ENGINEERING WORKS OF THE GUNDITJMARA AT LAKE CONDAH (TAE RAK) AND TYRENDARRA

NOMINATION UNDER HERITAGE RECOGNITION PROGRAM OF ENGINEERING HERITAGE AUSTRALIA

Prepared for Engineering Heritage Australia (Newcastle)

Nomination under Heritage Recognition Program of Engineering Heritage Australia

Cover photo: The south–western corner of Lake Condah where most of the structures are located following the floods of 2010/2011

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1 INTRODUCTION

This proposal has been prepared by Bill Jordan (Engineering Heritage Australia (Newcastle) and members of Gunditj Mirring Traditional Owners Aboriginal Corporation.

For the first charter of the institution of civil engineers in 1828, Thomas Tredgold provided the definition "… the profession of a civil engineer, being the art of directing the great sources of power in nature for the use and convenience of man."

Well before the formation of the Institution of Civil Engineers and similar bodies in the 19th century and before any thought was given to a formal technical education for engineers, many examples of works conforming to that definition of civil engineering had been built over many centuries: these ranged from Roman aqueducts and Mesopotamian irrigation works to the early European canal builders of the 18th century. It is useful to keep the above definition in mind as it distinguishes works of civil engineering from those purely intended to provide shelter, although in many cases the two are inextricably mixed.

1.1 Background

The history of the aborigines of the western district of Victoria and details of the settlements they lived in prior to European settlement, whilst it is at times an interesting story, adding to the total cultural significance of the place, it has only passing relevance to this nomination, suffice it to say that few attempts were made by settlers, the colonial government and the state government, right up until the 1960s, to understand or preserve the culture which existed previously. It has only been since the 1970s that a serious attempt has been made to recognize the culture and investigate its scope.

Burnum Burnum has written[1] "…the traditional Aboriginal economy was much more complex and varied than most textbooks have described it, some white explorers and early administrators described villages of finely constructed huts, methods of harvesting and storing grass seeds to prolong the season by many months, as well as complicated fish and game traps. Some of the fish traps, as at Brewarrina, still exist, though damaged by time and vandals. In Victoria, a vast network of canals and ponds, which brought eels across a mountain range to be stored and harvested at will, has been discovered and partly excavated, gradually it is dawning on the outside world that life in the traditional Aboriginal way involved a great deal of knowledge and skill."

In the definitive monograph published in 1978 , Coutts et al[2] suggest that "…by the time Europeans arrived in western Victoria the Aboriginal inhabitants of the region had developed a diverse technologically-oriented economy, the Lake Condah structures provide further evidence for specialised and large-scale technological adaptation in the district …".

The structures at and near Lake Condah "comprise the remains of semi-circular stone-walled houses, cairns, free standing rock walls, stone-walled channels, and fish-traps and canals excavated into fractured and weathered basalt". As further mentioned by Coutts, "nor were they all small structures – some were more than 450 m long, greater than 0.5 m deep and around 0.5 m wide"; it is also mentioned that Dawson in 1881[3] described the construction of races and channels with clay embankments 0.6 – 1 m high and 250 – 300 m long. It is these structures which led to an assessment of the whole infrastructure and led to this nomination for recognition as engineering heritage.

1 *Burnum Burnum's Aboriginal Australia - A Traveller's Guide,* edited David Stewart, Angus & Robertson,1988.

2 *Aboriginal Engineers of the Western District, Victoria,* Coutts PFJ, Frank RK & Hughes P, Records of the Victorian Archaeological Survey, Number 7, June 1978

3 *Australian Aborigines: the languages and customs of several tribes of Aborigines in the Western District of Victoria, Australia,* George Robertson, Melbourne, 1881

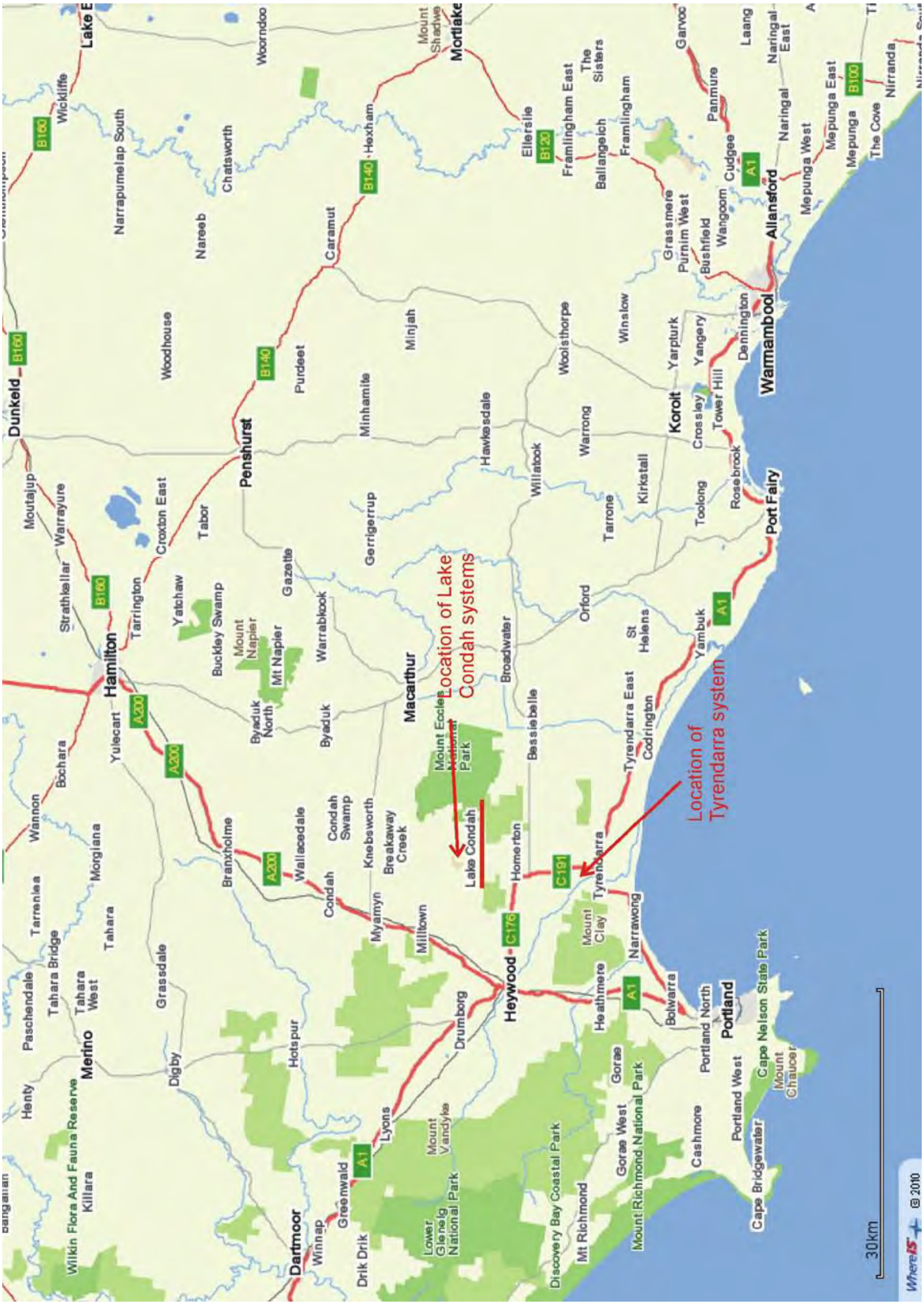


Figure 1: Locality map

Figure 2: A recent aerial photo of a section of Lake Condah, filled by the 2010/11 floods. The sites of two traps are indicated by arrow and the path of a channel is marked. Different systems are found relating to different water levels.

Figure 3: A dam is shown by red arrow and a trap by yellow arrow.

Figure 4: Photo taken in 2001 when Lake Condah was dry showing a weir built to form a pond with an opening for a fish trap.

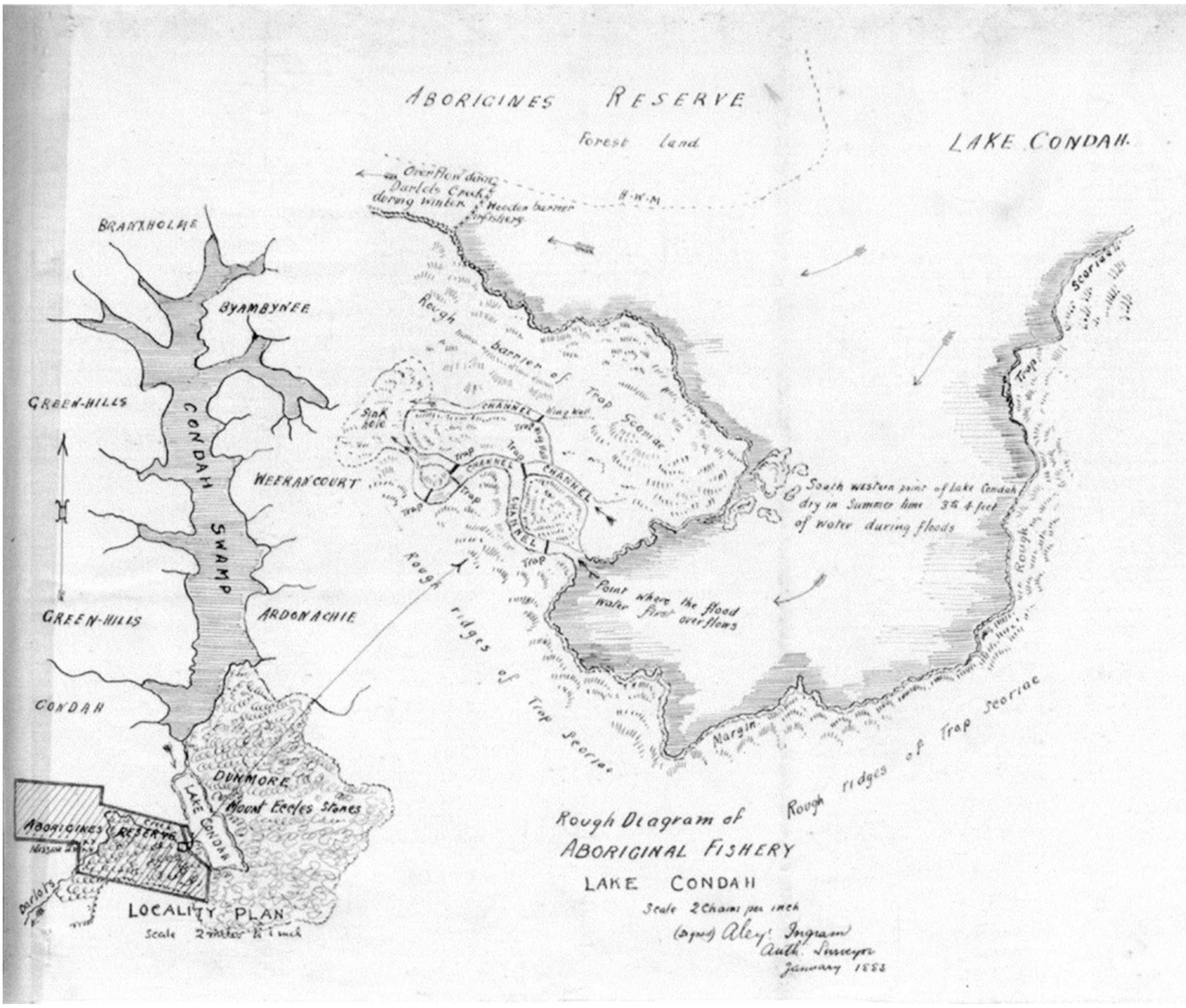


Figure 5: The first accurate mapping of the works at Lake Condah, drawn by surveyor Alexander Ingram in 1893 from observations made in 1883 in preparation for the first drainage scheme for Condah Swamp. The background and authenticity of this map are discussed in the paper "A Late-Nineteenth-Century Map of an Australian Aboriginal Fishery at Lake Condah" by Thomas Richards, Programme for Australian Indigenous Archaeology. School of Geography and Environmental Science, Monash University, Clayton, Victoria 3800, Australia and Aboriginal Affairs Victoria, Department for Victorian Communities, Melbourne, Victoria 3001, prepared for publication as part of a PhD thesis.

Figure 6: Photo, also taken in 2001, showing the remains of a channel at one of the higher levels which took water, an d fish, from the lake in the background to a reservoir behind the photographer.

Figure 7: Remains of another channel (from 2001) with the ranger standing at the mouth of the fish trap.

Fish traps are known from throughout Australia. The big difference at Lake Condah and Tyrendarra in western Victoria, which involved what we would call engineering, is that dams, stone races and canals were built to manipulate the water levels in the various basins of the lake and divert water from the creek at Tyrendarra into the engineered trap system. Coutts defines stone races as "above-ground structures for directing water" and canals as "channels dug into the ground", though observations on site suggest a blurring of this distinction. Stone races appear to have been built to force fish (mainly eels) into fish traps as lake waters rose or fell. Canals appear to have been formed to force water into various basins of the lake where natural flows were not reaching: in some cases it appears that these artificially filled basins were used as holding ponds to keep fish fresh until they were needed. Stone walls also appear to have been used to artificially define ponds.

The different systems of channels, races and ponds in Lake Condah were used at different lake levels, with transfer of activities from one to another as the lake level changed with seasons. At Tyrendarra the single system was associated with Darlot Creek and could be described as an off–stream facility into which the water of Darlot Creek was diverted as required by a stone weir.

Fish were caught in traditional woven traps placed in the channels, either supported by stone structures for single traps or by timber palisade–like structures across wider channels holding multiple traps.

Figure 8: Darlot Creek runs through Lake Condah and joins the Fitzroy River just before its mouth in the Southern Ocean. The creek had a dam upstream of this location (away from photographer) from which water was diverted into the Tyrendarra trap system in the land to the left.

In the only known instance in Australia, the Gunditjmara built stone and wattle–and–daub type huts for permanent settlement. Eels (mainly) and other fish were smoked in "smoking trees" and traded as well as being stored and consumed locally.

Figure 9: A smoking tree remaining near Lake Condah

The most recent description of the area and the aquaculture enterprise is contained in the 2010 book "The people of Budj Bim", a copy of which is available in conjunction with this nomination. This book gives good illustrations of the complex building forms found in the villages with groups of interconnecting circular stone houses for family groups.

1.2 Present Situation

Lake Condah was drained for grazing, starting in the 19th century with more "successful" and extensive work being undertaken in the early 20th century. Until recently, water could only be seen in the channel systems during very high floods. Figure 10 taken from the paper by Coutts et al, shows the operation of one of the channels during such a period.

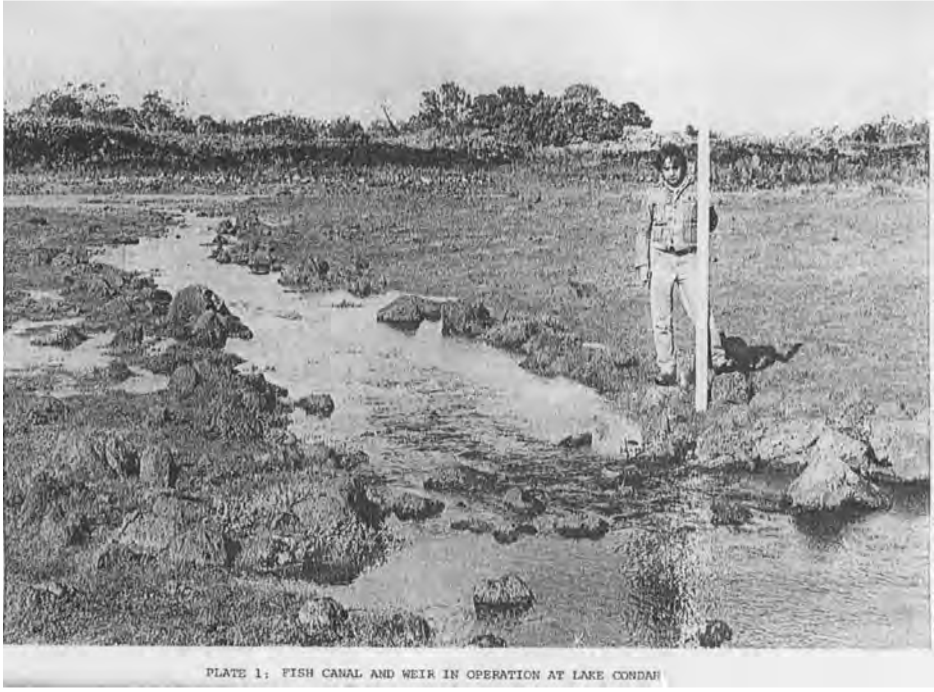


Figure 10: This picture, taken from the referenced paper by Coutts, shows the beginnings of the understanding of the system at lake Condah in the 1970s.

In recent years there has been a significant change in the circumstances at Lake Condah and surrounding areas. Native title has been granted to the community and archaeological investigations have begun again under a continuing

Figure 11: At Tyrendarra, an interpretation track has been established with descriptive signposting such as this at the remains of a weir and trap location.

Figure 12: At Tyrendarra, there are also reconstructions of earlier structures such as this timber palisade placed in a wide channel and holding a number of fish traps

program led by Dr Ian McNiven of Monash University.

In 2006 a new weir was built to block the European–constructed drainage channel. At the time of preparing this nomination, water (with eels) has been restored to the Lake Condah system and investigations are continuing to map and date the various parts of a very complex system.

Of particular significance is that the two sites at Lake Condah and Tyrendarra have been included on the National Heritage List.

Heritage Marker Nomination Form

The Administrator
Engineering Heritage Australia
Engineers Australia
Engineering House
11 National Circuit Barton ACT 2600

Name of work: Aboriginal Aquaculture works in western Victoria, specifically those at Lake Condah and Tyrendarra.

The above-named work is nominated to be recognized as an Engineering Heritage National Landmark

Location, including address and map grid reference if a fixed work: East and south–east of Heywood, Victoria, as shown on locality map.

Owner (name & address): Gunditj Mirring Traditional Owners Aboriginal Corporation, 4/48 Edgar Street, Heywood, Victoria, 3304..

The owners have been advised of this nomination and the relevant letter of agreement for the ceremony is attached (Appendix A).

Access to site: some parts of the various sites are accessible directly from public roads; other sections of the works can be accessed during guided tours run by Budj Bim Tours. A boardwalk with descriptive signs is accessible at the Tyrendarra site.

Nominating Body: Engineering Heritage Australia (Newcastle)

on behalf of Chair Of Engineering Heritage Australia (Newcastle)

Date: 24 April 2011

2 HISTORICAL

The history of the Lake Condah area is still being researched, mainly through archaeological means, and this can be found in the appended and referenced reports (see Appendix B). For popular reading the book "The People of Bidj Bim"[4] provides the most comprehensive current information.

The recent history can be best summarised by the Lake Condah Sustainable Development Project synopsis[5]:

Budj Bim National Heritage Landscape

Sacred to the Gunditjmara people, the Budj Bim National Heritage Landscape is home to the remains of potentially one of Australia's largest aquaculture systems.

For thousands of years the Gunditjmara people flourished through their ingenious methods of channelling water flows and systematically harvesting eels to ensure a year round supply. Here the Gunditjmara lived in permanent settlements, dispelling the myth that Australia's Indigenous peoples were all nomadic.

Dating back thousands of years, the area shows evidence of a large, settled Aboriginal community systematically farming and smoking eels for food and trade in what is considered to be one of Australia's earliest and largest aquaculture ventures.

This complex enterprise took place in a landscape carved by natural forces and which is full of meaning to the Gunditjmara people.

More than 30 000 years ago the Gunditjmara witnessed an important creation being reveal himself in the landscape. Budj Bim (known today as Mount Eccles) is the source of the Tyrendarra lava flow, which as it flowed to the sea changed the drainage pattern in this part of western Victoria, creating large wetlands. The volcanic activity lasted until about 7000 years ago, after the last ice age, and commencement of the aquaculture has been dated from as early as 6700 years ago, soon after the lava stopped flowing.

Figure 13: The crater of Mt Eccles today has a typical crater lake. Lava tubes and other distinctive features can be found nearby.

The Gunditjmara people developed this landscape by engineering channels to bring water and young eels from Darlot Creek to low lying areas. They created ponds and wetlands linked by channels containing weirs. Woven baskets were placed in the weir to harvest mature eels.

These engineered wetlands provided the economic basis for the development of a settled society with villages of stone huts, built using stones from the lava flow. Early European accounts of Gunditjmara describe how they were ruled by hereditary chiefs.

With European settlement in the area in the 1830s came conflict. Gunditjmara fought for their land during the Eumeralla wars, which lasted more than 20 years.

4 The People of Budj Bim, Engineers of aquaculture, builders of stone house settlements and warriors defending country, Wettenhall, Gib, with the Gunditjmara people, em PRESS Publishing, 2010.

5 http//:www.lakecondah.com/budjbim.html accessed 22/3/2011.

As this conflict drew to an end in the 1860s, many Aboriginal people were displaced and the Victorian government began to develop resources to house them.

Some Aboriginal people refused to move from their ancestral land and eventually the government agreed to build a mission at Lake Condah, close to some of the eel traps and within sight of Budj Bim.

The mission was officially closed in 1919 and the Lake Condah Aboriginal Church was demolished by authorities in 1957. The Gunditjmara continued to live in the area and protect their heritage and identity to see their Mission lands returned in 1987.

In 2007, the Gunditjmara achieved their recognition of their heritage and identity through the Federal Court of Australia's Gunditjmara Native Title Consent Determination. In 2008, Lake Condah was formally returned to Gunditjmara people by the State of Victoria.

The Gunditjmara manage the Indigenous values of the Budj Bim National Heritage Landscape through the Gunditj Mirring Traditional Owners and Winda Mara organisations. A large part of the area is the Mount Eccles National Park which is cooperatively managed by the Gunditjmara and Parks Victoria.

The Budj Bim National Heritage Landscape was declared by the Australian Government in July 2004 for the following outstanding national values:

- the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history;
- the place has outstanding heritage value to the nation because of the places' possession of uncommon, rare or endangered aspects of Australia's natural or cultural history;
- the place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period;
- the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.

3 HERITAGE ASSESSMENT

3.1 BASIC DATA

Item Name: Budj Bim Heritage Landscape Location (grid reference if possible): About 1250 ha, 20 km east-north-east of Heywood, and defined as the area within a circle of radius 2 km, centred at AMG point: 7221-740850; also see location map

Other/Former Names: Tae Rak (Lake Condah), Mount Eccles and lava flow (Budj Bim)

Suburb/Nearest Town: Heywood **State**: Victoria **Local Govt. Area**: Glenelg Shire Council

Owner: Gunditj Mirring Traditional Owners Aboriginal Corporation

Current Use: Interpretation, tourism and partial restoration of function. **Former Use (if any):** nil

Designer: Members of the Gunditjmara people **Maker/Builder**: Members of the Gunditjmara people

Year Started: 4700 BCE (?) **Year Completed:** Mid 19th century; restoration continuing.

Physical Description: Dams, races (above natural surface) and channels (excavated) built from basalt rock and clay to direct fish to traps and holding ponds. Other structures associated with the aquaculture enterprise such as smokimg tree and remains of stone huts in evidence.

Physical Condition: Much degraded by pastoralists in late 19th and 20th centuries, with much rock taken from structures for fencing. Restoration continuing.

Modifications and Dates: Structures continually modified during their up to 6700 year life to cater for changes in climatic conditions. Development ceased in 19th century as traditional owners were forced from their lands. Weir constructed in 2006 to block 20th century large drainage channel and restoration of system continuing.

Historical Notes: (see separate details)

Heritage Listings (information for all listings): listed at both State and Commonwealth level — see Appendix C — with UNESCO World Heritage status under consideration.

3.2 ASSESSMENT OF SIGNIFICANCE

Historical Phase: In the recent past the area has a strong association with the 19th century aboriginal wars which played a large part in bringing about the situation remaining today.

Historical Individuals or Association: not available

Creative or Technical Achievement: The system of ponds, wetlands, channels, weirs and fish traps in the Mt Eccles/ Lake Condah area are of outstanding heritage value. Gunditjmara people constructed the channels to manipulate water flows and the weirs to modify and create wetlands that provided ideal growing conditions for the shortfinned eel and other fish (Coutts et al 1978; Lourandos 1980; Williams 1988; Clark 1990a; Aboriginal Affairs Victoria and Kerrup Jmara elders Aboriginal Corporation 1993; Builth 2002, 2003). This system is confined to western Victoria and shows a high degree of creativity not found in freshwater fish traps in other parts of Australia. Unlike other places in western Victoria like Toolondo (Lourandos 1980) and Mt William (Williams 1988), the Mt Eccles/Lake Condah area contains all the elements that demonstrate the functioning of this system.

Research Potential: Offers continuing research potential for both the social and technical issues connected with its construction.

Social: The sites form the cultural focus of the Gunditjmara people and are essential to their recovering their identity.

Rarity: The various aquaculture sites in the Lake Condah area are the only ones known in Australia where substantial engineered structures were constructed to divert and contain water rather than the simple expedient of placing traps in streams and tidal flows seen elsewhere in Australia.

Representativeness: An outstanding example, and the most intact, of Aboriginal industry.

Integrity/Intactness: Sufficiently intact to allow continuing interpretation and restoration.

References: (see history)

Statement of Significance: (partly extracted from the National List entry) the Mt Eccles/Lake Condah system is markedly different from contemporary, historical and archaeological records or freshwater fish traps recorded in other parts of Australia. The fish traps in other parts of Australia provided a system for channelling fish in streams or rivers into traps rather than creating conditions for fish husbandry.

This system of eel aquaculture developed by Gunditjmara, including modified and engineered wetlands and eel traps, provided an economic basis for the development of a settled society. This system also resulted in high population densities represented by the remains of stone huts clustered into villages of between two and sixteen huts. This settled society demonstrates a transition from a forager society to a settled, stratified society ruled by chiefs with a form of hereditary succession that practised husbandry of fresh water fish.

Aboriginal people often used parts of the landscape that Europeans found difficult to access as a base for their resistance to encroaching European settlement. Gunditjmara used the Mt Eccles lava flow to launch their attacks. Because the lava flow is uneven and rocky, Europeans and their horses found it difficult to penetrate the area. This allowed Gunditjmara to escape from attempted reprisals and to continue their resistance to European settlement. The Mt Eccles lava flow provides a particularly clear example of the way that Aboriginal people used their environment as a base for launching attacks on European settlers and escaping reprisal raids during frontier conflicts.

Many Gunditjmara people living at Lake Condah Mission maintained their links to country. Following the proposal by Alcoa to develop an aluminium smelter at Portland, the Victorian government decided to return Lake Condah mission to the Aboriginal community in exchange for an agreement to the development of the smelter. However, the Victorian government was unable to pass the enabling legislation through its upper house and turned to the Commonwealth for assistance. In a rare example of the Commonwealth using its full constitutional powers granted under the 1967 referendum, the Commonwealth returned the mission to the Gunditjmara people under the Aboriginal Land (Lake Condah and Framlingham Forest) Act 1987.

Assessed Significance (whether national, state or local): National with likely UNESCO world heritage significance.

Image(s) with caption(s): (also see front cover, body of this document and appendices)

3.3 Interpretation Plan for Aboriginal Aquaculture Works at Lake Condah and Tyrendarra

3.3.1 INTERPRETATION STRATEGY

The strategy for interpretation of the engineering heritage works is laid out in EHA's "Guide to the Engineering Heritage Recognition Program" (September 2010).

In an overall sense, interpretation will be by: marking the works with an appropriate level of Heritage Marker; a public ceremony to unveil that Marker; and an interpretation panel which summarises the heritage and significant features of the works for the public.

It is proposed, in fact, to prepare interpretation panels at two locations. The first and most immediate requirement is for an interpretation panel at the Tyrendarra Indigenous Protected Area where public access is readily available and an interpretation centre has been constructed. At a later stage it will be appropriate to place a marker in a suitable location at or near Lake Condah Mission as conducted tours increase in number and the Lake Condah aquaculture is better interpreted and understood.

This plan provides a summary of the proposal for design, content, location, manufacture and funding of the proposed Tyrendarra and Lake Condah panels.

3.3.2 STRUCTURE OF INTERPRETATION PANELS FOR TYRENDARRA AND LAKE CONDAH

In accordance with the latest international designs, the panel will be a self-standing sign mounted at waist height, inclined at a 30 - 40 degree angle from the horizontal to facilitate viewing by a person standing facing the panel. The size of the panel itself will be approx. w:1200 mm x d:600 mm.

In accordance with recent practice it is proposed that the panel be steel with a vitreous enamel coating. The panel will be mounted on a solid and strong stand that deters/resists attack from vandals, but on the other hand provides a pleasing and clean appearance. In this instance it will be appropriate to mount the disk on the same stand as the panel(s). A laminated cardboard disk and panel should be provided for the principal community interpretation centre.

3.3.3 DESIGN PROCESS FOR THE PANEL CONTENT

The basic panel content will be proposed and initially laid out by EHA(N). The Gunditjmara people through the Gunditj Mirring Traditional Owners Aboriginal Corporation will be fully involved in the design of the panel for Tyrendarra and Lake Condah.

When a satisfactory design content has been achieved, it will be submitted for the approval of the EHA HR committee. Following approval of the draft design and content, it will be submitted to the EA's Marketing Manager in the Canberra office, who will finalise the graphical content and prepare the vector graphics file required by the surface-coating manufacturer.

3.3.4 CONTENT OF THE INTERPRETATION

In accordance with good interpretation practice (see Appendix D of the guide) the content of the panel will be divided into three themes for ease of understanding by the public. A summary of the proposed content is provided below.

The Themes and content are still to be fully approved by the aboriginal community representatives.

Title

The title of the interpretation is proposed to be "engineering the dreamtime". This title has been chosen to reflect the cultural approach of the traditional owners (see heritage assessment section). It also tries to avoid technical jargon in attracting the public's attention to the issues being presented.

Layout

In accordance with good interpretation practice (see Appendix D of the guide) the content of the panel will be divided into three themes for ease of understanding by the public.

Primary theme (cultural context)

A body of text will be derived from the nomination document to summarise the place of the engineering works in culture, time and geography.

Secondary theme (history)

The two major historical happenings, the volcanism which made it possible and the 19th century end to the traditional way of life will be simply explained.

Tertiary theme (engineering significance)

That the works are indeed engineering in nature and execution will be simply explained. It is the wish of the community elders that the engineering be highlighted as the historical and cultural attributes of the sites are explained on the National List sign which will be near the first EHA interpretation panel at Tyrendarra.

3.3.5 GRAPHICS

Map

If possible, it is proposed to include a map (possibly historical) showing the overall scheme as best known. This could be artistically added as a background to the panel. It is possible that a new stylised depiction of the works will be prepared by a Gunditjmara artist.

Images

Suitable historical (where culturally appropriate) and current photographs will be used to promote understanding of the site and works.

3.3.6 LOCATION OF THE INTERPRETATION PANELS AND HERITAGE MARKERS, FUNDING ETC.

Tyrendarra

The first location, and an appropriate site for a ceremony, is at the Tyrendarra Indigenous Protection Area where a marker is already erected to note the inclusion on the National List. The ceremony could be held at the marker site if weather permits or in the nearby Interpretation Centre if shelter is required.

Figure 14: The proposed location of the first interpretation panel and disk near the Tyrendarra Interpretation Centre (in the background) and beside the National Heritage list sign

Lake Condah Mission

The site can be better determined when plans for re–development of the site are more advanced.

Funding

An estimate for the cost of the interpretation panel at Lake Condah is $2,000 – $2,500.

EHA(N) and National Office will provide volunteer and in–house design resources for the above processes and actions in order to reduce this cost to a minimum (of mainly manufacturing costs).

It is considered that it would be appropriate for the manufacturing costs to be funded from the National Office budget as part of the Reconciliation Action plan.

Timing

During the week beginning 5 June 2011, a World Heritage Symposium is being hosted at Heywood by Gunditj Mirring Traditional Owners Aboriginal Corporation. A ceremony has been proposed for Tuesday 7 June 2011 at a time to suit transport arrangements for the various dignitaries.

Appendix A

Letter of approval from Gunditj Mirring Traditional Owners Aboriginal Corporation

4/48 Edgar Street
PO Box 216
Heywood VIC 3304

GUNDITJ MIRRING
Traditional Owners
Aboriginal Corporation

Phone: +61 (03) 5527 1427
Fax: +61 (03) 5527 1704
ABN 30 030 646 482 ICN 4672

21 March 2011

Bill Jordon
PO Box 141
Newcastle NSW 2300
Australia

Dear Bill

At their full group meeting held on 3 March 2011, the Gunditjmara traditional owners and native title holders confirmed their support for the proposed nomination to the Institute of Engineers Australia for their recognition of the significance of the traditionally engineering aquaculture structures along the Budj Bim National Heritage Landscape on Gunditjmara country in the far southwest of Victoria, Australia.

If you require further information please contact me on 03 5527 1427 or 0447 794 183 or damein@gunditjmirring.com.

Yours sincerely

Damein Bell

Damein Bell
Executive Officer

Appendix B

Current Archaeological reports

Archaeological Excavations at Muldoons Fishtrap Complex, Lake Condah

Ian McNiven

Report to Winda Mara Aboriginal Corporation and
Gunditj Mirring Traditional Owners Aboriginal Corporation

December 2009

Cultural Heritage Report Series: 50

Programme for Australian Indigenous Archaeology, School of Geography and Environmental Science,
Monash University, Clayton, Victoria 3800, Australia

MONASH University

Introduction

This report provides an overview of recent archaeological excavations at Lake Condah by Monash University. The research, which commenced in 2006, is a partnership project between Monash University, Winda Mara Aboriginal Corporation (and Gunditj Mirring Traditional Owners Aboriginal Corporation) and Aboriginal Affairs Victoria. Our research aims to shed light on the age of fish trapping structures. To date, the focus of our research has been a large and elaborate site known as Muldoons Trap Complex located on the southwest margin of Lake Condah. Since our work represents the first time any researchers have attempted to determine the age of a Gunditjmara fishtrap by archaeological excavation, we have needed to develop our own methodology. During the course of two excavation seasons (Feb 2006 and Feb/Apr 2008) we have continued to fine tune our methodology. As this report shows, we have produced new and exciting results on the age of the Muldoons site. However, more detailed research is required to determine the reliability of some new radiocarbon dates resulting from our 2008 excavations. This follow-up research is very important as it will determine whether or not Muldoons Trap Complex is one of the world's oldest known freshwater fishtraps.

Our three-way research partnership

Monash University

Dr Ian McNiven with students (2008 fieldwork)

Winda Mara Aboriginal Corporation

Daryl Rose at Muldoons fishtrap (2005)

Aboriginal Affairs Victoria

Tom Richards at Muldoons fishtrap (2005)

Gunditjmara fishtraps and aquaculture

Lake Condah is famous for its elaborate stone-walled fishtraps and associated aquaculture system. While these sites are an important part of Gunditjmara oral history, culture, identity and spirituality, it was only with research in the 1970s that the broader Australian community began to appreciate the scale and significance of these sites. This early research, directed by Peter Coutts from the Victorian Archaeological Survey, also highlighted the existence of eel holding ponds and the idea of eel farming and aquaculture. The scale and complexity of these traps and aquaculture system have also been documented further by Annie Clarke and more recently by Heather Builth. We now know that large areas of wetlands and waterways associated with Darlots Creek and the Lake Condah region were deliberately modified by the Gunditjmara and their ancestors to increase eel habitats and increase the production of eels.

How old is it and how did it develop?

The fact that eeling and trapping of freshwater fish is such a important part of Gunditjmara culture reveals that fishing facilities at places like Lake Condah have a long and complex history. While Gunditjmara know this history spans thousands of years, researching this history from an archaeological perspective has proved challenging. In the 1970s, Peter Coutts suggested the traps probably date mostly to the past 3000-4000 years because most other archaeological sites radiocarbon dated in the region (e.g. oven mounds, shell middens) also date to this period. A similar argument was also put forward by archaeologist Harry Lourandos. Despite these ideas, in reality the antiquity of the traps and aquaculture system and how it was developed and elaborated through the generations by the Gunditjmara remains a mystery. Up until our project, most archaeologists thought it was impossible to determine the age of stone-walled fishing facilities at places like Lake Condah.

A new approach to dating fishing facilities at Lake Condah

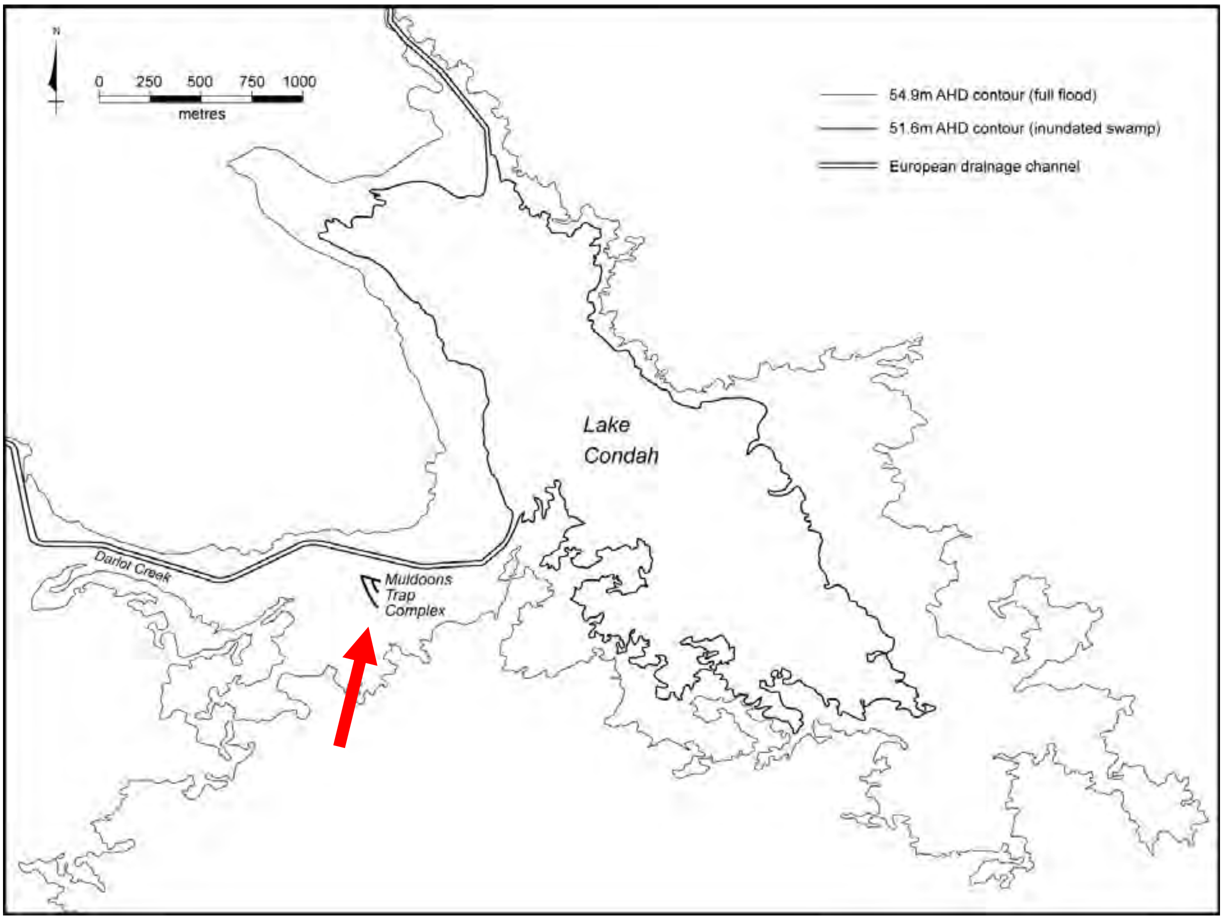
Our approach to shedding light on the age of these sites is straightforward – very carefully excavate layers of sediment that have built up around stone-walled fishing structures and determine the age of these sediments by radiocarbon dating fragments of charcoal mixed in with these sediments. These radiocarbon dates will provide insights into the age of the site because a stone structure must be at least as old as the age of sediments that partly bury it. The key to our dating technique is making sure we excavate surrounding sediments in very thin levels of only 2-3cm in thickness so we can document exactly how flood sediments built up around structures. In addition, we are making sure all charcoal fragments selected for radiocarbon dating represent wood that came in with flood sediments and not bits of burnt tree root from more recent times. This identification is done under the microscope. So what have we found?

Our excavations at Muldoons Trap Complex

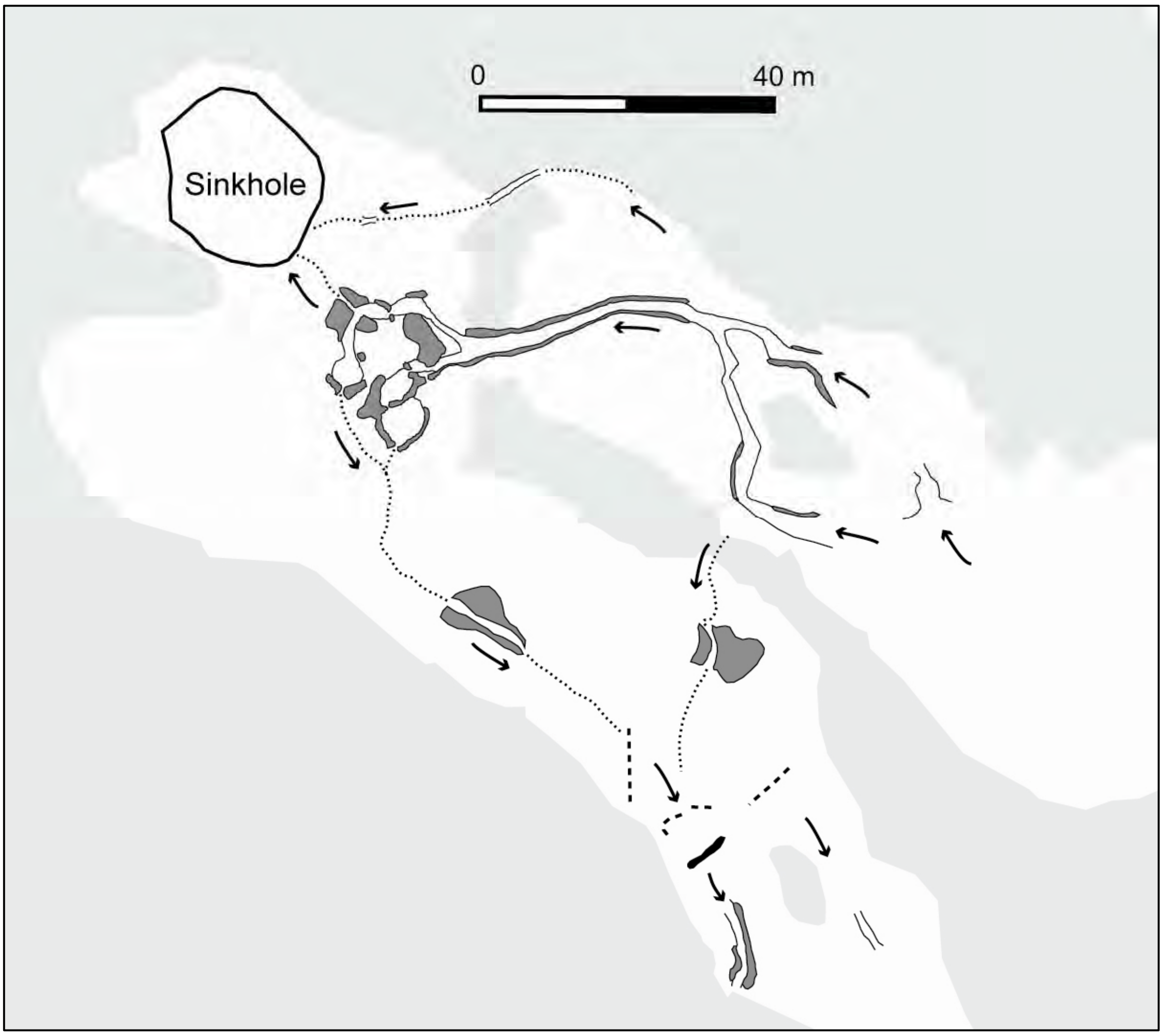
The site

Muldoons Trap Complex is located within stony rises located immediately west of Lake Condah (see **MAP 1**). It is part of a large number of stone-walled fishing facilities located along the southwest margins of the lake. The site consists of a complex system of channels constructed by removing basalt blocks from lava flow and building up the sides of these excavated channels using these and other basalt blocks from the area. Some sections of channel are straight while others curve around tight corners (see **MAP 2**). These changes in channel direction appear to be aimed at manipulating water flow speeds. In other locations, dam walls clearly were aimed at stopping the flow of water to allow ponding to occur.

Today, Muldoons Trap Complex is high and dry, but in the past prior to European drainage of the lake, flood waters (mostly during winter) would rise and flow through the site (see **PHOTO 1**). These flood waters contained fish which were fed through channels where they could be caught in intricately woven baskets set up at special points along the 350m-long trap. These special points can be seen today in the form of small walls across channels with narrow gaps which accommodated baskets. As such, the trap was as much about controlling water flows as it was about controlling the movements of fish. The key question we are interested in answering is – "when was this trapping facility built?".



MAP 1 – Lake Condah and location of Muldoons Trap Complex and extent of full flooding prior to European drainage.

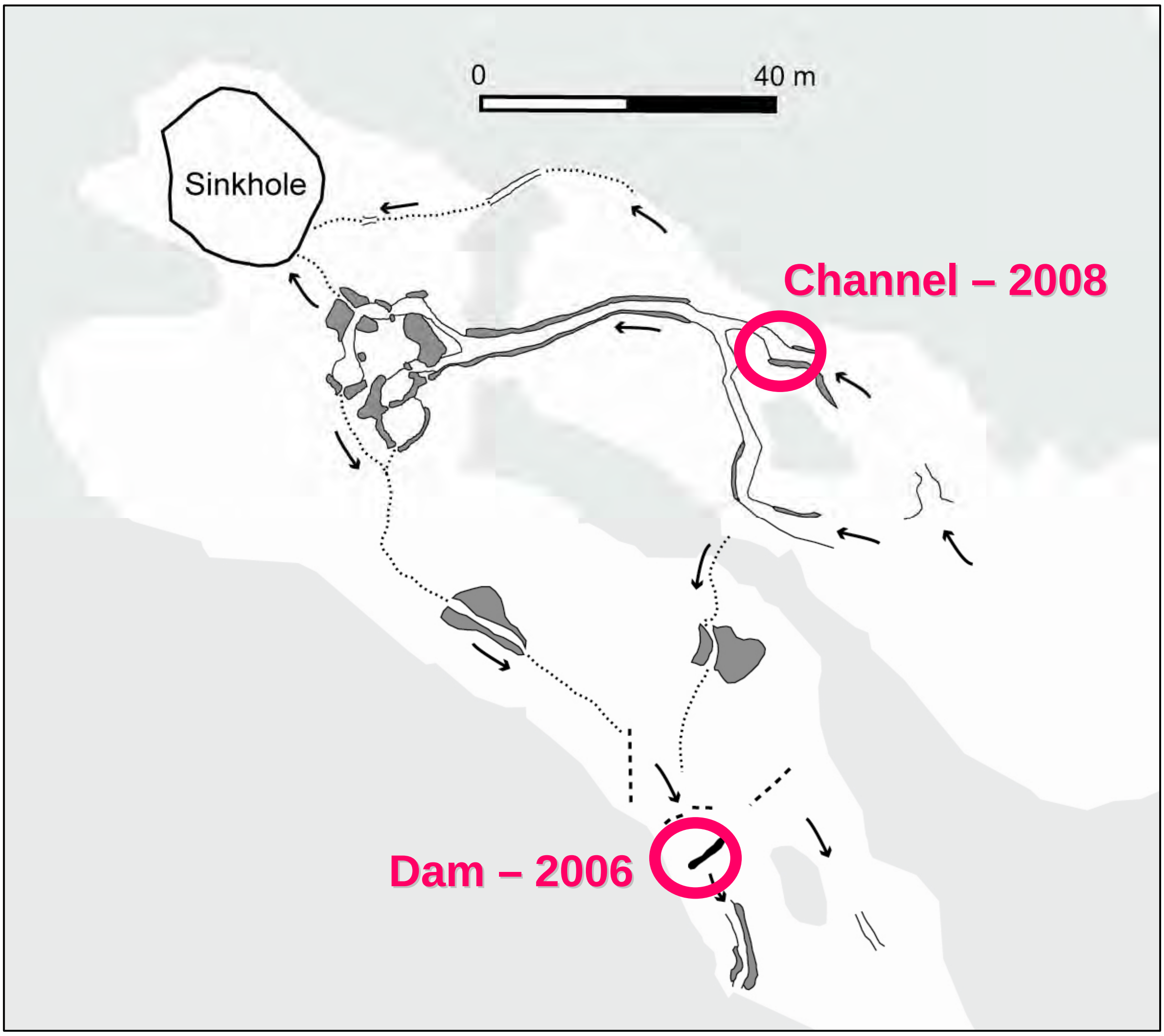


MAP 2 – Muldoons Traps Complex showing channels and original water flows (arrows).

PHOTO 1 – Lake Condah in partial flood, September 2008 (Photo: Damein Bell).

The excavations

Two locations were selected for excavation. Selection of excavation locations was aimed at documenting two different types of features at the site – dam walls and channels. The first location is a dam wall located towards the end of the site (**MAP 3**). The second location is a channel located towards the start of the site (**MAP 3**). As our methodology is evolving, we were interested in seeing if different features of a trap have different potentials for sediment build up and different potentials for dating. In the case of the dam wall, we predicted that water would pool in front of the wall and the potential for sedimentation would be considerable. In the case of the channel, we predicted that water flowing through this feature may not leave much sediment behind. As our subsequent excavations reveal, sedimentation was a feature of **both** features.



MAP 3 – Muldoons Traps Complex showing two excavation locations.

2006 – dam wall excavations

In February 2006, a small group of archaeology students from Monash University directed by Ian McNiven excavated a 1m x 1m pit up against the side of the dam wall. Excavations revealed that the bottom of the wall is located 30cm beneath the current ground surface. In other words, 30cm of flood sediments have accumulated to bury the lower half of the wall.

PHOTO 2 – Ian McNiven standing next to dam wall before excavation.

PHOTO 3 – Dam wall after excavation.

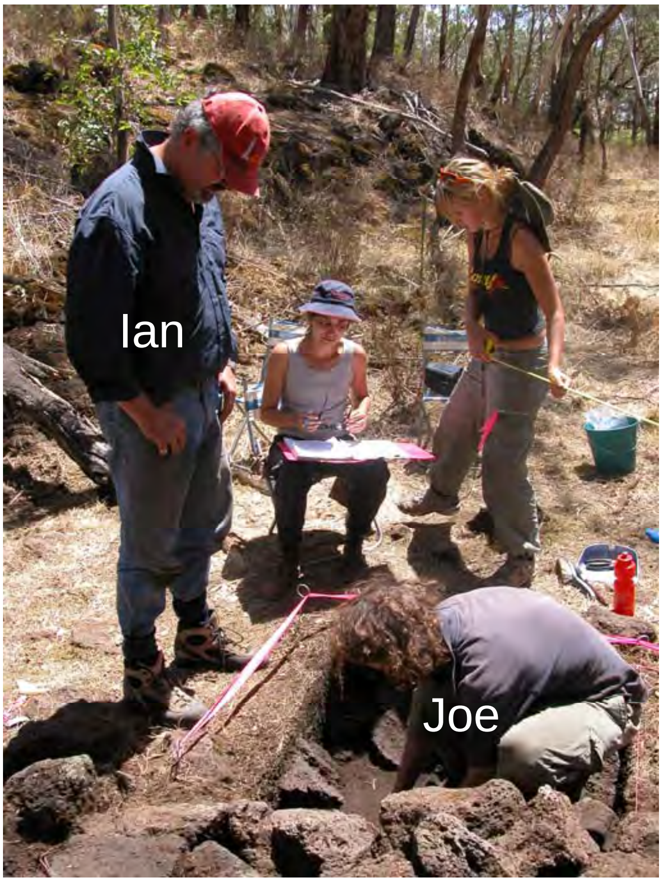


PHOTO 4 – Dam wall during excavation with students supervised by Ian McNiven and Joe Crouch. Sediments burying the lower sections of the wall were excavated carefully in thin level of 2-3cm thickness. Such fine excavation allows us to understand the history of sediment build up at the wall and to obtain a sequence of radiocarbon dates from different layers to date this history of sediment build up.

PHOTO 5 – Dam wall after excavation. Note that large basalt blocks making up the wall extend down under the ground surface and are resting on natural rubble. Excavations revealed that only the upper half of the wall is visible above the current ground surface. The lower half of the wall is buried by 30cm of flood sediments.

How old is the dam wall?

The figure below shows a cross-section of the excavation pit and the series of seven radiocarbon dates obtained on charcoal from different levels of sediment. These dates are shown down the right hand side of the drawing and are listed in years before AD 1950 (the convention for radiocarbon dates). The blue arrow points to the date obtained from the bottom of the wall. This date of 455±58 equates to around 500 years ago, indicating that the wall was built around this time.

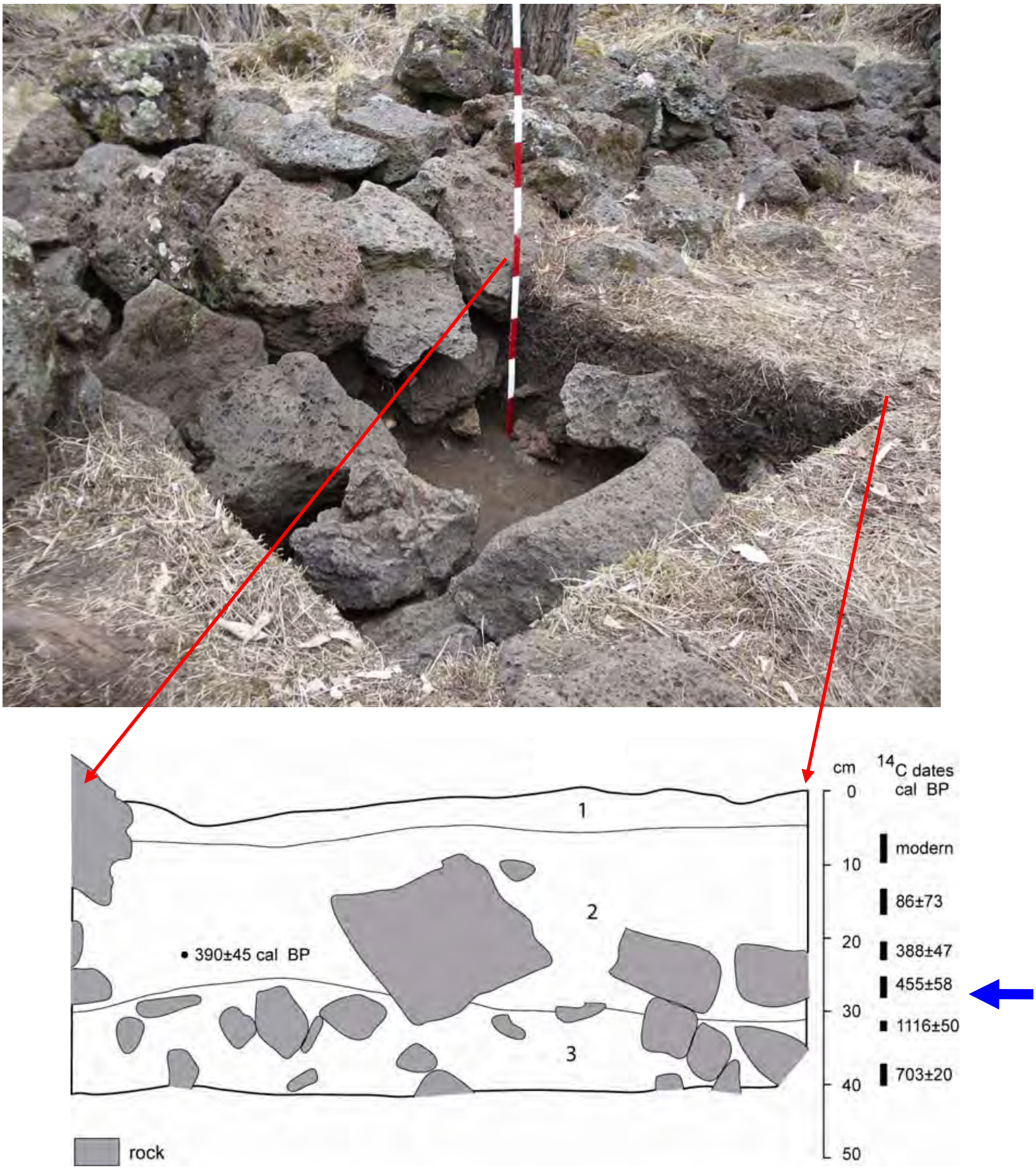


FIGURE 1 – Photo and drawing of cross-section of excavation pit at dam wall. Flood sediments burying the lower half of the wall were divided into three major layers. Layers 1 and 2 represent flood sediments down to a depth of 30cm. Layer 3 represents the original ground upon which the wall was built.

2008 – channel excavations

In February and April 2008, another small group of archaeology students from Monash University and Gunditjmara community members directed by Ian McNiven excavated a line of 1m x 1m pits across a channel feature located near the start of the trap complex (see **PHOTOS 6 & 7, FIGURE 2**). Excavations revealed that the bottom sections of the channel had been filled in by some 30cm of flood sediments.

PHOTO 6 – Channel feature before excavation.

PHOTO 7 – Channel feature after excavation.

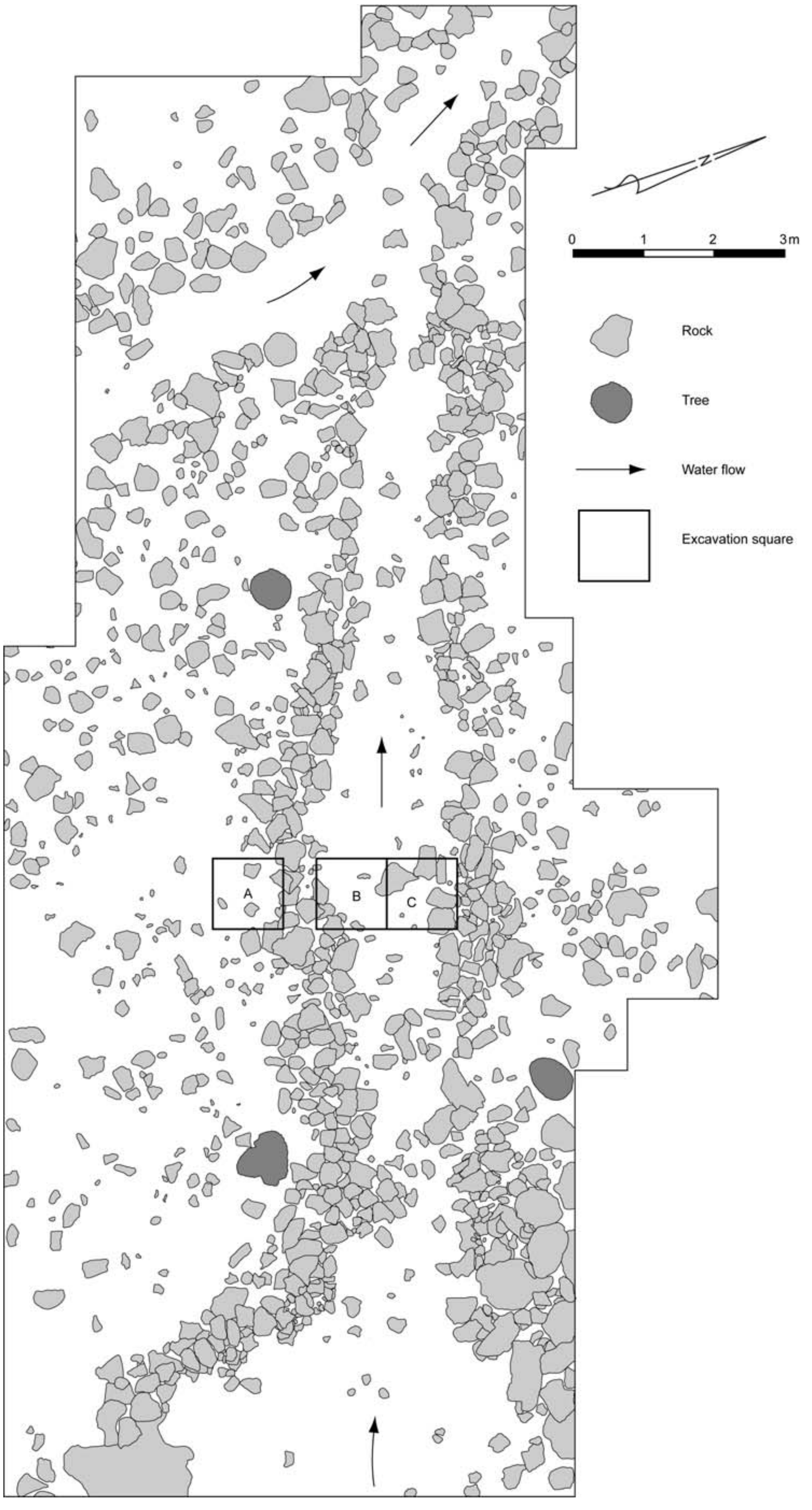


FIGURE 2 – Detailed plan of channel feature showing location of three 1m x 1m excavation pits (Squares A, B and C).

PHOTO 8 – Damein Bell and Ian McNiven having a yak with Monash University students about the progress of excavations at the channel feature.

PHOTO 9 – Excavating channel-fill sediments, looking northeast. Back row (L to R): Ian McNiven, Rob Skelly and Joe Crouch (Monash University), front row: Peter Saunders (Winda-Mara Aboriginal Corporation).

How old is the channel?

The figure below shows a cross-section of the excavation pits and six radiocarbon dates obtained on charcoal from different levels of sediment. The blue arrow points to the date obtained from the bottom of the channel. This date of 5870±50 equates to around 6700 years ago – but does this mean the channel is this old? Maybe, maybe not – see next section.

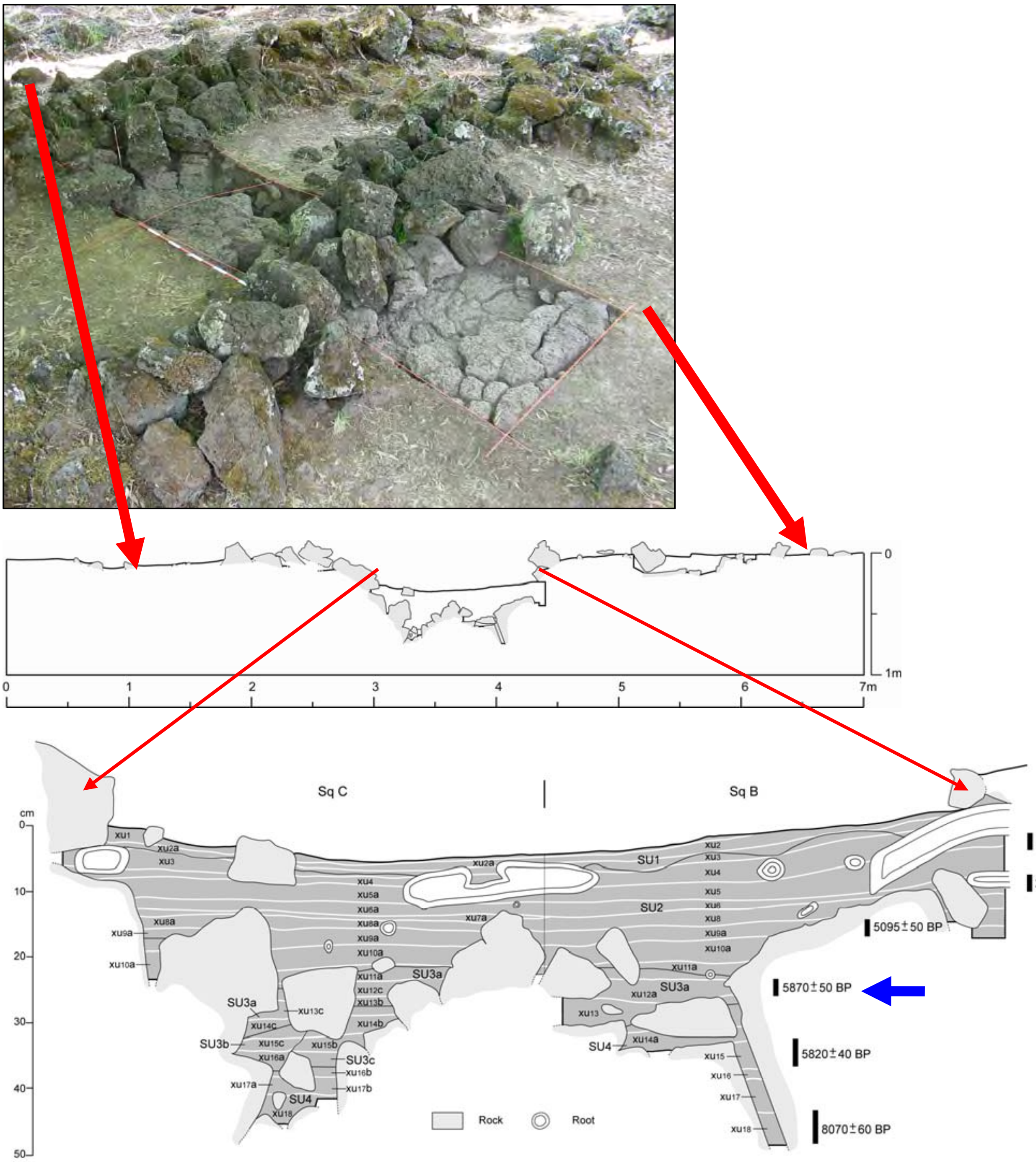


FIGURE 3 – Photo and detailed drawing of cross-section of excavation pits running across channel feature. The drawing also shows the position of each of the thin levels excavated (XU1, XU2 etc) and division of the flood sediments into four major layers (SU1 to SU4). Layers SU1 down to SU3a represent flood sediments which filled the lower 30cm of the channel. We also excavated down another 25cm amongst rocks and cracks in the basalt to see what occurs under the channel.

Is the channel really 6700 years old?

The date of 6700 years ago for the base for the channel is potentially very significant. If correct, the channel and the fishtrap would represent one of the world's oldest known freshwater fishtraps. Because of this potential significance, we need to be very careful and double check all our results before accepting the date. One potential complicating factor is that we found 6700 and 8900 year old flood sediments within natural cracks in the basalt under the channel. Is it possible that the trap was only built around 500 years ago and when blocks of basalt were removed during channel construction ancient 6700 to 8900 year old sediments between the blocks simply fell out and settled into the base of the newly made channel? This alternative explanation for the old dates at the base of the channel is a real possibility and clearly we need to resolve this issue before we can say the channel is really 6700 years old or not.

Further work needed to resolve the dating issue

What can be done to help resolve the question of the reliability of the 6700 year old dates for the lower parts of the channel fill? In short, we need to do more excavations in the same location to obtain block samples of sediment for further radiocarbon dating and for more detailed analysis of sediment particles. Soil scientists should be able to tell us if the lower sediments are either flood sediments that fell in from cracks in the basalt or flood sediments laid down after the channel was created.

Summary and conclusions

Our excavations at Muldoons Trap Complex have revealed that flood sediments have indeed buried large sections of the lower parts of stone features. This finding opens up the potential for determining the age of these features by dating charcoal found mixed in with the sediments. Excavations at the dam wall indicate this feature was built around 500 years ago. Excavations at the channel have revealed channel fill sediments containing 6700 year old charcoal. If the channel was built this long ago, it would represent one of the world's oldest freshwater fishtraps. However, other factors may be at play and the 6700 year old charcoal may have washed into the bottom of the channel when the channel was built only 500 years ago. We need to do more excavations at the site to obtain more samples of flood sediment to resolve this mystery.

Acknowledgements

Monash University would like to thank the Gunditjmara community for the special opportunity to undertake partnership research and the privilege to research the history of fishtraps at Lake Condah. All of us from Monash University (staff and students) that have worked on the project have found it extremely rewarding. In particular, we would like to thank Damein Bell for all his assistance over the past four years. Too deadly! We hope our research relationship continues.

Gunditjmara
Archaeology Overview

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SECTION 2:
RESOURCE USE

2.1 MARINE ANIMALS

The coastline of the Gunditjmara is one of the most archaeologically studied sections of Australian coastline. Most of the research has taken place in the west along Discovery Bay and around Cape Bridgewater. Abundant evidence exists of Aboriginal use of near-shore marine resources. In contrast, 'the Aboriginals of the Western District do not seem to have been ocean-going people. So far there is no convincing evidence from the many middens that dot the shoreline to indicate that Aborigines exploited off-shore marine resources' (Coutts 1985:26; see also Coutts 1981a:15).

2.1.1 Marine shellfish

Coutts' (1981a:18) suggestion that 'on the coastal fringe [of Victoria], the most important food resource was shellfish' is bourn out by archaeological evidence in the study region. Most shellfish remains are found in shell middens (sites dominated by shells). All researchers agree that these sites form part of campsites and the shells are the remains of shellfish meals. Richards & Johnston (2004:107) state that while it is well-recognised that on a world scale shellfish tend to contribute a minor part of coastal hunter-gatherer diets, in terms of the Cape Bridgewater site complex the 'very real possibility exists that shellfish was essentially the major, if not sole, source of protein consumed while people occupied this landscape'.

Discovery Bay midden shells reveal exploitation of two major habitats: sandy beaches for pipis (*Donax deltoides*) and Shining Wedge Shells (*Donacilla nitida*); rocky headlands for Beaked Mussels (*Austromytilus rostratus,* a.k.a. *Brachidontes rostratus*), Variegated Limpets (*Cellana tramoserica*), Dog Winkles (*Dicathais textilosa*), Warreners (*Turbo undulata*) and Mussels (*Mytilus planulatus*); and soft sediments for Mud Oysters (*Ostrea angasi*) (Godfrey 1989:66-67). Richards & Johnston (2004:Table 2) report exploitation of similar marine habitats at nearby Bridgewater Bay based on analysis of excavated middens at Cape Bridgewater. Here 17 shellfish species variously formed local diets over the last 4000 years, dominated by Narrow Wedge Shells (*Paphies angusta*) (sandy stratum) and Beaked Mussel (*A. rostratus*) (rocky stratum). Some of the very old Discovery Bay middens are composed of Mussels (*Mytilus planulatus*), a rocky platform species no longer found in the area (Godfrey 1989:66). One of the middens at Lake Yambuk 'is composed almost entirely of the mussel Brachidontes rostratus' (Gill 1976:37).

Richards & Johnston (2004:106) document changing use of shellfish species through time at Cape Bridgewater. The trend was one of increasing focus and specialisation on Narrow Wedge Shells with 'Beaked Mussel use notably declining over time'. At the nearby site of Bridgewater South Cave, Lourandos (1983:83-84) found that the proportion of shellfish increased in the local diet within the last 500 years, a situation explained possibly as a result of sea level rise and the closer proximity of the coast to the site.

It is generally accepted that shellfish were gathered by hand. Most shellfish were probably collected at low tide but some sub-tidal species 'require effort to locate' (Richards & Johnston 2004:106). Fireplaces with charcoal and stones found at the Cape Bridgewater midden complex imply shellfish were cooked 'by simply placing them on beds of hot coals and/or hot rocks' (Richards & Johnston 2004:107). Warreners may have been subject to 'mechanical processing' (i.e. smashed open) to assist with meat extraction (Richards & Johnston 2004:107). Witter (1977:57) suggests that fireplaces with limestone beach cobbles found associated with middens at Discovery Bay were where 'shellfish or perhaps plant foods were cooked'.

2.1.2 Marine fish

Fish bones are rare components of middens along the regions' coastline. For example, no fish bone was recovered during the extensive excavations at the Cape Bridgewater midden complex (Richards & Johnston 2004:107). Similarly, Lourandos (1983:83) reported that fish bones 'occur in very low frequencies' at nearby Bridgewater South Cave. Mulloway otoliths (ear bones) have been recorded in 'sites around the Glenelg estuary' (Godfrey cited in Head 1987:453). It seems doubtful that the paucity of fish bones is due to poor preservation as similar types of midden deposits across other parts of eastern Australia, such as the Sydney region (Attenbrow 2002:63-66) and SE Queensland (Ulm 2002; Walters 1989), reveal considerable fish bone assemblages.

2.1.3 Marine mammals

Seals

Lourandos' (1983:83, Table 1) excavations at Bridgewater South Cave revealed that local Aboriginal peoples have been using seals as a food for at least 11,000 years BP. However, from the 'very low' frequency of seal bones in the site it appears seal hunting was rarely undertaken whilst camped at this site (Lourandos 1983:83).

Whales

Head (1987:448) hypothesizes that 'stranded seals and whales would have provided temporary, although neither reliable not predictable, food resources' for Aboriginal people of the Discovery Bay region (see also Lourandos 1997:64-65; Williams 1987:313). While archaeological evidence for seal consumption exists at Bridgewater South Cave (see above), no archaeological evidence for whale consumption has been found. However, historical records make it clear that Aboriginal people ate beached whales. For example, Dawson (1881:18) reports that the 'Peek whuurong' (Port Fairy district) would 'bury' whale meat. Similarly, in his 1841 diary George Augustus Robinson (Chief Protector of Aborigines in Victoria 1839-1849) reports a massacre (known today as the 'Convincing Ground Massacre') of Aboriginal people on the beach at Portland Bay by men associated with The Henty's whale fishery in the 1830s. Robinson stated that 'the native considered [the whale] theirs and which it had been for 1000 of years previous' (for details see Clark 1995:17-22; Critchett 1995:77-80).

2.2 FRESHWATER ANIMALS

2.2.1 Freshwater shellfish

The 13 'tiny pieces of shell' recovered from the PAL-20 stone hut site near Condah Swamp 'are probably freshwater mussel (*Velesunio* sp.)' (Wesson 1981:69; see also Frankel 1991:91). Radiocarbon dates associated with the sites suggest occupation immediately before and/or after early European contact (see below).

2.2.2 Freshwater fish (non-eels)

Until three years ago, no direct archaeological evidence (e.g. bones) existed for exploitation of freshwater fish within the study region. However, Lane (2002b) reports fish bones excavated from two stone hut sites at Tyrendarra near the junction of Fitzroy River and Darlot Creek.

2.2.3 Eels

Not withstanding the possibility that Lane's (2002) fishbone finds at Tyrendarra are from eels, no direct archaeological evidence (e.g. bones) exists for exploitation of eels (e.g. Short-finned Eels, *Anguilla australis*) within the study region or any part of Victoria (Builth 2002:177). However, Builth (2002) presents evidence for eel lipid (fat/oil) residue within smoking trees in the Lake Condah district (see below). Furthermore, extensive research on trapping facilities across various parts of the study region, particularly around Lake Condah, provides strong indirect evidence for large-scale exploitation and consumption of eels (see below). Coutts (1981a:12) posits that 'eels provided one of the most important target food resources in the central Western District'. This view follows Dawson's (1881:94) comment that 'eels are prized by the [Western District] aborigines as an article of food above all other fish'.

2.3 TERRESTRIAL ANIMALS (INCL. BIRDS)

2.3.1 Coastal areas

Marsupials

Lourandos' (1983:83, Table 1) excavations at Bridgewater South Cave revealed that local Aboriginal people have been using a wide range of terrestrial animals as food for at least 11,000 years BP. According to Lourandos (1983:83), 'emphasis can be seen to have been placed upon the hunting of the larger animals such as Grey Kangaroo (*Macropus giganteus*), pademelon (*Thylogale billardierii*), wombat (*Vombatus ursinus*), Ringtailed Possum (*Pseudocheirus peregrinus*) and Brush-tailed possum (*Trichosurus vulpecula*)'. However, as a general rule, hunting was an 'ephemeral' activity throughout the site's history of occupation (Lourandos 1983:84). Lourandos (1976:189) concluded that the Bridgewater Caves 'served as temporary hunting camp, representing hinterland aspects of a coastal economy based predominantly on the medium to large land mammals'.

Birds

Archaeological evidence for exploitation of birds' eggs is meager, with Godfrey (1983:55) mentioning that 'occasionally fragments of egg shells have been found' in Discovery Bay middens.

2.3.2 Inland areas

Marsupials

Archaeological research has yielded few insights into terrestrial animal use by inland Gunditjmara. Much of this limitation is due to poor preservation. For example, excavation at the Palmer stone house site (PAL-20) located adjacent to the SE corner of Condah Swamp revealed 680 bone fragments but 'the majority are too small, too fragmented and too burnt to be identified and the economic aspects of the site remain obscure' (Coutts 1982:41). However, Wesson (1981:68) was able to identify some of the bones as from mammals, most probably 'macropod'. Radiocarbon dates associated with the sites suggest occupation immediately before and/or after early European contact (see below). The single bone fragment recovered from Kinghorn stone hut site (KH-12) located 10km north of PAL-20 is thought to be from 'a large mammal long bone' (Wesson 1981:87). This site dates to the early post-contact period (see below).

2.4 VEGETATION RESOURCES (FOODS)

Direct archaeological evidence for plant food use in the study region is limited by poor preservation and lack of research. In rare situations such as Bridgewater South Cave, the 'preservation of … vegetational remains was excellent throughout' but no further details are available (Lourandos 1976:189).

2.4.1 Coastal swamps

Little direct archaeological evidence exists of plant foods due largely to poor preservation conditions. Godfrey (1983:57) uses indirect evidence to suggest that Aboriginal people visiting Discovery Bay most likely also exploited local swamp resources. He notes that apart from the close proximity of middens to local swamps, it is 'plausible' that the uncharacteristic lake-like form of these swamps during the early contact period was as result to reed reduction caused by Aboriginal harvesting and firing. Significantly, 'ovens' around these swamps feature 'clusters of burnt calcarenite blocks' but 'never … any bone or shell remains' (Godfrey 1983:57). Godfrey (1983:57) concludes that the form and location of the ovens 'would lead one to suggest that plants harvested from the swamp were being brought to the ovens to be cooked'. Head (1987:457) goes so far as to suggest that swamp plant foods were the key factor attracting Aboriginal seasonal use of coasts in the study region: 'Despite the high visibility and good preservation of shell middens, "coastal" occupation is not necessarily directed primarily towards marine exploitation, and the shore and coastal waters of Australia's southern coast were not the automatic and bountiful sources of food that has been suggested for the east and north coast'.

2.4.2 *Typha* (a.k.a. cumbungi, bulrush)

Typha is a well-known, historically-recorded plant food staple of Victorian Aboriginal peoples that was obtained from swamps and waterways (Gott 1982b; Zola & Gott 1992:7-9). Recorded burning of *Typha* may have been associated with harvesting and even cultivation (Gott 1982b:61). Based on analysis of cores taken from Bridgewater Lakes at the eastern end of Discovery Bay, Head (1987:446, 1988) suggests evidence for Aboriginal burning (and presumably harvesting by extension) of *Typha* swamps extends back to 6800 years BP 'with no visible intensification of exploitation or apparent diminution of the resource base in that time' (Head 1983:78). Both Godfrey (1983) and Head (1983, 1987) have suggested that Aboriginal burning of swamps/lakes kept reeds at bay and promoted areas of 'open water'. Head (1983:78, 1987:454) cites Gott's (1982b:61) comment that 'sufficiently heavy harvesting and yearly firing [of *Typha*] could keep stands from increasing in size, but would promote growth of remaining plants'. While burning most likely decreased the *Typha* resource, it would also have allowed the shores of swamps/lakes to 'have been much more open' (Head 1987:451, 454) to allow easier access to other swamp/lake resources such as eels, tortoises and nesting birds.

2.4.3 Inland

Coutts (1985:40) suggests that grindstones made from basalt or sandstone found on stone artefact scatters across the Western District may have been associated with 'processing … plant foods'. Residue analysis of bottle glass artefacts excavated from a stone hut (KH-12) near Wallacedale indicates some of the tools were associated with 'subsistence activities' such as scraping tubers (Wolski 2000:Chapter 7; see also Wolski & Loy 1999) (see below).

2.4.4 Murnong (a.k.a. Yam Daisy, *Microseris lanceolata*)

Historically, *murnong* was a staple of Victorian Aboriginal people (Gott 1983). While direct archaeological evidence for use of *murnong* has yet to be found, Wolski and Loy's residue analysis is consistent with its use (see above). Furthermore, Balme and Beck (1996:47) advance a 'speculative hypothesis' that earthen mound sites (see below) of southeastern Australia 'were originally purposefully constructed as gardens' for growing the staple *murnong*.

2.5 VEGETATION RESOURCES (RAW MATERIALS)

2.5.1 Wood & bark

Edge-ground stone axes which have been found across Gundijmara lands (see below) imply chopping of wood and/or bark and use of trees as a source of raw materials. Axes were numerous in the Portland region (Mitchell 1949:41, opp. 70, 172). By far the most obvious archaeological evidence for use of wood is charcoal from fires found in all excavated occupation sites (middens, mounds and stone huts) within the study region (see below).

SECTION 3: RESOURCE SITES & SETTLEMENT PATTERNS

3.1 COASTAL

3.1.1 Middens

Nearly all of the middens are open sites (usually in sand dunes) with some midden deposits located within caves and rockshelters on headlands. The region features one of the highest concentrations of shell middens recorded along the Australian coastline. The region also reveals some of the earliest evidence for Aboriginal use of marine resources in eastern Australia and the earliest evidence for exploitation of marine resources along the Victorian coastline (Godfrey 1989:68). Direct radiocarbon dating of shells from Discovery Bay middens ‘shows that shellfishing has occurred over the last 10,000 years’ (Godfrey 1989:67). Excavations by Lourandos at Bridgewater South Cave in the mid-1970s revealed marine shellfish such as pipi (*Donax deltoides*) in levels radiocarbon dated back to 11,390±310 years BP (Before Present) (Head 1985; Lourandos 1983).

Discovery Bay

Godfrey (1989:67) reports ‘well over 1000 middens’ within the Discovery Bay National Park. Most of the Discovery Bay middens are located ‘less than 200 m behind the foredune’ with some middens located up to 2.5km inland (Godfrey 1989:Figure 1 site location map). Discovery Bay middens range in size from huge midden complexes spread over 2km parallel to the beach to small (single meal) clusters of 1m^2 (Godfrey 1989:Figure 1; personal observation 1983). Some of these sites are associated with the manufacture of stone tools from flint collected from the adjacent beach (see below).

Descartes Bay

Coutts (1967:33, 1968) mentions stone artefacts (and implies middens) at Descartes Bay and the adjacent area of Lakes Road.

Cape Bridgewater

Extensive midden deposits exist in the Cape Bridgewater area. The nature of these sites has been determined by excavations at Bridgewater South Cave (e.g. Lourandos 1983) and at the western end of Bridgewater Bay (Richards & Johnston 2004).

Lake Yambuk

Massola (1968a:135) reports ‘a very large midden on top of the consolidated sand dune immediately to the west side of the mouth’. According to Gill (1976:37) ‘a large number of middens occur on the west side of Lake Yambuk’.

3.1.2 Quarries

Discovery Bay

Aboriginal peoples of the western coast of Victoria are well-known in the archaeological literature for their use of marine flint. Flint nodules outcrop on the seabed off the coast. The nodules anchor kelp and wave action and currents dislodge the nodules that are rafted with the kelp onto nearby beaches (Witter 1977:52). Some of the beached nodules are over 5kg in weight and provided local Aboriginal peoples with an excellent raw material to craft a wide range of flaked stone tools. Not surprisingly, many of the middens along Discovery Bay are littered with flint artefacts. Such is the scale of flint tool manufacture that Hiscock and Mitchell (1993:68) in their Australian-wide survey of Aboriginal quarries describe Nobles Rocks at Discovery Bay as 'the best documented' example of a non-axe/grindstone quarry in southeastern Australia. In deed, Witter (1977:55) notes that Discovery Bay was a famed location for amateur artefact collectors in the formative years of Australian archaeology (e.g. Massola 1969:42; Mitchell 1949:7, 75, 90, 171, opp 187; see also Campbell and Walsh 1952). Witter's (1977:64) own research at Discovery Bay provides a detailed overview of the 'complex' processes of flint tool manufacture. Lourandos' excavations at Bridgewater South Cave revealed flint artefacts in levels radiocarbon dated back to 11,390±310 years BP. This confirms Witter's (1977:65) hypothesis that the flint technology at Discovery Bay is 'at least 8,000 years' old.

3.2 INLAND

Head (1987:456) notes that Discovery Bay 'comprised only a small part of the territory of the known historical Aboriginal group, the Gunditjmara … and cannot be considered in isolation'. 'Aborigines tended to camp in the vicinity of ecotones, or along rivers, creeks and streams where timber and fuel was more likely to be available' (Coutts 1985:25). Not surprisingly, a wide range of archaeological sites has been recorded across inland areas of Gunditjmara territory. Key types discussed below are:

- Mounds
- Stone circles (huts and villages)
- Stone walls (eel trapping devices)
- Stone walls (eel pens/growing ponds)
- Stone circles (eel caches/storage facilities)
- Trees (eel smoking facilities)
- Ditches (eel trapping facilities)

3.2.1 Mounds

Archaeological research indicates that Western District earthen mounds range in size from 3 to 30m in diameter and in height from 0.3 to 1.5m (Coutts 1985:31). 'Within the central Western District … most mounds are located adjacent to creeks, rivers, swamps and other areas of wetland' (Coutts 1985:31-33). More recent research reveals that mounds are found 'also on tops of hills, on high ground' (Williams 1987:317). Builth (2002:83) suggests the general absence of mounds on stony rises ('lava flow') is 'due to the lack of sediment depth on the landform'.

Coutts (1985a:31-32) makes reference to two different types of mounds in the Western District. Type A mounds 'were those that were built up prior to occupation (a process that I shall define as pre-mounding) by scraping up sediments from the surrounding landscape and dumping them in one locality. Later these were added to by the accumulation of occupational debris'. Type B mounds 'formed through the accumulation of occupation debris only. Type B mounds are generally small and low compared with Type A'. Apart from sediment, mounds usually contain charcoal and burnt clay fragments (both associated with cooking), but may also reveal stone artefacts, food remains (shells and bones) and burials (see overviews in Balme & Beck 1996; Coutts et al. 1976; Williams 1988).

In terms of mound function(s), Coutts (1985:51) hypothesizes that mounds (particularly Type A) were 'created [as] artificial 'house' platforms to provide well drained areas which could be occupied at any time of the year, but more likely during the winter-spring periods'. In contrast, Type B mounds may 'have formed through the natural accumulation of occupational debris and fallen roof fabric' (Coutts 1985a:53). It has been known since the 19th century that mounds could also be used a places of burial (see Part G below). As noted above, Balme and Beck (1996:47) hypothesise that mounds may have been 'gardens' for growing the tuber staple *murnong*. Wolski (1995) hypotheses that mounds also functioned as a form a territorial landscape marker (see Part G below for further discussion).

Hundreds of mounds have been records across the study area over the last century. Excavated mound sites in SE Australia date to the last 3000 years while in the central Western District they all date to the last 2500 years (Balme & Beck 1996; Lourandos 1997:225-226; Williams 1988:216-218). The following discussion lists key sites mentioned in the literature and in selected unpublished reports. Sites are discussed along a general north-south axis.

Croxton

Worsnop (1897:106) reports a very large mound 'about 5ft. in height and 100ft. in diameter' located 'near Croxton'.

Yatchaw

Kenyon (1912:100) reports a very large mound site measuring '100 feet in diameter, and 5 ft. 6 in. high in the centre' 'near the Yatchaw Railway Station'. It is possible this reference is derived from Worsnop's (1897) reference to the Croxton mound.

Condah Swamp (Balure)

A cluster of six mounds is located on the northwest margins of Condah Swamp 4km northwest of Wallacedale (McNiven & Russell 1994:4).

Condah Swamp (Wallacedale)

Ingram (cited in Kenyon 1912:102) notes that 'there are hundreds of aboriginal mounds [in the Hamilton district], notably around Condah Swamp'. A significant cluster of mounds is located on a spur jutting into the western side of Condah Swamp opposite Wallacedale (McNiven & Russell 1994:4). Designated the Wallacedale Earthen Mound Complex, it features at least 30 mounds 'with some mounds joining to form large multi-mounded structures up to 30m in length'. McNiven & Russell (1994:4) note that it is 'the largest mound complex recorded along the edge of Condah Swamp' and 'appears to represent the largest and most dense mound complex recorded in Victoria'.

Lake Condah

Smyth (1978, I:368-369) notes that a 'large axe-head' was excavated from a mound at Lake Condah' (see also Etheridge 1891, 1894; Spencer 1901).

Macarthur

Coutts & Witter (1977a:45, 51) report 121 mound sites ‘on the margins of a large swamp near Macarthur’ and three of these sites (at Kinghorn) were excavated.

Squattleseamere

Williams (1988:138, 152, 163, 166, 301) documents a cluster of 27 mounds over 0.5km^2 at Squattleseamere near the Eumeralla River northeast of Bessiebelle. The site complex is positioned on a ‘small rise that juts into Gorrie Swamp’. The largest mound is 21m in diameter.

Montrose

Williams (1988:138, 152-166, 1987:316-317) reports on excavations of Montrose Mound Sites 1 and 2 (MMS1 & 2) located near the Eumeralla River immediately northwest of Bessiebelle. Both sites contained charcoal and oven features, stone artefacts, but no faunal remains.

Darlot Creek

Lourandos (1976:179) reported a series of seven mounds along a 3km stretch of Darlot Creek southwest of Ellengowan approximately 9km from the coast. These mounds were originally discussed by Massola (1968b:200).

Age of mounds

With Gunditjmara territory radiocarbon dates are available for age of the earliest levels of Montrose Mound 1 (a little older than 1270±100 yrs BP) and Montrose Mound 2 (sometime after 1600±200 year BP) (Williams 1988). These dates are within keeping for the Western District in general where mounds all date to within the last 2500 years (Bird & Frankel 1991a, 1991b; Williams 1988)

3.2.2 Stone circles (huts & villages)

Louth Swamp (Kinghorn)

The significant site complex is located on the edge of Louth Swamp not far from the eastern margins of Condah Swamp between Wallacedale and Byaduk. Coutts et al. (1977a:200, Figure 2; see also Coutts et al. 1977b; Coutts 1985a:41-42, 1985b:Figure 6) report on numerous ‘houses’ forming a ‘hamlet’. According to Wesson (1981:29), 50 stone ‘house sites’ were recorded on two paddocks but only 26 house sites in one paddock were mapped in detail. ‘The structures tend to vary in shape from semi-circular to U-Shaped… with their entrances facing NE. All are adjacent to readily available building material, and all appear to have a small fireplace near the entrance’ (Coutts et al. 1977a:201). That the structures were used as huts/houses is consistent with local property owner Mr John Kinghorn who informed Peter Coutts in the mid-1970s that his grandfather told him that he saw ‘bark and sapling’ roofs on ‘similar stone houses on the family property’ (Coutts et al. 1977a:199). Four of the huts (KH-12, KH-16, KH-17 and KH-22) were excavated by VAS in 1975 ‘to determine whether or not these structures … were Aboriginal’ (Wesson 1981:1). These huts were the first Aboriginal stone huts excavated in Australia. Detailed analysis of excavation results for KH-12 by Wesson (1981:Chap 5) revealed flaked stone artefacts, metal items, and fragments of bottle glass and clay pipe. Coutts et al. (1977a:201) hypothesised that the village was associated with ‘family units’ with an overall ‘maximum population’ of 200. It was also hypothesised that the hamlet is post-contact and that Aboriginal people deliberately ‘abandoned’ local mound sites and positioned their settlement ‘in a less conspicuous, less favourable environment, when they came under stress caused either by Europeans or other Aboriginal groups' (Coutts et al. 1977a:201).

Wolski (2000:Chapter 7; see also Wolski & Loy 1999) undertook a detailed re-examination of artefacts excavated from KH-12. The clay pipe fragments represent partial remains of two 'well smoked' pipes dating to the 'early and mid nineteenth century' (Courtney cited in Wolski 2000:328). The 258 glass fragment represent partial remains of six bottles dating most 'likely' to the 'period 1820-1840'. A number of glass fragments exhibit secondary modification in the form of retouching and/or use-wear beveling (micro-flaking) consistent with use as tools. This hypothesis was confirmed by residue analysis that revealed both unmodified and secondarily modified glass fragments were used to 'shape and smooth both fresh wood and dry hardwoods, … [and] for subsistence activities, namely plant processing', probably associated with scraping tubers (Wolski 2000:339, 341). Wolski (2000:349) concludes that the residue analysis reveals that 'some of … [the glass artefacts] were used to make and repair wooden artefacts and that others were utilized in plant processing'. Furthermore, and taking available archaeological and historical information into consideration, 'I would suggest that this site was occupied in either the late 1830s or early 1840s, a period corresponding with the use of the Stony Rises as an Aboriginal refuge during the Eumeralla War. At the very least, it would seem that the material remains from this site are those of Aboriginal people who chose to live away from European society and beyond the sphere of European control' (Wolski 2000:349) (see Part D for further discussion of the post-contact refuge concept).

Condah Swamp

Worsnop (1897:78) report information from Alex Ingram ('inspecting surveyor of the drainage works at the Great Condah Swamp') on a 'cluster of huts circles', numbering 'ten or twelve', located 'among the broken lava near one of the arms of the swamp'. 'The floors were cleared and leveled by the removal of the loose blocks, which were piled up in a low wall around so as to form a break-wind, and which (as Mr. Ingram learned from a native born at the place and who remembered these particular shelters when used as dwellings) were roofed over with boughs or bark like an ordinary native hut' (see below).

Condah Swamp (Allambie)

In 1981, VAS undertook extensive surveys on 'Allambie' property (a.k.a. Palmer's property) located on the southeast edge of Condah Swamp (Coutts 1982:40, 1985a:41-42, Figures 11 & 12; Wesson 1981). In one paddock, designated the 'PAL complex', revealed 116 stone huts clustered as follows: '22 lone sites (distant more than 5 m from each other), seven pairs, four triplets, three groups of five, five groups of six, one of seven, and one of 16' (Coutts 1982:40). Coutts (1985a:42) posits the huts formed a 'village' site. The 1981 fieldwork included excavation of one of the huts (designated PAL-20) from the 16 hut cluster (for details see Wesson 1981; see also Frankel 1991:88-93). Three radiocarbon dates from the site produced a 'modern' age that suggests 'the stone house was occupied during the Late Prehistoric period' (Coutts 1982:38; see also Wesson 1981:49). However, the dates and the lack of 'European' items could indicate occupation from immediately before or after contact (i.e. late 18^{th} or early 19^{th} centuries). Excavations revealed 1750 stone artefacts, 680 fragments of bone, along with charcoal, four hearths and three stone-lined 'ovens'.

Further survey work at Allambie by VAS in 1984 and 1985 identified and recorded another 211 stone huts (Geering 1985, 1986). In 1990 a major re-survey and re-assessment of these sites was made by Clarke (1991, 1994). Clarke (1991:27) notes that prior to her research, VAS records revealed 234 'stone circle' (mostly stone house) sites registered/known for Allambie. Clarke (1991:27-28) recorded 42 'stone circles' of which 20 were new recordings. All of the stone circles revealed minimal burial and sediments inside and no obvious associated artefacts. Clarke (1991:40, 1994:8) suggested that poor visibility, site destruction through quarrying, and reclassification of sites as natural features accounted for her lower site inventory. Significantly, Clarke (1994:8) only relocated 65 of VAS's 128 stone circles and of these less than a third (n=21) were considered 'cultural sites after re-examination'. However, if the Aboriginal-made and natural stone circles are very similar in form, it is clear the later could function as the former. As Clarke (1991:8) acknowledges, 'none of this criticism precludes the cultural use of natural features'. Since none of the Aboriginal-made stone circles revealed artefactual remains, it raises the question of how it is possible to determine that Aboriginal people used none of the natural stone circles recorded by VAS in the absence of excavation data.

Lake Condah district

Worsnop (1897:105) notes that Alex Ingram informed him that in an area 'near a large waterhole in a fine permanent stream known as 'The River'', located 'about ten miles from Lake Condah', 'are the remains of an old Aboriginal camping-place, the name of which is *Narrarrabeen'*. The site consists of:

> …about twenty stone foundations, of horseshoe form, from 4ft. to 7ft. in diameter, and opening towards the east, a point from which the wind rarely blows. They are built among the loose blocks of cellular basalt, and appear to have been made by piling the stones removed to level the floor into a dry-stone wall about 1ft. high on the western or windward side. On this foundation – Mr. Ingram learned from Tommy White, a civilized aboriginal, who had been born at a similar camping-place (called by the blacks *Allumyung*, about a quarter of a mile higher up the river, near the point at which it issues from beneath the basalt) – the ordinary mia-mia of branches and bark was erected. In the forest, not far distant, is another old camping-ground, called *Eullameet'* (Worsnop 1897:105).

Lake Condah

Surveys by VAS in the 1970s recorded numerous stone hut sites in the immediate vicinity of Lake Condah (Coutts & Witter 1977a:47; Coutts et al. 1978:16, Figures 16, 17 & 18). In 1990, a major re-survey and re-assessment of these sites was made by Clarke (1991, 1994). Clarke (1991:27) notes that prior to her research, VAS records revealed 83 'stone circle' (mostly stone house) sites registered/known for the Lake Condah area (including 'Muldoon's' property to the southwest of Lake Condah). Clarke (1991:27-28, 33) recorded 87 'stone circles', most of which occurred in clusters (the largest cluster with 16 stone circles). Thirty-one of the sites were new recordings. Most of the recorded sites have a 'restricted distribution' to 'lava flow formations on the south-western side of the Lake' (Clarke 1991:47). All of the stone circles revealed minimal burial and sediments inside and no obvious associated artefacts. Unlike Allambie, 'no stone circles have been excavated at Lake Condah to demonstrate the occurrence of sub-surface artefacts or hearth features' (Clarke 1994:9).

Darlot Creek (Homerton)

Builth (2002:264-267, 2004:172-173) recorded 51 'dwelling/storage remains' associated with eel trapping facilities in this area.

Darlot Creek (Tyrendarra)

A survey by VAS in 1988 at immediately north of Tyrendarra located near Darlot Creek identified and recorded 38 'stone circles' (stone huts) (van Waarden 1990; see also Schell 1996). Lane (2001) reported a further 11 'stone circle' sites, while Builth (2002:230-258, 2004:174-175, in press) recorded 103 'stone circles' ('dwellings' and 'storage caches') associated with eel trapping facilities in this area. In 2002, Lane (2002b) excavated 4 known and 2 'possible' stone circles sites at the

Tyrendarra property flanked by the Fitzroy River and Darlot Creek. Two of the excavated sites revealed glass fragments of ‘ambiguous’ Aboriginal modification.

Gorrie Swamp

Williams (1988:139) documents excavations undertaken at a stone hut site (designated the Gorrie Swamp hut site or GHS) that formed part of a cluster of ‘at least ten stone walled features’. GHS is located on the edge of the southeast corner of Eccles lave flow north of Bessiebelle township. Excavation revealed stone artefacts and charcoal but no faunal remains such as bone or shell. No hearth features were observed. Two radiocarbon dates of ‘modern’ and 380±50 BP (c.300 years ago) were interpreted by Williams (1988:145) to suggest the site is ‘pre-contact in age’.

Bessiebelle

Lane (2002a) recorded 15 ‘stone circles’ on Thomas’ property near Bessiebelle. In 2002, she followed up her survey work and excavated 4 known and 2 ‘possible’ stone circles sites on Thomas’ property (Lane 2002b). One of the excavated sites revealed glass fragments of ‘ambiguous’ Aboriginal modification.

Mt. Eccles/Lake Gorrie

Ingram informed Worsnop (1897:106; also cited in Kenyon 1912:102) that stone huts are ‘found among the rough basalt around Mount Eccles and Lake Gorrie’.

Mt. Napier

Ingram (cited in Kenyon 1912:102) makes passing reference to ‘many semi-circular stone formations [stone huts] to be found in the Mount Napier and Mount Eccles stones’.

Age of huts

It is clear that while many stone huts date to the post-contact period that this site type has ‘its origins in the prehistoric period’ (Coutts 1985b:14). Glass artefacts at the KH-12 (Kinghorn) date to the 1830s/40s, while glass artefacts of possible Aboriginal manufacture have similarly been found within stone huts at Tyrendarra and Bessiebelle (Lane 2002a). Furthermore, ‘modern’ radiocarbon dates associated with non-contact artefacts at PAL-20 (Allambie) suggests either immediately before or after contact (i.e. late 18th or early 19th centuries). The date of 300 years ago (380±150 BP) for the GHS site (Gorrie Swamp) is the oldest date associated with a stone circle (hut) and suggests that the tradition of stone hut construction has a pre-contact antiquity. However, given the large standard deviation on the radiocarbon date it is possible the site is post-contact. Thus, while it is possible that most stone hut sites are post-contact in age (Bird & Frankel 1991a:8, 1991b:187), it is likely that the recent antiquity associated with excavated stone circle (hut) sites reflects selection of clearly delineated and well-preserved sites that most likely represent the more recently used sites. It is a plausible hypothesis that excavation of poorly-preserved sites would produce older radiocarbon dates. Furthermore, Builth (2002:107, 111) makes the additional and intriguing point out that if huts were cleaned out after occupation, little cumulative evidence for occupation would be expected at such sites and excavations would tend to reveal only the last episodes of occupation.

3.2.3 Stone walls (eel trapping facilities)

The Gunditjmara are famous in the Australian archaeological literature for the construction, use and maintenance of large eel trapping complexes in the Condah region. That these stone works are complex eel trapping facilities and have a history that starts well before European invasion is not only fully consistent with 19th century ethnohistorical records but orthodoxy within the discipline of Australian archaeology (e.g. Coutts et al. 1978; Flood 1990:216-220; Frankel 1991:101-103; Lourandos 1997; Mulvaney & Kamminga 1999).

Lake Condah

Ingram (cited in Worsnop 1897:104) provides a detailed description of a major eel trapping complex at the southwest corner of Lake Condah that starts thus: 'At the south-western point of Lake Condah (where it overflows down the valley of Darlot's Creek along the margins of the rough stony ground, there joining the permanent stream at the Condah mission station) is situated one of the largest and most remarkable aboriginal fisheries in the western district of Victoria' (see also Hemming 1985; Kenyon 1912:109-110, 1930:73-74). Furthermore, 'this is a work of undoubted antiquity, but to what remote period of time it owes its origin no one will ever know. It stands as a dateless monument of incredible labor visible through the volcanic *debris* discharged from Mount Eccles and Napier, and the work and its design were worthy of their builders' (Ingram cited in Worsnop 1897:105). Ingram (cited in Worsnop 1897:104) also made reference to 'numerous smaller fisheries constructed in suitable places in small bays and outlets where the water sinks into the trap scoriae down along the margin of the valley of Darlot's Creek. Across this valley, at suitable places, were erected large barricades constructed with strong forked stakes, horizontal spars, and vertical stakes strengthened with piles of stones; openings were also left in these'.

The next research on the Lake Condah eel traps after Ingram was by Peter Coutts and colleagues from VAS in the 1970s (Coutts et al. 1979; see also Coutts et al. 1977a:198). Their classic monograph *Aboriginal Engineers of the Western District, Victoria* describe four trapping 'systems' located along the south and southwest edge of Lake Condah. Four types of stone structures were identified to form these systems (Coutts et al. 1978:12; see Clark 1991:16-17 for a slight variation on this typology):

1. *Stone races* (artificial and built up basalt block walls, some more than 50m long and 0.75m high, channeled water flow).
2. *Canals* (artificial and excavated features, some more than 300m long, to channel water flow).
3. *Traps* (artificial and built up V-shaped basalt block walls with aperture to set a portable net or basket positioned across races and 'natural drainage lines').
4. *Stone walls* (artificial and built up basalt block walls 'forming the perimeters of the small embayment in which the fishtraps are located').

The differing orientations of V-shaped traps indicates they were used during the rising and falling of waters. 'The fish could be caught both as the lake rose and as it fell' (Coutts et al. 1978:25). 'Some of the channels and canals have tributaries and wing walls to direct fish into the channels' (Coutts 1985b:16). Coutts (1985a:44) added that 'when the floodwaters receded, large pools of water were left in the rocks where Aborigines would have been able to fish for some time afterwards'. Coutts et al. (1978:31) hypothesise that 'in practice, no more than two people would have been required to operate a trap so we are probably looking at the employment of no more than twenty people for … three [of the] systems' on the southern margin of Lake Condah.

The Lake Condah eel traps 'indicate that the Aborigines who were responsible for building them had a very refined knowledge of hydrodynamics, and were able to make use of flood levels to optimize their fishing strategies' (Coutts & Witter 1977a:47). Such is the scale of these constructions that

Coutts et al. (1977a:197) estimate that ‘many hundreds of tonnes of basalt boulders have been shifted at Lake Condah to build the intricate network of dams and weirs found their’.

In 1990, a major re-survey and re-assessment of these sites was made by Clarke (1991, 1994). Clarke (1991:27) notes that prior to her research, VAS records revealed 114 ‘fish trap’ sites registered/known for the Lake Condah area (including ‘Muldoon’s’ property to the southwest of Lake Condah). Clarke (1991:27-28, 33) recorded 68 ‘stone trap and channel features’ of which 28 were previously unrecorded. Most of the recorded sites have a ‘restricted distribution’ to ‘lava flow formations on the south-western side of the Lake’ (Clarke 1991:47).

Van Waarden & Wilson (1994:81) refer to ‘five trapping systems … along the southern shores of the lake’. In a significant and innovative move, they undertook detailed contour mapping of trapping ‘System 1’ and used GIS to develop a ‘hydrological model’ of how the traps operated at different water levels. This GIS approach was elaborated subsequently by Builth (2002) (see below).

Condah Swamp (Allambie)

In 1990, a major re-survey and re-assessment of these sites was made by Clarke (1991, 1994). Clarke (1991:27) notes that prior to her research, VAS records revealed only one ‘fish trap’ site registered/known for Allambie. Clarke (1991:27-28) recorded no ‘stone trap and channel features’.

Darlot Creek (Homerton/Ettric)

Another complex of traps is located on Darlot Creek immediately east of Homerton (Massola 1968b). These traps appear to be the same traps listed as ‘Ettric weirs’ by Coutts et al. (1977a:196). This area was also surveyed by Builth (2002:258-274, 2004:172-173) who recorded and GIS modeled a range of small- and large-scale eel trapping devices.

Darlot Creek (Tyrendarra)

A survey by VAS in 1988 immediately north of Tyrendarra located near Darlot Creek identified and recorded four fishtraps (van Waarden 1990). A further 2 fishtraps were recorded by Lane (2001). This area was also surveyed by Builth (2002:221-258, 2004:174-175, in press) who recorded and undertook GIS simulation modeling to provide insight into the functioning of small- and large-scale eel trapping devices (‘weirs/barrages/dams’) during hypothetical winter and summer hydrological regimes.

Age of traps

No direct dates are available for eel trapping facilities within the study area. While it is universally acknowledged that the sites are largely pre-contact, the origins and antiquity of these facilities are open to speculation. Coutts et al. (1978:34, original emphasis) hypothesised that as most other sites in the Western District date to the last 3500 years, ‘this *might* indicate a maximum age for the stone features in the vicinity of Lake Condah’. Furthermore, since fishing ‘structures in the Darlot Creek near Lake Condah Aboriginal Station were used for fishing during the nineteenth century and, since many of the Lake Condah structures are well preserved, some at least may be of late prehistoric origin’ (temporally defined as ‘the period immediately prior to the European invasion, circa 1830 AD’ – Coutts 1985:63). CONTEXT (1993:87) made the relevant point that:

> There is no evidence that all the traps were in operation at the same time or that the whole system was planned and built in one period. It seems more likely that the traps as seen today represent the

> cumulative process of minor additions and alterations in response to periodic and seasonal lake flow changes over a very long period of time.

What 'a very long period of time' represents is the key question given that 'there has been water in the Condah basin for at least 8000 years' which provides a maximum date for trap construction (Head 1989:110). However, documentation of rising water levels during the last 8000 years reveals that while some traps may have been operational 4000 years ago, more confidently it is only within the last 2000 years that water levels were high enough to make the lowest elevation traps operable (Head 1989:110, 115). Thus, it is likely the archaeologically-visible system of eel trapping facilities at Lake Condah date to within the last 2000 years. Bird and Frankel (1991a:9) suggest that 'while some fish-traps certainly developed in the last few thousand years there is no reason to assume that this technology was not employed earlier'. While this is true, Head's (1989) water level evidence makes it very clear that none of the known fishtraps of the Lake Condah area date before 4000 and most likely not before 2000 years ago.

3.2.4 Stone walls (eel pens/growing ponds)

Lake Condah

That the trapping facilities could also function as longer-term eel penning and storage facilities is revealed by an interesting observation by Coutts et al. (1978:28) following heavy rains in June 1977:

> As the lake level dropped, water was trapped in pools, some of which were very deep (3-4m) and extensive (50m across). These pools were connected by the now dry or damp stone races and canals or by a series of minor pools. In prehistoric times, fish could have been captured in these ponds and eels could have been taken in traps if they attempted to escape overland along the artificial structures towards the main body of the lake.

Darlot Creek (Homerton)

Builth (2002:269, 2004:175) also reports an area possibly 'used to hold or "grow" eels' at her northern case study area near Homerton.

Darlot Creek (Tyrendarra)

Builth (2002:242-244; 2004:175) noted that the form of certain so-called eel trapping devices was more consistent with penning of eels that simply trapping eels. That is, channels were constructed to divert water from Darlot Creek into adjacent complexes of depressions/swamps augmented by dams and linked through further channels. Based on the hydrological modeling, it was further hypothesised that these 'pens' were used to hold young eels (elvers) swimming upstream during spring and to provide favourable long-term conditions for subsequent growth into adulthood. After in-situ maturation, adult eels would after their normal 7-20 year 'terrestrial' life cycle, begin their autumn migration downstream where many were trapped and killed for consumption (Builth 2002:253). Penned elvers were kept in separate pens to protect them from adult eel predation (Builth 2002).

3.2.5 Stone circles (eel caches/storage facilities)

Clarke (1991:18) hypothesised that stone circles, apart from functioning as huts, 'may have been windbreaks, hunting blinds or fish processing sites'. In terms of the latter, it could be argued that use as eel storage facilities is unlikely as Williams (1987:313) claims 'storage of food was virtually non-existent' according to 19th century historical records. However, based on historical records (e.g. Dawson 1881), Lourandos (1997:64) noted that food storage *was* a feature of the Gunditjmara:

‘stored foods included eels and animal meat, and large quantities of acacia gum; eels and meat were cooked or smoked, eels and whale meat buried, and acacia gum cached as winter food’. In this connection, Builth (1996:118) hypothesised ‘that certain of the structures present at Lake Condah performed the function of storage caches for the eels caught in adjacent fisheries’. In particular, Builth (1996:119) posits that the smaller stone circles were the eel cache facilities while the larger stone circles were the hut sites. The feasibility of such storage is demonstrated by reference to the known storage of eels in moist conditions (e.g. wet straw) for weeks and possibly months in other parts of the world. Builth (1996:121) notes also that extended storage could be achieved through smoking.

Darlot Creek (Homerton)

Builth (2002:264) recorded 51 ‘dwelling/storage remains’ associated with eel trapping facilities in this area.

Darlot Creek (Tyrendarra)

Builth (2002:230-258, 2004:174-175, in press) recorded and mapped 91 ‘dwellings’ (stone huts), 36 ‘attached storage caches’, and 12 ‘pits’ associated with eel trapping facilities in this area. Dwellings were differentiated from storage caches by size with most dwellings having a diameter of >1.6m (Builth 2002:245). The 12 isolated ‘pits’ with diameters 2.2-2.6m and up to 0.5m deep were also hypothesised to be storage facilities (Builth 2002:245).

3.2.6 Trees (eel smoking facilities)

Scarred trees associated with bark and wood extraction are a well-known feature of the Aboriginal archaeological record for the Western District (e.g. Rhoads 1992). However, Builth (2002:152-210, 261-267) presents a radically new interpretation of large Manna gums (*Eucalyptus viminalis*) with hollow and burnt bases found associated with eel trapping facilities in the Lake Condah district.

Darlot Creek (Homerton)

Using 19th century records of tree base hollows used as hearths from other parts of Australia, Builth hypothesised that many of the Manna gums were similarly used as ‘the family hearth for baking’ and ‘use as a facility for smoking and preserving the trapped eels’ (Builth 2002:268, 2004:175-177, in press). Remarkably, gas chromatography (chemical fingerprinting) analysis by biomolecular archeologist Barry Fankhauser (ANU) of sediments taken from two hypothetical tree site ‘hearths’ identified lipids (animal fats/oils) of a form consistent with those from aquatic animals and freshwater fish in particular. As such, ‘given the context of the samples the most likely source of the residues is eel processing’ (Builth 2002:204). As such, Builth uses evidence for tree ‘smokers’ to support her existing argument that small stone circles were used as eel caching facilities (i.e. for the storage of smoked and preserved eels). Builth (2002:261-269) identified and recorded 30 ‘culturally modified’ Manna gums in this area.

Darlot Creek (Tyrendarra)

Manna gums modified for use as hearth and eel smoking were also recorded adjacent to eel trapping and caching stone facilities in this area (Builth 2002).

Age of smoking trees

Of all the Aboriginal archaeological sites within the application area, determining the age of the trees associated with eel smoking is the least contentious and the most obvious. While as a site type the antiquity of eel smoking trees is unknown, in terms of extant sites it is clear they can be no more a few hundred years, the known likely time span for Australian eucalypts. Thus, if these trees are indeed associated with eel smoking, they most likely date to the 19^{th} century.

3.2.7 Ditches (eel trapping facilities)

Gorrie Swamp

One of the eel trapping facilities noted above for Lake Condah was channels excavated across the ground surface. Williams (1988:166-169) excavated part of 50m-long, 1-2m wide and 0.1-0.2m deep ‘ditch’ near the Gorrie Swamp stone hut cluster. She suggests the feature may have been an Aboriginal trap whereby ‘fish and eels were herded into the pond and either speared, or the pond was emptied and the fish were stranded’.

3.2.8 Aquaculture: integrated functioning, ownership & management of the eel trapping systems

Did eel aquaculture exist?

Before discussing integration of various site types linked to the eel aquaculture system, a key issue that needs to be assessed and discussed is the plausibility and empirical likelihood of eel aquaculture. Four possible levels of live eel management can be identified for the Gunditjmara:

1. Eel trapping
2. Eel containment
3. Eel storage
4. Eel rearing

Eel aquaculture is associated with the fourth level of management - eel rearing, following the generally accepted definition of aquaculture as the artificial containment and rearing of aquatic life forms (from juveniles to adults) for human consumption. As such evidence must exist that young eels were artificially held in special areas where they could grow into larger eels and to a point where they were considered harvestable. First, in terms of eel trapping, it is an uncontested fact (both archaeologically and ethnographically) that the Gunditjmara constructed traps to capture natural populations of migrating eels for consumption. Second, in terms of eel containment, it is clear that channels were constructed by the Gunditjmara to divert water (and obviously eels) from natural water ways such as Darlot Creek into adjacent depressions to create artificial ponds with eels. At the very least, these artificial eel ponds were built as an additional method for artificially trapping eels. If the eels were not immediately taken from such ponds then they clearly also functioned as eel storage facilities. This storage functions is highly likely given that some of the ponds are large and deep (up to 50m across and 4m deep according to Coutts et al. 1978:28) which would make eel trapping both inefficient and difficult. As Builth (2002:96 citing Moriarty 1978) points out, ‘eels are much more easily trapped in flowing than still water’.

Fourth, the critical next question relates to aquaculture and the extent to which eel containment/storage facilities were used to hold young eels for rearing into larger adult eels suitable for consumption. This question revolves around the issue of whether or not juvenile eels (elvers) were held in containment ponds. Builth (2002:243) suggests that the channeling of water from Darlot Creek into swamps was to establish new rearing areas for elvers away from mature eels which are known to eat elvers. In terms of Darlot Creek per se, the existence of elver rearing areas remains a plausible hypothesis, but far from demonstrated. However, that pre-contact Western District Aboriginal peoples practiced elver rearing (and hence aquaculture) is essentially confirmed by previous research by Lourandos (1980:253-254) to the north of the application area at Toolondo. Here Aboriginal people excavated a 3km-long channel system to connect Budgeongutte Swamp (within natural range of eels) with Clear Swamp (located to the northwest and outside the natural range of eels). Lourandos (1980:254) argues that 'the size and construction of these drains points to their operation as more than mere eel harvesting devices.' The main channel is 2.5m wide and 1m deep but would have been deeper except for eroded infill. It most likely functioned to allow migrating eels to extend their range into a new and previously inaccessible swamp. Lourandos (1980:254) rightly concluded that 'an extension of eel range, by providing access to further inland swamps and waterways, would have led to an increase in the annual production of eels'. Furthermore, Lourandos (1980:263-254) argues that a system of side channels running parallel to the main channel functioned as traps to capture the downstream migrating eels. While not specifically mentioned by Lourandos, Builth (2002:96) points out that since it is elvers that migrate upstream, the artificial channel at Toolondo would have provided a new place for such young eels to grow up before they decided to migrate downstream (firstly through the artificial channel) as adults. Lourandos (1980:253) obtained a radiocarbon date of 210±120 BP for the base of the channel refill, which suggests that the refill is recent, and most likely immediately precontact. Thus, the Toolondo eel aquaculture elevates Builth's hypothesis for Darlot Creek aquaculture from plausible to likely.

Both the Homerton and Tyrendarra penning evidence ('growing ponds') indicate the inadequacy of the term 'fishtrap' to accommodate the broad range of functions associated with Aboriginal eeling in the Condah district. It is for this reason that Builth (2002) uses the term 'eel aquaculture'. Butlin (1983:126) thought it appropriate to refer to Gunditjmara eel management as 'eel farming'.

Integrated system?

According to Coutts et al. (1978:33), 'the presence of house sites and their association with particular traps [at Lake Condah] suggests that the traps were owned and operated by specific groups'. Furthermore:

> …if the area was rich in food resources, and there is little doubt that it was, its exploitation by organized and even institutionalized social groups seems logical; otherwise conflict between competing groups would have made the utilization of local resources in this manner difficult. Certainly, if Dawson (1881:94) is any guide, during the European contact period it is likely that individual ownership of fishtraps and large-scale organization of the fishing industry was known elsewhere in the Western District.

In 1991, Clarke (1991:49) posited that previous archaeological research has tended 'to view all the stone circles and all the fishtraps as contemporaneous, thereby giving, perhaps, an inaccurate view of the density and intensity of occupation. There is no clear evidence to associate the stone traps and stone circles apart from their association in a geologically distinct landscape'. The work of Builth (1996, 2002) casts serious doubt on Clarke's (1991) conclusions.

Builth (1996:116) points out that the spatial proximity of many stone huts with eel traps reflects 'their fundamental inter-connection. Together they form the socio-economic base of the hunter-fisher-gatherer people of western Victoria'. Builth (2002:78-80) points out this association not only is consistent with 19th century ethnographic observations, but also reflects the distribution of archaeological remains of such features in the Lake Condah area. Detailed GIS mapping showing associations between these sites around Homerton and Tyrendarra (Darlot Creek) is documented in Builth (2002:246-252, 262-272).

SECTION 4: SETTLEMENT-SUBSISTENCE MODELLING

All previous archaeological research within the Gunditjmara application area concurs that available archaeological data for the late Holocene (last 3000-4000 years) indicates an overarching settlement-subsistence system for the region that integrated coastal and inland clan/band groups and their associated settlement-subsistence subsystems. No evidence is available to indicate separate coast and inland peoples with separate settlement-subsistence systems. The annual seasonal round of inland Gunditjmara clans/bands included interactions with Gunditjmara coastal clans/bands and vice versa. But how has this model of an integrated settlement-subsistence system for the Gunditjmara been developed? While it will be seen that different researchers have developed slightly different settlement-subsistence models, all models represent syntheses of 19th century historical records on lifeways of the Gunditjmara and related Western District Aboriginal peoples, archaeological information on the range of site types and foods used for the region (as outlined in Parts A and B), and environmental information on the relative productivity and seasonality of historically-known food resources across the region taken in by the Gunditjmara. This process of synthesis is discussed in the first two sections below. The ensuing section discusses the compatibility of this hypothetical model with archaeologically-based inferences on seasonality of resource use and coastal-inland linkages.

4.1 GUNDITJMARA

4.1.1 A unified people and a unified settlement-subsistence system?

Tribal/language group

Both Lourandos (1976, 1977) and Coutts (1981a) use Tindale (1974) to demarcate the boundary of the Gunditjmara 'tribe' (**Figures 2, 3 & 4**). Lourandos (1977:212) notes that Tindale (1974) delineated the boundary of Gunditjmara based on Dawson's (1881) language groups but named the group based on Howitt (1904). Independently, Lourandos (1976:177) found that Tindale's boundary of the Gunditjmara was consistent with Robinson's 1841 journals of 'coastal bands operating up to about 150 km from the coast'. In other words, 'Robinson's [band] data basically agree with Dawson's language groups' (Lourandos 1977:212) while Robinson's 'Manemeet [Manmeet] nation' (speakers of 'one language') can according to Lourandos (1977:212) be 'geographically … related to Tindale's Gunditjmara'.

The most elaborate and detailed re-assessment of 19th century historical information pertaining to the Gunditjmara as a tribal entity is by Ian Clark (1990). As with Lourandos, Clark's primary source materials are the Robinson journals and Dawson (1881). Clark (1990) essentially follows Tindale's spatial delineation of the Gunditjmara but extends the western boundary to the Glenelg River (**Figure 5**). However, Clark does not agree that the term 'Gunditjmara' is the appropriate encompassing term for the language group. He rightly notes that the designation 'Gunditjmara' can be traced back to a single source – Howitt – who referred to the 'Gournditch-mara, whose headquarters were at Gournditch or Lake Condah' (Howitt 1904:69; see also Fison and Howitt 1880). Clark (1990:23-25) argues that the source of this information is Rev. Stahle (manager of Lake Condah Mission Station 1875-1913) who misunderstood that *Gournditch* (*gundidj*) is 'an affix literally meaning "belonging to"', as is '*Mara*' (*Ma:r* or *Mar*) an affix and a generic term for Aboriginal people. Despite this issue, Clark points out that 19th century historical records have little to say about an overarching term for the language. Acknowledging the need for a designator, he posits use of the dialect term Dhauwurd wurrung, which encompasses the Lake Condah area, 'as an acceptable alternative' to Gunditjmara

(Clark 1990:27). Tindale (1974:204) also suggested that ‘the language name [spelt ‘Dhauhurtwurru’] could be an acceptable alternative’. While ‘wurrung = tongue, lip, speech or language’, the ‘meaning of Dhauwurd’ is ‘unknown’ (Clark 1990:31).

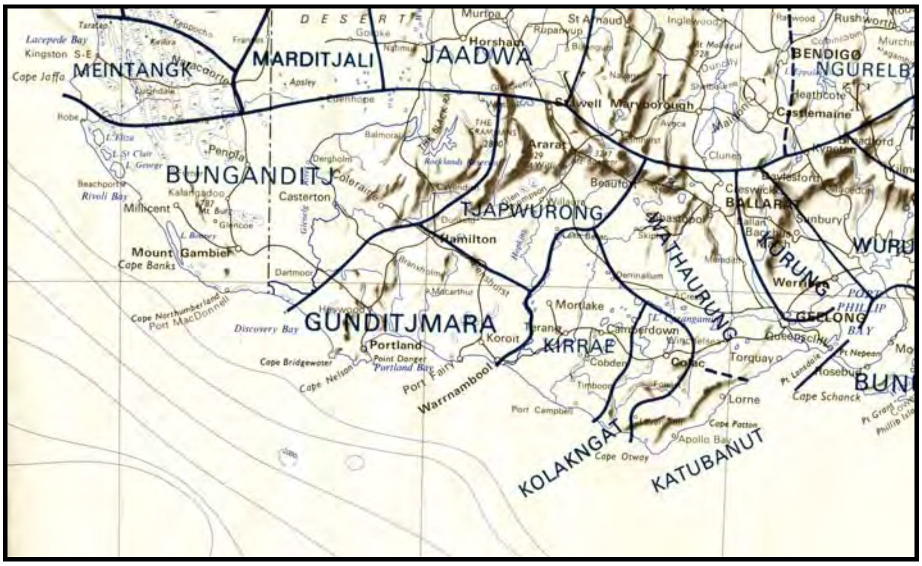

FIGURE 2. Tribal boundaries for southwest Victoria (from Tindale 1974:Map-SE Sheet).

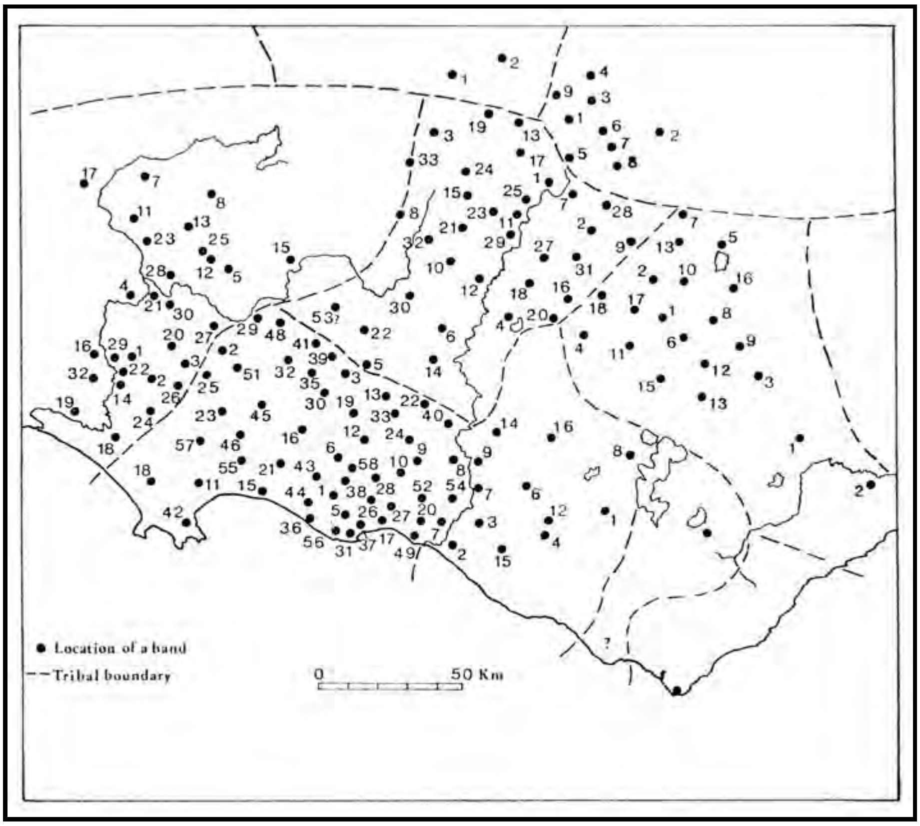

FIGURE 3. Lourandos’ (1977:Figure 1) map of southwest Victoria Aboriginal tribal boundaries (taken from Tindale 1974) and band locations (based on Robinson’s journals).

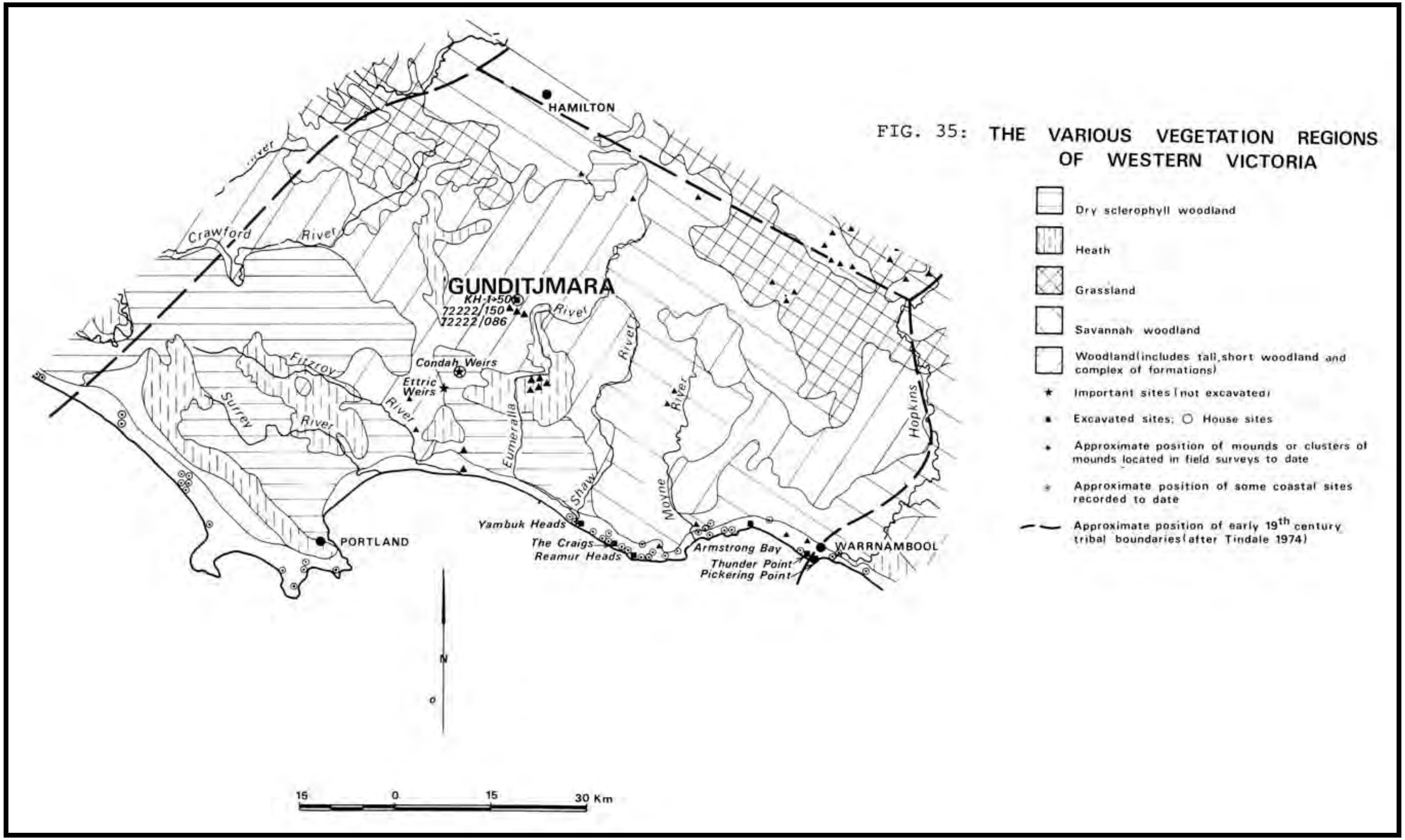

FIGURE 4. Gunditjmara tribal boundary (from Coutts 1981a:Figure 35).

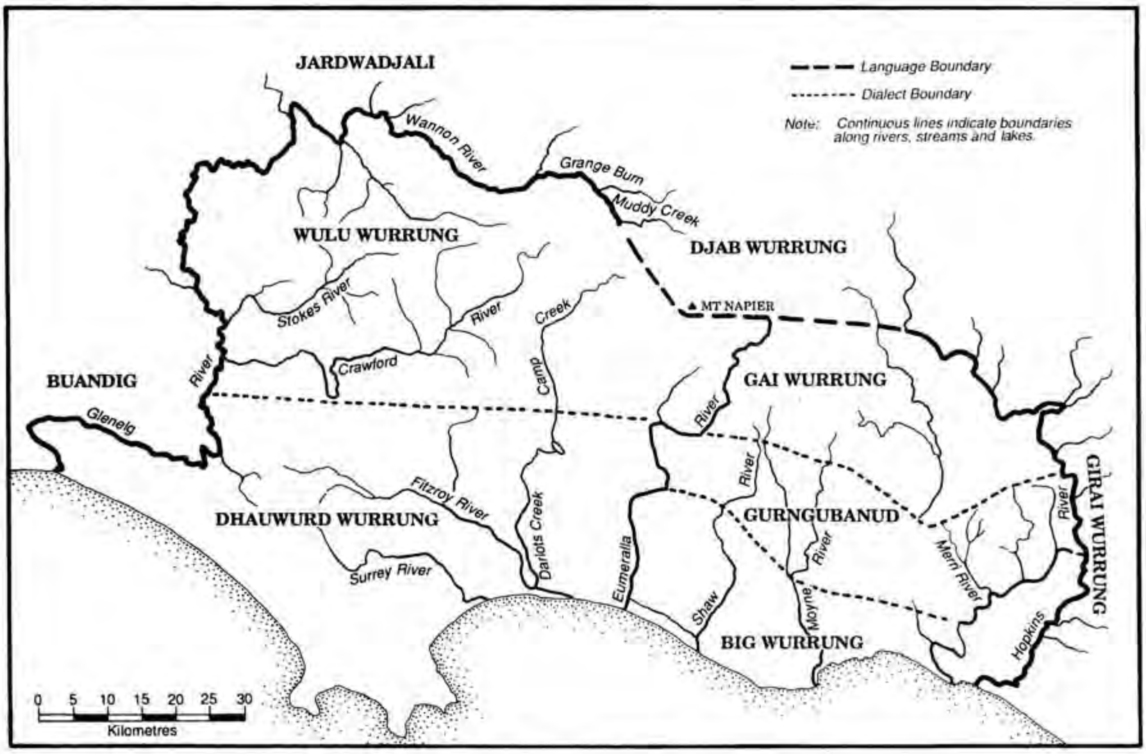

FIGURE 5. Dhauwurd wurrung (Gunditjmara) language area with dialectical sub-grouping boundaries (from Clark 1990:Figure 3).

Dialect sub-groups

Yet it would be a mistake to consider the Gunditjmara as a single group. Lourandos (1977:213) points out that Robinson distinguished 'three dialect and cultural areas' within the area corresponding to Tindale's Gunditjmara: 'the two coastal areas of Port Fairy and Portland, and the inland area centred around the swamplands of Mount Napier'. Lourandos (1977:213) also includes two more inland 'dialect' areas based on Dawson (1881): 'one around the rivers and plains about Spring Creek, and the other around the rivers, swamps and plains south of Mount Rouse'. As such, the language and dialect groups could … be described as clustering around the main resource areas, and for the most part having indistinct boundaries' (Lourandos 1977:214). Furthermore, the Gunditjmara 'can be seen as a collection of dialect groups oriented around the richest coastline of the district, and incorporating an equally fertile hinterland of marshes and open forest' (Lourandos 1977:214). Using the Robinson data, Lourandos (1977:214) suggested interactions between these divisions tended to be on a coastal-inland (~ north-south) basis with the Port Fairy peoples having little interaction with the Portland people to the west. Coutts (1981a:54, 1985:27) followed Lourandos and described the Gunditjmara as a 'coastal tribe' with a 'coastal economy' (**Figure 4**).

Following Lourandos, Clark (1990:22-23) also concluded that the Gunditjmara (Dhauwurd wurrung) comprised a 'dialect continuum' of five dialects. As can be seen from Clark's mapping of these dialects (**Figure 5**), the location of each dialect corresponds in a very general way to the location of the five groups identified by Lourandos using Dawson. That is, a coastal western dialect (Dhuawurd wurrung [cf. Portland]), an inland western dialect (Wulu wurrung [cf. Mt. Napier]), a coastal eastern dialect (Big Wurrung [cf. Port Fairy]), an immediate inland eastern dialect (Gurngubanud [cf. Spring Creek]), and a far inland eastern dialect (Gai wurrung [cf. Mt. Rouse]).

Bands/clans

Lourandos (1977:Figure 1) identified the location of 58 'bands' ('land-using unit') recorded by Robinson for the area taken in by Tindale's Gunditjmara 'tribe'. Using Robinson, Clark (1990:55) similarly record 59 'clans' for the area taken in by the Dhauwurd wurrung (Gunditjmara) (**Figure 6**). By examining Clark's (1990:Figure 2) map of the location of 50 of the 59 'clans', it is apparent that nearly all are focused along waterways either draining into the ocean or into the Wannon River. All major waterways are associated with 'clans', starting usually at the river mouth and followed by different clans spaced every 10-20km further upstream. Since rivers and major creeks are spread reasonably evenly across Gunditjmara territory, the result is that bands/clans also tended to be distributed reasonably evenly across Gunditjmara territory (**Figures 3 and 6**). Two spatial measures were used to test this visual impression of even spacing of clans. First, circles with a radius of 10km where positioned around each clan located by Clark. Most of the Gunditjmara territory is covered by these circles (usually involving major overlaps) (**Figure 7**). The only exception is a narrow zone running from Hamilton down to Discovery Bay between the watershed of the Crawford River and the watershed of Fitzroy River / Darlot Creek. However, circles with a radius of 15km cover nearly all of Gunditjmara territory. Second, nearly all of Gunditjmara territory can be divided into three 20km-wide zones paralleling the coast. For the 50 known clan locations, the number of clans for each band is 28 or 56% (within 20km of the coast), 15 or 30% (20-40km from the coast) and 7 or 14% (40-60km from the coast) (**Figure 7**). In other words, the number of clans drops by half moving inland from one 20km-wide zone to the next. This spatial pattern indicates that while band/clan groups were located across Gunditjmara territory, the density of groups tended to increase with proximity to the coast. The major reason for this increase in density is not the coast per se but the concentration of the lower reaches of rivers and creeks along the coast fringe. This inference is supported by (1.) the high concentration of coastal band/clans along the well-watered coastline between Portland and Warrnambool, (2.) the scarcity of bands/clans along the Discovery Bay coastline that does not feature waterways, and (3.) the concentration of bands/clans on the lower reaches of waterways entering the Wannon River. Indeed, 38 (76%) of the 50 clans mapped by Clark (see **Figures 6 and 7**) are located in the vicinity of the lower reaches (0-20km from mouth) of a river. Thus, while more than half of the bands/clans can be considered coastal peoples, a considerable proportion of Gunditjmara clans had estates located inland and more than 20km from the coast. In this light, it is a stretch to characterize the Gunditjmara generally as a 'coastal tribe' (Coutts 1981a:54, 1985:27) or 'coastal bands' (Lourandos 1976:177) with a 'coastal economy' (Coutts 1981a:54, 1985:27).

Lake Condah as an extra special place?

Despite the centrality of Lake Condah in archaeological research and as a focus of post-contact (mission/reserve) activity, Robinson's clan/band information does not indicate anything extra special about the district compared to other parts of Gunditjmara territory. Only one group (#17) – the Kerup gundidj – is recognized for the Lake Condah district (**Figure 6**; Clark 1991:62) suggesting the population density for the district was similar to other inland waterways of Gunditjmara territory. In this connection, Gerritsen (2000:4) points out that early records fail to reveal that the Lake Condah district was a special place of Aboriginal occupation. However, the suggestion by Gerritsen (2000:6) that Lake Condah may have featured 'no occupation … in the Pre-Contact Phase' is extreme and highly unlikely. At the very least the Lake Condah area, as a key eeling location, was one of a number of key *resource nodes* for the pre-contact Gunditjmara. The degree to which the Lake Condah district became extra special in the post-contact era is discussed in Section 8 below.

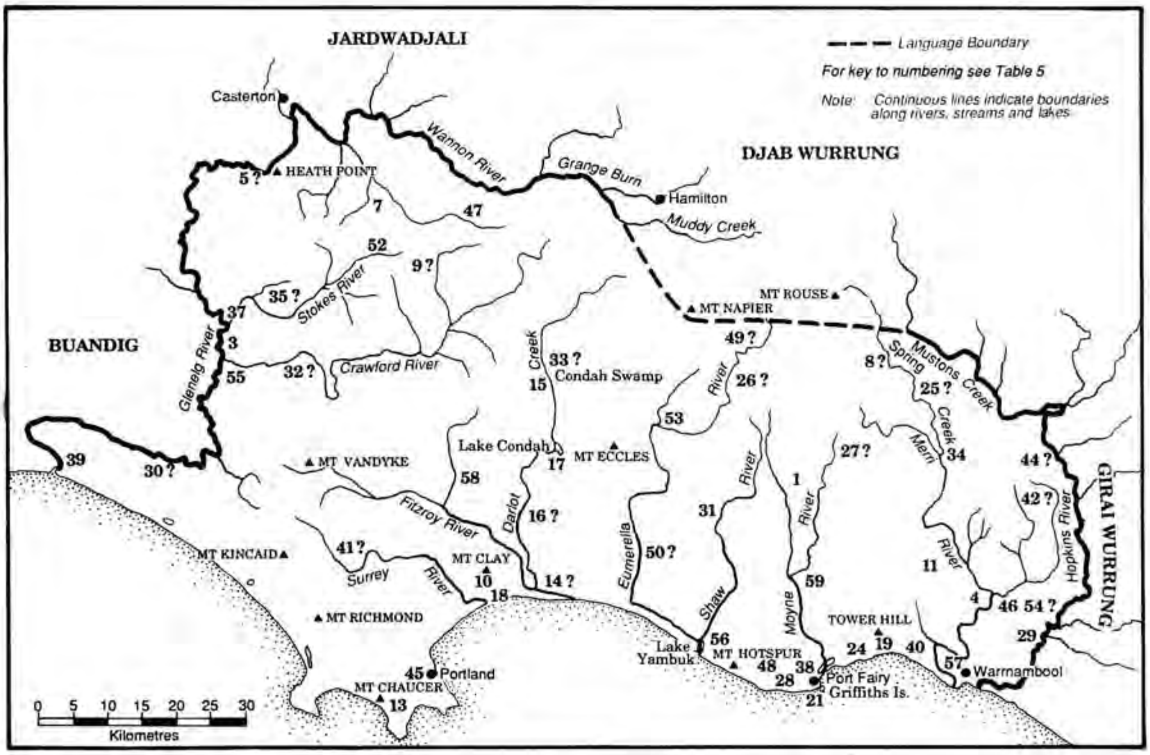

FIGURE 6. Dhauwurd wurrung (Gunditjmara) language area and known clans locations (from Clark 1990:Figure 2).

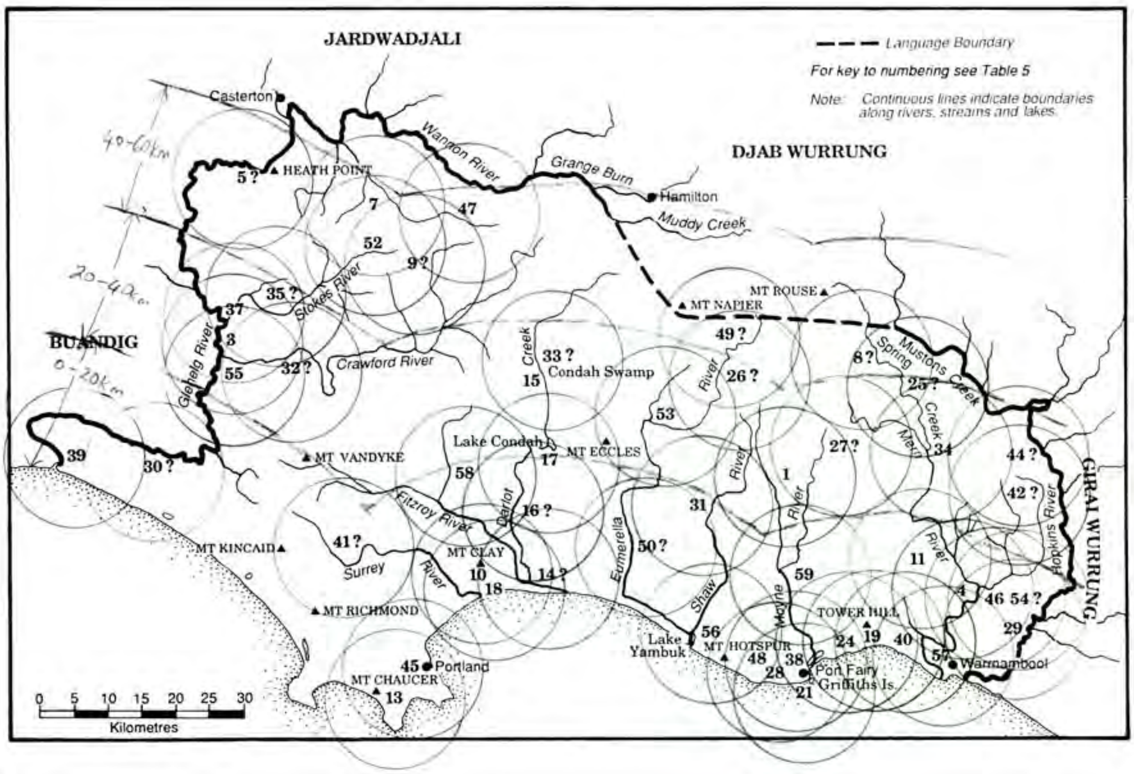

FIGURE 7. Spatial arrangement of known Dhauwurd wurrung (Gunditjmara) clans locations (from Clark 1990:Figure 2) based on 20km-wide zones parallel to the coast and 10km radius circles around each clan focus.

Population

Based on Robinson's data, Lourandos (1977:211) posits a 'conservative estimate of between 40-60 individuals per band' for the Western District. Using this estimate, a conservative population estimate for the 59 clans within the Gunditjmara territory delineated by Clark (1990) is approximately 2400-3500 people (Clark 1990:52). This equates to a density of 2-3 km^2 per person (Lourandos 1977:219). However, Clark (1990:52) suggests this population estimate is conservative since Robinson recorded seven clans with numbers more than 100. As such, Clark (990:53) estimates 'an 1841 figure greater than 4000'. As expected given the higher density of clans/bands along the coast, population densities on the coast were higher than those inland (Lourandos 1977:219). Butlin's (1983:140) reconstruction of Western District Aboriginal populations immediately prior to European impact of diseases (smallpox and venereal) suggests that the Robinson/Lourandos/Clark population estimates may be out by a factor of 2.5, implying the Gunditjmara may have numbered 10,000 people in 1788.

4.2 HYPOTHETICAL SETTLEMENT-SUBSISTENCE MODELS

4.2.1 Research by Harry Lourandos

The first serious attempt to understand Aboriginal settlement and subsistence in southwest Victoria was by Lourandos (1976). Apart from using well-known 19th century historical texts on local Aboriginal lifeways (e.g. Dawson 1881; Smyth 1878), Lourandos was the first archaeologist to make use of the ethnographic goldmine that was the unpublished 1839-49 journals of George Augustus Robinson. While not developing a detailed settlement-subsistence model, Lourandos (1976:177-178, 1977:204) identified 'seasonality' of resources as the key environmental factor affecting the 'pattern of subsistence' for the region. In this regard he posited three major resource 'habitats': (1.) 'wetlands' (providing 'an abundance of year-round food resources, including a wide range of aquatic resources' such as 'fish, migratory fish such as eels, birds, bird's eggs, a range of vegetables etc'), (2.) 'coastal strip' ('most productive during spring and summer when fish, seals and other marine resources were most plentiful and dependable'), and (3.) 'open forest and savanna grassland' ('a rich and diverse range' of mammals, birds and reptiles). In general, 'the season of greatest abundance was spring to early summer, and the leanest season, winter. Despite this variation, there does not appear to have been a serious depletion of resources in any season' (Lourandos 1976:177).

According to Lourandos (1977:215-216), historical records suggest that seasonal use of different areas was based around interactions between different bands, and 'most band interaction seems to have taken place within dialect areas'. However, 'the fluid composition of the band allowed for interaction across dialect and tribal boundaries'.

> Interaction, concerned with reciprocal access to food resources, was accelerated during seasons of resource abundance, for example the seasons of eels, bird's eggs, stranded whales, certain fruits (e.g. native berries at the mouth of the Glenelg), and perhaps seals. General seasonal abundance in particular resource zones had the same effect, for example in the marshlands and coastal regions during spring and early summer. At such times, large groups composed of representatives from many bands were recorded (Lourandos 1977:215-216).

Significantly, Lourandos (1977:220) concluded that 'there were no large scale seasonal movements'. Thus, 'coastal areas were more productive in spring and early summer, and would have supported higher population densities during these seasons. However, rich coastal marshlands would have supported semi-sedentary populations throughout the year. Fertile inland areas (e.g. Mount Napier area) could also have supported such populations throughout the year' (Lourandos 1977:220).

4.2.2 Research by Peter Coutts

Coutts built on Lourandos' (1976, 1977) foundational research to develop more detailed, seasonal settlement-subsistence models for the 'central Western District' (Coutts et al. 1978:41-42, Table 3; Coutts 1981a:11-15, 37-43, 1985a:54-56, 1985b) and more specifically for Western District 'coastal Aboriginals' and the 'Gunditjmara' (Coutts 1981a:15-18, 52-57, 1985a:54-56, 1985b). Related models, building on Coutts' research, have been made by Williams (1988:40-43) and McNiven (1998:72-74). A diagrammatic representation of Coutts' settlement-subsistence model for 'coastal regions of the Western District' (focusing on the Gunditjmara) is found in Coutts (1981a:Figure 34) and subsequently re-published in Coutts (1985a:Figure 20, 1985b:Figure 7) (see **Figure 8**). Coutts (1985a:56) noted that the diagrammatic 'model has been constructed on the basis of archaeological, historical and environmental data. The sequence of figures [for each season] illustrate the relationship between environment, population movements, seasonality and campsite location'. As with Lourandos, Coutts (1985a:30) identified the 'major sources' of 'historical information … available about the Aborigines of the Western District' as Dawson (1881), Smyth (1878) and the 1840s journals of George Augustus Robinson. Following Lourandos, Coutts' settlement-subsistence model has people throughout the region despite seasonal movements. In other words, it is doubtful that any major environmental zones of the region were abandoned during the year. The models of Lourandos and Coutts posit moving foci of activity as opposed to large-scale population movements (migrations). A summary of Coutts' settlement-subsistence model relevant to the Gunditjmara is presented below:

Summer (Dec-Feb)

According to Coutts et al. (1978:41), during summer 'foraging bands would normally have experienced least stress and been exposed to maximum variability of food resources'. While the activity focus for inland central Western District peoples was woodland where animals aggregated around permanent sources of water (Coutts et al. 1978:Table 3), for coastal peoples such as the Gunditjmara the focus was coastal 'dunes' where 'base camps' were established (Coutts 1981a:52, 1985a:56). The 'coastal periphery' was 'slightly more favourable environment at this time of year' (Coutts et al. 1978:Table 3) with the availability of 'sea birds, crayfish, shellfish, seals and fish' (Coutts 1981a:52). According to Coutts (1981a:52), people were 'very mobile' at this time of year.

However, researchers during the last 20 years have re-analysed ethnohistorical and environmental data for the region and have concluded differently that summer was a time of resource stress due to water scarcity. For example, Williams (1988:42) hypothesised that 'with the onset of late summer … groups became more settled again, this time because of lack of water. As swamps and creeks dried up, people moved their camps closer to the permanent waterholes'. Similarly, McNiven (1998:73-74) suggested that the summer 'dry season' was 'a time of resource contraction' with 'tethering' of Aboriginal groups 'to limited water supplies'. Builth (1996:75) similarly concludes 'that summer, as the driest season was probably the leanest time of the year'.

Autumn (Mar-May)

According to Coutts et al. (1978:41), autumn 'was by far the worst season'. The 'economy focuses on exploitation of eels and other fish' from inland 'base camps' with the 'population semi-sedentary during the eeling season' (Coutts 1981a:52). 'Fishing would appear to be the optimal activity during this period and would be the only activity which would allow population aggregation for any length of time' (Coutts et al. 1978:Table 3). Temporary visits to the coast from inland 'base camps' would have involved, in part, exploitation of 'mutton birds if and when available' (Coutts 1981a:52).

The view of autumn resource stress is contested by Builth (2002:48-49) as it is inconsistent with eel migrations and availability of wetland plant foods. Builth (2004:166) argues that it is ‘in the autumn and winter months that the floral and faunal resources of the wetlands are at their most productive’.

Winter (Jun-Aug)

According to Coutts et al. (1978:Table 3), winter was a period of ‘generally low productivity’. The focus of occupation would have been ‘fishing’ within grasslands and savannah woodlands, while the coastal periphery would have been ‘inhospitable and poor’ and ‘probably not used much’ (Coutts et al. 1978:Table 3). Occupation would have been ‘semi-sedentary’ with ‘substantial’ housing at inland ‘base camps’ (Coutts 1981a:52). Coastal use was mostly in the form of ‘occasional journeys to … exploit stranded whales’ (Coutts 1981a:52).

Builth (2002:40, 2004:166) contests Lourandos’ and Coutts’ notions of winter resource stress. Alternatively, ‘winter, being the high season of eel and other wetland resource activity, would also be a period of high Gunditjmara activity’.

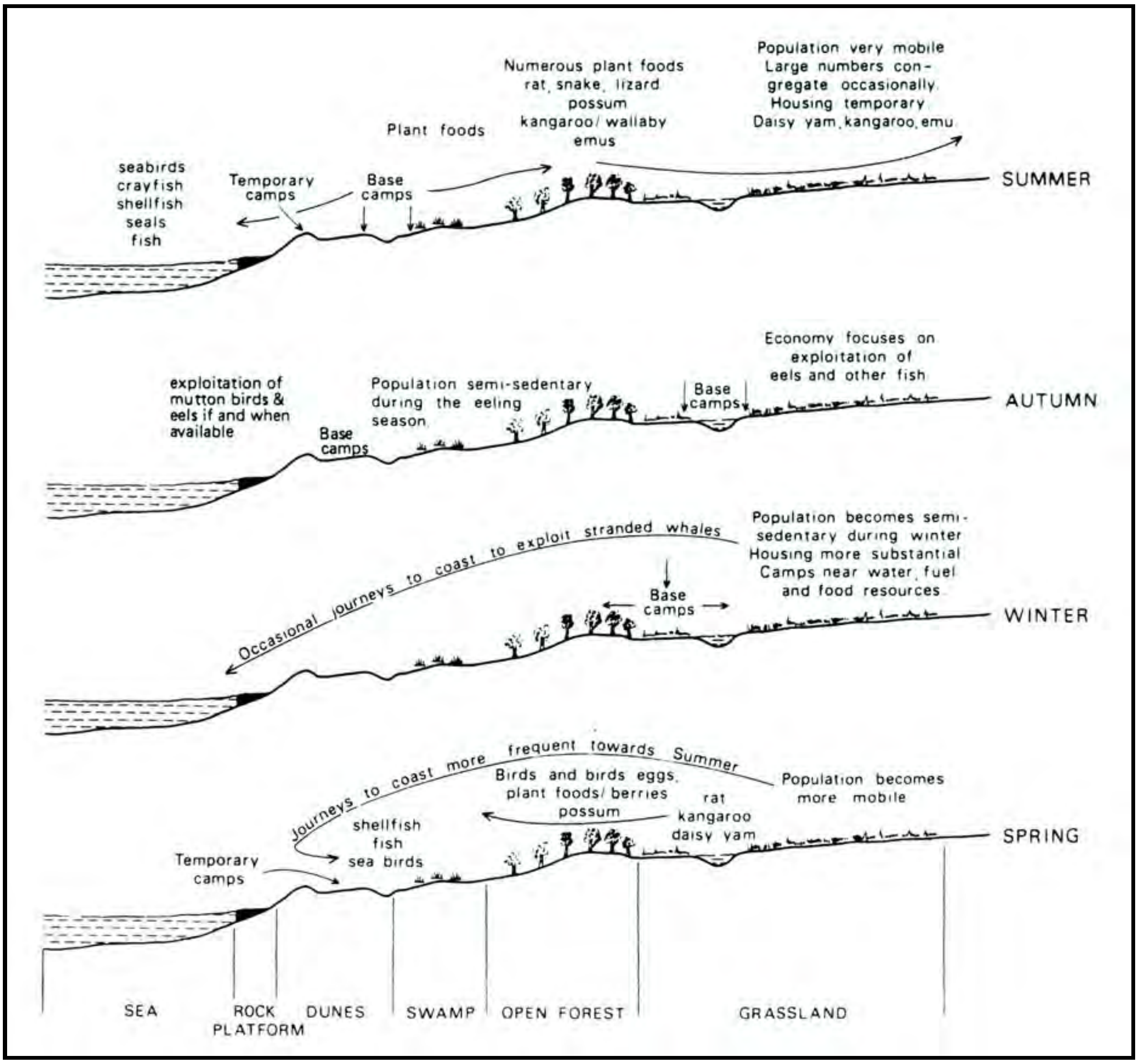

FIGURE 8. Gunditjmara settlement-subsistence model (from Coutts 1981a:Figure 34).

Spring (Sept-Nov)

During spring, 'savannah woodland and grassland' were the 'most important' environments, while the 'coastal periphery' was a 'poor environment by comparison with others at this time of year' (Coutts et al. 1978:Table 3). Key foods were murnong roots and eels (Coutts et al. 1978:Table 3). 'Population becomes more mobile' and use of the coast gradually increases for 'shellfish and sea birds' (Coutts 1981a:52). Builth (2002:83) argues that 'autumn, winter and spring were the seasons of plenty for the Gunditjmara. This is due almost entirely to the opportunities offered by the locally extensive wetlands.'

4.3 ARCHAEOLOGICAL COMPATIBILITY

4.3.1 Measures of coastal-inland movement

The key archaeological measure of coastal-inland connections for any part of the world is stone artefact raw material movements. Western Victoria is extremely suited to such analysis as flint, a key stone artefact raw material, is available along the shoreline. As noted above, places such as Discovery Bay reveal extensive evidence of flint tool manufacture. Flint tools have also been recorded along other sections of Gunditjmara coastline such as at Cape Bridgewater (Lourandos 1983), Cape Nelson (Mitchell 1949:172), Portland (Daley 1928; Whitehead 1973). According to Coutts (1981b:19), the two 'major flint catchment' areas of western Victoria are Discovery Bay and the Portland Bay area (i.e. the coastline of the study region).

That peoples who made these flint tools were also the same people who used inland parts of Gunditjmara territory is revealed by the dominance (even near exclusive use) of flint artefacts on inland sites (**Figure 9**). For example, 94% of the 1750 stone artefacts recovered from the PAL-20 stone hut excavation on Allambie property near Condah Swamp were made of 'coastal flint' (Coutts 1982:41; Wesson 1981:50). Frankel (1991:90) rightly concludes that 'it is therefore probable that the people using the Condah area moved between it and the coast' located 25km directly to the south where flint washes up onto the beach. One of the two stone artefacts recovered from Kinghorn stone hut (KH-12) was made from coastal flint (Wesson 1981:87). These findings are corroborated by more recent recordings showing that 186 (97%) of the 191 artefacts examined by Czerwinski (2002) from Tyrendarra were made from 'beach flint'; 27 (69%) of the 39 artefacts recorded within three artefact sites in the Lake Condah area are made from 'coastal flint' (Clarke 1991:29); over 95% of stone artefacts excavated from stone huts near Bessiebelle and at Tyrendarra by Lane (2002a) are flint; and 61 (85%) of the 72 stone artefacts recorded on an artefact scatter at Allambie near Condah Swamp are 'coastal flint' (Clarke 1991:44). Clarke (1991:44) suggests that the source of the flint artefacts she recorded in the Condah district is 'Discovery Bay some 40km to the south'. However, the adjacent coast between Port Fairy and Portland is a likely source as 'flint is most plentiful' along this coast (Daley 1928:520). Williams (1988:145, 162) found that 63 of the 64 artefacts recorded from the Gorrie Swamp hut site were made from coastal flint, whereas 58% of the 33 artefacts recovered the nearby Montrose Mound Sites 1 and 2 were made from flint.

Antiquity of inland flint movements

The antiquity of people taking coastal flint inland is not well understood. However, it is likely that it has been happening for over 10,000 years given that it is unlikely the occupants of the lower levels of Bridgewater South Cave were purely coastal peoples. That Gunditjmara were taking flint inland after contact is revealed by coastal flint artefacts associated with bottle glass artefacts within stone huts at Kinghorn (Wesson 1981) and possibly at Tyrnedarra (Lane 2002b) and Thomas' property at Bessiebelle (Lane 2002b).

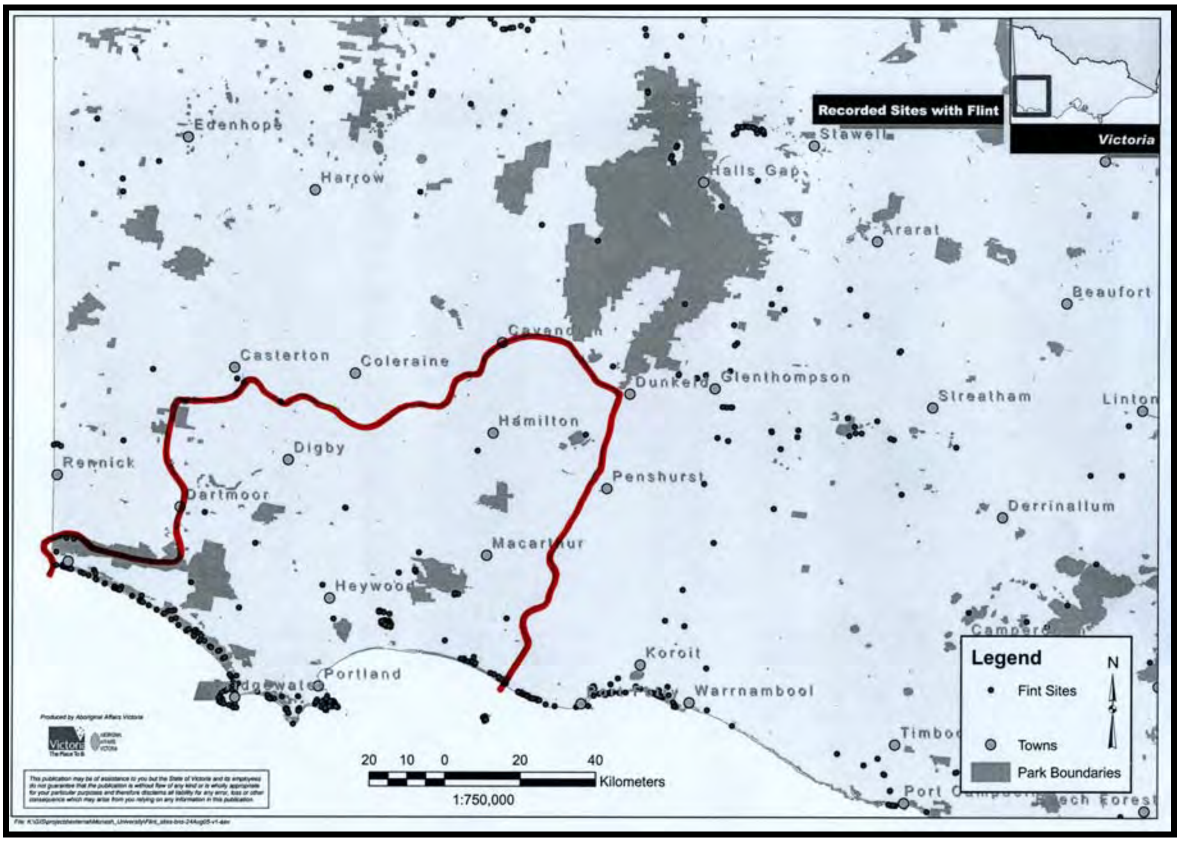

FIGURE 9. Distribution of archaeological sites with flint artefacts in western Victoria (Data courtesy AAV).

4.3.2 Measures of seasonality and mobility

Coastal middens

Lourandos (1976:178; 1977:215-216, 221; 1980:249) hypothesised that the ‘peak’ period during the year for occupation of shell middens (the key archaeological signifier of Aboriginal coastal occupation before European colonisation) coincided with the seasonal abundance of foods such as fruits and birds’ eggs during spring and early summer. This hypothesis is in line with more recent readings of ethnohistorical and environmental plant food records for the region (Gott 1982a; Head 1987:449-450). Furthermore, this hypothesis has been supported by Godfrey’s (1983) oxygen isotope analysis of pipi shells from Discovery Bay middens (Godfrey 1988, 1994). By measuring the ratio of oxygen isotopes ^{18}O and ^{16}O (ratio dependent on sea temperature) on the margins of pipi shells is possible to determine the time of death and hence the time of pipi collection by Aboriginal people. Godfrey’s (1994:314) analyses revealed that most pipis were collected in summer with some winter collection. Following Lourandos, Richards & Johnston (2004:108) similarly posit ‘late spring-early summer’ occupation of the Cape Bridgewater region as it coincides with high food productivity and ethnohistorical observations of coastal visitation. Seasonal use of the Cape Bridgewater midden complex is consistent with the dietary specialization (mostly Narrow Wedge Shells) and limited range of other activities (e.g. ‘stone working’) (Richards & Johnston 2004:109). Coutts (1985:26, 49) also considered that ‘resources of the intertidal zone were probably least attractive during the winter season’ when they ‘about half those available during summer’. Builth (2004:178) also acknowledges that ‘ethnographic and archaeological research (Godfrey 1994) informs us that Gunditjmara visited the coast for the summer months’.

The seasonal nature of coastal occupation is consistent with the form of middens. Lourandos (1977:221, see also 1980:250) observed that 'most coastal shell middens [in the Western District] appear to be specialized, or seasonal in nature'. For example, 'most' Discovery Bay middens are represented by 'single layers' of shell (Godfrey 1989:66), which suggests campsites were moved frequently. In this connection, Richards & Johnston (2004:105) demonstrate how the focus of midden formation (camping) at Cape Bridgewater moved a few 100m every few 100 years across an occupational 'landscape'. From the considerable size of the Cape Bridgewater midden complex, Richards & Johnston (2004:109) calculated that 'multiple cubic metres of midden [were] deposited per site visit'. They conclude by suggesting the Cape Bridgewater midden complex 'functioned as a base camp' where 'a social group such as a band (i.e. 20-60 people as per Lourandos 1980:89) lived and undertook a range of activities … probably on a semi-annual, seasonal basis for durations of a few weeks to a few months at a time' (Richards & Johnston 2004:109). Furthermore, 'the main reason people returned to this location [Cape Bridgewater] repeatedly over thousands of years was its strategic position near a predictable, reliable and abundant food source' (Richards & Johnston 2004:110).

Inland stone huts

Wesson (1981:77-79; see also Frankel 1991:91) hypothesised that the orientation of stone houses at the Palmer and Kinghorn site complexes to avoid the wind provides possible insight into the season of occupation. The fact that most houses are oriented with entrances facing east to northeast (Palmer complex) and northeast (Kinghorn complex) indicates they were built to avoid westerly to southwesterly winds. Based on the seasonality of wind directions for the district, the sites could have been occupied anytime from October to March, with a possible focus around November and December (Wesson 1981:77). However, as winds in the region hardly ever blow from the northeast, occupation during anytime of the year cannot be ruled out.

Inland eel traps

Ingram (cited in Worsnop 1897:104-105) was of the opinion that the Lake Condah and Darlot Creek eel traps were used by local Aboriginal people 'during winter'. This inference was based on environmental and ethnographic information. First, he noted that 'owing to the peculiar formation (open trap scoriae) along the eastern, southern, and part of the western sides of the lake, the water sinks very rapidly and becomes very low during summer months, but as it receives the drainage of a large extent of country the water rises very quickly during winter'.

Coutts et al. (1978:8-11) suggest it was only from May to October (late autumn to late spring) that rainfall was above 65mm per month and high enough to 'fill Lake Condah' and allow it to discharge into Darlot Creek. Thus eels could start migrating downstream in May/June. As such, 'utilisation of the structures at Lake Condah almost certainly depended upon the frequency and reliability of seasonal flooding'. From the location and orientation of traps, Coutts et al. (1978:25) suggest eels were caught during autumn downstream and especially spring upstream migrations. Significantly, they suggest that 'fish could still be trapped at other times of the year as well, in fact at any time following a period of heavy or persistent rainfall' (Coutts et al. 1978:25). Coutts (1985:44) suggested use of the eel traps during their 'autumn' downstream migration. Similarly, Massola (1968:200) posited the lack of summer use of the traps is confirmed by the simply fact that most of the traps are high and dry during summer. Builth (2002:252, 2004) also argues that the trapping systems were used during flooding times from autumn to spring.

Inland eels pens

In contrast to the seasonal use of eel traps, Builth argues that penned eels could be obtained throughout the year. She posits that 'during summer and/or drier times water is held back' in pens 'to enable the wetlands to thrive and eels to grow' (Builth 2004:175). Thus, penned eels 'were available throughout all seasons and over many years. In cases of extreme drought the eels could enter a state of torpor until the waters returned' (Builth 2002:253, 2004:169).

Mounds

Coutts (1985:32) posited that 'an analysis of the faunal evidence from these sites, the environmental contexts of the sites themselves and their associated faunas, and the disposition of the sites relative to accessible hydrological resources indicates that the mounds were probably used in the main between late autumn and spring'. More particularly, Coutts (1985:51) hypothesizes that the mounds (particularly Type A) were 'created [as] artificial 'house' platforms to provide well drained areas which could be occupied at any time of the year, but more likely during the winter-spring periods. They were a local response to a water-logged and wetland environment'. Coutts (1985:52) notes while 'no obvious reason [exists] why mound sites should not have been occupied during any time of the year', he suggests that as 'many of the mounds are located some distance from perennial water resources and whilst water would have been available in close proximity during winter from intermittent sources, during summer this may not have been the case'. Williams (1987:318) suggests that a 'more sedentary form of occupation' was associated with 'larger mound clusters'.

Stone artefact scatters

Coutts (1985:38) suggests that as most larger artefact scatters are located along waterways adjacent to 'perennial resources', they 'were probably occupied during the warmer months of the year [spring and summer], when such localities would have been more comfortable and convenient than alternative venues'.

4.4 DEGREES OF SEDENTISM

Putting available archeological, environmental and ethnohistorical information together, Coutts (1985:54-56) suggested that a 'highly patterned existence' was in operation 'for at least the past 2,000 - 3,000 years' across the Western District. A key component of this 'highly patterned existence' was establishment of certain types of sites for repeated, long-term use. For example, Coutts et al. (1978:33) point out that 'as with the construction of mounds', with the eel trapping systems 'we appear to be looking at examples of semi-permanent or permanent structural features which involves an initial high input of labour. However, once established, these systems provided an efficient mode of food procurement that required low maintenance'. Furthermore, 'the investment of time and energy needed to establish and maintain such fishing systems suggests they were designed to be used repeatedly' (Coutts et al. 1978:33). Williams (1987:318) also pointed out that 'increased investment in durable facilities such as mounds … suggest that people are increasingly returning to the same camp-site over time'. Coutts et al. (1977a:203) put the case succinctly: the 'construction of such monuments presupposes that their builders would return at a later date'.

Lourandos (1977:220; 1980:256) characterizes southwest Victorian Aboriginal peoples as living a 'semi-sedentary lifestyle'. The late Holocene Gunditjmara settlement system can be characterized as moving seasons of semi-sedentism, with most activity focused around major perennial water sources. Coutts (1985:23, 63) notes that 'from the viewpoint of Aboriginal settlement, the most significant features of the area [Western District] are the large numbers of perennial and intermittent lakes, swamps, streams and rivers which attract abundant wildlife and provide favourable environments for aquatic plants. Such wetlands were potentially rich and reliable sources of food for the Aborigines and were the focus of much economic activity during the late prehistoric period', that is 'the period immediately prior to the European invasion, circa 1830 AD'. In particular, 'inland fishing was an important aspect of late prehistoric economy' (Coutts et al. 1978:36). Williams (1988:62) similarly concluded for the central Western District 'that a small number of groups who had access to areas of swamps and marshes, and permanent water, may have been more sedentary'.

Despite the semi-sedentary lifestyle of late Holocene Gunditjmara indicates that individual sites such as middens, stone huts, and mounds were never occupied permanently with residency measured in days, weeks or months. In this connection, Lourandos (1980:249; see also 1976:178) stated:

> Wetlands (coastal and inland) consisting of perennial waterways, marshlands and fertile stretches of coastline, provided favourable situations of this kind, and in these areas the population appears to have been semi-sedentary throughout the year. Seasonal variations seem to have only marginally affected this settlement pattern (e.g. on the coast). Permanent base camps or 'villages' consisting of 10-30 large, well constructed and durable domed huts of wattle and daub, sometimes with stone sub-structures, were located only in these optimum habitats. These 'villages' formed part of a permanent network of base camps between which the population redistributed itself throughout the year.

Gerritsen (2000:37) posits that Aboriginal peoples of the broader Lake Condah region practiced 'multi-seasonal sedentism' at the time of first European contact. That is, groups moved between a series of permanently established settlements where occupants were sedentary for one or more seasons. However, such a situation is more consistent with notions of semi-sedentism outlined above. For Lake Condah, Clarke (1991:48; see also 1994:10-11) makes the following relevant point:

> Although not explicit in the limited academic literature relating to Lake Condah there is an implication that the Lake was permanently or semi-permanently occupied. Here, we need to ask what sort of signature would such an occupation pattern leave behind in the archaeological record? Given the rocky nature of the stony rises and the real lack of substantial archaeological deposits, I would suggest that the more permanent camps were not located around the lake but will be found along the banks of Darlot Creek and on the sloping, well-drained land surrounding the stony rises. This less rocky landscape is only a short distance from the stone traps and is only a 30 minute walk from even the southernmost traps. This also raises the question of the function of the stone circles. Were they constructed as temporary trapping and fishing huts; places where people waited for the traps to become operational? Were they the places where people processed the catch from the traps for transportation to the main settlements along the creek bank?

In this situation, it is perhaps better to suggest that the Lake Condah district, as an example of a rich resource node, was a place of semi-sedentary occupation for many Gunditjmara during its peak resource time when eels were running (e.g. autumn to spring). During other times of the year when Lake Condah resources dropped off and resource peaks occurred in other districts, the focus semi-sedentary occupation for many Gunditjmara moved accordingly. However, is unlikely that the Lake Condah district was ever abandoned during the year given perennial water resources. More importantly, the capacity of the *district* to support permanent and sedentary occupation was determined by the scale of aquaculture and eel storage (both live storage in holding/growing ponds and caching of smoked eels) so they were available outside of the migration times. However, Butlin (1983:126-127) reminds us that eels are only part of the subsistence story for the Western District, 'as this style of activity ['significant increase in population size and density'] might not have achieved a great change had it not been for an associated characteristic of the area – the rich resources of land animals and bird life together with rich vegetable supplies'.

Thus, the Lake Condah *district* most likely always had a core of permanent residents who moved between a series of sites throughout the year. Builth (2004:178, in press) concludes that 'the stony rises of the Mt Eccles lave flow' was occupied for 'at least' during autumn, winter and spring', with some peoples moving to the coast in summer. In contrast, some non-wetland areas of Gunditjmara territory were most likely seasonally abandoned during the height of summer when water sources dried up. Neither historical nor archaeological evidence exits for mass seasonal migrations of Gunditjmara from one locality to another.

SECTION 5: REGIONAL INTERACTION, GATHERINGS & ARTEFACT EXCHANGE

5.1 ETHNOGRAPHIC BACKDROP

5.1.1 Inter-group gathering/exchange centres

The Robinson diaries and Dawson (1881) demonstrate clearly that Western District Aboriginal peoples had an elaborate system of inter-group gatherings where hundreds and perhaps thousands of people from different groups would periodically come together for a broad range of socio-political, economic and ceremonial reasons. Significantly, these gatherings were also key contexts for exchange of a broad range of objects. The two *major* gathering/exchange centres were:

- Mirraewuae west of Caramut (Dawson 1881:3, 78)
- Mt Noorat near Lake Keilambete (Dawson 1881:78)

Minor gatherings were hosted by most major groups. The Gunditjmara hosted such a gathering at the 'great swamp' near Tappoc (Mt Napier) (Robinson in McBryde 1986:88). McBryde (1986:88; cf. 1978:364) suggests the 'great swamp' was the northern end of Condah Swamp (SW of Mt Napier) and not Buckley Swamp (NE of Mt Napier). Other smaller gathering/exchange centres were Kuunawarm located 'on the east side of the River Hopkins' (Dawson 1881:73) and 'Mount Rouse' (Dawson 1881:78). Coutts' (1985a:54, 1985b:20) view that Mirrraewuae and Mt Napier gathering locations are one in the same is at odds with other researchers.

5.1.2 Scheduling gatherings: resource abundance or concentration?

Lourandos (1977:215 emphasis added) posited that 'interaction, concerned with reciprocal access to food resources, was accelerated during seasons of resource *abundance'*. He pointed out recorded large-scale gatherings and associated resource abundances at Lake Bolac (eels), Port Fairy (stranded whales), and Mirraewuae, west of Caramut (emus etc) (Lourandos 1977:215-216) (see **Figure 10**). Furthermore, such gatherings were 'seen as regulating and distributing population in relation to variations in resource availability. … Support from neighbouring and often distant bands was necessary both at times of scarcity as well as abundance, if a more equitable distribution of resources was to be achieved' (Lourandos 1977:217) (for an extended discussion of this view see Lourandos 1988a).

Dawson (1881:72) recorded that the 'great meetings are held periodically in summer, by agreement among the friendly tribes'. Using the work of Dawson and Lourandos, Coutts (1985b:17) concluded that 'meetings normally took place during summer, when resources were most diverse and plentiful'. As discussed above, it is now generally agreed that summer was the lean season for many Western District groups. Following this view, McNiven (1998:74) suggested that inland gatherings were scheduled 'to take advantage of *concentrated* food resources' when people were already concentrated around perennial water sources. This said, it is pointed out that 'concentrated food resources' is a relative concept. A concentrated food resource can occur by default (i.e. other food resources drop off), appearance (e.g. eel migrations, beached whales), or by design (i.e. Aboriginal people artificially enhance a resource). In this sense, Dawson (1881) appears to be referring more to gatherings associated with summer 'default' resource concentrations. As Lourandos (1976:180) pointed out, gatherings associated with eel runs and whale strandings ('appearance' resource concentrations) took place in autumn and winter.

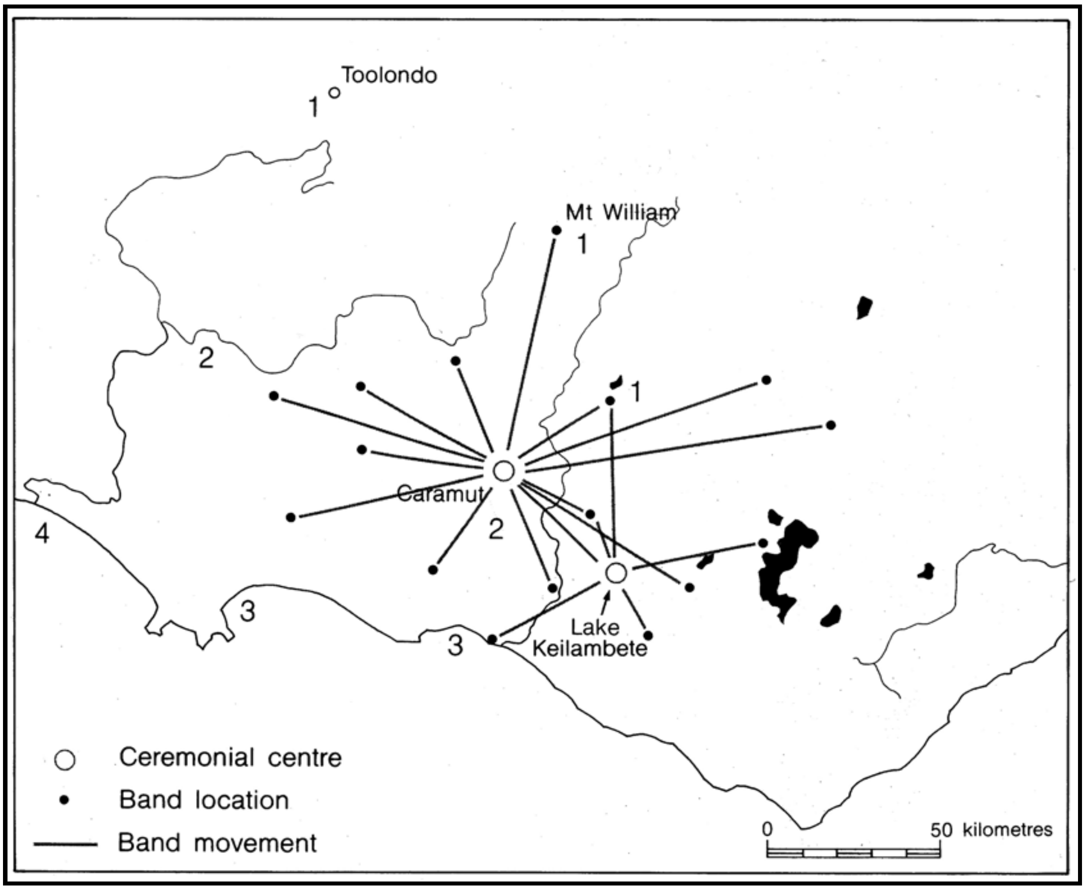

FIGURE 10. The main intergroup ceremonial and trading centres, along with locations of seasonal resource abundance, in SW Victoria at the time of European contact according to Lourandos (1977). 1 = eeling season; 2 = large scale hunts; 3 = whaling season; 4 = season of native fruits. (from Lourandos 1988b:297).

5.1.3 Coastal refuges

Lourandos (1977:218) suggested the historically known pattern of coastal groups being excluded from inland gatherings (see Clark 1990:29; Dawson 1881:3) reflected the relative richness of coastal areas. That is, the 'well watered coastal strip was not exposed to these variations in resources, and therefore would have provided a *refuge* area in times of need' (Lourandos 1977:218 emphasis added). Thus, Lourandos' views can be extended as follows. First, summer gatherings were scheduled to take advantage of existing tethering of peoples to perennial water sources. This pattern is more relevant for inland groups who underwent summer resource stress and hence summer gatherings were mostly an inland group affair. In this sense, and as pointed out by Lourandos, the system of gatherings cannot be divorced from broader concerns of settlement and subsistence. In contrast, coastal groups were less stressed during summer with little need to focus in a low number of perennial water sources. Second, coastal areas may well have functioned as a summer refuge for inland peoples during the summer lean season. Third, coastal areas could host gatherings when an 'appearance' resource concentration took place in the form of a whale beach stranding. In contrast, inland resource concentrations could happen by default, appearance and design.

5.2 ARCHAEOLOGY OF GATHERINGS

Three approaches have been used to explore the archaeology, antiquity and long-term historical development of inter-regional gatherings in western Victoria. They are examining (1.) gathering sites, (2.) logistical support facilities for gatherings, and (3.) artefacts exchanged at gatherings.

5.2.1 Gatherings sites

Despite historical documentation of known gathering sites in western Victoria, no specific gathering sites have been found archaeologically. This problem is largely theoretical and methodological. The question needs to be asked: ‘what are we looking for’? What does a gathering site look like archaeologically? The usual approach is to simply equation gathering sites with very large and diverse camping sites with unusually large amounts of archaeological materials. Such a case is found at Lake Bolac. Coutts (1985a:54) suggests the ‘diverse range of stone materials presumably reflect[s] the intensity of the trade and exchange networks that operated at Lake Bolac or in the area from time to time’. Similarly, Coutts (1985b:19) points out that the recovery of ‘hundreds of grinding stones’ from Lake Bolac ‘by collectors over the past 100 years’ is consistent with the site functioning as ‘a regular meeting place for Aboriginals’. Excavations at Lake Bolac reveal an major increase in activity within the last 500 years which Coutts (1985b:19) associates with an ‘intensification of activity’ and a minimum date for the site’s ‘role’ as a meeting place.

5.2.2 Logistical support facilities for gatherings

Coutts (1985b:19) suggests that ‘Lake Condah’ probably functioned as a meeting place ‘during the late prehistoric period’. This hypothesis appears to be based on the large eel trapping facilities that are capable of catching large quantities of food necessary for hosting large gatherings of people. Lourandos (1988a:153) argues that large eel trapping facilities ‘can be directly related to the large number of consumers (that is, large groups of people) - for consumption was immediate’. As such, and with regard to these facilities, ‘intensification and manipulation of eeling therefore operated mainly at the intergroup level’. It was a ‘complex technology developed to meet the needs of intergroup politics - beyond immediate domestic concerns’ (Lourandos 1988a:153-154). The only example of such facilities mention by Lourandos (1988a:153) are the elaborate drainage systems at Toolondo near the Grampians. However, it is clear he is also referring more generally to large eel trapping facilities within the stony rises.

5.2.3 Exchanged objects

The development of exchange systems and the antiquity of exchanged goods such as greenstone axes have been used as proxy measures for the occurrence of inter-regional gatherings. A discussion of the results of this research is presented in the following section.

5.3 ARCHAEOLOGY OF EXCHANGE & INTERACTION SPHERES

5.3.1 Flint

Coutts (1985a:27) suggests that ‘flint was also traded inland from the coast some hundreds of kilometers’ (see also Coutts 1981b:18-19). This view is consistent with the recording of sites with flint artefacts to the north of the Grampians (**Figure 9**) and the recovery of artefacts made from ‘flint from the Portland coast’ in the Mallee region (May & Fullagar 1980:164).

5.3.2 Eels

As noted above, Builth (2002, 2004:177) argues that a key reason why eels were smoked for preservation was to provision large gatherings. While this hypothesis is plausible and consistent with archaeological evidence for eel smoking using large hollow-based trees, subsequent stockpiling of smoked eels for gatherings is speculation.

5.3.3 Greenstone axes

It is with stone axes that the archaeology of exchange in southwest Victoria becomes more detailed, empirically sound and reliable. Research by Isabel McBryde (1978, 1979, 1984, 1986; McBryde & Harrison 1981; McBryde & Watchman 1976) has documented Aboriginal stone axe exchange systems across southeastern Australia by comparing the distribution of over 3000 axes of known raw materials across the landscape with the location of known quarries and outcrops of the same raw materials. The distribution arrays for axes from seven quarry/sources is shown in **Figures 11 to 14**. The most startling array is associated with the 'great quarry' at William north of Melbourne. Axes sourced to Mt William have been recorded 700km to the north near Broken Hill (NSW) and 550km to the west near Adelaide (SA). The arrays reveal that axes recovered archaeologically from Gunditjmara territory can be sourced back to distant quarries at Mt William and Mt Camel (located to the north of Melbourne) and Geelong (west of Melbourne), and more local quarries at Berrambool, Baronga and Jallukar (Hopkins River). A key finding is the focus on the manufacture of axes using greenstone despite the fact that other geologically suitable rocks occur in most locations. McBryde (1978:357) notes that 'there is no technological necessity in the importation of greenstone'. In other words, people who imported greenstone axes could have easily manufactured their own axes if they wanted to. 'The movement of goods is not necessarily towards those areas in which a particular object or its raw material is scarce' (McBryde 1984:268). This conclusion led McBryde to argue that greenstone from certain quarries had certain social and symbolic value that made it desirable for more than simple utilitarian reasons.

The distribution of greenstone axes 'can be explained in terms of the interrelationships between tribal groups' (McBryde 1978:363). That is:

> the motive for exchange here is more likely to be social and ceremonial than economic or utilitarian; to fulfil, cement or create social ties or ritual obligations. For such purposes a high value good is required. The direction of the distribution thus initiated will be determined by the exchange networks and kin affiliations of the individuals involved rather than by any bulk transfer of goods at 'trading centres' (McBryde & Harrison 1981:194).

The lack of export of greenstone axes into Gippsland, with whom the Kulin speakers of central and western Victoria historically had an enmity, further supports this contention (McBryde 1978, 1984). In other words, 'social barrier, traditional group alignments and hostilities may be invoked to explain the areas of non-penetration' of greenstone axes (McBryde & Harrison 1981:191). McBryde (1978:364) suggests that historically-known gathering locations such as Mt Noorat 'served as redistribution centres for greenstone from quarries' and 'that for the majority of recipients stone may have been acquired at these centres rather than the quarry site, being brought by its owners for exchange'. That Berrambool axes are on average slightly larger furthest from the quarry may indicate less utilitarian use (and hence less breakage and resharpening) and perhaps more ceremonial use and curation as prestige valuables (cf. McBryde & Harrison 1981:205-207). This pattern of changing use and value with increasing distance from quarry source also applies to Mt William axes (McBryde 1984:278).

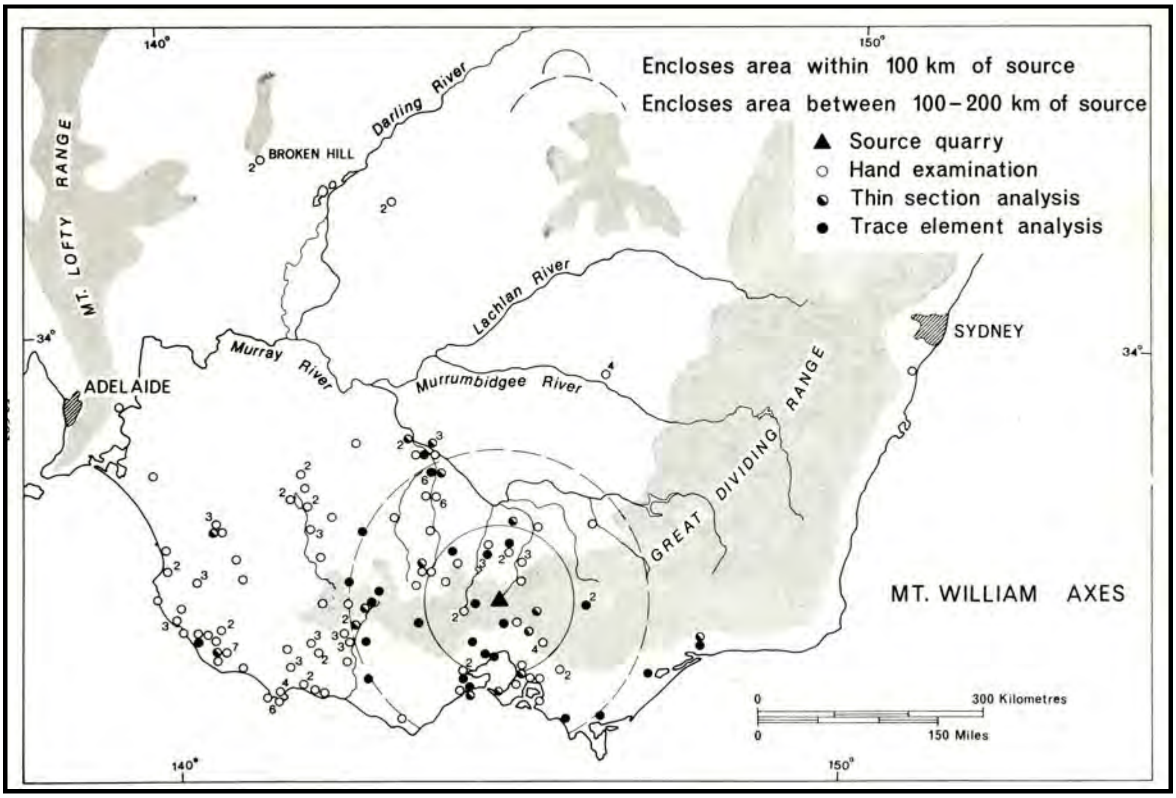

FIGURE 11. Distribution of Mt William stone axes (from McBryde 1978:Fig 2).

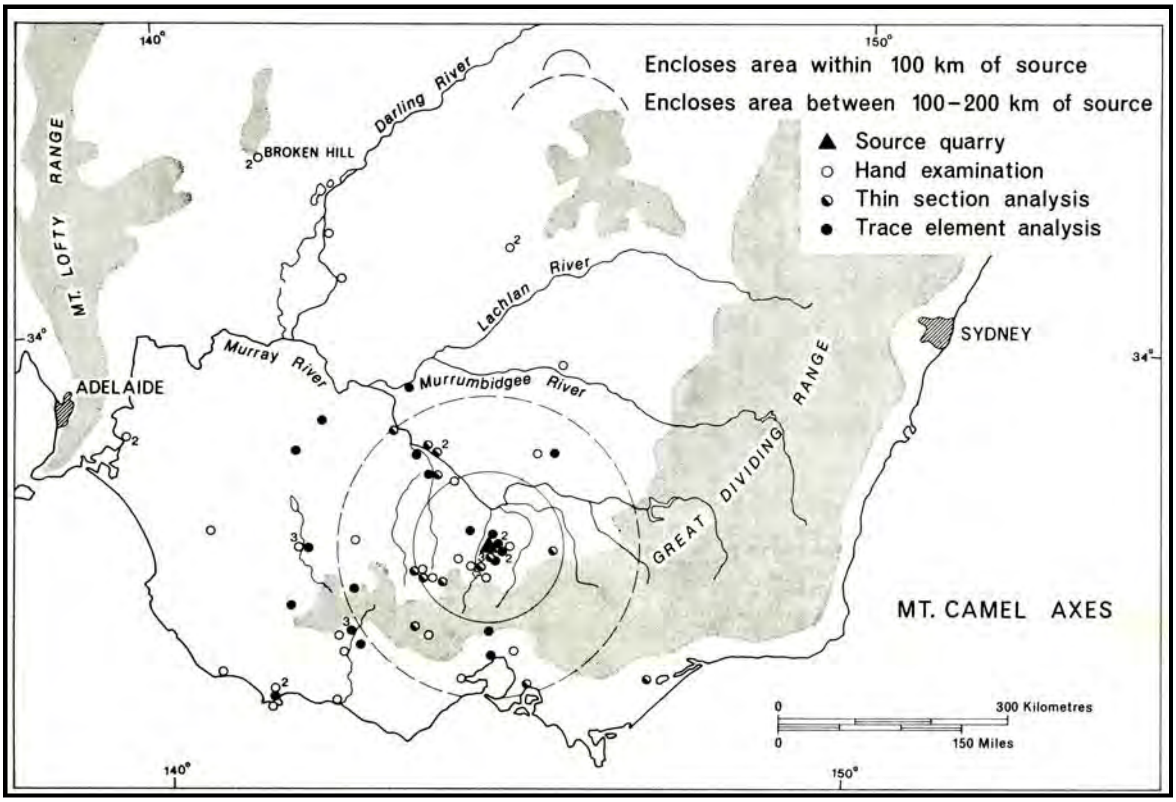

FIGURE 12. Distribution of Mt Camel stone axes (from McBryde 1978:Fig 3).

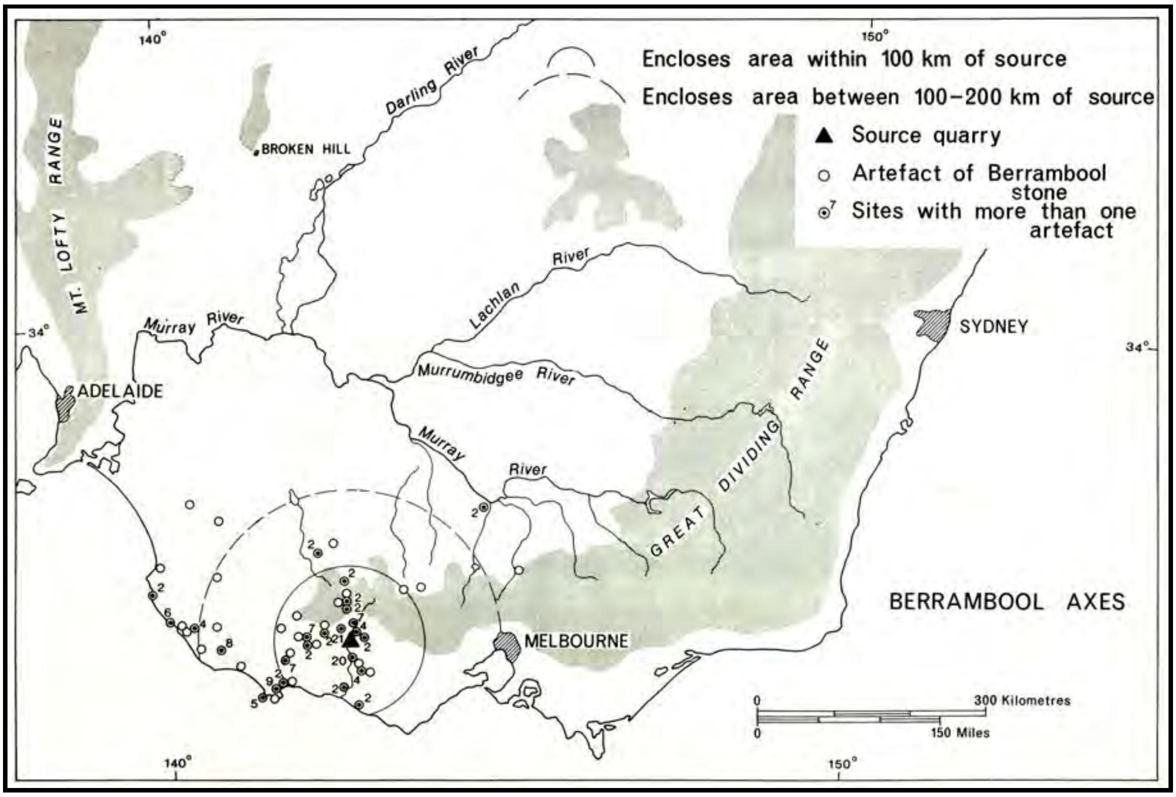

FIGURE 13. Distribution of Berrambool stone axes (from McBryde 1978:Fig 5).

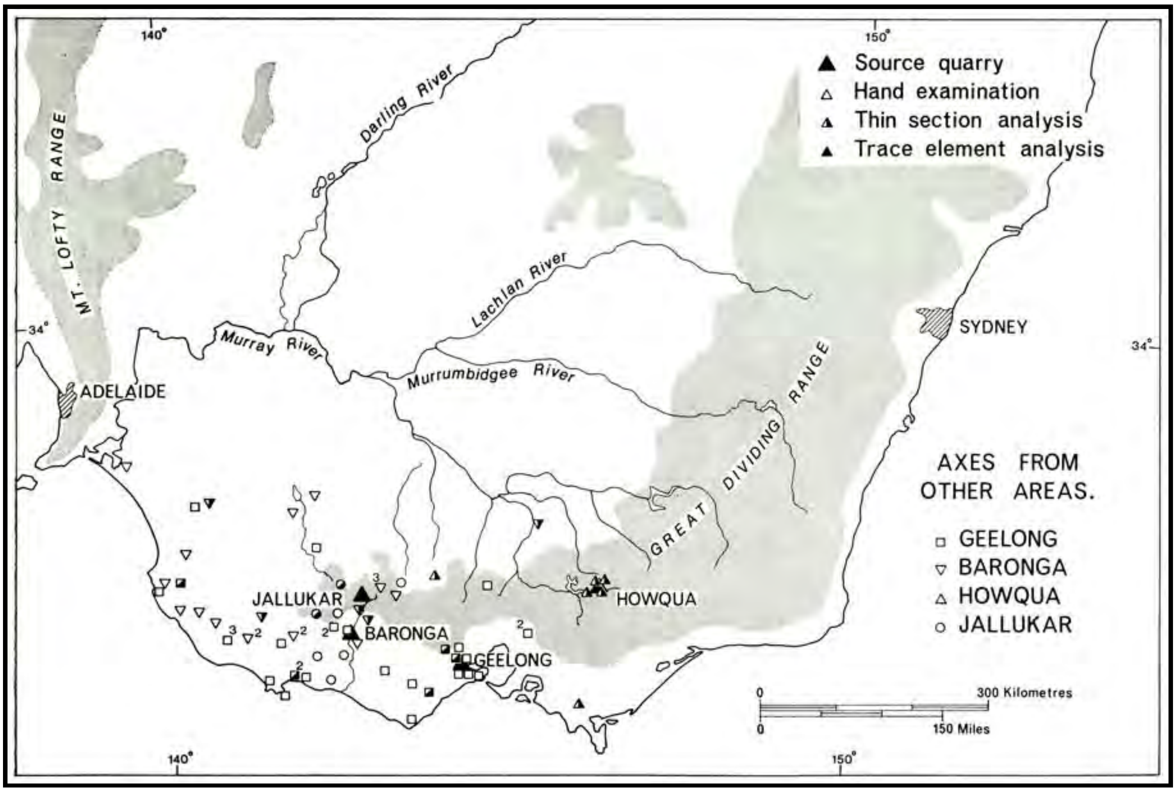

FIGURE 14. Distribution of Geelong, Baronga, Howqua and Jallukar stone axes (from McBryde 1978:Fig 6).

5.3.4 Antiquity of greenstone axe exchange systems

Two methods are available to date the system of greenstone axe trade elaborated by McBryde: first, excavate and date stratified (buried) greenstone axes or fragments of axes in sites, and second, excavate and date known greenstone quarries. Unfortunately, little archaeological research has been undertaken in both areas and McBryde's (1986:79) comment that 'evidence on the date of use of the quarries is not abundant' still stands.

Antiquity of greenstone axe quarries

To date, published accounts are available for only one greenstone axe quarry in western Victoria. Excavations at the Berrambool quarry in the mid-1970s by VAS produced a date of 1000 years ago (1090±95 BP) from a 'firepit' from the upper phase of site usage within 20cm of the surface (Coutts & Witter 1977b:67-68). The lower use phase between 20 and 30cm below the surface remains undated. However, the bulk of the site appears to date to the last 1000 years.

Antiquity of greenstone axes

At present, no convincing evidence exists for the antiquity of greenstone axes from known quarries within occupation sites across the Western District. Essentially all of the greenstone axes examined by McBryde in her distribution studies were museum specimens that have been surface collected. However, Bird and Frankel (1991a:9) note in the context of a discussion of the antiquity of greenstone quarries in western Victoria that 'greenstone flakes' were used during the last 3000 years at Billimina (Glenisla) rockshelter in the Grampians.

5.4 ARCHAEOLOGY OF SOCIAL GROUPINGS & BOUNDARIES

Lourandos (1977:233) pointed out rightly that 'it would be extremely difficult to isolate clear cultural boundaries (approximating tribal boundaries) prehistorically'. Yet a number of Australian archaeologists have had some success showing correlations between tribal boundaries and the archaeological distribution of stone artefacts (raw materials) (e.g. McNiven 1999) and rock-art (motifs) (e.g. David & Lourandos 1998; Veth & McDonald 2002). Part of the problem stems from the dynamic nature of group boundaries (Ellender 2002), which may change and move with such frequency to leave a blurred archaeological signature (Dortch 2002).

5.4.1 Distribution of greenstone axes

McBryde's research reveals that the geographical end point of use (i.e. where axes are found archaeologically) of greenstone axes from the Berrambool, Baronga and Jallukar quarries along the Hopkins River falls mostly within areas falling within the ethnographically recorded territories of the Gunditjmara and their northern (Djab wurrung) and western (Buandig) neighbours (see **Figures 13 and 14**). Following McBryde's model that axe exchanges reflect social proximity and alliances, it can be concluded that the Gunditjmara had close relationships and considerable interactions with peoples along the Hopkins River and their neighbours to the north and west. Since the Berrambool axe quarry appears to date mostly to the last 1000 years, it is likely that such social interactions and relationships have a similar antiquity.

SECTION 6:
LANDSCAPE INSCRIPTION
& PLACE MARKING

6.1 MOUNDS

6.1.1 As landscape (territorial) monuments

Lourandos (1976:180) was the first to point out that mounds, 'as archaeological markers … could serve as settlement units and be used in determining patterns of land usage'. Coutts (1985:35) noted that the area with the largest mounds (Willaura 1:100,000 map sheet) also corresponds 'within a distinct area of the Tjapwurong'. It was suggested that such a pattern may relate to the relatively high productivity of the Willaura regions and possible higher population densities and hence 'more intensive occupation' of mounds. Interestingly, Coutts (1985:36) noted that 'premounding was carried out in the Willaura and Warrnambool study areas, but very little evidence for it has been observed in the Ararat study area'.

Yet it is possible that mound sites have extra social meaning beyond functioning simply as facilities to elevate campsites above wet or damp ground. Williams (1994:166) argued that mounds were part of a broader package of cultural changes taking paces across southwestern Victoria during the late Holocene. She suggested that 'the introduction of mounds could represent shifts in factors such as climate, sedentism, the use of labour and notions of territoriality, or combinations of these shifts'. More specifically, Williams (1987:318) posits that since mounds 'would have been visible for some distance within the landscape … [they] may have functioned as some territorial symbol, marking off one group's camping area from another's'.

This notion of mounds as landscape markers or territorial symbol was taken up by Wolski (1995). Reiterating that many mounds are located away from swampy areas (some even on top of granite outcrops) (cf. Williams 1987:317), Wolski recast the mound question to ask why Aboriginal people during the last 2500 years used soil and campsite remains to construct 'protuberances', up to 'ten to twelve feet [3-3.7m] in height' according to one 19th century observer (Smyth 1878, I:240), across their landscapes? The subtle phenomenological move of Wolski was to consider mound sites as deliberately build and 'imposing' landscape 'structures' (i.e. 'monuments') as part of a constructed and visually engaged 'social landscape'. In this connection, it is pertinent that mounds 'are frequently located on natural rises and on high ground, often with good vantage of the surrounding countryside' (Coutts 1985:31). Wolski noted mounds in southwest Victoria run through the heart (highest axe densities) of the axe trade networks associated with the local quarries at Jallukar, Baronga, Geelong and Berrambool (**Figures 15 to 17**). Informed by McBryde's argument that greenstone axe trade relationships were an expression of social relationships, Wolski (1995:64) concluded that mounds were employed as a form of landscape 'social marker' that were 'connected with a more intricate web of social, economic and linguistic factors'. Since the core area of mounds (as revealed by **Figure 15**) in southwestern Victoria is the territories of the Gunditjmara and their northern neighbours the Djab wurrung, it is likely that they were a particular and special site type put to a particular social function by both these groups.

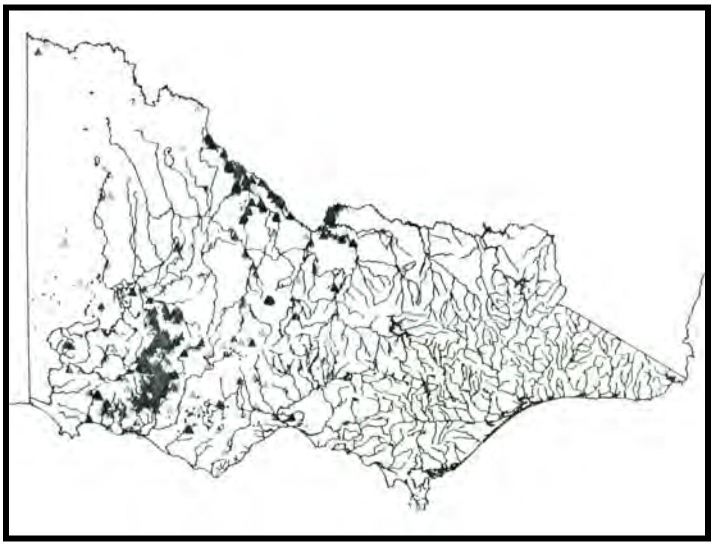

FIGURE 15. Distribution of mound sites in Victoria (Wolski 1995:Figure 1; data courtesy AAV) (▲ = mound).

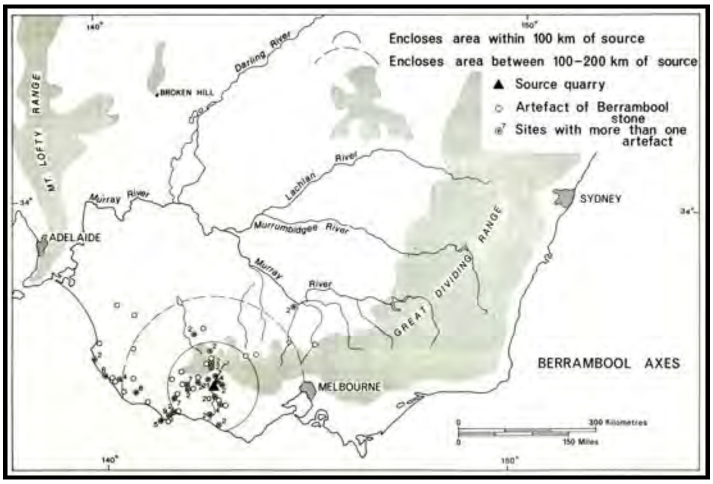

Figure 16. Distribution of Berrambool stone axes (from McBryde 1978:Fig 5).

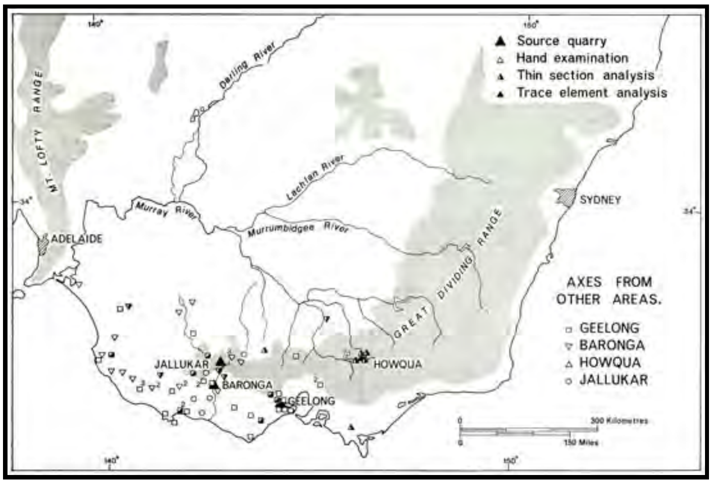

Figure 17. Distribution of Geelong, Baronga, Howqua & Jallukar stone axes (from McBryde 1978:Fig 6).

6.1.2 As burial (ancestral) markers

It is well known that mound sites often contain Aboriginal burials (e.g. Kenyon 1912:102). In the case of the Western District, Coutts (1985:38) notes that the 'larger mounds are associated with burials, including inhumations, pit burials, and cremations. Some burials were associated with grave goods'. Worsnop (1897:106), in a discussion of sites in the Condah region, reports that 'as many as seven skeletons having been taken out of one of them'. Coutts et al. (1976:22-26) excavated the remains of at least three burials within a mound site (FM1) southwest of Lake Bolac and three burials from a mound (KP1) immediately to the west on the Hopkins River.

The presence of burials in mounds reveals that certain mounds had an extra (special) function that extended beyond utilitarian facilities associated with camping, cooking and perhaps growing plant foods. The mortuary act of placing a body or human remains within a mound transforms the mound not only into a place of spiritual importance, but also an ancestral place and family monument. Since family members belong to clans, at the very least mounds with burials would have represented clan landscape markers with spiritual significance. In this construction, burial mounds embody enduring ancestral connections to place. They become clan territorial landscape markers.

6.1.3 Summary: Domestic structures enhanced as permanent clan markers

Archaeological evidence reveals that mound sites used by the Gunditjmara contain food refuse and in some cases post holes consistent with use as camping places. In some cases these mounds were heaped up to over 3m in height to form impressive landscape features. No simple utilitarian explanation exists of why such large mounds were created. Whatever the answer, at the very least these sites represent a monumentalisation of a domestic, utilitarian facility. That mounds could have extra layers of meaning added to them is confirmed by the presence of burials in some mounds. The association between monumentalisation and burials is not unique to the Gunditjmara, but a feature of complex societies the world over. The most extreme example is royal pyramid tombs of ancient Egypt. Where the Gunditjmara case is less common is in the use of an existing domestic site for such purposes. As artificially-created landscape features containing ancestors, mound burial sites acted as physical expressions and permanent markers of a group's social (clan) identity.

SECTION 7:
RITUALS & SPIRITSCAPES

7.1 AVOIDANCE PLACES

7.1.1 Deen Maar (Lady Julia Percy Island)

This island is located 8km from the coast at the eastern end of the Gunditjmara application area. The island hosts mutton bird rookeries and a seal colony (Fresløv & Frankel 1999:240; Gill & west 1971:84). However, the seal colony was exterminated for a period of time by the unsustainable actions of sealers in the early 1800s (Gill & West 1971:84). Archaeological surveys of the island have revealed a few stone artefacts but no obvious evidence for recent use such as middens (Gill & West 1971). Yet Coutts (1985:26) makes ambiguous reference to 'archaeological evidence of recent Aboriginal occupation … which does suggest off-shore journeys were made there from time to time'. However, it is unclear if this 'recent' evidences relates to the early contact sealing era. Whatever the case, Gill & West (1971:86) note that Aboriginal use of the island, albeit scant, is curious given the island was historically known as a 'spirit centre' and unknown to have been visited by the Gunditjmara. The 'spirit centre' ascription refers to the known ethnographic significant of the island as a place where spirits of the dead visit or reside (based on Dawson 1881 and Mathews 1904; see also Critchett 1995:126-127). Gill & West (1971:86) hypothesise that the flint artefacts may relate to Aboriginal visitation 'before creation of the legend' or 'at the time of European contact the Gunditjmara may occasionally have gone to the island even though they regarded it as a spirit centre'. They also note that 'the promise of food in the form of seals, eggs and seabirds [and flint] would have provided a strong incentive for them to brave the rough waters' (Gill & West 1971:86). While such attractions may account for occasional visits and the creation of the occasional stone artefact, the lack of evidence for systematic use of the island given the available resources is economically odd given that similar island resources along other sections of the Victorian coastline (e.g. Gippsland coast and Wilsons Promontory) attracted seasonal and specialized Aboriginal visitation (Gaughwin & Fullagar 1995; McNiven 2000; see also Massola 1968b:133). For example, archaeological evidence reveals open ocean canoeing by Aboriginal people out to Great Glennie Island located 7km off the east coast of Wilsons Promontory for seals and birds during the last 1500 years (Gaughwin and Fullagar 1995; Head et al. 1983; Jones and Allen 1979, 1980). Such island use discredits Coutts' (1981a:16) suggestion that 'overall, it seems that the ocean's off-shore resources remained largely untapped by [Victorian] Aboriginals'. Equally spurious is Coutts' (1981a:16) comment that 'even if Aboriginals had wanted to tap-off-shore resources, they would need to have carried their canoes from the forest to the seashore. This difficult task may have discouraged then altogether' (see also Coutts 1985a:26). A groups of people who went to the effort to move hundreds of tonnes of basalt and dirt to create eel trapping systems would have little concern about moving a bark canoe a few kilometres to the coast.

Parsimony would suggest that because of the spiritual significance of Lady Julia Percy Island, it was off the economic agenda for local Gunditjmara. McNiven (2003:33) uses Lady Julia Percy Island as an exemplary case study of the spiritual significance of an island within a spirit seascape. In a methodologically related case study, David and Wilson (1999) use the general absence of archaeological evidence for use of the top of Ngarrabulgan (Mt. Mulligan plateau) for the last 600 years to indicate the antiquity of the ethnographically-known Aboriginal avoidance of the area for spiritual reasons.

7.2 GRAVES AND CEMETERIES

Apart from burials found in mounds (see above), few other burials have been reported in the literature for the study area. In deed, the absence of recorded pre-contact cemeteries within Gunditjmara territory is curious given that cemeteries are often a feature of semi-sedentary and sedentary peoples (see Pardoe 1988). However, Worsnop (1897:105) provides information on a series of 'ancient' Aboriginal burials uncovered by workmen 'while cutting a drain about ten miles (16km) from Lake Condah'. As the spacing of the burials is unrecorded, the extent to which these burials can be said to belong to a cemetery is unknown.

7.3 STONE ARRANGEMENTS

A number of stone arrangement have been recorded across the study region that do not appear to be house structures or facilities associated directly with water management and eel aquaculture. Such sites are usually ascribed a ritual/ceremonial status by Victorian archaeologists (e.g. Frankel 1991:Chapter 9; Lane & Fullagar 1980). While such a categorization is usually another way of saying the function of such sites is unknown, ethnographic evidence from various parts of Australia suggests the label is not without merit (e.g. McNiven 2003).

7.3.1 Kinghorn

Coutts et al. (1977:200, Figure 2) note that amongst the 24 houses forming the Kinghorn hamlet are located two 'rock arrangements with no discernable entrance', seven 'possible rock arrangements', one 'cairns', and one 'stone wall intersection'. No hypotheses as the possible function(s) of these stone arrangements are made by Coutts et al. (1977a).

7.3.2 Lake Condah

Coutts et al. (1978:16) make a passing reference to 'stone cairns or groups of several stones are occasionally found in the area [Lake Condah]'.

7.3.3 Mt. Rouse

A stone arrangement is located on the summit of Mt. Rouse located immediately east of the study region (Coutts et al. 1977a:198).

SECTION 8:
SEDENTISM & CORE LANDSCAPES
(THE PRE- & POST-CONTACT
'INTENSIFICATION' CONTINUMM)

This final substantive section of the report brings together a wide range of archaeological information on Gunditjmara cultural sites and discusses these in terms of long-term cultural and historical change. It will become clear that Gunditjmara cultural underwent major transformations over the past 3500 years and particularly the last 2000-2500 years. It is argued that such transformations were carried forth into the post-contact era and elaborated and geographically focused with the decision to establish a frontier refuge within the Mt. Eccles stony rises to avoid extermination by European invaders.

8.1 CORE WETLAND LANDSCAPES (GENERAL)

8.1.1 Enhanced & regularized towards sedentism in the last 3500 years

New sites and increased occupational intensity

Lourandos (1997:213) points out that in 'southwest Victoria' available archaeological research reveals that 'most sites date to the last 4,000-3,000 years' and 'the most intensive phase of site establishment was the last 2,000 years' (see also Lourandos 1983:86). Examples of major changes within the last 2000-2500 years are:

- Mound sites are an innovation introduced around 2500 years ago (Williams 1988)
- Extant eel traps date to mostly to the last 2000 years (Head 1989)
- Eel aquaculture possibly an innovation of the last 2000 years (cf. Head 1989)

Thus, both mounds and the eel trap/aquaculture system reveal a major change in use of wetlands during the last 2000-2500 years. While most coastal shell middens of the region have been dated to the last 4000 years and particularly the last 1500 years (Lourandos 1997:225), it is difficult to assess the significance of this pattern given evidence for likely destruction of many earlier middens through major dune erosion between 6000 and 3000 years ago (Head 1983:78) and a possible research bias towards better preserved (and hence more recent) middens (Bird and Frankel 1991a:9, 1991b:185-187) (see also Fresløv & Frankel 1999:245; Godfrey 1989; Head 1987; Lourandos 1993:77, 1997:312). However, an examination of excavations of inland Western District sites showing long-term (>6000 year) use of areas reveals a consistent pattern of major increases in occupational intensity (i.e. amount of camping activity) within the last 2500 years:

- Billimina (Gariwerd): major increase = last 2300 years (McNiven et al. 1999:84)
- Drual (Gariwerd): major increase = last 2200 years (McNiven et al. 1999:83-84)
- Lake Colac: major increase = last 2000 years (McNiven 1998:83-84)
- Lake Bolac: major increase = last 2000 years (Coutts 1985a:53)

In addition, a jump in occupational intensity is registered at some sites across the region within the last 500-800 years (Lourandos (1997:214-125).

Why these cultural changes took place has been hotly debated within Australian archaeology. Basically, the debate centres on the work of Lourandos (1980, 1983, 1985, 1988a, 1988b 1997; see also Williams 1987) who sees these changes primarily the result of a process of 'intensification' and historically-contingent, internally-generated, long-term cumulative social changes. In contrast, Bird and Frankel (1991a, 199b) see these late Holocene cultural changes in an ahistorical sense, either as a disconnected series of 'short-term adjustments' to environmental change or, in terms of eel trapping systems, 'pieces of "appropriate technology" – efficient facilities that were *ad hoc* minor modifications of existing natural flow patterns, quickly constructed or easily maintained' (Frankel cited in CONTEXT 1993:87). In a similar ahistorical sense, such cultural changes are seen as a consequence of natural population increase (e.g. Beaton 1983) or even simply in terms of the inevitability of the development of eel aquaculture (Builth 2002:2, 275, 313, 2004:163, in press). Put simply, Lourandos sees nothing 'ad hoc', 'natural' or 'inevitable' about the complex set of cultural changes (particularly eel harvesting systems) that took place in southwest Victoria during the past 3500 years. Alternatively, Lourandos (1997:221) 'associated' the development of eel harvesting systems and what is now referred to as aquaculture (after Builth) with three processes that also tie in with broader changes in the archaeological record:

- 'Climate change'
- 'Competition between local populations'
- 'possibly demographic change' (i.e. population increase)

An over-response to climate change

Lourandos (1997:221) posits that development of eel enhancement systems may have been 'stimulated' by the onset of drier climatic conditions of 'the last 3000 years or so', which 'would have increasingly endangered aquatic resources'. While palaeoenvironmental evidence such as lake level data certainly reveal drier conditions around 4000-2000 years ago (for recent palaeoenvironmental overviews relevant to local archaeology see Kershaw et al. 2004, Tibby et al. in press, McNiven 1998:69-70), it needs to be pointed out that the key period of increase in cultural changes 2000-2500 years ago coincides with wetter conditions of the last 2000 years. In this connection, Bird & Frankel (1991a:8) suggest the development of mounds may simply be a response to these wetter conditions and a need for more elevated and hence drier camping locations.

While climate change does appear to have been a major stimulus to cultural changes of the last 2000-2500 years, it is clear that it is not the sole answer for three key reasons. First, if cultural change was simply a response to wetter and more productive times, both Williams (1987:317, 1988:218) and Lourandos (1984:31, 1993:79, 1997:225-226, 241) remark that it begs the question of why such changes did not also take place during an earlier and even wetter (and presumably more productive) period around 6000-7000 years ago? (compare **Figures 18 and 19**). Second, if eel aquaculture is inevitable why didn't eel aquaculture occur across southeastern Australia and why does it appear to be a recent phenomenon? Third, such changes also beg the question of why groups of hunter-gatherers would go to so much trouble not to 'live in harmony' with the natural availability of food but to artificially enhance the environment to increase the availability of key food items such as eels. To answer these questions, Lourandos rightly argues that we must look beyond the environment and examine internal structural changes taking place within Aboriginal societies. The key for Lourandos in this regard is the large eel trapping systems and systems of inter-group gatherings.

Developing competition between local groups

Lourandos (1980, 1985, 1988a, 1997) expounded two complementary explanations for the development of large- and small-scale eel trapping systems (including what is now referred to as aquaculture). First, the large-scale eel trapping systems provided a bumper harvest of eels that, in an absence of evidence for large-scale eel storage, implies immediate consumption directed at a 'large number of consumers' (Lourandos 1988:153). Since the large-scale earthworks and rockworks most likely also involved many people, and most likely members of a number of clans/bands, large-scale eel management operated at 'the intergroup level' (Lourandos 1985:408, 1997:221). 'In contrast, eeling for domestic purposes took place on a much smaller scale, with the use of weirs, traps and small drains' (Lourandos 1988a:153). The key point made by Lourandos (1988a) is that 'intergroup relations', best represented through inter-group gatherings, were 'competitive' affairs and open to augmentation as a 'self-amplifying system'. Such augmentation resulted in more participants, which in turn placed extra productive demands on food procurement facilities.

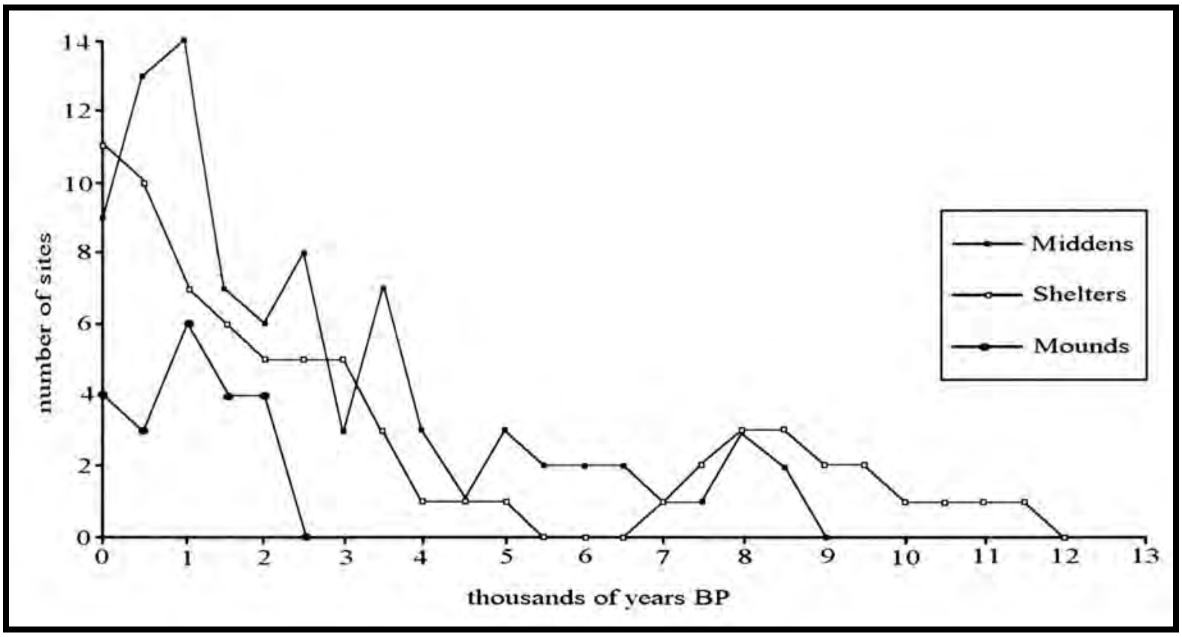

FIGURE 9. Chronological changes in frequency of archaeological sites of SW Victoria and SE South Australia (from Lourandos 1997:Fig. 6.17).

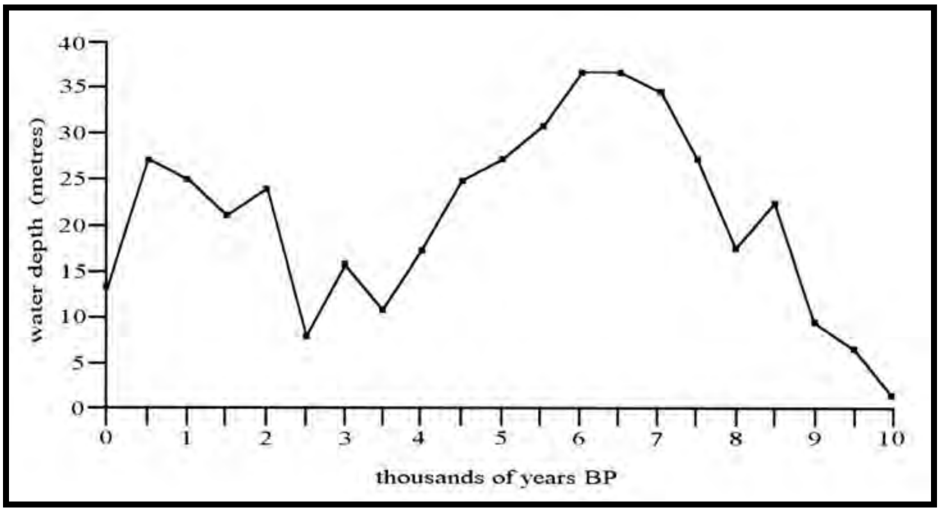

FIGURE 10. Changes in lakes levels at Lake Keilambete (SW Victoria) as a measure of climatic change (low lake levels = drier climate, higher lake levels = wetter climate) (from Lourandos 1997:Fig. 6.1).

While the ‘competitive’ and ‘self-amplifying’ nature of gatherings is plausible, unfortunately Lourandos does not explain why Aboriginal peoples of southwest Victoria developed large-scale, inter-group gatherings during the last few thousand years. Lourandos (1988a:160) rightly points out that ‘their genesis, presumably in the mid-Holocene and earlier, is less clear’. His ‘intensification’ model focuses more on explaining what happened, not so much on what initially trigger such events. As Bird & Frankel (1991a, 1991b) point out, another limitation of Lourandos’ chronological modeling of inter-group gatherings is the absence of independent evidence on the antiquity of gatherings in southwest Victoria (see Section 5.2.1). Similarly, while available dates of less than 3000 years for greenstone axe quarries and greenstone axe use is consistent with Lourandos’ ‘intensification’ model (see Section 5.3.4), further dates are required to more reliably date the development of greenstone axe exchange systems in southwest Victoria.

Population increase as a consequence

A key point made by Lourandos (1983:92, 1984:31, 1997:316-318) is that population increase, often posited as a prime mover of cultural change (e.g. Beaton 1983), was not the cause of cultural changes in southwest Victoria but a consequence of such changes. Lourandos (1980:255) stated that a major flow-on effect of artificial modification of eel populations was that it ‘protected people against variations in resource availability and therefore allowed for greater stability in the annual scheduling of subsistence activities’. Thus, what started off as an intentional way of compensating for drier climatic conditions and ‘endangered aquatic resources’ 4000-2000 years ago ended up having the unplanned consequences of (1.) establishing a ‘self-amplifying’ competitive inter-group gathering system, and (2.) a means for overriding natural seasonal variability in food availability which also set up a situation of self-amplification as regulation of food supply promoted sedentism which in term promoted population increase which in turn stimulated further growth in food enhancement techniques, and so on (Lourandos 1980:245, 255-256). Coutts (1985b:16) also associated the development of the traps with ‘increasing population pressure’ (and presumably population increase) and ‘accompanying pressure on resources’. The establishment of new sites (mounds and possibly eel traps and eel aquaculture facilities) plus increased use of existing sites (rockshelter and lakeside sites) in southwest Victoria over the last 2500 years is consistent with local population increase as predicted by Lourandos (1997:221-222, 226).

In this way, the Gunditjmara over-rode seasonal limitations imposed by the ‘natural’ availability of resources such as eels and ‘artificially extended spatially and temporally’ (Builth 2002:252) the availability of such resources – i.e. artificially ‘regularised’ the environment as Lourandos (1980:246) put it – to support semi-sedentary occupation of the region. This regularization resulted from technological developments in hydrological management and aquaculture, and coupled with food storage (e.g. live and smoked eels) according to Builth. The ‘function of storage bypasses the fluctuations in natural productivity levels; changing resource availability from being environmentally to socio-culturally dependent’ (Builth 2002:300). In a broader sense, Lourandos (1997:241-243) sees Aboriginal peoples of the Western District becoming ‘logistically’ organized during the last 3500 years and especially within the last 2500 years. Following on from Coutts et al. (1977a:203), landscape use became highly regulated and increasingly dependent upon ‘fixed (or “logistical”) facilities’ such as eel traps and mounds (Lourandos 1997:243). Coutts et al. (1977a:203) put the case succinctly: the ‘construction of such monuments [mounds] presupposes that their builders would return at a later date’. Thus, the high investment in these eel trapping facilities and mounds was built around a notion of futurising the landscape, just as aquaculture and ‘management of elvers [in ‘growing ponds’] was an investment for their future production’ (Builth 2002:311).

Clearly, major cultural changes took place within Western District Aboriginal societies during the last 3500 years. The extent to which such changes reflect responses to *external stimuli* (i.e. environmental changes) and *internal stimuli* (i.e. internally generated social changes) is a matter of ongoing debate within the archaeological discipline. Debates aside, general agreement exists amongst researchers that late Holocene Aboriginal societies of the Western District developed elaborate economies focused around semi-sedentary occupation of artificially-enhanced wetlands. As such, any assessment of post-contact changes must be set within the context of major cultural transformations of the previous 3500 years.

8.2 CORE WETLAND LANDSCAPES (STONY RISES):

8.2.1 Enhanced & regularized towards sedentism in the last 160 years

Lourandos (1983:92) ended his famous paper by suggesting that the 'process' of 'intensification' documented archaeologically for the last 3500 years of pre-contact Aboriginal Australia was 'nipped in the bud by the coming of the Europeans'. This view has been criticized by Allen (1997:376) who noted, following documentation of major expansions in exchange and use of large stone blades across Central Australia during the last 100 years, that 'these processes of change amongst Australian Aboriginal societies were by no means "nipped in the bud by the coming of the Europeans"'. In Allen's case, he was documenting changes in Aboriginal society that may have been little effected by Europeans. But can such changes be expected as a response to Europeans? That is, is it possible to document continuity in the process of 'intensification' into the post-contact era, albeit as a response to European invasion? In the case of the Gunditjmara, a strong argument can be made that continuity of 'intensification' in the form of continued enhancement and regularization of the key resource of eels in the Lake Condah district, as a response to increased confinement and semi-sedentism brought on by European invasion, was the basis of survival of the Gunditjmara to present times. In other words, if the ancestors of the Gunditjmara had not embarked on a pre-contact process of 'intensification' within the last 3500 years, and particularly during the last 2000-2500 years, where inter-group social relationships and gatherings became highly developed and the natural productivity of key food resources such as eels was enhanced and regularized, it is doubtful the Gunditjmara would have survived as they did at Lake Condah during mission times of the second half of the 19th century and through into the 20th century. While in a selected geographical sense Builth (2002:209) notes correctly that a 'consequence' of invasion and missionisation for the Gunditjmara 'was the purposeful generational disconnection with their land', in terms of the Lake Condah district connections were in fact intensified as a result of self-imposed confinement and sedentism. The related processes of confinement, sedentism and 'intensification' can be extended to two phases of post-contact activity and history: (1.) early contact and the Eumeralla War and its immediate aftermath, and (2.) the Lake Condah Mission Station. In both these situations, Lake Condah was transformed from one of a number of Gunditjmara key *resource nodes* to a *resource hub*.

Invasion and warfare (1840s)

It is generally accepted by historians and archaeologists that the 'stony rises' of the Mt Eccles lava flow were a defended refuge for Gunditjmara during the violent years of early contact in the 1840s and what has been referred to as the 'Eumeralla War' (e.g. Builth 2002:34-42, 2004:166; Clark 1990:33; Critchett 1990; Gerritsen 2000; Wolski 2000:349, 2001; Worsnop 1897:106). Gerritsen (2000:5) temporally delineates this 'Refuge Phase' between 1843 and 1866. While previous researchers have all focused on the impenetrability of the stony rises as the key defining feature of the area as a refuge, it also needs to be acknowledged that the refuge could only operate if it was compatible with existing local Gunditjmara cultural practices. In this connection, a strong case can be advanced that the refuge was viable because of the known *potential* of the area to sustain year round occupation through the ancient tradition of eel aquaculture. Furthermore, it could function as a refuge for Aboriginal people from various clans across Gunditjmara country as they were used to coming together for inter-group traditional gatherings. Thus, use of the Mt Eccles stone rises as a refuge was based on three key criteria:

1. Defensibility (due to impenetrability by Europeans on horses)
2. Subsistence sustainability (due to existing eel aquaculture system)
3. Social sustainability (due to existing inter-clan relationships and gatherings system)

Wesson (1981:97) concluded that the early contact period 'probably manifested itself in the form of more permanent settlement and more intense exploitation of the resources of the stony rises'. Yet Wesson (1981:97) felt the evidence for ephemeral occupation at stone hut sites 'does not reflect this more intense type of occupation'. In this connection, Coutts (1981a:105) concluded that during the early contact period 'Aboriginals became more nomadic and moved much more than they had in the prehistoric era'. The conclusions of Wesson and Coutts do not seem appropriate for the Mt Eccles stony rises district. The fact that many stone huts may date to the early contact period reveals considerable post-contact activity in this area. Builth (1996:52) notes that this area:

> …was an area occupied solely by Aboriginal people because it was inaccessible to the British and their horses. This explains why it became the centre for an organized resistance movement. But the area was also prominent in its own right as an important traditional centre for clan gatherings. This gave rise to a twofold advantage in the battle for the frontier: first, it was an area that was able to be shared by various groups as it was already established as a clan and tribal meeting place. Secondly, it therefore had the facilities to sustain large numbers of people. It was resource-rich, complete with fish-traps that were capable of feeding hundreds of people.

Thus, Builth (1996:136) concludes that 'Lake Condah and adjacent stony rises become the refuge for the remnant Gunditjmara. It had previously been an important place for them and continued in this role. Its isolation and perceived inhospitability ensured their safekeeping'. While in general terms this conclusion is plausible and empirically demonstrable to a large extent, the degree to which Lake Condah was an 'important place' during pre-contact times is hypothetical. It is likely that is was, along with other places, a key eeling location and resource *node* for pre-contact Gunditjmara and that elaborate eel traps and some form of aquaculture were in place to sustain local clan/bands and seasonal influxes of members of neighbouring clans/bands. However, the elevated status of Lake Condah as a *resource hub* and the Gunditjmara place for elaborate eel aquaculture may well be a post-contact phenomenon. To what degree construction of different sections of the eel aquaculture system in the Lake Condah district can be assigned to pre-contact and post-contact periods can only be answered by future research. It is highly unlikely that all of the complex eel aquaculture system in the Lake Condah district is pre-contact just as much as it is highly unlikely it is all post-contact.

Irrespective of issues of relative degrees of developments during pre- and post-contact times, the post-contact changes were a response to external stimuli (i.e. European invasion) and internal stimuli (i.e. deliberate decision to create a social refuge in the stony rises). As such, these post-contact changes represent continuity of a 3500 year old process of 'intensification' whereby intensified use of wetland resources represented responses to external stimuli (in the pre-contact case environmental changes) and internal stimuli (in the pre-contact case the development of competitive inter-group gatherings).

Builth (2002:110), unlike Bird and Frankel (1991a:8), does not associate refuge use of the stony rises with increased construction and use of stone huts as the region experienced an overall 'loss of population' during the early contact period. By extension this conclusion could be extended to the eel trapping systems. However, population increase is not the primary reason behind the 'intensification' process as elaborated by Lourandos. In deed, he stated (1980:256) that:

> It would be difficult to demonstrate that these Victoria water controls had an immediate effect on local population densities, but it is plausible to accept that they affected long-term population trends by providing greater stability in resource availability, and by relaxing pressures on other neighbouring resource areas. The latter are important mechanisms by which hunter-gatherer economies could expand by methods other than cultivation.

Thus it is not necessary to invoke local population increase to account for post-contact 'intensification' developments in the Condah district. In deed, as most researchers acknowledge, it is likely Aboriginal populations were drastically reduced by disease (causing death and infertility) and murder during the first half of the 19th century. The key issue is restricted mobility and semi-sedentism and implementation and augmentation of a long-established (pre-contact) strategy to accommodate such demographic changes; that is, eel aquaculture to turn a seasonal resource into a perennial resource to regularize and stabilize food availability. In this sense, possible increased numbers of stone huts in the area during the post contact period may not reflect population increase per se but permanent use of the area. Whether post-contact numbers were higher or lower is another question. However, an increase in population numbers slowly following decreased levels of mobility and increasing levels of semi-sedentism is a key of the 'intensification' process.

Lake Condah Mission (1867-1918)

According to Critchett (1995:27), 'by 1848 the frontier period had passed' in the Western District. During the 1850s and 1860s a number of missions were established in southwest Victoria for the protection and welfare of Aboriginal people. The Lake Condah Station was established in October 1867 but was not made a gazetted an Aboriginal reserve until January 1869 (Clark 1990:48; Massola 1970:97; Penney & Rhodes 1990). Inspector Green from the Central Board for the Protection of Aborigines (est. mid-1860s) spoke of Lake Condah 'as good a place as any that could be got in the colony: much of the land is first class, the climate is good, and in no part of the colony are there so many Aborigines belonging … to the one tribe' (cited in Critchett 1995:31). Massola (1970:96) suggested that when the Church of England Mission to the Aborigines decided to establish the Lake Condah Mission they:

> must also have taken into account the fact that from the earliest times the lake was the original home of a numerous tribe, whose chief camping ground was near where the Knebsworth homestead stands. As already stated this was a well-known centre and in the past the tribes were wont to gather there for their corroborees and ceremonies. It would thus be reasonable to assume that a mission in that locality would be an acceptable home for what was left of the western tribes.

Yet it is likely that the sustainability of the area was a product of Aboriginal enhancement activities that began before contact and were highly elaborated during the early years of contact as the local stony rises were transformed into an economically sustainable refuge. Thus, locational factors associated with establishment of the mission/reserve were in a sense determined by Aboriginal actions with an historical ancestry extending back over 2000 years. In a related sense, a key reason the Mt Rouse Protectorate Station (1841-1848) was abandoned by Aboriginal people and closed down was that it was unsustainable in terms of subsistence (Critchett 1990:152).

Such was the quality of the site that in 1868 Inspector Green reported that the reserve could be self-supporting in two to three years (Clark 1990:48). This view is borne out by station manager Shaw who reported in December 1870 that:

> The blacks continue to hunt native game, and occasionally spend a day or two in a week fishing. They are, however, getting above providing for themselves by hunting and roaming about the bush, as in years gone by; they would prefer, if possible, to obtain their living in a more civilized way, and it is only as a last resort that they fall upon hunting the native game for animal food, which they cannot well nor long do without. I think it would be much better and far more civilizing to supply them with animal food regularly, that they might attend to the work of the station and their own comforts, as well as to that of their own families, instead of being obliged to spend two or three days in a week hunting after possums and kangaroos (cited in Clark 1990:48-49).

In 1874, Station manager Rev. Amos Brazier wrote that ‘hunting and fishing are still pursued by the Aborigines, but not so fully as in former days’ (Massola 1970:101). In relation to the stone eel trapping systems, Alexander Ingram, ‘the engineer in charge of the reclamation [drainage] works’ at Condah Swamp, reported that ‘many of the aborigines residing at the Lake Condah mission station still *construct* similar barricades for trapping purposes, and large quantities of fish [‘eels, trout, &c’] are secured during winter’ (cited in Worsnop 1897:105 emphasis added). However, a key activity of the station was also European-based agriculture (e.g. potatoes) and pastoralism (e.g. diary cows and beef cattle). Ironically, in 1879 blasting of Darlot Creek was undertaken to begin the drainage of Condah Swamp ‘to render the station entirely self-supporting by adding to it extra acreage reclaimed from the swamp’ (Massola 1970:102). This action would have drastically decreased the functionality of the eel aquaculture system. Yet enough water runoff occurred during peak rainfall in winter to allow eel trapping to continue. Massola (1968:198) cites a 1893 report on the Lake Condah Mission stating ‘large quantities of fish were being secured during the winter months by means of traps’.

20th century eeling in the Lake Condah district

Builth (1996:65) provides information of local Aboriginal ownership, construction, use and maintenance of stone eel traps around Lake Condah.

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Appendix C

Heritage listings for the Works

The National Heritage List documents are appended. The Victorian listings aqre kept by Aboriginal Affairs Victoria, not Heritage Victoria, and are not currently available for public access

Place Details

Send Feedback

Budj Bim National Heritage Landscape - Mt Eccles Lake Condah Area, Mt Eccles Rd, Macarthur, VIC, Australia

Photographs:

List:	National Heritage List
Class:	Indigenous
Legal Status:	Listed place (20/07/2004)
Place ID:	105673
Place File No:	2/02/137/0001

Summary Statement of Significance:

About 30 000 years ago the Gunditj Mara people of Western Victoria witnessed the volcanic eruption of Mount Eccles, the way that the ancestral creation-being, *Budj bim*, revealed himself in the landscape. Mt Eccles is *Budj bim* and the scoria cones are described as *tung att* – teeth belong it. The volcano is an outstanding example of the process of ancestral beings revealing themselves to Aboriginal people as part of a changing physical and social landscape.

The lava flow from Mt Eccles changed the drainage pattern in this part of western Victoria, creating some large wetlands. Beginning thousands of years ago, the Gunditj Mara people started to develop this landscape to manipulate the wetlands to grow and harvest eels and fish. They used the stones from the lava flow to construct channels to link wetlands; weirs to pond water; and stone fishtraps.

The Mt Eccles/Lake Condah system is markedly different from contemporary, historical and archeological records or freshwater fish traps recorded in other parts of Australia. The fish traps in other parts of Australia provided a system for channelling fish in streams or rivers into traps rather than creating conditions for fish husbandry.

This system of eel aquaculture developed by Gunditj Mara, including modified and engineered wetlands and eels traps, provided an economic basis for the development of a settled society. This system also resulted in high population densities represented by the remains of stone huts clustered into villages of between two and sixteen huts. This settled society demonstrates a transition from a forager society to a settled, stratified society ruled by chiefs with a form of hereditary succession that practised husbandry of fresh water fish.

European settlement in the area commenced during the 1830s. Like many other frontiers, conflict between Europeans and Aborigines was endemic in the Lake Condah area. The Gunditj Mara people resisted European encroachment on their lands during the Eumerella wars that lasted more than 20 years.

Aboriginal people often used parts of the landscape that Europeans found difficult to access as a base for their resistance to encroaching European settlement. Gunditj Mara used the Mt Eccles lava flow to launch their attacks. Because the lava flow is uneven and rocky, Europeans and their horses found it difficult to penetrate the area. This allowed Gunditj Mara to escape from attempted reprisals and to continue their resistance to European settlement. The Mt Eccles lava flow provides a particularly clear example of the way that Aboriginal people used their environment as a base for launching attacks on European settlers and escaping reprisal raids during frontier conflicts.

Many Gunditj Mara people living at Lake Condah Mission maintained their links to country. Following the proposal by Alcoa to develop an aluminum smelter at Portland, the Victorian Government decided to return Lake Condah mission to the Aboriginal community in exchange for an agreement to the development of the smelter. However, the Victorian Government was unable to pass the enabling legislation through its Upper House and turned to the Commonwealth for assistance. In a rare example of the Commonwealth using its full constitutional powers granted under the 1967 referendum, the Commonwealth returned the mission to the Gunditj Mara people under the *Aboriginal Land (Lake Condah and Framlingham Forest) Act 1987.*

Official Values:

Criterion: A Events, Processes

The eel traps along the Tyrendarra lava flow are of outstanding heritage value. Gunditj Mara people constructed channels to link wetlands; weirs to pond water; and, stone fish-traps (Coutts *et al* 1978; Van Warden and Simmonds 1992; Aboriginal Affairs Victoria and Kerrup Jemara Elders Aboriginal Corporation 1993; Builth 2002, 2003). The construction of weirs allowed Gunditj Mara to create or manipulate wetlands, providing ideal conditions to grow and harvest eels and fish. (Builth 2002, 2003). The remains of the channels, weirs and fishtraps are hundreds and probably thousands of years old.

This system is markedly different from contemporary, historical and archaeological records of freshwater fish traps recorded in other parts of Australia which provided a system for channeling fish in streams or rivers into traps (Sutton 2004) rather than creating conditions for fish husbandry.

The remains of the system of eel aquaculture in the Mt Eccles/Lake Condah area demonstrate a transition from a forager society to a society that practiced husbandry of fresh water fish (Builth 2002, 2003). This resulted in high population densities represented by the remains of stone huts clustered into villages of between two and sixteen huts (Coutts *et al* 1978; Van Warden and Simmonds 1992; Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993; Clark 1990a). It also provided the economic base for a stratified society ruled by chiefs with a form of hereditary succession to this office (Dawson 1881; Clark 1990a).

Many of the sites in Western Victoria where eel husbandry was practiced have been destroyed by farming (Clark 1990a). Of the systems that remain, Mt Eccles/LakeCondah is a better representative of this Western Victorian system than other examples such as Toolondo (Lourandos 1980) and Mt William (Williams 1988; Clark 1990a). The latter areas have a limited range of the features associated with eel aquaculture, mainly channels and fish traps.

Criterion: A Events, Processes

The landscape of the Tyrendarra lava flow in the Mt Eccles/Lake Condah area is of outstanding heritage value because it provides a particularly clear example of the way that Aboriginal people used their environment as a base for launching attacks on European settlers and escaping reprisal raids during frontier conflicts (Clark 1990a, 1990b; Builth 2003).

Conflict between Europeans and Aborigines was endemic on the frontier of European settlement (Reynolds 1976). Aboriginal people often used parts of the landscape that Europeans found difficult to access as a base for their resistance to encroaching European settlement. Many of these landscapes of resistance centered on areas where vegetation made access difficult and some of these landscapes have been altered since European settlement.

Gunditj Mara used the Tyrendarra lava flow as a base from where they launched attacks on white settlers. Because the lava flow is uneven and rocky, Europeans and their horses found it difficult to penetrate the area. This allowed Aboriginal raiders to escape from attempted reprisals and to continue their resistance to European settlement for nearly a decade (Clarke 1990a: 238-250, 1990b; Builth 2003).

Criterion: B Rarity

The Lake Condah mission is of outstanding heritage value because of the legal process under which it was returned to the community. It is a rare example of the Commonwealth using its constitutional powers to provide benefits for a specific Aboriginal community. Following the proposal by Alcoa to develop an aluminum smelter at Portland, the Victorian Government decided to return the Lake Condah mission to the Aboriginal community. However, the Victorian Government was unable to pass the enabling legislation through its Upper House and turned to the Commonwealth for assistance (Context 2000). Under the constitutional power to make laws for Aboriginal people granted to the Commonwealth under the 1967 referendum, the Commonwealth passed the *Aboriginal Land (Lake Condah and Framlingham Forest) Act 1987*.The only other examples is the return of Framlingham Forest under the same Act.

Criterion: F Creative or technical achievement

The system of ponds, wetlands, channels, weirs and fish traps in the Mt Eccles/Lake Condah area are of outstanding heritage value. Gunditj Mara people constructed the channels to manipulate water flows and the weirs to modify and create wetlands that provided ideal growing conditions for the shortfinned eel and other fish (Coutts *et al* 1978; Lourandos 1980; Williams 1988; Clark 1990a; Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993; Builth 2002, 2003). This system is confined to Western Victoria and shows a high degree of creativity not found in freshwater fish traps in other parts of Australia. Unlike other places in Western Victoria like Toolondo (Lourandos 1980) and Mt William (Williams 1988), the Mt

Description:

The story of the Gunditj Mara people of Western Victoria is intimately related to the eruption of the Mt Eccles volcano, which was active between 30,000 and 20,000 years ago (Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993: 35).

Mt Eccles and the other Western Victorian volcanos are amongst the youngest in Australia. It dates to the Pleistocene with the most recent Tyrendarra lava flow occurring about 20,000 years ago. This means that Aboriginal people would have witnessed the eruption of Mt Eccles.

The Tyrendarra lava flow altered the drainage in the area and helped to create Lake Condah and its associated wetlands. These and other wetlands in Western Victoria were used and modified by Aboriginal people who developed a complex system for growing and harvesting fish, particularly eels (Builth 2002, 2003). This system is markedly different from the contemporary, historical and archaeological record of freshwater fish traps (Sutton 2004) recorded in other parts of Australia.

Aboriginal people dug channels to carry water from streams to low lying areas where a system of weirs was used to pond the water (Coutts *et al* 1978; Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993; Lourandos 1980, 1983; Clark 1990; Williams 1988; Builth 2002, 2003). The ponds and wetlands allowed Aboriginal people to practice a form of aquaculture in which they grew the fish and eels and then harvested them by draining the water through woven basket that trapped the fish (Builth 2002, 2003). Early descriptions and recent scientific evidence indicates that eels were preserved by smoking them in the hollows of mana gum (*Eucalyptus viminalis*) trees (Builth 2002).

In one part of Western Victoria, the area between Mt Eccles and the sea, this system of channels ponds, weirs and traps is associated with the remains of circular stone huts (Couts *et al* 1978; Van Warden and Simmonds 1992; Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993; Builth 2002, 2003). These huts can occur singly but generally occur in clusters of between two and sixteen huts (Clark 1990; Van Warden and Simmonds 1992). The material from the stone huts indicates they are Aboriginal (Coutts *et al* 1978; Van Warden and Simmonds 1992) and the spatial association between the huts and the fish traps indicates they are part of the same cultural complex.

This system of eel aquaculture provided an economic base that supported large numbers of people organised in a form of stratified society ruled by chiefs (Dawson 1881; Clark 1990a; Builth 2002, 2003).

Permanent European settlement in the area began in the 1840s with the arrival from Tasmania of the Henty Brothers. There was conflict as European settlement expanded into Gunditj Mara lands. Gunditj Mara used the Tyrendarra lava flow as a base from where they launched attacks on white settlers. Because the lava flow is uneven and rocky, Europeans and their horses found it difficult to penetrate the area. This allowed Aboriginal raiders to escape from attempted reprisals (Clarke 1990: 238-250). After a number of attacks on pastoral properties native police were dispatched to the district. By 1849, the native police had broken Gunditj Mara resistance (Clarke 1990: 238-250).

In the 1860s, Victoria began developing a system of Aboriginal Reserves. Gunditj Mara living in the Portland and Heywood areas refused to move to the mission at Framlingham so a new reserve and mission was created at Lake Condah in 1868 (Clark 1990: 232; Context 2000). In 1919, after the First World War in which many Gunditj Mara served, the Victorian Government closed the Lake Condah mission. Ironically, much of the land was sold to the Closer Settlement Board to provide land to returned soldiers. Although attempts were made to settle Aboriginal people on the lake Tyers Reserve many remained or returned to the Lake Condah mission area. The last of the reserved land was revoked in 1959 and the church was demolished.

The proposal by Alcoa to develop an Aluminium smelter near Portland led to protests and court actions by Gunditj Mara who wanted to protect their heritage. Following negotiations between Gunditj Mara, the Victorian Government and Alcoa, it was agreed that the old Lake Condah mission would be purchased and returned to the Aboriginal community (Context 2000). However, the Victorian Government was unable to pass the enabling legislation through its Upper House and turned to the Commonwealth for assistance (Context 2000). Under the constitutional to make laws for Aboriginal people power granted in the 1967 referendum the Commonwealth passed the *Aboriginal Land (Lake Condah and Framlingham Forest) Act 1987*.

History: Not Available

Condition and Integrity:

The system of eel aquaculture within Mt Eccles/Lake Condah area has been affected by natural decay over the last one hundred and fifty years, which has resulted in the loss of wood and clay features that formed part of the weirs, fish traps and huts. However, the stone bases of these structures are still intact. Some of these structures may have been dismantled by Europeans to construct the dry-stone fences that are ubiquitous in this area. There is a small modern quarry on the Alambie property which may have destroyed some of the Aboriginal huts in the area. These processes have not altered the legibility in the landscape of the Aboriginal settlement and aquaculture system.

Location:

About 7880ha, 6km south west of Macarthur, comprising Mount Eccles National Park, Stones State Faunal Reserve, Muldoons Aboriginal Land, Allambie Aboriginal Land and Condah Mission. Not included is the quarry located on Brians Road being Lot 1 LP138567.

Bibliography:

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Report Produced: Tue Mar 22 16:15:53 2011

Place Details

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Budj Bim National Heritage Landscape - Tyrendarra Area, Tyrendarra, VIC, Australia

Photographs:	None
List:	National Heritage List
Class:	Indigenous
Legal Status:	Listed place (20/07/2004)
Place ID:	105678
Place File No:	2/02/137/0001

Summary Statement of Significance:

The Tyrendarra Area in Western Victoria, contains the remains of a complex system of natural and artificially created wetlands, channels, the stone bases of weirs and stone fish traps that were used by Gunditj Mara people to grow and harvest eels and fish. The remains on Tyrendarra are part of the same system as the remains in the Mt Eccles/Lake Condah area, and are hundreds and probably thousands of years old.

The system is markedly different from contemporary, historical and archeological records of freshwater fish traps recorded in other parts of Australia. The fish traps in other parts of Australia channelled fish in streams or rivers into traps rather than creating conditions for fish husbandry. The remains of the channels, weirs and fishtraps at Tyrendarra show a high degree of creativity not found in freshwater fish traps in other parts of Australia, and contains all the elements that demonstrate the functioning of this system of eel aquaculture.

This system of eel aquaculture in the Tyrendarra area, including modified and engineered wetlands and eels traps, demonstrates a transition from a forager society to a society that practiced husbandry of fresh water fish. This resulted in high population densities represented by the remains of stone huts clustered into villages of between two and sixteen huts. It also provided the economic base for a stratified society ruled by chiefs with a form of hereditary succession to this office, which is unusual in Aboriginal Australia.

European settlement in the area commenced during the 1830s. Like many other frontiers, conflict between Europeans and Aborigines was endemic in the Lake Condah area. Aboriginal people often used parts of the landscape that Europeans found difficult to access as a base for their resistance to encroaching European settlement. The Gunditj Mara people resisted European encroachment of their lands during the Eumerella wars that lasted more than 20 years. Gunditj Mara used the Mt Eccles lava flow to launch their attacks. Because the lava flow is uneven and rocky, Europeans and their horses found it difficult to penetrate the area. This allowed Gunditj Mara to escape from attempted reprisals and to continue their resistance to European settlement. The Mt Eccles lava flow provides a particularly clear example of the way that Aboriginal people used their environment as a base for launching attacks on European settlers and escaping reprisal raids during frontier conflicts.

Official Values:

Criterion: A Events, Processes

The Tyrendarra area is of outstanding heritage value because it contains the remains of a complex system of natural and artificially created wetlands, channels, the stone bases of weirs and stone fish traps that were used by Gunditj Mara people to grow and harvest eels and fish (Builth 2002, 2003). The remains of the channels, weirs and fishtraps are hundreds and probably thousands of years old.

This system is markedly different from contemporary, historical and archaeological records of freshwater fish traps recorded in other parts of Australia which provided a system for channeling fish in streams or rivers into traps (Sutton 2004) rather than creating conditions for fish husbandry.

The remains of the system of eel aquaculture in the Tyrendarra area demonstrate a transition from a forager society to a society that practiced husbandry of fresh water fish (Builth 2002, 2003). This resulted in high population densities represented by the remains of stone huts clustered into villages of between two and sixteen huts (Builth 2002, 2003). It also provided the economic base for a stratified society ruled by chiefs with a form of hereditary succession to this office (Dawson 1881; Clark 1990).

Many of the sites in Western Victoria where eel husbandry was practiced have been destroyed by farming (Clark 1990a). Of the systems that remain, the remains on Tyrendarra are part of the same system as the remains in the Mt Eccles/Lake Condah area. They are a better representative of this Western Victorian system than other examples such as Toolondo (Lourandos 1980) and Mt William (Williams 1988; Clark 1990a). The latter areas have a limited range of the features associated with eel aquaculture, mainly channels and fish traps.

It demonstrates a transition from a forager society to a society that practiced husbandry of fresh water fish (Builth 2002, 2003). This resulted in high population densities represented by the remains of stone huts clustered into villages (Builth 2002, 2003). It is also associated with a form of stratified society (Dawson 1881; Clark 1990a), which is unusual in Aboriginal Australia.

Criterion: A Events, Processes

The landscape of the Tyrendarra lava flow in the MT Eccles/Lake Condah area is of outstanding heritage value because it provides a particularly clear example of the way that Aboriginal people used their environment as a base for launching attacks on European settlers and escaping reprisal raids during frontier conflicts (Clark 1990a, 1990b; Builth 2003).

Conflict between Europeans and Aborigines was endemic on the frontier of European settlement (Reynolds 1976). Aboriginal people often used parts of the landscape that Europeans found difficult to access as a base for their resistance to encroaching European settlement. Many of these landscapes of resistance centered on areas where vegetation made access difficult and some of these landscapes have been altered since European settlement.

Gunditj Mara used the Tyrendarra lava flow as a base from where they launched attacks on white settlers. Because the lava flow is uneven and rocky, Europeans and their horses found it difficult to penetrate the area. This allowed Aboriginal raiders to escape from attempted reprisals and to continue their resistance to European settlement for nearly a decade (Clarke 1990a: 238-250, 1990b; Builth 2003).

Criterion: F Creative or technical achievement

The system of ponds, wetlands, channels, weirs and fish traps in the Tyrendarra area are of outstanding heritage value. Gunditj Mara people constructed the channels to manipulate water flows and the weirs to modify and create wetlands that provided ideal growing conditions for the shortfinned eel and other fish (Coutts *et al* 1978; Lourandos 1980; Williams 1988; Clark 1990a; Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993; Builth 2002, 2003). This system is confined to Western Victoria and shows a high degree of creativity not found in freshwater fish traps in other parts of Australia. Unlike other places in Western Victoria like Toolondo (Lourandos 1980) and Mt William (Williams 1988), the Tyrendarra area contains all the elements that demonstrate the functioning of this system.

Description:

The story of the Gunditj Mara people of Western Victoria is intimately related to the eruption of the Mt Eccles volcano, which was active between 30,000 and 20,000 years ago (Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993: 35).

Mt Eccles and the other Western Victorian volcanos are amongst the youngest in Australia. It dates to the Pleistocene with the most recent Tyrendarra lava flow occurring about 20,000 years ago. This means that Aboriginal people would have witnessed the eruption of Mt Eccles.

The Tyrendarra lava flow altered the drainage in the area and helped to create Lake Condah and its associated wetlands. These and other wetlands in Western Victoria were used and modified by Aboriginal people who developed a complex system for growing and harvesting fish, particularly eels (Builth 2002, 2003). This system is markedly different from the contemporary, historical and archaeological record of freshwater fish traps (Sutton 2004) recorded in other parts of Australia.

Aboriginal people dug channels to carry water from streams to low lying areas where a system of weirs was used to pond the water (Coutts *et al* 1978; Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993; Lourandos 1980, 1983; Clark 1990; Williams 1988; Builth 2002, 2003). The ponds and wetlands allowed Aboriginal people to practice a form of aquaculture in which they grew the fish and eels and then harvested them by draining the water through woven basket that trapped the fish (Builth 2002, 2003). Early descriptions and recent scientific evidence indicates that eels were preserved by smoking them in the hollows of mana gum (*Eucalyptus viminalis*) trees (Builth 2002).

In one part of Western Victoria, the area between Mt Eccles and the sea, this system of channels ponds, weirs and traps is associated with the remains of circular stone huts (Couts *et al* 1978; Van Warden and Simmonds 1992; Aboriginal Affairs Victoria and Kerrup Jmara Elders Aboriginal Corporation 1993; Builth 2002, 2003). These huts can occur singly but generally occur in clusters of between two and sixteen huts (Clark 1990; Van Warden and Simmonds 1992). The material from the stone huts indicates they are Aboriginal (Coutts *et al* 1978; Van Warden and Simmonds 1992) and the spatial association between the huts and the fish traps indicates they are part of the same cultural complex.

This system of eel aquaculture provided an economic base that supported large numbers of people organised in a form of stratified society ruled by chiefs (Dawson 1881; Clark 1990a; Builth 2002, 2003).

Permanent European settlement in the area began in the 1840s with the arrival from Tasmania of the Henty Brothers. There was conflict as European settlement expanded into Gunditj Mara lands. Gunditj Mara used the Tyrendarra lava flow as a base from where they launched attacks on white settlers. Because the lava flow is uneven and rocky, Europeans and their horses found it difficult to penetrate the area. This allowed Aboriginal raiders to escape from attempted reprisals (Clarke 1990: 238-250). After a number of attacks on pastoral properties native police were dispatched to the district. By 1849, the native police had broken Gunditj Mara resistance (Clarke 1990: 238-250).

In the 1860s, Victoria began developing a system of Aboriginal Reserves. Gunditj Mara living in the Portland and Heywood areas refused to move to the mission at Framlingham so a new reserve and mission was created at Lake Condah in 1868 (Clark 1990: 232; Context 2000). In 1919, after the First World War in which many Gunditj Mara served, the Victorian Government closed the Lake Condah mission. Ironically, much of the land was sold to the Closer Settlement Board to provide land to returned soldiers. Although attempts were made to settle Aboriginal people on the lake Tyers Reserve many remained or returned to the Lake Condah mission area. The last of the reserved land was revoked in 1959 and the church was demolished.

The proposal by Alcoa to develop an Aluminium smelter near Portland led to protests and court actions by Gunditj Mara who wanted to protect their heritage. Following negotiations between Gunditj Mara, the Victorian Government and Alcoa, it was agreed that the old Lake Condah mission would be purchased and returned to the Aboriginal community (Context 2000). However, the Victorian Government was unable to pass the enabling legislation through its Upper House and turned to the Commonwealth for assistance (Context 2000). Under the constitutional to make laws for Aboriginal people power granted in the 1967 referendum the Commonwealth passed the *Aboriginal Land (Lake Condah and Framlingham Forest) Act 1987.*

History: Not Available

Condition and Integrity:

The system of eel aquaculture within the Tyrendarra area has been affected by natural decay over the last one hundred and fifty years which has resulted in the loss of wood and clay features that formed part of the weirs, fish traps and huts. However, the stone bases of these structures are still intact. Some of these structures may have been dismantled by Europeans to construct the dry-stone fences that are ubiquitous in this area. These processes have not altered the legibility in the landscape of the Aboriginal settlement and aquaculture system.

Location:

About 275ha, 2km north of Tyrendarra, comprising Lots 158A, 158B, 159, 159A, 159B.

Bibliography:

Aboriginal Affairs Victoria and Kerrup Jmara Aboriginal Corporation. 1993. *Lake Condah: Heritage Management Plan and Strategy*. Melbourne: Aboriginal Affairs Victoria.

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Lourandos, H. 1980. Change or stability?: hydraulics, hunter-gatherers and population in temperate Australia. *World Archaeology*, 11: 245-264.

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Place Details

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Lake Condah Area, Heywood, VIC, Australia

Photographs:

List:	Register of the National Estate
Class:	Indigenous
Legal Status:	Registered (21/10/1980)
Place ID:	3783
Place File No:	2/02/137/0001

Statement of Significance:

The specialised technology of the large scale fish weirs and other structures illustrates, together with the sites at Ettrick and Toolondo, a specialised form of subsistence associated with Aboriginal groups living south of the Great Dividing Range. They demonstrate that the Western District Aborigines had developed efficient methods for harvesting fish and that inland fishing was an important aspect of late prehistoric Aboriginal economy.

(The Commission is in the process of developing and/or upgrading official statements for places listed prior to 1991. The above data was mainly provided by the nominator and has not yet been revised by the Commission.)

Official Values: Not Available

Description:

Survey indicates four major systems of fishtraps, comprising articulated stone races, canals, traps and wells. Essentially the system appears to modify natural topographic and hydrologic settings to optimise fishing strategies. It seems that eels were the main species of fish being caught though the use of the traps must have been primarily geared to local hydrological regimes rather than to the seasonality of eels.

History: Not Available

Condition and Integrity: Not Available

Location:

About 1250ha, 20km east-north-east of Heywood, and defined as the area within a circle of radius 2km, centered at AMG Point: 7221-740850.

Bibliography:

COUTTS P; FRANK R AND HUGHES P; 1978 ABORIGINAL ENGINEERS OF THE
WESTERN DISTRICT REC OF THE VIC ARCH SURVEY NO 1;
COUTTS P.1977 SUMMER FIELD PROGRAMME OF VIC ARCHEAOLOGICAL SURVEY REC
OF THE VIC ARCH SURVEY NO 4: P7.
KENYON A 1930 STONE STRUCTURES OF THE AUSTRALIA ABORIGINAL EXTRACT
FROM COUTTS, FRANK AND HUGHES (1978) ATTACHED ALSO COPY OF THIS
PUBLICATION HELD IN A.H.C. LIBRARY.

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