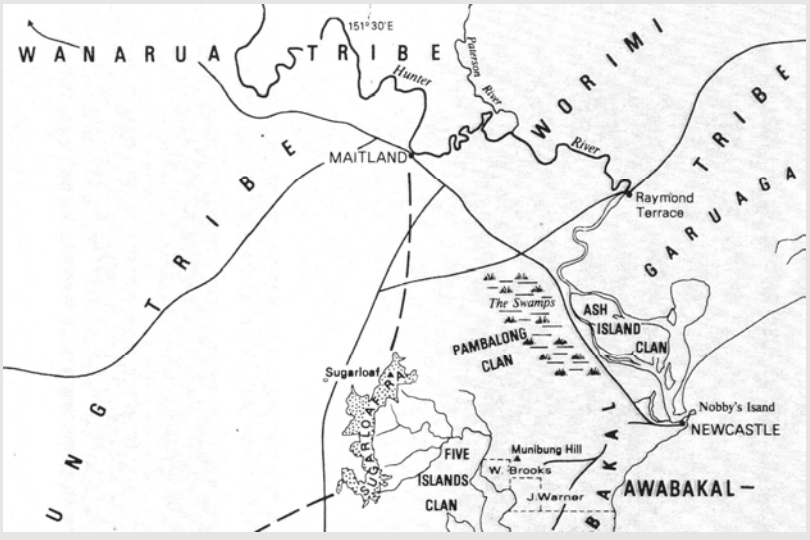
[7] *Lang 1839:140-142*

[8] *Dawson 1831: 327*

[9] *Kohen 1985; Ross 1988: 49*

Table 2: Aboriginal Sub-groups within the broader QHGP study area

Aboriginal Sub-groups within the broader QHGP Study Area	
Group	**Sub-group**
Kamilaroi	Murrii, Kubbi, Yipphi & Kumbo Marowancal, Tooloompikalal, Gundical & Paninpikilal
Wonnarua	Hunter River Tribe; Maitland Tribe; Boan Tribe
Awabakal	Pambulong (Hexam); Minyowa (horde at Newcastle) Newcastle tribe; Coal River tribe; Ash Island tribe; Reid's Mistake tribe; Tuggerah Beach tribe; Kangaroo Ground tribe
Worimi (Kattang)	Molo (? horde), Bahree (? horde), Karrapath (? horde), Carapath, Warrangine (? horde at Maitland) Port Stephens tribe



Sources: Tindale 1974; Brayshaw 1987; Horton 1994; Gunson 1974; Sainty & Johnson 1980; Olgivie in Blyton 2004: 29. Map of select clan groups in the Newcastle/Hunter Region (presented in Gunson 1974)

3.2.2 Traditional Life

Information about the traditional culture of Aborigines within the broader study area derives generally from the writings of explorers, missionaries and frontier settlers. The information is somewhat patchy but does provide some insight into traditional Aboriginal life prior to the transformation that resulted from close contact with Europeans.

3.2.2.1 Mobility & Seasonality

Traditional Aboriginal groups were generally self sufficient, highly mobile bands of hunter-gatherers.[10] The degree of mobility depended on environment, seasonality and ceremonial movement. Generally, in areas where resources were scarce groups moved frequently and broadly; in areas of abundance movement was less frequent and within narrower corridors. In some areas of particular richness, such as river mouths on the East Coast and within the Murray River Valley, semi-permanent 'base camps' existed and were used for extended periods (i.e. Clarence & Richmond river mouths).

Movement was regulated by seasonality, which saw inland groups concentrate on areas of permanent water in summer and coastal groups move between the coast and the greater hinterland with changes in season and associated resource availability. It was further regulated by ceremonial activity, which saw large groups of people cross the landscape for shared ceremony – some of which was tied in with seasonality such as the massive bogon moth feasts that took place annually in the Australia Alps, and the post-flood gatherings on the Diamantina River in the arid inland.[11]

Movement itself was dictated by the landscape. Inland, movement was facilitated by rivers and ridgelines and dictated by the availability of water across vast plains. On the coast, the rivers provided a transport corridor - as did the valley floors of the major rivers and the contrasting ridgelines and plateaus of the hinterland. Many of the traditional routes of Aboriginal people became the tracks of early white explorers and the roads of the settlers.

[10] *Mulvaney & Kamminga 1999: 79*

[11] *Mulvaney & Kamminga 1999: 80*

3.2.2.2 Subsistence

Traditional Aboriginal groups used a variety of means to obtain subsistence depending on location, season and cultural laws or taboos. As 'hunters' the men in particular sought and captured terrestrial game, birds and marine animals. As 'collectors' the women collected seeds, fruits, bulbs, vegetables and the likes of shellfish and crustacae. In addition, Aborigines practiced what may be most closely described as 'harvesting' – cutting bark for huts, canoes and water carriers; trapping ducks and fish with elaborate woven nets and stone traps; and collecting occasional foodstuffs such as the honey of native bees and the saps of plants.

Within the broader study area, which spans the coast and inland areas, a range of foodstuff and 'products' of the land are likely to have been procured for subsistence purposes. Table 3 below summarises some of this subsistence activity.

Table 3: Subsistence within the broader QHGP study area

Subsistence within the broader QHGP Study Area		
Activity	**Coast & Hinterland**	**Slopes & Plains**
Hunting	Spearing of larger marsupials (kangaroos and wallabies); trapping of smaller mammals (possums &c), birds (emus) and reptiles	Spearing of larger marsupials (kangaroos and wallabies); trapping of smaller mammals, birds (emus) and reptiles
Fishing	Spearing, line fishing, trapping and netting of near-shore maritime and estuarine species (especially the likes of groper, mullet, bream, snapper, & flathead) Collection of crustacea (crabs & crayfish) and shellfish (oysters, cockles, trident shells &c)	Spearing, line fishing, trapping and netting of riverine and freshwater species (especially cod, perch/bass, bony bream & catfish) Collection of freshwater mussels, crayfish &c); toredo (cobra) worms
Collecting	Native honey; flowers, necters & leaves; bush fruits and vegetables (such as yams,	Native honey; termites; white ants; fewer bush fruits and vegetables but considerable

	lilli pillies &c) Eggs	seeds and grasses Eggs; grubs (eg. Witchetty grub)
Harvesting	Bark for shelters, canoes and medicines; sap for adhesives and medicines; leaves, oils and essences for medicines and applications	Bark for shelters, canoes and medicines; sap for adhesives and medicines; leaves, oils and essences for medicines and applications
Other		
Sources: Mulvaney & Kamminga 1999; Brayshaw 1987; Horton 1994; Attenbrow 2003b; Grant 1803		

The following are examples of hunting and fishing practices – the means of food procurement most commonly described in the historic records.

3.2.2.3 Fishing

Colonial diarist Watkin Tench observed of the coastal Aborigines in the late 1700's that:

> *Fishing, indeed, seems to engross nearly all of their time, probably from its forming a chief part of their subsistence.*[12]

Early observers such as Tench believed that fish constituted the bulk of the diet of coastal Aborigines, being replaced inland by possums and other animals (principally marsupials and emus).[13] While this popular view may have been somewhat overstated – a result of the highly visible and exciting nature of 'hunting' practices as opposed to the more mundane nature of 'collecting' – marine and freshwater resources were none-the-less a significant part of the subsistence of coastal and river based inland Aboriginal economies.

[12] *Tench 1979*

[13] *Ebsworth 1826: 80; Brayshaw 1987*

Aboriginal people employed numerous fishing methodologies. Within the broader study area these included line fishing, spearing, netting and the use of traps or weirs.

Line fishing was a fishing method that appears to have been employed on the Australian East Coast for around the last 2000 years. It was practiced predominantly by women and involved the use of a line fashioned from tree or vine fibres set with a hook.[14] Hooks were made from a variety of materials including bone, stone, shell and miscellanea (including the talons of birds of prey). Shell was the most commonly used with individual shells '… ground down on a stone until it became the shape they wished'.[15] Early observers in the Hunter district stated that the shell most frequently used was oyster, however a variety of riverine, estuary and rock platform species were utilised depending on availability.[16] Hooks were baited with a variety of foods, including shellfish and grubs. On the coast there was prodigious use of burly (ground baiting).

Spear fishing was another common fishing method applied in shallow coastal contexts and the flats of rivers and creeks. Generally a male activity, spear fishing was generally restricted to foreshores but was also undertaken from canoes. The spears typically used were either single or multi-pronged and called 'fizz gigs' by early colonists. The shafts of these spears were up to six metres long and made of wood or the stems of flowering Xanthorroea grass trees. The prongs of fishing spears were barbed or pointed with stone, shell, hardwood, fish teeth, sharpened animal bone or stingray spines which were bound with two-ply rope or plant fibre and coated in plant resin.[17] These methods are exemplified in Figures 3, 4 and 5.

Nets and weirs were also used within the broader study area – often as part of 'communal' fish catching undertakings. Hand and cast nets of a variety of shapes constructed of plant fibres were used, with the latter widely utilised in the capture of seasonal sea run mullet around the Newcastle coast. Stone weirs and fishtraps

[14] *Brayshaw 1987: 76-77*

[15] *Threlkeld in Gunson 1974: 54*

[16] *Ebsworth 1826: 79; Emily Caswell 1843*

[17] *Notes from the Australian Museum Exhibition 'Catching Sydney Harbour'.*

constructed of vegetation (or a combination of both) were used both on the coast and inland.[18]

*Figure 3. Edmund Gill's '… fishing from a canoe and from the riverbank' (1845). The location of this image is unknown – Gill travelled widely in mainland Australia and Tasmania. The image does show however common fishing practices and the use of the canoe as a line and spear fishing platform. (State Library of NSW ML PX*D 73 Digital Id a955001)*

In the Newcastle area in the early 1800s, several fishtraps were recorded including strong grass net traps strung along creeks which Lieutenant James Grant described as 'one of their principal devices for taking fish'.[19] A different device was described by Lake Macquarie missionary Lancelot Threlkeld and was created by:

> *… planting sprigs of bushes in a zig-zag form across the streams, leaving an interval at the point of every angle where the men stand with their nets to catch what others frighten towards them by splashing in the water.*[20]

[18] *Grant 1803: 154-155*

[19] *Grant 1803: 54*

[20] *Threlkeld in Gunson 1974: 190*

Figure 4. Dubourg's engraving of Aborigines fishing from a canoe (pre-1808). This stylised image is from Clarke's book Field sports of the native inhabitants of New South Wales (1813) (State Library Victoria RARELTF 796 H84F SLV)

Figure 5. Joseph Lycett's Aborigines cooking and eating beached whales, Newcastle, NSW (c.1817). Stranded whales represented a feast for Aborigines and Threlkeld noted that on these occasions messengers were despatched to all the neighbouring tribes who gathered to partake (Gunson 1974:55). National Library of Australia – nla.pic-an2962715-s11)

Fishtraps were also widely used on inland waterways. On some of the major inland rivers and tributaries elaborate labyrinthine stone weirs were constructed. They were extensively used on the Darling and Barwon River systems, with the finest example being the fishtraps at Brewarrina that were described and recorded by Surveyor and pioneer ethnologist R. H. Mathews in 1903. Unfortunately, most of these types of trap were deliberately blasted or otherwise removed to allow passage for riverboats in the late 19th and early 20th century.

3.2.2.3.1 Hunting

In addition (or as an alternative) to fishing, individual or group hunting was commonly practiced. In the Hunter Region, Threlkeld wrote of a hunting expedition to capture 'a small species of kangaroo' (wallaby) undertaken by local Aborigines as follows:

> *We mustered about thirty persons armed with spears. After travelling a few miles, we arrived at the top of a high hill, the party separated, some going to the bottom, while we continued to the top. A deep valley was before us. The men arranged themselves in different parts, on rocks or stumps, or any little eminence waiting the appearance of game, which the party below, women chiefly, alarmed by their shouts. Seven or eight animals were obtained in less than two hours.*[21]

Kangaroo hunting was sometimes associated with ritual activity (or occurred at times of ritual congregation for feasting) and often involved broad scale use of fire to scare or concentrate game.[22]

Hunting activity undertaken inland (such as in the northern part of the broader study area) is less well described in the historic records. One may assume that methods were similar where group numbers were high and terrain afforded similar methods. Conversely, in open plain areas and/or where populations were lower, individual hunting (stalking) may well have been more prevalent. A kangaroo hunt is depicted in Figure 6.

[21] *Threlkeld in Gunson 1974: 191*

[22] *Brayshaw 1987: 74-75; Threlkeld in Gunson 1974: 206*

Figure 6. Joseph Lycett's Aborigines using fire to hunt kangaroos (c. 1817). This image is from Tasmania but highlights widely used collaborative marsupial hunting techniques. The kangaroos are scattered by fire and disoriented by boomerangs while spear throwers wait to take down the fleeing animals from higher ground (National Library of Australia nla.pic-an2962715-s20)

Other animals hunted by Aborigines in the broader study area included goannas, emus, bats (hunted or netted), bandicoots, echidnas, possums (smoked or beaten out of tree boughs) and snakes – the latter which Threlkeld described as being an Aboriginal 'tid bit … when roasted'.

3.2.3 Material Culture

With a lifestyle based on hunting, gathering and selective harvesting that was tailored to both location and season, Aboriginal people created a material culture based on tools and accoutrements to match. While this changed over time due to technological and stylistic advances and environmental change, it was essentially based locally on available resources (and from trade) and was derived from the raw materials the earth and water provided – principally stone, plant and animal products.

Table 4 describes elements of the traditional material culture of the Aboriginal people who lived within the broader study area.

Table 4: Material cultural within the broader QHGP study area

Material Culture within the broader QHGP Study Area		
Fabric	**Coast & Hinterland**	**Slopes & Plains**
Stone	Variety of types including tuff; lava (basalt); petrified wood; fine grained quartzites and silicious materials such as silcrete & mudstone Stone fashioned into a variety of implements including stone tools – scapers, hand axes, knive &c. Also used as part of composite tools including spears (used as spear points/barbs)	Variety of types including tuff; lava (basalt); petrified wood; fine grained quartzites and silicious materials such as silcrete & mudstone Used in a similar manner to coastal locales however increased use of seed and grass grinding implements including grinding stones and anvils
Vegetation	Tree limbs used for bark hut framing (gunyahs); bark used for roofing Wood and stems (eg. Grass tree stalks) used for spear shafts, clubs &c Grasses and vines used for baskets and nets	Tree limbs used for bark hut framing (gunyahs); bark used for roofing Wood and stems (eg. Grass tree stalks) used for spear shafts, clubs &c Grasses and vines used for baskets and nets
Animal	Skins and feathers used for clothing; fat used for insulation; teeth used for adornment; sinews used for fastening; bones used for	Skins and feathers used for clothing; fat used for insulation; teeth used for adornment; sinews used for fastening; bones used for

	tools (such as points & awls) Shells used for fishhooks and adornment	tools (such as points & awls) Shells used for fishhooks and adornment
Other	Clays (such as iron rich red clays and white kaolin) used in medicines and for body decoration	Clays (such as iron rich red clays and white kaolin) used in medicines and for body decoration

Sources: Mulvaney & Kamminga 1999; Brayshaw 1987; Horton 1994; Attenbrow 2003b

Image is Boisseau's Nouvelle-Hollande, Port Jackson, famille de sauvages en voyage (c.1825)

This image of the Port Jackson area shows an Aboriginal family camp. Family members are shown carrying the typical accoutrements of everyday life – the woman carries a fishing line and basket/water carrier; the man carries spears and a fighting shield.

(NLA digital image nla.pic-an9032049-v.jpg)

3.2.4 Accommodation

Traditional Aboriginal housing falls broadly into two categories: the opportunistic, and the constructed. The former category includes the shelter provided by the natural environment including the shade/cover provided by trees, rock shelters and overhangs. The latter category includes the various temporary and semi-permanent hut dwellings with a variety of traditional names such as 'gunyah'.

Preferential use of these shelter types appears to have been based on a number of factors including local geology (for rock shelters) and available vegetation (for huts).

On the NSW coast and hinterland, both types of accommodation appear to have been widely used. The paintings of early colonial artists show a variety of hut dwellings (especially in the Newcastle/Port Stephens district), however Watkin Tench suggests that in escarpment and rocky terrain 'they depend less on them (huts) for shelter than on the caverns with which the rocks abound'.[23]

In the plains country further inland, sandstone rockshelters were not an accommodation option and gunyahs were widely used. Surveyor Thomas Mitchell described an inland hut camp off the Gwyder River somewhere near Moree as follows:

> *Each hut was semi-circular, or circular, the roof conical, and from one side a flat roof stood forward like a portico, supported by two sticks. Most of them were close to the trunk of a tree, and they were covered, not as in most parts, by sheets of bark, but with a variety of materials such as reeds, grass, and boughs.*[24]

Figures 7 and 8 show early colonial depictions of Aboriginal camps.

[23] *Tench 1979 63*

[24] *Mitchell 10 January 1832*

Figure 7. Joseph Lycett's Aborigines resting by a campfire near the mouth of the Hunter River, Newcastle (c.1817). (National Library of Australia – nla.pic-an2962715-s15)

Figure 8. Augustus Earle's A native camp of Australian savages near Port Stevens (sic), NSW (1826). (National Library of Australia – nla.pic-an2818328)

3.2.5 Transport

The universal mode of rapid transport in both coastal and inland areas where there was a sufficiently large waterway was the canoe. These were generally boats constructed of eucalypt bark with lightweight framing (Figure 9). They were usually bound at each end by plant fibres and some were also sealed/patched with xanthorrhoea gum and lined with soft bark or cabbage tree palms. Serviceable but somewhat flimsy craft, these canoes were used to travel up, down and across waterways and rivers, and also functioned as mobile fishing platforms. The characteristic 'canoe shaped' scars or markings on old eucalypts that denote Aboriginal removal of bark for canoe construction are a significant feature of Australia's Aboriginal landscape.

Figure 9. Aborigines constructing a bark canoe (c.1905). This image – set up by a photographer in the early 20th century – shows two Aboriginal men constructing a bark canoe in the Port Macquarie district. In the twin belt on the man on the left of frame is the stone mogo or hatchet used to strip the bark for the canoe. (State Library NSW ML SLNSW BCP 04759)

3.2.6 Spirituality

In traditional Aboriginal society, most aspects of life were 'intimately associated with religious beliefs'. These were expressed through stories (myth) and ritual that belonged to the 'dreaming' or dreamtime – an Aboriginal concept that linked the past to the present.[25]

Unfortunately, our collective knowledge of specific beliefs and practices is very limited. Detailed ethnographic recording did not commence (if at all in some regions) till the 1870s and Aboriginal elders were not always able to pass information on from one generation to the next once whites had arrived.

Generally however, it appears that the 'religious system' for southeastern Australia (Victoria, NSW and southern Queensland) featured:

- Universal belief in an 'all father' supreme creative being; and
- Practical religion/spirituality based on 'rites of passage'

3.2.6.1 Creator

Commonly held Aboriginal beliefs in southeastern Australia included the existence of a Supreme Being or creator spirit known by a variety of names but most commonly referred to as Baiame. Generally it was held that Baiame came from the sky to the land and created all the rivers, mountains, and forests.[26] He was also responsible for the creation of all aspects of culture and gave the people their laws of life, traditions and songs, and their culture. It was also believed that he created the first initiation site – the bora.

Baiame was closely associated with another (often one legged) ancestral being referred to as Daramulan – though the relationship and status of each varied according to location, and in some instances they were one and the same.[27]

[25] *Attenbrow 2003b: 127*

[26] *Brayshaw 1987: 83*

[27] *Attenbrow 2003b: 128*

3.2.6.2 Totems

In day-to-day life, it appears that the most immediate religious concerns related to what we commonly refer to as 'totems' – connections between man and nature and ultimately to the ancestral beings. Totems (generally animals, plants or objects) influenced or regulated many aspects of individual and group life including marriage and movement. Not surprisingly, they were integral to ritual and ceremony.

3.2.7 Ceremony

In southeastern Australia, Bora was the name given to both a male initiation ceremony and the site on which it was performed. As R. H. Mathews wrote with reference to the Kamilaroi, the Bora was:

> *… an educational system for the initiation of youths into the privileges and obligations of manhood'.*[28]

Bora ceremonies differed from one Aboriginal nation to the next, but all involved ceremony associated with the creator figure Biame, and ritual practice (including law, dance, scarification and other bodily modification). In the broader study area, the ceremony generally took place on the full moon and included ritual tooth avulsion, but did not include circumcision or sub-incision, which was common elsewhere.[29]

Bora grounds throughout the broader study area were typically two circles constructed of mounded earth joined by a smoothed pathway.[30] Carved trees and 'earth' drawings of significant beings and spirits further marked the sites.

One of the best recorded Bora sites, which was still being used in the late 1800s was in Kamilaroi country at Terry Hie Hie, southeast of Moree.

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[28] *Mathews 1917: 423*

[29] *Attenbrow 2003b: 126–128; Tooth evulsion was common except in the extreme northern part of Kamilaroi lands (Doyle in Howitt 1904 [1996]: 595)*

[30] *There are examples of Bora grounds with only one circle having been recorded on the Page & Isis Rivers in the Hunter Valley (Brayshaw 1987: 86).*

Bora Ground at Terry Hie Hie

The Terry Hie Hie (also Terryhaihai) Bora Ground was located approximately one kilometre downstream from the Terrry Hie Hei homestead station, 64 kilometres southeast of Moree in the Parish of Bonanga, County of Benarba.

Geologist and researcher Alfred William Howitt described the location in his seminal Native Tribes of South-East Australia (1904) as ' … the greatest Bora of all the Kamilaroi tribes'.

When R. H. Mathews visited the site in 1901 it was 'still in a good state of preservation' and described as comprising:

Main circular ring with a diameter of 103 feet, defined by a raised earth bank with a hight of 12 to 15 inches.

A 5 feet wide opening on the western side from which a path lead away 'up a gentle slope through a forest of pine trees'

A smaller ring or goonaba of 50 to 60 feet in diameter - 24 ½ chains from the larger ring

The main (larger) ring was originally surrounded by marked trees.

Sources: Howitt 1904 [1996]; Mathews 1917

The following drawings show the nature of some of the ground drawings and tree carvings associated with Kamilaroi ceremonial sites (Figure 10).

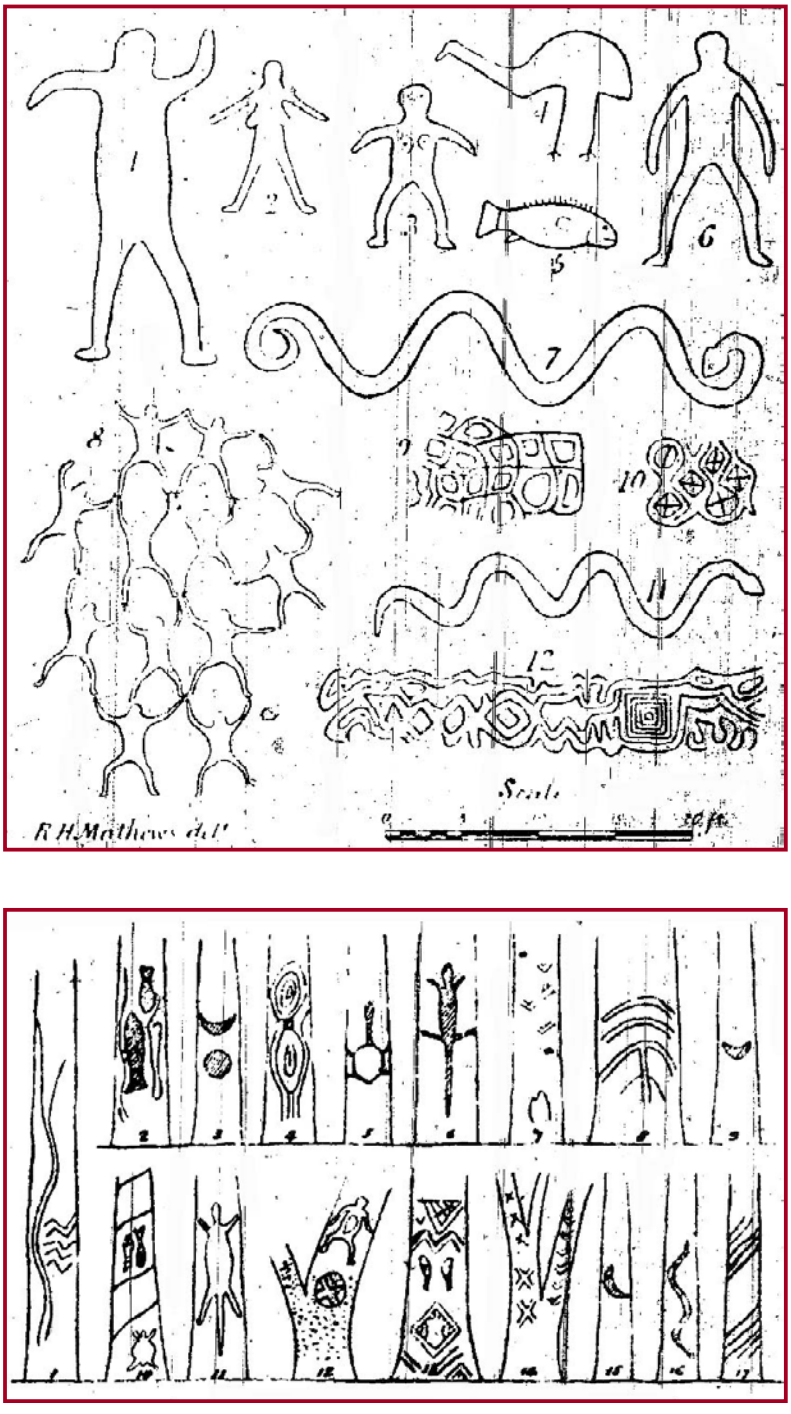


Figure 10. Bora Ground Drawings & Carved Trees (1917). These composite illustrations show ground drawings and carved tree motifs from a range if sites in southeast Australia. The figure in the top drawing (extreme left) is a colossal representation of Biaime; images of his wife Gunnannbeely are shown adjacent. The lower illustration shows a number of elaborately carved trees. Tree markings such as this marked both ceremonial grounds and (north of Narrabri) burial locations. (Mathews 1917)

Unfortunately, due largely to white settler land clearing and subsequent landuse (grazing/cropping), most of the Bora sites retain few physical remnants - though many locations are known to Aboriginal elders and researchers. Other Bora sites and locations with ceremonial association (Corroboree grounds) within the broader study area are presented in Table 5.

Table 5: Select Ceremonial Sites

Select Ceremonial Sites	
Coast & Hinterland	**Slopes & Plains**
Minimbah near Wallis Lake Junction of the Page and Isis Rivers in the Dungog/Gloucester area Newcastle West	Tallwood (southern Queensland) Banarway Station (Barwon River, Collarenebri) Kunopia (near Gnoura Gnoura Creek, Kunopia Homestead, near Boomi) Gurah (64 kilometres north of Moree)
	

Sources: Brayshaw 1987; Heritage Concepts Pty Ltd 2007a; Etheridge 1919; O'Rourke 1997

Image is Joseph Lycett's painting of a night corroboree at Newcastle (c.1820)

The location depicted appears to be in the western part of Newcastle – Nobbys, the Hunter River, and the lighthouse are clearly visible in the background. The full moon, on which many ceremonial activities were predicated, is shown peeking through the clouds.

(State Library of New South Wales ML DG 228 Digital Order No.: a928350)

3.2.8 Death

Burial in Aboriginal society was both a religious and practical undertaking. Within the broader study area, several methods have been recorded historically (or revealed archaeologically) involving varying degrees of ritual.

In-ground burial appears to have been the most common with the body (often wrapped in a bark shroud) placed in a variety of positions including extended, sitting, flexed, face up, face down and on its side. Pre-burial treatments varied but often included the application of a bark shroud; ceremonial painting of the body with ochres. The burial process itself often involved interment of weapons, other grave goods and occasionally cremation of the body (if the victim died as a result of crime or warfare).[31]

Along the coast and hinterland gravesites were often 'smoothed down' - hidden with little surface manifestation.[32] Further inland however burial was often within a shallow hole with mounded earth above – often associated with carved tree burial markers.[33]

Interment within caves or shelters was another form of burial not well attested in the historic record but revealed archaeologically in several instances (e.g. Owens Gap and Denman).[34] A further method was interment within the hollows of large trees – possibly in locations where soils were hard and caverns unavailable.[35]

[31] *Brayshaw 1987: 86–88; Threlkeld in Gunson 1974: 338*

[32] *Gunson 1974: 47; 89; 100*

[33] *Brayshaw 1987: 86*

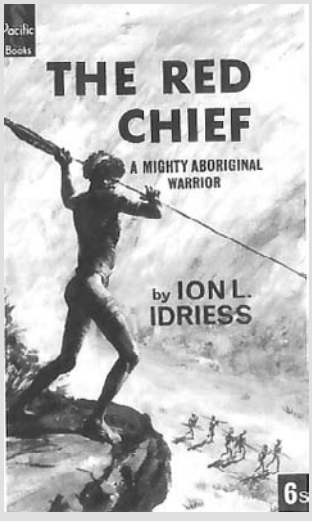
[34] *Brayshaw 1987: 86*

[35] *Mr Swan cited in Heritage Concepts Pty Ltd 2007a: 67*

3.2.9 Legend

There are numerous Aboriginal stories of legendary almost God-like warrior figures who existed in the years prior to European settlement. One of the better known from the broader QHGP study area is the so-called 'Red Chief' of Gunnedah.

The Red Chief of Gunnedah



Gunnedah is a sacred place set in the Namoi Valley and sited where there was formally a significant outcrop of white stone where the public school now stands in Bloomfield Street.

The classic Australian novel 'The Red Chief' (1953) by Ion L. Idriess is based on the story of Cumbo Gunnerah (also 'Red Kangaroo'), an 18th century Kamilaroi leader of the Gunn-e-darr people who inhabited the Gunnedah area and the great Namoi Valley in the years leading up to white settlement.

According to Kamilaroi folklore, Cumbo Gunnerah was a warrior leader who lead attacks on neighbouring tribes, and defended the community from the invasions of distant tribes – such as the much reviled Cassilis Tribe of the Hunter Valley.

He appears to have died in the early 19th century and was buried in Gunnedah – his grave and associated carved burial tree revealed by local Aboriginal elder Bungaree to Government Medical Officer Dr Edward Hayes in the 1880s. To the dismay of local Aborigines, the remains of Cumbo were exhumed and reputedly sent (along with the carved tree stump) to the Australian Museum. Their location is unknown today.

A memorial to the Red Chief was constructed in the vicinity of the warrior leader's former gravesite in 1984.

Sources: Idriess 1953; Gunnedah & District Historical Society 2006: 8; Roworth 200: 2-5

3.3 Contact

The following chapter details the 'contact period' – the period of initial European exploration and tentative settlement that saw Aborigines and white incursionists brought together for the first time. It addresses events during the period 1800 to 1850; discusses locations of significance; and describes the impact of contact on traditional Aboriginal society.

3.3.1 Coast and Hinterland

The first Europeans to visit the Newcastle area are believed to have been a party of escaped convicts lead by William Bryant who ventured into the Glenrock Lagoon area in 1791. The party are rumoured to have discovered coal, and named the area 'Fortunate Creek' due to the friendly Aborigines and plentiful food resources they encountered in the area.[36]

The 'official' European discovery of Newcastle is however attributed to Lieutenant John Shortland Jnr some six years later. Shortland had unsuccessfully pursued another group of convicts who had pirated the fledgling colony's largest vessel, the *Cumberland*, from the Hawkesbury River, and headed north. Shortland, in a five oared government whaleboat, gave chase as far as Port Stephens where he abandoned his pursuit. On the return journey, on 9 September 1797, Shortland discovered '…a very fine river, which I named after Governor Hunter'.[37] While in the lower reaches of the Hunter River, Shortland prepared an 'eye sketch' and collected surface coal from the southern banks of the river, and from seams in the southern headland (Figure 11).

[36] *Turner 1997: 5*

[37] *Described in a letter from Shortland to his father - cited in Turner 1997 & Callen 1994: 13. River also known as Paterson's River and Coal River*

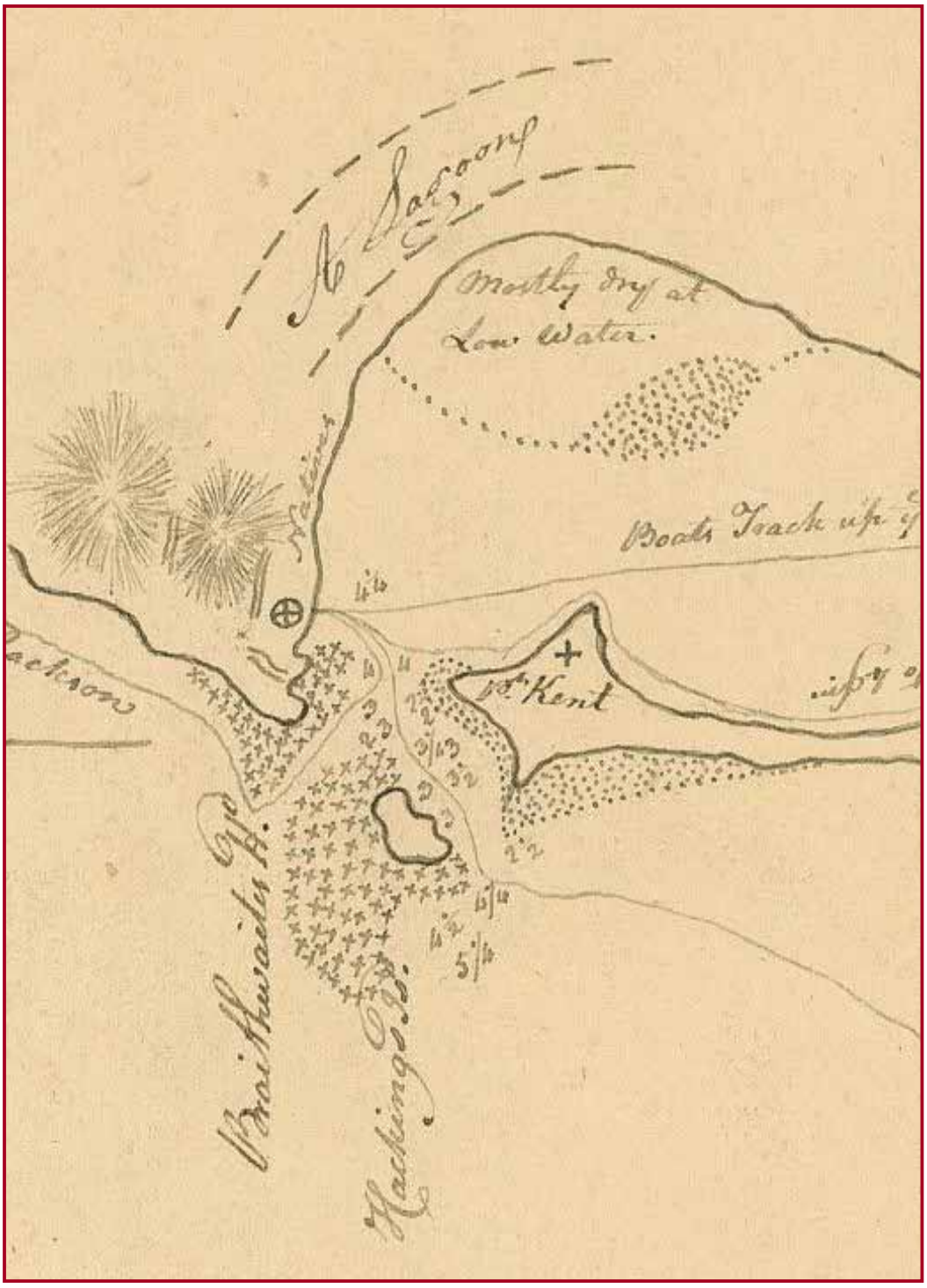


Figure 11. Shortland's Eye sketch of Hunter's River [1797]. In this original version held in the UK Shortland has annotated the southern shore 'natives'. http://www.newcastle.edu.au/service/archives/chrp/images/C642-1shortland1797.jpg

The 'discovery' of the river and the coal deposits was soon reported back to England by Governor Hunter who wrote:

> *A small river has been lately discovered by a boat I had occasion to send northward in pursuit of deserters. It is about sixty five miles from this port (Sydney) On the southern shore, a considerable quantity of coal was discovered, and the specimens bought hither.*[38]

From the late 1790s, the coal deposits and timbers along the Hunter River began to attract Sydney merchants who sent small vessels to the Hunter to reconnoitre and acquire these resources.

Hugh Meehan (merchant) appears to have been the first white person to dabble in settlement at Newcastle (then Coal Harbour). In May 1801, he established a sawpit at Freshwater Bay on the north side of the Harbour, as part of operations to procure timber and coal. After obtaining a cargo, he returned to Port Jackson on the after a stay of one month.[39]

3.3.1.1 Exploration

Lieutenant-Colonel William Paterson, first charted the Lower Hunter River, under the direction of Acting-Governor Philip Gidley King in June 1801.[40] Paterson travelled to the area on His Majesty's surveying vessel, the *Lady Nelson* with a party that included Lieutenant James Grant, NSW Corps Surgeon Harris and Ensign Francis Barrallier.[41] This journey of investigation and reconnaissance took place between the 10 June and 25 July 1801 and gathered considerable information about the nature of the river and it's shores and resources, conducted the survey work.[42]

[38] *Hunter to the Duke of Portland, 10th of January 1798 (Dispatch 30) in HRA I(II): 118*

[39] *HRA I(III): 772*

[40] *Turner 1980: 3.*

[41] *King to Portland, 21st of August 1801 in HRA I(III): 168*

[42] *Extract from Lieutenant Grant's Journal at Hunter River (King to Portland, 21 August, 1801 – Enclosure 2 HRA I(III): 169-174; Extract from Lieutenant-Colonel Paterson's Journal (King to Portland, 21 August 1801 – Enclosure 3 HRA I(III): 174-180*

3.3.1.2 Contact

While in the harbour, the survey party came across John Loft who had made his way to the district after being wrecked off Port Stephens. One of Loft's two companions had been killed by Aborigines, and the other had died after eating a toad fish.[43] The party also observed and made contact with some Aborigines during the expedition. On the 23 June 1801, the party met a native in 'the woods' who Grant described thus:

> *He was a little elderly man, strait made, and spoke not one syllable that was intelligible. He had all his fore teeth in, and spoke a jargon of simple sounds. As I particularly observed, few words that came from him were composed of more than one syllable. He could eat nothing: but two crows which some of the people had shot being given him, he stuffed them in the fire feathers and all, which after burning off, and heating them a little, he eat. In the morning, after using him kindly, the Colonel (Patterson) gave him a tomahawk, which he seemed mush pleased with, and shewed that he completely understood the use of it.*[44]

The elderly man's knowledge of the tomahawk led to some suspicion on the part of Paterson's party that escaped convicts or deserters were among the Aborigines of the Newcastle area. On the 5th of July, Paterson noted in his journal:

> *To-day we heard some natives, and saw a new canoe on the banks of the creek …From what I observed from the trees cut down by the natives, which must have been cut down with a much sharper edged tool than what their stone maga (axe) is, and from their shyness, I have little reason to doubt but that some of the European deserters are among them.*[45]

Surgeon Harris, part of Paterson's party, added the following observation about the Newcastle area Aborigines:

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[43] *Extract from Lieutenant Grant's Journal at Hunter River (King to Portland, 21 August 1801 – Enclosure 2 HRA I(III): 171*

[44] *Extract from Lieutenant Grant's Journal at Hunter River (King to Portland, 21 August 1801 – Enclosure 2 HRA I(III): 172*

[45] *Extract from Lieutenant-Colonel Paterson's Journal (King to Portland 21 August 1801 – Enclosure 3 HRA I(III): 178*

> *The natives here are remarkable shy. I am afraid they have been badly used by White people here some time since.*[46]

Harris's comments are significant in that they demonstrate that even before white settlement in Newcastle Aboriginal people had been significantly impacted by direct or indirect experiences with white invaders. These experiences included visitation by timber getters and escapees, perhaps experiences through visiting Sydney town, and certainly the devastating effects of smallpox.

3.3.1.2.1 Smallpox

The origin, spread and impact of smallpox on Aboriginal Australians is highly debated. What is not denied is that the spread of this disease, through a series of epidemics pre and post-dating European settlement had a very deleterious impact on the Aboriginal populations along the entire East Coast of Australia in the late 1700s and periodically throughout the opening decades of the 19th century. Department of Environment & Climate Change (Culture & Heritage Division) researcher Steve Brown has suggested that:

> *Even before European arrival to the Newcastle area, smallpox killed up to one third of the Aboriginal population of the Newcastle – Port Macquarie region and had a significant impact on Aboriginal society. Smallpox may have been a key factor shaping Aboriginal responses to the arrival of Europeans.*[47]

Table 6 details some of earliest observations of Aborigines in the Lower Hunter valley, as witnessed by the investigatory parties outlined above.

[46] *Letter to Governor King, 25th of June 1801 – quoted in Smith 1992: 43*

[47] *DEC 2005 – LGA profile – Newcastle (attachment). P: 2*

Table 6: Early observations of Aborigines in the Newcastle-Hunter Valley Area

Early Observations of Aborigines in the Newcastle-Hunter Valley Area		
Location	**Description/Comment**	**Source**
Newcastle	In my excursions in this charming spot the natives were seen, and in great numbers, judging by the different kinous (sic – canoes) I saw … they never allow us to approach we … were surprised at seeing a young native who was looking for the roots of fern	Barrallier: June 1802
	A creek … on its banks we found part of a net We likewise found marks of fires havng been lighted; and in the stream the remains of a weir The fires of the natives and many individuals of them were to be seen on the side of the harbour opposite Ash island	Grant: June 1801
	We … met with a native … an elderly man, of the class termed here, Bush Natives, who are considered as an inferior tribe by the inhabitants of the sea coast	Grant: 23 June 1801
Newcastle (Ash Island)	I saw some natives in the distance but could not get near them	Paterson: 19 June 1801
Lower Hunter	We … descried some of them at a distance, who fled on our approach. We came to a spot which they had just quitted, and	Grant: July 1801

	observed the marks of children's feet. The ground was covered with the shells of freshwater fish, of the sort found in the rivers of England & Scotland, and called the horse muscle, having sometimes small pearls in them	
	We saw several traces of the natives, both young and old, and passed some canoes, which are small and rudely put together	Grant: 8 July 1801
Below Maitland	On our passage (down the river) we saw several natives with their canoes. In many of them we saw fires, and in some of them observed a kind of eatable which they give the name Cabra: it appears to be abominably filthy, however when dressed it is not disagreeable to the taste	Grant: July 1801
Maitland	Here I found Bungaree, chief of the Boan native Tribe, with all his own family, and 30 more of his tribe, waiting my arrival, having come on purpose to meet me … Bungaree and his tribe entertained us with a Karaburie (corroboree) after dinner	Macquarie: 15 November 1821
	It rained so heavily that night that in the morning, the whole plain was flooed, and, in a lagoon where the plain had been, we saw blacks paddling in canoes made of bark, the ends tied with curridgeon (Kurrajong), and sealed with grass tree gum	Bundock: January 1926

Table formatted from information in Brayshaw 1987: 54-57; Enclosures 2 & 3 HRA I(III)

3.3.1.3 Initial Settlement

During the exploratory visit of 1801, Governor King established a 'small post' at Colliers Point, on the southern side of the Hunter River mouth. The purpose of the venture was to '… procure coal, timber and lime for the government'.[48] He explained in a letter to Portland, that although the entrance of the River was 'shallow and difficult':

> *… Not withstanding this disadvantage, the other advantages respecting the very great quantity of coals to be got there, and the immense quantity of shells for lime…*[49]

The founding party consisted of sixteen convicts and five soldiers under the control of a Corporal Wixstead. They mined coal by simple methods, having three men extract the coal and nine transport it in baskets to shore for transport. Output was around three tons per day.

Wixstead was replaced after three months due a series of disputes by Surgeon Martin Mason. The Collier's Point population was increased to 24 by November and nine tons of coal was being produced per day.[50] Despite the reasonable quality of the coal and the relative success of the operation, Mason 'misconducted' himself and the settlement was closed down in December 1801 after Governor King failed to secure a suitable overseer to replace Mason.[51]

3.3.1.4 Newcastle (Coal River)

In the wake of the 1804 convict uprising at Castle Hill, Governor King decided to remove rebellious convicts to Coal River. On the 18 March 1804, Lieutenant Charles Menzies of the Royal Marines was charged with the duty of establishing and overseeing a new settlement thereafter referred to as 'Kingstown', 'Kingston' and later as 'Newcastle in the County of Northumberland'.[52]

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[48] *Callen 1994: 13*

[49] *Governor King to Portland, 21 August 1801: 168*

[50] *HRA I(III): 772*

[51] *Callen 1994: 14: Turner 1980b: 9*

[52] *Callen 1994: 16; Clouten 1967: 12*

The second Newcastle convict settlement was sited on the southern side of the harbour and was centred around George Street (later Watt Street). Between 1804 and 1821 (the lifespan of the convict town) the Newcastle convict population ranged between 74 and 1051 people.[53] As with the initial 1801 settlement, the revisited convict enterprise centred on resource exploitation – timber, coal, lime-burning and salt making[54] (Figure 12).

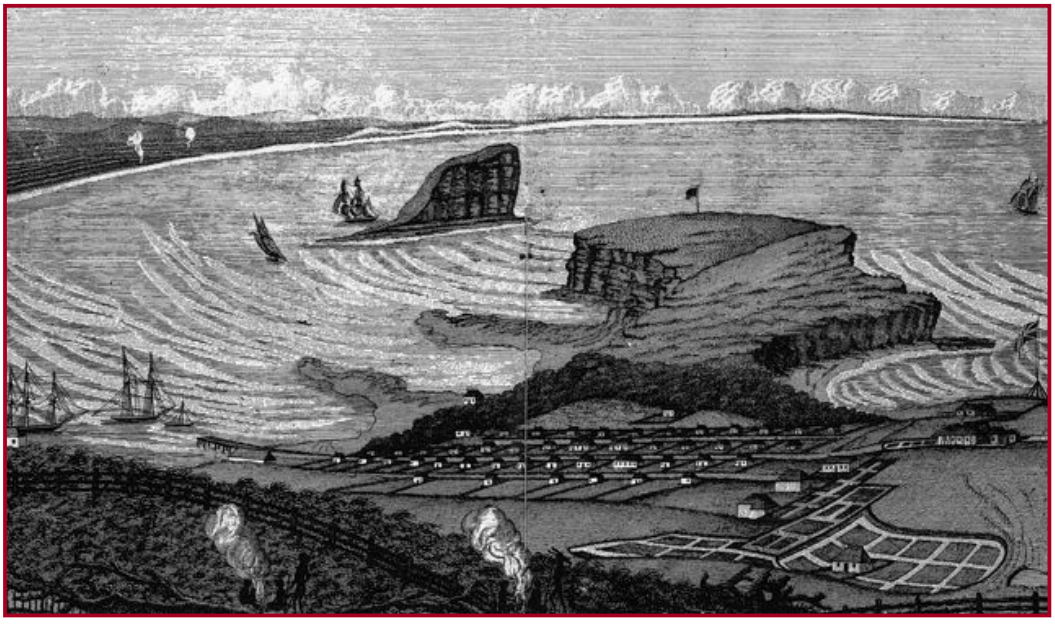

Figure 12. Preston's Engraving of Newcastle (c1812). Two Aboriginal camps are depicted in the foreground (Engraving in the Newcastle Region Art Gallery – presented in Turner 1980a)

3.3.1.4.1 Race relations in a convict town

Race relations in the convict town in the early 1800s were variable and largely influenced by the size and makeup of the convict settlement.

On the positive side, the relatively limited settlement area, centred around the southern foreshore, meant that Aboriginal people were freer to move around the landscape and continue their pre-contact lifestyle than in the settled districts about Sydney and the Hawkesbury. A rich cultural and ceremonial life continued for district Aborigines with Corroborees recorded in the Wickham and Belmont

[53] *Turner 1980b: 10 – Table 1*

[54] *Tuck 2004: 16-18*

areas and in the Lake Macquarie area hill-tops to the distant south.[55] Generally, Aborigines mingled freely with the white population and were involved in local commerce including supplying food to the settlement and taking soldiers on hunting and fishing trips.[56]

On the downside, the nature of the convict population and the low numbers of white females in the convict population proved problematic. The lack of women - there were never more than 50 females in the convict population - was a particular issue as convicts and bushrangers assaulted and abducted aboriginal women and young girls.[57] This undoubtedly inflamed local Aboriginal men and lead to considerable resentment. Not surprising, Aboriginal men became actively involved in the management of escaped convicts and became in a sense, 'allies' of the camp commandants. Lancelot Threlkeld wrote with reference to the relationship between the military establishment and the local Aborigines at this time:

> *Providentially for the colony, the aborigines were as much opposed to the prisoners of the crown, in consequence of the their bad conduct towards the wives and daughters of the blacks, so that whenever the police, or military, required a guide to direct them, or to trace the footsteps of the Croppies, as the Aborigines termed the runaway convicts, the blacks were ever ready for service.*[58]

Commissioner Bigge (during his investigation into the 'state of the Colony') added in 1821:

> *Many attempts are made by the prisoners to escape, and the natives who inhabit the Hunter River and Port Stephens Districts, have become very active in re-taking fugitive convicts. They accompany the soldiers sent in pursuit, and by their extraordinary site they can trace to a great distance with accuracy the imprint of a human foot. Nor are they afraid of meeting with the convicts in the woods, when sent in pursuit without the soldiers. By their skill in throwing the long painted darts, they wound and disable them, and bring them back prisoners, by unknown roads and paths, to the Coal River.*

[55] *Dyall 1971: 156*

[56] *Brayshaw 1987: 52-57; Bingle 1873: 13-14*

[57] *Turner 1980b: 10 – Table 1*

[58] *Threlkeld in Turner & Blyton 1995: 28-29*

> *They are rewarded for these enterprises by presents of blankets and maize, and not withstanding the apprehension of revenge from the convicts whom they bring back, they continue to live in Newcastle and its neighbourhood, but they are observed to prefer the company of soldiers to that of the convict.*[59]

Amongst the worst offenders with regards to Aboriginal ill treatment were the convict timber cutters who were the first to live periodically outside the designated Newcastle settlement area and were therefore the first to interact regularly with local Aborigines. The nature of this interaction was rarely to the advantage of the Aborigines, as Robert Dawson, first Chief Agent of the Australian Agricultural Company noted:

> *The timber-cutting parties therefore were the first people who came in contact with the natives in the neighbourhood of the sea: and as they were composed of convicts and other people not remarkable either for humanity of honesty, the communication was not at all to the advantage of the poor natives...*[60]

3.3.1.4.2 Convict Conflict

Not surprisingly, there was often physical conflict between convicts and Aborigines. On the 18 September 1819, convict Henry Langton received 75 lashes for 'cutting a black native with a knife'. Langton appears to have been a particularly nasty piece of work as he had been previously flogged for 'fracturing a man's skull with intent to murder' in the previous month.[61]

Physical conflict was also a consequence of the perusal of escaped prisoners by Aboriginal tracking parties. In 1820 Aborigines pursued a group of escaped prisoners one of the prisoners killed 'King Burrigan' while trying to escape. The prisoner Kirby was brought to trial for the murder and was hung on the 18 December 1820.[62] Despite the numerous murders of Aborigines in the early 19th Century, Kirby was the only man executed for such a crime between 1788 and 1838.

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[59] *Bigges quoted in Walker 1905: 202*

[60] *Dawson 1831*

[61] *Turner 1980: 18*

[62] *Col. Sec. Corr 31 October 1820; 16 November 1820 - SRNSW Reel 6067; 4/1807 pp.135-7;143;150; Turner & Blyton 1995: 29*

3.3.1.4.3 End of a Convict Town

By 1819 Newcastle had outlived its usefulness as a convict prison and Governor Lachlan Macquarie was making moves to replace it with a more suitable venue. The influx of free settlers into the Newcastle area, and the fact that the settlement was by then perceived as being too close to Sydney, were some of the reasons considered for moving the convict settlement.[63] The more distant Port Macquarie was proposed as a replacement in July 1819 and settlement commenced there under Governor Thomas Brisbane in 1821. It was not until 1824 however, that Newcastle was considered 'no longer a place of banishment'[64] (Figures 13 and 14).

Figure 13. Joseph Lycett's A View of Kings Town (Newcastle) [c.1822]. (National Library of Australia nla.pic-an5263654)

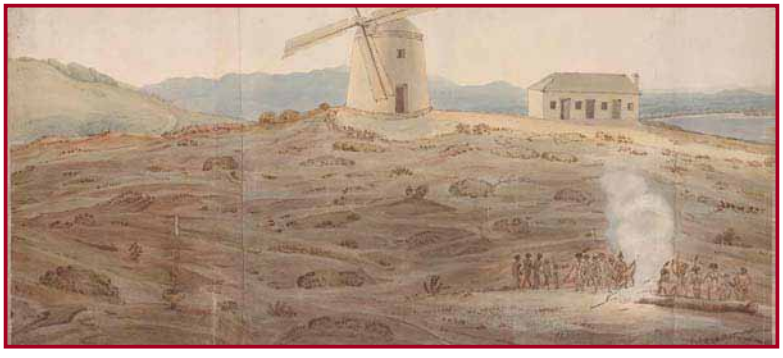


Figure 14. Sophia Campbell's Panorama of Newcastle (1821). This image of what is know 'the hill' area of Newcastle depicts Aboriginal ceremonial activity in the foreground with the contrasting background displaying the effects of white settlement – land clearing and construction. (State Library of NSW PXD 576 Id a1540003)

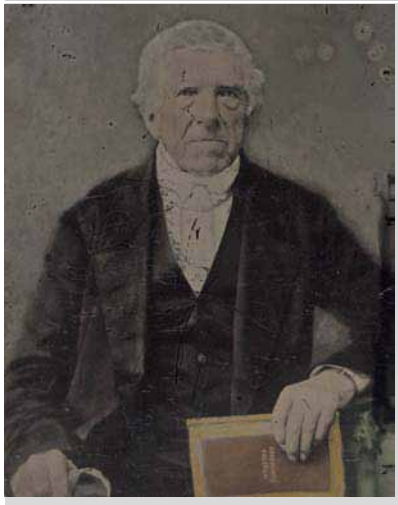
[63] *Walker 1905: 203.*

[64] *Turner 1980: 16*

3.3.1.5 Threlkeld's Mission

While Newcastle was in the throes of becoming a free town, Missionary Lancelot Threlkeld was in the process of establishing an Aboriginal Mission (one of the first in Australia) to the south of Newcastle at Lake Macquarie.

Threlkeld & the Aboriginal Mission at Lake Macquarie



Lancelot Threlkeld was a missionary and congregational minister from Southwark, London who joined the London Missionary Society in 1814. He travelled to the South Seas in 1816 and by 1825 had established himself in Newcastle with the intent on establishing a mission for the instruction and christianisation of local Aborigines.

Threlkelds 1st mission was established at Ried's Mistake (Belmont) in the Lake Macquarie heartland of the Awabakal. It was known as Batabah. At the mission, Threlkeld taught agriculture and the Christian faith. Operation of the mission was expensive and the pioneer operation was shut down by the early 1830s.

Threlkheld established a 2nd mission in Lake Macquarie on an 1831 land grant from Governor Darling at Ebenezer (Toronto). Over the next ten years he consolidated his work with the assistance of the tribal leader Biraban - mastering the local dialect; teaching agriculture and scripture (in language); promoting Aboriginal causes; acting as interpreter for Aboriginals on trial in Sydney; and printing regular reports. His letters, published reports and language studies are now regarded as landmarks in Aboriginal historical studies.

Aboriginal numbers in the area and at the mission declined during the 1830s and by 1841 the mission was disestablished. While the mission provided something of a haven for Aborigines (particularly during times of conflict) the mission had only limited success in the eyes of the Missionary Society and Threlkeld himself as he had made no converts to the Christian faith.

Sources: Threlkeld in Gunson 1974; www.adb.online.anu.edu.au/biogs/A020481b.htm

Image from the State Library of NSW ML MIN 45 Id a128176

Considerable information on the Awabakal Aborigines in the late 1920 and 1930s derives from the works of Threlkeld. Much of the additional information comes for Government correspondence and newspaper articles. Examples include an article from 1827 which discusses the local Aboriginal population and their activities:

> *… the black population of Newcastle is as great, if not greater than the white, which cannot be said of any other place in the colony – they carry wood and water, and in short are willing servants of the lowest classes, and look for their reward in small pieces of tobacco or a cob of corn. They go perfectly naked, and walk in and out of the houses of English females, without creating the smallest notice or concern.*[65]

The 1828 census reflected the substance of the newspaper article and bore witness to the relatively high Aboriginal population in the greater Newcastle area, with 760 Aboriginal people recorded in the greater Newcastle/Lake Macquarie area.[66] Some individuals from this period are depicted in Figure 15.

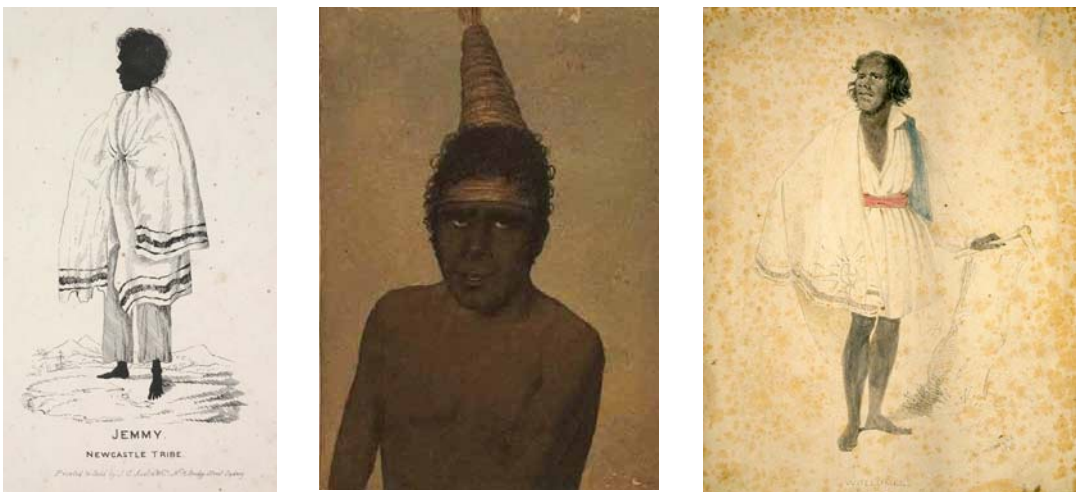


Figure 15. Jemmy [1836]; Augustus Earle's Tommy, Newcastle [1825]; William Nicholas's Wollomel (Wallace) Newcastle [c.1807 – 1854]. (National Library of Australia nla.pic-an2820746; State Library of NSW ML DL Pd 62)

[65] *1827 newspaper article quoted in Turner 1997a: 12*

[66] *Sainty & Johnson, 1980*

3.3.2 Opening up the Hunter Valley

Following the transfer of the penal settlement to Port Macquarie in the 1820s, the Hunter Valley was opened up to white settlement. The initial spread of settlement was facilitated by the explorations of Benjamin Singleton and John Howe who ventured into the Upper Hunter Valley (via Windsor and the Great Divide) under the instructions of Governor Lachlan Macquarie in 1818 and again in 1821.

3.3.2.1 Singleton & Howe

During the 1818 expedition Singleton's party encountered local Aborigines and the parties fear is palpable in the writings of Singleton:

> *Halted the night at about 8 o'clock. Disturbed by the voice of natives, cracking of the sticks, & the rolling of stones down towards us. Every man of us arose and fled from the fire secreting ourselves behind trees with our guns.*[67]

Despite the Aborigines, the expedition party returned in 1821 and reached the Maitland area, Howe describing the Hunter Valley as ' … the finest sheep land I have ever seen since I left England'.

3.3.2.2 Squatters

Almost immediately, the Valley became a target for squatters and pastoralists. Surveyor Henry Dangar (who undertook considerable work in the region) reporting in 1825 that:

> *From 1822, when the valley contained no people, save for a few Aboriginal inhabitants, to November 1925, no less than 372 141 acres were appropriated to 792 persons; 132 164 acres for church and school purposes, and 100 000 acres reserved in various parts by the Government.*[68]

3.3.2.3 A Violent Frontier

The parcelling up of the land and its supply with cattle had significant impacts on regional Aborigines. White land acquisition altered the ranges of Aboriginal groups; European stock and stockmen reduced the numbers of traditional food sources such

[67] *Singleton cited in Blyton et al 2004: 15*

[68] *Dangar cited in Blyton et al 2004: 16*

as kangaroos; Aboriginal women were abused and mistreated; and the combined effects of introduced disease caused Aboriginal populations numbers to enter a period of significant decline.

Not surprising, some Aboriginal individuals and groups responded to the invaders with violence. Surveyor Dangar himself was part of a surveying party that was attacked by Aborigines at the headwaters of the Hunter River in December 1824. Violence and counter-violence ensued and the situation was such by 1826 that Threlkeld decried from Lake Macquarie:

> *But alas! The blood of the blacks begins to flow, we are in a state of warfare up the country here – two stockmen have been speared in retaliation for the 4 natives who were deliberately shot without any trial or form whatever. Martial law is the cry of the settlers …* [69]

One of the four murdered Aborigines referred to by Threlkeld was a 'Jacky Jacky' (aliases Commandant and Jeffrey). He had been under the guard of a Lieutenant Nathaniel Lowe at Wallis Plains (Maitland) Gaol when he had been shot by firing squad.[70]

1826 was a particularly bloody year in the Hunter Valley. A year in which a collective of eleven Upper Hunter Valley landholders petitioned Governor Ralph Darling to provide police patrols to arrest the 'marauding conduct of the natives' and prevent '… revenge and depredation of these infuriated and savage people'.[71] After communications with the Earl of Bathurst at the Colonial Office, the Governor declined to send troops but informed the petitioners:

… Vigorous measures amongst yourselves would more effectively establish Your ascendancy than the upmost power of the Military… [72]

Darling's response provided the settlers with an opportunity to form officially sanctioned vigilante groups and by the close of 1826 punitive expeditions in the

[69] *Threlkeld 4 September 1826 cited in Blyton et al 2004: 17*

[70] *Lowe was tried before the Supreme Court in Sydney in 1827 for his role in ordering the shooting but was found not guilty (Blyton et al 2004: 18)*

[71] *Petition dated 4 September 1826 cited in Blyton et al 2004: 19*

[72] *Governor Darling October 1826 cited in Blyton et al 2004: 21*

Upper Hunter Valley (involving settlers and soldiers alike) had lead to the deaths of at least 18 Aborigines.[73]

Attacks and counter attacks were features of the closing years of the 1820s in the Hunter Valley with injuries and deaths sustained on both sides.[74] For example, Upper Hunter River resident Dr Little discovered the bodies of 'some half a dozen blacks' in a hut on the plains side of the Liverpool range – they had been killed by 'stock-keepers and others' reputedly in self-defence. In 1830, Aborigines at Wollombi killed 100 head of sheep and tied a shepherd to an ant hill, after which a party of police '… were sent after the offenders, of whom they killed several'.[75]

3.3.2.4 Merton

While some settlers acted violently towards the Aborigines whose lands they had assumed, others (for moral, paternalistic or economic reasons) provided some support and safety for Aborigines on their properties.

Figure 16. Merton Cottage, Upper Hunter Valley. (Australian Heritage Photographic Library rp02927)

[73] *Blyton et al 2004: 21*

[74] *Turner & Blyton 1995: 36*

[75] *Monitor 4 August 1828; Lieutenant Breton in Blyton et al 2004: 23 - 24*

At Merton (now Denman), the Jerrys Plains homestead of Captain William Olgilvie, Aborigines appear to have lived and worked on the property during and after the violent era of the 1820s (Figure 16). Olgilvie and his family afforded local and visiting Aborigines protection – as noted by neighbour Peter Cunningham:

> *The natives around Merton, the residence of Lieutenant Ogilvie R. N. had remained all along on the most friendly terms with his establishment…*[76]

Merton was considered a safe place and consequently was a location where blankets and slop (used) clothing were distributed to Aborigines in the 19th century.[77] The practice, benevolent in intent, was established under Governor Macquarie in 1816 and continued by his successors until the late 19th century. The process involved requests for blankets by reputable persons – district magistrates, established landholders – and their provision by the crown. The blankets were made available to Aborigines (originally on the monarch's birthday) at locations of convenience and 'returns' were kept detailing the people who received the blankets. The blanket returns for 1939 for instance show that 59 Aborigines attended Merton for the distribution of blankets – 40 men; 14 women; 1 boy; and 4 girls.[78]

[76] *Cunningham cited in Blyton et al 2004: 22-23*

[77] *Other distribution locations included Senegoe and the East Maitland Courthouse*

[78] *State Records of NSW Special bundle 4/1133.3*

Jackey Jackey (Galmarra)

One of the Merton Aborigines was a man named Jackey Jackey who grew up on the property in the 1840s. A skilled bushman he was chosen by explorer Edmund Kennedy to accompany him on an ill fated journey to find a land route from Rockhampton to Cape York Peninsula – Kennedy was killed by Murri Aborigines and Jackey Jackey returned alone.

After leading an unsuccessful retrieval party back to obtain Kennedy's body, Jackey Jackey was commended for his bravery with a gorget (king plate) and a large some of money which he spent horses and alcohol. After the event, he lived with Patricks Plains Aborigines in the Singleton area but became increasingly alcohol dependant. He died in 1854 (while still a young man) on a droving expedition outside of Albury. His 'fondness for ardent spirits' caught up with him when intoxicated, he fell into a fire and burnt to death.

Sources: 'Jackey Jackey' in *ADB* 1967 (2): 7; Blyton et al 2004: 35

Image of 'Silver breastplate presented by His Excellency Sir Charles Augustus Fitz Roy K.B., Governor of New South Wales, to Jackey Jackey' State Library of NSW ML a928501

3.3.2.5 Impact

Within the greater Hunter Valley, the 'frontier phase' of European occupation characterised by resistance and accommodation ended in around 1830 as settlers gained the upper hand.

By this time there had been a profound negative change in relations between Aborigines and Europeans in the Newcastle and Hunter Valley areas.[79] The reasons for this shift were numerous and included continued interference and conflict, and the cumulative effects of regional drought.

There were a significant number of bushrangers and ceder cutters in the Lake Macquarie and Tuggerah Lakes districts from the late 1820s. Some of these men interfered with district Aborigines. Threlkeld recorded the nub of the problem as:

> *The unmatromonial state of the thousands of male prisoners scattered throughout the country amidst females though of a different colour, leads them by force, fraud or bribery to withdraw the Aboriginal women from their proper mates.*

Threlkeld believed that much of the disease and death occurring in the Aboriginal female population at this time was a result of this illicit intercourse and noted that:

… the continued ill treatment and frequent slaughter of the black women can only be deplored, perhaps without remedy.[80]

Such interference on the part of whites, and its effect on the women, lead to reciprocal hostility and Aboriginal revenge attacks on district farms by 'parties of bewildered Aborigines who had been stirred into a frenzy by the outrageous conduct of runaway prisoners'.[81] This often lead to a circle of violence which featured repeated attacks and counter attacks. In some instances, engendered bitterness amongst Aboriginal men also resulted in the movement of families, and sometimes whole tribes, away from settlement areas.[82]

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[79] *Clouten 1967*

[80] *Threlkeld Report of the Mission to the Aborigines at Lake Macquarie 20 December 1837*

[81] *Clouten 1967: 69; 59*

[82] *Clouten 1967: 31*

In addition to the direct conflict outlined above, drought in the district in the late 1820s/early 1830s, had a considerable effect on relations between Aborigines and Europeans actively competed for diminishing resource areas.[83] During the drought, stockmen and graziers sought the same native pasture lands that the Aborigines used for hunting Kangaroos and other grazing game.[84] This of course lead to considerable ill feeling and conflict.

The pressures of diminishing natural resources, which compounded the effects of increasing alcohol abuse, and displacement, also lead to Aboriginal groups committing violence against each other.[85] Attacks on Aborigines in the Lake Macquarie and Newcastle area by Aborigines from elsewhere (eg: Brisbane Water, Maitland &c) were recorded on several occasions in the 1830s.[86]

The cumulative effect of interference, disease, displacement and conflict, was that Aboriginal populations all over NSW began to diminish noticeably in the 1830s. This problem was not lost on Threlkeld himself - he saw the greatest threat to the continuation and longevity of his mission as Aboriginal population reduction. Threlkeld lamented in his 1837 annual report that:

> *It appears that the decrease in the Black population is not local and temporary, but general and annual…* [87]

In his annual report of 1837 Threlkeld wrote

> *The various tribes at Port Stevens and its vicinities the returns of which contain about 500 Blacks; Hunter's River and its dependencies having about 300; and other contiguous tribes, consisting of about 200 more.*[88]

By 1838, the whole Aboriginal population between Sydney and Port Macquarie had been reduced to 1220. A return of Aboriginal natives taken Newcastle in 1837 listed only 26 people of the Newcastle, Ash Island, Lake Macquarie and Port

[83] *Sturt in Brayshaw, 1986: 18*

[84] *Dyall 1971: 154*

[85] *Turner & Blyton, 1995: 35*

[86] *Turner & Blyton, 1995: 36*

[87] *Threlkeld in Report of the Mission to the Aborigines at Lake Macquarie 20 December 1837*

[88] *Gunson 1974:135*

Stephens tribes in the whole Lake Macquarie – Port Stephens areas. It was noted at the time that:

> *The hundreds of Aborigines has lessened to tens, and the tens will dwindle to units before very few years have passed away.*[89]

By the 1850s, the Upper Hunter Valley Aborigines were sharing the same fate as their coastal brethren. Surveyor Felton Mathew visited Broke (northwest of Maitland) in the 1830s and remarked in his diary.

> *Measuring a line of Road from the Reserve of Broke N32º30'W towards the Reserve of Hay on the River Hunter – measured 6 miles & encamped. Visited the first camp of the natives, I have seen. There were about 60 men, women & children. I remained with them about an hour & saw them return for the night, each party or family kindling its own separate fire apart from the others.*
>
> *The place they were encamped in was a romantic spot on the bank of the Wollombi, and the scene altogether was to me one of peculiar interest. They were very curious [?] in observing every article of my dress & everything about me and were particularly amused with my watch & a pocket compass, especially the latter the use of which they appeared in some measure to comprehend. A whistle too which I wore suspended from my neck they were much pleased with & were very anxious to make it sound as I did –*
>
> *I prevailed on some of them to "give me a specimen of their skill in throwing the "Boomerang" a weapon which is composed of hard wood nearly in the shape of a crescent, which they throw from them to a great distance, causing it to describe a circle and fall again at their feet. They asked us to see their "gins" or wives & very obligingly invited us to select a good one each & invitation, which I did not feel at all disposed to avail myself of. They are amazingly quick of comprehension & caught my name in a moment pronouncing it well & distinctly – they were much amused at our awkward attempts at pronouncing some of the native names.*
>
> *They are certainly a less disgusting set than those in the neighbourhood of Sydney indeed one of them named "Wednesday" was really a very fine man – but many of them are ugly & loathsome from*

[89] *HRA I(21): 739*

> *dirt & starvation & I observed several who appeared to have defective eyes..*[90]

Similarly, Edward Olgilvie, who grew up on his father's aforementioned Jerrys Plains property of Merton (Denman), returned to the Upper Hunter in 1854 after an absence and spoke to a childhood friend, an Aborigine named Coolan:

> *He told me how the once numerous tribes of the Camilarrai (Kamilaroi) who in his boyhood roamed the plains and camped in the valleys – the Marowancal, the Tooloompikalal, the Gundical, and the fine intelligent tribe of the Paninpikilal, to which he himself belonged, had all sank, dropped off, died, and gradually disappeared, the miserable remnant, some half a dozen broken men, all gaining a livelihood like himself tending sheep.*[91]

3.3.2.6 Captain Thunderbolt & Mary Ann Bugg

Two significant figures in the history of the Upper Hunter Valley from the mid 1850s were bushranger Captain Thunderbolt (Fred Ward) and his partner Maitland Aborigine Mary Ann Bugg.

3.3.3 Central Slopes and Plains

While the Newcastle area and the Hunter Valley was ostensibly 'settled' by 1830, the slopes and plains beyond the Liverpool Range remained largely unexplored and stood beyond what Governor Ralph Darling had defined in 1929 as the 'settled district'.

3.3.3.1 Exploration

The explorers credited with first investigating this extensive area are John Oxley and George Evans who undertook an expedition into the interior in 1818 (Figure 17). The purpose of this expedition, their second major venture as an expeditionary team, was to determine if the Macquarie River emptied into an inland sea and/or joined other larger watercourses.[92]

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[90] *Mathew 11 February 1830 – Diary (1829 – 1831) http://www.users.bigpond.com/narrabeen/feltonmathew/journal.htm*

[91] *Edward Ogilvie cited in Blyton et al 2004: 29-30*

[92] *Whitehead 2005: 53 - 55*

Mary Ann Bugg (Black Mary)

Famed horseman, horse thief and bushranger Frederick Ward (better known as Captain Thunderbolt) was a man on the run for almost 20 years (c.1850-1870). Operating in the Hunter Valley, Liverpool Plains and central NSW, his companion for much of his criminal life was Mary Ann Bugg - an Aboriginal woman from Maitland, also known as 'Black Mary' and the 'Captain's lady'.

Mary Ann (b.1834) was the daughter of convict James Bugg and his wife Charlotte. She was one of eight children. She met up with Thunderbolt on a property in Mudgee where he was working after being released from Cockatoo Island prison in Sydney. At the time she was married to an Edgar Baker, but she formed a loving relationship with Thunderbolt that was to last many years.

The longevity of Thunderbolt's life of crime has often been attributed to Mary Ann Bugg who accompanied him on many daring raids, aided in his escape from prison on at least one instance, and is often described as Australia's first female bushranger. Probably the most famous example of her daring was when she swam a mile from Long Nose Point to Cockatoo Island in the dark so that Thunderbolt and an accomplice Fred Britton could affect an escape.

Mary Ann bore Thunderbolt four children, the fourth born after a stint in gaol that saw her health deteriorate. Soon after the birth, Thunderbolt moved Mary Ann to a settlers hut in Muswellbrook but she soon died due to complications associated with pneumonia (11 November 1867). After her death, her children were placed in Government orphanages – her descendants are part of the modern Hunter valley Aboriginal community.

Thunderbolt himself was shot dead at Uralla on 25 May 1870.

Sources: Blyton et al 2004: 36-41; 'Mary Anne Bugg – Captain Thunderbolts Lady' paper by Scott Matthew adapted with permission from an article by Andrew Stackpool (2007) http://www.uralla.com/history/details.php?who=9

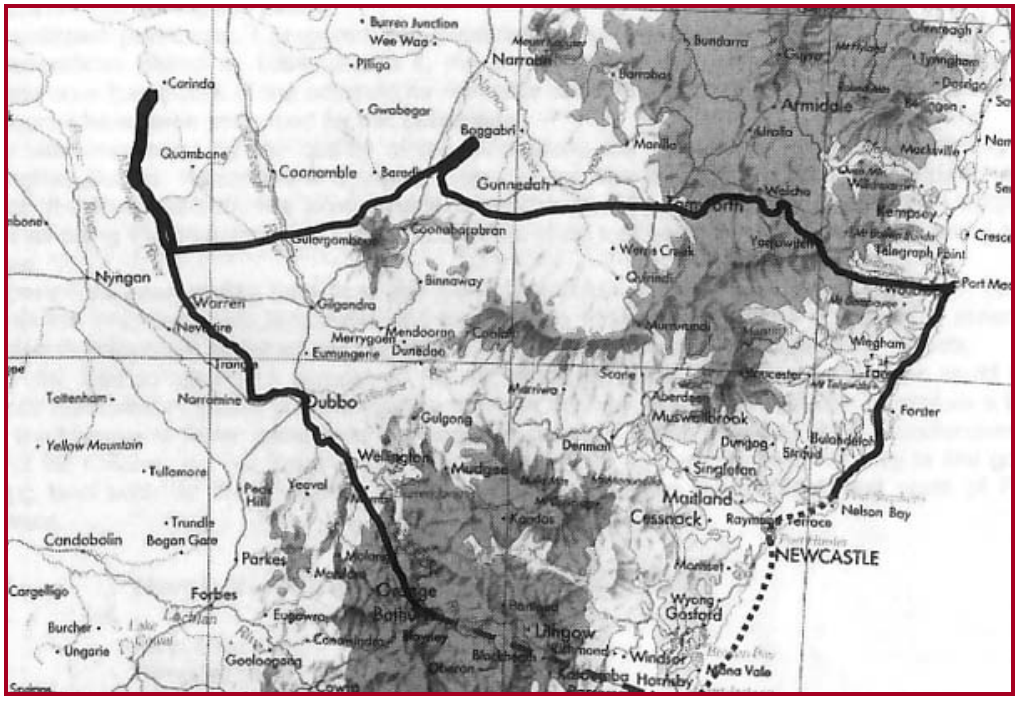

Figure 17. Map showing Oxley & Evan's 1818 expedition route. (Map presented as Figure 14.1 in Whitehead 2004: 53)

3.3.3.2 Oxley & Evans

The journey took Oxley's team from Sydney, over the Blue Mountains and northwest as far as the Macquarie marshes. The land in this area was in flood at the time and they were prevented from continuing north. Rather than retrace their steps, the team instead headed east towards the coast from Mt Harris and in doing so passed through the broader study area (below Gunnedah) in August 1818. They recorded few instances of sightings or interactions with Aborigines in the area and remarked of the land further west that '… the whole of this country appears to be very thinly inhabited'.[93]

Oxley's journey had taken him across the Liverpool Plains (in the vicinity of Curlewis) parts of which he discerned to be ideal for grazing and settlement. Thereafter numerous official and unofficial attempts were made to find a suitable way across the Liverpool Ranges to access the plains from the south and allow for settlement. These included Allan Cunningham's discovery of 'Pandoras Pass' in 1823 (which as the name suggest was a difficult track); the explorations of Henry

[93] *Oxley cited in Whitehead 2005: 226*

Dangar in 1824; and Cunningham's revisitation to the Plains in 1825 when he travelled north as far as Boggabri.[94]

While the official explorations created some interest in the Liverpool Plains and its offerings it was the illicit explorations, tentative settlement, and resultant anecdotes of escaped convict George Clarke that ultimately honed the interest of officials and settlers.

George Clarke & the Aborigines

George 'the barber' Clarke (b.1806) was sentenced to death for armed robbery in Shropshire, England in 1824. His sentence was commuted and he was sent to the Colony as a convict 'for the term of his natural life'.

On arrival in Australia he was assigned to Hunter Valley pioneer Benjamin Singleton though he absconded almost immediately and fled to the Liverpool Plains region.

Unlike most escaped convicts, Barber appears to have sought out local Aborigines and lived with Kamilaroi people in the Namoi Valley – principally between the later sites of Gunnedah and Narrabri. He was embraced by the local Aborigines as one of their own and was at least partly initiated – he was observed scarified, painted black and frequently in the company of two Aboriginal women.

With a Namoi Valley base, he took to bushranging but appears to have given himself up to his former master Singleton in 1831. Rather than hand Clark into the authorities, Singleton retained Clarke and was regaled by his stories of a great inland river that he had twice followed to the sea. Intrigued, Singleton set out on an exploratory journey of his own (with Clarke assisting).

En-route to the Liverpool Plains, Clarke again absconded and returned to life as an outlaw. He was ultimately captured and sent to Bathurst gaol. He escaped (again) but was ultimately recaptured and was hung for his crimes in 1835.

Sources: O'Rourke 1995: 12; Hunt 1980; Baker 1997

[94] *Hunt 1980: 10*

Before Clarke was hung his plausible account of a hitherto unknown inland waterway had sparked the imagination of Surveyor- General and explorer Thomas Mitchell (Figure 18). Mitchell was an exploration devotee claiming:

> *… there are few undertakings more attractive to the votaries of fame or the lovers of adventure than the exploration of unknown regions.*[95]

Before long Mitchell had obtained permission from then Acting-Governor Patrick Lindsey to test the veracity of Clarke's claims.

3.3.3.3 Search for the Kindur

Thomas Mitchell and an expeditionary party consisting of assistant surveyor George Boyle White and 15 convicts left Sydney on 24 November 1831 in search of *Kindur* – the river of legend from the tales of George Clarke.

Figure 18. Thomas Mitchell. (State Library of NSW ML 24)

The journey took the party from Sydney up through the Hunter Valley (via Singleton and Muswellbrook); to Tamworth and up the Namoi Valley (to around Moree and the confluence with the Barwon River); and into Queensland (as far as Mitchell on the Maranoa River) (Figure 19).

Mitchell did not find an inland river of enormous magnitude or his secretly desired inland sea – there was none. Clarke's stories may well have arisen from his misinterpretation of the Mehi-Gwydir country in flood.[96] Mitchell did however

[95] *Mitchell cited in Gunnedah & District Historical Society 2006: 9*

[96] *O'Rourke 1995: 13*

traverse thousands of kilometres with the aid of Aboriginal guides, and made a number of observations of Aboriginal people in passing (Table 7).[97]

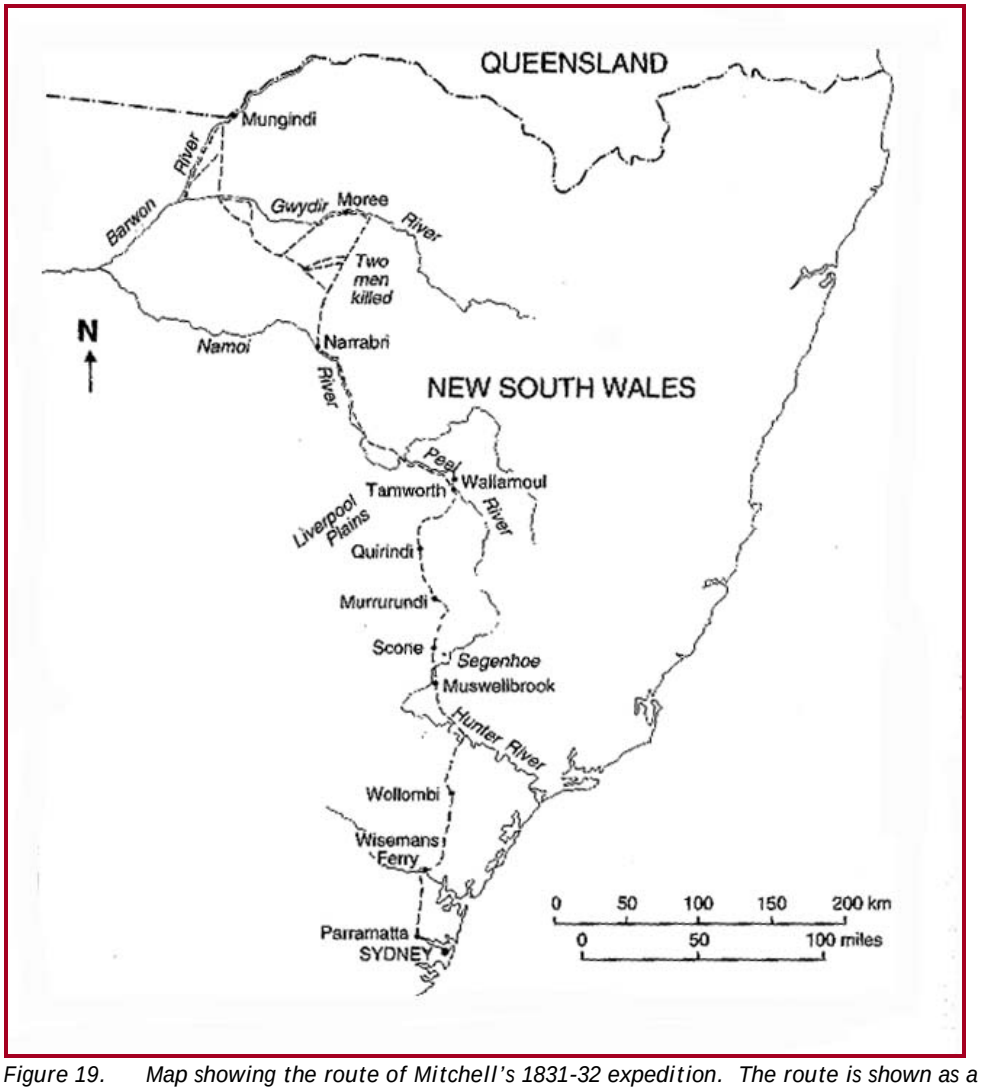

Figure 19. Map showing the route of Mitchell's 1831-32 expedition. The route is shown as a dotted line. The words 'two men killed' below Moree denote the location where Aborigines killed two of Mitchell's party. (Map presented in Baker 1997: 50)

[97] *It should be noted that Mitchell's original plan to pick up a guide at Segenhoe, a property in the Hunter valley at Muswellbrook. This did not eventuate because, as the absentee landlords agent observed, the Aborigines had by this stage all but disappeared from the Hunter Valley (Baker 1997: 49). Mitchell instead obtained the services of a Kamilaroi man 'Mr Brown' at Wallamul (Hunt 1980: 13)*

Table 7: Mitchell's observations of Aborigines in the Liverpool Plains

Mitchell's Observations of Aborigines in the Liverpool Plains		
Location	**Description/Comment**	**Source**
Murrurundi	I rode a little beyond our encampment, and chanced to fall in with a tribe from Pewen Bewen on Dart Brook (Hunter River tributary), one of whom afterwards visited our camp, but he could tell us little about the interior country … In the evening a native of the Liverpool Plains came to our tents	Mitchell: 4 December 1831
Above Murrundi	We reached at length the watercourse called by the native 'Curringai' and encamped upon its bank, beside the tribe from Dart Brook, which had just crossed the range (Liverpool Range) before us, apparently to join some of their tribe who lay extremely ill at this place having been affected with a virulent kind of smallpox. We found the helpless creatures stretched out on their backs beside the water, under the shade of the wattle or mimosa tress, to avoid the intense heat of the sun	Mitchell: 5 December 1831
Quirindi	Mitchell obtains the services of a pigeon specking Kamilaroi man, a 'quiet and sensible fellow' named 'jemmy'. Jemmy renders his giding services in exchange for an iron tomahawk	Mitchell: 8 December 1831
Near Currabubula	… the country seemed on fire all around us … the grass … was liable to catch fire, and	Mitchell: 9 December 1831

(NW of Quirindi)	was … frequently set on fire by the natives …	
Boggabri	… we came upon a narrow branch from the river (? Namoi) which we avoided by turning a little to the right. We next reached a very large stock yard, which the natives said had belonged to 'George the Barber' meaning the bushranger. We saw besides the remains of a house, the 'gunyahs' or huts, of a numerous encampment of natives	Mitchell: 17 December 1831
B/n the Namoi & the Gwydir	On gaining once more the open forest we saw two newly felled trees, which had been cut with an iron axe or tomohawk,: and immediately after, we perceived the natives at a distance The tribe appeared to consist of about 30 individuals; those who remained at a distance carried spears, and were evidently much afraid of us	Mitchell: 3 January 1832
Gwydir	In the afternoon the natives appeared on the opposite bank, and were soon after head calling out 'Witefellow, Witefellow'	Mitchell: 9 January 1832
Gwydir (near Moree?)	The deep and extensive hollows formed by the floods of this river forced us to travel southward for several miles. In crossing one hollow, we passed among the huts of a native tribe. They were tastefully distributed amongst drooping acacias and casuarinae; some resembled bowers under yellow fragrant mimosa; some were isolated under deeper shades of	Mitchell: 10 January 1832

	casuarinae; while others were placed more socially, three or four together, fronting to one and the same hearth. Each hut was semi-circular, or circular, the roof conical, and from one side a flat roof stood forward like a portico, supported by two sticks. Most of them were close to the trunk of a tree, and they were covered, not as in most parts, by sheets of bark, but with a variety of materials such as reeds, grass, and boughs. The interior of each looked clean, and to us passing in the rain, gave some idea, not only of shelter but even of comfort and happiness. They afforded a favourable specimen of the taste of the gins, whose business it usually is to construct the huts. This village of bowers occupied more space than encampments of native tribes in general; choice shady spots seemed to have been an object, and had been selected with care.	
Tributaries off the Gwydir	We could trace their course to a remote distance by the smoke fires of the native population. The numerous marks of feet on the banks, with the abundant remains of muscles, and bones of aquatic birds, proved, that human existence was limited to the channels; not only on account of water, but of those animals, birds and fishes also, which are man's natural prey	Mitchell: 16 January 1832
Gwyder – west	We heard the natives in the woods, during our journey, but none approached the	Mitchell 19 January

of Moree	party.	1832
Gwydir crossing NW of Moree (?)	Penetrating next through a narrow strip of casuarinae scrub, we found the remains of native huts; and beyond this scrub, we crossed a beautiful plain.	Mitchell 21 January 1832
	In some parts of this parched plain numerous prints of human feet appeared, but the soil which had evidently been very soft, when these impressions were made, was now baked hard as brick … the prints of the kangaroo, when persued by the natives, and impeded by the mud, were visible in numerous places	Mitchell 22 January 1832
Between Mungundi & Moree (?)	Two of Mitchell's party – a bullock driver and Bombelli murdered and their camp ransacked by Aborigines Mitchell witnesses the smoke signals of Aborigines near Mt Frazer	Mitchell February 1832
Table formatted from information in Mitchell 1839 [1996]: 1–143; Baker 1997: 40–67; O'Rourke 1995; 1997		

For the party, the most significant event was the murder of two convict assistants. The assistants were two of three convicts accompanying Assistant Surveyor Heneage Finch who was on his way across the Liverpool Plains from the Hunter Valley to join the expedition.

Establishing a temporary base camp between Narrabri and Moree, Finch left two of his convicts with the accompanying bullocks while he searched with another convict for Mitchell's party. On his return, the convicts who had stayed behind were found dead under ransacked tents, harnesses and provisions with their skulls smashed in. Fearing for their lives, Finch and his remaining assistant fled the scene

and ultimately met up with Mitchell's party on the Barwon River near Mungindi.[98] For the remainder of the journey the expeditionary party was particularly wary of the Aborigines of the Liverpool Plains who followed the party in considerable numbers and whom a somewhat rattled Mitchell referred to after the event as 'murderous savages'.

By the time Mitchell's expedition was completed tentative unsanctioned settlement had already occurred as far as Tamworth with runs taken up on the Namoi and at locations such as Breeza and Murrurundi.[99] As had occurred in the Hunter Valley in the 1820s, this 'frontier' spread of European settlement into the Liverpool Plains in the 1830s was accompanied by conflict between the local Aborigines and the white invaders.

Within three years of Mitchell's journey, Aboriginal verses settler conflict had broken out to such an extent that the frontier areas of the Liverpool Plains were in the grip of a race war.[100] Details of incidents that took place involving settlers and convict servants are sketchy, but it is known that by 1835 numerous white settlers (and an indefinite number of Aborigines) had been killed at a number of locations including Boggabri, Terry Hie Hie, Baan Baa, Therribi and Nyrrabry.[101]

3.3.3.4 Spread of Settlement

Governor Bourke attempted to assert some control over land use beyond the settled districts in 1836 with the imposition of the Squatters Act. The Act sought to regulate escalating land occupation and established squatting districts within which landholders were required to pay an annual fee of £10 to depasture stock on Crown lands. By 1939, the areas beyond the 'limits of location' had been divided into nine pastoral districts with overseeing commissioners.

In essence, the Act allowed for the partial legitimisation of squatting activity from the mid 1830s. Within the broader study area this facilitated extensive movement into the areas beyond Newcastle and the Hunter Valley along a broad front.

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[98] *Baker 1997: 58*

[99] *Hunt 1980 12*

[100] *O'Rourke 1995: 48*

[101] *O'Rourke 1995: 48; Millis 1992*

3.3.3.5 Massacres

Not surprisingly, the intensification of settlement in the Liverpool Plains from the mid 1830s lead to an intensified cycle of frontier violence as settlers sought to make their mark on the land and resident Aborigines rebelled. Some of the direst events took place in the Gwydir River Valley to the east of Moree during 1838 when a series of escalating frontier clashes culminated in Aboriginal massacres conducted by mounted police and stockmen. Further information of these events is provided in the information box below, and in Figures 20-22.

Waterloo Creek & Myall Creek Massacres (1838)

In January 1838, Major James Nunn, commandant of mounted police in the Sydney district, was despatched north with a detachment of armed men in an effort to arrest escalating tensions between Aborigines and settlers/stockmen in the Gwydir River area of the Liverpool Plains. The party travelled for eight weeks and though details of events are limited and conflicting it is clear that at a place called **Waterloo Creek** (Snodgrass Lagoon), Nunn and his men attacked an encampment of Kamilaroi.

The Waterloo Creek massacre saw the killing of somewhere between 100 and 300 Aborigines on Australia Day, 26 January 1838 – 50 years after first white settlement had occurred in the colony of NSW. Word of the killings reached the new Governor Sir George Gipps but (like similar official and quasi-official killings carried out by parties of mounted police all over Australia) secure evidence was lacking and the event was effectively covered up and not properly investigated at the time.

The other massacre, better known in Australian legal history, was the Myall Creek killings of June 1838, carried out by a large party of stockmen (including convicts). At Myall Creek, surveyor Henry Dangar's sheep and cattle station, the white vigilantes massacred twenty-eight Aboriginal men, women and children - some of whom appear to been lured to the spot for sex on the promise of protection.

Justifiably, there was outrage about the event (particularly given the Waterloo massacre only a few months beforehand). An investigation and inquiry followed and seven of perpetrators (convicts and former convicts - but not their leaders) were arrested, tried, and hanged for murder. These men were the only whites hanged for a premeditated attack on a group Aborigines in the history of the Colony.

Sources: O'Rourke 1995: 12; Hunt 1980; Baker 1997; Milliss 1992

Images: Portrait of Major James Winniett Nunn [c.1838] (National Library of Australia nla.pic-an9900674); The Myall Creek Massacre (etching from the Chronicles of Crime 1886 presented in Milliss 1992: 297)

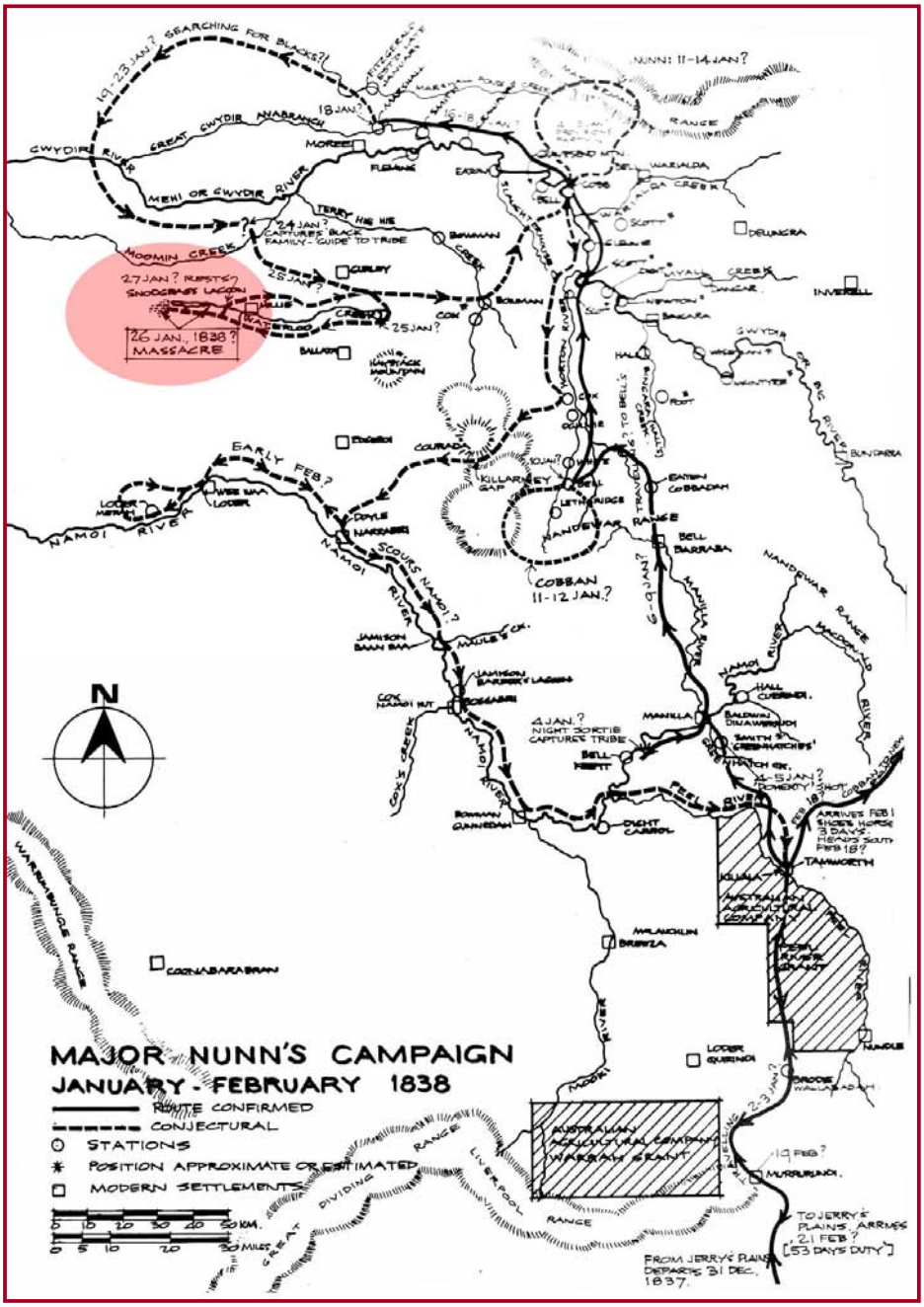

Figure 20. Map of 'Major Nunn Campaign' (Waterloo Creek massacre). (Milliss 1992: 193)

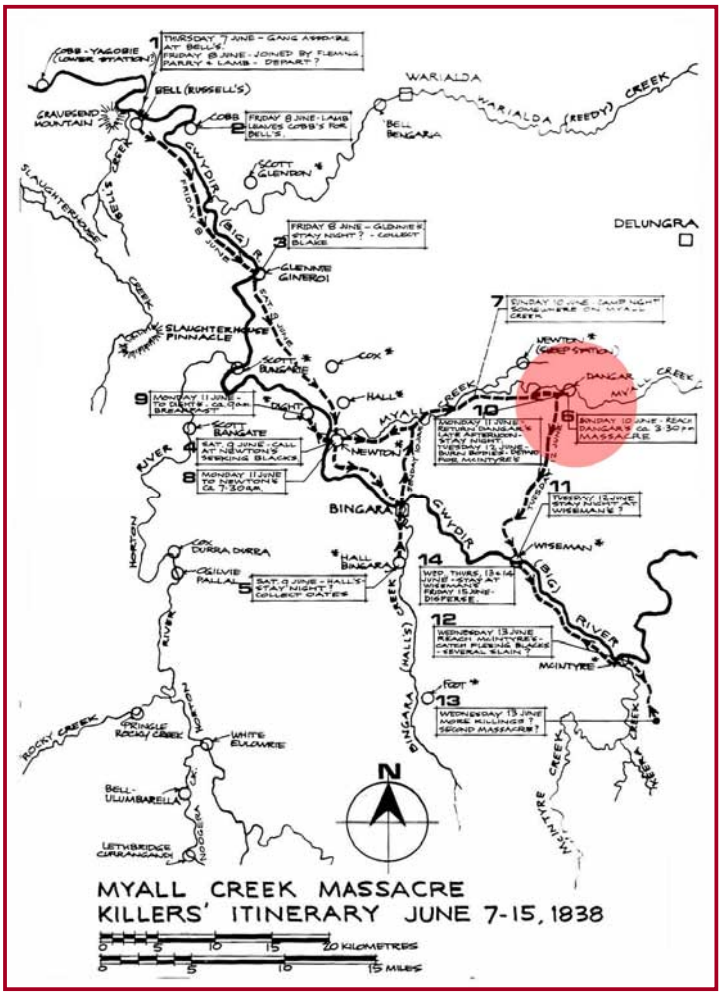

Figure 21. Map showing the Myall Creek Massacre 'Killer's Itinerary'. (Milliss 1992: 305)

Figure 22. Sawkin's Danger's (sic) Station, Mayal Creek (sic) [1852/3]. State Library of NSW image presented in Milliss 1992: 285)

3.3.3.6 After the War

In 1838, following a turbulent period of Aboriginal-settler relations that culminated in the massacres at Waterloo and Myall Creeks, the Government drafted a Bill for the Protection of Aborigines which contained provisions to protect their 'just rights and privileges as subjects of Her Majesty the Queen'.[102] At the very least, the bill was symbolic and acknowledged the widespread depravations committed against the country's original inhabitants. In practice the bill had only marginal effect with conflict slowing where settlement had became established and Aboriginal populations had been subdued, and continuing in the remoter regions.

Violence continued in the northern part of the broader study area (in northern NSW and into Queensland) until around the 1850s when a northern Native Police force was established to quell frontier violence. Ironically, violence was subdued by violence and further localised conflicts between the Native Police and regional Aborigines gave way to relative peace by the close of the decade.[103]

By this time, the broader study area as far north as Coolah and Murrurindi was well occupied and part of the expanded 'settled districts' (Figure 23). By the 1870s the best runs in the Liverpool Plains (those associated with the regions major rivers) had all been taken up.

[102] *Archives Authority of NSW 1998: 62*

[103] *Heritage Concepts Pty Ltd 2007a: 55*

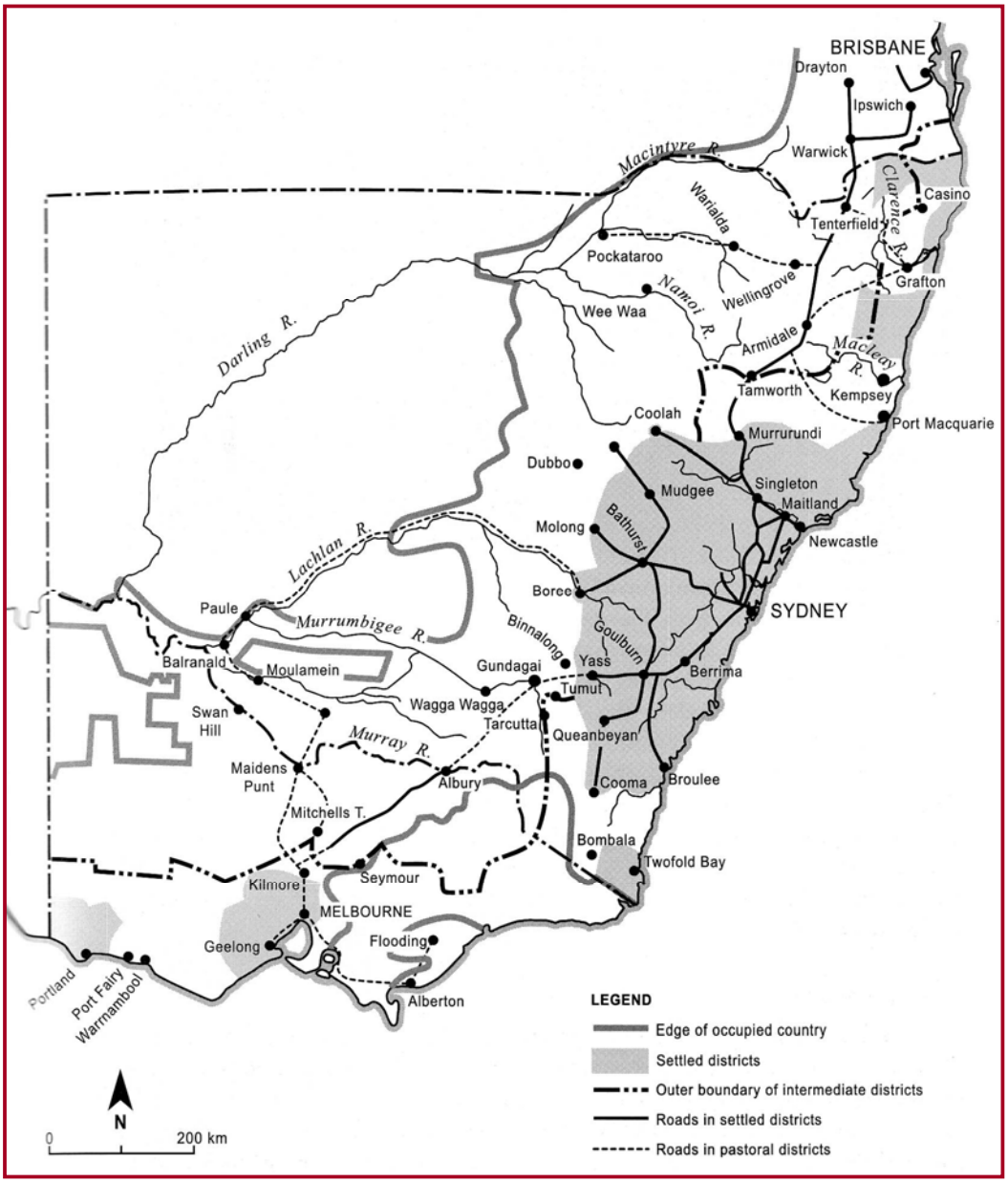

Figure 23. The Extent of European Settlement in NSW c.1850. (Map presented in Harrison 2004: 31)

3.4 Marginalisation

The first half of the 19th century was characterised by the devastation of Aboriginal populations across the length and breadth of the broader study area. In summary, Aboriginal society was shattered and population numbers diminished by Aboriginal interaction with white settlers and subsequent conflict, dislocation, disease and introduction to the trappings of white society (such as sugar, alcohol and tobacco). The ensuing section discusses the physical and social marginalisation of Aboriginal people in the period 1850 to around 1880; details the loss of traditional culture; and describes the evolution of a post-contact Aboriginal Society.

3.4.1 Colonial Interest

An 1845 Select Committee of Inquiry reflected on the state of Aboriginal affairs in NSW. Submissions to the enquiry addressed the negative impacts of Aboriginal dispossession and were presented by the likes of missionaries and bench magistrates from a host of locations. The following extract, from a submission by Reverend Joseph Cooper relates to Aborigines in the Hunter Valley area including Falbrook, Wollombi and Jerrys Plains – the tone and content however were replicated in the majority of submissions.

> *The probable number of Aborigines in the district is about one hundred & fifty. The males are most numerous; there is however a fair proportion of females; the number of children is comparatively small.*
>
> *The number has greatly diminished; within the last seven years the decrease has certainly been one-third of the number. About seven years ago I have seen eighty and ninety Aborigines encamped in the township of Paterson; the greatest number at the present never exceeds twenty-five.*
>
> *The decrease appears to me to have taken place mainly among the adults … many of the finest young men, existing three or four years ago, have now disappeared.*

The causes in my opinion two – the vice of drunkenness, to which they are both male and female very addicted; and disease contracted through their intercourse of their women with whites.

Their condition is very wretched; their means of subsistence is lessened to a very great extent … There are few or no kangaroo; they have either been destroyed, or they have retired far from the haunts of men. The kangaroo was the chief food of the natives.[104]

3.4.2 Enforced Change

Plenty white man coming all about – and bring plenty cattle. Tribe get small. White men take away our young lubras (girls) – young warriors go away for lubras down Namoi River long way – never come back no more.

…. Me I am getting old now, some day I finish. Then, no more king, no more Nammoi River Tribe. All gone, finish …[105]

The consequence of European settlement was that Aboriginal society was forced to change. Aboriginal people through necessity moved away from their traditional areas, their traditional social groups and their traditional ways of life. More specifically, Aborigines survived the new world order by adaptation measures including:

- Moving away from 'frontier areas' to new locations or perceived sanctuaries
- Forming new social networks based on mutual advantage rather than traditional obligation

Characteristics of this change included:

- Establishment of camps on the margins of settled towns or on farms
- Movement into white society through association and/or marriage

[104] *Cooper cited in Blyton et al 2004: 27*

[105] *Joe Bungaree of Gunnedah c.1887 - Ewing transcripts cited in O'Rourke 1997: 200*

3.4.2.1 Post-Contact Camps

Fringe camps and pocket camps appear to have been among the most frequently utilised Aboriginal accommodation options across NSW in the period 1850 to 1870. These camps were essentially autonomous gatherings where Aboriginal people established living areas on vacant land within 'the mosaic of white settlement'. [106] Typically such areas were on the farms of benevolent settlers (farm camps); vacant crown land on the margins of townships (fringe camps); or commons, travelling stock routes and water reserves elsewhere (pocket camps).

Within the broader study area Aborigines gathered informally on the fringes of the more established early townships such as Gunnedah, Singleton and Maitland from about the 1850s. Elsewhere, at locations such as Newcastle Beach, Swansea, Reddonbery and Glennies Creek in the Hunter Valley, and Moree and Whalen Station (near Boomi) in the Liverpool Plains.[107]

While these camps afforded some social continuity and protection, European goods such as alcohol, sugar and tobacco, went into wider circulation in these locations with the inevitable, negative long term health affects and addictions.

3.4.3 Co-Existence

While some Aborigines became 'fringe dwellers' others became increasingly associated with the more benevolent of the Hunter Valley and Liverpool Plains stations. On occasion, extended family groups lived on pastoral stations where they functioned as casual labour pools.

On the land, Aboriginal men were employed to strip bark for huts and worked as stockmen, shepherds, and 'usefuls' – especially during the boom times of the 1850s when 'gold fever' saw many of the itinerant white station workers abandon station life for the goldfields of Victoria and NSW. Aboriginal women regularly found work as nurses, nannies and domestics at rural homesteads.[108]

Towards the middle of the 1870s, the demand for Aboriginal labour decreased with both the introduction of wire fencing and the influx of white labour. The use of

[106] *Byrne & Nugent 2004: 56*

[107] *Maitland Mercury 21 June 1854; Heritage Concepts Pty Ltd 2007a: 55-56; Blyton et al 2004: 54*

[108] *Harrison 2004*

galvanised wire fencing (and the enclosure of stock) in particular reduced the need for shepherds and stockmen - occupations which Aboriginal men had been particularly good at and well suited to.

After the passing of the Crown Lands Act in 1884 and the subsequent break-up of the larger holdings, many pastoralists could not afford to maintain an Aboriginal station camp, nor did they have the amount of work to warrant them. Aboriginal families and groups were thereafter obliqued to move from station to station looking for work and between jobs, squatted on the outskirts of service towns or joined (or established) fringe camps. Such living arrangements bred poverty and continued to add to the fragmentation of the flailing Aboriginal communities.

3.4.4 Cultural Decline

It was during the closing decades of the 19th century that Aborigines within the broader study area moved from a semi-traditional lifestyle to what Michael O'Rourke has termed a 'semi-Anglicised' or 'post-traditional' lifestyle.[109] While living among and adjacent to whites and developing an increasing dependence on the trappings of a European lifestyle were obvious manifestations of this, less obvious (but more significant) changes included a diminution of traditional culture and lore. This was no more evident than in the loss of the Bora ceremony, which for most Aboriginal nations marked the end of 'high culture'.

3.4.4.1 Loss of the Bora

In very general terms, the cessation of the Bora ceremony (and its derivations) commenced in the 1840s/50s in the Sydney Region; in the 1850s/1860s in the surrounding settled districts (including Newcastle and the Hunter); and in the 1870s in the remainder of the state.

The last recorded Kamilaroi Bora ceremonies in the northern part of the broader study area (north of the Liverpool Range) were among the last recorded in the state. Table 8 highlights a number of these events.

[109] *O'Rourke 1995: 79*

Table 8: The Last Kamilaroi Bora Ceremonies

The Last Kamilaroi Bora Ceremonies	
Date	**Location**
1879	Bogamildi (northeast of Moree)
1879	Gil Gil Creek (west of Garah)
1880	Garah
c.1883	Terry Hie Hie
c.1890	Collymongle (near Collarenebri)
1891	Kunopia (Euraba - northeast of Boomi)
1893; 1905	Tallwood (Queensland)
1894	Gundabluey (northwest of Collarenabri)
1905	Wee Waa (corroboree)
Source: O'Rourke 1997: 210	

The Bora ceremony at Kunopia in 1891 saw approximately 20 to 25 youths from Aboriginal groups at Willarie, Moogan, Gundabluey, Mungindi and other places initiated. 250 people in all attended. The bora ring in this location featured two large figures made of loose earth (Baiame and his wife Gunnanbeeley) and several trees marked with images and figures.[110]

3.4.4.2 Myth of the Last Aborigine

Accompanying social fragmentation and the loss of high culture was the perceived demise of full-blooded Aborigines – reflected in the popular press as stories of the 'last blackfellow'. In the Dungog for example, the newspapers reported that a man

[110] *Mathews 1917: 427–430*

named Brandy had died (the last of the 'Gringai') with similar reports issuing from Muswellbrook and Newcastle.[111]

While such stories denied the identity of the children born to white fathers and black mothers, they were also fundamentally untrue. Aborigines who we would describe as full-blood continued to be born in the area during the late 1800s – such as Queenie Robinson born at Oakley Creek, Coolah in 1876.[112]

3.5 Missionisation

In 1880, a private paternalistic enterprise known as the Association for the Protection of Aborigines (APA) was formed. In 1881 it installed a political figurehead in George Thornton MLC, Protector of Aborigines. The aim of the APA reflected widely held beliefs that Aborigines were 'dying out' and was:

> *… for the purpose of ameliorating the present deplorable condition of the remnants of the Aboriginal Tribes of this Colony.*[113]

The ensuing chapter details the operation of the APA and its derivatives and describes the 'missionisation' of Aboriginal people through the spread of the reserve system during the closing decades of the 19th century and the opening years of the 20th century.

3.5.1 Aborigines Protection Board

In the same year as the APA installed the Protector or Aborigines, the *State Children's Relief Act 1881* came into force giving the NSW Government the power to remove children from charitable institutions and approve the adoption of wards of the state, thereby setting the scene for the broad-scale removal of Aboriginal children in the 20th century.[114] In 1883 the Aborigines Protection Board (APB), composed of officials and gentlemen 'with an interest in Blacks' was formed.[115]

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[111] *Bennett 1929; Blyton et al 2004: 32; Newcastle Chronicle 2 September 1871; Newcastle Morning Herald & Miners Advocate 16 June 188*

[112] *Blyton et al 2004: 32-33*

[113] *NSW Aboriginal Protection Association - Report 1881/1882*

[114] *Archives Authority of New South Wales 1998: 62-63*

[115] *Executive Council: Minute Books Volume 23, Minute 21, 2 June 1883. P.58 (SRNSW 4/1570)*

3.5.1.1 Reserves

Against this social and political landscape, numerous mission stations and reserves were set up across NSW, generally in association with the APB who subsidised many. Most of the reserves were located along the East Coast, and in the Murray and Murrumbidgee districts, and were designed to accommodate (and concentrate) impoverished and dislocated Aborigines, with some (variable) emphasis on training reserve dwellers to fit into white society.[116] The reserves had varying degrees or autonomy and were either 'managed' (overseen by a manager with significant Board input) or 'unmanaged' (provided with rations only). Some were major enterprises and others of a very small scale. Conveniently for the broader white community, these enterprises also functioned as 'labour pools' – especially in areas where a large seasonal workforce was required.[117]

Table 9 lists some of the Aboriginal reserves established within the broader study area from the c.1880s onwards. Some of these were new settlements. Others, like Eurabba and Terry-Hie-Hie, grew out of the formalisation of traditional or post-contact period camps. In the latter instance, there had often been a significant Aboriginal presence at the reserve site prior to it's official gazetting – the reserve gazettal date therefore being only an indicative start date for the settlement.

Table 9: Aboriginal reserves within the broader QHGP study area

Aboriginal Reserves within the broader QHGP Study Area		
Reserve	**Location**	**Details**
East Maitland	Reserve on Broughton Creek Parish of (?) Riverstone, County of Durham	AR 24533 gazetted 22/8/1896 With an area of 84 acres - revoked 5/6/1959. RR folio 80

[116] *Archives Authority of New South Wales 1998: 62-63*

[117] *Walden 1995*

Singleton	Singleton was made up of the Hunter River Aboriginal Reserve which operated from 1896 and also an unnamed Aboriginal Reserve 1.5 miles from Singleton on 320 acres which operated from 1889.	A). 3 acres on the Hunter River declared 1896 B). 320 acres 1.5 miles from Singleton declared 1889
St. Clair (near Singleton)	Also St Clare	24 acres near Bourke's Gully declared 1893
Glennies Creek		58 acres declared 1890
Eurabba	Reserve on the Boomi-Garah Road (old Kunopia) Parish of Tyrell, County of Benarba	Area 90 acres gazetted 24/9/1898 and marked as revoked on 20/8/1926. RR Folio 9
Caroona (near Quirindi)	Reserve (originally Caroona Station) Parish of Doona, County of Pottinger	AR 28828 & AR 30777 gazetted on 18/1/1899 & 7/4/1900 with an area of 220 acres, 2 roods, 39 perches (portion 214) RR folio 47
Quirindi	Parish of Quirindi, County of Buckland	AR 84767 gazetted 21/2/1964 with an area of 2 roods 8 perches (lots 4 & 5, section 10) RR folio 222
Curlewis (Gunedah	Parish of Curlewis, County of	AR 81340 gazetted 9/1/1959

area)	Pottinger.	(lots 1-5, section 13) RR folio 195
Gunnedah	Reserve on Carroll St. Parish of Gunnedah, County of Pottinger	AR 85480 gazetted 1/10/1895 with an area of 1 rood 27.5 perches (lots 1 & 2 section 60) RR folio 232
Kahibah (Newcastle area)	Parish of Kahibah, County of Northumberland	AR 88398 gazetted 12/11/1971 with an area of 2 acres, 2 roods (portion 834) RR folio 307
Moree	Reserve in Moree Parish of Moree, County of Courallie	AR 87907 gazetted 17/7/1970 with an area of 3 roods, 3 perches (lots 4 & 12 section 59 portions 60 & 531) RR folio 256
Wirajari (Moree area)	Reserve on the Gwyder River Parish of Moree, County of Courallie	AR 72574/5 gazetted 24/12/1947 with an area of 208 acres (portions 320, 347, 418, & 419) – revoked 3/6/1955 RR folio 173
	Reserve on the Gwyder River Parish of Carore, County of Courallie	AR 32730 gazetted 1/6/1901 with an area of 226 acres – revoked 8/12/1915. RR folio 13

Collarenebri (west of Moree)	This Aboriginal Reserve was in the Collarenebri area in the Parish of Collarenebri, County of Finch, and consisted of two Aboriginal Reserves	AR 29330 This Aboriginal Reserve was situated on 159 acres 3 roods and was operational from 13/5/1899 to 8/2/1924. AR 86194 This Aboriginal Reserve was situated on Church, Earl and High Streets and was operational from 24/2/1967.
Terry-Hie-Hei (Moree area)	Wee Waa Creek Parish of Moree, County of Courallie	A). AR 22505/6 notified 25/5/1895 with an area of 102 acres (portion 11) – marked revoked (but not revoked) 1961. RR 141 B). AR43581 gazetted 19/5/1909 with an area of 1 acre – being an Aboriginal cemetery at the junction of Wee Waa & Terry Hie Hei Creeks. RR 153
Wee Waa	Wee Waa Lagoon Parish of Wee Waa, County of White	AR 19783 gazetted 1/9/1894 with an area of 24 perches. RR folio 34
	Reserve at the junction of Coghill Creek & the Namoi River Parish of Bulgarra, County of	AR 37420 gazetted 12/3/1904 with an area of 35 acres – marked revoked 31/3/1939

	White	RR folio 35
Mungindi	Two reserves Parish of Yurouah, County of Benarba	A). AR 28403 gazetted 29/10/1898 with an area of 100 acres – revoked 22/3/1929. RR folio 10 B. AR80927/8 gazetted 8/8/1958 with an area of 5 acres (portion 132) RR folio 189
Narrabri	Three reserves Parish of Cooma, County of White	A). AR 28093 gazetted 3/9/1898 with an area of 800 acres – revoked 11/6/1920 RR folio 33 B). AR 83416 gazetted 1/9/1961 with an area of 2 acres (lots 2, 4 & 6; section 20) RR folio 202 C. Reserve on Bohena Creek with an area of 5200 acres (not detailed) RR folio 105
	Reserve at Baan Baa southeast of Narrabri Parish of Baan Baa, County	AR 32749 gazetted 25/5/1901 with an area of 20 acres – revoked 12/4/1918

	of Pottinger	RR folio 45
Toomeleh (Boggabilla area)	Parish of Merriwa, County of Stapleton	AR 66833/4 gazetted 2/7/1937 with an area of 64 acres. RR folio 8a
Sources: State Records of NSW - Aborigines Welfare Board: Register of Aboriginal Reserves, 1875-1904 [2/8349; Reel 2847]; McGuigan 1983 RR = Reserves Register (Aboriginal Affairs)		

The following sections detail some of the more prominent reserves established in the broader study area. It is by no means an exhaustive or comprehensive account.

3.5.2 Newcastle

The State Board for the Protection of Aborigines established an operation at Swansea, south of Newcastle in 1887. This operation was considered to be oppressive and many aborigines who had moved (or been forced) there, moved away, settling in Newcastle and other places where work could be obtained. Awabakal Aborigines Old Ned and Queen Margaret were however granted land at Pelican Flat, Swansea, and the family lived there well into the late 1800s.[118]

3.5.3 Hunter Valley

Probably the two best-known reserves established in the Hunter Valley area were Caroona and St. Clair.

3.5.3.1 St. Clair (Mt Olive)

St Clair mission reserve was established at Carrowbrook between Muswellbrook and Singleton in the early 1890s. Later known as Mt. Olive Station, the reserve

[118] *Tuck 2004; Turner & Blyton 1995: 44-45*

consisted of some 60-odd acres, which was farmed by Aborigines who grew a variety of crops including corn, potatoes and cabbages.[119]

The reserve came under the control of the Aborigines Inland Mission (AIM) founded by Baptist missionary Retta Dixon in 1905 and was managed from that time until 1916 with a considerable amount of evangelical religious zeal. The APB took over operation of the reserve in 1916, appointing a station manager – it was at about this time that the reserve became known as Mt Olive. The station was thereafter managed according to strict rules and significant numbers of Aborigines were expelled for failing to adhere. The station closed in 1923 – at a time when numerous reserves across the state were shut down. Its function as an Aboriginal work and social centre was largely replaced by the reserve at Caroona.[120]

3.5.3.2 Caroona (Walhallow)

The Caroona Aboriginal Reserve was established at pioneer grazing property Walhallow (Walhollow) Station on the outskirts of Quirindi in the 1890s (a little over 220 acres in the Parish of Doona, County of Pottinger).[121] The reserve was gazetted in 1899/1900 but was a location with Aboriginal association for some time prior to that (c.1870s).

The mission was under the control of a manager, featured its own primary school, and housed around 200 people at any given time.[122] A description of the station from *Dawn* Magazine (June 1962) described it as follows:

> *The station comprises approximately 240 acres, and up till a few years ago the land was put to use in growing crops and grazing an excellent herd of dairy cattle and sheep for meat.*
>
> *In Caroona's earlier days the old cottages were spread around the station.*
>
> *These old homes disappeared when the Welfare Board's policy of modernising stations resulted in 30 new cottages of two and three*

[119] *Blyton et al 2004: 57-60*

[120] *Blyton et al 2004*

[121] *State Records of NSW – Aboriginal Reserves Reel 2847*

[122] *Blyton et al 2004: 65*

> *bedrooms being built in a compact group on the eastern slope of a hill.*
>
> *The Board supplied water to the cottages, pumping from two wells about a mile from the homes.*
>
> *The station also boasts a large recreation hall and church, both Mly furnished, and a football ground second to none in the district.*
>
> *The aboriginal school caters for an average of 45 pupils in the preparatory and kindergarten classes. High School pupils are transported by bus to Quirindi High, which is 20 miles away.*

Associated with the reserve was a small 'mission cemetery' approximately one kilometre distant. Approximately fifty graves, evidenced by stone and wooden crosses and other grave markers, are located within the cemetery - the earliest dating to Mr Thomas Taylor (1901). The family names of others buried include Swan, Graham, Smith, Briggs and Williams. Oral tradition has it that there are also burials in and around the area pre-dating contact.[123]

The two acres of land on which the cemetery is located has been handed over to the Walhallow Aboriginal Corporation by the land owner Mr John Baker.

3.5.4 Liverpool Plains

Among the most significant of the reserves beyond the Liverpool Ranges were those at Terry-Hie-Hie, Eurabba and Toomelah.

3.5.4.1 Terry Hie Hie

The Aboriginal mission at Terry Hie Hie was established on a 102 acre portion of an historic grazing property on Wee Waa Creek in the Moree district in 1895. Even before the establishment of the mission, the location had considerable Aboriginal significance being a camping and ceremonial area (refer previous section 'ceremony').

By 1915, the reserve featured a school and housed about 95 residents. In the 1920s it is believed that people began moving off the reserve and camping closer to Moree in a fringe camp known as 'Top Camp'. There is some suggestion that the

[123] *Caroona Mission Cemetery - http://www.heritage.gov.au/cgi-bin/ahpi/record.pl?RNE16088*

reserve closed down in the 1920s, but the reserve register suggests it was not revoked until the 1960s. The reserve site is now in Aboriginal ownership (Land Council).[124]

Reserve records suggest that there was a one acre cemetery associated with the reserve at the junction of Wee Waa and Terry Hie Hie Creeks.[125] There were several other reserves in the Terry Hie Hie/Wee Waa area but little is known of their association or history at present.

3.5.4.2 Eurabba

The Eurabba mission reserve (Old Kunopia) was established on the Boomi-Garah Road in the Parish of Tyrell, County of Benarba in the 1890s. Accounting for about 90 acres, the reserve was near the township of Boomi.[126]

Like many reserves, the Eurabba mission featured a 'mixed mob' and was home to displaced Aborigines from a range of northern NSW and southern Queensland locales including Whalan Station, Mungindi, Tallwood and Wellton. The reserve operated for around 30 years and was closed in 1926/27 reputedly due to difficulties in obtaining water.[127]

The site remains identifiable and features the foundation stumps of six houses; the manager's cottage; corner posts of the schoolyard; and quantities of litter. A small, unmarked graveyard is also visible on the north-western perimeter.[128]

3.5.4.3 Toomelah

Toomelah (Toomeleh) Aboriginal Reserve was established on around 60 acres of land on the Boomi-Boggabilla Road in 1927 (Figure 24). It appears that the opening of this reserve in some way ameliorated the closure of Eurabba at around the same

[124] *Heritage Concepts Pty Ltd 2007a: 57*

[125] *McGuigan 1983*

[126] *McGuigan 1983*

[127] *Heritage Concepts Pty Ltd 2007a: 57*

[128] *Australia Heritage Places Inventory 17215*

time. The mission functioned for less than ten years – closing in 1937 and moving to Boggabilla.[129]

Figure 24. The sewing class, Toomelah (Boomi) - Miss M. McAulay and Miss Eadie AIM missionaries [May 1934]. (State Library of NSW ML a731007)

Associated with the reserve was Old Toomelah Cemetery, which now accounts for the only visible remains of the Reserve site. The cemetery was in use from 1915 to 1936 and many of the people buried there are still remembered by the Aboriginal community. The cemetery (less than 30 metres square) contains a number of burials marked by earth mounds - some of which have sandy concrete headstones made on the Mission. Two of these can still be read - the most impressive being that of King Charlie Hippi which bears the shape of the King's breastplate.[130]

By the close of the 19th century, most of the Aborigines within the broader study area are likely to have been associated with reserves such as those outlined above. Those that did not continued to live in camps on the larger stations and about the service towns were absorbed into the broader white community.

[129] *Heritage Concepts Pty Ltd 2007a: 57*

[130] *Australian Heritage Places Inventory 13712*

While some traditional activity was still taking place, it was limited and declining and Aboriginal people by and large were living a post-traditional lifestyle. The last recorded initiation ceremonies within the broader study area occurring in the extreme north and dating to the 1920s.

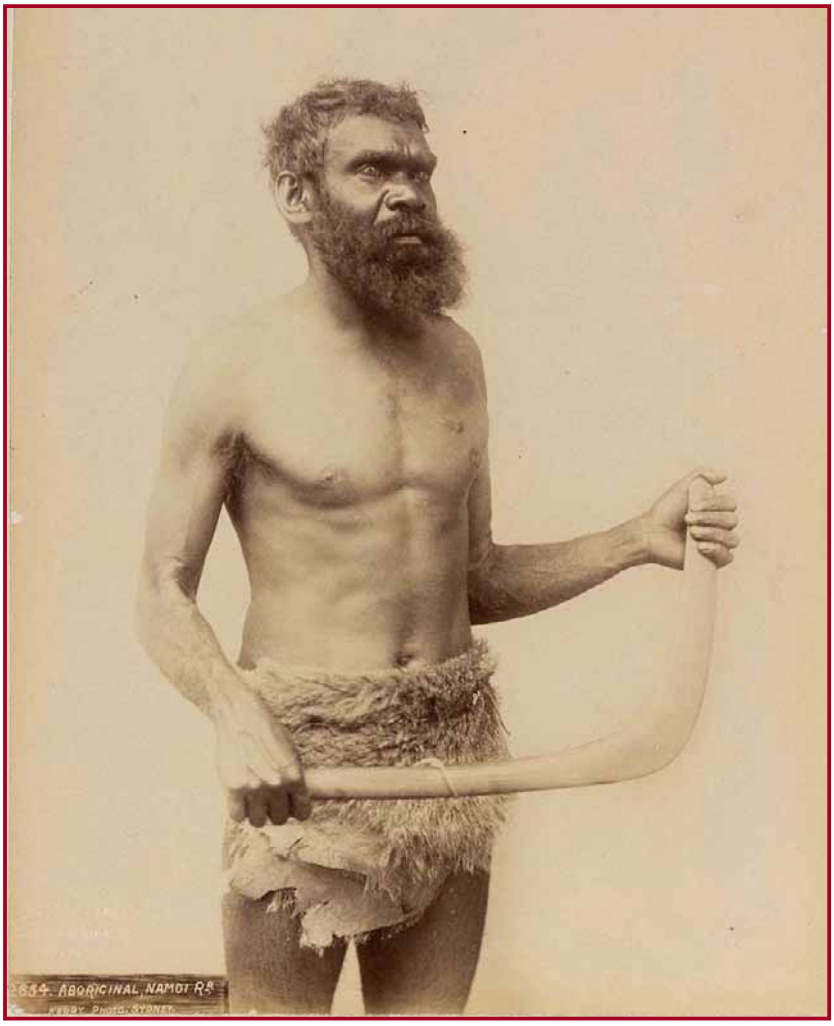

Figure 25. Aboriginal Namoi River (c.1890 – 1898). State Library of NSW - Australian Aboriginals photographed by Kerry & Co. ca. 1890-1898)

3.6 20th Century

3.6.1 Control

In 1909, the APB was reconstituted and became a statutory body with increased powers under the *Aborigines Protection Act 1909* (No.25). Specifically, the Board controlled:

- distribution of monies and rations
- custody, maintenance and education of children
- management and regulation of reserves
- general support and welfare.[131]

The makeup of the Board also changed at this time – with the requirement that it include the Inspector-General of Police as *ex officio* chairman.

After the gazettal of the Act in 1910, the APB 'regularized' the policy of removing Aboriginal children from their families. It also saw the establishment of numerous quasi-religious schools of instruction for boys and girls, including the Cootamundra Girls Home, which was opened in 1911 for the instruction of girls in domestic service (Figure 26).[132]

[131] *Archives Authority of New South Wales 1998: 63*

[132] *Walden 1995*

Figure 26. Aboriginal Indigenous Ministries Children's Home, Singleton (c.1908). This home was opened by AIM founder Rita Dixon in c.1905. (State Library of NSW ML PXA 773/Box 8; a128600)

The Act was amended by *the Aborigines Protection Amending Act 1915* (No.2). The revision gave the APB additional powers over Aboriginal apprentices and gave it full right to assume full custody and control over Aboriginal children if they were perceived to be in moral or physical danger.[133]

3.6.1.1 World War One

During WWI there was considerable employment available for Aborigines (particularly on inland stations) as many young white men left the country to fight abroad. Not all Aboriginal station workers stayed on the stations however. Some joined the war effort despite the fact that they were technically ineligible to do so.

[133] *Archives Authority of New South Wales 1998: 63*

Aboriginal Soldiers
Approximately 300 Aborigines from NSW, Queensland and Victoria served overseas during WWI – despite being 'non-citizens' and being ineligible to do so. The number may have been much higher as it has been suggested that many listed their racial origin as 'Maori' to disguise their racial identity. Around 40 were killed in action and about 60 wounded. Aborigines from Muswellbrook and number of Aboriginal men from the St Clair (Mt Olive) mission fought with the Australian Infantry in France on the Western Front. Private Alistair Lester from Mt Olive fell in combat on 18 April 1818.
Source: Blyton et al 2004: 62-63

After the War, employment on stations ceased for many Aborigines. Soldiers returned *en masse*, aided by the *Returned Soldiers and Sailors Employment Act* (1919) and they needed jobs. Soon after, Australia descended into worldwide economic depression when the independence of Aborigines was further diminished as whites and Aborigines alike struggled to find employment. It was during this time that a new wave of fringe camps and shantytowns were established and became home to both European and Aboriginal itinerants during the 1930s and 1940s. Locations such as Top, Middle and Bottom camps at Moree were examples of such places where underemployed Aborigines gathered and created living places that were an alternative to (and maintained some distance from) the official Board reserves.[134]

3.6.1.2 Consolidation of the APB Act

The Act was amended again during the depression when the *Aborigines Protection Amendment Act 1936* (No. 32) was passed. The amendment furbished the Board with wider powers and consolidated the child removal sections of Act. In practice, this meant that the Board and its agents had effective control over the lives of

[134] *Heritage Concepts Pty Ltd 2007a: 58*

every Aborigine living in NSW.[135] The Act and its enabling established an era of major Aboriginal institutionalisation.

3.6.1.3 Birth of Activism

Since first white settlement there had been Aboriginal protest at the injustices perpetrated by whites and the loss of Aboriginal land. This protest was manifest in the physical conflicts of the 19th century, as well as mission walk offs and limited individual or community campaigns in the early 20th century.

In 1924 however, the first politically organised all-Aboriginal group was formed in Sydney under the Presidentship of Hinton born, Hunter Valley Aborigine Fred Maynard. The Australian Aboriginal Progressive Association (AAPA) worked hard to be the public voice of Aboriginal people and their demands centred on numerous issues including the removal of Aboriginal children, citizenship, and cultural identity.[136] In 1837 on the sesquicentenary of white settlement the first official Day of Mourning and Protest was held.[137]

3.6.1.4 Aborigines Welfare Board

As Aboriginal people took an active interest in their own affairs, there was also disquiet with the APB and its workings from the Government and wider community. An inquiry followed and in 1940 the APB was reconstituted as the Aborigines Welfare Board (AWB) as a consequence of the passing of the *Aborigines Protection Amendment Act 1940* (No. 12). The act disconnected the Police from direct involvement in the running of the organization and by 1943 also saw the inclusion of two Aboriginal Board members.

3.6.2 Change

The second half of the 20th century was a period of significant change in Australia. Economic, industrial and social change swept the country and was felt by Aboriginal and white Australians alike and lead to significant alterations to the fabric of Aboriginal society.

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[135] *Archives Authority of New South Wales 1998: 63*

[136] *Blyton et al 2004: 61*

[137] *Archives Authority of New South Wales 1998: 64*

3.6.2.1 Boom & Bust

The years following WWII, which again saw Aboriginal servicemen involved in action, could best be described as a 'boom time' across much of Australia. Full employment was the aim of successive governments and population growth, the spread of settlement, and the demand for Australian resources meant that there was more work available than there had ever been.

Changes to Aboriginal communities at this time varied from location to location, but often involved:

- A partial movement away from underemployment in seasonal and casual work (though many remained on pastoral stations especially during the wool boom when wool was 'a pound for pound');
- Aboriginal involvement in major infrastructure projects (dams, roads, railways &c); and
- The end of many of the old missions and reserves (which had been in decline for some time) which contrasted with the creation of new Aboriginal settlement/housing areas (some of which grew out of the depression camps of the 1930s).

One of the major new employers of the Aboriginal people in post-war NSW was the Railways and Main Roads departments who required a large workforce of unskilled to semi-skilled labourers. In the Hunter Valley, work on the rail network in particular drew many Aboriginal people into locations such as Scone, Aberdeen and Muswellbrook where tent cities were established along the railway lines and Aborigines works as labourers and fettlers (Figure 27).[138] One Aborigine who worked in Scone remembered of the time:

> *There was still a stigma about Aboriginal people and we were fighting for basic individual rights. In the railways you were treated equal as long as you were prepared to sweat it out with the others.*[139]

[138] *Blyton et al 2004: 72*

[139] *Cited in Blyton et al 2004: 72*

This was the start of a long history of Aboriginal involvement with the railways and allied work.[140]

Figure 27. Aboriginal rail workers at Scone after the 1955 flood (n.d.). (Image presented in Blyton et al 2004: 73)

3.6.2.2 Pastoral Decline

The rural industry had been a mainstay of Aboriginal employment for most of the 20th century - albeit seasonal, casual, and poorly paid if at all. From the 1960s there commenced a general decline in the industry that affected Aboriginal employment and was exacerbated by a number of other factors including:

- Aboriginal wage rights claims in the 1960s (station owners were not prepared to, or couldn't afford to, pay Aboriginal workers real wages);
- The increased mechanisation of rural industry (including the wider use of trucks, motor bikes, cars and even light aircraft and helicopters) negated the need for horse riding stockmen (which was a profession that Aboriginal people were especially proficient at); and

[140] *E.g: An aboriginal company called Smiths Contractors was employed to lay siding to the Lidell Power Station between Muswellbrook and Singleton in the 1970s.*

- Increased urbanisation of the general population (including the Aboriginal population). People, particularly the young, were increasingly reluctant to live on the land and were moving towards the major cities.

As a consequence, many Aboriginal farm workers left the land for work in regional and city centres and the urbanisation of many formally rural or regional families commenced.

Resettlement in Newcastle

Newcastle is a prime example of a location where Aborigines were urbanised in the mid 19th century. After the war, the exodus of Aboriginal people from Newcastle ceased and people began moving into the Newcastle area under the Aboriginal Resettlement Scheme. Most of the movement centred around housing commission and low-middle class areas such as Toronto, Islington, Wickham and Carrington.[141] The scheme not only returned people to the area, but also brought new people to the area from distant places such as Walgett, Kempsey, Taree and Lismore, Relocation however, did not mitigate the threat of the removal of children by the AWB. Many of the Aboriginal children taken by the Board were sent to the Woodland Boys Home at Wallsend.[142]

3.6.3 Renewal

The late 1950s and 1960s saw many social justice and human rights movements established in the Western World – most notably the American civil rights movements. Australian Aboriginal civil rights movements were part of this global trend and drew strength from Black activism in the USA. In the mid 1960s, in response to the ongoing racial segregation of Aborigines within the broader Australian community, a mobile protest known as the 'freedom rides' was established.

3.6.3.1 Freedom Rides

In 1965, 'Student Action for Aborigines' or SAFA (centred on a group of 30 Sydney University students) commenced a 3200 kilometre protest bus tour of northern NSW. The purpose of the journey was to investigate and draw attention to

[141] *HRRC 1984: 138*

[142] *Tuck 2004: 40*

Aboriginal discrimination in country towns. Charles Perkins, later the first Aborigine to gain a tertiary degree, was the leader of the 'freedom riders'. Others involved included Jim (later Justice) Spigelman, Ted Noffs and Bill Ford.[143]

The ride, which is considered to be one of the most significant acts of cross-racial cooperation in the 20th century, featured well-documented stops at many towns including Moree. At the time, segregation was alive and well in Moree - Aboriginal and mixed-descent children were barred from the local swimming pool by Council bylaws.[144]

Charles Perkins and a group of Aboriginal children gained access to the pool and over the ensuing days (involving some well publicised conflict with pool management and Council staff) the scene was set for Council's later abolition of the pool 'black-ban' (Figure 28).[145] The ride of course had broader ramifications and was part of an overall movement that lead to the end of constitutional discrimination, the abolition of the AWB, and the establishment of citizenship and land rights from 1967.[146]

3.6.3.2 Intensification

Since the 1970s, there has been a continuous period of what has been described as 'cultural intensification' in New South Wales Aboriginal communities.[147] This intensification has resulted from renewed interest in Aboriginality and Aboriginal heritage and has lead Aboriginal people across the State to re-establish cultural links with kin and places of cultural significance. This process has been enabled and propelled by the reformation of Aboriginal Affairs in the 1970s, the Land Rights Act 1983 (NSW) and the establishment of Aboriginal Land Councils and Native Title Claimant groups. The process has been further advanced through the works of individuals within Aboriginal communities who have sought to reinvigorate and promote Aboriginal culture.

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[143] *http://www1.aiatsis.gov.au/exhibitions/freedomride/start.htm*

[144] *Heritage Concepts Pty Ltd 2007a: 58-59*

[145] *Heritage Concepts Pty Ltd 2007a: 59*

[146] *Archives Authority of New South Wales 1998: 64*

[147] *Beckett et al 2003: 26*

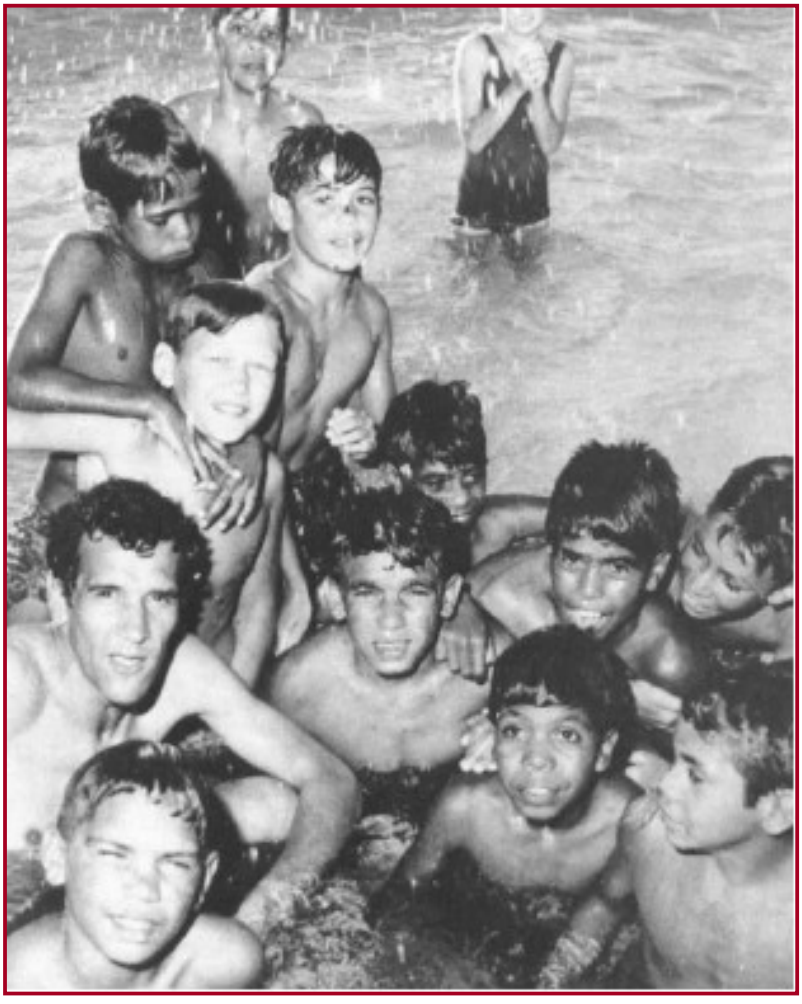

Figure 28. Charles Perkins & Aboriginal children at the Moree Pool (1965). (News Limited photograph presented in Horton 2004: 391)

4 ABORIGINAL COMMUNITY CONSULTATION

4.1 Preamble

Consultation with the Aboriginal communities along the pipeline study area has been undertaken in accordance with procedures set out in DECC's *Interim Community Consultation Requirements for Applicants 2004*. The following procedures were undertaken (a complete log of actions and correspondence regarding Aboriginal community consultation is presented in Appendix 3.1).

The consultation process for this project has two aims. Firstly, to comply with the DECC notification and consultation procedures to obtain input on our proposed assessment methodology and comment on our assessment report and management recommendations. Secondly, to identify cultural places and values that may be affected by the proposed pipeline through consultation with knowledge holders.

4.2 Notification and Consultation Procedures

The DECC Interim Community Consultation Requirements for Applicants (2004) was implemented in the following stages:

4.2.1 Notification and Registration of Interest

Stakeholder groups were identified by:

(a) placing an advertisement in the following local print media on the dates specified:

- Moree Champion (13.12.2007)
- Northern Daily Leader (14.12.2007)
- Tamworth City News (13.12.2007)
- Muswellbrook Chronicle (14.12.2007)
- Singleton Argus (14.12.2007)
- Port Stephens Examiner (13.12.2007)

- Maitland Mercury (14.12.2007)
- Scone Advocate (13.12.2007)
- Newcastle Herald (13.12.2007)

(b) providing written notification (dated 4.12.2007) to the Registrar of Aboriginal Owners, Native Title Services, DECC and the following Local Aboriginal Land Councils and Local Councils whose boundaries fall within the pipeline study area:

Local Aboriginal Land Councils

- Awabakal Local Aboriginal Land Council
- Worimi Local Aboriginal Land Council
- Mindaribba Local Aboriginal Land Council
- Wanaruah Local Aboriginal Land Council
- Nungaroo Local Aboriginal Land Council
- Walhallow Local Aboriginal Land Council
- Red Chief Local Aboriginal Land Council
- Narrabri Local Aboriginal Land Council
- Moree Local Aboriginal Land Council
- Mungindi Local Aboriginal Land Council
- Toomelah Local Aboriginal Land Council

Local Councils

- Gunnedah
- Liverpool Plains
- Maitland
- Moree Plains

- Muswellbrook
- Narrabri
- Newcastle
- Port Stephens
- Singleton
- Upper Hunter

The registration of interest stage allowed 10 working days for Aboriginal groups and individuals to respond. Groups and individuals that registered their interest are listed in Table 10.

4.2.2 Preparation for the assessment (design)

The *Proposed Methodology for Strategic Aboriginal Heritage Assessment* was presented to the registered stakeholders and other parties who were identified as potentially holding an interest in the Queensland Hunter Gas Pipeline Aboriginal Heritage Assessment. The PowerPoint presentation of the proposed methodology is included in Appendix 3.2. The locations of the meetings and a list of stakeholders and other interested parties that attended the meetings are provided in Appendix 3.3. Registered stakeholders who could not attend the meetings were posted a copy of the *Proposed Methodology for Strategic Aboriginal Heritage Assessment* (a printed version of the PowerPoint presentation used at the stakeholder meetings). Stakeholders were allowed 21 days to respond to the proposed methodology in accordance with the DECC Interim Community Consultation Requirements for Applicants (2004). A second series of revised study area maps were sent out on the 28th March 2008 and a further 21 days were allowed for responses.

Feedback received in oral form during the meetings and written form during the 21 working days feedback period regarding the proposed methodology is summarised in Section 4.3 below, while full meeting minutes are provided in Appendix 3.4. For privacy reasons, written responses are not reproduced in this document.

4.2.3 Drafting, Review and Finalisation of the AHIA Report

Copies of this draft Aboriginal Heritage Assessment were provided to all registered stakeholders for review and comment within a 21 day feedback period which ended on the 18th June 2008. Stakeholder comments are summarised in Section 4.3.3 and the log of correspondence is located in Appendix 3.5.

4.3 Results of Notification and Consultation

4.3.1 Notification and Registration of Interest

Following the notification procedures described above, responses were received from a number of organisations and individuals registering their interest in the project. These parties are listed in Table 10.

Table 10: Individuals and organizations registered for consultation

Date of Registration	Name	Organisation
14/12/2008	Arthur Fletcher	Wonn 1
17/12/2008	Gina Field	Red Chief Local Aboriginal Land Council
19/12/2007	Rick Griffiths	Mindaribba LALC
19/12/2007	Rodney Matthews	Giwiirr
20/12/2007	Donna Sampson	Wanaruah LALC
20/12/2007	Lea-Anne Ball	Lower Hunter Wonnarua Council
21/12/2007	Jane Bender	Gunida Gunyah
27/12/2007	Robert Lester	
27/12/2007	Scott Franks	
27/12/2008	Leonard (Lennie) Anderson	Nur-Run-Gee Pty Ltd

01/01/2008	Gordon Griffiths	Wonnarua Culture Heritage
02/01/2008	Rhonda Ward	Ungooroo Cultural and Community Service
03/01/2008	Eddy Neumann on behalf of: Alexander Munro Allan ("Jimmy") Blacklock Shane Levy Anthony Munro Ronald Connors Anthony Lonsdale Jill Connors	Nucoorilma Native Title Claim Group
15/01/2008	John & Margaret Matthews	
29/01/2008	Kerrie Brauer	Awabakal Traditional owners Aboriginal Corporation
11/03/2008	Luke Hickey	Hunter Valley Cultural Surveying
	Allen Paget	Ungooroo Aboriginal Corporation

4.3.2 Stakeholder review of assessment design

Following registration of the above parties, the preparation of assessment (design) stage of the consultation process commenced. A series of meetings were held with Aboriginal communities along the proposed pipeline study area to discuss the *Proposed Methodology for Strategic Aboriginal Heritage Assessment.* Invitations were extended to both registered stakeholders and other parties who were identified as potentially having interest in the Aboriginal Heritage Assessment. A

general summary of issues raised by Aboriginal communities during the meetings is provided in Table 11 below (minutes of each meeting are included in Appendix 3.4).

Table 11: Summary of issues raised during Aboriginal Community Consultation meetings for the Queensland to Hunter Gas Pipeline project

Newcastle – 11.02.08
• The community was generally concerned about the cumulative impact of the pipeline. Given that the overall impact will be very large, the community asked what benefit will be achieved for the Aboriginal community. • Response – Aboriginal people will be involved in all aspects of the cultural assessment where additional workers are required. • In terms of employment, the community was concerned that employment would be ongoing, would provide training and skills for Aboriginal people and benefit the community as a whole (eg. Trustfunds). • Response – Barbara explained that this is something that the client would look into and that meetings would be arranged to discuss matters important to the community. • The community was concerned about the 'intellectual and spiritual' property rights regarding sites. In particular, spiritual/cultural sites are often the most important site type but may have little or no tangible remains. In these cases, oral history is very important and should be considered as a valid source of information regarding these sites. • Response – We will be taking a discrete approach to non-tangible sites, which may be more important than sites with material remains. The Part 3A process allows us to be more flexible when assessing these sites because we are not tied to NPWS legislation.

- The community was very concerned about the classification of sites as high/moderate/low. The community commented that the archaeological resource is finite, and it is becoming increasingly less because archaeologists continually classify sites as being of low significance and they are therefore destroyed. The community regards the sites as having high significance because of their value in a landscape context. The community disagrees with the assessment of sites in isolation from other sites, and prefers a landscape approach which recognises the interrelationship and value between sites.

- Response – This assessment will take a landscape approach to assessing sites. Archaeologists can only classify sites in terms of their scientific significance, and in accordance with the methodology used for the entire EA we will be using High, Moderate and Low impact to categorise sites and areas of archaeological potential, and to inform appropriate management recommendations. The community will be responsible for determining the cultural significance of sites.

- Concern was raised about 'categorised' statements about Aboriginal history that often occur in archaeological/ethnographic reports, because there is no oral history to verify the history. The community stated that the scientific/white view is not a substitute for cultural knowledge or mapping. The Aboriginal community wants to be portrayed as progressive in these reports and not as an oppressed group, and stated that Aboriginal people deserve more respect because they are the knowledge holders.

Response – Recording of oral history from elders was offered as a solution to this problem.

Maitland - 12.02.08

- The community was interested to know the overall area of impact of the pipeline project (including access roads etc). The community also expressed an interest in being involved with the significance assessment of cultural places as having high, moderate or low significance. The

community expressed the view that cultural assessment should be given equal consideration with scientific assessment in terms of significance.

- The community requested to know how the assessment process would define sites as more important than others and how significance would be assessed.
- The community expressed concerns about ecology along the pipeline route and how this would be managed, especially with reference to walking trails used by Aboriginal people in the past.
- The community expressed an interest in being involved in the preparation of the statement of commitments for the pipeline project.

Muswellbrook – 13.02.08

- The community requested that consultation strongly involve Traditional owners.
- The community expressed the view that the pipeline project should benefit local people from the Muswellbrook area.

Gunnedah – 14.02.08

- The community expressed that there are man other sites within the area that area not included on the AHIMS register, and that these are not just located near water courses like rivers, but also near natural spring sites.
- The community was concerned that information collected during the assessment process would be withheld from Aboriginal communities, stating that this is not acceptable because Elders should know about any new information.

- Response – Aboriginal people will be given full access to information collected during the assessment. It is only the non-indigenous public who will not have access to information.
- The community expressed the view that all areas should have monitoring.
- Response – It is not practical to monitor all areas because of the length of the proposed pipeline route. A different methodology is proposed that targets archaeologically sensitive areas, as this approach will give more meaningful results.
- A member of the community raised concerns about the trade off of sites in exchange for open area excavation. In the past, the community has found it effective to have people in the field to recover material as construction occurs. This would reduce the impact of the 'trade off' between sites and excavation.
- Response – We explained why the archaeological research mitigation approach (as trade off for impact on numerous low and moderately significant artefact scatters) was a more effective mitigation approach because it provides more meaningful archaeological information about past Aboriginal use and occupation of the landscape. We noted, however, that members of the community have every right to disagree with the proposed methodology.
- The community requested to know why the pipeline was being placed underground rather than above.
- Response – The proposed underground route is designed as such for safety reasons, and also so that people may continue to have full use of the land.
- The community requested to know what benefits the pipeline would have for the local Aboriginal community.
- Response – Meetings will be arranged with communities to discuss which issues are important.

- The community expressed concern regarding the potential for unknown burials to be located in areas of local black alluvial soils and near water courses, especially given the history of massacres in the area. The community requested to know what procedures have been put in place should Aboriginal remains be discovered. The community reiterated their desire to have monitors in place during the earth moving process because of the potential for burials.
- Response – Monitoring would be in place in areas identified as having potential for burials, including the black soil plains.
- The community requested to know if payment would be provided for people who assist in assessments and provide cultural knowledge.
- Response – Yes, it is proposed that people who assist the assessment by providing cultural knowledge would receive payment.
- The community expressed concern that the Aboriginal community would not be consulted in a proper manner during the assessment process.
- Response – It is intended that community consultation will be respectful and thorough during the pipeline project.
- The community suggested that rock sources be identified during the assessment because this information can be used to provide information about culturally significant trading routes.
- The community expressed the view that local indigenous people who have experience and have completed courses should be given employment during the pipeline project.

Narrabri – 15.02.08

- The community requested that any artefacts recovered during the assessment be placed in the NPWS keeping place.
- The community indicated that the pipeline study area does not appear to be going through any known Aboriginal sites, however there are

plenty of Aboriginal sites recorded in the area, especially near water courses.
Moree – 15.02.08
• The community expressed a strong interest in developing training programs as part of the pipeline assessment project. • The community also requested that Elders in the area be consulted regarding the project.
Mungindi – 18.02.08
• The community expressed the view that Land Council boundaries are not relevant for the assessment, and that 'nation boundaries' should be used. It was suggested that a nation meeting should be organised to discuss the project. • The community explained that there are many sites in the region, including significant bora grounds. The community expressed a strong desire for the entire route to be surveyed and monitored to ensure that cultural sites and places are not destroyed. The community explained a strong cultural link with cultural sites in the area and explained that there will be a direct and negative impact on the community, especially Elders, should cultural sites be destroyed. • The community agreed with the proposed methodology for assessment of archaeology along the pipeline, and requested continued input and consultation during the project.

Following the meetings, 21 days were allowed for feedback on the proposed assessment methodology. Written and verbal feedback regarding the *Proposed Methodology for Strategic Aboriginal Heritage Assessment* was provided by a number of Aboriginal communities and individuals. Some small revisions to the

pipeline study area were made during March, therefore a second set of revised maps were sent out to all the registered stakeholders on the 28th March 2008. A further 21 days were allowed for feedback.

A digest of this feedback is presented in Table 12 below. Full copies of these responses are retained, but are not reproduced in this report for privacy reasons.

Table 12: Summary of written responses from Aboriginal communities on the *Proposed Methodology for Strategic Aboriginal Heritage Assessment*

Organization	Comments
Barkuma	• The organisation expressed support for the proposed methodology, particularly the open-area excavation approach.
Awabakal LALC	• The Council expressed support for the proposed methodology.
Awabakal Descendants Traditional Owners Aboriginal Corporation	• The Corporation expressed support for the methodology in principle, especially the proposal to excavate bands across the entire survey area. • The Corporation raised concern about the possible impact of access roads on potential Aboriginal sites, and emphasized the need for these impact areas to be surveyed by Aboriginal representatives.
Awabakal Traditional Owners Aboriginal Corporation	• The Corporation expressed concern that the proposed methodology does not address the potential impact of the proposed Gas Pipeline on the surrounding environment. • There was a further concern expressed that the proposed methodology does not allow for stakeholders to assess the proposed access roads, which have the potential to impact on Aboriginal

	sites outside the proposed pipeline area. • The Corporation recommended that representatives of the Awabakal Traditional Owners Aboriginal Corporation be involved in the field investigation to monitor the collection of artefacts. • The Corporation suggested that all artefacts be photographed and documented to provide site specific information. • The Corporation emphasized its right to obtain a care and protection permit for artefacts recovered from within the Awabakal boundary. • The Corporation stated a requirement for site health 'triggers' to be put in place to monitor and protect the area surrounding the Gas Pipeline. These triggers should be agreed upon before any excavation occurs in order to protect sites from negative impact. This may include immediately ceasing operations and notifying stakeholders if cultural material is encountered.
Gunida Gunyah Aboriginal Corporation	• The Corporation wished to ensure that impact on all known Aboriginal objects and places will be avoided, except where impractical and where agreed mitigation measures have been put in place. • The Corporation wished to ensure that boring under all water courses will be done at least 40 metres away from creek edges, in order to avoid possible impact upon unknown Aboriginal objects. • The Corporation stated that they should be consulted about mitigation measures for any

	impact on Aboriginal objects discovered through future surveys of the pipeline route. • The Corporation stated that for Aboriginal objects or places adjacent to the pipeline route, methods of enhancing/protecting that object or place should be discussed. • The Corporation requested that upon approval of the project, the proponent enter into a negotiated agreement regarding compensation for the loss of Aboriginal cultural values.
NTSCORP Ltd	• The Corporation commented that any cultural heritage assessment must include a complete survey walk of the proposed pipeline route by Gamilaroi People. This walk should include flagging, fencing and mapping of sites, including GPS recording and noting the proximity of sites to the proposed pipeline route. The information should be provided to DECC for sites registration. • The Corporation stated that prior to the commencement of formal approvals processes or consent by Gamilaroi People, the pipeline route should be agreed between Gamilaroi People and Hunter Energy Pty as part of the agreed Cultural Heritage Management Agreement and Cultural Heritage Management Plan. This Cultural Heritage Management Agreement and Cultural Heritage Management Plan should make a commitment to avoid or minimally impact sites. This should also include protocols for the protection of sites in the vicinity of the construction zone, the employment of Cultural Heritage Monitors to be on site for the entire construction period, procedures and practices to

	ensure protection of cultural heritage where a site of significance is uncovered during construction, a Cultural Heritage Coordinator to be employed during the project, a post construction audit of the pipeline, the repatriation of any artefacts and the rehabilitation of the pipeline route. • It was further stated that the terms of the Cultural Heritage Management Agreement and Cultural Heritage Management Plan should be negotiated and agreed simultaneously with, and as part of, a wider agreement between Gamilaroi People and Hunter Energy on the terms of compensation, employment and consent for the project.
Nur-Run-Gee Pty Ltd	• The organisation requested that a monitor from Nur-Run-Gee Pty Ltd be onsite while any inspection, walkover or any surface or sub-surface disturbance is undertaken. • The organisation expressed the view that the management plan as submitted is acceptable.
Namoi Advisory Committee	• Expressed the view that the community would prefer 'watchers' or sites officers be used for the whole project. • Expressed concern that targeting priority sites is insufficient. • Concern was raised about the use of AHIMS data for site identification, as the database is incomplete. • A request was made for ongoing consultation with the community as new information develops.

	• It was also requested that the criteria for selecting representatives to work on the project be made clear prior to selection. • The view was expressed that the consultation meeting at Gunnedah was too academic. The community requested that future consultation occur after hours and be scheduled closer to where the groups are located.
Wattaka Wonnarua Cultural Consultants Services	• The organisation expressed support for the proposed methodology, particularly the larger open-area excavation approach.
Mur-Roo-Ma Inc	• The organisation expressed support for the proposed methodology and stated that monitoring is required on all earthworks, not only on high impact sites.

4.3.2.1 Response to issues and concerns raised by Aboriginal stakeholders during the methodology review process

The comments and feedback received verbally during the consultation meetings and through written and verbal responses (as set out in Tables 11 and 12) were considered in developing the final assessment methodology. The comments that specifically relate to issues of Aboriginal participation in survey and excavation are not immediately relevant to the current strategic (desktop) assessment. They are issues that would be considered during the detailed investigations stage, which will involve fieldwork and participation of the Aboriginal community.

Issues of compensation, employment on the project and rent of cultural land were raised at the consultation meetings. Barbara Campany and Sandi Shrimski from Manidis Roberts attended as representatives of the proponent to discuss these issues. A separate process to address these issues (ie. issues not directly related to the cultural heritage assessment) has been initiated by the proponent. Individual communities will be contacted directly by the proponent to manage these issues.

These issues are not relevant for the purposes of the current assessment, and are therefore not discussed in any further detail here.

Other issues raised that were relevant to our proposed methodology are individually addressed below.

Community comment (Narrabri meeting 11.02.2008): The community was very concerned about the classification of sites as high/moderate/low. The community commented that the archaeological resource is finite, and it is becoming increasingly less because archaeologists continually classify sites as being of low significance and they are therefore destroyed. The community regards the sites as having high significance because of their value in a landscape context. The community disagrees with the assessment of sites in isolation from other sites, and prefers a landscape approach which recognises the interrelationship and value between sites.

Response: This assessment will take a landscape approach to assessing sites. Archaeologists can only classify sites in terms of their scientific significance, and in accordance with the methodology used for the entire EA we will be using High, Moderate and Low impact to categorise sites and areas of archaeological potential, and to inform appropriate management recommendations. The community will be responsible for determining the cultural significance of sites.

Community comment (Maitland meeting 12.02.2008): The community requested information regarding how the assessment process would define sites as more important than others, and how significance would be assessed.

How we propose to address this issue: For the purposes of impact assessment, High, Moderate and Low impact categories have been adopted, which are categorised based on the degree of physical impact of proposed development and the level of likely significance (using DECC significance criteria). These categories are defined as follows:

- High Impact – Direct development impact on a site, object or place that has a high level of scientific and/or cultural heritage significance. High impact sites would either have a high level of rarity, representativeness, archaeological research value or would have specific cultural value or importance to the local Aboriginal community. Disturbance of High Impact

sites would represent a significant scientific or cultural loss at a local, state or national level;

- Moderate Impact – Direct development impact on a site, object or place that has some scientific and/or cultural heritage significance. Moderate impact sites would have limited rarity, representativeness and archaeological research value at a local level. Disturbance of a moderate impact site would represent only a limited scientific or cultural loss at a local level;

- Low Impact – Indirect impact (ie. visual and contextual curtilage affected) on a site that has some rarity, representativeness, archaeological research value or cultural value to the local Aboriginal community. - Direct impact on a highly disturbed site or isolated find assessed to have negligible scientific or cultural significance.

Community comment (Gunnedah meeting 14.02.2008): The community expressed the view that all areas should have monitoring.

Response: It is not practical to monitor all areas because of the length of the proposed pipeline route. A different methodology is proposed that targets archaeologically sensitive areas, as this approach will give more meaningful results.

Community comment (Gunnedah meeting 14.02.2008): A member of the community raised concerns about the trade off of sites in exchange for open area excavation. In the past, the community has found it effective to have people in the field to recover material as construction occurs. This would reduce the impact of the 'trade off' between sites and excavation.

Response: We explained why the archaeological research mitigation approach (as trade off for impact on numerous low and moderately significant artefact scatters) was a more effective mitigation approach because it provides more meaningful archaeological information about past Aboriginal use and occupation of the landscape. We noted, however, that members of the community have every right to disagree with the proposed methodology.

Community comment (Gunnedah meeting 14.02.2008): The community expressed concern regarding the potential for unknown burials to be located in areas of local black alluvial soils and near water courses, especially given the

history of massacres in the area. The community requested to know what procedures have been put in place should Aboriginal remains be discovered. The community reiterated their desire to have monitors in place during the earth moving process because of the potential for burials.

Response: Monitoring would be in place in areas identified as having potential for burials, including the black soil plains.

Community comment (Gunnedah meeting 14.02.2008): The community suggested that rock sources be identified during the assessment because this information can be used to provide information about culturally significant trading routes.

How we propose to address this issue: NGH Environmental Consultants performed a fly-over survey of the entire pipeline route. This fly-over identified rock outcrops within the proposed impact area, which were then compared with geological mapping. All known outcrops were shown to occur on sandstone geology, which is unlikely to contain suitable flakable materials, apart from quartz[148].

Issue raised (Awabakal Traditional Owners Aboriginal Corporation 02.04.2008): The Corporation raised a concern that the proposed methodology does not make allowance for stakeholders to assess the proposed access roads, which have the potential to impact on Aboriginal sites outside the proposed pipeline area.

*How we propose to address this issue***:** All access roads will be included within the proposed study area, as provided to all registered stakeholders.

Issue raised (Awabakal Traditional Owners Aboriginal Corporation 02.04.2008): The Corporation suggested that all artefacts be photographed and documented to provide site specific information.

*How we propose to address this issue***:** Our proposed methodology for future archaeological investigations does not envisage detailed recording and salvage of all sites, objects and cultural deposits along the study area. This would simply be unfeasible given the scale of the project and the minimal archaeological research value in doing so. Instead we have proposed a substantial program of

[148] *Quartz is not normally indicative of a quarry in sandstone, as it usually occurs in small pieces as inclusions within the sandstone, and is often not of a quality suitable for flaking.*

archaeological research excavation as mitigation for the cumulative impacts on many moderate to low significance sites.

Issue raised (Awabakal Traditional Owners Aboriginal Corporation 02.04.2008): The Corporation emphasized its right to obtain a care and protection permit for artefacts recovered from within the Awabakal boundary.

How we propose to address this issue: Detailed care and control issues will need to be negotiated during the detailed study/investigation phase of work, and may require some negotiation between different Aboriginal interests that may seek care and control in particular parts of the study area.

Issue raised (Awabakal Traditional Owners Aboriginal Corporation 02.04.2008): The Corporation stated a requirement for site health 'triggers' to be put in place to monitor and protect the area surrounding the proposed pipeline route. These triggers should be agreed upon before any excavation occurs, in order to protect sites from negative impact. This may include immediately ceasing operations and notifying stakeholders if cultural material is encountered.

How we propose to address this issue: It is simply unfeasible for the proposed development (covering over 500km in length) to avoid all impacts on Aboriginal heritage, as it is likely that the soils along the majority of the pipeline route will contain at very least low densities of stone artefact deposits. It should also be noted that substantial mitigation measures are proposed, including substantial research excavation and management of areas of sensitivity.

Issue raised (Gunida Gunyah Aboriginal Corporation 11.04.2008): The Corporation wished to ensure that boring under all water courses will be done at least 40 metres away from creek edges, in order to avoid possible impact upon unknown Aboriginal objects.

How we propose to address this issue: The cost of doing this has been estimated by the proponent and would be prohibitive and make the project unviable.

Issue raised (NTSCORP Ltd 02.04.2008): The Corporation commented that any cultural heritage assessment must include a complete survey walk of the proposed pipeline route by Gamilaroi People. This walk should include flagging, fencing and mapping of sites, including GPS recording and recording the proximity of sites to

the proposed pipeline route. This information should be provided to DECC for sites registration.

How we propose to address this issue: The detailed predictive modeling and associated constraint mapping presented in this report identifies area of sensitivity for various site types, and further detailed investigations, including survey work, that would be required. We are not proposing survey of the entire study area, only areas of identified sensitivity.

Issue raised (NTSCORP Ltd 02.04.2008): The Corporation stated that prior to the commencement of formal approvals processes or consent by Gamilaroi People, the pipeline route should be agreed between Gamilaroi People and Hunter Energy Pty as part of the agreed Cultural Heritage Management Agreement and Cultural Heritage Management Plan. This Cultural Heritage Management Agreement and Cultural Heritage Management Plan should make a commitment to avoid or minimally impact sites. This should also include protocols for the protection of sites in the vicinity of the construction zone, the employment of Cultural Heritage Monitors to be on site for the entire construction period, procedures and practices to ensure protection of cultural heritage where a site of significance is uncovered during construction, a Cultural Heritage Coordinator to be employed during the project, a post construction audit of the pipeline, the repatriation of any artefacts and the rehabilitation of the pipeline route.

How we propose to address this issue: Most of the issues above will be addressed during future detailed studies and investigations, however Aboriginal participation will be in accordance with the DECC *Interim Community Consultation Guidelines for Applicants* 2004 and participants, if required, would be selected on the basis of fieldwork experience, cultural knowledge, fitness to carry out the fieldwork and appropriate insurances.

Issue raised (Namoi Advisory Committee 13.03.2008): A concern was raised that targeting priority sites is insufficient.

How we propose to address this issue: Targeting of "priority sites" is not proposed. An archaeological research excavation program as a form of impact mitigation for cumulative impacts has been proposed.

Issue raised (Namoi Advisory Committee 13.03.2008): A concern was raised about the use of AHIMS data for site identification, as the database is incomplete.

How we propose to address this issue: We acknowledge the limitations of AHIMS data, therefore we have also undertaken review of previous archaeological studies and assessments, historical research into Aboriginal use and occupation at first contact and research into environment factors. This research and review has been used to develop detailed predictive models that can assist in identifying areas of sensitivity where AHIMS currently indicates no sites.

Issue raised (Mur-Roo-Ma Inc 17.02.2008): The view was expressed that monitoring is required on all earthworks, not only on high impact sites.

How we propose to address this issue: This is unfeasible and would have very limited archaeological research or salvage value.

4.3.3 Finalisation of the assessment report.

Copies of the final draft of the *Queensland to Hunter Gas Pipeline Environmental Assessment- Aboriginal Heritage Assessment, May 2008* were sent to all registered stakeholders for review and comment. Stakeholders were provided at least 21 days to respond in accordance with the DECC *Interim Community Consultation Requirements for Applicants (2004).*

Feedback was received in writing and the comments and responses are summarised below. The written responses have been retained, but are not reproduced here for privacy reasons.

Mur-Roo-Ma Inc: The organisation reiterated the view that was expressed in the Newcastle meeting (17.02.08) that monitors should be present on all earthworks on the Hunter River south of Raymond Terrace, not only on high impact areas.

Response: Areas south of Raymond Terrace and adjacent to the Hunter River have been identified as sensitive for burials and middens. The management recommendation for the area of sensitivity for burials requires monitoring of excavation works and contingency measures (including stop work) if a burial is found. The management recommendations for areas of sensitivity for middens is to

undertake archaeological survey to identify middens and avoid them where possible within the 200 metre study area. More generally, impact on sites will also be mitigated by undertaking a programme of archaeological research excavation. Monitoring, survey and archaeological excavation will include participation of local Aboriginal stakeholder representatives.

Nur-Run-Gee Ltd-The organisation expressed concern over several issues, listed below:

1. They found the Part 3A legislation overrides Aboriginal rights in relation to correct protocols and procedures.

Response: The QHGP has specific protocols and procedures in place to protect and mitigate impact on Aboriginal heritage sites in the construction footprint of the pipeline (the ROW). Also the DECC Interim Community Consultation Requirements for Applicants 2004 process has been used to ensure consistency with industry standards.

2.They found the low impact rating in the region of Ash Island and Koorang Island is incorrect as they are inhabited by members of the "Ash Island" Clan and these areas are significant to the Worimi people.

Response: The assessment has taken a strategic landscape approach to assessing sites. In accordance with the methodology used for the entire EA, High, Moderate and Low impact have been used to categorise Aboriginal heritage sites and areas of archaeological potential. These impact categories were developed using a combination of the DECC significance criteria and the degree of impact of the proposed development. The impact assessment was in turn used to inform specific and appropriate management recommendations. The general locality of the area in question has been assessed as having sensitivity for middens and stone artefact scatters. A suite of management measures, including survey, monitoring and archaeological excavation would be undertaken to manage and mitigate impact on these sensitive areas.

3. They asked, what guarantees are there to protect Aboriginal cultural material if no Aboriginal person is on site during the construction process?

Response: There are several Statements of Commitments addressing the protection of Aboriginal cultural material during the construction process. For example, these commitments include an Aboriginal Cultural Education programme for personnel working on the QHGP construction to be aware of their responsibilities regarding Aboriginal heritage and protocols will be adopted (including stop work) if certain artefactual material is found. There are also provisions for further survey and monitoring by archaeologists and representatives of the Aboriginal community in areas of sensitivity for various site types. We also note that it is the community's responsibility to lodge a Section 85A if they wish to have Care and Control of artefacts found during the construction process, although we can assist in facilitating this.

4. The organisation requires local Aboriginal representatives to be present on any excavation that is to take place within Worimi boundaries.

Response: Aboriginal community participation and employment during archaeological fieldwork will be in accordance with the DECC Interim Community Consultation Requirements for Applicants 2004. Representatives would be selected on the basis of clear and fair criteria such as experience, skills, ability to undertake required tasks and cultural knowledge.

Wanaruah Local Aboriginal Land Council- The organisation considers the Hunter Valley to be very important to the Aboriginal people of the area. The LALC will treat all sites discovered in the QHGP to be *very* significant until investigations demonstrate otherwise. The LALC stated that they require exploration and/or monitoring of all areas to be impacted, disturbed and/or excavated so as to identify and record markers of their culture, irrespective of the archaeological significance as they are uncovered.

Response: This is unfeasible and would have very limited archaeological research or salvage value. As outlined in the management recommendations chapter of this report, there are a comprehensive array of management measures in place for areas of various sensitivity for different site types. This will include additional survey work, monitoring and archaeological research excavation that will include Aboriginal community representatives.

4.4 Oral Research

To meet the aims of this assessment to identify important cultural sites and places along the pipeline study area and to meet requests made by Aboriginal communities, a program of oral research is currently being undertaken. Aboriginal Elders and knowledge holders will be consulted in a targeted fashion to seek information about any significant cultural sites that may be located within the pipeline study area. This work is currently in progress. For reasons of cultural sensitivity and confidentiality, results of this work will be presented in a stand alone restricted access document that will inform the Queensland Hunter Gas Pipeline EA.

5 SYDNEY BASIN BIOREGION

5.1 Preamble

Archaeological assessment reports include information about the environmental context of study areas due to the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influenced both the type and availability of natural resources and the types of cultural activities that were carried out in the past. As a result, this also influenced the types of archaeological sites that may be found.

Archaeologists examine regional trends in the distribution of known Aboriginal sites in relation to environment and topography in order to determine Aboriginal settlement and site location patterns. This provides evidence about economic and social systems in the past and also assists archaeologists to predict likely site types and locations in a given area.

As described in the methodology, the assessment is divided into bioregions that are land units integrating geology, land form, soil and vegetation, on an ecosystem scale. This chapter outlines the environmental and archaeological contexts of the Sydney Basin Bioregion. This information is used to construct a predictive model of the site types and their likely environmental, geological and landscape context within the bioregion.

The Sydney Basin Bioregion lies on the central east coast of NSW. It covers approximately 3 624 008ha and it occupies 4.5% of NSW. It is bounded by the Pacific Ocean, and bioregions of North Coast, Brigalow Belt South, South East Corner, South Eastern Highlands and South Western Slopes.

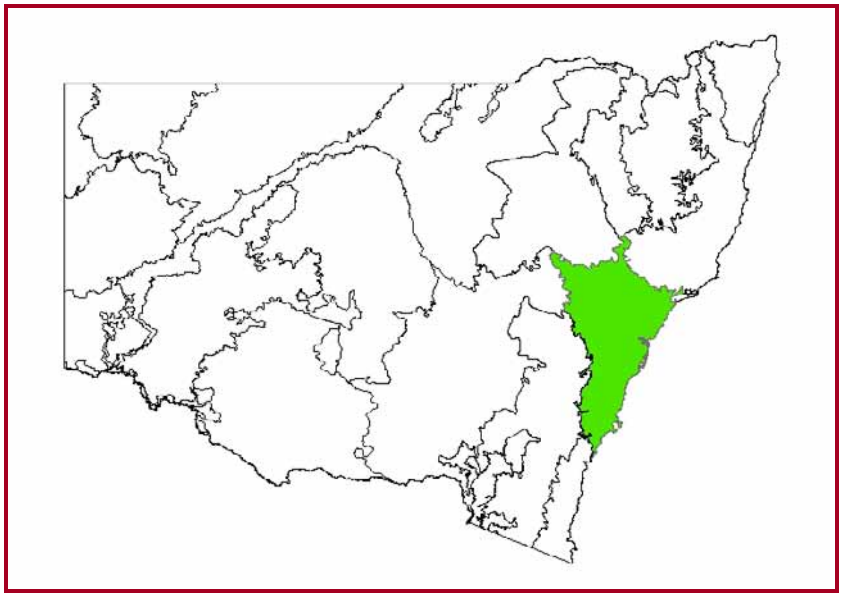

Figure 29. Map of the Bioregions of NSW highlighting the Sydney Basin Bioregion

5.2 Environmental Context

5.2.1 Climate

The Sydney Basin Bioregion[150] is dominated by a temperate climate characterised by warm summers with no dry season however, sub-humid climate occurs across significant areas in the northeast of the bioregion. Highest temperatures occur in the Hunter Valley and along the coast, becoming cooler on higher plateaus and in the west. The minimum average temperature ranges from -1.4 º C to 8.1º C and the maximum average temperature ranges from 22.4 º C to 31.9 º C.

Rainfall can occur throughout the year, but varies across the bioregion in relation to altitude and distance from the coast, with wetter areas being closer to the coast or in higher altitudes. Minimum average monthly rainfall is 26-101mm and maximum average monthly rainfall is 69-245mm.

5.2.2 Landscape Characteristics

The landscapes of the Sydney Basin Bioregion include coastal, estuarine, riverine and hinterland environments. Prominent landscape features of the bioregion include the Blue Mountains which constitutes part of the Great Escarpment, deeply

[150] *NSW NPWS website – Bioregions Information*

weathered sandstone stone pillars, shale and sandstone plateaus and the unique concentration of volcanic vents. The catchments of the Hawkesbury-Nepean, Hunter and Shoalhaven river systems flow through the Sydney Basin bioregion.

Coastal landscapes of the Sydney Bioregion include steep cliffs, beaches and estuaries. Dunes and lagoons form coastal barriers that are interspersed with rock platforms.

The major inland landscape features of the Sydney Bioregion are wide valleys and rolling hills. These are often associated with sandstone cliffs, plateaus and gorges. Remnant sandstone pinnacles and plateaus form isolated flat mountain tops. Shale and basalt plateaus with rolling hills and shallow valleys are occasional landscape features within the bioregion.

There are several volcanic landscapes in the Sydney Basin Bioregion. These include volcanic necks and vents which form circular depressions or low domes in the landscape. Some volcanic rocks protrude in shale plateau landscapes.

Swamps are a characteristic of the bioregion. These can be small such as swampy streamlines in catchment areas, isolated swamps where tributary streams fall into gorges, peat swamps or hanging swamps. Extensive estuarine swamps are located behind the coastal barrier of beach and dunes.

5.2.3 Geology

The Sydney Basin Bioregion consists of a geological basin filled with near horizontal sandstones and shales of Permian to Triassic age that overlie older basement rocks of the Lachlan Fold Belt. Sedimentary rocks have been subject to uplift with gentle folding and minor faulting during the formation of the Great Dividing Range. Erosion by coastal streams has created deep cliffed sandstone gorges and remnant plateaus, with the exceptions of the Hunter Valley and the low-lying Cumberland Plain.

The principal rock types that comprise the Sydney Basin bioregion geology are a complex of sandstones, shales, conglomerates and coal measures. There are several volcanic necks of Jurassic age as well as trachyte intrusives, granites and basalt flows of Tertiary to Silurian age. Other rock types present are siltstone and

quartzite. The Sydney Basin sandstone ranges from quartz sandstone groups with sub-horizontal bedding and strong vertical joint patterns to more lithic sandstones.

Quaternary muds, river gravels and sands feature along modern and ancient river beds. Dune sands are part of the Quaternary or Pleistocene coastal barrier systems. Quaternary fills dominate much of the coastal barrier complexes and estuary environments.

5.2.4 Soils

The soils of the Sydney Basin bioregion reflect the geology on which they lie and the local topography. In general, sandy top soils dominate (A horizon) the Sydney Basin bioregion. These are usually well drained with a gritty texture. They overlie tough yellow to grey poorly drained clays which in turn overlie shale bedrock. There are several exceptions due to the variety of environments in the bioregion.

The coastal soils are dominated by sand which range from clean, quartz sands with moderate shell content on beaches and frontal dunes to well developed, deep Pleistocene podsols. On coastal shales, soils are characterized by deep texture contrast soils with loam topsoils.

Swamp, estuarine and lagoon environments are dominated by organic sands and mud. Hanging swamps also have deep sands and clayey sands while swamps and estuaries have more peaty sands and organic silts.

Soils in areas of basalt have red to brown structured loams and clay loams. These can be buried by slope debris where volcanic necks form depressions.

On sandstone and rocky plateaus the soil landscape is dominated by shallow sandy, dark yellow sands and quartz sand profiles. Sandy soils and red to yellow soils of contrasting texture are located on sandstone and shale slopes. At the base of cliffs, soils comprise boulder debris with sandy clay matrix.

Valley bases are often associated with river terraces with soils that vary from sandy, alluvial fill to silicified gravels. Alluvium can be of various depths and comprise of deep sands and loams. Sandy alluviums to loamy sands occur along streams and creeks. High quality loams occur on modern floodplain alluviums.

5.2.5 Vegetation

The Sydney Basin Bioregion is one of the most plant species diverse in Australia. The type of vegetation corresponds to the geology, topography and climate of the area. A typical coastal dune assemblage includes coast tea-tree (*Leptospermum laevigatum*), coast wattle (*Acacia longifolia*), coast banksias (*Banksia aemula, B. serrata, B. integrifolia*), grass tree (*Xanthorroea sp*.) and lomandra (*Lomandra longifolia*). Blackbutt (*Eucalyptus pilularis*), black she-oak, smooth-barked apple (*Angophora costata*), old man banksia (*Banksia serrata*), swamp mahogany and diverse shrubbery also occurs. Mangrove (*Aegiceras corniculatum and Avicennia marina*) communities are limited to the entrances of coastal lakes. Old dune systems occur on the inland side of the coastal barrier or are found as parabolic dunes high in the landscape, such as on headlands, support a more mature coastal forest community.

Coastal forest communities can occupy shale-derived soils that cap sandstone. These vegetation communities are characterised by Sydney blue gum (*Eucalyptus saligna*), turpentine, grey ironbark (*Eucalyptus paniculata*), spotted gum, black ash and bangalay (*Eucalyptus botryoides*). These often have an open understorey, with macrozamia (*Macrozamia communis*) and cabbage tree palm.

Other water environments in the bioregion include estuaries, streams and swamps. In the estuaries, common reed (*Phragmites australis*), saltmarsh (*Juncus kraussii, Sporobulus virginicus,* and *Sarcocornia quinqueflora*) and mangrove (*Aegiceras corniculatum and Avicennia marina*) will occur. River oak and river red gum trees occur along streams and rivers.

Swamp vegetation includes common reed, complex prickly-leaved tea-tree *(Melaleuca stypheloides)* and paperbark (*Melaleuca quinquenervia*) associations, with swamp mahogany (*Eucalyptus robusta*), sedges, tall spike rush (*Elaeocharis sphacelata*) and juncus (*Juncus sp*.). Hanging swamps can be found on sandstone and dunes, with the dominant species being gahnia (*Gahnia aspera*) and banksia (*Banksia robur*). Swamp oak is extensive in estuary and swamp environments as well as occurring in the upper reaches and foot hills of the Hunter

The drier lowland environments and extensive sandstone plateaus of the bioregion support forest and woodland vegetation. These areas are dominated by forest red gum (*Eucalyptus tereticornis*), grey gum, spotted gum (*Eucalyptus maculata*),

scribbly gum (*Eucalyptus haemastoma*), grey box (*Eucalyptus moluccana*), white box, yellow box (*Eucalyptus melliodora*), fuzzy box (*Eucalyptus conica*), narrow-leaved ironbark (*Eucalyptus crebra*), broad-leaved ironbark (*Eucalyptus fibrosa*), rough-barked apple and yellow bloodwood.

5.3 Regional Archaeological Context

5.3.1 Preamble

The archaeology of the Sydney Basin bioregion has been well documented through a large number of academic studies, regional management studies and impact assessment investigations over the past 30 years. Thousands of Aboriginal sites have been recorded, reflecting both the wealth of archaeology in the region and the number of archaeological investigations undertaken. These factors have contributed to building up a significant database on the archaeology of Sydney Basin bioregion.

5.3.2 Early Occupation

Aboriginal occupation in the Sydney Basin bioregion dates back to the Pleistocene period (ie. prior to 10,000 years ago). This evidence comes from radio carbon (C14) dates retrieved from several excavated sites[151]. The George & Charles St Parramatta site, c.25,000 – 30,000 BP[152], is considered to be the oldest reliable date for Aboriginal occupation in this region.

Early occupation sites date to the late Pleistocene/early Holocene periods. These sites have been found in deep stratified rockshelter deposits and within alluvial deposits, located in stable Pleistocene dune systems and particularly on the margins of large rivers. McDonald has recently argued that the early occupation of the Sydney Basin was characterised by a high degree of 'residential mobility'[153] between small numbers of sites, focused on these primary river systems[154]. It is

[151] *Shaws Creek and Cranebrook Terrace are both located in the Penrith area and as cited in Attenbrow 2002:18-19; Cranebrook Terrace [41 700 +3000/-2000 ANU-4016]; Shaw's Creek [14 700±250 Beta-12423], Attenbrow 2002: 20-21*

[152] *As cited in Attenbrow 2002:18-19; Cranebrook Terrace [41 700 +3000/-2000 ANU-4016]; Shaw's Creek [14 700±250 Beta-12423]*

[153] *frequent movement between campsites*

[154] *McDonald 2005*

unclear whether these patterns are real or biased due to the exceptional preservation conditions found in deep alluvial deposits created by the large rivers. More work is required to test McDonald's model.

5.3.3 Intensification during the Holocene Period

The vast majority of dated sites in the Sydney Basin region are less than 5,000 years old[155]. It has been argued that this is a result of increased populations and 'intensification' of cultural activity during this period. The prevalence of sites dating to the last 5000 years may also be a result of the last significant rise in the sea level approximately 6000 years ago. The sea level rise would have submerged many of the older sites along the coastal fringe and forced Aboriginal groups westward to the current coastline.

In an attempt to better understand changes in use and occupation during the Holocene period, Val Attenbrow undertook a detailed study of a catchment in the northern portion of the Sydney Basin bioregion[156]. Sites were classified as either *base camps* or *activity locations/transit camps* based on comparative millennial artefact accumulation rates. Attenbrow's study found significant changes in site patterning during the Holocene. At a broad level, these site patterns are:

- More base camps were established at the same time as ground-edged implements were introduced into stone tool assemblages in the 4th millennium B.P;
- Base camps substantially increased with a reversal in the ratio of base camps to activity/transit camps during the 3rd millennium BP;
- The number of occupation sites increased over time, particularly after 2000 BP; and
- Shifts in site patterning indicate periodic re-organisation of residential mobility.

[155] *35 out of a total of 48 dated sites*

[156] *Attenbrow 2003a*

5.3.4 Site Types

There are a number of Aboriginal site types that have been found within the Sydney Basin bioregion. The most common types are:

- artefact scatters;
- grinding grooves;
- isolated finds;
- middens;
- modified trees (scarred or carved);
- potential archaeological deposits (PADs);
- rock art engravings; and
- rock shelters with midden deposits, art or artefacts.

Less frequent site types that occur within the bioregion are listed on the *DECC Aboriginal Site Register (ASR)*.

5.3.5 Stone Artefacts

Stone artefacts are the most commonly found cultural evidence throughout the bioregion. They are an important source of archaeological information because stone is preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as Carbon dating cannot be applied.

A technological sequence for stone artefacts for the region was first described in the late 1940s by Fred McCarthy and has since been refined over time[157]. Known as the 'Eastern Regional Sequence' it was based on direct dating of excavated sequences. Some debate about the precise nature and significance of the

[157] *The ERS is currently being re-examined by Hiscock & Attenbrow.*

technological changes described still continues[158], therefore the ERS should be regarded only as a general guide to technological change. The ERS phases are as follows:

- Capertian – is distinguished by large uniface pebble tools, core tools, horsehoof cores, scrapers and hammerstones. Backed artefacts occasionally present. Generally dates to before 5,000 years before present (BP).
- Early Bondaian – Aspects of the Capertian assemblage continue, but backed artefacts and ground-edged artefacts increase. Artefacts during this period were predominantly made from fine-grained silicious stone such as silcrete and tuff. Generally dated from 5,000 BP to 2,800 BP.
- Middle Bondaian – Characterised by backed artefacts, particularly Bondi Points and ground-edged artefacts. Artefacts made from silicious materials, however quartz becomes more frequent. Generally dated from 2,800 BP to 1,600 BP.
- Late Bondaian – characterised by bipolar technology, eloueras, ground-edged artefacts, and bone and shell artefacts. Bondi points are virtually absent and artefacts are predominantly made from Quartz. Generally dated from 1,600 BP to contact.

A number of observations have been made in regarding the Sydney Basin bioregion lithic assemblages. These observations relate to the type, use and source of stone tools and are summarised as follows:

- Silcrete (51 %) and Chert (34 %) are the most common raw materials used to manufacture stone artefacts in the northern portion of the bioregion[159];
- Other raw materials used to make stone tools are include quartz, basalt and quartzite; and
- The microliths or "small tool tradition" may have been used in composite tools, hafted in series on timber to produce a cutting/processing implement (ie. a knife).

[158] *Hiscock & Attenbrow 2000*

[159] *Kohen 1986: 280-281*

5.3.6 Site Patterns

There is general consistency in the types of Aboriginal sites and their distribution throughout the Sydney Basin bioregion. Environmental and topographic contexts are an important determinant of the size and nature of sites and their spatial location. Below is an outline of the site patterns for the Sydney Basin bioregion, including dominant site patterns and those in relation to coastal, estuarine and hinterland landscapes.

Drawing on various analyses[160] general statements regarding the dominant site patterns in the bioregion are:

- Sites would be found across the Sydney Basin Bioregion.
- There are areas of archaeological potential wherever there has been limited prior surface disturbance.
- Archaeological material is often found in areas of sub-surface exposure, such as those caused by erosion.
- Surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material. Extensive excavations have shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces. This is a critical consideration in aggrading soil landscapes;
- Aboriginal cultural material to survive on sites that contain remnant portions of the original soil profile. The potential for survival of any archaeological sites will largely depend on the degree of past disturbance;
- Aboriginal camp[161] sites were preferentially located at resource intersection zones in order to capitalise on a broader range of resources. Therefore, where more than one environment and site type occur in any location, the potential for Aboriginal camp sites is increased;

[160] *Hughes: 1984, Attenbrow 2002, McDonald 1997: 56*

[161] *Aitken 1985; Hynes & Chase 1982*

- Most archaeological evidence dates to the mid to late Holocene; and technological analysis of stone artefacts may assist in relatively dating sites that cannot be directly dated; and
- Burial sites and complexes can occur anywhere in the landscape including which occur in sandy or loose soils and shell middens.

5.3.7 Proximity of Sites to Water

Various studies have identified the relationship between certain site types and their proximity to water courses[162]. This relationship is one of the most commonly reported site patterns in the bioregion. The following observations have been made:

- Open artefact scatters are located within 100 metres of permanent fresh water[163];
- Low frequencies of sites were found over 100 metres away from permanent fresh water[164], hill slopes and crests;
- Open artefact scatters are more complex and more densely clustered along permanent creek and river lines;
- Sites will generally reduce in size as associated watercourses decrease in catchment size; and
- Grinding grooves are located near sources of water on areas of exposed flat bedded sandstone.

Furthermore, the factors of the permanence of fresh water sources and the proximities to stone sources play a part in the density and complexity of archaeological sites[165]. They will vary according to permanence of water (stream order), landscape unit and proximity to stone sources as follows[166]:

[162] *Kohen 1986, Barber 1993, McDonald 1997, Attenbrow 2003a.*

[163] *Kohen 1986, Barber 1993*

[164] *ibid*

[165] *McDonald 1997: 56-57*

[166] *McDonald 1997: 56-57*

- Near first order creeks (the headwaters of upper tributaries) archaeological evidence will be sparse and represent little more than background scatter;
- Near second order creeks (the middle reaches of minor tributaries), archaeological evidence will comprise sparse but focused activity (one-off camps, single event knapping etc);
- Near third order creeks (the lower reaches of tributary creeks), there will be evidence of more frequent occupation including repeated occupation by small groups, knapping floors and evidence of more concentrated activities;
- Near fifth order creeks (major creeks) archaeological evidence will reflect more permanent or repeated occupation. Sites will be complex and may be stratified;
- Creek junctions, may have been a particular focus of occupation;
- Ridge top locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be present;
- Sites in close proximity to an identified stone source will include stone artefacts with a range of size and cortex characteristics. The general size of artefacts and percentage of cortex will both decrease with distance from source; and
- High quality raw stone materials generally result in abundant flaking debris on the sides of watercourses. These locations with a stream order of two or higher, were important sources of raw material for stone artefact manufacture[167].

These patterns described above provide a useful general guide to site patterning and inferred cultural behaviour, however there are always exceptions such as large waterholes or wetlands on upper tributaries that were important resource zones and attracted repeated and complex Aboriginal occupation. This point is illustrated by recent work conducted by McDonald[168] who found that although lithic

[167] *ibid*

[168] *McDonald 2005*

assemblages decreased in scale and repetition further away from water, the composition of assemblages remained fairly consistent across the entire landscape. McDonald also concludes that classifying various landscape evidence according to site types (such as residential base camps, dinnertime camps etc) is not a useful framework for interpreting the archaeology areas of the Sydney Basin.

5.3.8 Coastal Landscapes

The east coast has been the subject of studies that examine settlement patterns, particularly in regard to the role of seasonality. Based on the results of coastal excavations and site distribution patterns, Gretchen Poiner[169] argued that seasonality was a major influence on settlement patterns and subsistence modes on the coast. Poiner claimed that large semi-sedentary summer camps gave way to dispersal of smaller groups into the hinterland during winter when marine resources diminished. Anne Ross challenged Poiner's model, using ethnographic evidence to argue that inland winter migration was unlikely due to tribal boundaries[170]. Instead, Ross argued that smaller groups were spread more thinly along the coast during winter.

Generally, coastal landscapes have:

- Artefacts that are generally made from indurated mudstone and silcrete and tuff[171];
- A concentration of occupation and use on slightly elevated topography (low crest and upper slope landforms) adjacent to water sources and resources areas[172] within stable Pleistocene and Holocene dunes; and
- Swamps located within deflation basins and swales in stable Pleistocene and Holocene dunes fields.

[169] *Poiner 1976*

[170] *Ross 1976*

[171] *Baker 1992: 7-9*

[172] *Dean-Jones 1990:77; Wheeler, 2004*

5.3.9 Estuarine Landscapes

Estuarine landscapes are located within the bioregion. In a regional archaeological study of the Newcastle Bight[173] of the Hunter river system, Dean-Jones made the following conclusions about the estuarine environments:

- The distribution of known sites indicates that estuarine shorelines have a high potential for preservation of occupation evidence;
- Sites located on rock platforms and dune surfaces in estuarine environments have a higher potential for preservation than sites located on estuarine clays and silts; and
- Sites along the estuarine shorelines are generally small middens or open artefact scatters.

5.3.10 Hinterland Landscapes

The site patterns in hinterland landscapes include some of those located around fresh water and estuarine sources. Generally, other hinterland site types and patterns include:

- Rock shelters found only in areas of exposed sandstone escarpment;
- Scar or modified trees found in areas or remnant vegetation of forest greater than 100 years old; and
- Suitable occupation locations include relatively flat dry land and rock overhangs.

5.4 AHIMS Data

A search of the DECC *Aboriginal Heritage Information Management System* (AHIMS) for a 1.5 kilometre area either side of the pipeline study area was undertaken to identify previously recorded sites in and around the study area. Within the broader pipeline study area there are 195 registered sites.

[173] *Dean-Jones, 1990:128*

The Sydney bioregion contains 117 sites of the total number of sites for the broader pipeline study area search and 6 site types as defined by DECC.

Table 13: AHIMS site types and quantity in the Sydney bioregion

Site Types	Number of Sites
Artefact	106
Hearth, Non-Human Bone and Organic Material, Shell, Potential Archaeological Deposit (PAD)	1
Modified Tree (Carved or Scarred)	4
PAD	4
Stone Quarry and Artefact	1
Grinding Groove	1

5.5 Predictive Modelling

Based upon information compiled within the *DECC AHIMS*, archaeological and environmental information reviewed above, we have prepared a predictive model of all likely site types within the bio-region.

The model describes the environmental, geological or topographic context each site type is likely to be found, areas of high sensitivity, the method(s) for identifying the site type and a general management approach for moderate and low impact sites. The model is presented overleaf on Table 14.

Table 14: Predictive modelling – Sydney Basin Bioregion

Site Type	Environmental Context	Areas of Sensitivity
1. Stone Artefact Scatter and Deposit	All areas containing topsoil	Undisturbed soils within 150 metres of permanent water (swamps, rivers, creeks etc) and/or stone sources.
2. Rockshelter (incl. art, deposit, midden & burials)	Sandstone outcrop	On sandstone benches and overhang within 150 metres of permanent water
3. Midden	Near coast, estuary and less commonly, freshwater streams	Within 1 kilometre of coast and estuary
4. Axe Grinding Groove	Sandstone outcrop	Flat bedded sandstone near creek lines or rock pools
5. Seed Grinding Dishes	N/A	N/A
6. Rock Engraving	Sandstone outcrop	Flat bedded sandstone
7. Modified Trees (Scarred or Carved)	Areas containing remnant vegetation	Areas containing mature / old growth trees greater than 100 years in age
8. Quarry and/or Stone Tool Source	Outcropping bedrock or gravel bed	Outcropping isotropic rock (particularly acid volcanics and pyroclastic), gravel beds on large rivers (within 150m on major rivers) and old river terraces.

		In particular, the rock types: acid volcanic rocks; pyroclastic rocks; tuff; indurated mudstone; quartz; silcrete; basalt and quartzite.
9. Waterhole / Well	Sandstone outcrop	Rock pools in sandstone outcrop
10. Burials	All areas containing soft soils or sediments	Areas with deep soft or sandy soils that are not highly acidic. Alluvial and aeolian soil landscapes are particularly sensitive.
11. Bora / Ceremonial	N/A	N/A
12. Natural / Mythological	N/A	N/A
13. Mission, Cemetery, Historic Site	N/A	N/A
14. Conflict Site	N/A	N/A
15. Other rare site types: Earth mound, Resource site, Stone arrangements.	N/A	N/A

6 NSW NORTH COAST BIOREGION

6.1 Preamble

Archaeological assessment reports include information about the environmental context of study areas due to the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influenced both the type and availability of natural resources and the types of cultural activities that were carried out in the past. As a result, this also influenced the types of archaeological sites that may be found.

Archaeologists examine regional trends in the distribution of known Aboriginal sites in relation to environment and topography in order to determine Aboriginal settlement and site location patterns. This provides evidence about economic and social systems in the past and also assists archaeologists to predict likely site types and locations in a given area.

As described in the methodology, the assessment is divided into bioregions that are land units integrating geology, land form, soil and vegetation, on an ecosystem scale. This chapter outlines the environmental and archaeological contexts of the NSW North Coast Bioregion. This information is used to construct a predictive model of the site types and their likely environmental, geological and landscape context within the bioregion.

The North Coast Bioregion lies adjacent to the east coast of NSW from north of Newcastle to inside the Queensland border. In NSW, it covers an area of approximately 5,924,130 hectares[174] and the NSW portion is 5,692,351.6 hectares occupying 7.1% of the state. It is bound by the Pacific Ocean and the bioregions of the Sydney Basin, Nandewar, and New England tablelands.

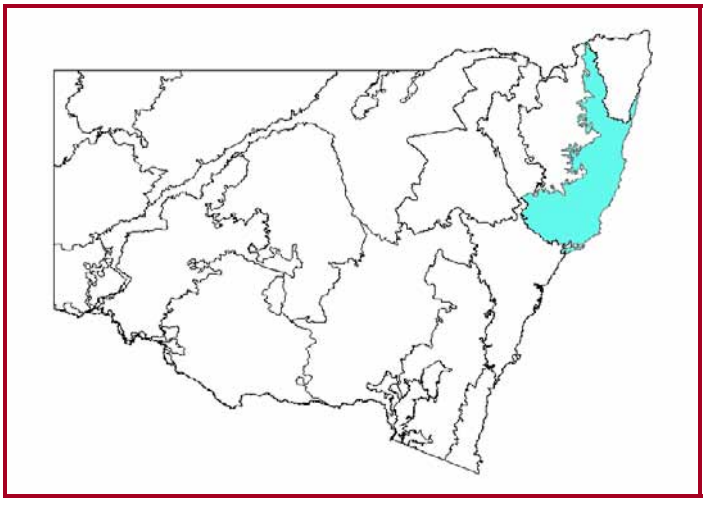

Figure 30. Map of the Bioregions of NSW highlighting the NSW North Coast Bioregion

6.2 Environmental Context

6.2.1 Climate

There are several climates within the NSW North Coast bioregion. There is a sub-tropical climate on the coast with hot summers, a sub-humid climate on the slopes and a temperate climate with warm summers and no dry season in the uplands and the western portion of the bioregion. At higher elevations in the southwest, a montane climate occurs. The minimum average temperature ranges from -2.8 º C to 9.8 º C and the maximum average temperature ranges from 20.3 º C to 30.9 º C.

Rainfall can occur throughout the year, but varies across the bioregion in relation to altitude and distance from the coast. Rainfall increases inland through the low foothills and ranges to the steep slopes and gorges of the Great Escarpment. Minimum average monthly rainfall is 30-99mm and maximum average monthly rainfall is 76-499mm.

6.2.2 Landscape Characteristics

The landscapes of the NSW North Coast bioregion include coastal, estuarine, riverine and hinterland environments. Prominent landscape features of the

bioregion include the gorges of the Great Escarpment, volcanic complexes and plateaus, major river systems and sand dunes.

The coastal landscape of the NSW North Coast bioregion includes beaches, dunes and lagoons. The dunes and lagoons form barrier systems which reach their maximum development at Myall Lakes. Low hills occur in this landscape of up to 25 metres.

The Tweed, Richmond, Clarence, Coffs Harbour, Bellinger, Nambucca, Macleay, Hastings and Manning River catchments all fall within the North Coast Bioregion. Alluvial plains and estuarine fills occur in the in the vicinity of these rivers and their tributary streams.

The major inland landscape features of the NSW North Coast bioregion are low foothills and ridges and valleys which run into the steep slopes and gorges of the Great Escarpment. The structural patterning of these features is controlled by the direction of the fault lines in the area. The foothills of the Great Escarpment have steep slopes with relief up to 750 metres where as the narrow alluvial plains have relief of up to 250 metres.

Volcanic landscapes are an important feature of the NSW North Coast Bioregion. These include dissected volcanic caldera with an outer rim of volcanic flows with well-developed radial drainage pattern around the central plug. These calderas have steep slopes and relief of up to 1100 metres. More common volcanic landscapes features are plateaus with basalt capping.

6.2.3 Geology

The NSW North Coast Bioregion principally consists of Devonian and Permian age bedrock that is a part of the New England Fold Belt. This bedrock has been closely faulted as it was thrust over the northern margin of the Sydney Basin. The Great Escarpment was created by erosion from rivers and streams formed the 80- 100 million years ago.

The principal rock types that comprise the NSW North Coast bioregion geology are slates, shales, phyllite, quartzites, carboniferous mudstones, claystones and sandstones lithic to quartz.

There have been significant amounts of volcanic activity in this bioregion. There have been three centres of Tertiary volcanic eruptions from calderas and shield volcanoes. Rock types include syenite and gabbro as remnants of the caldera explosion, basalts, acid volcanics, minor rhyolite and tuffs. Granite and granodiorites have intruded sedimentary rocks and serpentinite is present in specific locales in the bioregion.

Quaternary coastal sands dominate in the eastern portion of the region, however, the present coastal sands have accumulated during the Pleistocene (i.e. over the past 18,000 years). These sands have developed coastal barrier systems with high fore dunes, low inner barrier ridges, wide lake basins and high parabolic dunes blown onto bedrock hills.

There are a number of economic mineral deposits in the area including coal seams and minerals in beach and dune sand.

6.2.4 Soils

The soils of the NSW North Coast Basin bioregion reflect the geology on which they lie and the local topography. In general, the soils are sandy in areas of sedimentary and quartz rich geology and highly fertile loams occur on basalts. More detailed descriptions are provided below, in reference to specific environments and landscape feature of the bioregion.

Estuarine and riverine environments are dominated by organic sands and while loams also occur in the latter. In the coastal dunes, deep siliceous sands and very well developed podsols can be found, particularly Pleistocene high dunes.

Hills and ranges have several soil types. On sedimentary rocks, the soils are red, brown and yellow with texture contrast with areas of deeper sand occur on Mesozoic period rocks. On granites and most of the quartz rich sedimentary rocks, shallow yellow earths are found on hillcrests with yellow and brown texture contrast profiles found on slopes. Organic loams and sandy loams are found on alluvial plains and cracking clays are located on valley floors.

Basalts and granodiorites have red brown structured loams. Texture and fabric contrasts are recognizable on volcanic slopes with soils that are typically friable

loams or clay loams with high fertility, good structure and excellent water-holding capacity.

6.2.5 Vegetation

The NSW North Coast Bioregion has a diverse range of plant species. The type of vegetation corresponds to the different soil substrates, the topographic variation and the climatic differences encountered across and along the bioregion.

Soils derived from basalts and in sub-tropical and warm temperate climates support rainforests and wet sclerophyll forests. Dominant species in these environments include black booyong (*Argyrodendron actinophyllum*), white booyong (*Argyrodendron trifoliolatum*), hoop pine (*Araucaria cunninghamii*), bangalow palm (*Archontophoenix cunninghamiana*), climbing palm (*Calamus muelleri*), rough tree fern (*Cyathea australis*), Australian cedar (*Toona australis*), teak (*Flindersia australis*), white mahogany (*Eucalyptus acmenoides*), small-fruited grey gum (*Eucalyptus propinqua*), tallow wood (*Eucalyptus microcorys*) and Sydney blue gum (*Eucalyptus saline*). In contrast, cool temperate climates have Antarctic beech (*Nothofagus moorei*), occurring as a monoculture with a fern understorey.

Eucalypt forests grow on soils derived from granites. Dominant species include blackbutt (*Eucalyptus pilularis*), Sydney blue gum (*Eucalyptus saligna*), spotted gum (*Eucalyptus maculata*), grey gum (*Eucalyptus punctata*), forest red gum (*Eucalyptus tereticornis*), red bloodwood (*Corymbia gummifera*), brush box (*Tristania conferta*) and white mahogany.

In areas of dry, open flats, the vegetation community consists of White gum, blackbutt (*Eucalyptus pilularis*), forest red gum (*Eucalyptus tereticornis*) and grey box. In the hills of valleys and ranges, dry sclerophyll forests and woodlands of spotted gum, grey gum, blackbutt, red bloodwood and white mahogany occur.

In the coastal dunes, the vegetation sequence includes coast tea tree (*Leptospermum laevigatum*) and coastal wattle (*Acacia longifolia*) near the beach, with some areas of beach she-oak (*Casuarina equisetifolia*), snappy gum (*Eucalyptus racemosa*), blackbutt (*Eucalyptus pilularis*), dwarf red bloodwood and bastard mahogany (*Eucalyptus umbra*). Rare patches of rainforest species can also be found where sufficient nutrients have accumulated.

Estuaries are dominated by mangrove communities composed of *Avicennia marina*, *Aegiceras coniculatum*, *Exoecaria agallocha* and saltmarsh species. Freshwater margins are occupied by swamp oak (*Casuarina glauca*) and paperbark (*Melaleuca quinquenervia*) while the main tree to grow on alluvial river flats is the flooded gum (*Eucalyptus grandis*).

6.3 Regional Environmental Context

6.3.1 Preamble

The archaeology of the NSW North Coast bioregion has been well documented through a large number of academic studies, regional management studies and impact assessment investigations over the past 30 years. Thousands of Aboriginal sites have been recorded, reflecting both the wealth of archaeology in the region and the number of archaeological investigations undertaken. These factors have contributed to building up a significant database on the archaeology of NSW North Coast bioregion.

6.3.2 Early Occupation

Aboriginal occupation of the NSW North Coast bioregion dates back well into the Pleistocene period. This evidence comes from Carbon 14 dates retrieved from excavated sites. Evidence of earlier Pleistocene occupation has been found at Glennies Creek, north of Singleton. Radiocarbon-dated charcoal and geomorphological evidence suggests that artefacts found in intact B-horizon soils were deposited between 10,000 and 13,000 years BP[175]. Earlier occupation dates have been obtained from the Moffats Swamp Dune[176] in association with the Pleistocene lakes dating back to 17,376 years B.P through to approximately 7,000 years B.P.

[175] *Koettig 1986a and 1986b*

[176] *Baker 1994*

6.3.3 Intensification during the Holocene Period

The vast majority of dated sites in the NSW North Coast bioregion are less than 5,000 years old[177]. It has been argued that this is a result of increased populations and 'intensification' of cultural activity during this period. The prevalence of sites dating to the last 5000 years may also be a result of the last significant rise in the sea level approximately 6000 years ago. The sea level rise would have submerged many of the older sites along the coastal fringe and forced Aboriginal groups westward to the current coastline.

In an attempt to better understand changes in use and occupation during the Holocene period, Val Attenbrow undertook a detailed study of a catchment in the Mangrove Creek[178]. Sites were classified as either *base camps* or *activity locations/transit camps* based on comparative millennial artefact accumulation rates. Attenbrow's study found significant changes in site patterning during the Holocene. At a broad level, these site patterns are:

- More base camps were established at the same time as ground-edged implements were introduced into stone tool assemblages in the 4th millennium B.P;
- Base camps substantially increased with a reversal in the ratio of base camps to activity/transit camps during the 3rd millennium BP;
- The number of occupation sites increased over time, particularly after 2000 BP; and
- Shifts in site patterning indicate periodic re-organisation of residential mobility.

Models of possible patterns of pre contact settlement and movement in the region vary considerably. McBryde[179] suggests that clan groups moved between the coast and the foothills of the coastal ranges on a seasonal basis. A second model suggests that movement of coastal people was not frequent, and that semi sedentary groups

[177] *35 out of a total of 48 dated sites*

[178] *Attenbrow 2003a*

[179] *1974*

moved north and south within the coastal plain rather than to the upper rivers[180]. Godwin[181] argues neither model is well supported by the archaeological evidence. Instead, it was the local conditions which dictated exploitation strategies on the north coast of NSW.

6.3.4 Site Types

There are a number of Aboriginal site types that have been found within the NSW North Coast bioregion. The most common types[182] are:

- Artefacts (stone, bone, shell, glass);
- Ceremony and Dreaming Sites
- Ceremonial Rings (stone or earth)
- Earth mounds;
- Middens
- Modified tree (scarred or carved);
- Potential Archaeological Deposits (PADs);
- Rock Art;
- Shell; and
- Stone Arrangements.

Less frequent site types that occur within the bioregion are listed on the *DECC Aboriginal Site Register (ASR)*.

6.3.5 Stone Artefacts

Stone artefacts are the most commonly found artefacts throughout the bioregion. They are an important source of archaeological information because stone is

[180] *Coleman 1982*

[181] *1990, 1999*

[182] *Comprehensive Coastal Assessment Toolkit 2007: 5*

preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as Carbon dating cannot be applied.

A technological sequence for stone artefacts for the region was first described in the late 1940s by Fred McCarthy and has since been refined over time[183]. Known as the 'Eastern Regional Sequence' it was based on direct dating of excavated sequences. Some debate about the precise nature and significance of the technological changes described still continues[184], therefore the ERS should be regarded only as a general guide to technological change. The ERS phases are as follows:

- Capertian – is distinguished by large uniface pebble tools, core tools, horsehoof cores, scrapers and hammerstones. Backed artefacts occasionally present. Generally dates to before 5,000 years before present (BP).
- Early Bondaian – Aspects of the Capertian assemblage continue, but backed artefacts and ground-edged artefacts increase. Artefacts during this period were predominantly made from fine-grained silicious stone such as silcrete and tuff. Generally dated from 5,000 BP to 2,800 BP.
- Middle Bondaian – Characterised by backed artefacts, particularly Bondi Points and ground-edged artefacts. Artefacts made from silicious materials, however quartz becomes more frequent. Generally dated from 2,800 BP to 1,600 BP.
- Late Bondaian – characterised by bipolar technology, eloueras, ground-edged artefacts, and bone and shell artefacts. Bondi points are virtually absent and artefacts are predominantly made from Quartz. Generally dated from 1,600 BP to contact.

[183] *The ERS is currently being re-examined by Hiscock & Attenbrow.*

[184] *Hiscock & Attenbrow 2002*

A number of observations have been made in regarding the NSW North Coast bioregion lithic assemblages. These observations relate to the type, use and source of stone tools and are summarised as follows:

- Stone artefacts are generally made from indurated mudstone and silcrete, with Nobby's Tuff common in the coastal zone[185];
- Other raw materials used to make stone tools are include quartz, basalt and quartzite[186];
- The microliths or "small tool tradition" may have been used in composite tools, hafted in series on timber to produce a cutting/processing implement (ie. a knife); and
- The 'Worimi Cleaver' has been recovered from two sites with dates of 2,500 to 11,000 BP[187], demonstrating continued use of a very specialised implement over a period of at least 8000 years. Residue analysis indicates they were most likely a specialised tool used for processing Bungwall Fern (*Blechnum indicum*) which is a dominant species in many of the dune wetlands.

6.3.6 Site Patterns

Environmental context and landscape characteristics are important determinants of the size, nature and spatial location of Aboriginal sites. Below is an outline of the site patterns for the NSW North Coast bioregion, including dominant site patterns and those in relation to coastal, estuarine, riverine, hinterland and volcanic landscapes.

Drawing on various analyses[188]general statements regarding the dominant site patterns in the bioregion are:

- Sites can be found across the NSW North Coast Bioregion;

[185] *Baker; 1992, pp. 7-9*

[186] *Baker; 1992, pp. 7-9*

[187] *Baker 1993*

[188] *Hughes 1984, Attenbrow 2002, McDonald 1997: 56*

- There are areas of archaeological potential wherever there has been limited prior surface disturbance;
- Archaeological material is often found in areas of sub-surface exposure, such as those caused by erosion;
- Surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material. Extensive excavations have shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces. This is a critical consideration in aggrading soil landscapes;
- Aboriginal cultural material to survive on sites that contain remnant portions of the original soil profile. The potential for survival of any archaeological sites will largely depend on the degree of past disturbance;
- Aboriginal camp[189] sites were preferentially located at resource intersection zones in order to capitalise on a broader range of resources. Therefore, where more than one environment and site type occur in any location, the potential for Aboriginal camp sites is increased;
- Most archaeological evidence dates to the mid to late Holocene; and
- Technological analysis of stone artefacts may assist in relatively dating sites that cannot be dated by direct means.

6.3.7 Proximity of Sites to Water

Various studies have identified the relationship between certain site types and their proximity to water courses[190]. This relationship is one of the most commonly reported site patterns due to the nine river catchments located in the bioregion. The following observations have been made:

- Open artefact scatters are located within 100 metres of permanent fresh water[191];

[189] *Aiken 1985; Hynes & Chase 1982*

[190] *Kohen 1986, Barber 1993, McDonald 1997, Attenbrow 2003a*

[191] *Kohen 1986, Barber 1993*

- Low frequencies of sites were found over 100 metres away from permanent fresh water[192], hill slopes and crests;
- Open artefact scatters are more complex and more densely clustered along permanent creek and river lines;
- Sites will generally reduce in size as associated watercourses decrease in catchment size; and
- Grinding grooves are located near sources of water on areas of exposed flat bedded sandstone.

Furthermore, the factors of the permanence of fresh water sources and the proximities to stone sources play a part in the density and complexity of archaeological sites[193]. They will vary according to permanence of water (stream order), landscape unit and proximity to stone sources as follows[194]:

- In first order creeks (the headwaters of upper tributaries) archaeological evidence will be sparse and represent little more than background scatter;
- In second order creeks (the middle reaches of minor tributaries), archaeological evidence will comprise sparse but focused activity (one-off camps, single event knapping etc);
- In third order creeks (the lower reaches of tributary creeks), there will be evidence of more frequent occupation including repeated occupation by small groups, knapping floors and evidence of more concentrated activities;
- On fifth order creeks (major creeks) archaeological evidence will reflect more permanent or repeated occupation. Sites will be complex and may be stratified;
- Creek junctions, may have been a particular focus of occupation;

[192] *ibid*

[193] *McDonald 1997: 56-57*

[194] *McDonald 1997: 56-57*

- Ridge top locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be present;
- Sites in close proximity to an identified stone source will include stone artefacts with a range of size and cortex characteristics. The general size of artefacts and percentage of cortex will both decrease with distance from source;
- High quality raw stone materials generally result in abundant flaking debris on the sides of watercourses. These locations with a stream order of two or higher, were important sources of raw material for stone artefact manufacture[195]; and
- The locations of river gravel point bars, and on the sides of streams with an order of two or higher are generally in abundant flaking debris and important sources of raw material for stone artefact manufacture.

These patterns described provide a useful general guide to site patterning and inferred cultural behaviour, however there are always exceptions such as large waterholes or wetlands on upper tributaries that were important resource zones and attracted repeated and complex Aboriginal occupation. This point is illustrated by recent work conducted by McDonald[196] who found that although lithic assemblages decreased in scale and repetition further away from water, the composition of the assemblages remained fairly consistent across the entire landscape. McDonald also concludes that classifying various landscape evidence according to site types such as residential base camps, dinnertime camps, etc, are not a useful framework for interpretation.

6.3.8 Coastal Landscapes

The east coast has been the subject of studies that examine settlement patterns, particularly in regard to the role of seasonality. Based on the results of coastal excavations and site distribution patterns, Gretchen Poiner[197] argued that

[195] *Ibid, Baker; 1992, pp. 7-9*

[196] *McDonald 2005*

[197] *Poiner 1976*

seasonality was a major influence on settlement patterns and subsistence modes on the coast. Poiner claimed that large semi-sedentary summer camps gave way to dispersal of smaller groups into the hinterland during winter when marine resources diminished. Anne Ross challenged Poiner's model, using ethnographic evidence to argue that inland winter migration was unlikely due to tribal boundaries[198]. Instead, Ross argued that smaller groups were spread more thinly along the coast during winter.

Generally, coastal landscapes have:

- A concentration of occupation and use on slightly elevated topography (low crest and upper slope landforms) adjacent to water sources and resources areas[199] within stable Pleistocene and Holocene dunes;
- Swamps located within deflation basins and swales in stable Pleistocene and Holocene dunes fields;
- Burial sites and complexes which occur in sandy or loose soils and shell middens; and
- Early occupation is found in deep stratified rock shelter deposits and within alluvial deposits which are located in stable Pleistocene dune systems and particularly on the margins of large rivers.

6.3.9 Estuarine Landscapes

Estuarine landscapes are located within the bioregion. In a regional archaeological study of the Newcastle Bight[200] of the Hunter river system, Dean-Jones made the following conclusions about the estuarine environments:

- The distribution of known sites indicates that estuarine shorelines have a high potential for preservation of occupation evidence;

[198] *Ross 1976*

[199] *Dean-Jones 1990, 77; Wheeler [ERM] 2004*

[200] *Dean-Jones, 1990; pp. 128*

- Sites located on rock platforms and dune surfaces in estuarine environments have a higher potential for preservation than sites located on estuarine clays and silts;
- Areas of high occupation potential are dune land forms that have been stabilized for up to 12,000 years and have been adjacent to changing estuarine resource environments throughout the Holocene; and
- Sites along the estuarine shorelines are generally small middens or open artefact scatters.

6.3.10 Hinterland Landscapes

The site patterns in hinterland landscapes include some of those located around fresh water and estuarine sources. Generally, other hinterland site types and patterns include:

- Rock shelters found only in areas of exposed sandstone escarpment;
- Scar or modified trees found in areas or remnant vegetation of forest greater than 100 years old;
- Burial sites and complexes can occur anywhere in the landscape and they are found within sandy, black or loose soils; and
- Suitable occupation locations include relatively flat dry land and rock overhangs.
- Site patterning of places with story, mythology and ceremony are poorly represented.

6.4 AHIMS Data

A search of the DECC *Aboriginal Heritage Information Management System* (AHIMS) for a 1.5 kilometre area either side of the pipeline study area was undertaken to identify previously recorded sites in and around the study area. Within the broader pipeline study area there are 195 registered sites.

The NSW North Coast bioregion contains 36 sites of the total number of sites for the broader pipeline study area and 3 site types as defined by DECC.

Table 15: AHIMS site types and quantity in the NSW North Coast bioregion

Site Type	Number of Sites
Artefact	34
Grinding Groove	1
Conflict	1

6.5 Predictive Modelling

Based upon information compiled within the *DECC AHIMS*, archaeological and environmental information reviewed above, we have prepared a predictive model of all likely site types within the bio-region.

The model describes the environmental, geological or topographic context each site type is likely to be found, areas of high sensitivity, the method(s) for identifying the site type and a general management approach for moderate and low impact sites. The model is presented in Table 16.

Table 16: Predictive modelling – NSW North Coast bioregion

Site Type	Environmental Context	Areas of Sensitivity
1. Stone Artefact Scatter and Deposit	All areas containing topsoil	Undisturbed soils within 150 metres of permanent water (swamps, rivers, creeks etc) and/or stone sources.
2. Rockshelter (incl. art, deposit, midden & burials)	Sandstone outcrop	On sandstone benches and overhang within 150 metres of permanent

		water
3. Midden	Near coast, estuary and less commonly, freshwater streams	Within 1 kilometre of coast and estuary
4. Axe Grinding Groove	Sandstone outcrop	Flat bedded sandstone near creek lines or rock pools
5. Seed Grinding Dishes	N/A	N/A
6. Rock Engraving	Sandstone outcrop	Flat bedded sandstone
7. Modified Trees (Scarred or Carved)	Areas containing remnant vegetation	Areas containing mature / old growth trees greater than 100 years in age
8. Quarry and/or Stone Tool Source	Outcropping bedrock or gravel bed	Outcropping isotropic rock (particularly acid volcanics and pyroclastic), gravel beds on large rivers (within 150m on major rivers) and old river terraces. In particular, the rock types: acid volcanic rocks; pyroclastic rocks; tuff; indurated mudstone; quartz; silcrete; basalt and quartzite.

9. Waterhole / Well	Sandstone outcrop	Rock pools in sandstone outcrop
10. Burials	All areas containing soft soils or sediments	Areas with deep soft or sandy soils that are not highly acidic. Alluvial and aeolian soil landscapes are particularly sensitive.
11. Bora / Ceremonial	N/A	N/A
12. Natural / Mythological	N/A	N/A
13. Mission, Cemetery, Historic Site	N/A	N/A
14. Conflict Site	N/A	N/A
15. Other rare site types: Earth mound, Resource site, Stone arrangements.	N/A	N/A

7 NANDEWAR BIOREGION

7.1 Preamble

Archaeological assessment reports include information about the environmental context of study areas due to the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influenced both the type and availability of natural resources and the types of cultural activities that were carried out in the past. As a result, this also influenced the types of archaeological sites that may be found.

Archaeologists examine regional trends in the distribution of known Aboriginal sites in relation to environment and topography in order to determine Aboriginal settlement and site location patterns. This provides evidence about economic and social systems in the past and also assists archaeologists to predict likely site types and locations in a given area.

As described in the methodology, the assessment is divided into bioregions that are land units integrating geology, land form, soil and vegetation, on an ecosystem scale. This chapter outlines the environmental and archaeological contexts of the Nandewar Bioregion. This information is used to construct a predictive model of the site types and their likely environmental, geological and landscape context within the bioregion.

The Nandewar Bioregion lies in northern NSW and across the Queensland border. It covers approximately 2,700,313 hectares, with 2,069,604 hectares or 76.6 per cent of it falling in NSW and occupying 2.59 per cent of the state. The bioregion is bounded by the North Coast, New England Tablelands and Brigalow Belt South bioregions in the south, east and west respectively.

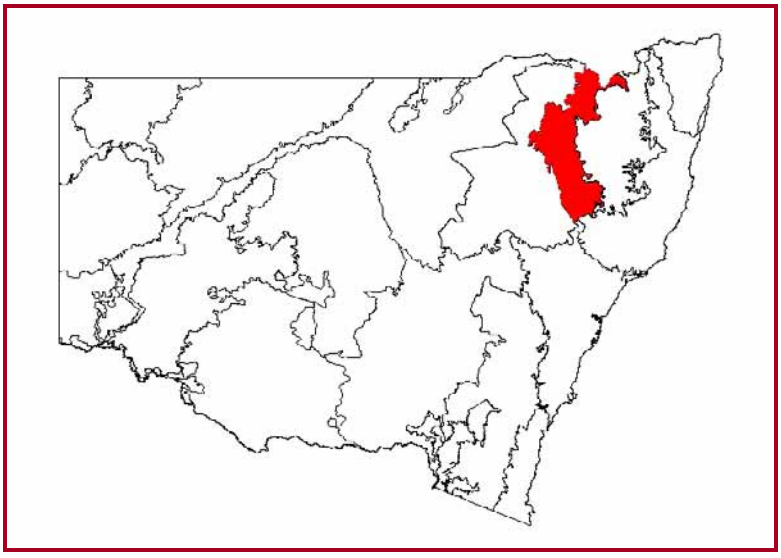

Figure 31. Map of the Bioregions of NSW highlighting the Nandewar Bioregion

7.2 Environmental Context

7.2.1 Climate

The Nandewar Bioregion is considered to be fairly warm and dry, although the climate varies markedly across the bioregion in relation to elevation[201]. The central areas are generally cooler as they tend to have a higher elevation, whereas the warmer areas correspond to the lowlands around the main river catchment areas. The minimum average temperature ranges from -3.5 º C to 3.6º C and the maximum average temperature ranges from 22.9 º C to 34.7 º C.

Rainfall is characterized as frequent and of high intensity. The rainfall pattern is slightly summer dominant[202] and generally decreases from east to west across the bioregion. Areas at higher altitudes, such as Mount Kaputar, receive significantly more rain annually than lower lying areas in the west[203]. Minimum average monthly rainfall is 31-83mm and maximum average monthly rainfall is 76-137mm.

[201] *NSW NPWS 2000*

[202] *Morgan and Terrey 1992*

[203] *NSW NPWS 2000*

7.2.2 Landscape Characteristics

The landscapes of the Nandewar Bioregion include volcanic, karst, riverine and hilly landscapes. The bioregion contains part of the catchments of the MacIntyre, Gwydir and Namoi rivers.

The undulating low hills and ranges of the Nandewar bioregion vary with the local geology. The hills are more rugged on granites than sedimentary rocks, particularly those with abundant granite outcropping. Long hill slopes are stepped across different lava flows and have a marked break of slope where buried sands and gravels are exposed. Hills tend to have a north westerly alignment due to the structure of the local geology. A more montane landscape occurs around Mt Kaputar which reaches an altitude of 1510 metres.

The riverine landscape is characterised by flat river valleys with alluvium. Short, steep gorges occur along the edges of major rivers. The Peel, Macdonald, McIntyre, Namoi, Severn and Gwydir rivers traverse the bioregion.

There are several volcanic landscapes in the Nandewar bioregion. These include the volcanic landforms of Mt Kaputar, sub-basaltic lava flows, the drainage patterns in the Inverell basalts and the granite topography of deep gorges at the Severn River. The Kaputar area has exposed volcanic plugs and dykes.

Karst landscapes are a unique feature of the Nandewar bioregion. These are areas of limestone terrane characterized by sinks, ravines and underground streams. These features are located at Ashford Caves and near Tamworth.

7.2.3 Geology

The Nandewar bioregion is located on the western edge of the New England Tablelands. It contains diverse geology including exposed formations illustrating the development of the continent.

The bioregion contains Silurian and Devonian sedimentary and volcanic rocks which formed in an island arc environment. It is composed of a narrow strip of ultra-basic rocks, including serpentinites that are derived from a deep ocean floor, marking the suture where a former island arc complex was linked to the Australian mainland. These rocks pass through Woodsreef and Tamworth where they are associated with karst limestone landscapes.

Limestone formations occur throughout the bioregion. Karst geology is located in the vicinity of Tamworth, and limestone also occurs in the north of the bioregion. Throughout the landscape, areas of limestone are associated with sub-horizontal Carboniferous shales and sandstones.

Triassic sandstones and shales were deposited by rivers of the Gunnedah basin at a time when New England was being lifted by intrusions of granite are exposed in the bioregion. This bedrock has been strongly folded and faulted in a northwest alignment.

There are extensive remains of Tertiary basaltic lava flows in the bioregion. The lava flows have a maximum preserved thickness of 800m with sub-basaltic sands and gravels are exposed at their edges. These lava flows buried river gravels and lake sediments that are now being exposed and contain deposits of tin, sapphires and diamonds.

7.2.4 Soils

The soils of the Nandewar bioregion reflect the geology on which they lie and the local topography. The bioregion is generally characterised by clay or loam soils with siliceous soils derived from acid volcanic rocks..

On the sedimentary rocks, shallow stony soils occur on ridges and texture contrast soils on almost all slopes. Red brown sub soils occur on upper slopes and yellow sub soils occur on lower slopes. Areas of exposed Tertiary sands and gravels are exposed, coarse sandy soils may develop podsol pans.

Alluvial loams and clays with moderate to high fertility are found in the base of valleys.

Black earths occur on areas of basalt geology, particularly located on lower slopes and valleys. The soil profiles in the eastern basaltic areas consist of frequent rock outcrops interspersed with shallow, stony, brown loams. In the central western area of the bioregion the basalts develop black earth profiles that thicken down slope with soil profiles of brown to black pedal loams and clays. In areas of serpentinite, the soil has a shallow stoney profile.

Granitic geology develops gritty shallow profiles between outcrops and tors[204]. These grade to harsh texture contrast soils with yellow clay subsoils that are prone to gully development on the lower slopes.

The composition of the limestone in karst environments is so unusual that they have distinct soils and vegetation. These consist of dark alkaline pedal clays develop on limestones.

7.2.5 Vegetation

The vegetation of the Nandewar bioregion is influenced primarily by geology and altitude.

The bioregion is has box woodlands that occur on clay or loam soils at typically low to mid elevation and basalt derived soils. These include white box (*Eucalyptus albens*), yellow box (*Eucalyptus melliodora*), Blakely's red gum (*Eucalyptus blakelyi*), narrow-leaved ironbark (*Eucalyptus crebra*), kurrajong and grey box (*Eucalyptus mollucana*). Bimbil box (*Eucalyptus populnea subsp. bimbil*), fuzzy box (*Eucalyptus conica*) and western grey box (*Eucalyptus microcarpa*) particularly occur in the western half of the bioregion.

Ironbark and cypress pine communities are common at mid elevations, particularly on sedimentary hills and ranges. They form woodlands and open forests. The vegetative communities typically consist of silver-leaved ironbark (*Eucalyptus melanophloia*), white cypress pine (*Callitris glaucophylla*) and tumbledown red gum (*Eucalyptus dealbata*). White box (*Eucalyptus albens*) and stringybarks are found in localised areas and form associations with mugga ironbark (*Eucalyptus sideroxylon*).

In granitic areas, Caleys ironbark (*Eucalyptus caleyi*) and black cypress pine (*Callitris endlicheri*) grey box, forest red gum, and bull oak vegetative communities are found.

At mid to high elevations in mountainous terrain, forests of silver-top stringybark (*Eucalyptus laevopinea*), manna gum (*Eucalyptus viminalis*) and mountain gum (*Eucalyptus dalrympleana subsp. heptantha*) occur. The montane woodlands of Mt

[204] *A rocky pinnacle; a peak of a bare or rocky mountain or hill.*

Kaputar additionally include snow gum (*Eucalyptus pauciflora*) and rough-barked mountain gum (*Eucalyptus volcanica*).

River oak (*Casuarina cunninghamiana*) and river red gum (*Eucalyptus camaldulensis*) occur along the major watercourses with Blakely's red gum. (*Eucalyptus blakelyi*) and rough-barked apple (*Angophora floribunda*) forming the common association along minor drainage lines. Northern smooth-barked apple (*Angophora leiocarpa*) and dirty gum (*Eucalyptus chloroclada*) are associated with sandstone parent material on the north-western edge of the bioregion.

Vegetation communities on limestone and serpentinite sites are distinct from adjacent areas. Large grass trees (*Xanthorrhoea sp.*) can be a prominent feature of such sites. Serpentinite areas are botanically important as they support endemic flora and currently undescribed species, including a red stringybark, which together with spinifex hummock-grass dominates several sites.

7.3 Regional Archaeological Context

7.3.1 Preamble

The archaeology of central northern NSW has been documented through archaeological and anthropological studies, oral histories and environmental impact assessments[205]. Hundreds of Aboriginal sites have been recorded in the Nandewar bioregion reflecting a wealth of archaeology in the area. The majority of studies have been due to development impacts[206] located in fertile and resource rich areas creating a biased record of site distribution. The lack of data is in part being rectified by a regional archaeological and cultural heritage study conducted for the Department of Infrastructure, Planning and Resources, modelled on the Brigalow Belt South bioregion study[207].

[205] *RACAC 2000b: 16*

[206] *RACAC 2000b:4*

[207] *RACAC 2000a, 2000b; RACAC 2002*

7.3.2 Occupational History

It is difficult to establish the occupational prehistory of the Nandewar bioregion due to a lack of studies and data on the subject[208]. However in general, the Aboriginal occupation in central northern NSW dates back to the Pleistocene period (ie. prior to 10,000 years ago). Pleistocene dates were retrieved from several sites including Narren Lake[209], the Warrumbungles (20,310BP)[210] and Cuddie Springs was suggested to be dated as far back as 30, 000 BP[211]. Quaternary sites in the Nandewar have been dated to 3,600 BP[212].

7.3.3 Site Types

More than 700 sites recorded in the Nandewar bioregion[213]. There are a number of Aboriginal site types that have been found within the Nandewar bioregion. The most common types are[214]:

- artefact scatters;
- ceremonial sites;
- grinding grooves;
- isolated finds;
- modified trees (scarred and carved);
- potential archaeological deposits (PADs);
- quarries (stone and ochre);
- rock shelters; and

[208] *RACAC 2000b:14*

[209] *Heritage Concepts 2007c: 43*

[210] *Gaynor 1996:185*

[211] *Furnby 1995:82*

[212] *Tamworth City Council 2001*

[213] *DIPNR 2005:25*

[214] *DIPNR 2005:27*

- rock art including engravings.

Less frequent site types that occur within the bioregion are listed on the *DECC Aboriginal Site Register (ASR)*.

7.3.4 Stone Artefacts

Stone artefacts are the most commonly found artefacts throughout the bioregion. They are an important source of archaeological information because stone is preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as Carbon dating cannot be applied.

A technological sequence for stone artefacts for the region was first described in the late 1940s by Fred McCarthy and has since been refined over time[215]. Known as the 'Eastern Regional Sequence' it was based on direct dating of excavated sequences. Some debate about the precise nature and significance of the technological changes described still continues[216], therefore the ERS should be regarded only as a general guide to technological change. The ERS phases are as follows:

- Capertian – is distinguished by large uniface pebble tools, core tools, horsehoof cores, scrapers and hammerstones. Backed artefacts occasionally present. Generally dates to before 5,000 years before present (BP).

- Early Bondaian – Aspects of the Capertian assemblage continue, but backed artefacts and ground-edged artefacts increase. Artefacts during this period were predominantly made from fine-grained silicious stone such as silcrete and tuff. Generally dated from 5,000 BP to 2,800 BP.

- Middle Bondaian – Characterised by backed artefacts, particularly Bondi Points and ground-edged artefacts. Artefacts made from silicious materials, however quartz becomes more frequent. Generally dated from 2,800 BP to 1,600 BP.

[215] *The ERS is currently being re-examined by Hiscock & Attenbrow.*

[216] *Hiscock & Attenbrow 2002*

- Late Bondaian – characterised by bipolar technology, eloueras, ground-edged artefacts, and bone and shell artefacts. Bondi points are virtually absent and artefacts are predominantly made from Quartz. Generally dated from 1,600 BP to contact.

There is a lack of data regarding lithic assemblages in the Nandewar bioregion. However, general observations can be made regarding stone tool assemblages in central northern NSW. These observations relate to the type, use and source of stone tools and are summarised as follows:

- There are a various types of stone used in the lithic assemblages including quartz, acid volcanics and pyroclastic rocks[217];
- Sources include river pebbles and quarries in stone tool outcrops[218]; and
- Stone tools assemblages include tools for small and heavy use activities, seed processing tools and waste material from tool production[219].

7.3.5 Site Patterns

Environmental and topographic contexts are an important determinant of the size and nature of Aboriginal sites and their spatial location. Below is an outline of the site patterns for central northern NSW based on the Brigalow Belt South Bioregion Aboriginal Heritage Study[220]. Included are general dominant site patterns and those in relation to a number of landscapes and associated landforms in the Nandewar bioregion.

Drawing on various analyses[221] general statements regarding the dominant site patterns in the bioregion are:

- Sites would be found in all landforms in various frequencies across the bioregion[222];

[217] *RACAC 2000b:13*

[218] *Tomkin 1997, Hesse 2000:41*

[219] *RACAC 2000b:29*

[220] *RACAC 2000, 2002*

[221] *RACAC 2000A, 2000B; RACAC 2002*

[222] *RACAC 2000a:20*

- Aboriginal sites are found in considerable distances from water[223];
- There are areas of archaeological potential wherever there has been limited prior surface disturbance[224];
- There is a higher density of sites recorded on erosional landforms compared to active depositional landforms[225];
- In some soil landscapes, particularly cracking clays which dominate northern NSW, artefacts are not retained in situ but move vertically and horizontally in the deposit[226];
- Aboriginal cultural material to survive on sites that contain remnant portions of the original soil profile. The potential for survival of any archaeological sites will largely depend on the degree of past disturbance.
- Aboriginal camp[227] sites were preferentially located at resource intersection zones in order to capitalise on a broader range of resources. Therefore, where more than one environment and site type occur in any location, the potential for Aboriginal camp sites is increased; and
- Surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material. Extensive excavations have shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces.[228]

7.3.6 Proximity of Sites to Water

Aboriginal site distribution is commonly accepted as being influenced by the location of water courses[229]. This relationship is one of the most commonly reported site patterns in NSW. The following observations have been made:

[223] *Koetigg 1986:81*

[225] *Heritage Concepts 2007c:68*

[226] *Ibid:29*

[227] *Aitken 1985; Hynes & Chase 1982*

[228] *Hesse 2000:40*

[229] *RACAC 2000a; RACAC 2000b; RACAC 2002; Appleton 1997, Kelton 1999*

- On average, sites occur within 100 m of water[230];
- 50% of sites occur within 200m of water[231] but sites continue to be found up to 750m away[232];
- Open camp sites are located in stable land surfaces on river terraces set back from the immediate river bank[233];
- Archaeological sites are likely to have been moved and/or buried by river alluvium in flood prone areas[234]; and
- Grinding grooves are common throughout central northern NSW where sandstone bedrock is exposed along water courses[235].

In other areas of NSW, the factors of the permanence of fresh water sources and the proximities to stone sources play a part in the density and complexity of archaeological sites[236]. They will vary according to permanence of water (stream order), landscape unit and proximity to stone sources[237]. The following site patterns have been observed for central northern NSW:

- Artefact distribution is widespread in areas of major creek systems[238];
- A proportion of Aboriginal sites occur among lower order drainage lines[239]; and
- Sites recorded among lower order streams are exposed by erosion on creek banks[240].

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230 *RACAC 2002*

231 *AGL 1999:14,Heritage Concepts 2007c:48*

232 *RACAC 2002;*

233 *Heritage Concepts, 2007c:70*

234 *Balme 1986, Roberts 1991, Heritage Concepts 2007c:29*

235 *RACAC 2000b:13*

236 *McDonald 1997: 56-57*

237 *Ibid*

238 *Heritage Concepts 2007c:27*

239 *RACAC 2000a:19*

240 *Heritage Concepts 2007c:46*

An issue in establishing site patterns in relation to stream orders in central northern NSW is they are often inconsistently and inaccurately mapped[241]. Also, published mapping does not account for ancient channels and changes in water courses over time. Analysis of soil landscape and geological mapping is required to establish these earlier water courses[242]. Predictive modelling for sites in relation with various stream orders, as applicable and tested in eastern NSW, are as follows:

- Near first order creeks (the headwaters of upper tributaries) archaeological evidence will be sparse and represent little more than background scatter;
- Near second order creeks (the middle reaches of minor tributaries), archaeological evidence will comprise sparse but focused activity (one-off camps, single event knapping etc);
- Near third order creeks (the lower reaches of tributary creeks), there will be evidence of more frequent occupation including repeated occupation by small groups, knapping floors and evidence of more concentrated activities;
- On fifth order creeks (major creeks) archaeological evidence will reflect more permanent or repeated occupation. Sites will be complex and may be stratified;
- Creek junctions, may have been a particular focus of occupation;
- Ridge top locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be present; and
- Sites in close proximity to an identified stone source will include stone artefacts with a range of size and cortex characteristics. The general size of artefacts and percentage of cortex will both decrease with distance from source;
- High quality raw stone materials generally result in abundant flaking debris on the sides of watercourses. These locations with a stream order of two or

[241] *Ibid: 19*

[242] *Ibid:27*

higher, were important sources of raw material for stone artefact manufacture[243].

These patterns described above provide a useful general guide to site patterning and inferred cultural behaviour, however there are always exceptions such as large waterholes or wetlands on upper tributaries that were important resource zones and attracted repeated and complex Aboriginal occupation. This point is illustrated by recent work conducted by McDonald[244] who found that although lithic assemblages decreased in scale and repetition further away from water, the composition of assemblages remained fairly consistent across the entire landscape. McDonald also concludes that classifying various landscape evidence according to site types (such as residential base camps, dinnertime camps etc) is not a useful framework for interpretation.

Sites are located in proximity to water sources other than water courses such as creeks and rivers. Other watered locality landforms frequently associated with sites in central northern NSW include swamps, wetlands, lagoons, lakes, billabongs, gilgai, and chain of ponds, that are located in forested at high elevations[245]. Their associated soils will vary and can be alluvial, clayey, sandy or loamy.

Site types that have been associated in these watered localities include:

- artefact scatters and open camp sites;
- burials[246];
- middens[247];
- modified trees (scarred and carved)[248];
- seed grinding dishes near gilgai[249]; and

[243] *ibid*

[244] *McDonald 2005*

[245] *RACAC 2000a: 1, RACAC 2000b, Heritage Concepts 2007c:19,49*

[246] *Kelton 1998:14; see burials discussion later in the chapter*

[247] *RACAC 2000B:15, Liverpool Plains Shire Council 2005:83, Heritage Concepts 2007c:61-4*

[248] *Heritage Concepts 2007c*

[249] *RACAC 2000b:33-34*

- stone arrangements in watered areas that are marginal to hilly and broken terrain[250].

7.3.7 Riverine Landscapes

Central northern NSW is dominated by ancient and modern riverine landscapes. It has been discussed above that archaeological sites are commonly located in proximity to water features. The presence or absence of water features today is not in itself sufficient to make predictions about site locations. This section will outline the diverse range of landforms of past and present riverine landscapes in which there is the potential for sites to be found. This will assist in predictive modelling for archaeological sites in the bioregion by undertaking a more targeted landscape approach.

The following details specific site patterns that occur in the following landforms:

- Aboriginal sites occur with high frequencies in alluvium, which dominates riverine landscapes. Alluvial landforms generally located in low lying areas of the bioregion[251] and include modern channels, floodplains, terraces and water localities[252]. These settings are commonly targeted by archaeologists due to their aggrading nature[253];

- Archaeological sites in flood plains are likely to be inundated, covered or removed by alluvium in floodplain environments[254]. Sites are more likely to be found on the adjacent terraces and in small areas of raised ground in floodplains which have higher potential[255] as they are unable to be frequently covered by alluvium or removed by flood waters[256].

[250] *RACAC 2000b:15*

[251] *Heritage Concepts 2007c:43*

[252] *RACAC 2000b:29, RACAC 2000a: 1*

[253] *As buried and preserved within depositional environments . Heritage Concepts 2007c:70*

[254] *Heritage Concepts 2007c:29*

[255] *Heritage Concepts 2007c:45*

[256] *Heritage Concepts 2007c:29*

Ancient riverine landscapes are associated with sand bodies in the landscape. Several types of sandy landforms correspond to ancient riverine environments which have the potential for aboriginal sites. These landforms include sand monkeys, paleochannels and stable sand bodies. Site patterns and the characteristic of landforms to contain sites are as follows:

- Palaeochannels are old abandoned channels that can be identified by their remnant meandering channel patterns, and are dry and filled or open and holding water[257];
- Stable deep sands are areas where water is generally scarce but can become available after intermittent rain periods where water collects in hollows around box vegetative communities[258].
- Sand monkeys are ancient water channels that are convex at the surface. They are also identifiable as they have deep to medium, yellow or red sands depending on drainage, long continuous sand bodies with low sinuosity and characteristic sparse, cypress dominated vegetation. Their channel outline can only be determined by excavating in cross section. They have the potential to contain Pleistocene sites[259]
- Older alluvial terraces are exposed through erosion by modern water courses[260];
- Sandy banks within modern floodplains are associated with ancient palaeochannels and streams[261].

[257] *RACAC 2000 b:43*

[258] *Heritage Concepts 2007c:44*

[259] *Thermoluminecene has dated sand monkeys to 43,000-60,000 BP in the region. Hesse 2000:32*

[260] *Hesse 2000:13*

[261] *Heritage Concepts 2007c: 29*

7.3.8 Hill Landscapes

Areas of undulating hills and slopes, elevated topography and ridges with rocky outcrops are a landscape feature of the Nandewar bioregion. Sites occur in this landscape whether these features are close or distant from water sources, with the later being less thoroughly investigated[262].

There are several site types, patterns and associated land forms for hilly landscapes. These include:

- Sites found on flat high points in topography is likely to be in lag deposits due to erosion [263];
- Sites located on shallow soils of the higher slopes are more likely to be translocated down hill through colluvial and/or fluvial erosion[264];
- Rocky ground has a great variety of site types associated with it, more than any other single land form. The site types include camp sites, ochre quarries and grinding grooves, rock shelters, burials[265] and artefact scatters[266];
- Where there is colluvium, sites types of small artefact scatters and modified trees occur along drainage lines, depressions, and ponds[267];
- A few sites are associated with soil mantled slopes mostly associated with drainage depressions[268]; and
- Rock shelters found in areas of exposed sandstone escarpment.

[262] *RACAC 2000b:8*

[263] *Heritage Concepts 2007c:30, 70*

[264] *Heritage Concepts 2007c:70*

[265] *See Burials discussion later.*

[266] *RACAC 2000b:32b-34*

[267] *ibid*

[268] *ibid*

7.3.9 Wooded Landscapes

Modified trees are one of the most common site types in central northern NSW[269]. Some common patterns of modified trees are as follows:

- They occur both near and away from water sources;
- The distance from water where modified trees occur appears to be related to differences in landscapes[270];
- In the north west floodplains modified trees frequently occur along creeks and billabongs[271];
- Tree types include coolibah tree, Red River Gum, coolabahs, yellow box, pilliga box, bimble box, apple box and cypress pine[272];
- Uses of modified trees in the region were their bark for huts, grave markers[273], as symbolic[274] and for broad shields[275].

7.3.10 Burials in the Landscape

Burials are a sensitive site type that can be found in a number of environments in central northern NSW. Some general site patterns are:

- Burial sites and complexes can occur anywhere in the landscape;
- Areas strategic to water are particularly sensitive, such as terraced bank locations, sandy ridges[276].

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269 *Ibid:13*

270 *Balme 1986*

271 *Balme 1986*

272 *RACAC 2000b:14, Roberts 1991:16, AGL 1999: App7, Gresser, 1964*

273 *Rundle 1993:104*

274 *RACAC 2000b:15*

275 *bulgen and white beech trees*

276 *Witter Fullager and Pardoe 1993*

When interned, they are found within[277]

- sandy soils;
- loose soils;
- black earths or dark lenses in the soil[278];
- deposits of softer lighter soil of river banks;
- sand dunes adjacent to river banks;
- edges of billabongs; and
- sand dune surfaces.

In some parts of northern NSW there are no soft soils, only hard clays in which to dispose of the dead. Other methods that have been noted are of internment are:

- Middens
- Potential for burials in rock shelter areas.
- Rock shelters, particularly with art
- Trees with large hollows[279].

7.4 AHIMS Data

A search of the DECC *Aboriginal Heritage Information Management System* (AHIMS) for a 1.5 kilometre area either side of the pipeline study area was undertaken to identify previously recorded sites in and around the study area. Within the broader pipeline study area there are 195 registered sites.

The Nandewar bioregion contains no DECC registered sites from the broader pipeline study area search.

[277] *Kelton 1998:14*

[278] *McBryde 1972*

[279] *RACAC 2000b:32b-34*

7.5 Predictive Modelling

Based upon information compiled within the *DECC AHIMS*, archaeological and environmental information reviewed above, we have prepared a predictive model of all likely site types within the bio-region.

The model describes the environmental, geological or topographic context each site type is likely to be found, areas of high sensitivity, the method(s) for identifying the site type and a general management approach for moderate and low impact sites. The model is presented in Table 17.

Table 17: Predictive modelling – Nandewar bioregion

Site Type	Environmental Context	Areas of Sensitivity
1. Stone Artefact Scatter and Deposit	All areas containing topsoil	Undisturbed soils within 150 metres of permanent water (rivers, creeks, swamps etc) and/or stone sources. Within palaeochannel soils e.g. sand monkeys, stable sand bodies.
2. Rockshelter (incl. art, deposit, midden & burials)	Sandstone outcrop	On sandstone benches and rock overhang within 150 metres of permanent water
3. Midden	Water bodies including lagoons, lakes, and wetlands.	Within close proximity (150 metres) of large water bodies such as lagoons and swamps.

4.Axe Grinding Groove	Sandstone outcrops	Flat bedded sandstone near creek lines or rock pools
5. Seed Grinding Dishes	Gilgai	Cracking clays with shrink swell properties of Gilgai.
6. Rock Engraving	Sandstone outcrop	Flat bedded sandstone
7. Modified Trees (Scarred or Carved)	Areas containing remnant vegetation	Areas containing mature / old growth trees greater than 100 years in age. In particular, the tree types: Red River Gum, coolabahs, yellow box, pilliga box, bimble box, apple box and cypress pine.
8. Quarry and/or Stone Tool Source	Outcropping bedrock or gravel bed	Outcropping isotropic rock (particularly acid volcanics and pyroclastic), gravel beds on large rivers (within 150m on major rivers) and old river terraces. In particular, the rock types: quartz; acid

		volcanics and pyroclastic rocks
9. Waterhole / Well	Sandstone outcrop	Rock pools in rock outcrop
10. Burials	All areas containing soft soils or sediments, including alluvium, sand and black soils, particularly adjacent to water localities. Middens Rock shelters, particularly with art Trees with hollows	Areas with deep soft or sandy soils that are not highly acidic. Alluvial, aeolian, sand, black earth soils in the landscape are particularly sensitive. Rockshelters. Large trees greater than 100 years old.
11. Bora / Ceremonial	N/A	N/A
12. Natural / Mythological	N/A	N/A
13. Mission, Cemetery, Historic Site	N/A	N/A
14. Conflict Site	N/A	N/A
15. Other rare site	N/A	N/A

types: Earth mound, Resource site, Stone arrangements.		

8 BRIGALOW BELT SOUTH BIOREGION

8.1 Preamble

Archaeological assessment reports include information about the environmental context of study areas due to the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influenced both the type and availability of natural resources and the types of cultural activities that were carried out in the past. As a result, this also influenced the types of archaeological sites that may be found.

Archaeologists examine regional trends in the distribution of known Aboriginal sites in relation to environment and topography in order to determine Aboriginal settlement and site location patterns. This provides evidence about economic and social systems in the past and also assists archaeologists to predict likely site types and locations in a given area.

As described in the methodology, the assessment is divided into bioregions that are land units integrating geology, land form, soil and vegetation, on an ecosystem scale. This chapter outlines the environmental and archaeological contexts of the Brigalow Belt Basin Bioregion. This information is used to construct a predictive model of the site types and their likely environmental, geological and landscape context within the bioregion.

The Brigalow Belt Bioregion lies in northern NSW and southern Queensland, extending from south of Dubbo in central-western NSW to the mid-Queensland coast, the southern portion is defined as being located in New South Wales. The bioregion has a total area of 27,196,933 hectares, of which 5,333,469 hectares (19.6%) falls within NSW[280] occupying 6.7 per cent of the state. It is bounded by the Nandewar, North Coast, Sydney Basin, South Western Slopes and the Darling Riverine Plains Bioregions.

[280] *Environment Australia 2000*

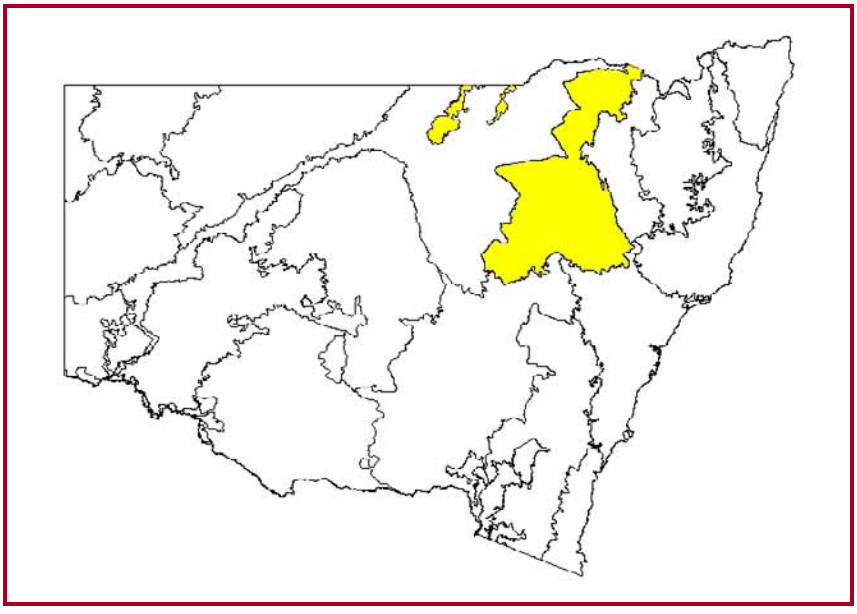

Figure 32. Map of the Bioregions of NSW highlighting the Brigalow Belt South Bioregion

8.2 Environmental Context

8.2.1 Climate

The Brigalow Belt South bioregion is predominately located within a sub-humid climate however the climate changes from the southeast to northwest across the bioregion. The south-eastern corner of the bioregion has a sub-humid climate with no dry season and a hot summer with occasional patches of temperate zones with a warm summer. A dry subtropical climate dominates the northwest of the bioregion and a hot and semi arid climate dominates the far west.

The minimum average temperature ranges from -2.1 º C to 4.0º C and the maximum average temperature ranges from 22.9 º C to 34.7 º C. Rainfall varies across the bioregion depending on the aridity of the climate. The minimum average monthly rainfall is 23–75 mm and maximum average monthly rainfall is 58-120 mm.

8.2.2 Landscape Characteristics

The landscape characteristics of the Brigalow Belt South bioregion changes from the southeast to the northwest. The bioregion has riverine, volcanic and arid landscapes. There are several springs and bogs such as Cuddie Springs where

Pleistocene animal fauna and a pollen record have been recovered in association with early human stone tools 30, 000 BP[281]. There are significant ephemeral wetlands which have a record of climate change in the Quaternary period.

Riverine landscapes are dominant as there are seven major rivers which flow through the Brigalow Belt South Bioregion. These are the MacIntyre, Gwydir, Namoi, Castlereagh, Goulburn, Talbragar and Macquarie Rivers and their catchments form an integral part of the Murray-Darling River System. The Liverpool Range in the southeast of the bioregion feeds the headwaters of the Hunter and Namoi Rivers. Alluvial channels and floodplains occur across this landscape.

Undulating hills and plateau tops are common landscape characteristics that vary in gradient from steep margins to shallow slopes. Stepped sandstone ridges with low cliff faces and high proportions of rock outcropping are a feature. Hills can be low, rocky or rounded with a bedrock of sandstone or basalt. Hilly landscapes in the bioregion are characterized by colluvial and soil mantled slopes[282] which often adjoin alluvial land forms in Riverine landscapes.

Valleys and cliff landscapes are characterised by incised contemporary or abandoned stream channels. These stream channels have alluvial fans that are sandy with patches of heavy grey clay.

The volcanic mountain landscape of the Warrumbungles in the Pilliga region has volcanic domes, plugs and dykes. The Liverpool Range in the southeast of the bioregion has a major lava field supporting important grassland ecosystems. Other basalt flow remnants are located in the vicinity of Invernell and Croppa Creek.

8.2.3 Geology

The Brigalow Belt South bioregion consists of bedrock comprised of horizontally bedded Jurassic and Triassic quartz sandstone and shale with limited areas of conglomerate or basalts. Some of the Jurassic sediments contain interbedded volcanics that are locally important in affecting soils and vegetation. Streams follow the direction of major fault lines in the narrow sandstone gorges, depositing colluvial fans of coarse sands and gravels in the wider valleys.

[281] *Furnby 1995:82*

[282] *Heritage Concepts 2007c:46; RACAC 2000b:30*

The geology of the bioregion is dominated by Quaternary sediments in the form of alluvial fans and outwash slopes deriving from Jurassic quartz sandstones and Tertiary basalts. These are composed of coarse sediment and fan out at a slightly steep gradient. Quaternary age streams occur with long, sand-filled channels, clay plains and gilgai[283]. The alluvial plains and associated sedimentary rocks are part of the Surat Basin which is an important water intake bed for the Great Artesian Basin[284].

The Liverpool Range in the south eastern corner of the bioregion is the largest lava field province in NSW, representing the old core and flow of a shield volcano. It is dated as flowing between 32 and 40 million years ago covering an area of over 6,000 km². The area consists of multiple Tertiary basalt flows of up to 400m thickness with intervening sediments and ash fall material.

All the volcanic flows covered a pre-existing topography that is now being exposed as a result of erosion. Erosion has revealed buried river gravels and lake sediments that contain well-preserved plant and fish fossils and a record of climate change on a geologic time.

The bioregion covers a part of the Gunnedah Basin; a major coal-bearing sedimentary basin that supports mineral industry in the bioregion. Other industry includes coal, petroleum, gold, base metals, zeolites and clay minerals[285].

8.2.4 Soils

The soils of the Brigalow Belt South bioregion reflect the geology on which they lie and the local topography. As such, the soils vary greatly, and it is necessary to differentiate between hill tops, plateaus, slopes and valley floors.

The sandstone ridge tops carry thin, discontinuous soils with stony and sandy profiles. Texture contrast soils are located on slopes, are typically found with harsh clay sub-soils, and accumulate calcium carbonate in drainage lines.

[283] *Shallow depressions between ridges in which rainwater collects*

[284] *a Jurassic-Cretaceous basin covering a large part of eastern Australia*

[285] *Hartley et al 2000*

In the valley floors sediments tend to be sorted into deep sands with yellow earthy profiles, harsh grey clays and more texture contrast soils with a greater concentration of soluble salts.

In basalt country, the hill tops have stony, red or brown, well-structured clays. Stony red brown loams are located on ridges, while shallow stony clay soils are on steep slopes grading to deep black earths on lower slopes. Clay materials accumulate on valley floors. In some areas soils alternate between linear patterns of deep yellow sand, stony red brown earths.

Uniform sandy alluvium occurs in stream lines with heavy grey clays are located on alluvial flats.

8.2.5 Vegetation

The Brigalow Belt South bioregion has variable vegetation which depends on soil quality, geology, topography and climate of a given area. Although the bioregion forms the southern extremity of the Queensland Brigalow Belt, it is not dominated by brigalow (*Acacia harpophylla*) which only occurs in areas of brown clay.

The sandstone areas of the bioregion support various forests and woodlands. Woodlands found on stony sandstone plateau and streams are dominated by blue-leaved ironbark (*Eucalyptus fibrosa*), scribbly gum (*Eucalyptus rossii)*, black cypress pine (*Callitris endlicheri*), whitewood (*Atalaya hemiglauca*) and rough-barked apple (*Angophora floribunda*). Vegetation occurring on gentler sandstone slopes include narrow-leaved red ironbark (*Eucalyptus creba*), white cypress pine (*Callitris glaucophylla*), red stringybark (*Eucalyptus macrorhynca*), patches of mallee (*Eucalyptus sp*) and broom heath (*Melaleuca uncinata*).

On the stoney hills in the north of the bioregion, silver-leaved ironbark (*Eucalyptus melanophloia*), spotted gum (*Eucalyptus maculata*) and smooth-barked apple (*Angophora costata*) communities occur.

On heavy alluvial soils in the west and northern portions of the bioregion the vegetative community includes pilliga box (*Eucalyptus pilligaensis*), grey box (*Eucalyptus moluccanna*), poplar box (*Eucalyptus populnea*), fuzzy box (*Eucalyptus conica*), bull oak (*Casuarina luemhannii*), rosewood (*Heterodendrum oleifolium*), whitewood, wilga (*Geijera parviflora*), belah (*Casuarina cristata*), yarran (*Acacia*

homalophylla) and budda (*Eremophila mitchellii*). Other species occurring on along streams and run off sites are Blakely's red gum (*Eucalyptus blakelyi)*, white cypress pine, red ironbark (*Eucalyptus sideroxylon*), silver-leaved ironbark, white box (*Eucalyptus albens*), river red gum (*Eucalyptus camaldulensis*) and river oak (*Casuarina cunninghamiana*).

Diverse grassland ecosystems dominate the southern end of the bioregion. Common species include plains grass (*Stipa sp.*), panic grass (*Panicum sp*.), windmill grass (*Chloris sp.*) and blue grass (*Dicanthium sp*.) on black earths, with the occasional white box, yellow box, poplar box and wilga.

On high colder ridge crests, silvertop stringybark (*Eucalyptus laevopinea*), manna gum (*Eucalyptus viminalis*) and mountain gum (*Eucalyptus dalrympleana*) are found with snow gum (*Eucalyptus pauciflora*) in cold air drainage hollows.

Tallow wood (Eucalyptus microcorys), blackbutt (Eucalyptus pilularis) and blue gum (Eucalyptus saligna) occur on eastern slopes with small areas of vine forest. On northern slopes, white box (*Eucalyptus albens*) and rough-barked apple (*Angophora floribunda*) occur with belah (*Casuarina cristata*) in the creeks.

8.3 Regional Archaeological Context

The archaeology of central northern NSW has been documented through archaeological and anthropological studies, oral histories and environmental impact assessments[286]. Hundreds of Aboriginal sites have been recorded in the Brigalow Belt South bioregion reflecting the wealth of archaeology in the area. The majority of studies have been due to development impacts[287] located in fertile and resource rich areas creating a biased record of site distribution. This has been somewhat rectified by a regional archaeological and cultural heritage study conducted by NPWS in 2000[288].

[286] *RACAC 2002:16*

[287] *RACAC 2000b:4.*

[288] *RACAC 2000b, RACAC 2002*

8.3.1 Early Occupation

Aboriginal occupation in the Brigalow Belt South bioregion dates back to the Pleistocene period (ie. prior to 10,000 years ago). Pleistocene dates were retrieved from several sites including Narren Lake[289], the Warrumbungles (20,310BP)[290] and Cuddie Springs was suggested to be dated as far back as 30, 000 BP[291]. It is difficult to establish details of the Pleistocene occupation in central northern NSW due to the lack of studies data[292]. Quaternary sites in the Brigalow Belt South Bioregion have been dated to 4,000 BP[293].

8.3.2 Site Types

By 2002, a total of 1,940 sites had been recorded in *DECC* AHIMS database in the Brigalow Belt South Bioregion[294]. A number of Aboriginal site types[295] occur, including the following:

- Aboriginal Ceremony and Dreaming;
- Artefact;
- Art (Pigment or Engraved);
- Bora rings;
- Burials and burial complexes (with or without carved tree/bora ground);
- Ceremonial Ring (stone or earth);
- Conflict;
- Earthen mounds;

[289] *Heritage Concepts 2007c: 43*

[290] *Gaynor 1996:185*

[291] *Furnby 1995:82*

[292] *RACAC 2000b:14*

[293] *Balme 1986*

[294] *RACAC 2002*

[295] *Liverpool Plains Shire Council 2005; Heritage Concepts 2007c; Balme 1986;*

- Grinding grooves and dishes[296];
- Middens;
- Modified Tree (Carved or Scarred);
- Potential Archaeological Deposits (PAD);
- Stone and ochre quarries; and
- Stone arrangement.

Less frequent site types that occur within the bioregion are listed on the *DECC Aboriginal Site Register (ASR)*.

8.3.3 Stone Artefacts

Stone artefacts are the most commonly found artefacts throughout the bioregion. They are an important source of archaeological information because stone is preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as Carbon dating cannot be applied.

A technological sequence for stone artefacts for the region was first described in the late 1940s by Fred McCarthy and has since been refined over time[297]. Known as the 'Eastern Regional Sequence' it was based on direct dating of excavated sequences. Some debate about the precise nature and significance of the technological changes described still continues[298], therefore the ERS should be regarded only as a general guide to technological change. The ERS phases are as follows:

- Capertian – is distinguished by large uniface pebble tools, core tools, horsehoof cores, scrapers and hammerstones. Backed artefacts occasionally present. Generally dates to before 5,000 years before present (BP).

[296] *Gaynor 1993; Heritage Concepts 2007b:45*

[297] *The ERS is currently being re-examined by Hiscock & Attenbrow.*

[298] *Hiscock & Attenbrow 2002*

- Early Bondaian – Aspects of the Capertian assemblage continue, but backed artefacts and ground-edged artefacts increase. Artefacts during this period were predominantly made from fine-grained silicious stone such as silcrete and tuff. Generally dated from 5,000 BP to 2,800 BP.

- Middle Bondaian – Characterised by backed artefacts, particularly Bondi Points and ground-edged artefacts. Artefacts made from silicious materials, however quartz becomes more frequent. Generally dated from 2,800 BP to 1,600 BP.

- Late Bondaian – characterised by bipolar technology, eloueras, ground-edged artefacts, and bone and shell artefacts. Bondi points are virtually absent and artefacts are predominantly made from Quartz. Generally dated from 1,600 BP to contact.

A number of observations have been made in regards to the Brigalow Belt South bioregion lithic assemblages. These observations relate to the type, use and source of stone tools and are summarised as follows:

- There are a various types of stone used in the lithic assemblages including quartz, hornsfel, quartzite, cherts[299] , some volcanics and petrified wood[300];

- The majority of artefacts in the south-east of the bioregion are manufactured from quartz[301];

- River pebbles were the main stone source from which Aboriginal tools were manufactured in the bioregion. River pebbles can be sourced from eroding river terraces and eroding conglomerates with sandstone[302];

- Outcropping of stone suitable for knapping can be found on exposed hilltops, notably where the contact of sandstone and basalts occur[303];

[299] *RACAC 2000b:13*

[300] *Ibid:38*

[301] *Heritage Concepts 2007c*

[302] *Tomkin 1997, Hesse 2000:41*

[303] *RACAC 2000b:13*

- Quarries are an alternate method of procuring stone for tool manufacture and a low number have been found in the region[304];
- Stone sources thought to have been quarried in the bioregion include outcrops of suitable volcanic rock, silcretes, quartzites and mudstone[305];
- Stone axe production is localized at a number of quarries in the region; and
- Stone tools assemblages include tools for small and heavy use activities, seed processing tools and waste material from tool production[306].

8.3.4 Site Patterns

Environmental and topographic contexts are an important determinant of the size and nature of Aboriginal sites and their spatial location. Below is an outline of the site patterns for the Brigalow Belt South bioregion, including dominant site patterns and those in relation to a number of landscapes and associated landforms.

Drawing on various analyses[307] general statements regarding the dominant site patterns in the bioregion are:

- Sites would be found in all landforms in various frequencies across the bioregion[308];
- Aboriginal sites are found in considerable distances from water[309];
- Aboriginal cultural material to survive on sites that contain remnant portions of the original soil profile. The potential for survival of any archaeological sites will largely depend on the degree of past disturbance;

[304] *Heritage Concepts 2007c:43*

[305] *RACAC 2000b:13*

[306] *RACAC 2000b:29*

[307] *RACAC 200A, 2000B, RACAC 2002*

[308] *RACAC 2000a:20*

[309] *Koetigg 1986:81*

- Aboriginal camp[310] sites were preferentially located at resource intersection zones in order to capitalise on a broader range of resources. Therefore, where more than one environment and site type occur in any location, the potential for Aboriginal camp sites is increased;

- There is a higher density of sites recorded on erosional landforms compared to active depositional landforms[311];

- In some soil landscapes, particularly cracking clays which dominate northern NSW, artefacts are not retained in situ but move vertically and horizontally in the deposit[312];

- Surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material. Extensive excavations have shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces. This is particularly true for the Brigalow Belt South bioregion where bioturbation of soils in the bioregion ensure that artefact scatters more than a few centuries old will be completely buried by topsoil[313]

8.3.5 Proximity of Sites to Water

Aboriginal site distribution is commonly accepted as being influenced by the location of water courses[314]. This relationship is one of the most commonly reported site patterns in NSW. The following observations have been made:

- On average, sites occur within 100 m of water[315];

- 50% of sites occur within 200m of water[316] but sites continue to be found up to 750m away[317];

[310] *Aitken 1985; Hynes & Chase 1982*

[311] *Heritage Concepts 2007:68*

[312] *Ibid:29*

[313] *Hesse 2000:40*

[314] *RACAC 2000a; RACAC 2000b; RACAC 2002; Appleton 1997, Kelton 1999*

[315] *RACAC 2002*

[316] *AGL 1999:14,Heritage Concepts 2007:48*

- Open camp sites are located in stable land surfaces on river terraces set back from the immediate river bank[318];
- Archaeological sites are likely to have been moved and/or buried by river alluvium in flood prone areas[319]; and
- Grinding grooves are common throughout central northern NSW where sandstone bedrock is exposed along water courses[320].

In other areas of NSW, the factors of the permanence of fresh water sources and the proximities to stone sources play a part in the density and complexity of archaeological sites[321]. They will vary according to permanence of water (stream order), landscape unit and proximity to stone sources[322]. The following site patterns have been observed for central northern NSW:

- Artefact distribution is widespread in areas of major creek systems[323];
- A proportion of Aboriginal sites occur among lower order drainage lines[324]; and
- Sites recorded among lower order streams are exposed by erosion on creek banks[325].

An issue in establishing site patterns in relation to stream orders in central northern NSW is they are often inconsistently and inaccurately mapped[326]. Also, ancient channels and do not account for the changes in water courses over time, which can be accounted for by other means[327]. Predictive modelling for sites in

[317] *RACAC 2002;*

[318] *Heritage Concepts, 2007c:70*

[319] *Balme 1986, Roberts 1991, Heritage Concepts 2007c:29*

[320] *RACAC 2000b:13*

[321] *McDonald 1997: 56-57*

[322] *Ibid*

[323] *Heritage Concepts 2007c:27*

[324] *RACAC 2000a:19*

[325] *Heritage Concepts 2007c:46*

[326] *Ibid: 19*

[327] *Ibid:27*

correlation with various stream orders, as applicable and tested in eastern NSW, are as follows:

- Near first order creeks (the headwaters of upper tributaries) archaeological evidence will be sparse and represent little more than background scatter;
- Near second order creeks (the middle reaches of minor tributaries), archaeological evidence will comprise sparse but focused activity (one-off camps, single event knapping etc);
- Near third order creeks (the lower reaches of tributary creeks), there will be evidence of more frequent occupation including repeated occupation by small groups, knapping floors and evidence of more concentrated activities;
- On fifth order creeks (major creeks) archaeological evidence will reflect more permanent or repeated occupation. Sites will be complex and may be stratified;
- Creek junctions, may have been a particular focus of occupation;
- Ridge top locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be present;
- Sites in close proximity to an identified stone source will include stone artefacts with a range of size and cortex characteristics. The general size of artefacts and percentage of cortex will both decrease with distance from source; and
- High quality raw stone materials generally result in abundant flaking debris on the sides of watercourses. These locations with a stream order of two or higher, were important sources of raw material for stone artefact manufacture[328].

These patterns described above provide a useful general guide to site patterning and inferred cultural behaviour, however there are always exceptions such as large waterholes or wetlands on upper tributaries that were important resource zones and attracted repeated and complex Aboriginal occupation. This point is illustrated

[328] *ibid*

by recent work conducted by McDonald[329] who found that although lithic assemblages decreased in scale and repetition further away from water, the composition of assemblages remained fairly consistent across the entire landscape. McDonald also concludes that classifying various landscape evidence according to site types (such as residential base camps, dinnertime camps etc) is not a useful framework for interpretation.

Sites are located in proximity to water sources other than water courses such as creeks and rivers. Other watered locality landforms frequently associated with sites in central northern NSW include swamps, wetlands, lagoons, lakes, billabongs, gilgai, and chain of ponds, that are located in forested at high elevations[330]. Their associated soils will vary and can be alluvial, clayey, sandy or loamy.

Site types that have been associated in these watered localities include:

- artefact scatters and open camp sites;
- burials[331];
- middens[332];
- modified trees[333];
- seed grinding dishes near gilgai[334] ; and
- stone arrangements in watered areas that are marginal to hilly and broken terrain[335].

[329] *McDonald 2005*

[330] *RACAC 2000a: 1, RACAC 2000b, Heritage Concepts 2007c:19,49*

[331] *Kelton 1998:14; see burials discussion later in the chapter*

[332] *RACAC 2000B:15, Liverpool Plains Shire Council 2005:83, Heritage Concepts 2007c:61-4*

[333] *Heritage Concepts 2007c*

[334] *RACAC 2000b:33-34*

[335] *RACAC 2000b:15*

8.3.6 Riverine Landscapes

Central northern NSW is dominated by ancient and modern riverine landscapes. It has been outlined above that archaeological sites are located in proximity to water features. The presence or absence of water features today is not in itself sufficient to make predictions about site locations. This section will outline the diverse range of landforms of past and present riverine landscapes in which there is the potential for sites to be found. This will assist in predictive modelling for archaeological sites in the bioregion by undertaking a more targeted landscape approach.

The following details specific site patterns that occur in the following landforms:

- Aboriginal sites occur with high frequencies in alluvium, which dominates riverine landscapes. Alluvial landforms generally located in low lying areas of the bioregion[336] and include modern channels, floodplains, terraces and water localities[337]. These settings are commonly targeted by archaeologists due to their aggrading nature[338];

- Archaeological sites in flood plains are likely to be inundated, covered or removed by alluvium in floodplain environments[339]. Sites are more likely to be found on the adjacent terraces and in small areas of raised ground in floodplains which have higher potential[340] as they are unable to be frequently covered by alluvium or removed by flood waters[341].

Ancient riverine landscapes are associated with sand bodies in the landscape. Several types of sandy landforms correspond to ancient riverine environments which have the potential for aboriginal sites. These landforms include sand monkeys, palaeochannels and stable sand bodies. Site patterns and the characteristic of landforms to contain sites are as follows:

[336] *Heritage Concepts 2007c:43*

[337] *RACAC 2000b:29, RACAC 2000a: 1*

[338] *being buried and preserved within depositional environments . Heritage Concepts 2007c:70*

[339] *Heritage Concepts 2007c:29*

[340] *Heritage Concepts 2007c:45*

[341] *Heritage Concepts 2007c: 29*

- Palaeochannels are old abandoned channels that can be identified by their remnant meandering channel patterns, and are dry and filled or open and holding water[342];
- Stable deep sands are areas where water is generally scarce but can become available after intermittent rain periods where water collects in hollows around box vegetative communities[343].
- Sand monkeys are ancient water channels that are convex at the surface. They are also identifiable as they have deep to medium, yellow or red sands depending on drainage, long continuous sand bodies with low sinuosity and characteristic sparse, cypress dominated vegetation. Their channel outline can only be determined by excavating in cross section. They have the potential to contain Pleistocene sites[344]
- Older alluvial terraces are exposed through erosion by modern water courses[345];
- Sandy banks within modern floodplains are associated with ancient palaeochannels and streams[346].

8.3.7 Hill Landscapes

Areas of undulating hills and slopes, elevated topography and ridges with rocky outcrops are a landscape feature of the Brigalow Belt South bioregion. Sites occur in this landscape whether these features are close or distant from water sources, with the later being less thoroughly investigated[347].

There are several site types, patterns and associated land forms for hilly landscapes. These include:

[342] *RACAC 2000 b:43*

[343] *Heritage Concepts 2007c:44*

[344] *Thermoluminecene has dated sand monkeys to 43,000-60,000 BP in the region. Hesse 2000:32*

[345] *Hesse 2000:13*

[346] *Heritage Concepts 2007c: 29*

[347] *RACAC 2000b:8*

- Sites found on flat high points in topography is likely to be in lag deposits due to erosion [348];
- Sites located on shallow soils of the higher slopes are more likely to be translocated down hill through colluvial and/or fluvial erosion[349];
- Rocky ground has a great variety of site types associated with it, more than any other single land form. The site types include camp sites, ochre quarries and grinding grooves, rock shelters, burials[350] and artefact scatters[351];
- Where there is colluvium, sites types of small artefact scatters and modified trees occur along drainage lines, depressions, and ponds[352];
- A few sites are associated with soil mantled slopes mostly associated with drainage depressions[353]; and
- Rock shelters found in areas of exposed sandstone escarpment.

8.3.8 Wooded Landscapes

Modified trees are one of the most common site types in central northern NSW[354]. Some common patterns of modified trees are as follows:

- They occur both near and away from water sources;
- The distance from water where modified trees occur appears to be related to differences in landscapes[355];
- In the north west floodplains modified trees frequently occur along creeks and billabongs[356];

[348] *Heritage Concepts 2007c:30, 70*

[349] *Heritage Concepts 2007c:70*

[350] *See Burials discussion later.*

[351] *RACAC 2000b:32b-34*

[352] *ibid*

[353] *ibid*

[354] *Ibid:13*

[355] *Balme 1986*

- Tree types include coolibah tree, red River Gum, coolabahs, yellow box, pilliga box, bimble box, apple box and cypress pine[357];
- Uses of modified trees in the region were their bark for huts, grave markers[358], as symbolic[359] and for broad shields[360].

8.3.9 Burials in the Landscape

Burials are a sensitive site type that can be found in a number of environments in central northern NSW. Some general site patterns are:

- Burial sites and complexes can occur anywhere in the landscape;
- Areas strategic to water are particularly sensitive, such as terraced bank locations, sandy ridges[361];

When interned, they are found within[362]:

- sandy soils;
- loose soils;
- black earths or dark lenses in the soil[363];
- deposits of softer lighter soil of river banks;
- sand dunes adjacent to river banks;
- edges of billabongs; and
- sand dune surfaces.

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356 *Balme 1986*

357 *RACAC 2000b:14, Roberts 1991:16, AGL 1999: App7, Gresser 1964*

358 *Rundle 1993:104*

359 *RACAC 2000b:15*

360 *bulgen and white beech trees*

361 *Witter Fullager and Pardoe 1993*

362 *Kelton 1998:14*

363 *McBryde 1972*

In some parts of northern NSW there are no soft soils, only hard clays in which to dispose of the dead. Other methods that have been noted are of internment are:

- Middens
- Potential for burials in rock shelter areas;
- Rock shelters, particularly with art; and
- Trees with hollows[364].

8.4 AHIMS Data

A search of the DECC *Aboriginal Heritage Information Management System* (AHIMS) for a 1.5 kilometre area either side of the pipeline study area was undertaken to identify previously recorded sites in and around the study area. Within the broader pipeline study area there are 195 registered sites.

The Brigalow Belt South bioregion contains 26 sites of the total number of sites for the broader pipeline study area and 3 site types as defined by DECC.

NB: The Narrabri LALC did not provide NPWS and DECC with the sites in their area which is located in this bioregion. Therefore, there are likely to be more sites than this in the Brigalow Belt South Bioregion area.

Table 18: AHIMS site types and quantity in the Brigalow Belt South bioregion

Site Type	Number of Sites
Artefact	13
Grinding Groove	1
Modified Tree (Carved or Scarred)	12

[364] *RACAC (BBSB) 2000a:32b-34*

8.5 Predictive Modelling

Based upon information compiled within the *DECC AHIMS*, archaeological and environmental information reviewed above, we have prepared a predictive model of all likely site types within the bio-region.

The model describes the environmental, geological or topographic context each site type is likely to be found, areas of high sensitivity, the method(s) for identifying the site type and a general management approach for moderate and low impact sites. The model is presented in Table 19.

Table 19: Predictive modelling – Brigalow Belt South bioregion

Site Type	Environmental Context	Areas of Sensitivity
1. Stone Artefact Scatter and Deposit	All areas containing topsoil	Undisturbed soils within 150 metres of water (rivers, creeks, swamps etc) and/or stone sources. Within palaeochannel soils e.g. sand monkeys, stable sand bodies.
2. Rockshelters (incl. art, deposit, midden & burials)	Sandstone outcrop	On sandstone benches rock overhangs within 150 metres of permanent water
3. Midden	Water bodies including lagoons, lakes, and wetlands	Within close proximity (150 metres) of large water bodies such as lagoons and swamps.
4. Axe Grinding	Sandstone	Flat bedded sandstone

Groove	outcrops	near creek lines or rock pools
5. Seed Grinding Dishes	Gilgai	Cracking clays with shrink swell properties of Gilgai.
6. Rock Engraving	Sandstone outcrop	Flat bedded sandstone
7. Modified Trees (Scarred and Carved)	Areas containing remnant vegetation	Areas containing mature / old growth trees greater than 100 years in age In particular, the tree types: Red River Gum, coolabahs, yellow box, pilliga box, bimble box, apple box and cypress pine.
8. Quarry and/or Stone Tool Source	Outcropping bedrock or gravel bed	Outcropping isotropic rock (particularly acid volcanics and pyroclastic), gravel beds on large rivers (within 150m on major rivers) and old river terraces. In particular, the rock types: acid volcanic; pyroclastic; hornsfel; quartz; quartzite; silcrete; mudstone; and petrified wood.

9. Waterhole / Well	Sandstone outcrop	Rock pools in outcrops
10. Burials	All areas containing soft soils or sediments, including alluvium, sand and black soils, particularly adjacent to water localities. Middens Rock shelters, particularly with art Trees with hollows	Areas with deep soft or sandy soils that are not highly acidic. Alluvial, aeolian, sand, black earth soils in the landscape are particularly sensitive. Rockshelter sites. Large trees greater than 100 years old.
11. Bora / Ceremonial	N/A	N/A
12. Natural / Mythological	N/A	N/A
13. Mission, Cemetery, Historic Site	N/A	N/A
14. Conflict Site	N/A	N/A
15. Other rare site types: Earth mound,	N/A	N/A

Resource site, Stone arrangements.		

9 DARLING RIVERINE PLAINS

9.1 Preamble

Archaeological assessment reports include information about the environmental context of study areas due to the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influenced both the type and availability of natural resources and the types of cultural activities that were carried out in the past. As a result, this also influenced the types of archaeological sites that may be found.

Archaeologists examine regional trends in the distribution of known Aboriginal sites in relation to environment and topography in order to determine Aboriginal settlement and site location patterns. This provides evidence about economic and social systems in the past and also assists archaeologists to predict likely site types and locations in a given area.

As described in the methodology, the assessment is divided into bioregions that are land units integrating geology, land form, soil and vegetation, on an ecosystem scale. This chapter outlines the environmental and archaeological contexts of the Sydney Basin Bioregion. This information is used to construct a predictive model of the site types and their likely environmental, geological and landscape context within the bioregion.

The Darling Riverine Plains Bioregion lies in the central north of NSW. It has a total area of 10,651,748 hectares in NSW and Queensland. The majority of the bioregion, 88.19 per cent (9,394,263 ha), is in NSW and it occupies 11.74 per cent of the state. It has a long, narrow riverine corridor that runs southwest along the Darling River. The bioregion is bound by six others, the Brigalow Belt South, the Mulga Lands, NSW Southwestern Slopes, Cobar Peneplain, Murray Darling Depression and Broken Hill Complex bioregions.

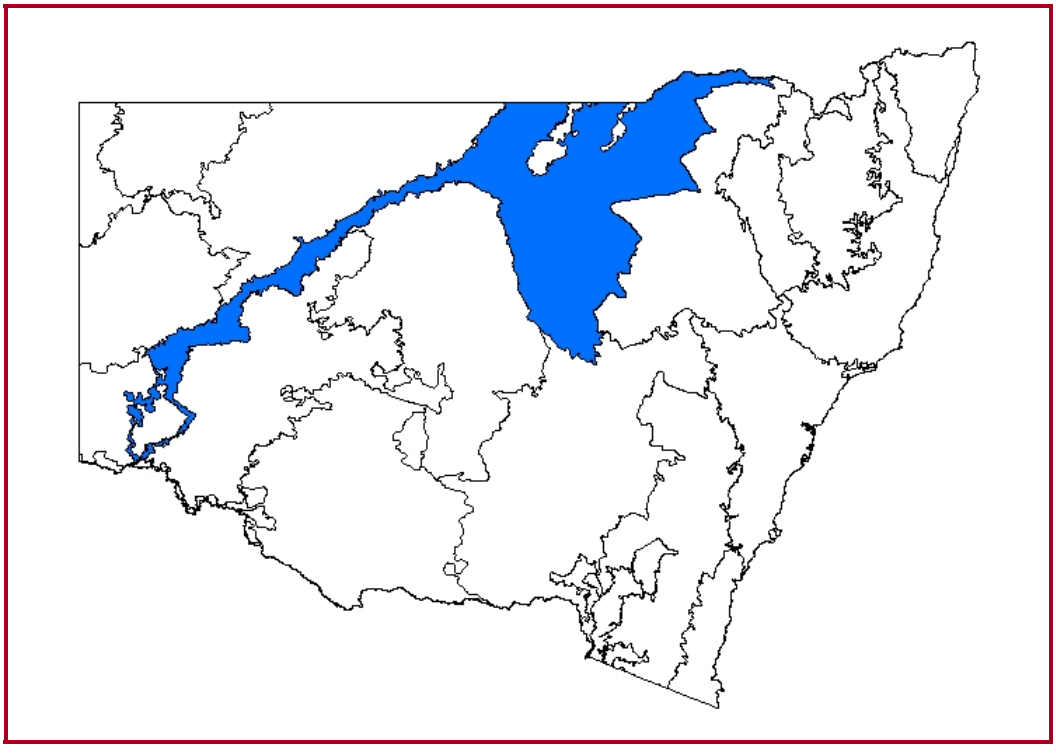

Figure 33. Map of the Bioregions of NSW highlighting the Darling Riverine Plains Bioregion

9.2 Environmental Context

9.2.1 Climate

The Darling Riverine Plains Bioregion lies in the semi-arid climatic zone which is hot and persistently dry[365]. This semi-arid area occupies most of the western extension of the bioregion, accompanied by very small patches of both arid and warm semi-arid climate. The bioregion contains minor patches of subtropical climate in the east with sub-humid areas in the southeast. The minimum average monthly temperature is 2.4 º C – 4.9 º C and the maximum average temperature ranges from 32.5 º C to 35.4 º C.

On average, the eastern portion of the bioregion receives higher and more reliable rainfall, with flooding occurring mainly in summer, while irregular cyclonic

[365] *Stern et al. 2000*

depressions can occur to the north of the bioregion[366]. Minimum average monthly rainfall is 11-37 mm and maximum average monthly rainfall is 22-86 mm.

9.2.2 Landscape Characteristics

The landscape of the Darling Riverine Plains bioregion is dominated by past and present riverine landscapes. The entire bioregion is an important example of an inland drainage system where the streams flow into an arid region. The bioregion contains numerous sites that have the potential to yield information about past climates, past environments and human pre-history. Only a few sites have been examined and they have become important heritage sites as a consequence; examples are Cuddies Springs and the lunette of Lake Tandou. Other prominent landscape features include wetlands, the Gwydir raft which is a classic example of a giant debris dam and lakes. There are also several significant wetlands in the bioregion.

The bioregion falls entirely in the Murray-Darling Basin and includes the catchments of the Macintyre-Dumaresq, Culgoa, Narran, Warrego, Paroo, Moonie, Barwon, Gwydir, Namoi, Macquarie, Yanda, Castlereagh and Darling Rivers. Catchment landscapes include channels, floodplains, billabongs and a series of overlapping, low gradient alluvial fans. Overall, the landscape is flat with river channel and flood plain features dominant.

Low ridges and low rounded hills feature in the landscape. These tend to have a maximum relief of 20 and 10 metres, respectively.

Swamplands are characteristic of the bioregion. These include flow delta and lunette swamps. The Macquarie Marshes are the most important and extensive example of a through flow delta-like swamp in the bioregion. Sand plains, dune fields and lunettes also feature.

9.2.3 Geology

The Darling Riverine Plains bioregion consists of geology dominated river systems. The entire region has not been effectively mapped, but in those areas where

[366] *Morgan and Terrey 1992*

details are available, the complexities of geomorphology and surface sediment distribution all reflect past climates and different river discharge regimes.

Sheets of Quaternary alluvium up to 100m thick have been deposited on older sedimentary rocks and contain marine sediments of an inland sea of Cretaceous age. Almost all bedrock features have been buried under alluvium, with only a few high points of basement rocks such as Mt Foster rising above the plain and more extensive areas of the Cretaceous sandstones forming low rises around Lightning Ridge and in the Collarenebri interfluve[367]. The underlying bedrock of Cretaceous and Jurassic age form part of the Great Artesian Basin, which is partly recharged in the upper margins of the Darling Riverine Plains.

Each main stream carries different sediments depending on catchment geology and rainfall. The Bogan rarely flows strongly and only carries suspended clay past Nyngan, the Castlereagh floods more often and carries a sand bed load because it drains extensive areas of Jurassic sandstones with higher rainfall and the Namoi deposits clays derived from volcanic rock. Some streams are ephemeral and contribute little water or sediment such as those below the Bourke, while the Darling River is subject to extreme flow variation. The main streams contributing water and sediment to the current alluvial fans are the Bogan, Macquarie, Castlereagh, Namoi, Gwydir, Macintyre, Narran, Bokhara and Culgoa rivers.

The Macquarie is the largest tributary and has a complex alluvial fan. This river drains a large area of the South Eastern Highlands Bioregion, and because its headwaters are in the high rainfall zones of the Great Dividing Range to the east it has a high discharge, is subject to large floods, and is sensitive to climate change. Any long-term change in average discharge causes the Macquarie River to change form and shifts the location of sand or clay deposition on the alluvial fans. Anabranches[368] are a feature of some rivers in the bioregion, for example the Darling River breaks into anabranches that flow on roughly parallel courses for up to 200 km and often attached to large circular or ovoid overflow lakes, which can be up to 15 km in diameter but are only a few m deep.

There are three kinds of wetlands are found in the bioregion: delta-like swamplands, terminal drainage basins and lakes and overflow lakes. The Narran

[367] *A region of higher land between two rivers that are in the same drainage system.*

[368] *A type of stream branching that re enters with the main stream.*

Lakes complex are an example of terminal basins at the end of the Narran River while the Menindee Lakes complex are overflow lakes that are filled by floodwaters that drain back to the river as the flood recedes. All lake beds consist of grey cracking or pelleted clays and the eastern margins of most lakes have well-formed sandy beaches and crescent-shaped dunes or lunettes up to 25 m high which are composed of fine cemented quartz sand.

9.2.4 Soils

The soils in the bioregion directly reflect past patterns of sedimentation and the present flooding regime.

Sandy soils are found in linear belts along the older stream channels, sometimes with local source dunes on their border. White sand occurs in channels, lake beds and beaches of rivers.

All lake beds consist of grey cracking clays and the eastern margins of most lakes have well-formed sandy beaches and crescent-shaped dunes or lunettes. Lunettes have white or pale yellow sand alternating with layers of pale brown pelleted clay.

Texture contrast soils occur on the low rises of levees and marginal channels of all ages. These include brown loamy sands, pale yellow or red sands. Texture contrast soils are also often badly eroded.

Clay soils vary depending on source rocks in the catchment. Grey clays are found on almost all landscapes in the bioregion, such as in channels, floodplains and lake beds. Most of the plains and depressions are dominated by deposits of heavy and dark-coloured clays, tending grey to brown. The majority of the clays are extensively cracked while others are more or less permanently wet in swamplands. In swamps, grey and brown clays merge with red sands and some texture contrast soils on sand plains. Many clay areas have gilgai micro-relief patterns.

Red soils are a limited component of the bioregion's soil profile. Stoney red earths, some with a gravel pavement, occur on ridge tops while red soils and patchy sands are likely to represent ancient alluvial terraces.

Most soils in the bioregion contain high levels of calcium carbonate and some are saline.

9.2.5 Vegetation

The soils in the bioregion directly reflect past patterns of sedimentation and today's flooding regime, with some variation in plant species across the region relating to summer or winter rainfall dominance.

Modern river channels in the bioregion support river red gum (*Eucalyptus camaldulensis*), river cooba (*Acacia stenophylla*) and river paperbark (*Melaleuca trichostachya*) communities. Coolabah (*Eucalyptus microtheca*) can also be found on the northern rivers.

Trees on the more distant flood plains differ with locality. Yellow box (*Eucalyptus melliodora*) communities are found in the upper Macquarie, poplar box (*Eucalyptus populnea*) communities occur on the Bogan, coolabah (*Eucalyptus microtheca*) communities are found on the Culgoa and most of the more northern streams support black box (*Eucalyptus largiflorens*) vegetation.

Only the hardiest trees can survive the heavy clays of the plains. These species include myall (*Acacia pendula*), poplar box (*Eucalyptus populnea*), belah (*Casuarina cristata*), coolabah (*Eucalyptus microtheca*) and black box (*Eucalyptus largiflorens*) on northern streams. Many plains are treeless, supporting only shrubs and grasses such as oldman saltbush (*Atriplex nummularia*), bladder saltbush (*Atriplex vesicaria*) and Mitchell grass (*Astrebla sp.*).

Landscapes closer to the hills support western plains woodlands, which consist of grey box (*Eucalyptus microcarpa*), Blakely's red gum (*Eucalyptus blakelyi*), silver-leaf ironbark (*Eucalyptus melanophloia)*, poplar box(*Eucalyptus populnea*), wilga (*Geijera parviflora*), rosewood (*Heterodendrum oleifolium*), belah (*Casuarina cristata*), kurrajong (*Brachychiton populneum*), white cypress pine (*Callitris glaucophulla*), and several species of *Acacia* including yarran (*Acacia homalophylla*) and brigalow (*Acacia harpophylla*).

Sandy soils on levees of old channels and dunes often have stands of white cypress pine. Lake beds may be bare or covered by clumped lignum (*Muehlenbeckia cunninghamii*) with a fringe of black box (*Eucalyptus largiflorens*). Lunettes support stands of belah (*Casuarina cristata*), some mallee, white pine, prickly wattle (*Acacia victoriae*), black bluebush (*Maireana pyramidata*), and sandhill canegrass (*Zygochloa paradoxa*).

On the lower reaches of the Darling through the anabranch, river red gums line the banks with old man saltbush and lignum. Billabongs and floodplains are characterised by black box, canegrass (Eragrostis australasica) and lignum, and adjacent dunes support prickly wattle, belah, narrow-leaf hopbush (Dodonea attenuata) and various bluebush species.

Swamp vegetation varies with the duration and depth of flooding. Marshes supplied with more permanent water support associations of common reed (*Phragmites australis*), cumbungi (*Typha sp*.), water couch (*Pseudoraphis spinescens*) and aquatic species such as water milfoil (*Myriophyllum propinquum*) and duckweed (*Lemna minor*). Less frequently flooded swamps support water couch in particular and lignum,grasslands and nardoo (*Marsilea hirsuta*).

9.3 Regional Archaeology Context

9.3.1 Preamble

The archaeology of central northern NSW has been documented through archaeological and anthropological studies, oral histories and environmental impact assessments[369]. The majority of studies have been due to development impacts[370] located in fertile and resource rich areas creating a biased record of site distribution. Aboriginal sites have been recorded in the Darling Riverine Plains bioregion indicating Aboriginal occupation and use of the area, however, no overall heritage assessment of the Darling Riverine Plains bioregion has been undertaken to date[371]. Similarities occur between this and the adjacent Brigalow Belt South bioregion, from which some generalisations will be made regarding central northern NSW archaeology.

9.3.2 Early Occupation

It is difficult to establish the occupational prehistory of the Darling Riverine Plains bioregion due to a lack of studies and data on the subject[372]. However in general, the Aboriginal occupation in central northern NSW dates back to the Pleistocene

[369] *RACAC 2000a:16*

[370] *RACAC 2000b:4.*

[371] *Moree LEP 2007:68*

[372] *RACAC 2000b:14*

period (ie. prior to 10,000 years ago). Pleistocene dates were retrieved from several sites including Narren Lake[373], the Warrumbungles (20,310BP)[374] and Cuddie Springs was suggested to be dated as far back as 30, 000 BP[375].

9.3.3 Site Types

There are a number of Aboriginal site types that have been found within the Darling Riverine Plains bioregion and in central northern NSW. The most common types are:

- artefact scatters[376];
- ceremonial sites
- grinding grooves;
- hearths
- modified trees (scarred or carved)[377].
- ochre sites
- potential archaeological deposits (PADs);
- rock art including engravings;
- rock shelters
- Shell middens
- Stone arrangements

Less frequent site types that occur within the bioregion are listed on the *DECC Aboriginal Site Register (ASR)*.

[373] *Heritage Concepts 2007c: 43*

[374] *Gaynor 1996:185*

[375] *Furnby 1995:82*

[376] *Panich 2007:21*

[377] *Panich 2007:21*

9.3.4 Stone Artefacts

Stone artefacts are the most commonly found artefacts throughout the bioregion. They are an important source of archaeological information because stone is preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as Carbon dating cannot be applied.

A technological sequence for stone artefacts for the region was first described in the late 1940s by Fred McCarthy and has since been refined over time[378]. Known as the 'Eastern Regional Sequence' it was based on direct dating of excavated sequences. Some debate about the precise nature and significance of the technological changes described still continues[379], therefore the ERS should be regarded only as a general guide to technological change. The ERS phases are as follows:

- Capertian – is distinguished by large uniface pebble tools, core tools, horsehoof cores, scrapers and hammerstones. Backed artefacts occasionally present. Generally dates to before 5,000 years before present (BP).
- Early Bondaian – Aspects of the Capertian assemblage continue, but backed artefacts and ground-edged artefacts increase. Artefacts during this period were predominantly made from fine-grained silicious stone such as silcrete and tuff. Generally dated from 5,000 BP to 2,800 BP.
- Middle Bondaian – Characterised by backed artefacts, particularly Bondi Points and ground-edged artefacts. Artefacts made from silicious materials, however quartz becomes more frequent. Generally dated from 2,800 BP to 1,600 BP.
- Late Bondaian – characterised by bipolar technology, eloueras, ground-edged artefacts, and bone and shell artefacts. Bondi points are virtually absent and

[378] *The ERS is currently being re-examined by Hiscock & Attenbrow.*

[379] *Hiscock & Attenbrow 2002*

artefacts are predominantly made from Quartz. Generally dated from 1,600 BP to contact.

There is a lack of data regarding lithic assemblages in the Darling Riverine Plains bioregion. However, general observations can be made regarding stone tool assemblages in central northern NSW. These observations relate to the type, use and source of stone tools and are summarised as follows:

- There are a various types of stone used in the lithic assemblages including quartz, acid volcanics and pyroclastic rocks[380];
- Sources include river pebbles and quarries in stone tool outcrops[381]; and
- Stone tools assemblages include tools for small and heavy use activities, seed processing tools and waste material from tool production[382].

9.3.5 Site Patterns

Environmental and topographic contexts are an important determinant of the size and nature of Aboriginal sites and their spatial location. Below is an outline of the site patterns for the Brigalow Belt South bioregion, including dominant site patterns and those in relation to a number of landscapes and associated landforms.

Drawing on various analyses[383] general statements regarding the dominant site patterns in the bioregion are:

- Sites would be found in all landforms in various frequencies across the bioregion[384];
- Aboriginal sites are found in considerable distances from water[385];

[380] *RACAC 2000b:13*

[381] *Tomkin 1997, Hesse 2000:41*

[382] *RACAC 2000b:29*

[383] *RACAC 2000; RACAC 2002.*

[384] *RACAC 2000a:20*

[385] *Koetigg 1986:81*

- Aboriginal cultural material to survive on sites that contain remnant portions of the original soil profile. The potential for survival of any archaeological sites will largely depend on the degree of past disturbance;
- Aboriginal camp[386] sites were preferentially located at resource intersection zones in order to capitalise on a broader range of resources. Therefore, where more than one environment and site type occur in any location, the potential for Aboriginal camp sites is increased.
- There is a higher density of sites recorded on erosional landforms compared to active depositional landforms[387];
- In some soil landscapes, particularly cracking clays which dominate northern NSW, artefacts are not retained in situ but move vertically and horizontally in the deposit[388]; and
- Surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material. Extensive excavations have shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces.

9.3.6 Proximity of sites to water

Aboriginal site distribution is commonly accepted as being influenced by the location of water courses[389]. This relationship is one of the most commonly reported site patterns in NSW. The following observations have been made:

- On average, sites occur within 100 m of water[390];
- 50% of sites occur within 200m of water[391] but sites continue to be found up to 750m away[392];

[386] *Aitken 1985; Hynes & Chase 1982*

[387] *Heritage Concepts 2007c:68*

[388] *Ibid:29*

[389] *RACAC 2000a; RACAC 2000b; RACAC 2002; Appleton 1997, Kelton 1999*

[390] *RACAC 2002*

- Open camp sites are located in stable land surfaces on river terraces set back from the immediate river bank[393];
- Archaeological sites are likely to have been moved and/or buried by river alluvium in flood prone areas[394]; and
- Grinding grooves are common throughout central northern NSW where sandstone bedrock is exposed along water courses[395].

In other areas of NSW, the factors of the permanence of fresh water sources and the proximities to stone sources play a part in the density and complexity of archaeological sites[396]. They will vary according to permanence of water (stream order), landscape unit and proximity to stone sources[397]. The following site patterns have been observed for central northern NSW:

- Artefact distribution is widespread in areas of major creek systems[398];
- A proportion of Aboriginal sites occur among lower order drainage lines[399]; and
- Sites recorded among lower order streams are exposed by erosion on creek banks[400].

An issue in establishing site patterns in relation to stream orders in central northern NSW is they are often inconsistently and inaccurately mapped[401]. Also, ancient channels and do not account for the changes in water courses over time,

391 *AGL 1999:14,Heritage Concepts 2007c:48*

392 *RACAC 2002;*

393 *Heritage Concepts, 2007c:70*

394 *Balme 1986, Roberts 1991, Heritage Concepts 2007c:29*

395 *RACAC 2000b:13*

396 *McDonald 1997: 56-57*

397 *Ibid*

398 *Heritage Concepts 2007c:27*

399 *RACAC 2000a:19*

400 *Heritage Concepts 2007c:46*

401 *Ibid: 19*

which can be accounted for by other means[402]. Predictive modelling for sites in correlation with various stream orders, as applicable and tested in eastern NSW, are as follows:

- Near first order creeks (the headwaters of upper tributaries) archaeological evidence will be sparse and represent little more than background scatter;
- Near second order creeks (the middle reaches of minor tributaries), archaeological evidence will comprise sparse but focused activity (one-off camps, single event knapping etc);
- Near third order creeks (the lower reaches of tributary creeks), there will be evidence of more frequent occupation including repeated occupation by small groups, knapping floors and evidence of more concentrated activities;
- On fifth order creeks (major creeks) archaeological evidence will reflect more permanent or repeated occupation. Sites will be complex and may be stratified;
- Creek junctions, may have been a particular focus of occupation;
- Ridge top locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be present; and
- Sites in close proximity to an identified stone source will include stone artefacts with a range of size and cortex characteristics. The general size of artefacts and percentage of cortex will both decrease with distance from source;
- High quality raw stone materials generally result in abundant flaking debris on the sides of watercourses. These locations with a stream order of two or higher, were important sources of raw material for stone artefact manufacture[403].

[402] *Ibid:27*

[403] *ibid*

These patterns described above provide a useful general guide to site patterning and inferred cultural behaviour, however there are always exceptions such as large waterholes or wetlands on upper tributaries that were important resource zones and attracted repeated and complex Aboriginal occupation. This point is illustrated by recent work conducted by McDonald[404] who found that although lithic assemblages decreased in scale and repetition further away from water, the composition of assemblages remained fairly consistent across the entire landscape. McDonald also concludes that classifying various landscape evidence according to site types (such as residential base camps, dinnertime camps etc) is not a useful framework for interpretation.

Sites are located in proximity to water sources other than water courses such as creeks and rivers. Other watered locality landforms frequently associated with sites in central northern NSW include swamps, wetlands, lagoons, lakes, billabongs, gilgai, and chain of ponds, that are located in forested at high elevations[405]. Their associated soils will vary and can be alluvial, clayey, sandy or loamy.

Site types that have been associated in these watered localities include:

- artefact scatters and open camp sites;
- burials[406];
- middens[407];
- modified trees[408];
- seed grinding dishes near gilgai[409]; and
- stone arrangements in watered areas that are marginal to hilly and broken terrain[410].

[404] *McDonald 2005*

[405] *RACAC 2000a: 1, RACAC 2000b, Heritage Concepts 2007c:19,49*

[406] *Kelton 1998:14; see burials discussion later in the chapter*

[407] *RACAC 2000b:15, Liverpool Plains Shire Council 2005:83, Heritage Concepts 2007c:61-4, e.g. Midden at Mungyer Lagoon Heritage Concepts 2007b:21*

[408] *Heritage Concepts 2007c*

[409] *RACAC 2000b:33-34*

9.3.7 Riverine Landscapes

Central northern NSW is dominated by ancient and modern riverine landscapes. It has been outlined above that archaeological sites are located in proximity to water features. The presence or absence of water features today is not in itself sufficient to make predictions about site locations. This section will outline the diverse range of landforms of past and present riverine landscapes in which there is the potential for sites to be found. This will assist in predictive modelling for archaeological sites in the bioregion by undertaking a more targeted landscape approach.

The following details specific site patterns that occur in the following landforms:

- Aboriginal sites occur with high frequencies in alluvium, which dominates riverine landscapes. Alluvial landforms generally located in low lying areas of the bioregion[411] and include modern channels, floodplains, terraces and water localities[412]. These settings are commonly targeted by archaeologists due to their aggrading nature[413];

- Archaeological sites in flood plains are likely to be inundated, covered or removed by alluvium in floodplain environments[414]. Sites are more likely to be found on the adjacent terraces and in small areas of raised ground in floodplains which have higher potential[415] as they are unable to be frequently covered by alluvium or removed by flood waters[416].

Ancient riverine landscapes are associated with sand bodies in the Darling Riverine Plains bioregion, although not as frequently as the adjacent bioregions. Several types of sandy landforms correspond to ancient riverine environments which have the potential for aboriginal sites. These landforms include sand monkeys, palaeochannels and stable sand bodies. Site patterns and the characteristic of landforms to contain sites are as follows:

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410 *RACAC 2000b:15*

411 *Heritage Concepts 2007c:43*

412 *RACAC 2000b:29, RACAC 2000a: 1*

413 *being buried and preserved within depositional environments . Heritage Concepts 2007:70*

414 *Heritage Concepts 2007c:29*

415 *Heritage Concepts 2007c:45*

416 *Heritage Concepts 2007c:29*

- Palaeochannels are old abandoned channels that can be identified by their remnant meandering channel patterns, and are dry and filled or open and holding water[417];
- Stable deep sands are areas where water is generally scarce but can become available after intermittent rain periods where water collects in hollows around box vegetative communities[418];
- Sand monkeys are ancient water channels that are convex at the surface. They are also identifiable as they have deep to medium, yellow or red sands depending on drainage, long continuous sand bodies with low sinuosity and characteristic sparse, cypress dominated vegetation. Their channel outline can only be determined by excavating in cross section. They have the potential to contain Pleistocene sites[419];
- Older alluvial terraces are exposed through erosion by modern water courses[420];
- Sandy banks within modern floodplains are associated with ancient palaeochannels and streams[421].

9.3.8 Hill Landscapes

Areas of undulating hills and slopes, elevated topography and ridges with rocky outcrops a re a landscape feature of the name bioregion bioregion. Sites occur in this landscape whether these features are close or distant from water sources, with the later being less thoroughly investigated[422].

There are several site types, patterns and associated land forms for hilly landscapes. These include:

[417] *RACAC 2000 b:43*

[418] *Heritage Concepts 2007c:44*

[419] *Thermoluminecene has dated sand monkeys to 43,000-60,000 BP in the region. Hesse 2000:32*

[420] *Hesse 2000:13*

[421] *Heritage Concepts 2007c: 29*

[422] *RACAC 2000b:8*

- Sites found on flat high points in topography is likely to be in lag deposits due to erosion [423];
- Sites located on shallow soils of the higher slopes are more likely to be translocated down hill through colluvial and/or fluvial erosion[424];
- Rocky ground has a great variety of site types associated with it, more than any other single land form. The site types include camp sites, ochre quarries and grinding grooves, rock shelters, burials[425] and artefact scatters[426];
- Where there is colluvium, sites types of small artefact scatters and modified trees occur along drainage lines, depressions, and ponds[427];
- A few sites are associated with soil mantled slopes mostly associated with drainage depressions[428]; and
- Rock shelters found in areas of exposed sandstone escarpment.

9.3.9 Dune Landscape

Dune and lunette landscapes are located in the bioregion. Although under represented in archaeological literatures in the region, sites have been found within these landforms. The site patterning within this landscape is that:

- Site will be found in stable sands have the potential to contain archaeological artefacts[429];
- The dunes and lunettes in the bioregion have sites dating to the Pleistocene and Holocene[430];

[423] *Heritage Concepts 2007c:30, 70*

[424] *Heritage Concepts 2007c:70*

[425] *See Burials discussion later.*

[426] *RACAC 2000b:32b-34*

[427] *ibid*

[428] *ibid*

[429] *Balme 1986*

[430] *Old Harbour dune, Hesse 2000:13*

- There is a concentration of occupation and use on slightly elevated topography (low crest and upper slope landforms) adjacent to water sources and resources areas[431] within stable Pleistocene and Holocene dunes; and
- There is the potential for sites to occur where sand bodies are associated with gilgai[432].

9.3.10 Wooded Landscapes

Modified trees are one of the most common site types in central northern NSW[433]. Some common patterns of modified trees are as follows:

- They occur both near and away from water sources;
- The distance from water where modified trees occur appears to be related to differences in landscapes[434];
- In the north west floodplains modified trees frequently occur along creeks and billabongs[435];
- Tree types include coolibah tree, red River Gum *(more so in the DRP bioregion)*, coolabahs, yellow box, pilliga box, bimble box, apple box and cypress pine[436];
- Uses of modified trees in the region were their bark for huts, grave markers[437], as symbolic[438] and for broad shields[439].

[431] *Dean-Jones 1990, 77; Wheeler [ERM] 2004*

[432] *RACAC 2000b:33-34*

[433] *Ibid:13*

[434] *Balme 1986*

[435] *Balme 1986*

[436] *RACAC 2000b:14, Roberts 1991:16, AGL 1999: App7, Gresser, 1964*

[437] *Rundle 1993:104*

[438] *RACAC 2000b:15*

[439] *bulgen and white beech trees*

9.3.11 Burials in the Landscape

Burials are a sensitive site type that can be found in a number of environments in central northern NSW. Some general site patterns are:

- Burial sites and complexes can occur anywhere in the landscape;
- Areas strategic to water are particularly sensitive, such as terraced bank locations, sandy ridges[440];

When interned, they are found within[441]

- sandy soils;
- loose soils;
- black earths or dark lenses in the soil[442];
- deposits of softer lighter soil of river banks;
- sand dunes adjacent to river banks;
- edges of billabongs; and
- sand dune surfaces.

In some parts of northern NSW there are no soft soils, only hard clays in which to dispose of the dead. Other methods that have been noted are of internment are:

- Middens
- Rock shelters, particularly with art[443]
- Trees with hollows.

[440] *Witter Fullager and Pardoe 1993*

[441] *Kelton 1998:14*

[442] *McBryde 1972*

[443] *RACAC (BBSB AppC) 2000b:32b-34*

9.4 AHIMS Data

A search of the DECC *Aboriginal Heritage Information Management System* (AHIMS) for a 1.5 kilometre area either side of the pipeline study area was undertaken to identify previously recorded sites in and around the study area. Within the broader pipeline study area there are 195 registered sites.

The Darling Riverine Plains bioregion contains 16 sites of the total sites for the broader pipeline study area search. The bioregion contains four site types as defined by *DECC.*

Table 20: AHIMS site types and quantity in the Darling Riverine Plains bioregion

Site Type	Number of Sites
Aboriginal Dreaming and Ceremony	1
Burial	1
Modified Tree (Carved or Scarred)	14

9.5 Predictive Modelling

Based upon information compiled within the *DECC AHIMS*, archaeological and environmental information reviewed above, we have prepared a predictive model of all likely site types within the bio-region.

The model describes the environmental, geological or topographic context each site type is likely to be found, areas of high sensitivity, the method(s) for identifying the site type and a general management approach for moderate and low impact sites. The model is presented in Table 21.

Table 21: Predictive modelling – Darling Riverine Plains

Site Type	Environmental Context	Areas of Sensitivity
1. Stone Artefact Scatter and Deposit	All areas containing topsoil	Undisturbed soils within 150 metres of permanent water (rivers, creeks, swamps etc) and/or stone sources. Within palaeochannel soils e.g. sand monkeys, stable sand bodies.
2. Rockshelter (incl. art, deposit, midden & burials)	Sandstone outcrop	On sandstone benches and rock overhangs within 150 metres of permanent water
3. Midden	Water bodies including lagoons, lakes, and wetlands.	Within close proximity (150 metres) of large fresh water bodies such as lagoons and swamps.
4. Axe Grinding Groove	Sandstone outcrops	Flat bedded sandstone near creek lines or rock pools
5. Seed Grinding Dishes	Gilgai	Cracking clays with shrink swell properties of Gilgai.
6. Rock Engraving	Sandstone outcrop	Flat bedded sandstone
7. Modified Tree (Scarred or Carved)	Areas containing remnant vegetation	Areas containing mature / old growth trees greater than 80 years in age. In particular, the tree types: Red River Gum, coolabahs, yellow box, pilliga box, bimble box, apple box and cypress pine.

8. Quarry and/or Stone Tool Source	Outcropping bedrock or gravel bed Ochre and stone	Outcropping isotropic rock (particularly acid volcanics and pyroclastic), gravel beds on large rivers (within 150m on major rivers) and old river terraces. In particular, the rock types: quartz; hornfels; quartzite; chert; acid volcanics; pyroclastics; and petrified wood.
9. Waterhole / Well	Sandstone outcrop	Rock pools in rock outcrop
10. Burials	All areas containing soft soils or sediments, including alluvium, sand and black soils, particularly adjacent to water localities. Middens Rock shelters, particularly with art Trees with hollows	Areas with deep soft or sandy soils that are not highly acidic. Alluvial, aeolian, sand, black earth soils in the landscape are particularly sensitive. Rockshelter sites. Large trees greater than 100 years old.
11. Bora / Ceremonial	N/A	N/A
12. Natural / Mythological	N/A	N/A
13. Mission, Cemetery, Historic Site	N/A	N/A
14. Conflict Site	N/A	N/A

15. Other rare site types: Earth mound, Resource site, Stone arrangements.	N/A	N/A

10 IMPACT EVALUATION

10.1 Preamble

This chapter provides a description of proposed development and an assessment of the impact of proposed development on the known Aboriginal sites identified during this assessment.

For unknown sites that may be present within areas of potential sensitivity identified in the predictive models, it is currently impossible to assess impact. Instead further investigations, standardised management procedures, mitigation measures, monitoring and contingency procedures are proposed to manage these areas of sensitivity. These management procedures apply to the various site types as presented in the previous chapters and are described in more detail in the management recommendations chapter that follows this one.

10.2 Proposed Development

Manidis Roberts has been commissioned by *Hunter Energy* to prepare an Environmental Assessment for an 850 kilometre high pressure gas pipeline to connect the Wallumbilla Gas Hub in South Central Queensland to the existing Sydney to Newcastle pipeline at Hexham in NSW. Within NSW the pipeline will extend from the NSW-Queensland border north of Boomi, to Hexham in the Hunter Valley; a length of approximately 600 km. The pipeline will generally follow Travelling Stock Routes near the boundaries of farms, skirt Moree, cross the Gunnedah-Tamworth pipeline, traverse the Liverpool Range near Murrurundi, and follow the New England Highway towards Muswellbrook.

The pipeline will provide a missing link in the eastern Australia gas supply network, securing the supply of gas to Sydney and Newcastle for industrial, commercial and domestic use. The pipeline will be buried underground for its entire length except at supply and delivery points en route and at intermediate compressor points. Construction will generally require an easement 20 metres wide to provide vehicle access and room for temporary stockpiling of spoil during excavation. At this stage of the proposal, the assessment covers a 200 metre proposed pipeline study area.

10.3 Basis for Evaluation

For the purposes of the impact assessment, we have adopted the categories used project-wide for historical heritage, flora, fauna, bio-diversity etc. These are High, Moderate and Low impact. For the purposes of Aboriginal heritage assessment, the categorisation will use degree of physical impact of proposed development and the level of likely significance (using DECC significance criteria[444]) as the basis for determining whether known impacts and potential impacts are high, moderate or low. The following definitions are applied to the impact categories:

- **High Impact** – Direct development impact on a site, object or place that has a high level of scientific and/or cultural heritage significance. High impact sites would either have a high level of rarity, representativeness, archaeological research value or would have specific cultural value or importance to the local Aboriginal community. Disturbance of High Impact sites would represent a significant scientific or cultural loss at a local, state or national level;

- **Moderate Impact** – Direct development impact on a site, object or place that has some scientific and/or cultural heritage significance. Moderate impact sites would have limited rarity, representativeness and archaeological research value at a local level. Disturbance of a moderate impact site would represent only a limited scientific or cultural loss at a local level;

- **Low Impact** – Indirect impact (ie. visual and contextual curtilage affected) on a site that has some rarity, representativeness, archaeological research value or cultural value to the local Aboriginal community. - Direct impact on a highly disturbed site or isolated find assessed to have negligible scientific or cultural significance.

The following impact evaluation section includes two tables. The first table is a significance and impact evaluation of all sites within the 200m study area using the criteria described above. The second table lists all other sites outside the 200m study area, but within an additional 300m wide buffer either side.

[444] *National Parks & Wildlife Service. Standards & Guidelines Kit 1998.*

10.4 Evaluation

10.4.1 Sites within and in the immediate vicinity of the proposed 200m study area potential Impact Zone (based on Rev H and Lateral D)

There are 16 DECC registered sites that are or may be directly within the study area (subject to the accuracy of the DECC spatial data). There are 10 artefacts, 1 artefact and axe grinding groove, 2 modified trees, 1 former Mission/Ceremonial/Dreaming site, 1 burial and 1 conflict (Table 22).

Table 22: AHIMS sites within the proposed pipeline study area

DECC Site Number	Site Type	Site Name	Rarity/ Representativeness	Arch Research Value	Cultural Value (if known)	Impact Category	Bioregion	Closest KP
20-4-0009	Artefact / Axe Grinding Grooves	Wilga	Mod	Mod	Unknown	Mod	Brigalow Belt South	565
37-2-0886	Artefact	BM4	Low	Low	Unknown	Low	Sydney Basin	697
37-2-0891	Artefact	BM9	Low	Low	Unknown	Low	Sydney	701

							Basin	
37-2-0892	Artefact	BM10	Low	Low	Unknown	Low	Sydney Basin	700
37-2-0893	Artefact (Isolated Find)	BM11	Low	Low	Unknown	Low	NSW North Coast	724
37-2-1503	Artefact (Isolated Find)	Abt11	Low	Low	Unknown	Low	NSW North Coast	755
37-6-0121	Artefact	Farley G	Mod	Low	Unknown	Mod-Low	Sydney Basin	9
37-6-1500	Artefact (Isolated Find)	Site 12, Lot 12, Stanhope	Low	Low	Unknown	Low	Sydney Basin	691
38-4-0713	Artefact	Heritage Green 23/G	Low	Low	Unknown	Low	Sydney Basin	10
38-4-0730	Artefact (Isolated Find)	Heritage Green 22/A	Low	Low	Unknown	Low	Sydney Basin	10

38-4-0927	Artefact	Site 1, Thornton North, Lot 1	Low	Low	Unknown	Low	Sydney Basin	289
10-3-0010	Modified Tree (Carved or Scarred)	Watervale Yards; Moree;	Mod	Mod	Some	Mod	Darling Riverine Plains	305
01-6-0007	Mission / Aboriginal Ceremony & Dreaming	Euraba Mission	High	Moderate	High	**High**	Darling Riverine Plains	252
01-6-0007	Burial	Euraba Mission	High	Mod	High	**High**	Darling Riverine Plains	252
01-6-0009	Modified Tree (Carved or Scarred)	Euraba Whalan Creek	High	Mod	High	**High**	Darling Riverine Plains	252

38-4-0337[445]	Conflict	Wallalong Brush (general locality)	High	Mod-Low	Unknown	**High**	NSW North Coast	770

10.4.2 Sites outside but within 300m of the proposed study area (based on Rev H and Lateral D)

Known sites within 300 metres either side of the proposed pipeline study area are shown in Table 23 below. Although they fall outside the current proposed study area, they have been included because of their close proximity to the proposed study area and the possible errors and inaccuracies in the spatial information provided by DECC.

Table 23: AHIMS sites located within 300m of the proposed pipeline study area

Distance from Pipeline	Site Number	Site Name	Site Type	DECC's Importance	Metres from study area
0-100m	37-6-1501	Lot 12 Site 11 - Stanhope	Artefact	Not Determined	10
	38-4-	T 8	Artefact	Not Determined	22

[445] *The specific locality of the conflict is unknown, only the general locality of 'Wallalong Brush'. The conflict may have occurred within or near proposed pipeline study area. Further detailed research is currently underway to determine the exact location (if possible) of the site.*

	0249				
	37-2-0884	BM 2	Artefact	Not Determined	22
	10-3-0024	Moree scarred tree #13	Modified Tree (Carved or Scarred)	Not Determined	34
	37-2-1502	Abt 10;Aberdeen Abattoir	Artefact	Not Determined	50
	20-4-0052	Gunnedah	Modified Tree (Carved or Scarred)	Not Determined	53
	37-2-1493	Abt 1;Aberdeen Abattoir	Artefact	Not Determined	61
	37-6-1495	Lot 12 Site 6- Stanhope	Artefact	Not Determined	72
	38-4-0749	Thornton A 3 (TA3)	Artefact	Not Determined	77

	37-2-0888	BM 6 (ISF)	Artefact	Not Determined	78
	37-2-1499	Abt 7;Aberdeen Abattoir	Artefact	Not Determined	83
	38-4-0732	Heritage Green 21/B	Artefact	Not Determined	93
	37-2-1498	Abt 6;Aberdeen Abattoir	Artefact	Not Determined	94
100-200m	38-4-0890	Thornton North 1	Artefact	Not Determined	107
	37-2-0889	BM 7	Artefact	Not Determined	113
	38-4-0834	Heritage Green 21/A (HG 21/A)	Artefact	Not Determined	122
	37-2-0530	No. 2	Artefact	Not Determined	141
	37-6-	Lot 12 Site 9 -	Artefact	Not Determined	150

	1498	Stanhope			
	37-2-1497	Abt 5;Aberdeen Abattoir	Artefact	Not Determined	154
	38-4-0715	Heritage Green 15/A	Artefact	Not Determined	156
	10-3-0048	BBS; Moree LALC; Marshalls ponds TSR 5	Modified Tree (Carved or Scarred)	Not Determined	159
	10-3-0056	BBS; Moree LALC; Marshalls ponds TSR 12	Modified Tree (Carved or Scarred)	Not Determined	159
	10-3-0058	BBS; Moree LALC; Marshalls ponds TSR 14	Modified Tree (Carved or Scarred)	Not Determined	159
	37-6-0119	Lochinvar; Farley E	Aretefact	Not Determined	162
	20-4-0068	BBS; Red Chief LALC; Barkers Lagoon ST 2	Modified Tree (Carved or	Not Determined	179

			Scarred)		
	37-6-1503	Lot 12 Site 18 Stanhope	Artefact	Not Determined	183
	37-6-1502	Lot 12 Site 10 - Stanhope	Artefact	Not Determined	183
	38-4-0248	T 7	Artefact	Not Determined	185
200-300m	38-4-0885	Thornton Beechwood 27	Artefact	Not Determined	202
	29-1-0040	DTG/ST40 - Merrigal 1	Modified Tree (Carved or Scarred)	Not Determined	202
	38-4-0752	Thornton A 13 (TA13)	Artefact	Not Determined	218
	37-2-0531	No. 3	Artefact	Not Determined	219
	38-4-	Brisbane Fields PAD 1	Potential	Not Determined	223

	1004		Archaeological Deposit (PAD)		
	38-4-0250	T 8_A_(T9);	Artefact	Not Determined	224
	37-6-0120	Lochinvar;Farley;F;	Artefact	Not Determined	229
	37-2-2031	CB 1	Artefact	Contributes to Secondary Importance	241
	37-6-1507	Lot 12 Site 14 Stanhope	Artefact	Not Determined	242
	37-2-1494	Abt 2;Aberdeen Abattoir	Artefact	Not Determined	247
	10-3-0023	Moree scarred tree #12;	Modified Tree (Carved or Scarred)	Not Determined	252
	10-3-0042	MPC-ST1	Modified Tree (Carved or	Contributes to Primary	256

			Scarred)	Importance	
	38-4-0123	None Specified	Artefact	Not Determined	285
	38-4-0075	Tomago	Modified Tree (Carved or Scarred)	Not Determined	285

10.5 Predictive Modelling: Areas of Sensitivity

Detailed maps have been produced which show known Aboriginal sites and areas of sensitivity, that is, where certain types of Aboriginal sites are *likely* to occur in the landscape. These are areas that require further investigation and/or mitigation. The scope of further investigation required and management recommendations for each Aboriginal site type and sensitivity zoning are described in the following Management Recommendations chapter. The maps showing predictive modelling for the five bioregions are presented in Appendix 5.

10.5.1 Data Sources

Data sources provided by *Manidis Roberts* or sourced directly from data providers by *AHMS*, have been used to identify the areas of sensitivity. The data sources have limitations and constraints that have consequences for the quality and integrity of sensitivity mapping. Some factors to be taken into consideration when mapping include scale, projection, the type of data, the method in which the data was obtained, the intention of the cartographer, the differences and inconsistencies in the type of data between data sets, and our intention in utilising these data sources. The data sources used and their associated limitations are described in Appendix 1.

In short, the precision, accuracy and resolution of our sensitivity mapping is wholly dependent on the accuracy of the data sources. For instance, there is no spatial data for remnant vegetation greater than 100 years old, which is an environmental factor that has been identified as having sensitivity for modified (scarred and carved) trees. The data provided only tells us about types of land use or certain tree types along the study area. In these instances, and in the interests of a sound and precautionary approach, we have included all areas that have trees as areas of potential sensitivity. Further investigations will be recommended in the following chapter to more accurately define some zones of sensitivity (such as areas of sensitivity for scarred/carved trees). Further investigation may include liaising with the environmental consultants employed by Manidis Roberts, who will conduct detailed mapping, fly-overs and surveys of vegetation along the pipeline study area in future stages of detailed investigation. If additional data cannot be provided by environmental consultants or from other source, archaeological survey and field

work may be required to further delineate areas of sensitivity and identify sites within the study area.

11 MANAGEMENT RECOMMENDATIONS

11.1 Preamble

In the impact assessment described in the previous chapter we adopted the categories of High, Moderate and Low impact. The impact evaluation considered physical impact of proposed development and the level of likely significance as the basis for determining whether known impacts and potential impacts are high, moderate or low. In this chapter, the level of impact (High, Moderate & Low) is used as the basis for making appropriate management recommendations that are appropriately suited to the type of site, its level of cultural and archaeological significance and nature of potential impact.

Our management recommendations can be divided into the following categories:

- High Impact sites that require specific investigative and management procedures;
- Moderate-Low Impact sites that require application of standardised investigative and management approaches; and
- Areas of archaeological sensitivity that require application of standardised investigative and management approaches.

The following sub-sections describe our proposed recommendations for High Impact sites and proposed recommendations for Moderate-Low Impact sites and areas of archaeological sensitivity.

11.2 High Impact Sites

The following known High impact sites require specific management procedures to minimise and avoid impact. Specific management measures are established on an individual site-by-site basis and tailored to the nature of the impact and the type of site.

Table 24: Management Recommendations for High Impact Sites

Site Number	Site Type	Site Name	Bioregion	Closest Kp	Management Recommendations
01-6-0007	Mission / Aboriginal Ceremony & Dreaming	Euraba Mission	Darling Riverine Plains	252	Undertake archaeological survey with Aboriginal elders to identify the extent of the mission site, including all areas and features of cultural importance; Avoid any impact on the defined mission area; and Re-design proposed pipeline to ensure it does not cross the area of defined mission.
01-6-0007	Burial	Euraba Mission	Darling Riverine Plains	252	
01-6-0009	Modified Tree (Carved or Scarred)	Euraba Whalan Creek	Darling Riverine Plains	252	
38-4-0037	Conflict	Wallalong Brush (general locality)	NSW North Coast	770	Undertake primary historical research and consult with any Aboriginal knowledge holders to identify the nature of the conflict, specific locality and extent (if possible) of the conflict site and to assess the cultural importance of the place to the local Aboriginal Community;

					If the location of a culturally significant place or area related to the conflict is identified through research and consultation, any impact to the defined area of significance will be avoided. Re-design proposed pipeline to ensure it does not cross any defined areas of high cultural significance.

11.3 Moderate – Low Impact Sites

The known Moderate - Low impact sites and areas of archaeological sensitivity would be managed with generalised investigative and mitigative approaches. This sub-section summarises the proposed management approaches and is followed by a table showing our recommended management approaches for each site type.

The following generalised management approaches are proposed.

11.3.1 Programme of Archaeological Research

In the past, archaeological investigations for linear developments such as pipelines, power lines and roads have involved survey of areas with low ground visibility, followed by dispersed test pitting programmes in many areas defined as 'Potential Archaeological Deposits'. This approach was time consuming and had limited value from an archaeological research point of view because stone artefact samples were often too small to adequately characterise the archaeological site[446] and too small to make any meaningful conclusions about past use and occupation. Such investigations often failed to identify intra-site variation and patterning – issues that are critical in gaining a meaningful understanding of Aboriginal use and occupation of the broader landscape and particular landforms within the landscape.

For the Queensland Hunter Gas Pipeline project we propose a more strategic and holistic approach to management of the many moderate to low impact artefact scatter / deposit sites. The reasoning behind this approach is that impact will be fairly minor in each area that the pipeline passes through, but the overall cumulative impact along the whole study area may be significant. Using this approach, we recommend larger research-focused open-area excavations as a mitigation measure designed to investigate research questions that may provide meaningful information about how Aboriginal people lived and used the land in the past. The archaeological research recommended would be done as mitigation of generalised impact on the many low and moderate impact artefact scatter /

[446] *Hiscock 2001*

deposit sites along the pipeline route[447]. The benefits of the management approach we have adopted for this assessment is it will:

- Provide better mitigation of the cumulative impact of the development;
- Identify rare artefact types, providing a much better understanding of how the landscapes and places were used. The relationship between activities at the site and local resources can be more thoroughly examined;
- Facilitate comparisons with other excavated sites, which may provide information about the types of activities that occurred on particular landforms and near particular resources; and
- Provide more meaningful mitigation outcomes rather than lots of smaller investigations.

Prior to commencement of development, a suitably qualified archaeologist should be engaged to develop an archaeological research excavation programme that aims to undertake comparison of intra-site patterning, Aboriginal occupation and use of analogous landforms between each bio-region. It is suggested that controlled manual open-area excavation methods are used (minimum 100 square metres in area) for each bioregion. It is further suggested that undisturbed landforms adjacent to high order streams or at resource intersection zones are targeted for the investigations in each bio-region.

11.3.2 Monitoring

Monitoring of development excavation works is recommended for areas that have potential to contain Aboriginal burials (as developed and presented in the predictive model mapping included in Appendix 5). The precise location and preservation of burials within these soil types cannot be predicted with any degree of accuracy. Nor can they be detected by archaeological survey because they are usually buried below current ground surfaces. Archaeological test excavation may identify some burials, but may not detect burials if they fall within un-excavated areas between test trenches. Therefore the only effective method for identifying

[447] *This approach follows that used in Biodiversity and Ecological management commonly referred to as 'off-setting' where strategically-focused management measures are adopted to mitigate against cumulative impact.*

burials is to undertake monitoring of the development excavation works by representatives of the local Aboriginal community and a suitably qualified archaeologist / physical anthropologist. In order for this management approach to be successful, contingency plans should be prepared in the event that skeletal remains are revealed during the excavation. Development of contingency plans will require further consultation with Aboriginal stakeholders to identify what each community considers to be appropriate management. Appropriate management is likely to vary in different areas of the pipeline to suit the particular requirements of each Aboriginal community. A range of contingency options may be required, including:

- stop work, record remove and re-bury off site;
- stop work, record, cover and divert pipeline away from the burial; or
- stop work, record, cover and directional drill underneath the burial (this option is likely to be preferred where it is suspected that more burials may be present.

Construction plans will need to be clearly marked with the areas requiring monitoring and protocols established to contact the project's consultant well in advance of work in these areas to ensure monitors are present on required days.

11.3.3 Avoid within 200m study area

The width of the 200 metre study area relative to the 30 metre width of likely impact (ie. trench and machinery access for pipeline) provides an opportunity to avoid many site types that are likely to be limited to specific locations. Such site types include scarred/carved trees, rock shelters, axe grinding grooves, engravings, earth mound, quarry, well, stone arrangement etc. These site types are usually limited in size and extent, therefore there is a high likelihood they can be avoided within the 200 metre study area by moving the 30 metre wide impact zone away from the individual site.

This management approach will require archaeological survey of relevant areas of sensitivity as defined in the predicative model mapping for the applicable site types. The archaeological survey would be conducted by a suitably qualified archaeologist with assistance from representatives of the local Aboriginal

community. The survey would aim to identify and accurately record applicable sites so that they can be avoided during development, and where appropriate fenced off or clearly demarcated as a sensitive area to be avoided. The site locations will need to be marked on relevant construction plans to ensure the site is not impacted by development works. Monitoring during the development works (by a suitably qualified archaeologist and Aboriginal community representatives) would also be required to ensure the site is identified in the field, construction crews are made aware of its location and the no ancillary or accidental damage is caused to the site.

Prior to commencement of development works, a suitably qualified archaeologist or archaeological consultancy should be engaged to undertake survey of the applicable areas of sensitivity shown on the constraints plans included in Appendix 5. The applicable site types where survey is required are described in Table 25 overleaf.

11.3.4 Avoidance Required

Site types that are likely to have a high level of cultural significance and sensitivity to the Aboriginal community will be considered as High Impact sites and will need to be avoided by all development works. This assessment has endeavoured to identify as many of these sites as possible, drawing on historical evidence and consultation with local Aboriginal communities. If any other culturally significant sites, such as former missions, cemeteries, bora/initiation sites, natural/mythological sites etc are identified, the pipeline will need to either divert around the site or under the site using directional drill.

Table 25: Standardised management approaches for Moderate-Low Impact sites and areas of archaeological sensitivity

Constraints related to the implementation of the management approaches set out in this table are included on maps in Appendix 5, in order to guide implementation of management procedures prior to and during construction.

Site Type	Method(s) of Identification	Management Approach (MOD and LOW impact sites).
1. Stone Artefact Scatter and Deposit	AHIMS, Survey, Test Excavation	Mitigation of impact to the many moderate and low impact sites by undertaking a programme of archaeological research based on targeted open-area excavation designed to address comparative inter-bioregional research questions.
2. Rockshelter (including with art, deposit, midden & burials)	AHIMS, Survey	Avoid within the 200m study area. Survey large rock outcrops and escarpments required.
3. Midden	AHIMS, Survey, Test Excavation	Avoid within the 200m study area (if possible). Mitigate impact by undertaking programme of archaeological research (described above). Survey areas within 1km of coast / estuary required.

4. Axe Grinding Groove	AHIMS, Survey	Avoid within the 200m study area. Survey of sandstone outcrop required.
5. Seed Grinding Dishes	AHIMS, Survey	Avoid within the 200m study area. Survey of Gilgai prone soil environments required.
6. Rock Engraving	AHIMS, Survey	Avoid within 200m study area. Survey of sandstone outcrop required.
7. Modified Trees (Scarred and Carved)	AHIMS, Survey	Avoid within 200m study area. Survey of remnant vegetation and mature trees required. Comprehensive survey required in Nandewar, Darling Riverine and Brigalow Belt South bioregions where modified trees are common
8. Quarry and/or Stone Tool Source	AHIMS, Survey	Avoid within 200m study area; or undertake further archaeological survey to determine significance.
9. Waterhole / Well	AHIMS, Historical Research, Oral Research	Avoid within the 200m study area.

10. Burials	AHIMS, Test Excavation, Monitoring, Historical Research, Oral Research	Monitoring of development excavation works in potential soil landscapes (Aeolian, alluvial and other soft soils) and other environments in which they can be found. Contingency measures required in the event that burials are found (the measures may vary in different areas according to Aboriginal community views).
11. Bora / Ceremonial	AHIMS, Historical Research, Oral Research and Survey	Avoidance required. All Bora/Ceremonial are High Impact Sites.
12. Natural / Mythological	AHIMS, Historical Research and Oral Research	Avoidance required for specific sites because they will be High Impact. For large cultural landscapes, further consultation with Aboriginal stakeholders required.
13. Mission, Cemetery, Historic Site	AHIMS, Historical Research, Oral Research and Survey	Avoidance required for specific sites that are culturally significant. For other sites with less significance but associations, such as former properties worked on by Aboriginal people, further consultation required for appropriate management.
14. Conflict Site	AHIMS, Historical Research	Avoidance required. All conflict sites are High Impact Sites.

	and Oral Research	
15. Other rare site types: Earth mound, Resource site, Stone arrangements.	AHIMS, Historical Research, Oral Research and Survey	Avoid within 200m study area or specific management measures required.

Table 26: Management recommendations for known moderate-low impact sites

Site Number	Site Type	Site Name	Bioregion	Closest Kp	Management Recommendations
20-4-0009	Artefact/ Axe Grinding Groove	Wilga	Brigalow Belt South	565	Mitigate artefact site by undertaking archaeological research programme. Avoid the axe grinding groove within the 200m study area. Survey to identify and accurately record site location required.
37-2-0886	Artefact	BM4	Sydney Basin	697	Mitigate by undertaking archaeological research programme

37-2-0891	Artefact	BM9	Sydney Basin	701	Mitigate by undertaking archaeological research programme
37-2-0892	Artefact	BM10	Sydney Basin	700	Mitigate by undertaking archaeological research programme
37-2-0893	Artefact (Isolated Find)	BM11	NSW North Coast	724	Mitigate by undertaking archaeological research programme
37-2-1503	Artefact (Isolated Find)	Abt11	NSW North Coast	755	Mitigate by undertaking archaeological research programme
37-6-0121	Artefact	Farley G	Sydney Basin	9	Mitigate by undertaking archaeological research programme
37-6-1500	Artefact (Isolated Find)	Site 12, Lot 12, Stanhope	Sydney Basin	691	Mitigate by undertaking archaeological research programme
38-4-0713	Artefact	Heritage Green 23/G	Sydney Basin	10	Mitigate by undertaking archaeological research programme
38-4-0730	Artefact (Isolated Find)	Heritage Green 22/A	Sydney Basin	10	Mitigate by undertaking archaeological research programme

38-4-0927	Artefact	Site 1, Thornton North, Lot 1	Sydney Basin	289	Mitigate by undertaking archaeological research programme
10-3-0010	Modified Tree (Carved or Scarred)	Watervale Yards; Moree;	Darling Riverine Plains	305	Avoid within 200m study area. Survey of remnant vegetation and mature trees required.

11.4 Recommendations Summary

We recommend the following tasks should be undertaken and be completed prior to completion of the Preferred Project Report (PPR):

1. The recommendations made regarding High Impact sites should be implemented. In particular, the proposed pipeline study area should be re-designed in the vicinity of the Euraba Mission site (KPs: 252) to ensure it avoids the Mission. A survey and further consultation with local Aboriginal Elders will be required to establish the extent of the Mission area;

2. Further detailed ethno-historical research is to be undertaken prior to development of the Preferred Project Report to determine the location and extent (if known) of the Wallalong Brush site AHIMS #38-4-0337 (near KP 770) and implement the other recommendations outlined in Table 24 for this site;

3. Additional oral history research is to be undertaken by *AHMS Pty Ltd* and Evelyn Crawford of DECC (refer to Section 4.4). The additional work aims to actively identify key knowledge holders and facilitating face to face meetings to identify any other culturally significance sites or places that may be affected by the pipeline;

We also recommend the following tasks be included as Statement of Commitments to be undertaken prior to or during construction:

4. As discussed in Chapters 1, 2 and 10 of this report, the quality and accuracy of our constraints mapping is directly related to the accuracy of the base data provided (or available). There may be an opportunity to more tightly define the areas of constraint shown in Appendix 5 by obtaining better base data related to vegetation, soils, geology and water (if available);

5. The recommendations made regarding known moderate and low impact sites described on Table 26 and shown in Appendix 5 should be implemented.

6. The recommendations made regarding further investigations and mitigation measures for areas of archaeological sensitivity as described on Table 25 and shown in Appendix 5 should be implemented. This will include archaeological survey work, further research, community consultation and monitoring as

described on Table 25 and in Appendix 5. In particular it should be noted that:

a. certain areas as outlined in the management recommendation tables and shown in the sensitivity mapping will require archaeological survey in partnership with representatives of the local Aboriginal communities

b. certain areas as outlined in the management recommendation tables and shown in the sensitivity mapping will require archaeological monitoring during development excavation works in partnership with representatives of the local Aboriginal community

c. certain areas as outlined in the management recommendation tables and shown in the sensitivity mapping will require additional research or Aboriginal community consultation

d. certain areas may, through access to more detailed information derived from ongoing investigations and consultations, prove to be areas of low sensitivity, requiring only standardised management measures

7. The recommendation regarding research-focused open-area excavations should be implemented and sufficient time should be allowed to prepare for and undertake the work. The archaeological research recommended would be done as mitigation of generalised impact on the many low and moderate impact artefact scatter / deposit sites along the pipeline route. A suitably qualified archaeologist or archaeological consultancy should be engaged to design the research excavation programme in consultation with the DECC and local registered Aboriginal community stakeholders;

8. An Aboriginal Cultural Education programme should be implemented to train and make all personnel working on the pipeline construction aware of their responsibilities regarding Aboriginal heritage;

9. A training programme should be developed for monitors to develop skills in assessing the significance of finds during the construction process. The

provision should establish and include protocols and thresholds to identify and manage sites;

10. Establish and implement a stop work and evaluation protocol in the event that high sensitivity sites are found during construction. The provision should include strict protocols, time-frames and thresholds to ensure work is not stopped each time a low to moderate significance site is found; and

11. Procedures set out in the *DECC Interim Community Consultation Requirements for Applicants 2004* should be used as the basis for continuing consultation with Aboriginal community stakeholders.

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