

Ancient Australia

An Introductory Guide for Teachers and Students



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Ancient Australia: An Introductory Guide for Teachers and Students

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Front page image: Rock painting of a Wandjina spirit, Raft Point, Kimberley, Western Australia, image paulmichaelNZ, Shutterstock.

Acknowledgement of Country

HTANSW acknowledges the Traditional Owners and Custodians of the ancestral lands across Australia, where we live, and where we teach, learn and practise History.

As we share our knowledge as storytellers, we pay respect to the oral traditions and the knowledge embedded within Indigenous Custodianship of Country.

We pay respect to Elders, past, present and emerging, as we share in preserving First Nations traditions, story and memory.

Authorship and consultation

This resource was developed by the History Teachers' Association of NSW by compiling key information that is readily available in the public domain through existing literature, published in print and online. No new research was conducted.

Our aim was to create a widely available resource to expand teacher (and student) knowledge, by providing a scholarly but accessible overview of the topic that also incorporates multiple Indigenous voices and perspectives, through the use of direct quotes and other contemporary sources.

Drafts of this resource were reviewed by several prominent academic archaeologists and historians, including Indigenous scholars, and the text was revised according to their expert feedback.

Permission to reproduce images of cultural material and sites has been sought from the relevant Traditional Custodians.

Introduction

The 50,000 years or more of human experience in Australia is a significant part of global history. This resource is intended to support teachers and students in extending their knowledge of the subject, encouraging us to consider how the combination of Indigenous perspectives and Western scientific and academic approaches help to widen our understanding of the human experience of Australia's deep past.

For many decades, Australia's ancient past was investigated only by archaeologists; historians were only concerned with the past after European contact, and Aboriginal peoples were excluded from the study of their own culture and deep history. Colonialism and its long-term legacy resulted in dispossession, frontier violence, forced migrations to missions and reserves, the banning of languages, child removal, disconnecting peoples across Australia from their ancestral lands, language and knowledges. But now there is a cultural renaissance, with people reviving languages and knowledge systems, practising art and ritual, and connecting with ancestors through working on archaeological projects about deep time. Some historians, too, are beginning to challenge older mindsets to look beyond the traditional boundary of what is considered history or prehistory, and to include the Indigenous ancient past in their studies.

The study of Australia's ancient past is an exciting and dynamic field that is constantly being revised by the discovery of new evidence, new theories, new technologies and methods and interpretations. It draws on the traditional knowledges of Australia's Indigenous peoples and the disciplines of archaeology, history, anthropology, science and Indigenous studies. This complex field involves various excavation and analytical techniques, scientific dating systems, unique terminology and concepts, and a diverse range of material and oral evidence. Rather than being a singular history, the deep history of Australia is plural, in which there was great diversity of experience among the people who occupied various parts of the continent. In addition, the places they knew were not static but underwent dramatic changes through time.

The ephemeral nature of some archaeological evidence from tens of thousands of years ago means that the study of Australia's ancient past can create some challenges for comprehending key concepts and the importance of some of the most significant sites. The time frames are long, the types of evidence are diverse in character, sites are geographically dispersed across Australia, the discovery and analysis of new evidence can be controversial, and differing perspectives on the surviving evidence can create sustained debate. This introductory resource, intended to be used in conjunction with other textbooks and reading material, is designed to equip teachers with useful outlines of some of the key perspectives, concepts, sites, types of evidence and debates for teaching Australia's ancient past.

Each of the four sections includes a variety of sources and activities to help teachers and students develop knowledge and skills relevant to this topic. It is not expected that students would complete all sections or even all activities within this resource. Instead, they are designed so that teachers or students might select the most relevant or interesting elements at an appropriate level of challenge.

Tips for Teaching Australia's Deep History

Volume 56.1 of the journal *Teaching History* published by the History Teachers' Association of New South Wales in 2022 was dedicated to the theme of Australia's Deep Time history. Below is a list of tips compiled from various articles in that volume for working on this aspect of Australian history in schools.

- Involve local Indigenous communities and/or appropriate knowledge holders in determining suitable resources.
- Follow the NSW Education Standards Authority's 'Aboriginal and Torres Strait Islander principles and protocols' for teaching Indigenous history and culture.
- Read, listen to and include First Nations authored or endorsed/peer reviewed publications and other media.
- Consider and integrate different historical and narrative traditions.
- Listen to diverse Indigenous voices, through their earlier records and their recent writings.
- Explore a wide array of evidence.
- Note the significance of stories of continuity and the everyday.
- Avoid passive voice and passive depictions (think about the people).
- Think critically when examining the available archaeological and ethnographic sources (think about gender; the material culture that survives was usually used by men).

Terminology

While various terms have been used historically, this resource uses the following terminology, based on currently accepted First Nations and academic approaches, and the terminology used in the NSW History syllabuses, and ACARA Australian Curriculum, version 9.0. HTAN-SW acknowledges that some terms move in and out of preference, but we have endeavoured to use those that are as current as possible at the time of publication.

Table i: Common terminology used in this resource.

Appropriate Terminology	No longer preferred
Ancient Australia, Aboriginal archaeology, deep history, deep time history	Prehistory, prehistoric, prehistorical, primitive
First Nations peoples, First Nations Australians, first Australians, Aboriginal and Torres Strait Islander people, Indigenous Australians, Aboriginal people, Aboriginal Australians	Aborigines, Aborigines
Semi-permanent occupation/habitation	nomadic
years ago or BP (before present) – most appropriate for referring to ancient Australia	BCE (before common era) or BC (before Christ) – not relevant for referring to ancient Australia

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What is Australian ‘Deep History’?

Key Questions

What is ‘Deep History’ in Australia?

What are the different theories, interpretations, and perspectives for understanding Australia’s deep history?

Section 1 Glossary

anatomically modern human: our early ancestors that were physically the same as living humans.

Australian deep history: period between the occupation of the continent by humans, most widely accepted to be about 60,000 years ago, and the arrival of Europeans on the continent.

autochthonous: originating in a place, rather than descended from migrants or colonists.

behaviourally modern humans: emerged within the last 100,000 years, including abstract thinking, burying the dead, language skills and symbolic behaviour.

Country: lands, waterways and seas with which Aboriginal people are spiritually and culturally connected.

Holocene: the geological epoch that began about 11,650 years ago, when the last glacial period ended, and climates improved; ending with the testing of the atomic bomb in the twentieth century.

Late Pleistocene: the period during which people arrived in Australia and the last glacial period.

Pleistocene: a geological epoch lasting from about 2,580,000 to 11,650 years ago, during the last period of repeated glaciations or ice ages.

stratigraphy: the study of layered materials that were deposited over time.

taphonomy: the scientific discipline that investigates the integrity of geological and archaeological deposits.

1.1 Knowledge, interpretations and perspectives on deep history

Terminology and Australia's ancient past

It is now known that the Earth is 4.5 billion years old, but for centuries, it was widely accepted that the Earth was only 6000 years old. In 1788 Scottish geologist James Hutton challenged this concept, arguing that the planet was much older. He first used the term 'deep time', proposing that descriptions of time measured in millions of years were required for geological features. Two hundred years later, in his 1982 book *Basin and Range*, the term was used again by American author John McPhee, to describe the difference between the length of the existence of humans and the geological forces that formed our planet.

Combining that concept with the Humanities discipline 'History' to make 'deep time history' (or more simply, 'deep history'), we are referring to the expansion of humans across the Earth, beginning with the emergence of anatomically modern humans, from about 160,000 years ago, up to the development of writing, about 5500 years ago. When applied to Australia's past, 'deep history' refers to the period between the occupation of the continent (the single landmass at low sea levels of New Guinea, mainland Australia and Tasmania during the Late Pleistocene) by behaviourally modern humans, most widely accepted to be between about 50,000-65,000 years ago and the arrival of Europeans on the continent.

Deep history can also be referred to as 'ancient Australia' or the ancient history of Australia, and as a branch of archaeological study, it is referred to as Aboriginal or Indigenous archaeology. The investigation of Australia's ancient past relies predominantly on physical non-text based archaeological sources. Knowledge of ancient lifeways are also enhanced by examining ancient oral traditions such as creation stories and myths that have been passed on across generations to living Indigenous Australians.

Early European explorers' diaries of interactions with Aboriginal people have also often been used by historians, archaeologists, and anthropologists to draw conclusions about Aboriginal people's culture and lifeways prior to 1788. However, there are potential problems with drawing analogies with ancient lifeways from the activities, material culture and cultural practices observed since 1788 by Europeans. This is because it cannot be assumed that those practices remained unchanged, or even existed, throughout the entirety of Aboriginal Australia.

Contested knowledges

The study of ancient cultures and deep history was long dominated by the academic discipline of archaeology, which tended to focus more on things rather than people, and often excluded Indigenous people from the study of their own history. However, deep history is now also studied by historians and Indigenous peoples, and the best investigations about deep history engage with the perspectives and knowledges of living Indigenous peoples, widening our understanding of how people experienced Australia's deep past.

But Indigenous Australians, archaeologists, historians and others understand and interpret the concept of deep history and time in varying ways. This derives from cultural differences in approaches to the term 'evidence' and what constitutes evidence of people's lives in ancient Australia.¹ For example, the longevity of human occupation of the continent is interpreted differently by those searching for archaeological evidence of the initial migrations to the continent and by those whose perspectives are based on oral traditions, and who believe that Aboriginal Australians have always occupied the continent.

¹ For a discussion of Indigenous views of evidence (versus revelation) see A. McGrath, 'People of the Footprints: Rediscovery, Indigenous Historicities and the Science of Deep Time', *Interventions* 24, no. 2 (2021): 181-207, DOI: 10.1080/1369801X.2021.1972822

Traditional Aboriginal knowledge systems reflect a complex understanding of the Australian environment, such as names in every language for plants and animals. Ancient stories that survive today even indicate first-hand experience and memory of events in deep history (such as rising sea levels) that have been passed between the generations. Some of this knowledge corroborates the findings of contemporary science, but there are also examples of how Western and Traditional Aboriginal knowledges are an uncomfortable fit and are contested.

An Indigenous perspective

First Nations Australians have deep connections with the land and believe their people were autochthonous, meaning they were always here. So, some Aboriginal Australians disagree with the need for archaeological investigations to define the date of migration and the first footprints on Australian soils.

Over time, oral histories and other complex traditions such as dance, song lines, rock art, message sticks and memory schemes were passed between generations. Creation stories are further evidence of the longevity of people on the continent. Aboriginal elders describe Country as an archive of their history. For example, some Dreamtime stories from Victoria tell of giant birds and volcanic eruptions, demonstrating intersections between the ancient oral tradition and the occurrence of ancient events reflected in the archaeological evidence.

As with many Indigenous cultures around the world, time is non-linear for many Aboriginal Australians. Unlike Western culture, with its Gregorian calendar for measuring time, Aboriginal Australians think about time as a multi-layered present, which anthropologist W.E.H. Stanner translated as the ‘everywhen’, in which the past, present and future are interconnected and time folds in on itself.² Everywhen is a kind of eternal present, in which past, present and future exist as one, but it does not imply that Indigenous people are unaware of time passing.

An archaeological perspective

Archaeologists have been investigating ‘deep history’ since the discipline was established in the nineteenth century. The study of Australia’s ancient past involves the search for evidence of places once occupied by people to understand how people lived long ago. Archaeologists specialise in the identification, analysis and interpretation of material evidence such as camp sites, rock art, shell middens and other places that people occupied long ago. The investigation and excavation of archaeological sites often involves collaboration with other scientists, including geologists, geographers, geomorphologists, and geneticists, to determine dates of occupation, and develop theories of origin, migration patterns and diet. For many decades Indigenous peoples were excluded from the investigation of their own archaeological heritage, but since the late twentieth century, Aboriginal Australians were increasingly involved in archaeological investigations, and their cultural knowledge is now recognised as an important collaborative component, enriching the findings from the material evidence and the outcomes of the studies.

Pioneering archaeologists in Australia, such as John Mulvaney, Rhys Jones and Isabel McBryde, used the term ‘prehistory’ for many years, to refer to the vast expanse of time before British occupation. Trained in the Cambridge University tradition of European archaeology during the 1950s, where European deep history was also referred to as ‘prehistory’, they applied the same methods and terms to studying Australia’s ancient past. While archaeologists have commonly used the term ‘prehistory’ to mean ‘before the written word’ (which usually did not aim to intentionally diminish Indigenous histories), some others feel the term reinforces the idea that Aboriginal Australians lived before ‘time’ had begun. In the 1990s, Australian archaeologists stopped using the term ‘prehistory’, because of its implications of European racial superiority. Instead, archaeologists and heritage managers used the term ‘Aboriginal archaeology’ (as opposed to ‘historical archaeology’ – the study of material and documentary evidence from the period after 1788).

² For further reading see A. McGrath, L. Rademaker and Jakelin Troy (eds) *Everywhen: Australia and the Language of Deep History* (Sydney: New South Publishing: 2023).

Since the evidence for Australia's deep history is nearly exclusively archaeological or based on material evidence, Dr Louise Zarmati suggests that thinking like an archaeologist is important for studying deep history. To consider time, place, material culture and people, archaeologists employ the three dimensions of space – length, breadth, and height – and add the dimension of time, and combine these with interactions between environment, climate, people and societies, events, and artefacts (the things people made, used and valued). The approach allows archaeologists to develop theories and draw conclusions about where people lived, what their environment was like, what things people made, used and valued, and why, with whom they lived and interacted, and when they lived and died.

An historical perspective

Contrary to the traditional text-based practice of History as the study of eras in which humans created written documents, some historians are now shifting their approach to the past. They are changing the way the discipline is framed by examining 'deep history' as an expansion of the modern era. Historian Dipesh Chakrabarty argued that the discipline of history should develop an expanded framework that considers geological time – which he saw as necessary to understand the Anthropocene era of human-induced climate change. Australian archaeologist John Mulvaney tried to address this issue in the late 1960s, publishing his book *The Prehistory of Australia* (1969), intending the term 'prehistory' to be inclusive of the 'history' of Indigenous Australians.

This evolving study of 'deep history' deconstructs the framing of history as the era after written texts and is inclusive of time periods, places, people and perspectives. Historians of deep history see their practice as distinct from the approach of many archaeologists and collaborating scientists, who seek factual, material evidence-based information. The historian's approach is to include cross-cultural perspectives and to narrate stories about the lives of ancient people. Their challenge is to develop methodologies and different approaches to historical evidence, engage with different kinds of history telling and consider various ways of thinking about time, all within a framework in which the traditional evidence is oral, material and archaeological, rather than text-based.

Australian historians, such as Professor Anna Clark and Professor Ann McGrath, have called for the story of Indigenous Australians' deep past to be recognised as 'history'. The collaborative Research Centre for Deep History at the Australian National University has been influential in achieving this, with politicians, Indigenous rally leaders and others now referring to 'deep history', and not only using the term 'continuing culture' referred to previously.³ In Australia, the historians' approach to 'deep history' seeks to collaborate with Indigenous scholars and knowledge holders, to address the question of why Indigenous people have been seen as not having a history of their own and were left out of global history narratives. As Professor Ann McGrath wrote, 'It was as if Europeans had to be on the scene, on the continent of Australia, before Aboriginal Australians could be "in History"'.⁴ The approach is focused on the basis that all ancient peoples shared many experiences of modern humans and lived their lives through history. The shared humanity is what McGrath sees as one of the most compelling arguments for the study of deep history.

Source 1.1

Jakelin Troy (Ngarigu woman), 'Standing on the Ground and Writing on the Sky: An Indigenous Exploration of Place, Time and Histories', in A. McGrath, L. Rademaker and Jakelin Troy (eds) *Everywhen: Australia and the Language of Deep History* (Sydney: New South Publishing: 2023), p. 37

...I have been exploring how understanding 'Country'... can build a path back to the deep past for Aboriginal communities such as my own Ngarigu people. I do this through drawing together oral history, archaeological data, and the documentary history created by and about our peoples.

³ For education resources on Australian deep history, see Research Centre for Deep History, 'Marking Country', Australian National University, <https://re.anu.edu.au/marking-country/>

⁴ A. McGrath, 'What is Deep History?', *Teaching History* 56, no.1 (2022): p. 4-8.

Source 1.2

Dr Emily Poelina-Hunter (La Trobe University, Nyikina woman), quoted in K. Pollard, C. Smith, J. Willika, V. Copley Snr, C. Wilson, E. Poelina-Hunter, J. Ah Quee, 'Indigenous views on the future of public archaeology in Australia', *Archaeologica Publica* 10 (2020), p. 39

The way Australians are taught to think about time is very linear, and the way the public are taught to be impressed by traditions that are really recent becomes more obvious once you study archaeology and have an understanding of approaching Australia's past in terms of the tens of thousands of years that Aboriginal people have been here. It is a problem with colonised societies that are still being governed by colonisers. They think a family living on a farm for three generations is impressive. I think 200+ generations of Aboriginal people farming the land without having to build a fence around it is better! This idea of 'long', non-linear time, equates better with my Aboriginal (Nyikina) concept of time.

Source 1.3

Professor Marcia Langton AO (University of Melbourne, Yiman and Bidjara nations), *Welcome to Country: A Travel Guide to Indigenous Australia* (Richmond, VIC: Hardie Grant Explore, 2nd ed. 2021), pp. 1-2 and 4-5.

Nowhere else in the world can you see and experience the oldest living cultures of humankind... The Indigenous footprint can be found across the Australian continent... but it is often invisible until it is pointed out. Once you see the evidence of Aboriginal life, a whole new world opens up... This fascinating history of the world's driest inhabited continent is one of great human ingenuity in the face of unknown lands... this was the first southern-most human population on the globe.

Source 1.4

Dr Scott Cane (Australian National University) *First Footprints: The epic story of the First Australians* (Crows Nest, NSW: Allen & Unwin, 2013), pp. 3-4.

The original Australian story remains one of the world's greatest unknown human narratives... [it] is the greatest Australian story, one of enormous antiquity and remarkable diversity, a story of monumental events and incredible environments, and of the people who came first, settled and stayed.

Source 1.5

Dr Billy Griffiths (Deakin University), *Deep Time Dreaming: Uncovering Ancient Australia* (Collingwood, VIC: BlackInc, 2018), p. 11.

To dream of deep time is not to dig in search of treasure; it is to seek to understand and revivify the human history of a place from the fragments that have survived the vicissitudes of time. It is an act of wonder... a scale of thinking that propels us into a global perspective and allows us to see ourselves as a species. It also asks us to respect the deep past as a living heritage and to recognise the possibilities and responsibilities it generates. The revelation ... is that Indigenous history is ancient, various and ever-changing.

Activity

1. In your own words, and using both Indigenous and Western perspectives, provide a brief definition of 'deep history' as it relates to Australia.
2. What do Sources 1.1, 1.2 and 1.3 reveal about how some Aboriginal people view archaeological investigations and western understandings of time?
3. Why is the term 'prehistory' no longer preferred when referring to Australia's ancient past?
4. Describe the main differences between the approaches of archaeologists and historians in studying Australia's 'deep history'.
5. If studying Australia's deep history, what skills and approaches would you use to think like an archaeologist?
6. What are some of the challenges of exploring deep history? In your response, refer to 1-2 of the sources provided in this section.

1.2 Timeline of Australia's ancient past

The deep history of people on the Australian continent falls within two geological epochs that Western scientists refer to as the Pleistocene and Holocene. Within the immense time span of the Pleistocene, which began about 2.6 million years ago and ended about 11,650 years ago, there were a series of ice ages (glacial cycles including periods of peak cold and, increasingly, dryness and climatic variability). Temperatures were several degrees Celsius colder on average than they are today. Within the Pleistocene (the period from about 115,000 until 11,650 years ago known as the Last Glacial Period), scientific evidence indicates that modern humans colonised the Australian continent. During this time, much of the Earth's water had turned to ice, making sea levels up to 150 metres lower than today and causing widespread drought and desertification.

However, Aboriginal peoples around Australia have different interpretations and stories about the origins of their ancestors on the continent. Many believe that their nations have lived on the continent since 'time immemorial'¹, and they reject the notion that people colonised the continent from somewhere else. Many also reject the Western approach to dating archaeological evidence, feeling that knowing the age of materials created in deep history serves no purpose.

Source 1.6

John Maynard (Worimi man), 'Across "Koori Time" and Space', in A. McGrath, L. Radmaker and Jakelin Troy (eds) *Everywhen: Australia and the Language of Deep History* (Sydney: New South Publishing: 2023), p. 221.

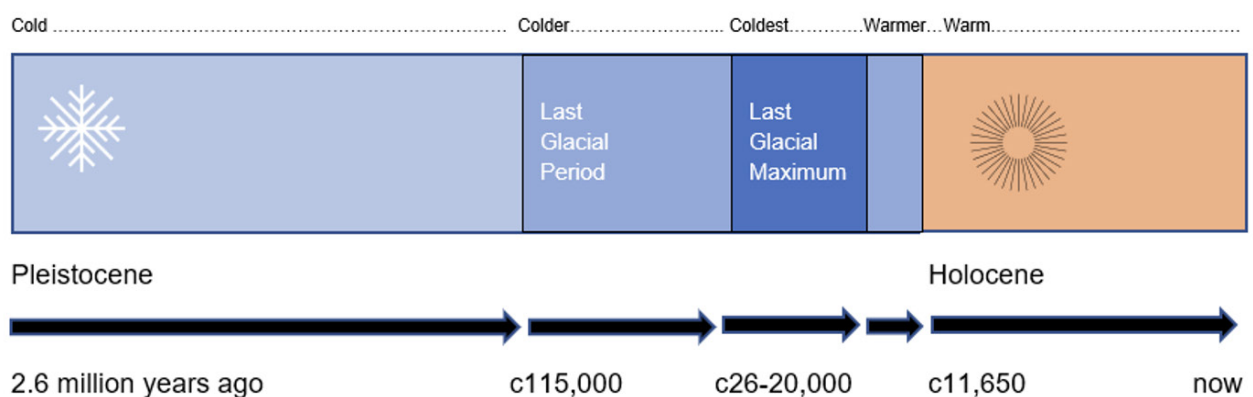
...according to an Aboriginal sense of time, we have always been here. We came directly out of the Dreamtime of the creative ancestors and lived and cared for Country as it was on the very first day.

Source 1.7

Jim Allen and James F. O'Connell (Professors of Archaeology), 'A different paradigm for the initial colonisation of Sahul', *Archaeology in Oceania* 55 (2020): p. 1.

... recent genetic studies can be interpreted to show that the initial human colonisation of Sahul involved many hundreds and possibly thousands of individuals, probably within a time period shorter than one millennium.

Figure 1.1 Pleistocene to Holocene timeline, showing climate changes



¹ Research Centre for Deep History, 'Marking Country', Australian National University, <https://re.anu.edu.au/marking-country/about>

From about 33,000 years ago, the ice sheets that covered much of the Earth began to grow and were at their greatest extent from about 26,500 to 20,000 years ago. This period is referred to as the Last Glacial Maximum (peak Ice Age), and temperatures were even cooler, sea levels dropped further and in some places there was extreme drought. Aboriginal peoples experienced a climate that was dry and windy, where the arid regions across the Australian continent extended further to the coasts than they do today, covering nearly seventy per cent of southern Sahul (effectively the landmass of modern Australia) (see Figure 1). Traditional knowledge and stories passed down through the generations tell of how their Country changed and archaeological evidence suggests that the first Australians dealt with these changes by retreating into areas where fresh water was still available.

About 14,000 to 11,650 years ago, the Last Glacial Maximum ended as the Earth's temperatures began to increase, and ice sheets melted, causing sea levels to rise rapidly. The new epoch is referred to as the Holocene. The rising sea levels flooded the land bridges, from the Torres Strait to the north and Bass Strait to the south, probably isolating the people who had settled these regions.

Figure 1.2 A depiction of Sunda and Sahul, showing the islands of Wallacea, Source: Wikimedia Commons / Maximilian Dörrbecker / CC-BY-SA-3.0



Table 1.1: Milestones in Australia's Deep History

2.6 million to c11,650 years ago Pleistocene Epoch (or Era)	2 million years ago		archaic hominins migrate out of Africa
	c160,000 years ago		first anatomically modern humans appear (in Africa)
	c115,000 – c11,750 years ago	c80,000 years ago	anatomically modern humans migrate out of Africa, to Europe and Asia
	Last glacial period (Ice Age)	c74,000	Mt Toba volcanic eruption, Indonesia
		c65,000 - c51,000	migrations from Sunda to Sahul (Australian continent) world's first modern human sea crossing
		c50,000 (at least, possibly c65,000)	Madjedbebe, NT world's first grinding stones and edge ground axes
		c45,000	Puritjarra, central Australia settlement of desert regions
		c44,000	Parmerpar Meethenar, TAS people first occupy glacial Tasmania
		c43,000	Winjana Gorge, WA world's oldest hafted stone axe
		c42,000	Lake Mungo, NSW world's oldest human remains and oldest cremation
		c40,000	Jansz and Mandu Mandu, Pilbara coast, WA Oldest evidence of marine subsistence in Australia
		c40,000	Murujuga & Carpenter's Gap, WA oldest evidence of art (petroglyphs and ochre) and world's largest rock art gallery
		c35,000	Murujuga, WA possibly world's oldest depiction of a human face
		c30,000	cooler, sea levels drop, extreme drought in some places Last Glacial Maximum (peak Ice Age) begins
		c30,000	Mandu Mandu, WA among oldest shell beads in the world
		c40,000 - 30,000	Cuddie Springs, NSW co-existence with megafauna
		c22,000	Willandra Lakes, NSW footprints of people
		21,000	occupation of the emerging coasts
		c12,000 - 9,000	climate improving, sea levels rise, coasts flooded, climatic variability; Mainland Australia separated from New Guinea and Tasmania.

Table 1.1: Milestones in Australia's Deep History (*continued from previous page*)

c11,650 years ago to 1945 CE Holocene Epoch (or Era)	c10,000	Swamp in southeastern-Australia oldest surviving boomerang
	c9,000	small blades, spear throwers, composite spears more diverse and innovative tools appear
	c9,000	Rosemary Island, WA stone shelters constructed
	c6,600	Budj Bim, VIC fish traps - some of the world's oldest aquaculture
	5,000	new migration of people from South-East Asia dingo arrives on the Australian continent
	4,000	'x-ray' art of Arnhem Land anatomical drawings of people & animals
	3,000	intense use of coastal resources, sea levels peak, climate drier increased territoriality
	2,000	complex social & religious systems develop increasing settlement and site numbers
	300	Indonesians visit north coast to fish and trade
	1500s-1700s (CE)	Portuguese, Dutch, Macassan, and British explore the Australian coastline

Activity

1. Consider the differences in perspectives in Sources 1.6 and 1.7, and explain why there are 'contested knowledges' about the origins of people on the continent.
2. Describe the main differences between the Pleistocene and the Holocene and how these would have affected the experiences and ways of life of Aboriginal people in deep history.
3. Outline the main changes to the Australian continent since the Pleistocene. In your response, make use of key terms such as Sahul, ice age and climate.
4. Closely examine Table 1.1. Make a list of all the 'world's first' and 'world's oldest' items listed. What impression does this give you of the importance of ancient Australia as a part of global history?

1.3 Studying the evidence from Australia's deep history

Identifying, recording and analysing the evidence

All across Australia, the first Australians left behind traces of their daily life, some of which survive today as a diverse range of archaeological and geological evidence. There are hundreds of thousands of sites that show evidence of how people lived, including:

- shell middens
- rock shelters
- rock engravings & paintings
- campsites
- stone arrangements
- used ochre (a natural pigment colour made from clay)
- tools and other artefacts (surface scatters or densely 'stratified')
- tool production sites
- grinding grooves
- scar trees
- fish/eel traps
- ochre quarries
- burials/cremations
- ceremonial grounds
- intangible – song, dance, myths

The identification, recording, analysis and dating of the evidence from these sites is crucial to increasing our knowledge of the ancient past, and a wide range of scientific techniques and methods are employed to identify, record and analyse archaeological evidence, including:

- field surveying (walking 'parallel transects' and other methods)
- ground penetrating radar and LIDAR
- photography
- digital scanning
- excavation
- stratigraphic analysis
- artefact technology, associations and frequencies (quantities)
- soil analysis
- plan/map and section drawing - by hand and digitally using a Geographic Information System (GIS)
- forensic and DNA analysis
- usewear and residue analysis
- radiometric and relative dating techniques
- study of ethnographic materials
- experimental recreation of tools and other materials
- stone raw material studies

Site formation and stratigraphy

The deposits archaeologists excavate contain sediments, stone, charcoal and cultural materials that have accumulated over thousands of years, creating layers, which scientists refer to as 'strata'. These can be described according to their colour, texture and chemical composition, and their relative ages can be studied. One of the simplest forms of geological and archaeological dating is known as the 'law of superposition' – a principle of stratigraphy (layers of soil or rock) which holds that the lowest level of an excavation (and the evidence of human occupation within it) must be older than the levels above it. This study of strata by archaeologists and geologists is called stratigraphy. The strata are not neatly horizontal, but can be sloping and mixed, challenging scientists to accurately define the layers from youngest to oldest. Artefacts contained within the layers can be dated by stratigraphic associations with the sediments, charcoal and bone in the strata, using radiometric data or relative dating techniques such as optically stimulated luminescence (OSL).

Archaeological dating techniques

Almost all archaeological dating relies on the association of artefacts or evidence of human activity with natural materials such as sand, charcoal or bone that have measurable changes over time, because of radioactive decay. But dating of these natural materials does not confirm that humans were present, and archaeologists rely on the 'stratigraphic associations' of these materials with the artefacts found in the same soil contexts. Complex scientific 'radiometric' dating methods, including radiocarbon dating, thermoluminescence and optically stimulated luminescence, are employed to provide date ranges for the manufacture and use of tools, occupation of campsites, burial of human remains and creation of rock art. Often, a combination of techniques is used, since, as with the study of any historical period, employing multiple techniques to gather evidence produces more data and allows more reliable conclusions to be made.

Table 1.2: The main methods of dating artefacts used by modern archaeologists

Radiocarbon dating (C14)	The most common technique, based on the principle that when organisms die, the carbon-14 (the longest-lived radioactive isotope of carbon) begins to decay at a known rate, so is therefore referred to as a radiocarbon. However, carbon-14 has a half-life of 5730 years so dating is limited to between a few hundred and about 50,000 years.
Thermoluminescence dating (TL)	Dates the last time the mineral was heated or exposed to sunlight and can be used to provide age-estimates on samples up to 500,000 years old. However, many analyses can give inaccurate results.
Potassium-argon dating (K-Ar)	Most useful for minerals older than 100,000 years, to date mineral deposits above and below archaeological deposits.
Optically stimulated luminescence dating (OSL)	Dates the last time mineral deposits were exposed to sunlight.
Electron spin resonance dating (ESR)	Used to date materials that radiocarbon dating cannot, including minerals, biological materials and archaeological materials.
Uranium series (U-series)	A broad term covering a number of dating schemes based on the measurement of the natural radioactivity of Uranium isotopes in minerals, shell, bones and teeth; the most widespread technique after radiocarbon dating.

Problems with archaeological dating techniques

The accurate dating of archaeological materials presents challenges because the available dating methods are not perfect, and results are often open to interpretation and scrutinised for being affected by independent factors. Radiocarbon dating (C14) is the only absolute dating method and is effective on samples up to about 50,000 years old. In the 1970s, the 50,000 year age, which has been referred to as the 'radiocarbon barrier', was recognised by archaeologist Rhys Jones. He suggested that radiocarbon dating was unsuitable for investigating human occupation in Australia, since it probably

occurred before 50,000 years ago. More recently, the radiocarbon dating of archaeological materials from Madjedbebe to 55,000 years ago appears to have breached what was long thought to be the radiocarbon barrier.¹ Archaeologists continue to debate whether the so-called 'barrier' is real.

While ages for ancient sites and human activity are often quoted as single dates, they are almost always actually date ranges with an average calculated date. Usually, this is because they are adjusted using calibration curves developed by various dating laboratories with a value plus or minus either side of the average date. These are often only estimates of age rather than precise dates, and their value and accuracy often relies on numerous factors, including whether the site has been disturbed since artefacts were deposited. The strata in archaeological deposits can sometimes be disturbed in some way, but it is not always the case. It is possible, for instance, that artefacts can move upwards or downwards in sand sheets. This might be caused by:

- Erosion or deposition
- Humans walking or digging
- Bioturbation (animals burrowing and building nests)
- Wave action or water percolating through the sediments
- Shrinking or expanding of sediments as they dry out or get saturated

Indigenous objects used and made after the arrival of Europeans in Australia are referred to as ethnographic materials, and in the past, archaeologists have used these as reference for studying archaeological finds. Some ancient tools and cultural objects, especially those made from organic materials, have not survived the passage of time. Ethnographic material can provide important insights about resource use over time, however, as retired archaeology Professor Peter Hiscock pointed out, some examples do not have a long history of use and, as such, have limited interpretive value for studying deep history.²

Why is the date of 65,000 years of occupation of Australia controversial?

The oldest date obtained for any site in Australia comes from Madjedbebe in the Northern Territory. To obtain a date for the deepest artefacts recovered from Madjedbebe, archaeologists used thermoluminescence dating of the sand surrounding them, and obtained the date c65,000 years ago. Under normal circumstances, lower layers of the sediment should be older than those above. But a range of factors may interfere with the integrity of the stratigraphy, including erosion, seismic activity, underground de-formation and subsequent human activity at the site. Critics argue that the result is misleading because the soils had very likely been disturbed, with the artefacts having been moved deeper than the level at which they were deposited. The discipline that investigates the integrity of deposits is called taphonomy.

Activity

1. Outline the ways in which two different places provide evidence of people's occupation of Australia in deep history.
2. Divide the list of archaeological techniques in section 1.3 into those involved in recording and those used for analysis. Which techniques do you think could be applied to which types of archaeological evidence also listed in section 1.3?
3. What are the potential challenges in studying ancient lifeways by comparison with 'ethnographic' sources?
4. Describe some of the key challenges in dating artefacts.

¹ P. Veth, 'Breaking through the radiocarbon barrier: Madjedbebe and the new chronology for the Aboriginal occupation of Australia', *Australian Archaeology* 83, no. 3 (2017): 165-167, DOI: 10.1080/03122417.2017.1408543

² P. Hiscock, *Archaeology of Ancient Australia* (Oxford: Routledge, 2007), p. 1-19.

First Australians: Origins and Migration

Key Questions

According to modern scientific evidence, when, why and how did people first migrate to Australia, and how did they spread out across the continent?

How does the available evidence indicate that the first Australians are among the oldest continuing cultures in the world?

Section 2 Glossary

bipedalism: the ability to walk on only two legs.

DNA: deoxyribonucleic acid – the hereditary material in humans and almost all other organisms.

hominin: modern humans, extinct human species and all our immediate ancestors.

molecular clock estimate: using the mutation rate of biomolecules to determine the time when two or more life forms diverged.

paleoanthropologist: scientist who studies human evolution through fossils and archaeological evidence.

2.1 Origins of Homo sapiens and the first Australians

Current fossil evidence shows that humans evolved from apes in Africa, over a period of approximately six million years. Over four million years ago, bipedalism appeared. Paleoanthropologists believe that there were fifteen to twenty species of early humans. Homo erectus lived in Africa between about 1.9 million and 135,000 years ago and is the most likely recent ancestor of modern humans. Homo sapiens, which emerged about 300,000 years ago, had a large, complex brain and the cognitive ability to make and use simple tools. Their capacity for complex language is estimated to have developed in the last 150,000-100,000 years as behaviourally modern humans emerged. Advanced traits, such as symbolic expression, art and culture, appeared during the past 100,000 years.

Scientists agree that Homo erectus was the first hominin to migrate out of Africa to Asia, between 2 million and 1.8 million years ago, and into Europe later, about 1.5-1 million years ago. Homo sapiens first migrated out of Africa by at least 125,000 years ago, and another wave, that left between 80,000 and 50,000 years ago, spread out to occupy the continents. But the migration path of early humans leaving Africa has long been debated. During the 1980s and 1990s, scientists proposed two theories, known as the 'Out of Africa' model and the 'Multi-regional' model.

Table 2.1: A summary of the two main theories for the dispersal of humans

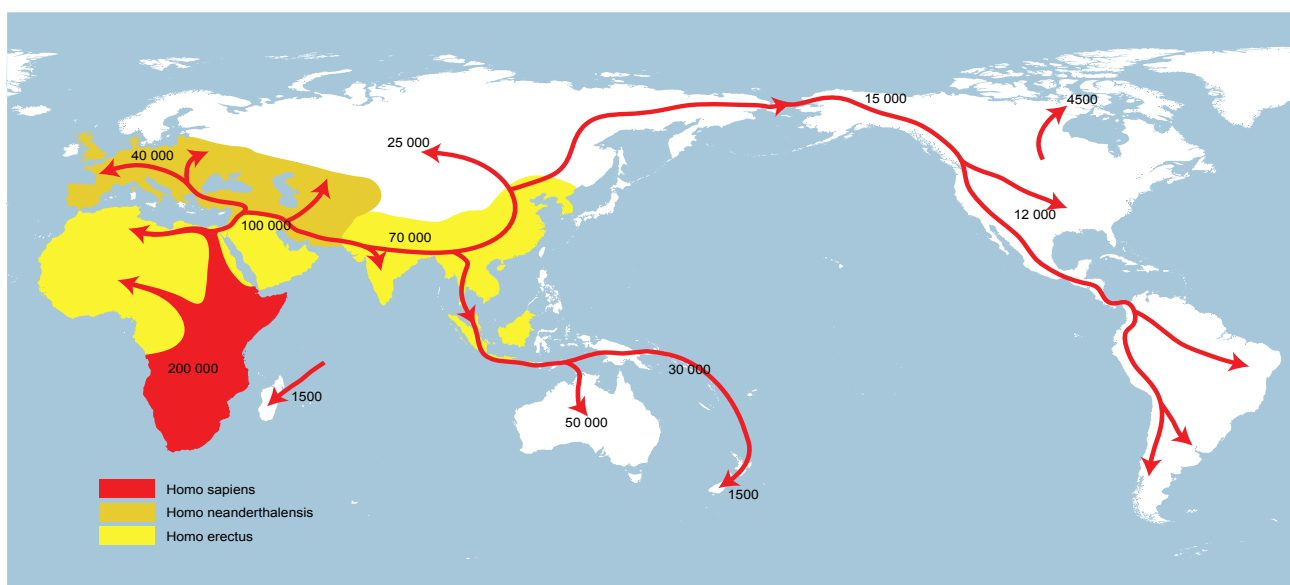
Multi-regional	The multi-regional theory, now generally rejected, suggested that <i>Homo sapiens</i> evolved in numerous continents over time, and intermingling resulted in the single species that we know today. This theory suggested that Australia was colonised by two different genetic lineages of modern humans – one descending from Indonesian <i>Homo erectus</i> and the other from Chinese <i>Homo erectus</i> .
Out of Africa	The Out of Africa model, which is now widely accepted and supported by genetic evidence, proposes that modern humans evolved in Africa before migrating, and that Indigenous Australians descend from a single lineage of humans that travelled through southeast Asia.

Genetic studies of today's populations show that after leaving Africa, anatomically modern humans interbred with Neanderthals in Europe, and with Denisovans and two other archaic hominins in Asia. Stone tools and fossil skeletal remains show that hominins had migrated out of Africa more than a million years ago and were eventually replaced by modern humans. But further debate has arisen about the role that interbreeding had on modern humans. For example:

- The 'Recent African Origin' model argues that modern human traits emerged in Africa, and the interbreeding after migration had little impact.
- The 'Assimilation' model claims that interbreeding outside Africa had great influence in determining modern human traits. These modern humans had reached Asia by 70,000 years ago and the first people to arrive on the Australian continent were their descendants.

It is important to note that some Indigenous knowledge systems reject the 'Out of Africa' theory. Many (though not all) Aboriginal Australians consider that their peoples have always been on the continent and that their 'becoming' and their formation of nations occurred on the Australian continent.

Figure 2.1 The 'Out of Africa' model of the migration of *Homo sapiens* around the world, showing the extent of the now-extinct archaic hominins *Homo erectus* and *Homo neanderthalensis* (Source: Wikimedia Commons / NordNordWest / public domain)



Activity

1. Explain the difference between the 'Multi-regional' and 'Out of Africa' theories about humans' occupation of the globe.
2. What are the two conflicting theories that explain the development of modern human traits?
3. Discuss why some Aboriginal people reject the 'Out of Africa' model.

Further activity

1. Research the debate between the 'Recent African Origin' and 'Assimilation' theories. Make a case for the one that is most convincing to you.

2.2 Arrival on Sahul

What drove the migration to Sahul?

Since the mid-twentieth century, the questions of when, how and why people reached the Australian continent have been central to the work of archaeology and other scientists. The reason humans made the move is still debated, but they may have been influenced by the volcanic eruption of Mount Toba, which destroyed the central northern part of what was Sunda and is now northern Sumatra (in modern day Indonesia). Ice-core evidence confirms an eruption occurred between about 71,000 and 74,000 years ago, and today, it is widely considered to have been the largest volcanic eruption in human history. As the poisonous gas, rock, lava and ash spread, the sky darkened, forests died, animal populations declined, and some became extinct. People also suffered tsunamis and plummeting global temperatures, and it has been argued that these events nearly caused the extinction of modern humans.

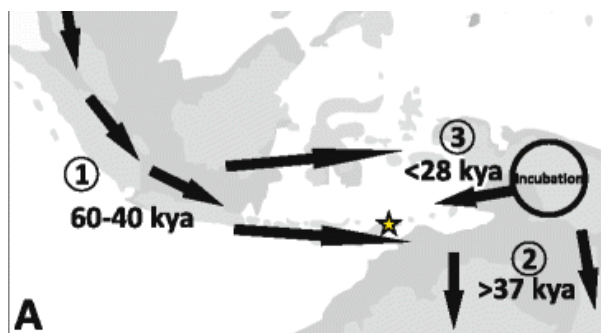
The extreme environmental conditions may have motivated human populations to migrate further south in search of new coastlines where resources could be found. Migration theories are based on the shortest possible routes and the existing land bridges during periods of low sea levels. People might also have travelled when sea levels were higher, the flooding of the peninsula creating more islands and producing new coastlines where fishing was possible and where shellfish could be collected.

The first known human sea crossing

Around 74,000 years ago, when behaviourally modern humans had reached Asia, the land mass now called Australia did not exist. It was a great, southern mega-continent that is now called Sahul. At the time, much of the Earth's water was contained in ice, so sea levels were as much as 150 meters lower than today. An ocean (now called Wallacea) separated Sahul and the land mass scientists call Sunda (now Sumatra and Borneo), but it was narrower than today, possibly about 90 kilometres between Timor and Sahul. That passage of sea contained many small islands (now submerged), from where (it is theorised) people could see the continent of Sahul.¹ Researchers have estimated that it took people about four to seven days to reach the north-west coast of Sahul, by island hopping across the passage. The first places the travellers occupied on the north-west coast are now some of the oldest known occupation sites in Australia, including Madjedbebe, Nauwalabila and Boodie Cave. People also migrated across to the Birds Head of what is now New Guinea, and they occupied the New Guinea Highlands by 50,000 years ago and the Bismarck Archipelago by 42,000 years ago.

These crossings, undertaken by the first Sahul settlers, are the first known long sea voyages in human history – one of the greatest feats of early humans. The voyages, which required complex language, navigational skill, and the technological capacity to build boats, have been called the 'earliest evidence of modern human behaviour'.² No evidence of their vessels has survived, but it has been suggested they were probably made from bamboo, which floats well and is readily available in Asia.

Figure 2.2 Migration routes from Sunda to northern and southern Sahul, showing the islands of Wallacea, which the first Australians used to make the crossing. Source: Wikimedia Commons / Was a bee (user) / CC. BY. 2.0



1 K. Norman, J. Inglis, C. Clarkson, J.I. Faith, J. Shulmeister and D. Harris, 'An early colonisation pathway into northwest Australia, 70-60,000 years ago', *Quaternary Science Reviews* 180 (2018): p. 229-239.

2 W. Noble and I. Davidson, 'Why the First Colonisation of the Australian Region is the Earliest Evidence of Modern Human Behaviour', *Archaeology in Oceania* 27, no. 3 (1992): p. 135-142.

The evidence for the occupation and its date

Investigations into the earliest human occupation of the Australian continent rely on the dating of archaeological evidence such as:

- sediments (thermoluminescence)
- rock art and ochre (C14 dating)
- charcoal (indicating campfires and controlled burning) (C14 dating)
- shell middens (C14 dating)
- human and animal skeletal remains (including teeth) (C14, ESR and Uranium series)
- DNA

Various claims and theories have been made for the timing of human arrival in Australia at around 80,000 to 100,000 years ago or more. Considering that current known theories place *Homo sapiens* leaving Africa at a more recent date, these claims for early occupation raised questions and have yet to be answered. One such early theory was based on a sharp increase in charcoal deposits in ancient sediments from Lake George near Canberra, dating from 130,000 years ago, which were initially thought to represent the presence of humans and controlled burning of the landscape.¹ But the charcoal was more likely to have been created by a naturally occurring bushfire (fires have always occurred naturally on this dry continent), rather than by humans.

50,000 years ago: the earliest evidence of occupation of Australia

The date of around 50,000 years ago is now the most widely accepted date for the first human arrivals in Australia, though one study of artefacts from Madjedbebe proposed a controversial date of up to 65,000 years ago. Some of the first Australians to occupy the Madjedbebe rock shelter (previously called Malakunanja II) in Arnhem Land left behind artefacts there, and these were found by archaeologists at the lowest layers of the excavations. Archaeologist Professor Rhys Jones, who applied the thermoluminescence method to date sediments associated with the artefacts, reported in 1990 that they were 50,000 to 60,000 years old. In 2012 archaeologists returned to the site and identified stone tools that Aboriginal people had used for food processing and ochre, which they might have used to create rock art or to decorate their bodies. Optically stimulated luminescence (OSL) dating of sediments associated with the finds confirmed the dating by Jones, producing a date of 50,000 to 65,000 years ago.² However, the date of 65,000 years old is controversial. The proposed date range is much earlier than the earliest dates of evidence known from the islands of Wallacea to the northwest. Other sites will need to be discovered to provide further credibility to 2012 findings from Madjedbebe.

In 2020 Jim Allen and Jim O'Connell made a compelling case for the age of the site to be c.50,000 years old.³ They argued that the dating of the sediments near the artefacts did not account for the taphonomy where artefacts could have moved down into older sand. Many other sites provide good evidence for 50,000 years ago as the earliest occupation. Their study showed that the available genetic evidence and molecular clock estimates indicate that the first Australians most likely arrived around 47,000 to 51,000 years ago.

Genetic evidence

Researchers have long thought that the first peoples colonised Sahul by travelling on the simplest watercraft, taking the shortest route, and with the smallest viable group. But genomic evidence now suggests the colonisation was more complex. Their migration to Sahul is more likely to have occurred in waves involving the movement of much larger groups (requiring considerable planning and the construction of vessels), which some researchers argued occurred within a short period of less than

1 G. Singh and E.A. Geissler, 'Late Cainozoic history of vegetation, fire, lake levels and climate, at Lake George, New South Wales, Australia', *Philosophical Transactions of the Royal Society of London B* 311 (1985): 379-447.

2 C. Clarkson, Z. Jacobs, B. Marwick, R. Fullagar, L. Wallis, R.G. Roberts, E. Hayes, K. Lowe and X. Carah, 'Human occupation of northern Australia by 65,000 years ago', *Nature* 547, no. 7663 (2017): 306-310.

3 J. Allen and J.F. O'Connell, 'A different paradigm for the initial colonisation of Sahul', *Archaeology in Oceania* 55 (2020): 1-14.

one millennium. Rather than the first peoples arriving by accident, as if one small group was blown off-course, it appears that they deliberately intended to cross over to Sahul.

Genetic evidence contained in the DNA of living Aboriginal Australians suggests that the ancestors of the first Australians may have already been living in Asia between 62,000 and 75,000 years ago, when Mount Toba erupted. While crossing Sunda (South-East Asia), modern humans appear to have interbred with at least three species of archaic hominins that had already been living there for over a million years – Denisovans and two other now extinct hominins. Just as in Europe, where contemporary populations carry about three per cent Neanderthal DNA, the first peoples of Australia and New Guinea carry DNA from Wallacea's archaic hominins.⁴

Challenges for locating and dating the first occupation sites

The rich traditional stories of today's Aboriginal Australians, passed between the generations, tell the story of these migrations, but the archaeological evidence is inaccessible because of environmental changes. Rising sea levels at the end of the Pleistocene flooded about 2 million kilometres of land that had previously been accessible, meaning that archaeological evidence of the earliest occupation sites, and even those until about 7000 years ago, is now underwater. The maritime archaeological sites may hold the evidence that confirms when people first arrived in this region and hold the potential to significantly transform our understanding of how and when people arrived on Sahul. Investigations have begun to survey and study these sites.⁵ However, it is likely that archaeologists may never be able to establish the exact date or location of the first arrivals. The evidence from known sites documents the dispersal of the first people inland, and in doing so, establishes a minimum age for colonisation of Sahul. For now, the date of c.50,000 years ago is the most widely accepted date for the colonisation of Sahul. However, current interpretations of the available evidence may be revised in future when new archaeological discoveries are made.

Dreaming stories of rising sea levels

Some ancient Aboriginal dreaming stories that survive today, both myths and plain narrative, reflect generations-old traditional knowledge of events in deep history that are now known from scientific evidence. For example, dreaming stories that survive today from twenty-one places around Australia's coastline describe a time in deep history when the sea levels were much lower than the present, and how the seas began to rise, covering and changing the land and forcing people to adapt their ways of life.⁶ Science indicates that the present sea levels were created about 7000 years ago, so these stories must therefore predate that period. The stories corroborate the contemporary scientific evidence and their endurance over thousands of years indicates the importance of the transfer of knowledge between generations for Aboriginal people.

4 J.C. Teixeira and A. Cooper. 'Using hominin introgression to trace modern human dispersals', *Proceedings of the National Academy of Sciences* 116, no. 31 (2019): 15327-15332.

5 See for example J. Benjamin et al. 'Aboriginal artefacts on the continental shelf reveal ancient drowned cultural landscapes in northwest Australia', *PLoS ONE* 15, no. 7 (2020).

6 P. D. Nunn and N. J. Reid, 'Aboriginal Memories of Inundation of the Australian Coast Dating from More than 7,000 Years Ago', *Australian Geographer*, published online 7 September, 2015; DOI: 10.1080/00049182.2015.1077539.

Activity

1. What were some possible motivations for migration to Sahul?
2. How does recent genetic evidence suggest that the first occupation of Sahul was deliberate rather than accidental?
3. Study Figures 1.1, 2.1 and 2.2. Describe the environment and the climate that the first Sahul arrivals experienced when crossing to the continent. How could they have achieved the crossing? Which natural resources would have been available for them to use?
4. How can archaeologists investigate flooded archaeological sites? Why are they so important?
5. Why is the Madjedbebe rock shelter so important to the study of Australia's deep history?
6. Explain why the Madjedbebe date of 65,000 years ago is considered problematic and the date of 50,000 years ago is more widely accepted.
7. Explain why archaeologists have not found evidence of the types of boats the first arrivals used to migrate to Sahul.

Further activity

1. Conduct some research about the Mount Toba eruption and the general impacts of volcanic eruptions. Explain what specific factors might have caused humans to move out of Sunda across Wallacea to Sahul.

2.3 The continuity of ancient Australian culture

One of the questions scientists have long wanted to answer is how modern Aboriginal people and the first Australians are linked. Early research on the subject, published in 2001, examined what was argued to be DNA sequences obtained from the remains of ancient Australians.¹ This study found great genetic differences between the ancient DNA (aDNA) and that of living Aboriginal Australians. It concluded that people had migrated to the Australian continent in multiple stages, and that Aboriginal Australians alive today are not descendants of the first Australians. This resulted in heated debate.

In more recent years, with advances in methods for analysing DNA (both ancient and modern), studies have demonstrated that the first people to set foot on the continent about 50,000 years ago are the ancestors of Aboriginal Australians alive today. Aboriginal Australians are therefore descendants of the first anatomically modern humans to leave Africa. This makes the culture of Australia's Aboriginal people among the oldest continuous living cultures in the world, and certainly the oldest outside Africa.

In 2011 DNA taken from a century-old lock of hair donated by an Aboriginal man to an anthropologist confirmed that today's Indigenous Australians are descendants of the people who left Africa, possibly between 62,000 and 75,000 years ago.² This was at least 24,000 years before the wave of migration that populated Europe and Asia (25,000-38,000 years ago). A more recent study, using DNA from hair and saliva samples from living indigenous people from Australia and Papua New Guinea, confirmed that their ancestors had split from the first modern human populations that left Africa about 51,000-72,000 years ago.³ About 25-40,000 years ago the Australian and Papuan populations broke into subgroups, resulting in a diverse gene pool.

This longevity of people on the Australian continent means that the first Australians achieved some important milestones in human history. These include the first known planned sea crossings, the first known processing of seeds for food and pigments for making art, some of the oldest edge-ground and hafted axes, some of the oldest known rock art (petroglyphs or carvings), some of the oldest beads in the world, and importantly, the oldest known human burial and cremations.

Activity

1. What scientific evidence is there that living Aboriginal Australians are descended from the first people to arrive on the Australian continent?

1 G. Adcock, E. Dennis, S. Easton and A. Thorne, 'Mitochondrial DNA sequences in ancient Australians: Implications for modern human origins', *Proceedings of the National Academy of Sciences of the United States of America* (PNAS) 98, no. 2 (2001): 537-542.

2 M. Rasmussen et al. 'An Aboriginal Australian Genome Reveals Separate Human Dispersals into Asia', *Science* 334, no. 6052 (2011): 94-98.

3 A.S. Malaspina, M. Westaway, C. Muller, et al. 'A genomic history of Aboriginal Australia', *Nature* 538 (2016): 207-214.

2.4 The world's oldest known modern human remains

The Willandra Lakes region of south-western NSW is the most extensive region of ancient burials known in Australia, where the remains of 130 people who lived in the Pleistocene have been discovered. It has been dry for 18,000 years, but it was once an enormous freshwater lake system, with an abundant source of fish, shellfish and marsupials supporting the numerous people who lived around its shores. The first peoples settled there from at least 47,000 years ago, and the sediments and charcoals associated with the flaked stone artefacts they made and left behind there have been dated (using radiocarbon, thermoluminescence and optically stimulated thermoluminescence dating). The different densities of stone tools and other artefacts left behind there suggest that their occupation peaked about 45,000-43,000 years ago.

The oldest human remains yet discovered in Australia come from Lake Mungo. About 40,000 years ago, a young woman who lived in the region died, and her family cremated her body. Now known as Mungo Lady (LM1), her remains were found in 1968 by Professor Jim Bowler. Analysis suggested she was 18 years old and that she died about 26,000 years ago. Further investigations revised the date to c.40,000 years. Mungo Lady's remains are the oldest known accurately dated burial in Australia and the oldest known cremation in the world. The other skeleton found, now known as Mungo Man (LM3), was discovered in 1974, and was buried on the edge of the lake. He was around 50 years old when he died and his family had covered his body in red ochre and laid him on his back, with his hands clasped and knees bent. The use of ochre in Mungo Man's burial, the source of which was over 200 kilometres from the site, indicate that people travelled long-distances or traded to obtain it. The evidence seems to suggest that Mungo Man was a high status and well-respected person, and that his family and friends experienced grief at his death. They appear to have made great effort and care with his burial, and may have even considered his afterlife.

The remains of Mungo Man were estimated to be between 28,000 to 32,000 years old, and further investigations returned a date of c.40,000 years, which is now most widely accepted. In 2001 a group of scientists claimed that DNA extracted from Mungo Man proved that his genes were different to modern humans, suggesting that not all *Homo sapiens* have the same recent ancestor as proposed by the 'Out of Africa' theory.¹ But the scientists' claims were controversial and could not be replicated in a later study in 2016, so they were subsequently dismissed. That study now demonstrates how research findings about deep time are often being revised or reinterpreted.

Figure 2.3 Lake Mungo, south-western NSW, 2013. Source: Shutterstock / Michael Leslie



¹ Adcock et al. (2001)

Source 2.1

Stan Grant, journalist (Wiradjuri man) *Talking to My Country* (Sydney: Harper Collins, 2017), 11.

On 26 February 1974 a rainstorm lashed the lake. It was just enough to loosen the hard packed soil. Jim Bowler, a young geologist, spotted a skull poking just above the surface. He cleared the loose sand and what he found altered our entire view of the continent. Lying there was an intact skeleton, buried in this ground for 40,000 years. It wasn't his first discovery. Years earlier Bowler had uncovered the remains of a female. Together they are known as Mungo Man and Woman, named after the lake where they lived.

These findings doubled the known length of time my people had lived in this land.

Source 2.2

Professor Ann McGrath (Research Centre for Deep History, ANU) *How to Write History that People Want to Read* (Sydney: UNSW Press, 2009), 1.

When Mutti-Mutti elder Mary Pappin visits 'country', the dried up salt lake called Lake Mungo in western New South Wales, she is walking over the remains of her ancestors and the remnants they left of their everyday activities. She talks about one of these people, Lady Mungo, as if she were an old aunty who died just yesterday. Lady Mungo lived here when the Neanderthals were hunting game in Europe. Walking this country, the historian can talk to Mary Pappin, and see the relics of the campfires that cooked freshwater mussels before the last Ice Age. History, modern and ancient, lies all around.

The remains of other individuals who lived at various periods during Australia's deep history have also been discovered from locations across the continent. For example:

- In 1884 a skull was found at Talgai, on the Darling Downs, Queensland, dating between 9000 and 11,000 years old.
- In 1925 a skull was found at Cohuna, north-west Kow Swamp, Victoria, showing characteristics of deliberate cranial deformation, and in 1940, a 12,000-year-old skull was found at Keilor, in Melbourne, Victoria.

The remains of forty individuals excavated in 1968-72 at Kow Swamp in Northern Victoria, one of the largest burial sites of its kind in the world, have been dated to 9500-14,000 years old. Compared with Aboriginal people today, the skeletons tended to be heavier, their jaws were more robust, and they had larger areas of muscle attachment. The remains of 126 people excavated from a sand ridge at Coobool Crossing, New South Wales, have been dated to between 13,000 and 9000 years old. They are important because their size is larger than the bones of other individuals who lived about 6000 years ago, and their skulls demonstrate artificial cranial deformation.² This was practised intentionally by several ancient cultures worldwide, and is now thought to have indicated high social status or group affiliation. A deformed skull seems to have been considered more aesthetically pleasing and was achieved by distorting the normal growth of an infant's head by applying force through binding.

² P. Brown, *Coobool Creek: a morphological and metrical analysis of the crania, mandibles and dentitions of a prehistoric Australian human population*, Terra Australis 13, Department of Prehistory, Australian National University, 1989, <https://openresearch-repository.anu.edu.au/handle/1885/127428>

Activity

1. Describe in detail how scientific techniques were used to determine when Mungo Man and Mungo Lady lived.
2. Read Sources 2.1 and 2.2 and explain the main differences in the approaches and perspectives about the remains of Mungo Lady.
3. What problems and challenges might arise from uncovering human remains like those of Mungo Man and Mungo Lady?
4. With reference to Source 2.1, explain the significance of the discoveries of Mungo Man and Mungo Lady.

First Australians' Relationship with the Continent

Key Questions

How did people spread across the Australian continent and what impacts did they have on the landscape?

How did the first Australians develop their technology, cultural practices and social organisation in response to environmental processes and change over time?

How did technology, cultural practices and social organisation develop in different regions and contribute to daily life, and land and water management? How does the evidence demonstrate continuity and change over time?

What is the evidence for the subsistence of ancient Australians and how are interpretations of the evidence debated today?

Section 3 Glossary

adze: similar to an axe, they are usually hafted with the cutting edge parallel to the handle.

arid zone: desert or area receiving less than 250mm annual average precipitation.

awl: small, pointed tool, usually made from bone; used for piercing holes, such as in animal hides for making clothing.

backed blade: small flaked stone tool, shaped like a mandarin segment, sharp on one side; used as barbs for spears or knives.

chert: hard, fine grained sedimentary rock used by people in deep history for making flaked stone tools and for producing sparks for starting fires.

flaked stone tools: made by hitting a piece of stone, called a 'core', with a hammerstone, usually a pebble.

foraging: searching for and collecting wild food.

ground-edge axe: stone chopping tool with cutting edges formed by grinding, usually hafted with cutting edge perpendicular to the handle.

hunter-gatherer: living a lifestyle in which all or most food is obtained by foraging and hunting.

kinship: relationship between members of the same family.

knapping: the action of creating flaked stone tools.

megafauna: large or giant animals that roamed the earth during the Pleistocene, 2.5 million to 11,700 years ago, including now-extinct species in Australia (e.g. Diprotodon), Europe and North America (e.g. woolly mammoths, sabre-toothed tigers, cave lions, cave bears), and extant species in Africa (e.g. elephants, giraffes, rhinoceroses).

ochre: a natural clay earth pigment mixture of ferric oxide and varying amounts of clay and sand.

Panaramitee: picked engravings depicting animal tracks and radiating designs, circles, spots, crescents and spirals.

pebble chopper: the oldest type of stone tool, a rounded pebble knapped to create an irregular cutting edge.

petroglyph: an image created by removing part of a rock surface by incising, picking, carving or abrading.

sclerophyll forest: plants with hard, short, spiky leaves such as eucalypts, wattles and banksias and divided into wet and dry.

subsistence: maintaining or supporting oneself by providing sustenance.

tensile strength: the stress that a material such as stone can withstand until it breaks.

Tjukurrpa (the Dreaming): the creation period when ancestral beings created the world and laid down their laws; it is the past, but is also timeless.

waisted blade: stone tool made with a narrowing or a groove cut around the centre to allow for hafting onto a wooden handle.

3.1 Migration and settlement patterns

Arriving on the continental shelves of the northwest coast of Sahul (which are now submerged), the first peoples settled the northern part of the continent. At sites such as Madjedbebe and Nauwalabila in Arnhem Land, they left behind their used stone tools, bones from meals, and charcoal from their campfires. After those first settlements, where did they go next? There are many theories about how people first dispersed across the Australian continent. Evidence is scarce because few known archaeological sites date from these earliest movements. Sea levels were lower when people arrived on the continent and any evidence such as the first campsites or tool manufacturing sites were covered with water when the melting ice caps flooded the continental shelf at the end of the Pleistocene.

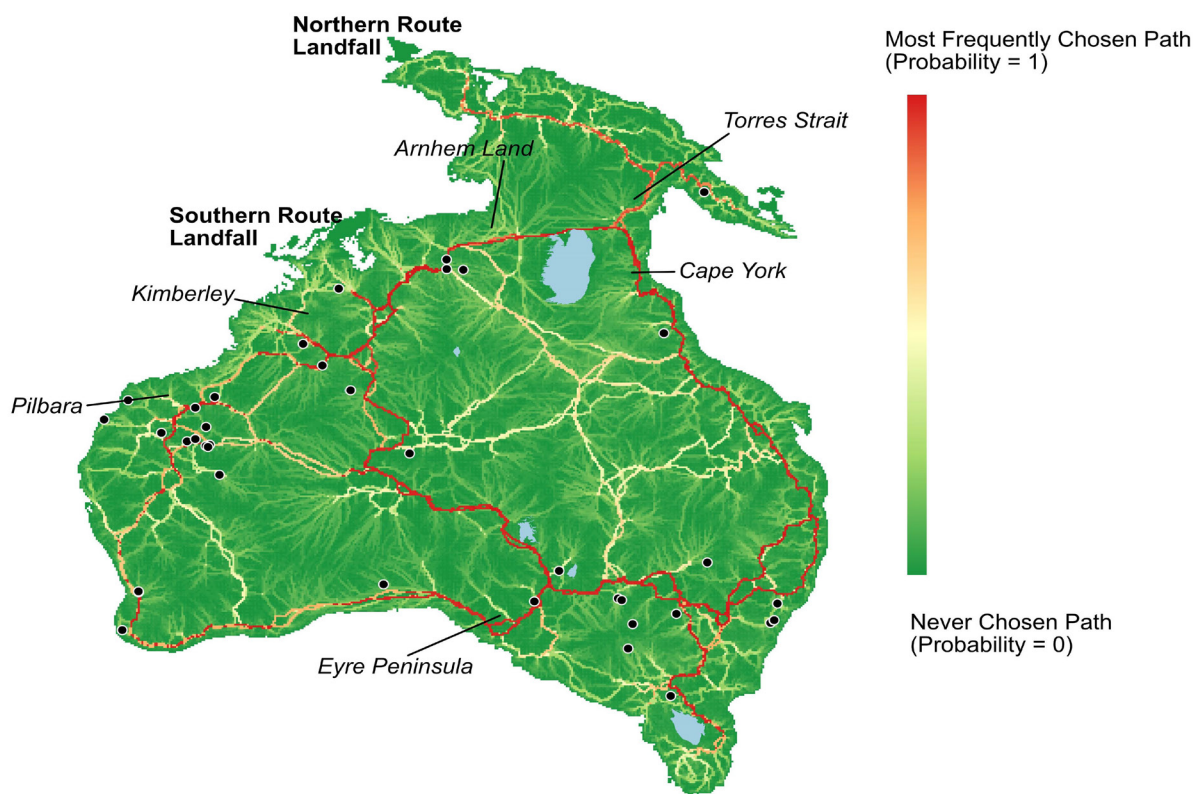
However, genetic evidence indicates that there was a single, rapid migration along the east and west coasts of the continent, with people reaching southern Australia by 49,000 to 45,000 years ago. One study has found evidence of the continuous presence of distinct populations in different geographical areas, dating back to about 50,000 years ago, concurring with the deep cultural connections Aboriginal people hold today with Country.¹

Another study, published in 2021, to map the movement of the first Australians, speculated that people navigated by moving towards prominent land features such as mountain ranges visible in the relative flatness of the Australian landscape.² By creating a digital elevation model of the Sahul land mass at c.50,000 years ago, the researchers were able to understand what early travellers could see and combined this with other considerations such as the estimated capacity of people travelling on foot, distribution of freshwater sources and perceived difficulty of terrain. Their probability modelling resulted in a map of the optimal 'superhighways' taken by the first explorers, which the researchers argued to be the likely routes used by subsequent generations. Several of the paths they identified are well recognised in historical times as Aboriginal trade routes, and trade and stock routes used by Europeans, based on apparently already-established Aboriginal routes.

¹ R. Tobler, A. Rohrlach, J. Soubrier, et al. 'Aboriginal mitogenomes reveal 50,000 years of regionalism in Australia', *Nature* 544, no. 7649 (2017): 180–184.

² S.A. Crabtree, D.A. White, C.J.A. Bradshaw, et al. 'Landscape rules predict optimal superhighways for the first peopling of Sahul', *Nature Human Behaviour* 5 (2021): 1303–1313.

Figure 3.1 Map of Sahul showing migration routes across the continent. Source: Stefani Crabtree, reproduced with permission. It should be noted that the data from the New Guinea north coast was excluded in this study, and the modelled routes reflect this. In fact the oldest site (50,000 years) in New Guinea is in the Ivane Valley in the east. Access to this site is most likely to be from the north coast, where other sites older than 40,000 years are found. Source: Professor Stefani Crabtree.



Then, spreading across the plains on the eastern and western edges of the continent (now underwater), they occupied other regions in southeastern Australia, including the ancient Willandra Lakes system by about 51,000 years ago. By about 50,000 years ago people had entered the desert, and left evidence at sites known today, including Paraku (Lake Gregory) on the northern margin of the Great Sandy Desert. A stone core tool that someone in deep history flaked from a river cobble there has been dated to 45,000 to 50,000 years old. Its date confirms that people lived in the desert before many other regions of the continent, and suggests that people colonised northern Australia well before the oldest known sites in that region.

By 47,000 years ago, people were living in the far corners of the continent, including Devil's Lair in southwestern Australia. People had begun to occupy the arid desert regions by 47,000 years ago, confirmed by artefacts and ochre left behind at Puritjarra, in the Cleland Hills, Central Australia. By about 44,000 years ago people occupied glacial Tasmania, walking across the land bridge that existed due to the low sea levels. They then moved on to first occupy the hinterland and along the rivers, then the foothills and mountains of central and southwest Tasmania. Sub-antarctic Tasmania was then one of the coldest known living environments on earth. The mountains were capped with ice and glaciers extended from the upper Derwent Valley (in the south) to the Forth and Mersey Valleys (in the north). People lived in caves and were primarily hunters of wallabies, which provided the protein, fat and thick fur for making into cloaks needed for the bitterly cold climate. Hundreds of thousands of bones were found among tens of thousands of stone artefacts at Parmerparr Meethaner (occupied 44,200 years ago) and many other caves across southwestern Tasmania, indicating how people moved according to the seasons and availability of the animals they hunted. These Tasmanian populations became isolated from the mainland people with the flooding of Bass Strait about 14,000 years ago.

Activity

1. Create a flowchart that outlines the story of the First Australians' occupation of Sahul.
2. What factors do you think influenced the first Australians to spread out across the continent?
3. What evidence/factors did researchers use to determine the most likely migration routes people took across the continent?
4. How did the first Australians colonise the southernmost part of Sahul (now Tasmania) and why did they eventually become isolated from the mainland?

3.2 Effects of colonisation and the megafauna

When the first Australians arrived on the continent they were confronted by a suite of plants and animals they had not previously known. The new environments and landscapes they encountered influenced their way of life, and as they quickly adapted to these new habitats, their cultural practices in some places also subtly shaped their environment and ecosystems. One of the earliest land management tools they used was controlled fire. Often referred to as ‘mosaic burning’, this ancient tradition made the landscape safer for people, reducing the incidence of broad scale wildfires, improving access, assisting with communication, and facilitating regrowth of certain plant foods and grasses that would attract the animals they wished to hunt. In other places, burning of the overstory exposed animal tracks, revealed burrows and flushed out prey. Controlled burning was regular and commonly used across the continent, and its importance is explored in more detail in Part 4 of this resource.

Many species of marsupial fauna and birds were new to these colonists, such as the emu and the kangaroo, and there were numerous species of (now extinct) giant animals, which scientists call megafauna. The megafauna included:

- The huge slow-moving wombat-like *Diprotodon optatum*, which weighed about 3 tonnes.
- A giant kangaroo *Procoptodon goliah*, which could grow to over three metres tall.
- The marsupial lion *Thylacoleo carnifex*; about the size of a modern lioness with the most specialised teeth of any known carnivore.
- A giant flightless bird *Genyornis newtoni*; looked a bit like an overgrown goose and weighed approximately 275kg.
- Giant crocodiles, snakes and lizards such as the enormous goanna *Varanus priscus*, which was comparable in size to a Komodo Dragon, and possibly venomous.

Between 50,000 and 40,000 years ago, about fifty megafauna species became extinct across the continent; an event sometimes referred to as the ‘extinction window’. It remains unclear how many megafauna species were present when people arrived on Sahul, but the evidence suggests that there were few.¹ Only one site on the Australian continent (and one site in New Guinea) demonstrates that humans co-existed with them.

Two theories to explain their demise have been debated for decades. Some scholars have argued that people hunted them into extinction, and while this remains possible, the theory is still unproven. Substantial evidence now points to the loss of numerous megafauna species even before people arrived on the continent, due to the increasingly arid conditions, with the megafauna being unable to reproduce fast enough as their natural habitats gradually transformed.² These two theories are summarised in Table 3.1:

Table 3.1: The two theories attempting to explain the extinction of Australia’s megafauna

Sudden extinction theory	Many of the Sahul megafauna became extinct in a brief period, caused by humans spreading out across the continent, modifying the animals’ habitats and hunting them into extinction.
Slow demise theory	The megafauna began to become extinct before humans arrived on the Sahul continent, and continued to disappear after their arrival, but this was most likely due to the ongoing climatic changes.

1 J. Field and S. Wroe, ‘Aridity, faunal adaptations and Australian late Pleistocene extinctions’, *World Archaeology* 44, no. 1 (2012), 56-74.

2 See for example, S. Wroe, J. Field, M. Archer and S. Mooney, ‘Climate change frames debate over the extinction of megafauna in Sahul (Pleistocene Australia-New Guinea)’, *Proceedings of the National Academy of Sciences of the United States of America* 110 (2013):8777-81, <http://dx.doi.org/10.1073/pnas.1302698110>; L. DeSantis, J. Field, S. Wroe and J. Dodson, ‘Dietary responses of Sahul (Pleistocene Australia-New Guinea) megafauna to climate and environmental change’, *Paleobiology* 43, no. 2 (2017): 1-15.

Figure 3.2 An artist's impression of the *Diprotodon optatum*, a giant marsupial from the Pleistocene era (2008). Source: Wikimedia Commons / Dmitry Bogdanov / CC-BY-3.0



The most important evidence for megafauna in Australia comes from an ephemeral lake or waterhole called Cuddie Springs on the riverine plains in northwestern NSW. Artefacts and bones of (extinct) megafauna and modern species (extant) have been found mixed together. Megafauna remains have also been found at other sites though none were found alongside stone tools. The bones of 10,000 animals that had been dismembered and broken (but no skulls) were uncovered at Lancefield Swamp in Victoria. A small proportion have what were first thought to be cut marks, but these have since been identified as tooth marks from the marsupial lion, *Thylacoleo carnifex*. Two stone artefacts, including a 21-centimetre-long stone blade, were found in a channel underlying the bones, but there is currently no evidence of human interaction with the animal species identified here. While tied to an ever-diminishing water source, some animals were preyed on by *Thylacoleo carnifex*. Once thought to date from as recently as 26,000 years ago, the ages of these remains are now thought to be greater than 30,000 years old.

Megafauna at Cuddie Springs, NSW

Around 30,000-40,000 years ago Aboriginal people lived around a lake in the region now known as Cuddie Springs, southeast of Brewarrina in central-northern NSW. Megafauna and other animals came to the lake to drink. Some animals died there and as the waterhole dried up, their bones became embedded in the sediments, alongside flaked stone tools used by the people who also frequented the lake.

Cuddie Springs is the only known site in Australia where a well-stratified archaeological and faunal record demonstrates the coexistence of humans with megafauna. In 1876 a deep well was dug there, revealing the fossilised megafauna bones. The first archaeological excavation was conducted in 1933 by Dr Charles Anderson and Mr Harold Fletcher of the Australian Museum. Between 1991 and 2009, more extensive excavations and analysis were carried out by Dr Judith Field and her team from the University of Sydney. Based on the megafauna bones (some with cut marks) and stone artefacts found together, Field's work has shown that megafauna and people lived there concurrently for up to 10,000 years.³

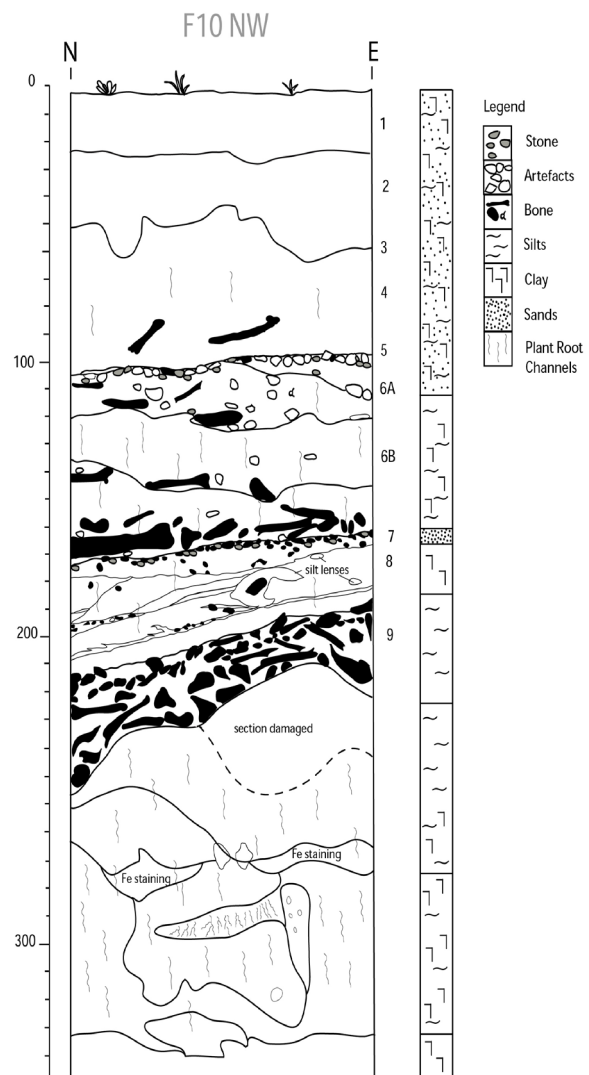
³ J. Field and J. Dodson, 'Late Pleistocene Megafauna and Archaeology from Cuddie Springs, South-eastern Australia', *Proceedings of the Prehistoric Society* 65 (2014): 275-301; J. Field and R. Fullagar, 'A large area archaeological excavation at Cuddie Springs', *Antiquity* 75, no. 290, (2015): 696-702.

Despite ongoing debates over the dating and the integrity of the evidence, it is clear that humans lived alongside these animals for some thousands of years, but it is not currently known if people actively hunted megafauna. However, we do know that people prepared their 'toolkits' to minimise risk – if the first Australians knew that certain animals were common, then they would have made sure they had the tools to catch them. Furthermore, animals were more likely to be butchered where they were caught, with only the usable parts brought back to camp. But sometimes, animals would have been consumed at 'dinnertime' camps and never brought back to the group's main campsite.

Human and megafauna coexistence on the continent was long enough for the animals to become part of cultural mythology and, in some places, Aboriginal people depicted them in their art. Of the 6000 rock art sites known today in Arnhem Land Plateau in northern Australia, which include some of the oldest paintings in the world, 126 sites display depictions and records of extinct species, including the Thylacine. These sites also depict mythological creation stories. A well-known example is of the giant snake, known in the north as the Rainbow Serpent – the story of a large, dangerous, waterhole- and cave-dwelling snake, which is common to desert populations across the continent. Numerous other megafauna became mythologised too, including the giant kangaroos and giant flightless birds.

Megafauna existed on the Sahul continent for millions of years and a significant number went extinct before people arrived. Scientists are still debating the causes of the extinctions, but it is now broadly accepted that the drier and cooler climate, resulting in desertification, and climatic variability during the late Pleistocene were contributing factors in their decline. Some palaeontologists argue that human activities, such as controlled burning of habitats and hunting, may have been the cause, but a fossil study of at least thirteen species of megafauna that lived in what is now tropical northern Queensland until about 40,000 years ago found that that extreme climate change, resulting in increased wildfires, reduction in grasslands and water sources, was a significant cause of their extinction. Despite humans having lived alongside megafauna for thousands of years in this region, the study found no evidence that humans were directly involved in the extinctions of these species and therefore cannot be solely blamed for their demise. The megafauna extinctions may not be an archaeological problem at all, but an environmental one.

Figure 3.3 Diagram showing the stratigraphy of Cuddie Springs excavations, showing the association of megafauna bones and stone tools. Source: Dr Judith Field.



Activity

1. Describe Australia's megafauna.
2. Explain the difference between the 'sudden extinction' and 'slow demise' theories of the disappearance of Australian megafauna.
3. Review the evidence from the case study of Cuddie Springs and write two paragraphs about how the archaeological evidence suggests what happened there in deep history.

3.3 Adapting to shifting environmental conditions

By 30,000 years ago people were living in all types of environments and archaeological evidence of their occupation now survives across desert, mountainous, coastal, savannah and forested habitats. Archaeological evidence indicates that they adapted to changes in their environment as the climate became colder during the last glacial maximum, and then considerably warmer in the Holocene. By the late Pleistocene, almost every region of Sahul had been occupied. In the extreme conditions of the last glacial maximum, and the Pleistocene more generally, people lived in bitterly cold conditions in the mountainous regions of the south (Tasmania) and north (now New Guinea), specialising in the hunting and gathering of the available food sources in those regions, and even travelling long distances or trading for materials for making stone tools necessary for processing their food and making fur clothing to provide warmth. In the arid regions, people equally adapted to the conditions, sheltered in caves when the weather demanded. In comparison to those in the more fertile areas, desert populations were small and more nomadic, by necessity, and left fewer traces of their lives. In Tasmania, caves were used as permanent camps; in Arnhem Land they were used seasonally. But in the deserts, caves were mainly used for short term protection from the elements. For this reason, few artefacts are usually found in them.

Population sizes fluctuated in response to environmental change. Some people's physical characteristics changed as they adapted to the climatic changes and as populations mixed, and their social and economic systems were adjusted accordingly. The ease with which they adapted to these varied environments is considered remarkable and one of the reasons for their success across the continent. Just as people had successfully adapted as the ice age progressed into the coldest phase of the last glacial maximum, between about 18,000 and 15,000 years ago, people found ways to adapt as the climate warmed, sea levels rose and the vegetation and landscape changed again.

Table 3.2: Environmental differences between the last glacial maximum of the Pleistocene epoch and the Holocene epoch

Last glacial maximum (during the Pleistocene) c.26,000-c.20,000 years ago	Earth's climate cooled and dried, sea levels dropped, continents were characterised by extreme drought, sparse vegetation, watercourses dried up, minimal rainfall, windy, frequent dust storms, highlands and mountains covered in snow and ice, megafauna roamed the continent.
Holocene From c.11,650 years ago	Earth's climate had warmed to current temperatures, glaciers melted, sea levels rose in stops and starts, 25 per cent of the land available to the first peoples on Sahul became flooded by sea, vegetation expanded, megafauna had become extinct on Sahul.

Last glacial maximum challenges

With the cooling and drying of the earth during the last glacial maximum, about 30,000 years ago, sea levels dropped further, and the Australian landmass expanded and was characterised by extreme drought. Deserts expanded, vegetation became sparse, rivers and lakes shrank or dried up, rainfall was minimal, dust storms and winds were frequent, and highlands and mountains were covered in snow and ice. The conditions would have tested people to their limits, but people endured, adapted and survived. As archaeologist Scott Cane has noted, 'Their survival is an extraordinary testament to human resilience and adaptability'.¹

People developed strategies for living in these extreme environments. In many areas, like the Great Sandy Desert, people were both highly nomadic, moving between food and water sources, and highly settled around those water sources at other times of the year. In contrast, the people of the Great Victoria Desert, where water was very scarce, became essentially sedentary, with a few water holes supporting large populations. Contemporary Aboriginal knowledge and narratives about waterholes suggest that the people of the last glacial maximum probably had similar intricate knowledge of the water sources that would sustain their communities and determine their survival.

¹ S. Cane, *First Footprints: The epic story of the First Australians* (Crows Nest, NSW: Allen & Unwin, 2013), 160.

At least fifty archaeological sites dating from the period 30,000 to 18,000 years ago demonstrate that people did not abandon the arid zones of the continent during this extremely cold period. However, there is evidence that people adjusted their lifestyles to adapt. At Puritjarra rock shelter in central Australia, archaeological evidence suggests that from about 24,000 years ago, as the glacial conditions stressed local populations, use of the cave increased, and instead of travelling long distances or trading to obtain ochre and better-quality stone for making tools, they made social adjustments, remaining close to the known water sources and using local materials. To survive the challenging environmental conditions, some people took fewer risks and reduced their social networks. But many others were able to continue living normal lives in the extreme climate during the last glacial maximum, such as the twenty-three men, women and children who left behind over 560 footprints in the mud at Willandra Lakes. Optically stimulated luminescence dating indicated those people walked across that mud 19,000 to 23,000 years ago. Heights and weights inferred from the footprints suggest that the people were reasonably tall, healthy, and well-fed, and living in a cooperative community that had not abandoned the lakes during the drought.

Excavations at Burrill Lake on the NSW South Coast, and Wallen Wallen Creek on North Stradbroke Island, provide evidence of how people settled on the coastal plains during the ice age. At Wallen-Wallen Creek, people did not eat shellfish, but walked the plains and made stone tools from high quality chert (hard, fine-grained sedimentary rock). At Burrill Lake, people occasionally lived in a cave overlooking a valley about 21,000 years ago, and developed an innovative technique - using heat to reduce the tensile strength of stone to make it flake more efficiently for tool making.

Others living in a large cave about 23,000 years ago, on what is now Hunter Island in Bass Strait (then a plain connecting Tasmania with the mainland), extracted the marrow from marsupial bones using pieces of quartz, and made polished tools from the long bones of kangaroos, possibly for use as awls (small, pointed tools for piercing holes), spear points or to make clothes, nets or baskets. Cane notes how these people's lives were relatively rich in material culture, and despite their difficult environment, they were not destitute.²

In Tasmania people made tools from the local quartzite and travelled long distances to seek better materials. Evidence of volcanic glass appears in sites located over 100 kilometres from the source, suggesting people either walked the 200-kilometre round trip or traded the materials. These were shaped into small tools used for scraping and cutting, for use on bone, animal hides and plants, and also as spear points and for piercing and sewing animal hides together. The evidence indicates how these people adapted to the extreme environment of glacial Tasmania.

Adapting to warming in the Holocene

Between about 18,000 and 15,000 years ago the glaciers melted and sea levels rose in stops and starts over a period of 13,000 years. The result was that 25 per cent of the land available on Sahul during the Pleistocene was flooded, cutting off Tasmania about 10,000 years ago and Papua New Guinea about 8500 to 6500 years ago. People living on the coasts and coastal plains had to decide when to leave their traditional lands, and where to move, and this would have had implications for their social structures, causing encroachments on the lands of other groups.

Some populations became isolated on islands such as Flinders Island in Bass Strait and Kangaroo Island, but evidence suggests that their new island homes could not sustain them. On other islands, however, evidence suggests that people adapted successfully. On Hook Island in the Whitsunday Islands, in northern Queensland, people adapted to their new situation by becoming specialised marine foragers, inventing new tools such as fishhooks and spear points to suit their needs. They also developed their own distinctive social traditions and language. Numerous narratives about great floods survive in Aboriginal stories that are at least 6500 years old, if not 10,000 years old, making them among the oldest known stories on earth. They are generally consistent with what is known from scientific evidence about climate change in the Holocene.

² Cane (2013), 184.

By the time the first Australians had spread out across the continent, they had established customs and traditions related to their new land, and had become societies founded on allegiances, order, communication, art and industry. Lifestyles and cultural practices varied across the continent in response to different environments, climates, and natural resources. While it was once thought that people were dispersed and culturally uniform during the Pleistocene, archaeological evidence now suggests otherwise. It shows that they were diverse by region and through time, in their economics, technology, society, and their spiritual and artistic practices.

During the Holocene, the rising sea levels put pressure on existing populations, land and resources became scarcer and social conflict increased. People had to make territorial and social adjustments, establishing and protecting their own spaces, becoming more sedentary and developing regional cultural and linguistic variations. Mobility and trade seem to have increased and people began to exploit resources more effectively, using new tools and improved methods of producing and storing food.

By the late Holocene, the society of the first Australians had become sophisticated with social alliances, networks and trade. They were increasingly sedentary with some peoples living temporarily in huts arranged in villages. Subsistence became more labour intensive as food gathering and processing became more collective and they began to store food for greater security. Technologies were more efficient, land management was widespread and populations began to increase. In the Murray-Darling Basin in the mid to late Holocene, people appear to have become about 20 per cent smaller than their ancestors. Burial and ritual customs seem to have become more common and burials were more regulated with males laid on their backs in a westerly direction. Women were typically cremated.

Activity

1. Make a list of all the ways Aboriginal people adapted to the climatic changes during the Holocene.
2. Describe how climatic changes influenced Aboriginal societies and culture.
3. *The first key to understanding pre-contact Indigenous societies is climate.* To what extent can this statement be justified?
4. Other than stone, what other materials could people use in deep history, and how were these natural products used? For example, see Source 3.1: how does the 'scar tree' from Culgoa National Park (near the NSW/Queensland border) provide evidence?

Further activity

1. Locate some of the most significant Indigenous archaeological sites in your state or territory on a map. How are these regions different in terms of geology, food sources, climate, etc? How does the evidence indicate how people in different regions responded to their environment?

Technological developments

The first Australians used a range of ground-edge stone tools, such as waisted blades (with a groove cut to allow fixing to a timber handle), core tools, split pebble choppers and large, flaked scrapers. The examples uncovered in Australia indicate that the first Australians developed these types of tools 10,000 years earlier than people in Europe. Tool manufacture and use varied regionally and through time, with people in different regions developing tools according to the local resources they were procuring.

- knapped/flaked stone tools
- ground stone tools (ground-edge axes, waisted blades)
- spear points and blades
- worked shell/bone (fish hooks, etc)
- grinding stones
- animal bones and shells (food refuse)
- wooden and other organic artefacts such as boomerangs and spears
- animal hide cloaks

Figure 3.4 Scar tree, Culgoa National Park, near Lightning Ridge, NSW, 2018.
Source: Shutterstock / Wright Out There



Pleistocene tools and the stone axe revolution

In Kakadu, in northern Australia, people lived in caves and at settlement sites, leaving behind abundant evidence of their occupation. Excavations at Nauwalabila retrieved over 30,000 stone tools that ancient people used in woodworking and food preparation, at a density of 12,000 flakes per cubic metre, representing periods of occupation and seasonal settlement. Stone chips from the axes they made and used at Nauwalabila have been dated to 30,000 years old, and other ground-edge axes from other sites in the region are over 20,000 years old. One fragment of an axe from Nawarla Gabarnmang in western Arnhem Land is 35,400 years old. These are the first ground-edge stone axes in the world – similar tools would not begin to be made in Europe until the Neolithic, 25,000 years later. This innovation represents a revolution in the use of stone and allowed the first Australians to use stone axes fixed to wooden handles for numerous purposes. These included clearing trees, splitting wood, ring-barking trunks, trimming branches, stripping bark, and clearing dense foliage and roots.

Since organic materials such as animal skins and wood decay in soil, they usually do not survive at archaeological sites, so an enormous amount of material made by the first Australians has been destroyed over time. The artefacts that are uncovered from ancient Australian archaeological sites are mainly stone, mineral, bone and shell, but an absence of evidence is not evidence of absence. The first peoples likely made practical and ceremonial objects from fur, skin, feathers, plant fibre, bark and wood, like those that are depicted in ancient rock art, and those that have survived since the arrival of Europeans, but no physical examples have survived in the archaeological record. The wooden and animal product objects known from the past few hundred years may provide some evidence of material culture in ancient Australia, but we cannot assume that these modern objects were always in use throughout Australia's deep history.

Archaeologists once generally thought that all the tools people made during the Pleistocene were simple, rough, large, thick and robust, and that there was little variation in their form in different regions or over tens of thousands of years. But as research has continued, it is now thought that as more complex culture gradually developed, so did peoples' toolkit and other cultural traits, and regional differences also began to develop.³

3 P. Hiscock, *Archaeology of Ancient Australia* (Oxford: Routledge, 2007).

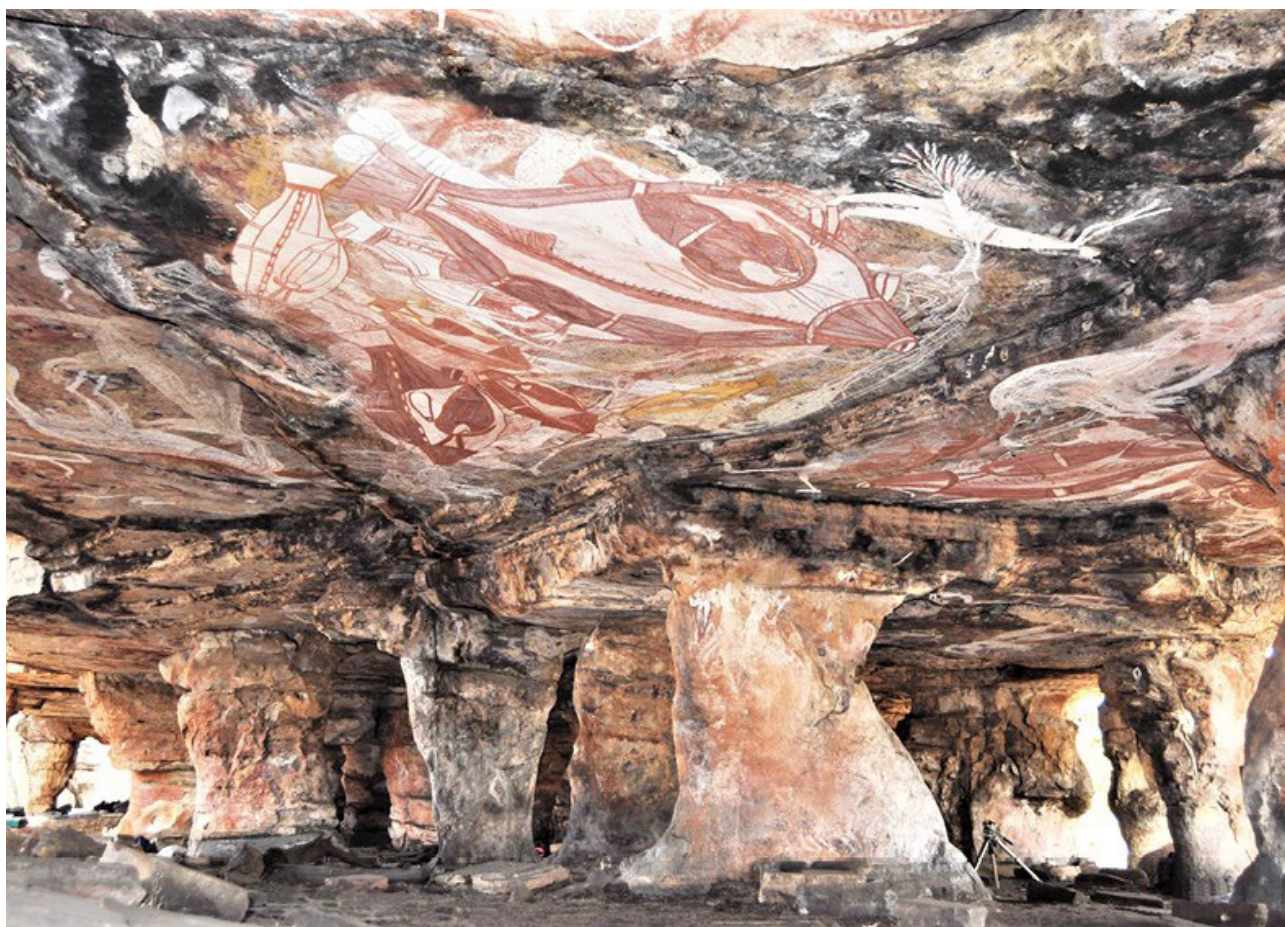
For example, during the Pleistocene, people in the south of the continent did not use stone axes, and the distribution of the manufacture and use of boomerangs and spear throwers is still not known. According to current evidence, Tasmanians certainly had fewer tools than mainlanders – there were no spear throwers, bone points or boomerangs, but these differences appear to have been due to the unique environment in Tasmania that did not require these specialised tools. They did, however, develop spears and throwing sticks, which later proved highly effective in the colonial wars against the Europeans.

As the first Australians used their stone and bone tools, they became damaged and worn, and on the tools that have been found at archaeological sites, these are visible as microscopic scratches. The tools also have residues of organic substances such as blood and starch, which show how the tools were being used in particular ways. For example, small bone tools found at Willandra Lakes have use-wear caused by scraping animal hides and spearing animals, and possibly even sewing skins together for making clothes. Stone tools from Willandra Lakes have been found to contain starch residues, indicating that people used them to harvest and process sweet potatoes.

Holocene tool innovations

During the Pleistocene, first people's lifestyles were generally simple, uniform and conservative, but by the Holocene (from 11,650 years ago), this was becoming more complex, with more regional diversity and they were taking risks to adapt to their new environments. They responded to the climatic changes and increasing demands on land and resources, becoming more settled in specific regions and developing regionally specific and more efficient tools.

Figure 3.5 Ceiling paintings and pillared structure of the Nawarla Gabarnmang rock shelter, western Arnhem Land, NT. Source: Shutterstock / Wright Out There.



About 6000 years ago, Australians developed more specialised flaked stone tools (produced by cracking larger rocks and chipping the edges), including points, backed blades and thumbnail scrapers, which had sharper edges than the older ground edge tools. People in different regions developed their own innovations and versions of these tools, but some, such as backed blades, are now found across the continent. Since the first few were studied by archaeologists in the early twentieth century, they have been the subject of a century-long debate about when they were first made, how they were used, and when and why they stopped being used. Similar tools were already known from sites in Europe and India, and it was initially thought that new technologies were only invented once in human history and spread around the world from there. This caused some researchers to speculate that they had been introduced to Australia from a foreign source, maybe from India, or at least a variety of the technology that enabled the Australians to make them. Backed blades and flaked bi-facial points, which appeared about the same time, 4500 to 5000 years ago on the Australian mainland, became grouped together as the 'Small Tool Tradition', suggesting they had a common origin.

In the 1970s and 1980s some archaeologists argued that the blades only served a symbolic purpose, since the Australians already had effective wooden spear barbs and points before the small stone tools arrived on the continent. Since they appeared on the continent about the same time as the dingo, archaeologist Sandra Bowdler argued in 1981 that the tools and the dingo were all part of a larger package of new knowledge and social behaviour that was then transferred to the continent.⁴

Recent re-examinations of the evidence now reveal that the changes that occurred 4500 to 5000 years ago are unlikely to have been introduced from overseas but reflect improvements to the existing toolkit. For example, archaeologists Peter Hiscock and Val Attenbrow showed that thousands of small tools excavated from a small rock shelter at Capertee, NSW, including more highly flaked and shaped backed blades over time, suggest that people began to spend longer making tools to make them more effective.⁵ Dating of deposits from other sites with backed blades suggests that they were in use from at least 15,000 years ago, but that a dramatic increase occurred in their production about 4500 to 5000 years ago. Hiscock has suggested that this technological development was people's response to risk and adjusting to their new situations in the changing landscape and availability of prey due to the climatic conditions of the Holocene.

A group of twenty-five wooden artefacts, dated to more than 10,000 years ago, were uncovered at Wylie Swamp, South Australia, including digging sticks, pointed stakes, short spears, barbed spears and returning boomerangs for knocking down birds and other animals. These deadly weapons are the oldest examples of their kind in the world and represent sophisticated problem solving by their makers.

People also developed composite tools at this time, including those with spare parts, which could be mended rather than remade. These included spears with detachable ends and the spear thrower, which had multiple functions. A stone blade attached to one end allowed for cutting, its curve functioned as a container, and it could be rubbed against a dry branch to make fire.

Figure 3.6 Cobble-chopper, Castlereagh region, NSW. Source: Macleay collection, Chau Chak Wing Museum (ET2014.431).



⁴ S. Bowdler, 'Hunters in the Highlands: Aboriginal adaptations in the eastern Australian uplands', *Archaeology in Oceania* 16 (1981): 99-111.

⁵ P. Hiscock, *Archaeology of Ancient Australia* (Oxford: Routledge, 2007), 154.

People made stone tools that were lighter, more efficient and included new blades for cutting. They made adzes (similar to an axe but with the cutting edge perpendicular to the handle, rather than parallel) for woodworking, scrapers and carving tools. These allowed people to more efficiently process food, create wooden tools, and decorate wooden implements for ritual purposes. 'Backed' blades, which they flaked to be blunt on one side forming a 'backed' edge, were made from about 15,000 years ago. These were highly effective cutting and scraping tools, which people also hafted as knives or on the tips of spears. Microscopic residues on the blades indicate that people used them in multiple ways – for cutting bone, meat, and feathers, as well as resin and plants.⁶ They became abundant in the Holocene and increased in production to become highly popular around 4000 years ago. Backed blades seem to have also been used as weapons against people. The 3700-year-old bones of a man uncovered at Narrabeen in Sydney indicate how he was attacked with such blades. One is wedged into his spine suggesting he was speared in the back. The body was found with twelve backed blades, which are damaged from use as spear tips or knives. One seems to have been used for puncturing animal hides and its position suggests that the man was carrying it in his hair when he was killed.⁷

Figure 3.7 Depiction of a dingo at Split Rock, Laura, Northern Queensland.
Source: Wikimedia Commons / Doug Beckers / CC-BY-SA-2.0.



More migrations and domesticated dogs

After the landmass that became modern Indonesia flooded at the beginning of the Holocene, many thousands of people there were also displaced. Evidence suggests that some migrated to the Australian continent – first about 7000 years ago, and second about 5000 years ago, when they brought the dingo to the continent. But the exact origins of the dingo remain a mystery, and there is continuing debate about exactly when people introduced the animal to the Australian continent, and whether it was by early agriculturalists, hunter-gatherers or sea-faring traders.⁸ They became successfully domesticated pets and hunting companions all over Australia and were sometimes also eaten. By 3000 years ago dingos were all across Australia, and their arrival seems to be linked with the mainland extinction of the Thylacine, 3300 years ago.

Activity

1. What archaeological evidence is there of technical innovation among Indigenous Australians?
2. Examine the stone tool pictured in Figure 3.4. Describe its shape, texture, and unique characteristics. What do these reveal about how the tool was made and used? Research other pictures of ancient Australian stone tools online, and compare their shapes, characteristics and how these reflect their various uses.
3. Do some research online about the origins of the dingo. Write two paragraphs about the theories about when and how the dingo may have arrived in Australia.

⁶ G. Robertson, V. Attenbrow and P. Hiscock, 'Multiple uses for Australian backed blades', *Antiquity* 83, no.320 (2009): 19-24.

⁷ J. McDonald, D. Donlon, J. Field, R. Fullagar, J.B. Coltrain, P. Mitchell, M. Rawson, 'The first archaeological evidence for death by spearing in Australia', *Antiquity* 81, no. 314 (2007): 877-885.

⁸ M. Fillios and P. Tacon, 'Who let the dogs in?: A review of the recent genetic evidence for the introduction of the dingo to Australia and implications for the movement of people', *Journal of Archaeological Science* 7, no. 337 (2016).

3.4 Social and cultural complexity

The widespread settlement and proliferation of the first Australians tens of thousands of years ago was the result of their dynamic response and adaptation to the ancient Sahul landscape and climates, the coasts and seas, terrestrial water courses, flora and fauna. There was great diversity in the cultural practices of the first peoples, as there is in the environmental zones in which they lived, ranging from the tropics to the cool temperate climates of the southern latitudes. People developed deep connections to their 'Country', whether it be in the deserts or the southern reaches of what is now Tasmania. Derived from and inspired by their knowledge of Country, Aboriginal Australians developed rich cultural traditions and practices including art and technology, rituals, trade, hunting, gathering, harvesting, land and sea management and oral histories.

Social organisation and kinship systems

During the Holocene, with its improving climates, the first peoples established and expanded social networks, invented new tools and made improvements to old technology. They journeyed far and wide and numerous trade routes criss-crossed the continent. The antiquity of these routes is still unknown. People established more distinct territories but they also shared resources, and had common religious and cultural traditions and shared language. Groups or bands were broadly homogenous, but there were regional distinctions. Spiritual traditions defined people's relationships with geographical areas and gave meaning to them, connecting the lifestyles of people across all territories. People were connected by kinship systems with strict codes. These codes defined social customs such as marriage, rituals and subsistence obligations. At least in the Holocene, social organisation was complex and richly underpinned with political and spiritual meaning. The Holocene is characterised by relatively stable climatic patterns, especially when compared to the climatic variability of the Pleistocene. The warming climate led to increasing population density (reflected in the increasing number of sites they occupied), which then led to further development of social systems and territorialism, trade, increasing sedentism, agricultural activity and religion.

Stone arrangements, huts and villages

People moved around the landscape with the seasons as availability of different resources changed and cultural obligations were fulfilled. In some parts of the continent, particularly in the past few thousand years, semi-permanent shelters were constructed. In some places, huts were arranged in villages, as seen in southwestern Victoria at the World Heritage Site of Budj Bim. In southwestern Queensland, the Mithaka people of the Channel Country constructed huts forming seasonal villages. As in other parts of the arid and semi-arid zones, grinding stones were used there to process native grass seeds, sophisticated trading networks were in use, and, like Budj Bim and on the Barwon River at Brewarrina in northwestern NSW, fish traps were constructed.¹

At Budj Bim in southwestern Victoria, over seventy large mound clusters, which have survived from as early as 2500 years ago, were used as hut foundations, campsites and cooking areas. Huts were made from branches bent to form a dome. Similar mounds also dating from 2500 years ago survive along other rivers in Australia. Some have hearths, burials and hut foundations and may have been associated with the establishment of gardens.

Within the past 2000 years, Tasmanian people established villages along the western and southern coasts. Today they are visible as clusters of ring-shaped depressions, which were once covered with dome-shaped circular huts, and situated on grassy beaches, near freshwater streams and abundant marine food. The domed structures were made from tea tree and melaleuca branches and roofs were made from thatched grass and bark. These cosy huts were insulated inside with feathers and kangaroo skins for warmth and had small fires near the entrances. These people were sedentary and intensively exploited the coastal food resources. Excavations of a village at West Point showed that 65 per cent of the occupants' diet was elephant seals, which appear to have been hunted into extinction, as there are no elephant seal colonies around the Tasmanian coast today.

1 M. Westaway, et al. 'Hidden in plain sight: The archaeological landscape of Mithaka Country, south-west Queensland', *Antiquity* 95, no. 382 (2021): 1043-1060.

Figure 3.8 A spectacular stone arrangement from Mithaka country, QLD (2021). Source: Lyndon Mechielsen.



Trade, war and conflict

Evidence from several regions in Australia indicates that during the Pleistocene, people transported ochre over great distances as part of exchange networks. One example comes from Puritjarra, where ochre was traded intermittently from Karrku 125 kilometres to the northwest, from at least 39,000 years ago. The long distance trading of ochre attests to the diverse nature of social networks which were an important component of artistic performances such as rock art.

A fragment of an abalone shell, which someone dropped 14,700 years ago in Allen's Cave on the Nullarbor Plain (when the sea levels had risen and the coastline was 65 kilometres from the site), suggests that people from the coast were travelling and making contact with desert people, or at least the goods were traded inland. Two fragments of cockle shell were also left there 3000 years later, along with stone artefacts made from a wide range of materials, some of which came from the desert 300 kilometres north of the site. It was a time of cultural change as people became more mobile, driving social change. Aboriginal people actively traded with neighbouring groups, sometimes travelling vast distances to trade with remote communities. In the lower Murray-Darling Basin in southeastern Australia, the movement of ground-edge axes can be traced from the stone source to where they were last used and discarded. Some axes were traded up to 300 kilometres from their source quarries, and the likely trade routes suggest the social and linguistic areas and territorial relations according to where axes were and were not traded.

Figure 3.8 Coloured ochres in an ochre pit in Tjoritja / West MacDonnell National Park, Northern Territory, 2021. Source: Wikimedia Commons / user Teckez / CC-BY-SA-4.0.



During the Holocene, the first Australians harvested, dried, and packed the narcotic plant pituri into net bags, before trading it over distances of up to 900 kilometres. The trade routes traverse an enormous area of arid Australia. They also traded Baler shells from the north to the south of the continent with routes criss-crossing the deserts. Lack of evidence to date suggests that people may have no longer made boomerangs in the north during the later Holocene, but they were traded into the desert for use as musical instruments, rather than hunting tools. Sandstone slabs, which people used as seed grinding implements, were commonly traded. At Wadla Wadlyu quarry in the Flinders Ranges, between 500,000 and 1.5 million grindstones were quarried, for trade up to 1000 kilometres away. Ochre was also a highly valued trade good, and was mined from underground tunnels in places such as Karrku and Wilgie Mia in the Weld Ranges near Meekatharra. People travelled and traded over vast distances. Trade connected people and their places across the continent with large ceremonial gatherings held to facilitate exchanges.

The social and cultural complexity of the Holocene also influenced greater conflict between groups. Men engaged in combat are depicted in rock art images from Arnhem Land in the Northern Territory and the Kimberley region in Western Australia, dating to about 10,000 years ago. The images are the oldest of their kind anywhere in the world. They show men as warriors – running, waving weapons, spearing others and fighting. By 6000 years ago, the battle scenes became more complicated and larger. The apparent increase in representations of warfare and territorialism may have been the result of reduced lands and resources available when much of the continent was flooded at the end of the Pleistocene.

Figure 3.9 Warrior frieze at Ubirr, Kakadu National Park, Northern Territory, 2008. Source: Alamy / robertharding.



Language and Spirituality

As generations of people permanently settled in different regions of the continent, they developed distinctly different languages, cultures, spiritual beliefs and systems of ownership of Country. The passing of cultural knowledge to the next generations continues today. Ancient creation stories and spiritual beliefs of groups from across the continent are known today through the rich oral traditions and cultural knowledge of living Indigenous Australians, and historically, through records made as a result of interactions between Indigenous Australians and Europeans after 1788.

Source 3.1

Peter Yu (Yawuru man) quoted in S. Yu, D. Appleby, L. Pigram and T. Edgar, 'Bugarrigarra Nyurdany, Because of the Dreaming: A Discussion of Time and Place in Yawuru Cosmology', in A. McGrath, L. Rademaker and Jakelin Troy (eds) *Everywhen: Australia and the Language of Deep History* (Sydney: New South Publishing: 2023), 60.

Language is not only a way of describing the world. It is in fact a way of knowing and comprehending the world, and of understanding oneself, relating to others and reading the natural world... for us in this country, language is the connection between people, the Bugarrigarra (Dreaming), well-being and country...

The first Australians lived with an awareness in which time and place were deeply interwoven, as do many of their living descendants today. Aboriginal cosmologies (belief systems), in which past, present and future are one, are now referred to in English as the 'everywhen'. This concept is fundamental to the ancient belief system that existed among groups across the continent and is known as Tjukurrpa in many central Australian languages. In English, it is referred to as the 'Dreaming' or 'Dreamtime', in which beings believed to be both actual and spiritual ancestors of contemporary people performed acts that created and formed the world, including the landscape, all beings that live in it, and the laws and codes that govern people's lives. The landscape and everything in it embodies the actions of these beings. The journeys they made across the landscape, now referred to in English as songlines, translated into ancient walking routes that crossed people's Country, linking important locations. The Dreamtime provides creation stories explaining the formation of the world, but it was not only a period in deep history – it is an eternal process, a system of law that governs everything in the known world. The Dreamtime explains everything from the seasonal availability of food sources to the stars in the night sky.

Aboriginal people recorded their sophisticated belief system in the rock art, which now also serves to document intangible cultural practices. Objects such as stone tools probably embodied the Dreamtime for the people of deep history who made and used them, as sacred objects do for those living today. Many organic objects and activities and behaviours such as storytelling, song, dance, sand drawing, body painting and ceremony have not survived in the archaeological record. By working with living Indigenous people and analysing European explorer and ethnographic records since 1788, anthropologists who study these intangible complex cultural systems are exploring how these ancient myths and cultural practices such as song may be examined across time.²

Source 3.2

Stanley Douglas (Walinynga man) 'Stanley Douglas Narrating Story', Songlines: Tracking the Seven Sisters, National Museum of Australia, <https://songlines.nma.gov.au/walinynga-rock-art/o/hotspot/story/content/1/layer/1/> (accessed 22 August 2024).

This cave [Walinynga / Cave Hill, SA] was created by Ancestral beings from the Tjukurpa. My uncle told me and many people about this Tjukurpa. All our people's knowledge and remembering is here... following the songline of the Seven Sisters. They talked as they travelled. 'Watch out for that man – Nyirul'. They

² A. McGrath, L. Rademaker and J. Troy (eds) *Everywhen: Australia and the Language of Deep History* (Sydney: NewSouth Publishing, 2023).

were always looking over their shoulder. He could change himself into many things to trick them. He was a shape-shifter.

The Seven Sisters were digging near this waterhole here. Nyiru saw them from a long way away... they ran... But Nyiru sent a strong wind, to chase them... The women hid in the cave. But Nyiru found them... The women were sitting in this very cave, telling stories... the older sister had made an opening in the back of the cave. Safe way for them to get out... the sisters were ready for him. They had already escaped.

Activity

1. What is intangible heritage?
2. How do we know if the creation stories shared by Indigenous people today existed tens of thousands of years ago? Can we know when they began to be passed down if they changed through time? Discuss what evidence survives from the archaeological record and what evidence is missing.
3. Read Stanley Douglas' account (Source 3.2) of the Seven Sisters story, passed down from his ancestors. The Seven Sisters songlines are some of the most important creation tracks that criss-cross Australia.
 - a. Next, explore the rock art in Walinynga cave at Cave Hill in Central Australia using the online interactive at <https://songlines.nma.gov.au/walinynga-rock-art/1/>
 - b. How are these two types of evidence connected? Discuss what they reveal about the culture and ways of life of the Anangu people in deep history.

Rock Art

It is clear from the traditional knowledges of living Aboriginal peoples today that art and other cultural practices have long played a central role in spiritual beliefs and practices. Rock art did not necessarily always play the same role or carry the same importance throughout Australia's deep history, but archaeological evidence from the earliest dated archaeological sites certainly indicates that it has always been part of the culture of the First Australians.

Throughout deep history, hundreds of generations of Aboriginal people created rock art in the places where they lived, to record their cultural stories and histories. Consisting of maps, diagrams and epic creation stories, the rock art depicted animals, plants, people and spirits. So much of the rock art they made has been destroyed over time, but many distinctive rock markings, paintings and engravings survive across Australia. They are evidence of the enduring connection of Aboriginal peoples with Country and with the continent, and they act as an archive for Aboriginal people to connect with their ancestors, to tell their deep history, and to pass on traditional knowledge.

Ochre use and rock painting

The symbolic and decorative use of ochre is evident across all regions of Australia and all time periods. Archaeological evidence has shown that ochre was used in rituals such as burial (see Lake Mungo) and for painting, as seen in rock art, and to express ideologies and social relationships. At Puritjarra, in Central Australia, ochre was used in rock paintings throughout the 40,000-year occupation of the site. Sometimes, the ancient paintings do not survive, but evidence for it may be preserved as ochre fragments recovered from archaeological deposits. Rock shelters in Cape York, for example, contain 'used' ochre dated to at least 30,000 to 40,000 years ago, but none of the paintings that have survived on the nearby rock are older than 3000 years old.

Figure 3.10 Aboriginal pictograph, Arnhem Land, NT. Source: Shutterstock / MintImages.



People in Arnhem Land ground ochre on portable grinding stones and in sandstone bedrock, and there is evidence that they used ochre crayons 20,000 to 30,000 years ago. There are over 6000 rock art galleries across the region, showcasing the art of ancient Australians, who were vastly more prolific than their Palaeolithic relations in Europe, who produced 275 sites by comparison. At the beginning of the Holocene, about 12,000 to 10,000 years ago, more occupation sites appear in the archaeological record, and are associated with an increasing use of ochre, suggesting a rapid increase in artistic activity. Other cultural activities were likely associated with the proliferation of art and are likely to have included complex ritual activities and other cultural functions such as medicinal use and for decorating bodies and wooden implements.

Ochre is an iron oxide that occurs naturally in clay earth in colours ranging from yellow to red and brown. It has been found in a faceted form indicating human use, suggesting that art made with ochre was created from at least 50,000 years ago in Australia, 10,000 years before the earliest known art in Europe. The abundance and age of Australia's ancient rock engravings and paintings makes them comparable with the more widely known European cave art sites including Lascaux in France and Altamira in Spain.

The oldest known image drawn in Australia was found at Nawarla Gabarnmang, western Arnhem Land. A small, flat piece of rock that fell from the roof of the cave carries a charcoal drawing of two crossed lines, one with a bulbous, curved section. It dates to between 15,600 and 45,600 years ago and is most likely about 28,000 years old. An ochre crayon from the site, in a mulberry colour matching some of the dynamic or 'mimi' human-like figures painted on the cave's walls dates to between 15,000 and 25,000 years old. Depicted with material possessions such as clothing and ornamentation, barbed spears and boomerangs, the figures found here represent a range of common activities such as hunting as well as expressing something of the experience and emotions of the artists. These are examples of an ancient artistic tradition that existed across the north of Australia, and are among the oldest art movements on earth.

Nawarla Gabarnmang cave in southwestern Arnhem Land was first occupied about 45,000 years ago, and is a spectacular example of artistic achievement. Its flat ceiling, and the thirty-six sandstone pillars supporting it, have been elaborately decorated with paintings and the ceiling stone has been deliberately removed in parts to create space, expose fresh surfaces for painting and for making into stone tools. As Scott Cane has suggested, it is 'testament to tradition, community, social cohesion, artistic brilliance and ritual activity'.³

During the Holocene, people in Arnhem Land developed a distinctive artform, which has now become known as x-ray art. Both descriptive and decorative, it portrays humans and the anatomy of animals not previously depicted, such as barramundi, mullet, catfish and crocodiles. The increase of wetlands in northern Australia is reflected in the art of this time, with freshwater birds and water lilies and people hunting on rafts with specialised spears. Didgeridoos appeared at this time and art was used to represent connections between life, fertility, death and country.

Rock engraving

The Pilbara region in Western Australia is one of the richest places on earth for ancient petroglyphs, or rock carving. It is estimated that there may be over a million ancient engravings on the rocks in the region – artwork that cut through the dark outer rock surface to expose the yellows and orange rock within. The earliest examples, probably 25,000 years old, are lines and geometric patterns, human figures and land animals. More recent examples, representing sea animals, date from about 7000 years ago, after the sea levels rose. Two sets of engravings dating from about 4000 years ago, of men who appear to be climbing, and which are thought to be part of the same cultural/artistic tradition, have been found in two locations, separated by a distance of 600 kilometres. They represent common cultural traditions shared by people across a large geographic area, and across social groups. These are examples of a widespread artistic tradition known as the 'Panaramitee', found throughout Arid Australia, from Western and South Australia, Northern Territory to New South Wales and northwestern Tasmania. This symbolic artistic tradition used common symbols of tracks, lines and circles, which came to be used with regional variation across the arid regions, implying communication and social coherence across first peoples' groups. Unlike artefacts recovered from either dateable soils, charcoal, shell or bones, accurately dating rock engravings is very difficult, so there is no confirmed date range for the creation of Panaramitee art, though it is certainly ancient.

Figure 3.11 Petroglyphs from Gundabooka National Park, NSW. Source: Wikimedia Commons / User Cazz / public domain.



3 S. Cane, *First Footprints: The epic story of the First Australians* (Crows Nest, NSW: Allen & Unwin, 2013), 69.

Representation of the human face

While depictions of human figures are abundant in the art of deep history, representations of the human face are rare. The first images of the human face known from Western civilisations date to less than 5000 years ago. On the Australian continent, in the deserts of central Australia, within the Panaramitee art tradition, people's faces are represented in stone engravings at least 10,000 to 15,000 years before any other place in the world. The images are created by pecking, the eyes surrounded by concentric circles, with mouths, noses and ears in heart-shaped heads, and reflect an awareness of self in their expression of identity. The age of the pecked engravings is still unknown, but associated weathering rates suggest an age between 10,000 and 25,000 years. At Murujuga, on the northwest coast of Australia, archaeology demonstrates that people had settled the region by 50,000 years ago. There is a rich cultural landscape with over a million petroglyphs, and Murujuga is now considered one of the densest and richest locations for ancient art in Australia. A diverse suite of animals are depicted, including extinct species such as thylacines. The site's elaborate face petroglyphs are considered the oldest known depictions of human faces in the world. Murujuga also includes depictions of 'Climbing Men', which archaeologist D.J. Mulvaney considered in 1980 as 'one of the great masterpieces of prehistoric art from any stone age gallery throughout the world'.⁴

Figure 3.12 Rock art depicting Wandjina spirits, Mount Elizabeth Station, Barnett River, East Kimberley, WA. Source: Wikimedia Commons / Graeme Churchard / CC-BY-2.0



⁴ Quoted in K. Mulvaney, 'Murujuga: Managing an Archaeological and Sacred Landscape Through Industry', in António Batarda Fernandes, Melissa Marshall, Inés Domingo (eds) *Global Perspectives for the Conservation and Management of Open-Air Rock Art Sites* (New York: Routledge, 2022).

Jewellery and clothing

At least 32,000 years ago, someone living near what is now the Pilbara coast of Western Australia collected conus shells of similar size, perforated them, and strung them together as beads. The beads were left behind in Mandu Mandu rock shelter, now on the coast, and during the Pleistocene, about 12 kilometres away from the sea. These beads, which are the oldest known beads in Australia and among the earliest in the world, are evidence of creativity, self-expression, material value, aesthetics, and were possibly of ritual importance. They may also be indicative of communal interaction and trade. At Riwi rock shelter, further inland, on the edge of the Kimberley, archaeologists found ten other shell beads that were made by snapping and sawing the shells. These beads provide evidence of a long-distance trade network that saw marine resources from the coast transported up to 500 km inland. The Riwi beads date from 30,000 years ago and, incredibly, a tiny fragment of natural fibre is still attached to one of the beads, indicating they were strung together on a necklace. Residue on the beads suggests that they were originally coloured, and possibly had a ritual purpose.

At Roonka Flat on the Murray River, around 7000 years ago, people were making and wearing animal skin cloaks, held together on the shoulder and down the front with bone pins. In one burial of a man and young boy at Roonka Flat, a cloak was found that had animal paw tassels and feather decorations. Both males were wearing headbands decorated with wallaby teeth, and the boy also had a necklace of snake vertebrae and a brolga skull pendant.

Activity

1. Explain how the rock art of ancient Australia is significant in global history. In your response, refer specifically to any two of the images provided.
2. Examine the rock art in Figure 3.12 then answer and discuss the following questions:
 - a. How many faces can you find? Can you see any other images such as animals or their tracks?
 - b. What does the work reveal about how it was made?
 - c. Do these faces depict humans or ancestral beings? Research the word 'Wandjina' and discuss what this artwork represents and why it was made.

3.5 Regional variation and subsistence

Seasonal subsistence through time

In regions settled by the first Australians, the diversity of plant and animal species provided an abundant variety of inland and coastal food sources. These animal and plant resources were very different from those of Sunda (southeast Asia) and attest to rapid adaptation of the first peoples, who moved around the landscape with the seasons and the availability of resources. During the Pleistocene, the unpredictable climatic changes and shifting character of the continent's landscapes and ecosystems meant that people had to continually adapt.

Evidence from numerous sites across the inland areas of the continent, including Willandra Lakes, indicates that people had a diverse and seasonal diet. They exploited plants such as yams, bush tomatoes, grass seeds and wild fruits. Tubers (yams/bush potatoes), small marsupials and reptiles were cooked in shallow fireplaces or earth ovens, aided by heat retaining rocks or clay balls to retain the heat.

From about 2500 years ago, there is some evidence that agricultural-type activities and communal food collection was emerging, though there is no evidence of widespread or intensive agriculture or farming, as known in other civilisations. People consumed more plant foods in autumn and winter and reptiles and marsupials in spring and summer. Hunting large marsupials was men's work and it could be very unreliable. Larger animals were more commonly eaten in the southern deserts, and smaller animals in the north, though in any area, people tended to hunt whichever animals they encountered. Hunting smaller animals and collecting plant foods was mainly women's work, though at different times everyone was involved. During the late Holocene, people began to live more regularly in rock shelters, because rain was more frequent and heat more intense.

Using fire and living sustainably

The controlled use of fire played an important role in Australia's deep history and was central to subsistence practices. People used fire management to actively manage the land, flora and fauna. By deliberately lighting and controlling the path of bush fires, animals were flushed out for hunting, paths were cleared for moving between places, and plants requiring fire to reproduce would shed their seeds. 'Mosaic burning' ensured that animal and plant resources were abundant, conveniently accessible and available as needed. Intermittent burning of the bush also meant that wildfires caused by lightning strikes were less destructive. After observing controlled burning by Aboriginal people in Australia's north in the twentieth century, archaeologist Rhys Jones named the practice 'fire stick farming'.¹

Analysis of ancient sediments containing charcoal indicates that the first colonists may have started firing the landscape in Arnhem Land soon after they arrived. Charcoal and pollen records indicate that about 40,000 years ago, rainforests in Cape York were replaced by sclerophyll vegetation such as melaleuca and eucalyptus. Similar changes in vegetation occurred in many other dry areas of the continent from about 60,000 years ago – and are variously attributed to human fire regimes, natural fire and climate change.

Charcoal and pollen recorded from Lake George near Canberra date to at least 60,000 years ago, and indicate that fire may have caused a shift from mainly she-oaks (casuarina) to fire-tolerant eucalyptus. Similar evidence of vegetation change and increased burning have also been found in sediments in the Snowy Mountains and Tasmania, though depending on the timing, it may be interpreted as people using fire to maintain open grassy plains for hunting animals. Natural fires caused by lightning strikes have of course always been frequent and more intense in the Australian bush. Deep ocean cores also contain charcoal and pollen from river drainage that was blown out across the ocean, and while they document an increase in the frequency of widespread burning of the Australian landscape from about 60,000 years ago, these records are generalised and cannot be relied on as regional records from the land.

¹ R. Jones, 'Fire stick farming', *Australian Natural History* 16, no. 7 (1969): 224-228.

Fire was an important tool for Australia's first peoples, aiding communication, improving access to formerly dense bushland, and maximising hunting and gathering opportunities. Fire was also used to assist with plant regrowth, and Emeritus Professor Bill Gammage, among others, has argued that the open plains and grassy fields observed by Europeans in the early contact period were the result of regular low intensity firing by Aboriginal people over time.² More generally, Aboriginal people's lifestyles were sustainable; governed by the availability of different food sources. They adapted their daily living patterns according to seasonal change, took only what they needed from their environment and avoided overuse or misuse of resources, such as pollution of rivers.

Source 3.3

Dianne Appleby (Yawuru woman) quoted in S. Yu, D. Appleby, L. Pigram and T. Edgar, 'Bugarrigarra Nyurdany, Because of the Dreaming: A Discussion of Time and Place in Yawuru Cosmology', in A. McGrath, L. Rademaker and Jakelin Troy (eds) *Everywhen: Australia and the Language of Deep History* (Sydney: New South Publishing: 2023), 61.

We follow the seasons; that is how we survived. For us time is cyclical, not linear. Everything has a season. There is jalangardi (goanna) time; walgawalga (salmon) time. This is how we measure our time.

Processing and storing seeds

People used grinding stones for preparing ochre pigments for art and manufacture of stone axes, and also for processing small animals, grass seeds and other starchy plant parts for consumption. Researchers know that seed processing first emerged in the Late Pleistocene because fragments of grinding stones have been recovered from Pleistocene deposits at Cuddie Springs and from Willandra Lakes in southwestern New South Wales.³ Preserved chenopod seeds, dating from 26,000 to 18,000 years ago, have been identified at Carpenter's Gap in the Kimberley Region of Western Australia, which are known from historical times to have been soaked, ground, then baked into a damper. Wear traces and starch preserved on the surface of one of the Cuddie Springs grinding stone fragments suggests someone used it to grind grass seeds.⁴

Researchers are also investigating the processing of starch plants such as grass seeds and water lily seeds and corms at Madjedbebe, where grinding stones have been recovered from layers dated to more than 50,000 years. This therefore makes them Australia's (if not the world's) oldest known seed processing, along with the oldest edge-ground stone axes and the earliest use of ground ochre pigments.⁵ Ethnographic records of Aboriginal communities, made since the arrival of Europeans, have shown that grinding stones used for the wet milling of grass seeds were often heavy and usually cached (hidden) at popular campsites. The quarries from which the predominantly sandstone raw materials were derived were often 'owned' by different groups. Permission was required to access the quarries or they were traded over vast distances.

Figure 3.13 Food grinding hollows, Kakadu National Park, Northern Territory.
Source: Shutterstock / sljones.



² B. Gammage, *The Biggest Estate on Earth: How Aborigines Made Australia* (Sydney: Allen & Unwin, 2012).

³ R. Fullagar, E. Hayes, B. Stephenson and J. Field, 'Evidence for Pleistocene seed grinding at Lake Mungo, south-eastern Australia', *Archaeology in Oceania* 50, no. 51 (2015).

⁴ R. Fullagar, J. Field and L. Kealhofer, 'Grinding stones and seeds of change: starch and phytoliths as evidence of plant food processing', in Y. Rowan and J. Ebling (eds), *New Approaches to Old Stones: Recent Studies of Ground Stone Artifacts* (London: Equinox Press, 2008), 159–72.

⁵ E. Hayes, R. Fullagar, J. Field, et al. '65,000-years of continuous grinding stone use at Madjedbebe, Northern Australia', *Scientific Reports* 12, no. 11747 (2022).

Finding coastal foods

With about 60,000 kilometres of coastline, the margins of Sahul and the Australian continent provided rich food resources. The first peoples who lived around the coasts were skilled and exploited the rich diversity of fish and shellfish, and often supplemented this seafood diet with terrestrial animals and plants. Some of the most ancient evidence for marine subsistence comes from the Pilbara Coast of Western Australia. Two rock shelters known as Jansz and Mandu Mandu on Cape Range Peninsula have revealed how people about 40,000 years ago lived off both marine and terrestrial sources. They hunted kangaroos, bandicoots, bettongs, possums, turtles and fish and collected emu eggs and shellfish.

Along the lower Darling River in New South Wales, some sites have been dated to c.30,000 years ago. People who settled there fished for golden perch, a species that made up 70 per cent of all the excavated fish bones from the site. The size of the juvenile fish suggests that nets and traps were used to catch fish of a similar size. Such activities required social organisation to manufacture the string for the nets. Hunting of marsupials and birds, and the collection of emu eggs, were likely driven by the seasonal availability of resources.

Shell middens found all along the Australian coastline provide evidence of the range of plant and animal species that people collected, hunted and consumed. Radiocarbon dating of charcoal, shell and bones from middens determine dates when they were deposited. Some of the largest middens contain between 30,000 and 40,000 shells per cubic metre.

At Currajong in Jervis Bay, NSW, middens accumulated over a period of 4000 years demonstrate how people collected oysters and hunted and gathered fifty-six other species of land and sea animals for food. Further north, at Birubi Point near Newcastle, middens built up about 500 years ago contained pipi, limpet, periwinkle, mussels, and turbo shells, and sea urchins. Around twenty-three species of fish were caught using fish hooks, and land animals are also present. These activities were specialised and localised to people living on the temperate, humid coasts of eastern Australia, rather than populations living in the arid coasts of southern and western Australia, where shell middens are rare.

Figure 3.14 Aboriginal coastal shell midden, Sydney, NSW. Source: Shutterstock / Ken Griffiths.



Activity

1. Explain what is meant by the expression 'regional variation' in relation to Australia's deep time past.
2. Examine the evidence from the sites in Figure 3.13 and 3.14.
 - a. What characteristics of these places would lead you to identify them as archaeological sites, rather than natural features of the landscape?
 - b. If stone artefacts and animal bones were also found at these sites, what could you infer about how the places were used in deep history?

Freshwater aquaculture

During the Holocene, hunting and gathering techniques became more specialised. Along with numerous technological innovations, people were making fish nets up to 90 metres long as well as wicker fish traps. They also built extensive stone-walled fish traps and weirs (small dams). People collected freshwater mussels resulting in middens formed along the riverbanks where they discarded the shells.

At Budj Bim, Lake Condah, in southern Victoria, the Gunditjmara people used stone walls and channels to construct an aquaculture system, thought to have been developed over the past 9000 years. With a series of stone channels, they drained water and caught fish and eels using wicker baskets (which have long since disintegrated) between the stone weirs. By 2000 years ago, locally quarried basalt was used to construct stone walls up to six metres high. The Budj Bim cultural landscape is the oldest and most extensive example of ancient aquaculture anywhere in the world and was inscribed on the UNESCO World Heritage list in 2019.

Stone arrangements which functioned to trap fish in the Darling River at Brewarrina provide evidence of ancient knowledge of river hydrology and fish ecology. Near Toolondo in western Victoria, an extensive drainage system was created using natural elevations to quickly move water between swamps to flush out eels and fish into drains and then funnel-shaped wicker traps. The system also helped retain water in the swamps during drought.¹

Brewarrina fish traps

On the Darling River, near Brewarrina, in north-west New South Wales, the Ngemba people built dry-stone weirs and ponds, taking advantage of the natural configuration of the landscape and seasonal changes in water flow on the river. A creation story, passed down to their living descendants, involves the ancestral being Baiame, who threw his net over the river, and with the help of his two sons, built the fish traps in the shape of this net. The traps are nearly half a kilometre long and their design is extraordinarily complex, trapping fish as they migrate both upstream and downstream.

Figure 3.15 Aerial view of stone arrangement fish traps on the Barwon River, Brewarrina, far northwest NSW. Source: Shutterstock / John Carnemolla.



¹ H. Lourandos, *Continent of Hunter-gatherers: New perspectives in Australian prehistory* (Cambridge: Cambridge University Press, 1997).

Source 3.4

William Mayne describing the rock arrangements in the Darling River at Brewarrina in 1848, *Historical Records of Australia I*, 26, 635.

In a broad but shallow part... where there are numerous rocks, the Aborigines have formed several enclosures or Pens, if I may use that word, into which the fish are carried, or as it were decoyed by the current, and there retained. To form these must have been the work of no trifling labour, and no slight degree of ingenuity... The Aborigines catch immense quantities of fish in these and are also enabled to destroy great number of fishing Birds of various kinds that are attracted to them by their prey thus imprisoned; and from these two sources the Tribes in that locality derive a considerable portion of their subsistence.

Figure 3.16 Brewarrina Fishery from L.G. Thompson (1893), *History of the Fisheries of New South Wales: with a Sketch of the Laws by Which They Have Been Regulated*, Sydney, NSW, Australia: Charles Potter, Government Printer (Public Domain)



Tasmanians after the ice age

When sea levels rose dramatically, from about 14,000 years ago, Bass Strait flooded and separated Tasmania from mainland Australia, isolating the first peoples living on the higher land south of the Strait. Some formerly habitable landscapes became unsuitable, and others became richer and more accessible. Some researchers have suggested that people in Tasmania struggled from being isolated, but recent archaeological evidence shows that people reconfigured their activities, became less focused on the coastal food resources and intensively exploited inland and island resources. The 20,000-year tradition of wallaby hunting disappeared as the climate warmed. As forests re-established, and no longer supported the fauna that people had long hunted there, the long-inhabited caves in the valleys were abandoned, except for one site called Parmerparr Meethaner, which was occupied until 200 years ago.

People responded to change with diverse solutions. Enormous middens, quarries, stone arrangements, artefact scatters, and rock art along the coast indicate how people adapted their lifestyles as climates improved, and became increasingly settled in villages, leaving an enormous number of sites with a great density of material for archaeologists to analyse. At Temma, a complex of over 1000 sites is thought to be one of the largest concentrations of archaeological artefacts in the world. The evidence includes stone paths and alignments, mounds, cairns, hunting hideouts, and rock engravings.

In 1963 archaeologist Rhys Jones began excavating two rock shelters at Rocky Cape, occupied since about 8000 years ago, and found abalone shells that had been swept to the edges of the cave, fireplaces that were located near the walls to reflect heat, smashed bones of seals, birds, small marsupials, shellfish and fish scattered across the floor and stone tools found where people had left them. The debris suggests that the occupants obtained more than half of their meat from molluscs and supplemented that meat source by hunting seals and land animals. Hundreds of fish bones were found, but they are not easily interpreted as evidence of fishing, and it was concluded that fish consumption was minimal.

Curiously, after about 3700 years ago, Tasmanians appear to have stopped eating fish. A change in tool technology also occurred, with the manufacture of bone tools appearing to have ceased around the same time, suggesting that they were used to make traps or bait fish. Jones argued the Holocene Tasmanians lost many skills and that these changes represented a cultural degeneration among the Holocene Tasmanians, generating decades of debate among archaeologists.² As the Tasmanian toolkit was already different to that of the mainland peoples, it is now widely accepted that there is no credible evidence to indicate that they lost significant parts of their knowledge or skills as a result of isolation. For example, others have suggested that the changes may relate to a period of unpredictable and dry climatic conditions around 4500 to 4000 years ago when people lived less on the coast and more often inland, and/or other explanations such as a cultural taboo against eating fish, a preference for fatty foods like seals, or mass poisoning of fish from algal growth.³

Activity

1. Read Source 3.4 and examine the images of the Brewarrina fish traps (Figures 3.15 and 3.16).
 - a. Describe the fishing practices at this site.
 - b. Considering this evidence, discuss how this fish trapping practice falls within the typical activities undertaken by peoples described as hunter-gatherers, agriculturalists, and farmers.
2. How did the end of the ice age encourage changes to patterns of life in Tasmania?

² R. Jones, 'Why did the Tasmanians stop eating fish?', in R. Gould (ed) *Explorations in Ethnoarchaeology* (Albuquerque, NM: University of New Mexico Press, 1978), 11-48.

³ See P. Hiscock, *Archaeology of Ancient Australia* (Oxford: Routledge, 2007), 136-8.

3.6 Foragers or farmers? The Dark Emu debate

One of the foundational and long-standing concepts in Australian archaeology was that, unlike the sedentary crop-growing and animal farming cultures known from other regions of the world, the first peoples of Australia were best described as hunter-gatherers. The image this portrayed is of people who obtained food by hunting and catching animals and foraging to collect plants and shellfish. They were believed to be mobile, moving according to the availability of food and other resources and cultural obligations.

Since the 1960s, archaeologists and others have been researching and publishing on the subject, asking if ancient Australian lifestyles and food systems can be accurately labelled in this way. The stereotype of Indigenous Australian lifeways being unchanging and unsophisticated was challenged by numerous studies that demonstrated how people hunted and collected foods using a sophisticated range of tools, strategies and techniques. Since 2008 some prominent historians have also argued that first Australians' subsistence activities represented highly sophisticated hunter-gatherer practices, and that many were even agricultural in nature, such as the management of landscapes and storage of food resources.

But despite the decades of academic research on the subject, the question of whether Aboriginal people were foragers or farmers has only been a major public debate since 2014. This shift occurred due to the historian and writer Bill Pascoe's book *Dark Emu: Black Seeds – Agriculture or Accident?* (2014), which took the discussion one step further and made the bold claim that Aboriginal people were farmers.¹ *Dark Emu* stimulated widespread interest and has popularised some of the complex discussion that once existed only among scholars, winning the NSW Premier's Literary Awards and Book of the Year in 2016. The impact of Pascoe's book was largely due to everyday Australians' lack of knowledge of the cultural complexity of Australia's Indigenous peoples. Readers who are new to the subject appear to find Pascoe's work revelatory. However, those who are most familiar with the archaeological record commonly challenge the bold assumptions made by Pascoe.

Dark Emu won numerous awards and by mid-2021, 250,000 copies had been sold. However, there are some widely acknowledged flaws in *Dark Emu*, and many critics, especially experts in the subject, had much to say about Pascoe's claims. A heated national discussion erupted, influenced by conflicting understandings of key terminology, use of culturally loaded labels, the scholarly use (or not) of appropriate evidence, reliance on outdated colonial concepts, and the politics of contemporary race relations. The ongoing dispute that has resulted has become known as the 'Dark Emu debate', in which there are at least three broad positions. These are briefly outlined in Table 3.3 and then expanded on below.

Table 3.3: The three broad interpretations of the subsistence activity of the first Australians, relevant to the Dark Emu debate

Agriculturalists	Some scholars and commentators believe that the subsistence activity of the first Australians was 'agricultural'; some lived in temporary villages, and they altered the landscape for gathering food, but their lifestyle was not that of 'farming' in the typical way in which that term is used (describing highly structured systems of cultivation).
Farmers	Some claim that the first Australians had highly developed farming techniques, including cultivating crops, irrigation, food storage, animal farming, permanent dwellings and bread making.
Complex hunter-gatherers	Many find that the evidence indicates that the first Australians practised complex hunter-gathering activities; they were mobile rather than sedentary in villages, practised purposeful food gathering, altered the landscape and sometimes deliberately scattered seeds, but they were not like European farmers herding animals and irrigating crops.

1 . B. Pascoe, *Dark Emu: Black Seeds: Agriculture or Accident?* (Broome, WA : Magabala Books, 2014).

Ancient Australians as agriculturalists

Two academic historians introduced the idea that Indigenous Australians were agriculturalists: Rupert Gerritsen, in *Australia and the Origins of Agriculture* (2008) and Emeritus Professor Bill Gammage, in *The Greatest Estate on Earth* (2011).² Gerritsen argued that Indigenous people in three areas of Australia were engaged in agriculture and aquaculture when they encountered Europeans. He argued that they were sedentary and living in permanent habitations, arranged in villages of up to 1000 people. He said that the reliance on 'inappropriate paradigms' (the polarised definitions of hunter-gatherer versus farmer) has prevented scholars from looking at the behaviours, properly explaining the evidence for ancient food production, and limiting the possibility of seeing agricultural behaviour on the continent prior to the arrival of Europeans.

Gammage argued that Indigenous Australians were practising some agricultural activities when the Europeans arrived in 1788, and that they effectively had 'farms without fences', but that they can not be broadly described as farmers. He wrote, 'These are not the same: one is an activity, the other a lifestyle'. He notes that some people practised agriculture and aquaculture, and many people did live in villages, but most only when harvesting and they did not stay in their houses or near their crops. He notes that 'Most observers, lay and expert, are adamant that Aborigines were not farmers, and did not farm.' He adds that they did 'till and toil, but did not farm'.

What the critics say about this interpretation

- Gerritsen's work was based solely on ethnographic and historical evidence, rather than archaeological evidence.
- Gammage took observations of practices from some areas in Australia and applied them to others, meaning that his argument ignored how Aboriginal knowledge and practices were highly regional and related to local environments.

Ancient Australians as farmers

Building on the work of Gerritsen and Gammage, historian and writer Bruce Pascoe argued in *Dark Emu* (2014) that Aboriginal people who lived on the continent before the arrival of Europeans were farmers, engaged in agriculture, irrigation and construction. He argued they were not 'hapless wanderers across the soil, mere hunter-gatherers', but that they were farmers who worked the soil, sowed seeds and irrigated their crops, harvested and stored food, and altered the course of rivers, built dams, sewed clothes, made bread, and lived for long periods in dwellings. Despite the decades of scholarly research and discussion around the subject, it was Pascoe's book that brought the subject into popular, and at times heated, discussion.

What the critics say about this interpretation

- Pascoe's framework ranks hunter-gatherers beneath agriculturalists, making technological advancements a measure of people's worth and reinforcing an old European hierarchy imposed on cultures and societies.
- Pascoe's analysis is problematic, his claims are misleading and his ideas have been accepted uncritically by many readers.
- Pascoe has exaggerated certain points and edited sources to suit his main argument.
- His work engages very little with Traditional Owners' knowledge or archaeological evidence.
- He provides examples of region-specific behaviour and then suggests that they were the norm across the continent.
- His ideas were not new, since scholars have long rejected the old claim that Aboriginal people were 'simply nomadic'.

² R. Gerritsen, *Australia and the Origins of Agriculture* (Oxford: British Archaeological Reports International Series 1874, 2008) and B. Gammage, *The Biggest Estate on Earth: How Aborigines Made Australia* (Sydney: Allen & Unwin, 2012).

Ancient Australians as complex hunter-gatherers

In 2021 anthropologist Dr Peter Sutton and archaeologist Dr Keryn Walshe published a scholarly counterargument, entitled *Farmers or Hunter Gatherers?: The Dark Emu Debate*.³ They argue that Aboriginal people were not agriculturalists or farmers, but ‘complex hunter gatherers’, suggesting that their practices lay somewhere between the two other characterisations already discussed. They were not like European farmers, but nor were they ‘simple nomads’. Sutton and Walshe argue that their food gathering activity was purposeful and complex, making them highly successful hunter-gatherer-fishers, and their practices were underpinned by a complex spiritual outlook. They agree that the evidence indicates that Aboriginal people did alter the landscape in significant ways, and sometimes deliberately scattered seeds, but seeds were never systematically planted or watered for farming. They argue that the rock formations for catching fish were not made for fish farming but arranged by people around natural river formations to make catching fish easier.

Table 3.4: A summary of some of the key conclusions about pre-contact Indigenous lifeways.

Food & lifestyle activities	Sutton & Walshe	Gerritsen / Gammage	Pascoe
Hunting animals & fishing	✓	✓	✓
Collecting plant foods & shellfish	✓	✓	
Travelling long distances to food sources	✓	✓	✓
Nomadic/mobile – no fixed settlements	✓	✓	
Controlled use of fire	✓	✓	✓
Semi-sedentary - temporary habitations		✓	✓
Permanent habitations and settlements			✓
Trapping fish/eel using natural river formations	✓		
Trapping fish/eel with rocks/channels		✓	
Yam harvesting and replanting	✓	✓	✓
Seed storage		✓	
Scattering/broadcasting seeds	✓	✓	
Cultivating crops – irrigation, harvesting		✓	✓
Food storage to build up surplus		✓	✓
Breeding and raising domesticated animals			✓
Large populations sustained by farmed food			✓
Bread making			✓

3 P. Sutton and K. Walshe, *Farmers or Hunter Gatherers?: The Dark Emu Debate* (Melbourne: Melbourne University Press, 2021).

Moving beyond the debate

Archaeologist Harry Lourandos pointed out that many complex behaviours were shared by both agriculturalists and hunter-gatherers, but one of the main divisions in world debates about definitions of agriculture versus hunting and gathering is the domestication of animals and plants, and how this is recognised.⁴ He suggests that in thinking about the lifeways of the First Australians, the emphasis needs to be on the more nuanced areas between the two more rigid categories, not on the labelling, which only creates boundaries. For example, an important question is how to understand 'managed' landscapes and resources.

Some scholars are now suggesting that Aboriginal lifeways need to be examined and understood by another framework that rises above the old hierarchy of hunter-gatherers versus farmers.⁵ Rather than attempting to use the troublesome, restrictive, loaded labels of 'hunter-gatherers', 'agriculturalists' or 'farmers', which have impeded progress towards a better and more widespread understanding of ancient Australia, it is important now to move beyond such categorisation and to focus on the actual activities under discussion.

Rather than suggesting that Indigenous people in deep history lived like Europeans, we can celebrate their ingenious achievements, knowledge systems, cultural continuity and dynamism to survive in the widely varied and sometimes extreme environments of the ancient Australian continent.

Activity

1. Create a table to list some of the words used to describe the activity of first Australians in deep history by Gerritsen, Gammage, Pascoe and Sutton and Walshe.
2. What are the principal differences between the three main positions in the Dark Emu debate? How would you summarise the debate?

Further activity

1. Conduct some research and find 2-3 media articles about Dark Emu. They should be from varying perspectives. What do these articles reveal about this debate in public? Consider the authors, the language they use and their claims about Dark Emu (or Bruce Pascoe).

⁴ H. Lourandos, 'Review of Australia and the Origins of Agriculture by Rupert Gerritsen', *Australian Archaeology* 70 (2010): 75-77.

⁵ J. McDonald, 'Archaeology, deep history and the culture wars: Why most archaeologists have not critiqued Dark Emu', *Australian Archaeology*, 87, no. 3 (2021), 313-315.

Ancient Australian Heritage: Significance, Conservation & Repatriation

Key Questions

How are the surviving archaeological sites, ancestral remains, and material culture managed today?

What is the role of collaboration between First Nations Australians and other individuals and groups to ensure the conservation of culturally sensitive material and sites?

Section 4 Glossary

cultural heritage: the tangible and intangible heritage assets of a group or society that have been inherited from previous generations.

intellectual property: intangible property created by human intellect.

outstanding universal value: cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of humanity.

provenance: the place of origin or context.

Traditional Owner: a descendant of the tribe or ethnic group that occupied a particular region before European settlement.

World Heritage: places of cultural and/or natural sites considered to have 'Outstanding Universal Value', which have been inscribed on the World Heritage List by the World Heritage Committee.

4.1 Cultural Significance for Indigenous Australians

Indigenous Australians have long fought for the right to control, manage and interpret their own heritage. As the Traditional Owners of Country and the custodians of an ongoing living culture, they are recognised as one of the oldest continuing cultures in the world. The places where their ancestors lived in deep history hold spiritual importance, since the features of the landscape, sacred sites and artefacts all embody ancestral spirits and stories. Flaked and ground stone artefacts, for example, were not only used for hunting and food processing, but they also hold a special spiritual meaning – they are thought to hold the spirits of the ancestors who once owned them.

Many sites visited in the ancient past have continued to be used by Indigenous peoples since Europeans arrived on the continent, and even continue to be used today as important places for teaching and passing on cultural knowledge to future generations. In contrast, archaeologists see the sites as scientific evidence of people's lifeways from the past. As rock art specialist Distinguished Professor Paul Tacon has suggested, a better understanding of this difference, and finding ways to combine the two perspectives, is important for better conservation and management of heritage sites.¹

¹ P. Tacon, 'Connecting to the ancestors: Why rock art is important for indigenous Australians and their well-being', *Rock Art Research* 36, no. 1 (2019): 5-14.

Rock art is an essential part of culture and wellbeing for living Aboriginal Australians, allowing links to ancestors, Tjukurrpa/Dreamtime, and connecting them with important cultural stories, places and landscapes. They represent living histories, ancient memory narratives, and art traditions that tell the story of creating Country. For example, at Ubirr, in Kakadu National Park, rock art that has been continuously painted and repainted perhaps over 40,000 years depicts creation ancestors known as ‘mimi’ spirits, as well as animals from the area, many in a style known as ‘x-ray’ art. Many of the paintings are more recent, perhaps 2000 years old, and the site still has significance for living Indigenous people, with some of the paintings having been repainted into the modern era. Some Traditional Owners work as rangers in the National Park, guiding visitors around the site and explaining its significance.

Source 4.1

Wally Bell (Ngunawal elder), ‘Today’s Ngunawal culture and country: Archaeology from an Aboriginal perspective’, Canberra Archaeological Society, 19 April 2017, National Museum of Australia, <https://www.nma.gov.au/audio/canberra-archaeological-society/todays-ngunawal-culture-and-country-archaeology-from-an-aboriginal-perspective> (accessed 4 January 2023).

We believe country is where we come from... We’re here for a little while as custodians and then we return to the country and that’s why when I work with the country, I call upon the ‘spirit of the land’ which is also my ancestral spirit because that’s where everybody is. It’s our cultural belief that that’s where we all are. We have our dreaming stories. Our main one is about the creation of this country for us by our ‘creator being’. We call our creator being Budjabulya which is a serpent that lives in a place called Ngungara.

Figure 4.1 Ubirr sacred site, containing one of the most important rock art galleries in the World Heritage-listed Kakadu National Park, NT, source: Shutterstock / Serge Goujon.



Activity

1. Using the example of rock art, explain the concept of cultural significance in relation to ancient Australian sites.

4.2 Managing Indigenous heritage – registers, the law, access and threats

There are hundreds of thousands of ancient archaeological sites and moveable artefacts around Australia. Their registration, conservation and management is undertaken by heritage site managers, archaeologists, museums and traditional custodians, and artefacts and declared Aboriginal Places are managed and protected by legislation at federal and state levels.

Registration

Each state and territory of Australia has processes in place for recording and registering Indigenous heritage sites. Sites are listed on online databases, such as the Aboriginal Heritage Information Management System (AHIMS) in NSW, the Aboriginal Cultural Heritage Register and Information System (ACHRIS) (VIC), and the Register of Sacred Sites (NT), and related information and reports are held in physical archives. Since the location of many sites is restricted to prevent damage to sites, these databases can only be accessed by people or organisations who protect and manage the heritage and need detailed information on cultural heritage places and objects. These include Traditional Owners, heritage managers and advisors, museums, archaeologists, historians, anthropologists, landowners, heritage authorities, and anyone who has been granted a cultural heritage permit.

Heritage listing

Cultural heritage sites in Australia are organised on four levels of heritage lists, according to their assessed level of significance. All declared sites are registered by local governments, the most significant in each state or territory are registered on State Heritage Registers, and those considered most important to Australia as a nation are registered on the National Heritage List. A few of these sites, recognised for their global importance in the history of humanity, are also inscribed on the UNESCO World Heritage List, and recognised for their outstanding universal value. These include:

- Buj Bim
- Kakadu
- Tasmanian Wilderness
- Uluru Kata-Tjuta
- Willandra Lakes
- Blue Mountains

Legislation

Legislation to protect both Indigenous and European heritage in Australia has been developed gradually since the 1960s. Today, Indigenous cultural heritage is mainly the responsibility of state and territory governments. However, at the national level, there are currently three Acts of the Australian Parliament that protect cultural heritage. These allow the Commonwealth Government to take action if a state or territory government's laws fail to protect Indigenous cultural heritage, for sites listed on the World Heritage List, the National Heritage List or the Commonwealth Heritage List, and to protect moveable objects (such as artworks, traditional and sacred objects, and Ancestral Remains) from export. The Acts are:

- Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (ATSIHP Act)
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Protection of Movable Cultural Heritage 1996 (PMCH Act)

Each state and territory also has an act of parliament in place to protect cultural heritage within its boundaries. These are identified in Table 4.1.

Table 4.1: State legislation protecting Indigenous cultural heritage

Australian Capital Territory	<i>Heritage Act 2004</i>
New South Wales	<i>National Parks and Wildlife Act 1974</i>
Northern Territory	<i>Aboriginal Sacred Sites Act 1989</i> <i>Heritage Act 2011</i>
Queensland	<i>Aboriginal Cultural Heritage Act 2003</i> <i>Torres Strait Islander Cultural Heritage Act 2003</i>
South Australia	<i>Aboriginal Heritage Act 1988</i>
Tasmania	<i>Aboriginal Heritage Act 1975</i>
Victoria	<i>Aboriginal Heritage Act 2006</i> <i>Heritage Act 2017</i>
Western Australia	<i>Aboriginal Cultural Heritage Act 2021</i>

Access

As cultural heritage is protected by legal instruments, individuals who want to research or engage in any activity relating to Aboriginal heritage must apply for a cultural heritage permit from the relevant state or territory heritage authority. This activity could include:

- excavation or disturbance of a site to uncover or discover Aboriginal cultural heritage
- rehabilitation of land at an Aboriginal place
- re-burial of Aboriginal Ancestral Remains at an Aboriginal place
- conducting research on an Aboriginal place
- conducting an activity that will, or is likely to, harm Aboriginal cultural heritage
- selling an Aboriginal object (where it was not made for the purpose of sale)
- removing an Aboriginal cultural heritage object from its original state or territory

Threats

The preservation of Indigenous cultural heritage sites is threatened by numerous factors. Erosion, fire and extreme weather events such as flooding and rising sea levels caused by climate change can expose, damage, or destroy fragile archaeological sites. Notably those situated on coasts around the mainland and Australia's island territories are endangered from rising sea levels and storms. Natural resource extraction and development activities such as open cut mines, the levelling of sand dunes, clearing of native bushland and road and infrastructure building are also potentially highly destructive. For example, in 2020 a sacred cave in Juukan Gorge in the Hammersley Ranges, Western Australia was catastrophically destroyed during the expansion of Rio Tinto's nearby iron ore mine. It contained evidence of 46,000 years of continuous occupation and a 4000-year connection with the current traditional owners of the site. Juukan 2 had been timetabled for destruction in 2013, when the company had been granted permission to expand the mine. A year later, a salvage excavation intended to rescue the site's evidence before it was destroyed found that the site was twice as old as previously thought. Outdated heritage legislation failed to prevent the destruction of the site.

In Victoria, a plan to widen the Western Highway threatened about 3000 trees, six of which were scar trees, birthing trees, or otherwise culturally modified, and considered to have social and cultural significance. The Djab Warrung Heritage Protection Embassy, which argued for their protection, insisted that the trees were living beings that embodied their stories throughout the landscape.

Damage and destruction of sites can also occur by hiking, climbing (drilling holes or drawing on rock art with chalk) and recreational off-road driving. Climbing has been banned as a result in some highly sensitive areas such as the Grampians National Park in Victoria. Vandalism has also damaged and destroyed sites and is one of the reasons why the location of many sites is restricted and access to heritage databases is only for heritage practitioners.

While tourism at Indigenous heritage sites is often successful, and there is increasing awareness and attempts to reduce the impacts, there are many examples of the destructive impacts of tourists on sensitive cultural heritage sites. Excessive numbers of tourists, and related tourism infrastructure and facilities such as car parks, signage and walking tracks, can destroy the physical features of the very sites they came to see. At Ubirr, one of the most important rock art sites in the World Heritage listed Kakadu National Park, tourists have been visiting in large numbers since the early 1980s. One study found that the installation of barriers and boardwalks were effective in dissuading visitors from touching the rock art and educational signage helped to reduce vandalism. In addition to the physical impacts, there can also be negative social and cultural impacts for Indigenous communities, such as at Uluru in Central Australia, a sacred place for the traditional owners, the Anangu, and a World Heritage site. Despite the Anangu long demanding a ban on climbing the sacred rock, tourist climbers continued for decades, causing significant erosion of the sandstone along the historic climbing route and polluting the site's sensitive ecology.

Conservation

The conservation of Indigenous heritage sites relies on a combination of laws, policies, recording, registration, scientific and practical techniques and collaboration. The largest and most significant sites have Conservation Management Plans drawn up by teams of experts. These important documents outline everything that is known about the place and how it should best be managed to ensure its preservation for the future. When sites are threatened by forces such as erosion or the impacts of tourism, practical measures can be taken to help conserve the values of the site. At highly sensitive places, such as Uluru and rock art sites in Kakadu, practical measures such as bans on climbing or approaching the rock art are enforced to stop the damage caused by tourists. In the cases where natural forces are damaging or threatening heritage sites, ongoing maintenance and monitoring and mitigation measures are crucial.

Source 4.2

Dr Chris Wilson (Flinders University, Ngarrindjeri man) quoted in K. Pollard, C. Smith, J. Willika, V. Copley Snr, C. Wilson, E. Poelina-Hunter and J. Ah Quee, 'Indigenous views on the future of public archaeology in Australia', *Archaeologica Publica: Online Journal in Public Archaeology* 10 (2020): 31-52.

The main concern is the ongoing impacts that mining and government economic interests have on heritage legislation and archaeological ethics. The discipline [archaeology] in Australia has been very supportive of Indigenous rights and the protection of archaeological sites but further exploration of duty-based ethics and relationship to industry and Indigenous communities is needed. One of the solutions to overcome this is more formal training and education for Indigenous peoples.

Activity

1. Why are the main threats to Aboriginal heritage sites?
2. Outline some of the main strategies used to help conserve important deep time history sites in Australia.
3. Using Source 4.2, explain some of the main challenges to conserving deep time sites in Australia.

4.3 The importance of collaboration

For many decades, archaeologists and anthropologists around the world worked independently of Indigenous people, treating them only as the subject of study. In Australia, in addition to being excluded from the investigations into their own history, Aboriginal peoples' connections to their lands, languages and traditional knowledges were disrupted and prevented by dispossession, frontier violence, forcible migrations to missions and reserves, banning of Indigenous languages and child removal.

However, since the 1980s, the question 'Who owns the past?' became increasingly prominent and policies and legislation began to change, with recognition that intellectual property for cultural heritage rests with the Traditional Owners with links to Country. Archaeologists, anthropologists and historians now work alongside Aboriginal people and there is a cultural renaissance, with people reviving languages and knowledge systems, practising art and ritual. Aboriginal people are connecting with ancestors through working on archaeological projects about deep time.

Who owns the past?

In 1983 a group of archaeologists, anthropologists, Aboriginal people, historians, museum professionals and other scholars met in Canberra to hold a symposium entitled 'Who owns the past?'.¹ Their papers and discussion sought to answer three difficult questions: who owns the artefacts and heritage of the past? What purpose does heritage serve in the present? And how and why do our perceptions of the past affect our understanding of the present, and vice versa?

At the symposium, Canadian archaeologist Professor Bruce Trigger argued that Indigenous scholars and archaeologists must be recruited and provided with the necessary resources to study their own culture and history as well as the history of settlers in Australia. Australian archaeologist and heritage manager Sharon Sullivan also suggested that research into Indigenous culture in Australia to date had been largely irrelevant to Aboriginal peoples, and she also insisted on the need to encourage and facilitate Indigenous people studying Australia's ancient past. This important symposium reflected early developments in the changing approach to the study of the ancient past in Australia, towards the involvement of Aboriginal people in studying their own culture and history.

¹ I. McBryde (ed) *Who owns the past? Papers from the annual symposium of the Australian Academy of the Humanities* (Melbourne: Oxford University Press, 1985).

Combining expertise in traditional cultural knowledge with Western scientific and scholarly approaches, collaborative teams of Australian First Nations knowledge holders and non-Indigenous archaeologists and historians are now standard practice. The widespread aim is that Indigenous people are treated as equal partners in the study of their culture and history. This process is recognised as important for broader efforts towards creating social justice, recognition of Indigenous knowledge, re-building identities, reconciliation and decolonising the approaches of the past. The collaborative process allows the community to assert ownership of the site, train younger community members as site managers and record cultural knowledge for 'Caring for Country'.

Increasingly, Aboriginal Australians are becoming qualified and practising as archaeologists and heritage managers and a group of Indigenous archaeologists formed the Australian Indigenous Archaeologists' Association. There are still relatively few Aboriginal people working as archaeologists, and publications are still mainly written by non-Indigenous archaeologists. Traditional Owners are increasingly working in collaborative teams for cultural heritage management and are attendees and speakers at heritage conferences and events. But collaboration can be challenging – Indigenous archaeologists may be required to balance conflicting approaches and expectations of the archaeology profession and Traditional Owners, and non-Indigenous archaeologists need to shift their approach

from working with Traditional Owners, to working for them.¹ Traditional knowledge systems are now being considered in collaborative projects, such as how biologists can learn from traditional knowledge of plants as medicines and food.

Archaeologists now regularly work with Aboriginal communities and traditional owners across Australia to identify, record and excavate sites and analyse archaeological evidence and to manage the tangible and intangible value of Indigenous cultural heritage. Indigenous people are also routinely involved in the planning and daily management of many cultural heritage sites and active in collaborative approaches to conservation. For example, small teams of Traditional Owners, rock art specialists and national park rangers work together to take care of rock art in Kakadu National Park. Ideally, Indigenous cultural knowledge is considered first, and western scientific conservation techniques are brought into use to support the traditional knowledge.

McGrath, Rademaker and Silverstein have suggested that ‘deep listening’ to Indigenous people is an approach that might allow for more mutually beneficial and satisfying collaborations in the interpretation and management of sites such as at Willandra Lakes.² Management of the 20,000-year-old footprints that ancient Australians left there involves collaboration between First Nations custodians, archaeologists and government agencies. After erosion of the site exposed the footprints, and a young Mutti-Mutti woman ‘discovered’ them, the site was excavated and recorded. But the erosion was ongoing and the discussions and planning of the collaborative team resulted in the reburial of the excavated site as the agreed strategy for best protecting it from the harsh desert conditions.³ McGrath has also pointed out how the footprints have highlighted how attributing the Western concept of ‘discovery’ to an Indigenous person is problematic and, more generally, how the Western ‘discovery’ of archaeological evidence is often an uncomfortable fit with Indigenous cultural values.⁴ For example, for local Aboriginal tribes, these remains were not simply ‘evidence’. Rather than being uncovered or discovered, they consider that the ancestral remains and footprints left behind at Willandra Lakes actively surfaced for a reason and that people living today have a duty to the ancestral spirits.

Collaboration plays a fundamental role in the ongoing management of Indigenous cultural heritage in Australia, especially in relation to the repatriation of Ancestral Remains. It is crucial for traditional knowledge to be incorporated into efforts to repatriate Ancestral Remains, so that the process is culturally and ethically appropriate.⁵

However, despite many successful outcomes from recent years, it has also been observed that often, when the significance of cultural heritage places is formally assessed, the level of input from Aboriginal people is minimal at best, and scientific archaeological concepts of significance are still prioritised.⁶ In response, in Victoria, the work of the Bunurong Land Council Aboriginal Corporation frames significance assessment according to the concept of Country, integrating scientific archaeological approaches with Aboriginal cultural values and community perspectives. Their process allows Aboriginal community perspectives to inform the management and conservation of sites in ways that are meaningful to the Traditional Owners and through methods that decolonise understandings of the past.

1 C. Smith, H. Burke, J. Ralph, et al. ‘Pursuing Social Justice Through Collaborative Archaeologies in Aboriginal Australia’, *Archaeologies* 15 (2019): 536–569.

2 A. McGrath, L. Rademaker and B. Silverstein, ‘Deep history and deep listening: Indigenous knowledges and the narration of deep pasts’, *Rethinking History* 25, no. 3 (2021): 307–326.

3 C. Macgregor, ‘Preserving the Ancient Human Trackways Site in the Willandra Lakes World Heritage Area’, *Studies in Conservation* 67, no. 1 (2022): 150–155.

4 A. McGrath, ‘People of the Footprints: Rediscovery, Indigenous Historicities and the Science of Deep Time’, *Interventions* 24, no. 2 (2021): 181–207, DOI: 10.1080/1369801X.2021.1972822

5 A. Weisse, ‘Provenancing Australian Aboriginal Ancestors: The Importance of Incorporating Traditional Knowledge’, in C. Meloche, L. Spake, K. Nichols (eds) *Working With and For Ancestors: Collaboration in the Care and Study of Ancestral Remains* (London: Routledge, 2020).

6 D. Tutchenner, R. Kurpiel, A. Smith and R. Ogden, ‘Taking control of the production of heritage: Country and cultural values in the assessment of Aboriginal cultural heritage significance’, *International Journal of Heritage Studies* 27, no. 12 (2021): 1310–1323.

Source 4.3

Professor Jacqui Huggins (Bidjara, Biri Gubba and Juru woman) 'Walking Deep History: Carnarvon Gorge', Marking Country, Research Centre for Deep History, <https://re.anu.edu.au/marking-country/carnarvon-gorge/> (accessed 14 November 2023).

Never think that scientific evidence is the best way to go, because it's the knowledge of our people that will stop these places being ruined.

Source 4.4

Vince Copley Senior (Ngadjuri elder) quoted in K. Pollard, C. Smith, J. Willika, V. Copley Snr, C. Wilson, E. Poelina-Hunter and J. Ah Quee, 'Indigenous views on the future of public archaeology in Australia', *Archaeologica Publica: Online Journal in Public Archaeology* 10 (2020): 35.

Archaeology opens the doors to information and knowledge that people like myself [Indigenous Australians] have unfortunately missed out on. To me, it brightens the light in my head... archaeology seems to be something that I have been looking for in terms of finding country and finding out about people that were close to me that had the knowledge that I haven't got... Archaeology records. It puts our history on a record. Prior to any archaeological record of Indigenous culture in Australia we were classed as 'prehistoric', which puts you in line with Neanderthals or even dinosaurs in people's minds. Archaeology documented our culture as Australian history. Through archaeology and anthropology we have a record of our culture that is accepted by the public...

The archaeological record can be used to address racist assumptions or misconceptions... Today, we have the documented evidence that has been collected by archaeology and anthropology, so when you come across people who say something ignorant, you can say 'That's not right'.

Source 4.5

Julie Ah Quee (Flinders University) quoted in K. Pollard, C. Smith, J. Willika, V. Copley Snr, C. Wilson, E. Poelina-Hunter and J. Ah Quee, 'Indigenous views on the future of public archaeology in Australia', *Archaeologica Publica: Online Journal in Public Archaeology* 10 (2020): 42.

My biggest concern is: How much of the work that's done today reflects the actual wants and needs of an Aboriginal community or the academic and funding bodies' agendas and priority? If that is the nature of the beast, how can money and resources be raised to allow community-driven projects to come to fruition? Are there alternative ways to raise funding? Can community archaeology be publicly funded, for example.

Activity

1. Go to the UNESCO World Heritage website and read the entries for the World Heritage listed Indigenous cultural sites in Australia. Explain why you think they are considered so important in the history of humanity, and were eligible for recognition alongside sites like the Pyramids of Giza and the Great Wall of China.
2. Compare the perspectives offered in Sources 4.3, 4.4, and 4.5. What insights do they offer about Australia's deep time past?
3. Discuss in class how 'contested knowledges' and differing attitudes might create challenges for the study of deep history and the conservation of Aboriginal heritage sites.

4.4 Repatriating Ancestral Remains and cultural objects

History of collecting, studying and displaying Ancestral Remains

In the eighteenth to twentieth centuries, the remains of Indigenous people from many countries, including America, Canada and Australia, were excavated and collected for scientific research and display in museums. This was done without consent, against the will of Indigenous peoples, and sometimes in ways that are now considered unethical. Colonial scientists considered them 'curiosities' of what they thought to be 'dying races'. It is now known that the study of their remains has caused physical harm and been intensely culturally insensitive. For example, Norman and Payne give the example of the display of Tasmanian Aboriginal woman Truganini, who was considered by settler Tasmanians as the 'last of her people'. At the end of her life, knowing that the Royal Society of Tasmania wanted her body when she died, she pleaded not to be dissected, and to be buried behind the mountains where her body could not be found.¹ But her body was exhumed and her skeleton was displayed at the Tasmanian Museum and Art Gallery between 1904 and 1947.

In 1911 Australian laws introduced greater regulation of the export of skeletons for anthropological study. Their removal from Australia was prohibited unless approved by a recognised scientific organisation and the Australian government. But this change meant that many remains were smuggled out of Australia illegally to enter the big European institutions and private collections.² Rather than being created out of concern for Indigenous peoples, the new law seems to have been to protect the interests of Australian scientists who wanted to retain the remains for their own study. Despite Aboriginal people objecting and trying to prevent the disturbance of burial grounds, archaeologists, property owners and the police continued to collect and deposit Indigenous remains in Australian institutions until as recently as 1980.

The number of Indigenous Australians whose remains are stored in collecting institutions is unknown, but research commissioned by the Australian Institute of Aboriginal and Torres Strait Islander Studies suggests that the remains consist of between 500 and 1400 unprovenanced individuals and a further 3000 with limited provenance.³ The actual number is probably higher, if considering private collections and other types of remains such as blood samples, hair samples, casts and ash bundles.

New policies and Laws

Attitudes began to change in the 1970s and 1980s, including efforts to decolonise institutions and begin repatriation of Ancestral Remains. There was a gradual recognition of the fact that human remains are not simply scientific specimens, and especially for the descendants of those people and contemporary Indigenous communities, the return of their remains to the places where they lived and died is of primary importance. For many decades, Indigenous people fought for the return of their ancestors' remains, and a dialogue gradually developed between Indigenous peoples and collecting institutions. Government policies and laws now govern the way human remains are managed. If human remains are now found in situ, they must not be disturbed, and those remaining in museum collections are not to be publicly displayed. This process is crucial for reconciliation, and is recognised as the return of dignity, authority, responsibility and identity to the relevant communities.⁴

A dramatic shift has also occurred in the way secret-sacred cultural objects are curated in museums. Largely collected through trade with anthropologists and museum collectors during the nineteenth

1 H. Norman and A-M. Payne, 'Nowhere Else but Home: A National Resting Place for Indigenous Australian Ancestral Remains', *Curator: The Museum Journal* Vol 65, no. 4 (2022): 817-834.

2 C. Fforde, M. Sumner, L. Sumner, T. Besterman and S. Hemming, 'Ancestors or Artefacts: Contention in the Definition, Retention and Return of the Ngarrindjeri Old People', in F. Bodenstein, D. Otoiu, E-M Troelenburg (eds) *Contested Holdings: Museum Collections in Political, Epistemological and Artistic Processes of Return* (New York: Berghahn, 2022), 117.

3 Pers. Comm. Fforde, 2020, in H. Norman and A-M. Payne, 'Nowhere Else but Home: A National Resting Place for Indigenous Australian Ancestral Remains', *Curator: The Museum Journal* 65, no. 4 (2022): 817-834.

4 M. Pickering, 'Rewards and frustrations: Repatriation of Aboriginal and Torres Strait Islander ancestral remains by the National Museum of Australia', in C. McCarthy (ed.) *Museum Practice: Critical debates in the museum sector, International Handbook of Museum Studies* (John Wiley & Sons, Ltd, 2015), 455-478.

century to the mid-twentieth century, by nature, these cultural objects cannot be publicly displayed or discussed, requiring sensitivity, resources and policies acceptable to Indigenous groups.⁵

Safekeeping Ancestral Remains

Revisions in attitudes have resulted in a re-evaluation of approaches to curating and providing access to remains and a recognition of the ethical concerns involved. Many Australian museums, and others around the world, have now established 'keeping places' for unprovenanced remains and those awaiting return. These are stored under strict conditions and governed by restricted access and cultural protocols. Several museums around Australia receive funding for such safekeeping, including the Australian Museum, Museum and Art Gallery of the Northern Territory, Museum Victoria, National Museum of Australia, Queensland Museum, South Australian Museum, Tasmanian Museum and Art Gallery and Western Australian Museum.

Repatriating Ancestral Remains

Many museums, both in Australia and overseas, now have programs in place to organise the return and reburial of Ancestral Remains, including those excavated from archaeological sites in recent decades as well as secret and sacred objects also held in museum collections. But the path to this approach was gradual, with some museums initially only agreeing to return named individuals, those less than one hundred years old, or those with proof of biological links.⁶

A range of challenges are presented however, including the questions of how it should be done, to whom, and where; if remains should be reburied or remain in keeping places to allow future access, how and where remains should be buried if traditional burial grounds no longer exist, and whether communities are able or willing to receive the remains. As Turnbull notes, returning Ancestral Remains is challenging and stressful for Indigenous communities, as they are required to confront issues of loss of ancestral lands, questions of authority and the history and experience of colonialism.⁷ Challenges can also be met when remains belong to more than one group and there are conflicting ideas about how to appropriately return and rebury the ancestor.

Some of the remains were collected and stored with information about their provenance – where they were collected – which allows museums to connect with the relevant custodians and Indigenous groups to return the remains, though what constitutes accurate provenance is under question. However, for many Ancestral Remains in museum collections, information about where the bones were found or to which cultural group the person belonged was never recorded, or has been lost, making repatriation to the right place very difficult or impossible. Unprovenanced remains being returned from overseas collections are transferred into storage at the National Museum of Australia. Those in Australian museums usually remain indefinitely in each institution's keeping place.

Genomic research

To resolve this problem, in 2018 Australian archaeologists and other scientists tested DNA-based methods, by sequencing genomes from ancient Australians of known provenance and connecting them to the same genomes found in contemporary Aboriginal Australians of known provenance.⁸ Using this technique, scientists are able to identify the origins of unprovenanced ancient human remains and are creating genomic maps and databases that can help connect ancient and historical era Indigenous remains with their living descendants and regional groups. This information has been used to assist with repatriating the remains to the relevant communities. For example, the individuals excavated from Coobool Creek, which became part of the University of Melbourne collection, were

5 J. Gibson, 'Aboriginal secret-sacred objects, their values and future prospects', in Howard Morphy and Robyn McKenzie (eds) *Museums, Societies and the Creation of Value* (London: Routledge, 2021).

6 C. Fforde, M. Sumner, L. Sumner, T. Besterman and S. Hemming, 'Ancestors or Artefacts: Contention in the Definition, Retention and Return of the Ngarrindjeri Old People', in F. Bodenstein, D. Otoiu, E-M Troelenburg (eds) *Contested Holdings: Museum Collections in Political, Epistemological and Artistic Processes of Return* (New York: Berghahn, 2022), 117.

7 P. Turnbull, 'International repatriations of Indigenous human remains and its complexities: the Australian experience', *Museum and Society* 18, no. 1 (2020): 6-19.

8 J. Wright, et al. 'Ancient nuclear genomes enable repatriation of Indigenous human remains', *Science Advances* 4, no. 12, 2018.

returned to the community for reburial in 1985. While the genomic research method of matching remains with living groups is highly valuable, some traditional knowledge holders believe that reconnecting the remains with places is more significant than connecting them genetically, so DNA linking is not always considered appropriate.⁹

National Resting Place

Aboriginal and Torres Strait Islander peoples have been campaigning for decades for the Australian Government to establish a resting place for unprovenanced Ancestral Remains, with an Indigenous-centred approach, as an alternative to the keeping places in museums around Australia. Finally, in January 2022, the Australian Government announced its intention to establish a National Resting Place within Ngurra (meaning 'home'), a new national Aboriginal and Torres Strait Islander cultural precinct in Canberra. It will provide culturally appropriate long-term care for the Indigenous Ancestral Remains returned to Australia from collections overseas, if their provenance cannot be determined and their return to the relevant community not possible.

Case Study 1 – The Ngarrindjeri repatriation

Australia's largest repatriation to date is that of the remains of over 300 Ngarrindjeri Old People from the Edinburgh Collection in 2003.¹ Remains of a further thirteen individuals were returned in 2016. But the skull of one of these individuals was considered an artefact by the museum, since it had been modified with a rope handle and contained grass – a rare example of remains modified in this way, which Western scholars refer to as a 'cranial drinking cup'. For descendants, these are not artefacts, they are the Ancestral Remains of high-status knowledge holders whose skulls had been ceremonially transformed into vessels. They believe that knowledge was passed on to those who drank water from the vessel. Examples of these vessels exist in a number of museums in the United Kingdom, such as the Pitt Rivers Museum, but the meaning ascribed to them as cultural artefacts meant that the museums initially refused to repatriate them, effectively judging the descendants' knowledge as invalid, and remaining in their colonising mindset.² In the case of the skull in the Edinburgh Collection, a government decision finally overruled the museum's attitude, and it was repatriated. There were also other cultural, political and economic challenges in the process, including resources needed to fund community meetings to decide on how to manage the reburial, negotiations with governments for land and approvals, and finding appropriate storage facilities until the reburials.

1 C. Wilson, 'Implications and challenges of repatriating and reburying Ngarrindjeri Old People from the Edinburgh Collection', *Museum International* 61, no.1-2 (2009): 37-40.

2 C. Fforde, M. Sumner, L. Sumner, T. Besterman and S. Hemming. 'Ancestors or Artefacts: Contention in the Definition, Retention and Return of the Ngarrindjeri Old People', in F. Bodenstein, D. Otoiu, E-M Troelenburg (eds) *Contested Holdings: Museum Collections in Political, Epistemological and Artistic Processes of Return* (New York: Berghahn, 2022), 117.

9 A. Weisse, 'Provenancing Australian Aboriginal Ancestors: The Importance of Incorporating Traditional Knowledge', in C. H. Meloche, L. Spake, and K.L. Nichols (eds) *Working With and For Ancestors: Collaboration in the Care and Study of Ancestral Remains* (London: Routledge, 2020).

Case Study 2 – To re-bury or not? The case of Mungo Man and Mungo Lady

In early 2021 plans had been established for the reburial of the remains of over 100 ancient Aboriginal people, including Mungo Man and Mungo Lady, who it has been observed are ‘arguably the two most important people who ever lived in Australia’.¹ That is because their remains and the way they were interred tens of thousands of years ago play a crucial role in the understanding of how modern humans dispersed and occupied Earth’s continents, and how they adapted to ancient climate change. During the 1980s the remains were excavated and some were collected by archaeologists after they had been exposed due to erosion. DNA was retrieved from one individual, but the majority have not been the subject of research. All parties involved agreed that the remains needed to be returned to Country, but the management of the remains was complicated.

An Indigenous perspective

During the 1980s and 1990s Aboriginal people fought for the repatriation of these Ancestral Remains, and in 1992 and 2017-8 they were returned to Willandra Lakes. A National Congress of Australia’s First Peoples agreed that a keeping place and monument should be built on the site, rather than the remains being reburied. But in 2018 representatives of the Barkindji/Paakantji, Mutthi Mutthi and Ngiyampaa peoples met, without input from paleoanthropologist or biological anthropologists, and they approved a plan for reburial, disrespecting the Elders’ original vision and causing an ongoing dispute between Aboriginal groups.

A scientific perspective

This caused significant concern for scientists, who argued that reburial of the remains in unmarked graves would result in a significant loss of future knowledge, by preventing study of the remains when new dating techniques become available in future.² For example, the remains have the potential to reveal new insights into the ancestry of the First Australians, the burial practices of the people of Willandra Lakes, how people adapted to climate change, and the migration of people across the continent, especially during the peak of the ice age, 40,000 to 20,000 years ago. The discovery and dating of the Mungo remains is recognised internationally, influencing the work of scientists and changing the perception of the deep human past of Australia. A keeping place was preferred as it would enable future learning.

The outcome

Despite ongoing disputes and an injunction filed by the three Indigenous groups to delay the reburials to allow for further consultation, the remains of Mungo Man and Mungo Lady were removed from storage and reburied on 24 May 2022. The NSW Government had not authorised or endorsed the re-burial.

Source 4.6

Alice Kelly (Mutthi Mutthi elder) quoted in ‘Mungo Reburial Public Information Session on Govt. plan for secret reburial of Ancestral Remains’, <https://www.youtube.com/watch?v=Ba7LQXZEbcE> (accessed 15 November 2022).

I’d like to build a centre out there, a keeping place, but I don’t want them to study those bones no more. A keeping place would be better because it [the remains] could fall into restless hands or development could damage it. I want those remains safe in one place so they can’t be disturbed.

1 M. Westaway, D. Williams and J. Kelly, ‘Mungo ancestral remains reburial proposal disrespects the Elders’ original vision’, *The Conversation*, 4 August 2021: <https://theconversation.com/mungo-ancestral-remains-reburial-proposal-disrespects-the-elders-original-vision-164854> (accessed 15 November 2022).

2 M. Westaway, D. Williams and J. Kelly, ‘Mungo ancestral remains reburial proposal disrespects the Elders’ original vision’, *The Conversation*, 4 August 2021: <https://theconversation.com/mungo-ancestral-remains-reburial-proposal-disrespects-the-elders-original-vision-164854> (accessed 15 November 2022).

Case Study 2 (continued from previous page)

Source 4.8

Mary Pappin (Mutthi Mutthi elder) transcription of video excerpt in 'Mungo Reburial Public Information Session on Govt. plan for secret reburial of Ancestral Remains', <https://www.youtube.com/watch?v=Ba7LQXZEbcE> (accessed 15 November 2022).

Somewhere along the lines we got overstepped... we preached to them [government] that Mungo was a sharing place for all Aboriginal people and all walks of life... What's happened to us? We're fighting against everything, to keep our cultural heritage... They can't go back in the ground until after we get our keeping place... [it] was going to be the place where they should go... We didn't want them locked away and buried so that they could never be seen again. We knew we would need them one day to explain to the rest of the world how precious these people were to us...

Activity

1. What are some of the key considerations involved in the repatriation of human remains and cultural objects?
2. Why can Mungo Man and Mungo Lady be considered two of the most important people who ever lived in Australia?
3. Explain how and why their remains were managed the way they were. Discuss ways that the process and outcome might have been made more successful for both Traditional Owners and future scientific research.
4. *Repatriation of remains and cultural objects is always the best option.* To what extent do you agree with this statement?

References and Further Reading

- Adcock, G., E. Dennis, S. Easteal and A. Thorne, 'Mitochondrial DNA sequences in ancient Australians: Implications for modern human origins', *Proceedings of the National Academy of Sciences of the United States of America* (PNAS) 98, no. 2 (2001): 537-542.
- Allen, J. and J. F. O'Connell, 'A different paradigm for the initial colonisation of Sahul', *Archaeology in Oceania* 55 (2020): 1-14.
- Attenbrow, V. *Sydney's Aboriginal Past: Investigating the archaeological and historical records* (Sydney: University of NSW Press, 2010) (2nd ed).
- Benjamin, J. et al. 'Aboriginal artefacts on the continental shelf reveal ancient drowned cultural landscapes in northwest Australia', *PLoS ONE* 15, no.7 (2020).
- Bird, M.I., R.J. Beaman, S.A. Condie, A. Cooper, S. Ulm and P. Veth, 'Palaeogeography and voyage modeling indicates early human colonization of Australia was likely from Timor-Roti', *Quaternary Science Reviews* 191 (2018): 431-439.
- Bowdler, S. 'Hunters in the Highlands: Aboriginal adaptations in the eastern Australian uplands', *Archaeology in Oceania* 16 (1981): 99-111.
- Brown, P. *Coobool Creek: a morphological and metrical analysis of the crania, mandibles and dentitions of a prehistoric Australian human population*, Terra Australis 13, Department of Prehistory, Australian National University, 1989, <https://openresearch-repository.anu.edu.au/handle/1885/127428>
- Cane, S. *First Footprints: The epic story of the First Australians* (Crows Nest, NSW: Allen & Unwin, 2013).
- Clarkson, C., Z. Jacobs, B. Marwick, R. Fullagar, L. Wallis, R.G. Roberts, E. Hayes, K. Lowe and X. Carah, 'Human occupation of northern Australia by 65,000 years ago', *Nature* 547, no. 7663 (2017): 306-310.
- Crabtree, S., D. White, and C. Bradshaw et al. 'Landscape rules predict optimal superhighways for the first peopling of Sahul', *Nature Human Behaviour* 5 (2021): 1303-1313.
- Curthoys, A. and A. McGrath, *How to Write History that People Want to Read* (Sydney: UNSW Press, 2009).
- DeSantis, L., J. Field, S. Wroe and J. Dodson, 'Dietary responses of Sahul (Pleistocene Australia-New Guinea) megafauna to climate and environmental change', *Paleobiology* 43, no. 2 (2017): 1-15.
- Fforde, C., M. Sumner, L. Sumner, T. Besterman and S. Hemming. 'Ancestors or Artefacts: Contention in the Definition, Retention and Return of the Ngarrindjeri Old People', in F. Bodenstein, D. Otoiu and E-M Troelenburg (eds) *Contested Holdings: Museum Collections in Political, Epistemological and Artistic Processes of Return* (New York: Berghahn, 2022), 117.
- Field, J. and J. Dodson, 'Late Pleistocene Megafauna and Archaeology from Cuddie Springs, South-eastern Australia', *Proceedings of the Prehistoric Society* 65 (2014): 275-301.
- Field, J. and R. Fullagar, 'A large area archaeological excavation at Cuddie Springs', *Antiquity* 75, no. 290, (2015): 696-702.
- Field, J. and S. Wroe, 'Aridity, faunal adaptations and Australian late Pleistocene extinctions', *World Archaeology* 44, no. 1 (2012), 56-74.
- Fillios, M. and P. Tacon. 'Who let the dogs in?: A review of the recent genetic evidence for the introduction of the dingo to Australia and implications for the movement of people', *Journal of Archaeological Science* 7, no. 337 (2016).
- Flood, J. *Archaeology of the Dreamtime: The story of prehistoric Australia and its people* (Marleston, SA: Gecko Books, 2010) (rev. ed.).
- Fullagar, R., E. Hayes, B. Stephenson and J. Field, 'Evidence for Pleistocene seed grinding at Lake Mungo, south-eastern Australia', *Archaeology in Oceania* 50, no. S1 (2015).

- Gammage, B. *The Biggest Estate on Earth: How Aborigines Made Australia* (Sydney: Allen & Unwin, 2012).
- Gerritsen, R. *Australia and the Origins of Agriculture* (Oxford: British Archaeological Reports International Series 1874, 2008).
- Gibson, J. 'Aboriginal secret-sacred objects, their values and future prospects', in H. Morphy and R. McKenzie (eds) *Museums, Societies and the Creation of Value* (London: Routledge, 2021).
- Grant, S. *Talking to My Country* (Sydney: Harper Collins, 2017).
- Griffiths, B. *Deep Time Dreaming: Uncovering Ancient Australia* (Melbourne: Black Inc, 2018).
- Hayes, E., R. Fullagar, J. Field, et al. '65,000 years of continuous grinding stone use at Madjedbebe, Northern Australia', *Scientific Reports* 12, no. 11747 (2022).
- Hiscock, P. *Archaeology of Ancient Australia* (Oxford: Routledge, 2007).
- Hocknull, S., R. Lewis, L. Arnold, et al. 'Extinction of eastern Sahul megafauna coincides with sustained environmental deterioration', *Nature Communication* 11, no. 2250 (2020).
- Isaac, J. *Aboriginal Dreaming: 40,000 Years of Aboriginal History* (Sydney : Lansdowne Press, 1980).
- Johnson, M. *Australia's Ancient Aboriginal Past: A Global Perspective* (Melbourne: Australian Scholarly Publishing, 2021) (new ed.).
- Jones, R. 'Fire stick farming', *Australian Natural History* 16, no. 7 (1969): 224-228.
- Jones, R. 'Why did the Tasmanians stop eating fish?', in R. Gould (ed) *Explorations in Ethnoarchaeology* (Albuquerque, NM: University of New Mexico Press, 1978), 11-48.
- Kinsela, A. *Ancient Australia Unearthed* (Footscray, VIC: Plainspeak Publishing, 2014).
- Lourandos, H. 'Review of Australia and the Origins of Agriculture by Rupert Gerritsen', *Australian Archaeology* 70 (2010): 75-77.
- Lourandos, H. *Continent of Hunter-gatherers: New perspectives in Australian prehistory* (Cambridge: Cambridge University Press, 1997).
- Macgregor, C. 'Preserving the Ancient Human Trackways Site in the Willandra Lakes World Heritage Area', *Studies in Conservation* 67, no. 1 (2022): 150-155.
- Malaspinas, A.S., M. Westaway, C. Muller, et al. 'A genomic history of Aboriginal Australia', *Nature* 538 (2016): 207-214.
- Marshall, M., K. May, J. Lee and G. O'Loughlin, 'Looking After the Rock Art of Kakadu National Park, Australia', *Studies in Conservation* 67, no. 1 (2022): 156-165.
- McBryde, I. (ed) *Who owns the past? Papers from the annual symposium of the Australian Academy of the Humanities* (Melbourne: Oxford University Press, 1985).
- McDonald, J. 'Archaeology, deep history and the culture wars: Why most archaeologists have not critiqued Dark Emu', *Australian Archaeology* 87, no. 3 (2021): 313-315.
- McDonald, J., D. Donlon, J. Field, R. Fullagar, J. Coltrain, P. Mitchell and M. Rawson, 'The first archaeological evidence for death by spearing in Australia', *Antiquity* 81, no. 314 (2007): 877-885.
- McGrath, A. 'People of the Footprints: Rediscovery, Indigenous Historicities and the Science of Deep Time', *Interventions* 24, no. 2 (2021): 181-207, DOI: 10.1080/1369801X.2021.1972822
- McGrath, A. and M-A. Jebb (eds), *Long History, Deep Time: Deepening Histories of Place* (Acton, ACT: Australian National University Press, 2015).
- McGrath, A., L. Rademaker and B. Silverstein, 'Deep history and deep listening: Indigenous knowledges and the narration of deep pasts', *Rethinking History* 25, no. 3 (2021): 307-326.
- McGrath, A, L. Rademaker and J. Troy (eds) *Everywhen: Australia and the Language of Deep History* (Sydney: NewSouth Publishing, 2023).

- McNiven, I. and B. David (eds) *The Oxford Handbook of the Archaeology of Indigenous Australia and New Guinea* (Oxford: Oxford University Press, 2023).
- Morwood, M. *Visions from the Past: The Archaeology of Aboriginal Art* (Crow's Nest, N.S.W.: Allen & Unwin, 2003).
- Mulvaney, J. and J. Kamminga, *Prehistory of Australia* (St Leonards, NSW: Allen and Unwin, 1999).
- Mulvaney, K. 'Murujuga: Managing an Archaeological and Sacred Landscape Through Industry', in A.B. Fernandes, M. Marshall and I. Domingo (eds) *Global Perspectives for the Conservation and Management of Open-Air Rock Art Sites* (New York: Routledge, 2022).
- Noble, W. and I. Davidson, 'Why the First Colonisation of the Australian Region is the Earliest Evidence of Modern Human Behaviour', *Archaeology in Oceania* 27, no. 3 (1992): 135-142.
- Norman, K., J. Inglis, C. Clarkson, J.I. Faith, J. Shulmeister and D. Harris, 'An early colonisation pathway into northwest Australia, 70-60,000 years ago', *Quaternary Science Reviews* 180 (2018): 229-239.
- Norman, H. and A-M. Payne, 'Nowhere Else but Home: A National Resting Place for Indigenous Australian Ancestral Remains', *Curator: The Museum Journal* 65, no. 4 (2022): 817-834.
- Nunn, P.D. and N. J. Reid, 'Aboriginal Memories of Inundation of the Australian Coast Dating from More than 7,000 Years Ago', *Australian Geographer*, published online 7 September, 2015; DOI: 10.1080/00049182.2015.1077539.
- Oliveri, V., G. Porter, C. Davies and P. James, 'The Juukan Gorge destruction: a case study in stakeholder-driven and shared values approach to cultural heritage protection', *Journal of Cultural Heritage Management and Sustainable Development* 12 (2022).
- Pascoe, B. *Dark Emu: Black Seeds: Agriculture or Accident?* (Broome, Western Australia : Magabala Books, 2014).
- Pickering, M. 'Rewards and frustrations: Repatriation of Aboriginal and Torres Strait Islander ancestral remains by the National Museum of Australia', in C. McCarthy (ed.) *Museum Practice: Critical debates in the museum sector, International Handbook of Museum Studies* (John Wiley & Sons, Ltd, 2015), 455-478.
- Porr, M. and J. Matthews, 'Interrogating and decolonising the deep human past' in M. Porr and J. Matthews (eds) *Interrogating Human Origins* (London: Routledge, 2019).
- Rasmussen, M. et al. 'An Aboriginal Australian Genome Reveals Separate Human Dispersals into Asia', *Science* 334, no. 6052 (2011): 94-98.
- Research Centre for Deep History, 'Marking Country', Australian National University, <https://re.anu.edu.au/marking-country/>
- Robertson, G., V. Attenbrow and P. Hiscock, 'Multiple uses for Australian backed blades', *Antiquity* 83, no.320 (2009): 19-24.
- Saltr , F., J. Chadoeuf, K. Peters, et al. 'Climate-human interaction associated with southeast Australian megafauna extinction patterns', *Nature Communication* 10, no. 5311 (2019).
- Smith, C., Burke, H., Ralph, J. et al. 'Pursuing Social Justice Through Collaborative Archaeologies in Aboriginal Australia', *Archaeologies* 15 (2019): 536-569.
- Sutton, P. and K. Walshe, *Farmers or Hunter Gatherers?: The Dark Emu Debate* (Melbourne: Melbourne University Press, 2021).
- Tacon, P. 'Connecting to the ancestors: Why rock art is important for Indigenous Australians and their well-being', *Rock Art Research* 36, no. 1 (2019): 5-14.
- Teixera, J.C. and A. Cooper. 'Using hominin introgression to trace modern human dispersals', *Proceedings of the National Academy of Sciences* 116, no. 31 (2019):15327-15332.
- Tobler, R., A. Rohrlach, and J. Soubrier, et al. 'Aboriginal mitogenomes reveal 50,000 years of regionalism in Australia', *Nature* 544 (2017); 180-184.

- Tutchener, D., R. Kurpiel, A. Smith and R. Ogden, 'Taking control of the production of heritage: Country and cultural values in the assessment of Aboriginal cultural heritage significance', *International Journal of Heritage Studies* 27, no. 12 (2021): 1310-1323.
- Tuniz, C., R. Gillespie and C. Jones, *The Bone Readers: Atoms, genes and the politics of Australia's deep past* (Crows Nest, N.S.W. : Allen & Unwin, 2009).
- Turnbull, P. 'International repatriations of Indigenous human remains and its complexities: the Australian experience', *Museum and Society* 18, no. 1 (2020): 6-19.
- Veth, P. 'Breaking through the radiocarbon barrier: Madjedbebe and the new chronology for the Aboriginal occupation of Australia', *Australian Archaeology* 83, no. 3 (2017): 165-167, DOI: 10.1080/03122417.2017.1408543
- Weisse, A. 'Provenancing Australian Aboriginal Ancestors: The Importance of Incorporating Traditional Knowledge', in C.H. Meloche, L. Spake and K.L. Nichols (eds) *Working With and For Ancestors: Collaboration in the Care and Study of Ancestral Remains* (London: Routledge, 2020).
- Westaway, M. et al. 'Hidden in plain sight: The archaeological landscape of Mithaka Country, south-west Queensland', *Antiquity* 95, no. 382 (2021): 1043-1060.
- Westaway, M., D. Williams, and J. Kelly, 'Mungo ancestral remains reburial proposal disrespects the Elders' original vision', *The Conversation*, 4 August 2021: <https://theconversation.com/mungo-ancestral-remains-reburial-proposal-disrespects-the-elders-original-vision-164854> (accessed 15 November 2022).
- Wilson, C. 'Implications and challenges of repatriating and reburying Ngarrindjeri Old People from the Edinburgh Collection', *Museum International* 61, no. 1-2 (2009): 37-40.
- Wright, J., et al. 'Ancient nuclear genomes enable repatriation of Indigenous human remains', *Science Advances* 4, no. 12 (2018).