



GANDANGARA
Local Aboriginal Land Council

Marumali
Health Services
Transport Services

An Assessment of Traditional Ecological Knowledge (TEK) of Heathcote Ridge

Table of Contents

Executive Summary	4
Board Members and Yarn Up Elders in Residence Representatives	6
Our Team	7
Staff Journey	8
Elders Engagement	16
1. Introduction	18
1.1 Purpose of This Report	20
1.2 Scope and Application	20
1.3 Background to This Report	20
1.4 Cultural Background	22
1.5 Legal Authority	23
2. Research Methodology and Results	24
2.1 Literature Review	24
2.2 Aerial Photography	25
2.3 Information Available from GLALC Records	26
2.3.1 Cultural Significance of Land	26
2.3.2 Cultural Significance of Water	28
2.3.3 Cultural Significance of Species	28
2.3.4 Interviews with the Gandangara First Peoples Ranger Team	28
2.4. Review of the Archaeological Record	30
2.4.1 Analysis of AHIMS Records	31
2.4.2 Artwork	31
2.4.3 Stone Artefacts	31
3. Discussion and General Interpretations	32
4. Conclusions and Recommendations	35
5. References	37
6. Attachment A: AHIMS Site Card Data	39
6. Attachment B: Interview with Ranger Manager/Team Leader, Kelly Barton	44

Acknowledgement of Country

The name 'Gandangara' does not refer to the Traditional Custodians of the area within Gandangara's boundary. Definitively identifying the traditional owners or custodians of the land of our area is fraught with difficulty, given the reliability of historical sources and the contemporary perspective of identity politics and language revivalism. Early Gandangara documents and publications noted: 'the original owners of the land of our region are the Darug Nation and particularly the Cabrogal Clan, whom we acknowledge and to whose Elders and ancestors we pay deep respect.' (Board tenure 2011-2015). Gandangara has a nuanced position on the use of Dharug words because:

- Gandangara is aware of the Federal Court's decision in *Gale v Minister for Land & Water Conservation for the State of New South Wales* [2004] FCA 374, and in particular, Justice Madgewick's findings at paragraphs 34, 46 – 60, 105– 106, and 132 – 134 of that decision
- Gandangara's statutory objects require it to "improve, protect and foster the best interests of all Aboriginal people" within our area, including those who identify as Dharug and those who don't
- Gandangara would prefer to consult with its members before providing any view on the use of Dharug words for naming. That consultation has its own processes. Information and historical records about the Traditional Owners have come from early colonists and ethnographers observing Aboriginal people. Historical records are made through the lens of settler colonialism as found in the records of the early colonists (especially Watkin Tench, William Dawes and David Collins). The difficulty is compounded by the specific and severe dispossession and devastation inflicted upon the First Peoples of the Sydney area.

Traditional Custodians Academic scholarship on the topic of Traditional Owners in the South-Western Sydney area is scant; frequently cited sources include Kohen (1993 – although his work is controversial), Attenbrow (2003), Dreher (2006) and Gapps (2010).

Most of this scholarship acknowledges the traditional Country and language as being 'Darug' and the clan of the Cabramatta region as being 'Cabrogal' (or Gabrogal). Because of contemporary politics of representation around the history (and the current revivalism) of the Darug language, Gandangara chooses to focus on recognising the families within the Cabrogal clan as the traditional custodians of the land.

Research postulates that the historical connection of the Cabrogal clan as original to the South-Western Sydney area can be seen in the 'Cabra-' prefixes in place names such as Cabramatta, and in the Cabrogal grub, a woodworm whose provenance is the Cumberland plains. Historians note that a 'clan' of Aboriginal people was an extended family of up to around 60 persons and that the Cabrogal (also recorded as Ga-brogal or Cobrakall between the 1790s and 1800s) were the clan group original to the Cabramatta creek areas.

No descendants of this historical clan are recorded on the Register of Aboriginal Owners for Gandangara's area established under the ALRA. As such, Gandangara's community today is a multicultural collection of Aboriginal persons from many different families, clans, tribal and nation groups from many different countries. We acknowledge the Cabrogal clan as the Traditional Custodians of this land. Gandangara Local Aboriginal Land Council act as the statutory custodians of the Aboriginal persons living in this land.'

We honour our Elders past, present and emerging. More research needs to be conducted incorporating local Aboriginal perspectives in the construction of this history.

Executive Summary

This report has been prepared in fulfilment of a commitment to the Aboriginal Affairs NSW (AANSW), under the Community & Place 2024-25 Grant funding arrangement. It provides an analysis of Traditional Ecological Knowledge (TEK) – that special set of cultural and environmental understanding based on relationships between the physical and spiritual - that pertains to Heathcote Ridge. By carefully capturing and analysing this set of data, Gandangara Local Aboriginal Land Council (GLALC) aims to further enshrine the values of Australia's First Peoples into the New South Wales (NSW) Government's 'Connecting with Country' framework.

GLALC views connecting with country as more than a simple framework through which development and planning can be guided towards minimal impact. First Peoples are connected to the environment through a sense of place and purpose, built upon symbiotic relationships across the whole of the environment. For these relationships to be maintained, we must all shift towards 'Caring for Country' which is built around these associations, that are long-embedded and well-defined in our TEK.

Completing a meaningful TEK project is a complex task, punctuated by a paucity of information and an inherent stubbornness of many Western scientists to accept that TEK has a value at least equal to that of modern environmental analysis. However, in the context of 'Connecting with Country', it is incumbent on the Government to ensure that all available information is gathered from all sources if its frameworks and programs are to be socially acceptable.

In completing this report, GLALC has drawn together three sources of historical information – contemporary and historical literature, archaeological records, and ethnographic records expressed through oral histories to generate an early indication of the amount of TEK that has survived. Outcomes show that almost all first-hand accounts are regionalised, rather than local, and do not contain significant detail to provide a clear indication of patterns of cultural and environmental use at Heathcote Ridge.

Oral histories are fragmented, either because of the decimation of First Peoples in the late 18th Century, an unwillingness to share cultural information to prevent further loss, or both. Conversely, the archaeological record provides much stronger physical evidence of how First Peoples moved across and within the landscape and how its resources were used, but the conclusions drawn remain highly interpretive. Nevertheless, it has been possible to gather sufficient data to draw some early conclusions.



For example, we can be certain that prior to European contact, First Peoples primarily lived a subsistence lifestyle, which saw them moving continuously across the environment gathering resources according to the seasons. Stone tool assemblages were suited to their lifestyle, and representative of the small tool tradition that dominated Holocene societies at least 5,000 years ago.

The oral tradition and remnant artwork retain some evidence of ceremony and spiritual significance at a few locations, but this remains scant and ill-defined.

We note that patterns of vegetation at Heathcote Ridge have changed little since European contact. The similarity of micro- and macro-environments over the Heathcote Ridge landscape suggests a historic biodiversity that contains species having values and uses common to all the area's First Peoples groups, and that remain today. This creates a solid base through which contemporary and historic environmental management systems can be integrated into an enhanced and leading-edge process.

GLALC recognises this as an opportunity to promote and protect its First Peoples' culture by gathering and applying TEK not only at Heathcote Ridge, but across the wider region.

To achieve our goal, the following recommendations with allowance for protection of the 'sacred and secret' are made:

1. An internal Governance Group dedicated to guide cultural and scientific research of interest to Gandangara First Peoples will be instituted
2. A detailed long-term strategy that describes how GLALC will fund and utilise its Ranger group to routinely gather and apply TEK as part of their normal work routine should be established
3. Additional sources of funding to expand the project beyond Heathcote Ridge and across Gandangara lands should be sought. Extension of the work to include neighbouring First Peoples groups should also be considered
4. Close connections with local Universities should be established to broaden the scope of TEK data to be collected, analysed, and integrated into future cultural and environmental management programs.

Successful completion of these recommendations will allow GLALC to expand its TEK program to produce a more comprehensive outcome for Heathcote Ridge and apply the findings more broadly across Gandangara lands, and beyond.

Doing this would create leading-edge outcomes for cultural and environmental management that truly reflect an ongoing connection with country and commitment to caring for its intertwined natural and cultural attributes. In this way, we can redefine our sense of place and purpose.

Board Members



Board of Directors: (back row) Diane Van Aken (Deputy Chairperson), Amanda Roa, Bernadette Compton, Roslyn Way, Steve Ingram, Uncle Tony Scholes (Chairperson), (front row seated) Sandra German, Aunty Gail Smith and Roxanne Sheridan.

Yarn Up Elders in Residence Representatives



(Left - Right) Aunty Dot Shipley, Aunty Dawn Compton, Aunty Lola Simmons, Uncle John Simmons, Uncle Ron Davis, Aunty Mary Allen

Our Team



Dr. Melissa Williams
CEO



Mark Spithill
Director of Enterprise Sustainability,
Property, Corporate Services &
Transport (Entity)



Strini Pillai
Program Manager
Heritage, Ecology &
Land Management (HELM)



Dr. Howard Smith
Chief Scientist
Technical Writer/Mentor



Kelly Barton
Ranger Project Manager



Trinity Paulson Dixon
Ranger Trainee

Staff Journey

Strini Pillai

Program Manager

Heritage, Ecology & Land Management (HELM)

Navigating the hard work of caring for Country

Strini Pillai is Program Manager for Heritage, Ecology and Land Management at GLALC, which is building one of the most ambitious First Nation Ranger Programs in South West Sydney.



Strini Pillai watches a snake slide into the undergrowth at Heathcote Ridge. It's a sight that gives him a profound sense of purpose. *"The greatest reward for me is to know that I have helped to provide a safe place for an animal."*

His team of First Nation Rangers is beginning the work of transforming 1,100 hectares of a critically endangered ecosystem at Heathcote Ridge into both a sanctuary for native wildlife and a training ground for the next generation of environmental stewards.

The area will connect the Georges River, Heathcote and Royal National Parks, creating a vital wildlife corridor and sanctuary to the benefit of all Australians.

Land management priorities

Strini's role requires navigating negotiations with program managers of local councils and state bodies, principal ecologists and senior policy officers while ensuring traditional knowledge remains central to land management decisions.

"I focus on the science and legislation that informs GLALC's efforts on behalf of eco-heritage, ecology and land management," he says, acknowledging the guidance he receives from other managers and experts within the organisation, as well as external stakeholders.

The First Nations Ranger Program emerged from necessity when GLALC acquired the Heathcote Ridge property but faced a dumping crisis emanating from multiple local government areas. An estimated 1,200 tonnes of illegal, development-related waste, including asbestos, is contaminating the site.

With the assistance of Sutherland Shire Council, GLALC is mapping, quantifying and identifying dumped waste. *"Only once it is removed, can we legally focus on restoration and fire management."*



Holistic training approach

He has adopted a holistic approach to training, with a program covering boundary protection, monitoring dumping incidents, restoring fire tracks, vegetation management, wildlife management and fire management.

"The training program meets Gandangara's unique ecological needs and prepares the rangers to become future environmental area managers, to advocate for the protection of their land," he says. The training also includes archaeology, anthropology, town planning and heritage values.

Women rangers are central to GLALC's vision. *"We want to empower women to be part of this protection and preservation of life,"* he says. The program currently has hired trainee ranger Trinity Paulson Dixon and ranger manager Kelly Barton, with three more trainee rangers currently in the hiring pipeline.

One important aspect of the Ranger program involves re-discovering traditional ecological knowledge where cultural knowledge was lost through dispossession and colonisation of the land.

In some of the first steps to regain this knowledge, Trinity and Kelly are speaking with Elders, learning about traditional practices such as making spears and coolamons and also examining middens and soil evidence to reconstruct stories about extinct species and traditional fire management practices.

Vision for the future

Research conducted on fauna across the site revealed a large variety of birds, reptiles and marsupials, providing a baseline for future fauna management plans.

A key aspect of land management at Heathcote is fire management, including hazard protection burns and fire-trail development. Rangers learn about asset protection, reducing fuel without killing-off native species and protecting houses from fires. The program includes traditional fire management training to assist the Rural Fire Service in Sutherland in controlled hazard burns.

After a 20-year career in film, television and theatre production in South Africa, Strini immigrated to Australia in 2012 and re-trained as an environmentalist and ecologist. He joined Gandangara in 2022 and was inspired by its ambitious vision for the future, including establishing Heathcote Ridge as an eco-tourism destination.

The master plan includes developing an eco-hotel serving fusion food and an eco-cultural centre, an amphitheatre for recording live dance, stories, cultural performances and artwork.

He also envisions partnering with universities for research and drawing on his previous media experience, bringing in a television production company to make a series about the rangers.



"A visitor could experience it all on a walk on Country with Elders and rangers firsthand, but can you imagine putting a camera on the challenges rangers face daily, like restoration, fire management, border protection and land and water animal rescue?" he says. *"We'd be telling the world about Australia through the eyes of its First Peoples."*

Dr. Howard Smith
Chief Scientist (Technical Writer/Mentor)

Bridging science and First Peoples' culture

Dr. Howard Smith brings deep experience to his role as Technical Writer and Environmental Scientist at Gandangara Local Aboriginal Land Council (GLALC).



Dr. Howard Smith combines technical expertise with cultural sensitivity. His work is a bridge for collaboration between Western science and traditional ecological knowledge, pointing to a future where both systems complement each other to build healthier communities and landscapes.

He was hired in September 2024 to assist with strategic planning on several complex issues, including providing technical writing support on the Heathcote Ridge property in Sutherland Shire.

The ultimate aim is to restore the environment in a way that's informed by cultural knowledge, he says.

"We're trying to flesh out as much of that information as we can to tell that story and then use it to restore the environment to how it would have been before European settlement, or as close as we can."

Traditional ecological knowledge

Dr. Howard Smith has already played a key role in the restoration and regeneration of Heathcote Ridge, by compiling a Traditional Ecological Knowledge (TEK) technical report, drawing from publicly accessible data.

He says this report is only the initial step, while deep, nuanced knowledge must come from First Peoples themselves. The rangers lead that engagement, he says.

"Traditional knowledge is now about repairing the damage that's been done, and how it can be planned for by integrating this with scientific methods," he says. He works with the Program Manager HELM Strini Pillai, Lead Archeologist Bronwyn Patell, and in a mentoring role with the Ranger team. He guides rather than directly instructs the rangers, he says.



"My role would be just showing them, say 'hey, look, now you've got this, this is how it probably all fits together. You work with me and tell me what you think, and then you take it back to your Elders,' and that's how the process begins," he says.



Another milestone of the team is the Heritage, Ecology, and Land Management Five-Year Strategic Plan. It outlines operational goals including ranger training, strategic partnerships with councils and private enterprise, financial sustainability and community engagement. Dr Howard Smith takes a forward-thinking approach, anticipating the region's imminent developments.

"In the very near future, the new (Western Sydney International) airport will be opened, and we have to take the skills we have learned at Heathcote Ridge and apply them to our lands surrounding the airport," he explains.

Dr. Howard and the team are also considering commercial land development opportunities as part of the Gandangara Community, Land and Business Plan 2024-2028, ensuring Gandangara has meaningful input into local council developments affecting their lands, with financial independence as a key priority.

Diverse experiences

Up until now, Dr. Howard has had an extensive career in the environmental, engineering and land management sectors.

Arriving in the Northern Territory as a laboratory analyst in 1987, he worked in Nhulunbuy on the Gove Peninsula as a chemical engineer.

His commitment to community service was evident even then – he trained as a volunteer paramedic, recognising the need to contribute beyond his professional duties in this remote area.

His academic credentials span multiple disciplines: a PhD in Applied Chemistry, qualifications in tropical environmental management, archaeological heritage, ancient history and classical literature.

One of his many roles included a decade-long tenure with the Northern Land Council from 2005 to 2013, and again from 2015 to 2017. As a senior project officer managing development applications across half the Northern Territory, he learned how to work effectively with First Nations communities, building trust over time.

"While I was there for the first five years, it took nearly three years to build people's trust," Howard says, reflecting on his work with traditional owners. *This patience became central to his approach, leading to recognition when mining companies began seeking his advice.*

Central to Howard's work is his understanding that environmental and cultural health are inextricably linked. *"It is about delivering on the truth that a healthy land means healthy people."*

Strong future voice

Looking to the future, he's optimistic about the potential of the Heathcote Ridge's site for genuine restoration due to its relatively undisturbed state.

"When you look at all the aerial photographs back to 1920, it hasn't changed that much. So if it hasn't, I'd say that's a good indicator of what it was like before Europeans got into the environment."

On the broader impact of his team's work, Dr. Howard says his goal is to create a *"pool of evidence and information that can be applied to whatever the government is doing"* to ensure that Gandangara has a strong and informed voice in everything that affects First Peoples.

Kelly Barton

Ranger Project Manager

Path to renewal: a journey to reconnect with Country

Ranger Manager, Kelly Barton says her role at Gandangara represents a transformation in her career and an exciting opportunity to help people better understand and connect to Country



Kelly Barton describes it as “a 360-degree turnaround” in her career: from a job that ultimately helped to facilitate development, sometimes too quickly and detrimentally, to a position of conserving the land that holds her people’s deepest cultural connections.

Kelly’s previous job involved liaising with Aboriginal groups and other experts on development projects. It ensured community voices were heard, she says, but she also came to understand that it was often more about “ticking a box so that development could go through without any hiccups from the Aboriginal community.”

Today, as a Project Manager of the Gandangara First Nations Ranger Program working on the restoration of the land council’s Heathcote property — 1,100 hectares of culturally significant land — Kelly has found a role she takes pride in.

Her role is not only about environmental restoration; but cultural renewal, community empowerment and reconnecting people with the living landscape that Aboriginal people have cared for across countless generations for more than 60,000 years.

Living Connection

Country extends far beyond physical boundaries, says Kelly. “Country goes all the way up to the stars and all the way down to the core of the middle of the earth,” she says.

“It doesn’t matter where you are as long as you’re together, because we are also Country. We come from Country.” This profound understanding shapes everything she does, from the practical work of removing invasive species to the cultural education she provides to visitors.

“Our dreaming stories actually line up with science,” she says, pointing to how Aboriginal oral traditions accurately preserve memories of megafauna that lived thousands of years ago. This connection between traditional knowledge and modern science underpins her approach to land management and education.



Kelly initially heard about Gandangara’s First People’s Ranger Program when she took part in their Community, Land and Business Plan workshop. “I grew up in Liverpool, so Gandangara is my Local Aboriginal Land Council,” Kelly says.

“I was blown away by the workshop and I thought, wow, it’s really kicking off here for the Aboriginal community and when a position comes up, I’ll definitely keep my eyes open.” She was happy when the ranger management position was advertised and she was hired in October 2024.

Healing Community

The Heathcote property faces significant challenges, including removing extensive illegal dumping before restoration of the property can begin. In tandem with Trinity, Gandangara’s first Aboriginal ranger, Kelly has just completed a Certificate II in Conservation and Ecosystem Management so they are equipped to do this work.

Most of their learning and practical work happens at Gandangara’s purpose-built Eco Depot at Heathcote Ridge. Among other skills, Trinity and Kelly learned how to identify native and non-native plants, spray weeds, track and identify animals, read maps and use GPS.

The pair has also deepened their understanding of Indigenous culture and knowledge from spending time with elders, such as learning cultural practices to make artefacts, including cutting coolamon - a carrying vessel made from a hard wood tree creating a scar - making spears and digging sticks.

In anticipation of koalas possibly returning to the area when Heathcote Ridge is restored and regenerated, Kelly and Trinity have taken part in the Taronga Zoo koala protection program. They are also networking with other Aboriginal rangers’ groups across NSW.

Sharing Knowledge

Kelly envisions a future where Heathcote Ridge becomes a centre for cultural exchange, education and healing.

“Once that Country is restored, I hope our community can hold corroborees again,” Kelly says, imagining nighttime ceremonies where different dance groups share culture with the broader community. She discusses opportunities for cultural burns, traditional camping experiences, and educational programs.

The key to Heathcote Ridge’s future, Kelly adds, is to increase public awareness, with the intention of boosting community participation, corporate investment and attracting lots of volunteers.



This includes initiatives such as the ‘Healthy Country, Healthy People’ program, which brings Gandangara members out on Country for bushwalks.

The rangers are also taking corporate groups on cultural immersion experiences. Kelly and Trinity help others see connections to Country, whether it’s showing them scar trees, cave paintings and sleeping or tool-making sites. This makes the deep history of the land accessible to people who might otherwise walk past without understanding what they’re seeing.

“We need to build relationships with conservationists, universities and young people in schools, because if you educate the young ones, they will educate the parents for us. They will get their parents to come out on a weekend and school holidays and help us do weeding and planting. We’ll need lots of volunteers, a lot of hands,” she says.

Trinity Paulson Dixon

Ranger Trainee

Following family footsteps: Trinity becomes Gandangara's first Aboriginal ranger

Trinity's visit to Uluru sparked a life-changing realisation that led her to become Gandangara Local Aboriginal Land Council's first Aboriginal ranger. Now she's following in the footsteps of her great aunt, one of Australia's first Indigenous rangers, while reconnecting with her culture and caring for Country.



Looking up at the towering red rock of Uluru, a sacred place for the Anangu people of Central Australia, Trinity made a life-changing decision: she would become an Aboriginal ranger, and develop her knowledge, understanding and connection to Country.

"Uluru is the most beautiful, most spiritual place I've ever been and I felt very connected. I realised at that moment that I wanted to be a park ranger — I just love walking and being out on Country," Trinity says.

At the time, she was working as a receptionist at a resort near Uluru. When she returned home to Redfern in Sydney, she started looking for a ranger job. She became the Gandangara Local Aboriginal Land Council's first ranger in October 2024.

Born in Dubbo, and spending some of her childhood in Taree, and then ever since in Redfern, Trinity says she used to feel shame when she learnt traditional dances and danced in front of people.

"I was ignorant of culture and I was walking around a bit lost," she says. *"Since working here (at Gandangara) I am getting a proper connection to Country and culture. There's no need to be ashamed of what I do and who I am. It's been a big change for me. It's a big eye opener, and I'm very grateful for the opportunity that I've had."*

Weeks into the new role, Trinity faced a significant learning curve as she began a Certificate II in Conservation and Ecosystem Management.

Most of her learning and practical work happens at Gandangara's purpose-built Eco Depot at Heathcote Ridge in Sutherland Shire, on 1100 hectares owned by GLALC.

Among other skills, Trinity learned how to identify native and non-native plants, spray weeds, track and identify animals, read maps and GPS.

"My brain is just loving the learning journey," she says. *"At school, although I loved science I got distracted easily, but during the traineeship it's a lot easier because I am genuinely interested in the topics."*



Culture, Heritage and Land Management Officer. *"Uncle Darren took us out for a walk and I saw an echidna up close, so close I could have patted him,"* she says.

Since then, she's seen Eastern Brown and Red Belly Black snakes, but wasn't scared, just intrigued and is keen to do her snake handling course. *"I have a really strong passion for looking after native animals, and I feel like if I do this course with snakes, that's one step closer for me being able to handle more native animals,"* she says.

"Being a ranger to me is about being an advocate for the land, waterways, animals and sky, teaching people how to understand our connection to the land."

Trinity also discovered that being a ranger is in her blood. Her great Auntie Elvina Oxley Paulson was one of Australia's first recorded Aboriginal rangers. *"I'm following my Auntie's footsteps and I feel very proud of her legacy,"* Trinity says.

"She's the knowledge holder in our family and she's going to pass that knowledge to me."

"The more I learn about culture, the more I know I am an Aboriginal ranger. I am connected to culture and have an understanding of Country, and that's important."

Trinity says that when she takes visitors on a tour, she may show them a Melaleuca paperbark tree. Trinity shares the importance of trees and their significance in culture.

Aboriginal people use the bark for wrapping food for cooking, as bedding, for shelters and, because the bark has antiseptic properties, for treating wounds.

Already, Trinity has had opportunities to host corporate groups on Country and speak to them about some of the wonders of the bush.

"I got so much good feedback," she says. *"The people said that I was funny, but the one thing that they liked best was my passion and how I spoke about our culture. That was nice, because I have learned most things just from watching and listening to others and Elders."*

Looking to the future, Trinity is excited that she's found a career path that enables her to make a difference. *"I would like to continue being an Aboriginal Ranger and bring both traditional knowledge and modern science to look after our beautiful country and also educate people on why this needs to be done."*

"Being a ranger to me is about being an advocate for the land, waterways, animals and sky, teaching people how to understand our connection to the land and sharing our knowledge so they can feel connected too."



Elders Engagement



1. Introduction

This report examines the depth of cultural and environmental knowledge that has been retained by First Peoples who have an intergenerational connection with Heathcote Ridge. One of our objectives is to take this knowledge and use it to develop a more comprehensive and inclusive means of long-term environmental management to serve the area's restoration. Plans for Heathcote Ridge include development of a world-class ecotourism venture owned and managed by First Peoples that showcases the area's beautiful landscapes, impressive cultural history, and rich biodiversity. A second objective is to gather and preserve these multiple streams of information, often referred to as TEK, for future generations.

In its broader context, TEK has multiple definitions, but they can be collectively summarised as the cumulative body of beliefs, knowledge, and practices that define the full set of relationships between living beings and their environment across the ages (Whyte, 2013). Although often couched in a different worldview and in a different language, TEK is a system of knowledge that is complementary with Western modes of science. By implication, it therefore has intrinsic value and can play an integral role in generating holistic views of the environment and how that environment is managed.

TEK is not unique to Australia. A wide-ranging review shows that TEK, including taboos, rites, and rituals, is being applied by communities around the world to enhance environmental regulations and create local repositories of biodiversity (Sinthumule, 2023). In that review, the cultural and spiritual values of local communities were identified as two of the key foundations behind protection and conservation of local ecosystems.

TEK delivers an ancient cultural perspective that provides new streams of information to modern

decision making. For example, TEK intrinsically accounts for natural oscillations and seasonal patterns and can be applied to the management of climate change and natural disasters caused by climate change at the local level (Clarke 2007; Clarke, 2009). Likewise, astronomical indicators may be useful in defining the timing of cultural fire and flood management (O'Connor; 1997).

TEK works by contributing to all aspects of ecological restoration, from the reconstruction of the reference ecosystem, adaptive management, and species selection, to monitoring and evaluation of outcomes. Revitalisation of local knowledge and practices is crucial for the ecological transition since it may encourage sustainable land use practices, enhance biodiversity, and assist and empower local communities.

Cultural burning is one specific land management practice that is being re-introduced to rebalance ecologies across a range of landscape types (Mariani et al, 2022). While the modern view is that fire is a threat, it was a tool used by First Peoples to clean and care for country (Russell-Smith et al. 1997; Walsh 2008), but the gradual depletion of biodiversity and extinction of some species caused by loss of cultural burning patterns has led to a loss of plant knowledge. This loss of knowledge creates a circular problem because as culture begins to weaken, TEK is lost due to decreasing biodiversity, and leading-edge conservation is undermined (Haq et al, 2023).

TEK shows us that First Peoples' cultures were effectively borne from ecosystems and remain intertwined with them, even as climate changes. Thus, ancient and unique First Peoples' perspectives cannot be excluded from the way land is managed. A revival of TEK will contribute a forgotten perspective to comprehensive land management practices (biosecurity and



biodiversity management, fire management) and climate change challenges (Laudine, 2009, p.135). Unfortunately, there is often resistance to integrating TEK into modern methods of environmental management because the spiritual components and perceptions tied to First Peoples' worldviews are not considered to be a valid part of the environment by Western science. It has been argued that the introduction of non-local cultures and histories dilutes local TEK and weakens the base for its transmission (Hartel et al, 2023). Conversely, the incorporation of new knowledge could also lead to its enrichment (Albuquerque et al, 2024), highlighting the complexity of fusing multiple knowledge streams.

Despite this lingering resistance, the potential value of TEK has not been fully discarded, so GLALC has chosen to undertake a detailed study of the TEK that has been retained by Gandangara First Peoples and apply it to current restoration programs on its land, starting at Heathcote Ridge.

Heathcote Ridge is a relatively small part of a much larger landscape, where many First Peoples were decimated by conflict and disease over two hundred years ago. It is therefore reasonable to assume that the amount and quality of TEK available may be limited. However, a thorough search of literature, the archaeological record, and

stories collected from Elders could identify heritage values and data that Western scientists might otherwise not know.

Importantly, identification and application of TEK principles at Heathcote Ridge may also lead to the establishment of a suitable platform for its application across the broader Gandangara lands and lend support to the Government's 'Connecting with Country' initiatives that are being implemented as the Western Sydney population grows. A detailed understanding of TEK of Gandangara land will also allow more detailed interpretations of how localised data fits into the broader cultural context and landscape and expand our knowledge of First Peoples' culture prior to the arrival of Europeans.

The Government's 'Connecting with Country' framework seeks to embrace First Peoples' concepts and use them to guide development of built environments. Under this framework, cultural knowledge is to be valued, respected, and allowed to continue and thrive in conjunction with modern living. The integration of TEK with modern technologies and approaches to create innovative solutions to environmental management is recognised within this framework as a key measure to protect biodiversity and cultural heritage and to encourage cultural expression. However, satisfactory collection and integration of TEK with modern environmental knowledge is a complex and time-consuming task.

Effective application of TEK requires a holistic approach, so at the very least, the prospect of incorporating TEK with the 'Connecting with Country' framework should be viewed as a means of improving acceptance of First Peoples and their wealth of knowledge into an enhanced means of protecting the region's biodiversity for future generations.

This report should therefore be viewed as the starting point of a much larger, more detailed, and ongoing piece of work that aims to integrate cultural knowledge with Western knowledge at various landscape levels. TEK covers all aspects of those landscapes, having separate applications to land, water, and species and the interactions between them. Each of these is investigated in further detail in this Report.

1.1 Purpose of This Report

This report has been prepared to fulfil a commitment made during the application for funding by the Department of AANSW under the Community and Place Grants (2023-24).

Its main purpose is to gather, catalogue, manage, and apply First Peoples’ knowledge to the development of improved environmental management systems. Through this, we hope to enhance and provide greater protection to the region’s biodiversity.

Although focused on Heathcote Ridge, the outcome of the study will also serve as the foundation of a longer-term project that aims to capture TEK across the entirety of Gandangara land. This will serve two main purposes. First, it will help First Peoples of the Western Sydney region to rebuild, maintain, and transmit their special knowledge to future generations.

Second, practical application of this knowledge creates opportunities to develop enhanced systems of cultural and environmental management that offer greater involvement in the regional planning process. These will be of great value to current and future generations of First Peoples Rangers charged with maintaining the regional environment under AANSW and NIAA programs and initiatives.



1.2 Scope and Application

Our study is not constrained by artificial boundaries. Although the immediate investigation is confined to the landforms and waterways of Heathcote Ridge, positive outcomes will have wider regional application because the project can serve as a model for Gandangara land and across the lands of the neighbouring First Peoples. There will also be natural and cultural linkages beyond the immediate confines of Heathcote Ridge because the First Peoples’ worldview considers landscapes, not locations defined by artificially mapped boundaries.

Neither is this study temporally constrained. TEK changes over time in response to changing environments, cultural intrusion, and technological change. Although we aim to capture as much TEK from before the arrival of Europeans, historic and contemporary values are equally important because they demonstrate how First Peoples have adapted in response to changing cultural and environmental circumstances. Without this complete picture, we will remain ill-placed to fully understand the complex relationships involved.

1.3 Background to This Report

Following a successful application to AANSW under the Community and Place Grants Scheme (2023-24), GLALC committed to launching our First Peoples’ Caring for Country Program. Starting on 1 July 2024, an immediate focus was placed on onboarding and training staff to deal with management issues at Heathcote Ridge. We are now at the point where active management of Heathcote Ridge has commenced.

One of the most significant current issues is the unauthorised and unwanted access by community leisure groups, which is resulting in destruction of the area’s environmental and cultural attributes. This has become further complicated by dumping of waste materials (some of which are toxic) on the land. We subsequently felt that by instituting a program of active management built around the application of First People’s TEK and supported by practical measures, the Heathcote Ridge landscape

and its attributes could fully recover and be better protected.

Following receipt of one year’s funding from AANSW and now moving forward four years of NIAA funding, practical measures are now being implemented to limit and eventually eradicate unauthorised access to Heathcote Ridge and to restore its natural environment. In accordance with the aims and objectives of the AANSW Project Plan and in conjunction with the recently funded NIAA Indigenous Ranger Program to extend the current program across 2025-2028, restoration activities are being undertaken in a culturally appropriate manner by a local First Peoples Ranger group established by GLALC. The intent has always been to start small at Heathcote Ridge and build a much larger, self-sustaining program that can be applied to much larger landscapes even amid significantly increased population and land development.

GLALC committed to the production of a TEK Report by 30 June 2025 as part of the agreed AANSW Project Plan. The proposed project aims to identify how First Peoples have historically managed land and water management and how this knowledge can be integrated with the ‘Connecting with Country’ framework.

Doing this will allow us to directly and indirectly contribute to sustaining local First Peoples’ cultural

heritage at Heathcote Ridge and extend its application to the broader Western Sydney region.

Culturally based projects of this nature are of particular significance to First Peoples because they encourage the strengthening and flourishing of language and culture, and provide positive benefits to health and wellbeing at personal and community level. They are also of benefit to all communities because of the flow-on benefits that enhance biodiversity and the quality of green spaces that will become more and more necessary in the wake of future urban spread. However, current restoration work on Heathcote Ridge has so far provided only limited opportunities to collect and apply information that contributes to developing an intrinsic understanding of traditional environmental management practices. Traditional practices such as cultural burning at Heathcote Ridge and gathering of ethnographic records (mainly oral histories) and archaeological information from around the neighbouring area are some notable examples.

It is important to note that these activities are only a first step, and a considerable amount of additional effort and time is required to produce a quality outcome that enhances our Rangers’ skills and is reflected by an improved natural environment. Reaching a quality outcome requires us to continue to access and analysis relevant data from multiple information streams as summarised in Table 1.

Table 1: summary of information type and sources.

Information Type	Source	Availability
Historic data representing external views of interactions with the land	Aerial photographs, online studies, archived documents, and newspapers	Available
Oral records and transgenerational knowledge	Interviews with First Peoples Other information contained within GLALC files and systems	A limited amount of information is available. It may be possible to expand this through more discussions with First Peoples from the Western Sydney region
Archaeological Records that include mapping of artefact types and distributions	Various studies associated with planning projects on the Land Trust	Detailed data available through AHIMS with limited data available from on-line reports published as part of the planning process
Anthropological Records		

Once collected and analysed, this data must be used. We believe that governing authorities have begun to recognise the intrinsic value that TEK holds and are actively reaching out to integrate it where possible into the 'Connecting with Country' framework. Recent discussions with interested NSW and Local Government Authorities suggest that our project may be of great value in guiding and strengthening community acceptance of their planning and development objectives.

Areas of particular interest include management of intersections between land, biodiversity, and water. Consequently, we are also investigating the possibility of partnering with local Universities to undertake more detailed investigations into how the area's waterways have been modified or have changed and whether improved practices based on TEK can be implemented to enhance their social values.

1.4 Cultural Background

To succeed, we must first have a good understanding of the cultural context in which our study is based. The general understanding of First Peoples' culture in Australia is historically defined by a 'top-down' structure built around major language groups that devolve down into individual clans and families. While each family, clan, or language group may use the landscape differently,



their cultural perceptions are essentially identical within a region. Any notable cultural differences are gradually absorbed by the wider and, in some circumstances, neighbouring groups.

Traditional custodianship of Gandangara land has yet to be resolved. A Native Title Claim that covers the region has been lodged (Federal Court of Australia, 2018), but currently no descendants of historical clans are recorded on the Register of Aboriginal Owners for Gandangara land. Records also show that hostility and disease resulting from historic interactions between the First Peoples of the Western Sydney region and European settlers created a vacuum that was filled with people from surrounding areas. This means that definitive identification of traditional owners or custodians of these lands is now fraught with difficulty.

In this context, the name 'Gandangara' does not currently refer to the Traditional Owners or Custodians of the area. Instead, the contemporary Gandangara community is best defined as a multicultural collection of First Peoples from many different families, clans, tribal and nation groups from many different countries.

Uncertainty in Traditional Ownership and Custodianship also means that the true value of any information gathered by direct discussion with current First Peoples may be questioned at a local level, even if it is generally consistent with that which has been gathered across the wider region. It is clear that more research is needed to better define this cultural mix, and this may become visible through a detailed review of historical documents, the archaeological record, and developing an improved understanding of the region's ethnography.

Scientific research suggests that three main groups – Dharug, Gurringai (also referenced as coastal Dharug) and Tharawal – dominated specific areas of the Western Sydney region, and that cultural boundaries were defined in response to ecologies (Brown, 2010). Interpretation of this evidence indicates that Dharug (both hinterland and coastal) had strongest connections to the area around Heathcote Ridge.

Although decimated and dispossessed during the 1800's, the 2004 Gale v Minister for Land & Water Conservation for the State of New South Wales Native Title Claim showed that some Dharug continue to retain a knowledge of bush foods and medicines that has been handed down from generation to generation, along with some oral traditions that may have continued from before 1788 (Madgwick, 2004).

Few physical artefacts survive in the hands of the applicants and evidence as to places of special significance, particularly of great spiritual significance, is very sparse. However, we note that the sacred nature of this material means that it might continue to be maintained behind strict cultural walls of secrecy.

We also acknowledge that while the amount of evidence presented during the claim was small, it does demonstrate that the First Peoples descendants continue to assert cultural affinity with the land, and that we may be able to bring some of this to the fore through a well-designed examination of available TEK.

Figure 1: location and extent of the GLALC land.



1.5 Legal Authority

The statutory rights of GLALC are established under the Aboriginal Land Rights Act 1983 (NSW) and the Native Title Act (1993). Through these Acts, GLALC holds legal authority and responsibility for improving, protecting, and fostering the best interests of all First Peoples. This applies to all First Peoples that are living within GLALC's designated area of the South Western Sydney region.

As the prescribed authority that manages this land on behalf of the region's First Peoples, Gandangara is especially charged with protecting and promoting land management, culture, and heritage.

It is therefore incumbent on us to fully investigate what extent of pre-European cultural information remains and how we can apply it appropriately to management of those lands, as shown in Figure 1, where practicable.

2. Research Methodology and Results

Our methodology entailed investigating three streams of inquiry, which include information contained in (i) scientific and literature reports (including those from early newspapers); (ii) archaeological evidence, and (iii) ethnographic evidence collected from interviews with First Peoples of the region. While the intent was to focus primarily on matters pertaining to Heathcote Ridge, it was recognised that the amount of specific information would likely be very limited and that the area of interest from which information should be captured would need to broaden significantly. Irrespective, the initial focus was placed on gathering information of greatest relevance to Heathcote Ridge.

Time constraints meant that the literature review was restricted to an analysis of information available through readily accessible public sources such as the Internet and libraries. Archaeological information, initially collected from documented surveys undertaken as part of regional development plans were included.

Ethnographic material was collected over several years through discussion with Elders in Residence as part of GLALC's Yarn-up Group and archived. Review of this suffers similar limitations because available records are culturally sensitive and apply across the whole of GLALC land, not just Heathcote Ridge. Consequently, the quality of information and its applicability to a detailed TEK analysis from literature have not been fully tested. Additional insights were gathered through interviews with the Gandangara First Peoples Ranger Team (refer to Attachment B and Attachment C).

Review of the archaeological record built from publicly available surveys was then expanded to include data from a sample of site cards for sites reported from Heathcote Ridge and adjacent parts of the Holsworthy air base.

Once collected, survey and site data were collated into the form of an interpretive report (Section 3 of this document) to provide background to the available TEK, and to inform a strategy for further study.

2.1 Literature Review

Our review showed that the body of literature reflecting pre-European cultural use of the environment is small. There are a few regional news reports dating back to the early 1820's that discuss interactions between European settlers and local First Peoples, but these provide us little more than knowledge that, though limited in number, First Peoples maintained a connection with their ancestral lands.

These observations are supported by Indigenous cultural knowledge documents in the archived collections of missionaries and anthropologists (Mason, 2024). We have yet to obtain access to these collections to determine if any further detailed evidence relating to Heathcote Ridge and its surrounds is available.

A brief regional study summarising historical evidence that outlines how First Peoples lived in the Sydney region prior to European contact has been reported in recent ethnographical literature (Attenbrow, 2012). We note that the extent of Attenbrow's study does not extend westward beyond Liverpool, and although it touches on Mill Creek and the Upper Georges River, the volume and detail of information pertaining to the area around Heathcote Ridge is extremely limited.

The study's true value lies in providing a solid context to the culture and land use practices of people of the larger South Western Sydney and coastal regions.

2.2 Aerial Photography

Aerial photographs from across the region allow us to assess gross changes to the landscape. Our analysis of aerial photographs dating back to the 1920s suggests that while the landscape to the west and the east has undergone significant anthropogenic modification, there has been little change at Heathcote Ridge.

We interpret this to mean that biodiversity in some areas along the creek line (although currently impacted by changes to water quality) could be considered to represent the pre-European environment. Unfortunately, online services that provide more detail related to vegetation patterns and distribution do not contain sufficient detail to fully describe these environments. Further examination of these systems and the documents behind them is therefore warranted.

A recent survey of biodiversity, flora and fauna of Heathcote Ridge (BBC Consulting and Cumberland Ecology, 2013) indicated that despite some unwanted intrusions and activities, the area is generally intact and characterised by a mosaic of heath, woodland, forest, and wetland species. This survey notes that several of these species are

listed under the Commonwealth Environmental Biodiversity and Conservation (EPBC) Act 1999 and/or the NSW Threatened Species Conservation (TSC) Act 1995 as threatened or vulnerable, and that some larger areas of known habitats for these species are in areas adjacent to Heathcote Ridge.

The scant literary evidence directly related to Heathcote Ridge that is available indicates that Mill Creek was a source of native foods, including wild honey, oysters, wallabies, goannas, and black bream (Jackson and Forbes, undated).

There are also records identifying several plants known to have formed part of the Aboriginal subsistence economy either as food or for other purposes. Parts of plants often consumed include rhizomes, seed, nut, and inner leaves.

Acacia bark supplied tannin and was used as an anaesthetic and to stun fish while Xanthorrhoea supplied resin and spear shafts (Bird, 1984).



2.3 Information Available from GLALC Records

Information in the form of oral histories and stories was investigated to broaden the understanding gleaned from our literature review. This first required a discussion with our anthropology staff to determine what information previously provided to GLALC could be made available for disclosure in this report. However, like the literature review, we note that the amount of oral information directly associated with Heathcote Ridge is extremely limited and fragmented.

Our records show that members of First Peoples families who have lived continuously in the Western Sydney region prior to first European contact still retain some traditional knowledge that has yet to be fully tapped. We know from discussions with family members that the area occupied by First Peoples was managed in response to many factors, such as the season, extended climatic cycles, and ceremonial and ritual obligations.



We know that separate knowledge streams exist for land, water, flora, and fauna – and that when these knowledge streams were linked, the environment was used in a sustainable manner over many thousands of years. We also know that some of this knowledge and the practices continue to be used by today's Aboriginal communities.

What we do not have is a clear understanding of spiritual values attributed to parts of the landscape or its natural resources. We cannot explain the full depth of First Peoples' relationships with the land and its resources.

Without this deep level of understanding, we will continue to lack guidance on how to manage certain parts of the landscape to maximum effect. One of our main challenges is therefore to bring all these information streams together to create a well-defined and holistic cultural map that describes patterns of land and resource use, and how they have changed over time.

From there, we can work on restoring the Heathcote Ridge environment to a standard that not only meets regulatory requirements but has true meaning to First Peoples.

2.3.1 Cultural Significance of Land

Our initial inquiry indicates that several locations that retain spiritual and cultural significance exist within GLALC land. Although 98 sites have been identified at Heathcote Ridge, the significance of known sites to its restoration rests in their potential to provide further context for other attributes of the surrounding areas.

Information related to the use and values of these sites is not public, but a measure of their significance continues to be passed down to successive generations through ongoing site visitation and stories. For example, our records show that Dharug continued to gather periodically at the Rooty Hill site until at least 60 years ago (Schilling, 2025).

Stories are another rich source of traditional knowledge. For example, Yandel'ora is a story that tells of a time of peaceful intergenerational gatherings of the region's people; the circumstances that led to the creation of the different languages spoken in the larger region; and how the lands about the Nepean (around present-day Camden) became the place to gather each generation.

The story also provides background to an understanding of transit and resource use across the natural environment by outlining routes and directions that various groups travelled to gather at this meeting place.

We know from Yandel'ora that First Peoples travelled around this region via primary travel/trade linkages that existed along several routes, listed below. Although none are linked directly with Heathcote Ridge, the story shows a distinct pattern that could be presumed to apply.

1. Along northern and southern Eastern Creek, then over the lower ridge toward Prospect Creek through to the Georges River and on to the coast or upstream towards the site
2. North and south from the Nepean River plains near the site, then along the eastern ridge slopes through to Eastern Creek and Western Sydney plains of the Hawkesbury River,
3. North to south from Nepean River plains then along the Western ridge slopes through to South and Rope Creeks and the Western Sydney plains of the Hawkesbury River
4. East to west from Eastern Creek over the lower ridge line to Toongabbie Creek and the Parramatta River basin, either on the northern or southern banks
5. Various east-to-west linkages over the ridgeline and interlinked creek systems through to the Plumpton Ridge, a site that retains contemporary value and has long been known for access to materials for the manufacture of stone artefacts.

Yandel'ora also reveals a limited amount of information about the significance of some parts of the landscape. For instance:

1. The area to the immediate east of Prospect Reservoir catchments contains three hilltops (one of which is now known as Pemulwuy Hill) that have cultural significance to First Peoples
2. Rooty Hill has significance for Aboriginal communities both pre- and post-contact for purposes of meeting, camping, and resource gathering. It has additional significance because it is one of the highest points between Parramatta, Penrith, and the Blue Mountains and has cultural links to the three hilltops to the east of Prospect Reservoir
3. A site on the Nepean where a small stream enters from the west, past the right bank, which reaches the creek in a narrow finger, was a common gathering place for many local people, and may be the same as that recounted in the Yandel'ora story.

Stories are another rich source of traditional knowledge

In addition, there are other sites of significance within the area that are likely to have cultural connections to those mentioned above, but further work is required to uncover the nature and strength of those connections. For example, Shaws Creek (Blue Mountains National Park) was the site of a massacre in the early 1800s, and the island on the Nepean junction is recorded as a male-specific site.

Stone fisheries and other material in the area are known to the local community. The Euroka Clearing at Glenbrook is a site known to the local community that has continuing cultural significance for community gatherings and memorials.

2.3.2 Cultural Significance of Water

Our discussion (Schilling, 2025) also revealed that water played a special role in culture. From this, we understand that First People of the Cumberland Plain area understood the broad landscape to have two parts - Sweet Water Country, referring to areas where the fresh waters primarily run over rock, and Bitter Water Country, where the water runs over soil and sand, ultimately mixing with the salt waters of estuaries. This delineation is also used to describe differences in the distribution of usable natural resources across the landscape.

Our understanding is that the need for water and water-based resources resulted in internal waterways and creek lines becoming trade and travel routes connecting various peoples across the region.

Although each group may have had different associations and values for water-based environments, their close ties often led to a sharing of resources and materials from around the country.



2.3.3 Cultural Significance of Species

Information within our records about species and their use as resources is scarce, and we are unable to add to that information which has already been made available by the literature review. Available data is at high level and there is no reference to cultural and spiritual values contained of any species contained within the report.

2.3.4 Interviews with the Gandangara First Peoples Ranger Team

To strengthen the integration of TEK into land care activities at Heathcote Ridge, interviews were conducted with the Gandangara Ranger Team: Ranger Manager Kelly Barton and Trainee Ranger Trinity Paulson Dixon.

Their reflections highlight how Aboriginal land management knowledge, passed down through oral tradition and living experience, is now being reactivated and applied to contemporary conservation work.

TEK in Practice: Cultural Indicators, Seasonal Cues, and Living Knowledge

Kelly Barton brings a leadership perspective to TEK, describing how Country itself is a cultural archive - a living entity that holds knowledge about species behaviour, seasonal change, and ancestral lore. Drawing on traditional understandings of plant cycles, animal signs, and storylines, she supports a model of land management that honours both scientific data and cultural protocols.

This includes mapping culturally significant sites, facilitating intergenerational knowledge sharing, and supporting the return of traditional practices like cultural burning and artefact-making.

Kelly explains that Aboriginal Dreaming stories are deeply aligned with ecological systems - for example, oral histories that describe megafauna now align with paleontological records. This connection reinforces the legitimacy and depth of Aboriginal ecological knowledge.

"Our stories align with science. Our people have always been scientists of Country - we just used different language to explain it."

Her leadership is shaping Heathcote Ridge into a place where TEK is not just remembered, but practised - through cultural workshops, youth training, and ecological restoration informed by Elders.

Learning Through Doing: Youth Connection to TEK

Trinity Paulson Dixon, as a trainee ranger, illustrates how TEK is a living experience. Through guided learning on Country, she has developed skills in identifying indicator species, recognising gendered plants, and understanding when species are breeding or flowering based on seasonal cycles. These TEK markers are used to plan work such as weed treatment, habitat protection, and community education.

She shares how the cultural meanings behind plants and animals guide respectful engagement with the environment. For example, knowing when to avoid disturbing a place due to men's or women's business, or understanding when a particular species signifies a time for action.

"To care for Country, you have to be on Country. You have to listen - to the land, the Elders, and the Dreaming."

For Trinity, TEK is not just knowledge - it's identity, story, and belonging. Her journey exemplifies how TEK can be revitalised through cultural mentoring and structured employment that values both Aboriginal knowledge systems and conservation science.

Embedding TEK Across Projects

Both Kelly and Trinity contribute to the collection and application of TEK at Heathcote Ridge and other GLALC sites. This includes:

- Identifying and recording culturally significant sites and species
- Applying TEK-informed ecological restoration practices
- Educating the broader community through cultural immersion sessions, where Dreaming, artefacts, and landscape features are interpreted through a TEK lens
- Supporting the Healthy Country, Healthy People program, which takes First People on bushwalks to reconnect with Country and relearn traditional knowledge through experience.

Their insights confirm that TEK is not static - it is responsive, adaptive, and thriving when passed on through purposeful, lived practice.



2.4 Review of the Archaeological Record

While the amount of information directly available from our literature review is small, the archaeological record is more extensive and contains strong physical evidence to support prevailing views of the environment and its cultural context.

The first step was to undertake a high-level desktop inspection of archaeological information presented in planning documents for locations scattered across the Gandangara estate. From this, we were able to develop a broad insight into historical visitation and derive an insight into where land and resource use were most intensive.

Next, we queried the GLALC archaeological database for Heathcote Ridge to generate a map showing the distribution of archaeological sites in the vicinity of Mill Creek (refer to Figure 2).

This allowed us to identify sites that could be subjected to greater scrutiny. Outcomes for these are discussed in Sections 2.4.1 through 2.4.3 of this report.

Unsurprisingly, our collective evidence shows that most of the Heathcote Ridge sites are located along watercourses and near wetlands, where an abundance of native food sources would be expected to accumulate, or on ridgelines and high points that offer ease of transit and good visibility over the landscape.

Noting that a lot of detail for each site has been redacted from publicly available planning documents (Koettig and McDonald, 1984; Koettig, 1985; Koettig, 1990; Sefton, 1990; and KNC, 2020), we extended our analysis through an examination of the NSW Aboriginal Heritage Information Management System (AHIMS).

2.4.1 Analysis of AHIMS Records

The basic and extensive search functions of AHIMS were used to generate a list of sites recorded on or near Heathcote Ridge. Over 200 sites were identified in total, none of which have been declared to be of significance under current legislation, but all of which are culturally important.

This was narrowed down to a subset of 171 sites in proximity to Mill Creek and the ridgeline. 55% of these were identified as holding potential for archaeological deposits (PAD), 16% held examples of art, 12% contained stone artefacts, 10% held evidence of grinding grooves, and 2% showed some evidence of habitation. Several sites contained multiple attributes, the most common of which were the presence of artefacts in proximity to shelters containing evidence of art and/or habitation. The remaining sites were characterised by a miscellany of other cultural materials, such as middens, shells, stone arrangements, and a modified tree.

Within the 171 sites, 46 were described as shelters with evidence of visitation. Site cards for these were obtained and subjected to a more detailed analysis on the basis that they were most likely to display the widest array of attributes related to First Peoples culture. A copy of pertinent data is provided in Attachment A.

Analysis of these records show that artwork at various stages of preservation has been recorded in 26, and stone artefacts in 20 of the 46 shelters. Four (4) of the shelters were sterile, and 4 contained both art and stone tools. Data from one site was precluded because of the high prevalence of graffiti that prevented definitive identification of older art potential. We also note that at least three of the sites have now been.

2.4.2 Artwork

More than 50% of the artwork recorded is faded and poorly defined, suggesting that it has not been retouched for many years. In terms of style, most of the art is presented as outlines and filled outlines (78%) or as stencils (20%), while engravings accounted for the remainder. Several of the site cards report that the examples of art recorded are

consistent with styles that are observed across the wider region.

Of the 76 motifs that could be identified, anthropomorphic and human figures (42%) are well represented, with some appearing to describe ceremonial activity. The next common set of motifs were hand stencils and fauna (15% each). Within the fauna motifs, are 11 depictions of macropods, 7 of birds and 1 each of an echidna and a fish.

The art is predominantly black in colour, with decreasing preference for white, red, and yellow. Charcoal and clay were the favoured materials, however at least some of the red and yellow art may have been drawn using iron oxides (or ochre). Many motifs were simply described in site cards as 'black' in colour, and although likely to be charcoal, the use of black oxidic materials cannot be excluded.

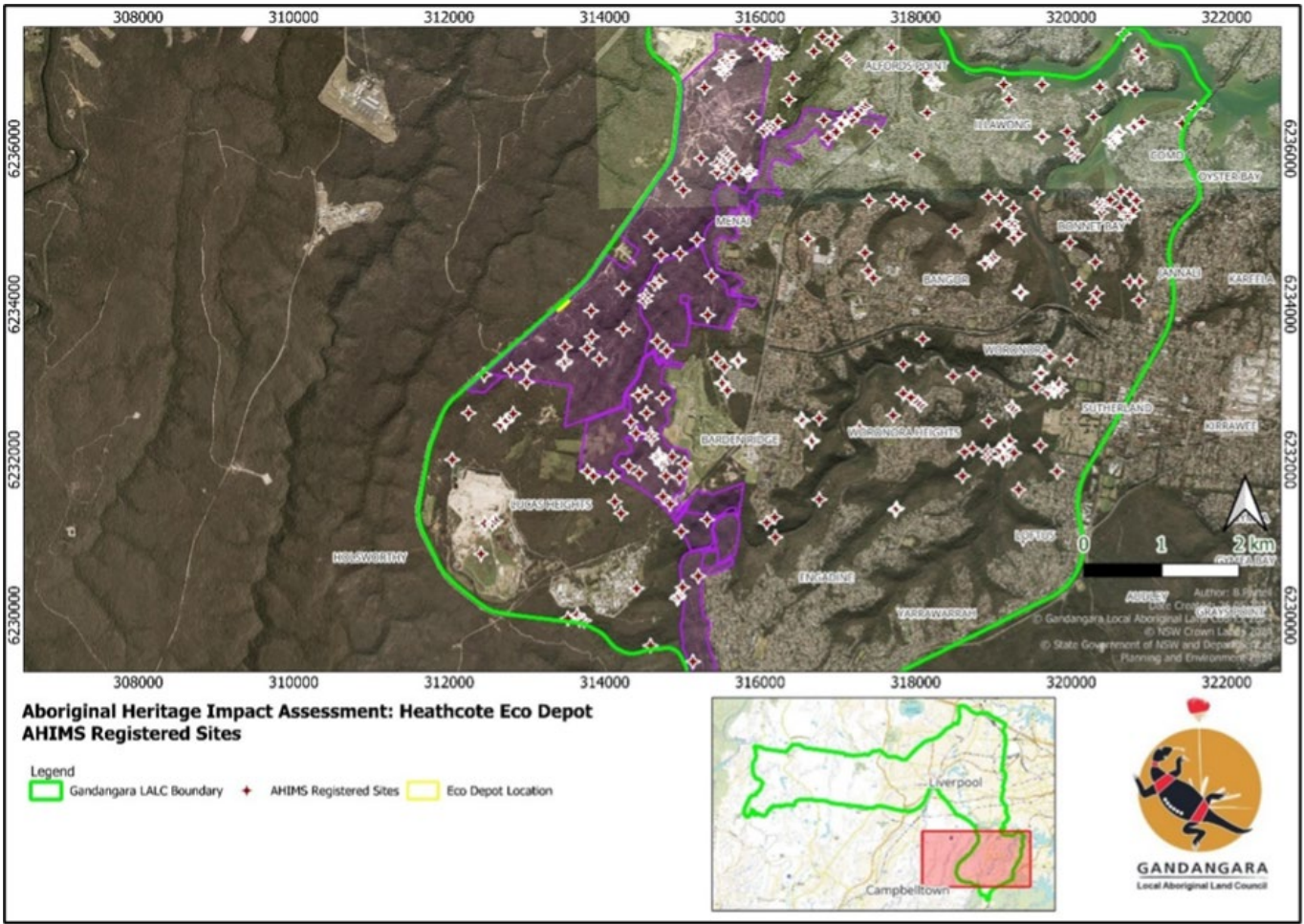


2.4.3 Stone Artefacts

Although over 1000 artefacts have been collected from these shelters over many years, detail is available for only a very small number. Artefact data recorded in the site cards indicate a predominance of quartz flakes and pieces (>74%), with very few cores (3%) present.

Alternative materials used include chert, silcrete, and there was one example of petrified wood. Material from middens, mainly shells, was found in 11% of the shelters. The types of artefacts and the materials used in their manufacture is consistent with the small-tools tradition of the wider area.

Figure 2: Map of archaeological sites located along southern Mill Creek and Heathcote Ridge



3. Discussion and General Interpretations

First Peoples describe their relationship to the land through a ‘sense of place’ that combines its natural and spiritual elements into a cultural whole. It provides identity and meaning and describes their journey through life that is reflected not only by the way that they interact with the environment as it changes, but also how this is expressed in spirituality and an ‘oneness’ with each other and nature. Historically and culturally, this is the root of TEK – the interaction of people and the environment across the passage of time.

Unfortunately, the depth of available information that describes TEK at Heathcote Ridge is currently limited to a handful of literature reports, descriptions of archaeological evidence, and the memories of First Peoples who may or may not have transgenerational linkage to pre-European times. Although the sense of place remains, physical information is scant and disjointed, and interpretation of how this information fits together to provide a holistic worldview is currently fraught with challenges. Until the depth of information and degree of detail are increased, the picture remains unclear.



Most of the information we have comes from the archaeological record in the form of art, stone artefacts, and working of the environment (i.e. grinding grooves) in and around shelters and outcrops. These represent positive proof of site visitation, but do not permit an assessment of timing, frequency, duration, and in some instances, the purpose of those visits without which we will struggle to provide a clear interpretation of how and why the landscape was historically used.

The location of shelters with evidence of visitation at Heathcote Ridge supports the general conclusion that First Peoples used resource-intensive waterways to transit and occupy the environment. This conclusion is also supported by stories that inform us the Nepean and Hawkesbury Rivers, and their tributaries, are known archaic pathways and food resource centres for much of the area’s original and contemporary populations. However, we currently know little about the types of resources that were historically gathered and used. Resource species that have so far been identified from the information gathered here, for Heathcote Ridge, are listed in Table 2.

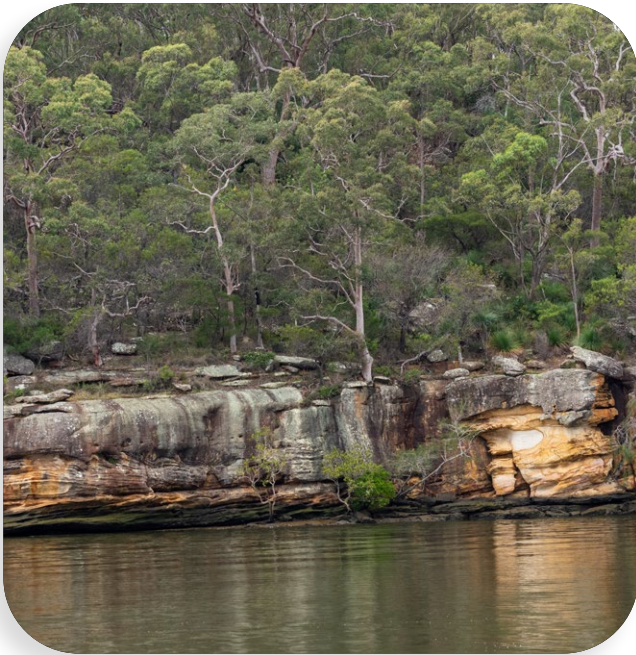


Table 2: Summary of species and their cultural attributes

Species	Cultural Use
Flora	
Acacia	Seeds used for food as a source of tannin (presumably for working skins) Leaves used as an anaesthetic and to stun fish
Bracken fern	Rhizomes used as food
Geebung	Seeds used as food
Gymea Lily	Roots used for food
Macrozainia	Nuts used for food
Xanthorrhoea	Inner leaves used for food Plant parts (including resin) for spear manufacture
Fauna	
Emu	Meat for food (presumed)
Kangaroo and Wallaby (macropods)	Meat used for food Skins used for clothing (presumed)
Fish (black bream)	Meat for food
Shellfish (predominantly oysters and cockles)	Meat for food
Goannas	Meat for food
Wild Honey	Honey and potentially honeycomb for food

One of the more significant challenges to TEK-based restoration programs is that without knowledge of a full species set and their cultural significance, reconstruction of the historic environment will remain partial. The list provided in Table 2 is short, and we understand the full list of species having cultural use is considerably greater, so further information gathering is warranted. The type of information gathered should be extended to include spiritual and mythological attributes for a complete picture of the First Peoples’ sense of place to be acquired.

We also consider that, if strong associations between the fauna and flora species can be established from historical records, these may be useful as an initial guide for developing a restoration program for Heathcote Ridge that is balanced and of relevance to Gandangara’s First Peoples. Detailed species datasets for vegetation units protected by the EPC and TSC Acts may provide one source of additional information that could be used for improving our list of cultural and spiritual values.

Site cards indicate that the flora species listed in Table 2 are still present at Heathcote Ridge. We contend that they represent a significant, if only partial, remnant of the area’s pre-European biodiversity and natural ecosystems. Our interpretation that aerial photography at Heathcote Ridge shows relatively little change since the 1920’s supports this conjecture, but ground truthing is required to provide further substantiation.

Additional support could be found from a more detailed analysis of oral histories and literature records. With this increased degree of scrutiny, it may be possible to create a satisfactory base that identifies patterns and types of vegetation that existed well before the impact of European culture.

This would be an important step forward in our efforts to fully restore Heathcote Ridge and recreate an environment that meets the requirements of ‘Connecting with Country’ physically, culturally, and spiritually.

The distribution of stone artefacts provides us with evidence of transit and occupation of the landscape, often defining connections between individual sites and shelters. Grinding grooves provide evidence of how First Peoples worked with the environment to shape and polish their stone tools. Stone tools and grinding grooves are scattered across the landscape but tend to concentrate around shelters and along the ridges and waterways.

We also note that artefacts are of types and materials consistent with the small tools tradition that appeared during the mid to late Holocene (approximately 5,000 to 1,000 years ago). During this tradition, backed blades and sometimes flakes were hafted to wood using resin (in this instance, possibly from *Xanthorrhoea* spp.) to create hand tools for hunting and ceremonial purposes. Further information could be obtained by re-inspecting these sites and undertaking more sophisticated analysis to help determine the age of the art and the provenance of materials used.

Regarding occupancy, we note that radiocarbon dating from a handful of sites suggests the Cumberland Plain may have been occupied as long as 10,000 years ago (APEX, 2023), suggesting a lengthy regional tradition. However, many sites around the Georges River, for example Mill Creek M14, are now considered to have 'return occupancy dates' that are significantly later (Attenbrow, 2012). These later dates are generally consistent with the small tool tradition and historical European records that extend back to the late 18th Century and reflect the widespread displacement of the original First Peoples clans.

The spiritual and ceremonial backdrop of the First People's worldview is attested by some artwork in the shelters (which appear to represent dancing figures) and by the importance attributed to elevated areas near Prospect Reservoir. However, we cannot determine if the shelters containing the art are sites of spiritual importance, or ceremony

sites, or if the art is merely a record of ceremonial activities held elsewhere. Neither has detail been provided about why the sites near Prospect Reservoir are important.

In summary, the TEK that we have collected points to the existence of a rich cultural history that preceded the arrival of Europeans in the area around Heathcote Ridge. However, the limited and fragmented nature of this information makes it difficult to progress beyond the preliminary interpretations presented here and allow it to be applied to more meaningful and socially acceptable environmental management.

Further examination of archived material, particularly that of early missionaries, anthropologists, settlers, and explorers, melded with additional oral histories, stories and personal recollections is therefore warranted. Special attention should also be paid to ancient art, artefacts and known cultural values (including the identification of totemic species), to bring out the full depth of TEK relevant to Heathcote Ridge and its surrounds and bring the First Peoples' sense of place to the fore.

We recognise that there are currently large gaps in our understanding of TEK. For example, although cultural fire training has been implemented, its full value to historic land management practices and its ability to restore pre-European ecologies still needs to be fully demonstrated. We need better information about symbiotic relationships between flora, fauna, and how First People interpreted them to guide their seasonal movements across the landscape. This level of information can be gathered through ongoing dialogue with our Elders in the Yarn-up Reference Group, and ongoing discussion with our Rangers as they grow and develop into purposely developed roles.

As our Rangers develop, and the volume of pertinent information grows, GLALC will be able to progress its activities away from a simple 'Connecting with Country' philosophy towards one that better reflects 'Caring for Country'. In turn, this will provide a demonstrable means through which our First Peoples will be able to re-establish connection to country and their sense of place, where it has been lost.

4. Conclusions and Recommendations

We have worked from the premise that traditional ecological knowledge (TEK) represents the sum of cultural, environmental, and other knowledge that has been and continues to be used by people to modify their living environment. From this, we are beginning to gather a cache of information that demonstrates an ancient worldview that differs from, but is complementary with that of European science.

Our view promotes the ultimate significance of the landscape to TEK, because it is the landscape scale that provides the most complete representation of how culture and nature coalesce into a holistic interpretation of First Peoples' spiritual worldviews. This worldview is maintained by a process of intergenerational transmission of an understanding of how place and purpose changes over time in response to external influences, including imposition of other cultures and technological advancements.

The degree of change may be large or small, and our evidence suggests that the Heathcote Ridge (and Holsworthy airbase) landscape and its basic ecology and biodiversity has undergone little change since pre-European times. This provides us with an ideal base upon which land and cultural management practices reflecting both First Peoples and European worldviews can be built. We need to do this now, because Heathcote Ridge is now under pressure from expanding development and if its ecological diversity and cultural values are to be protected, leading edge management practices are required.

Regulatory authorities have developed a 'Connecting with Country' framework that works down this path, but to achieve this from a First Peoples' perspective, inclusion of TEK is paramount. Inclusion of TEK will demonstrate clear evidence

of buy-in from First Peoples, but will require careful management, especially of sacred information.

Success in establishing a detailed TEK program will also allow GLALC to go beyond this commitment and move onto a process that allows First Peoples to truly Care for their Country.

We have reported here the results of an initial analysis of TEK material from Heathcote Ridge. Outcomes of this analysis show that:

1. Currently accessible TEK data is limited in scope and volumes and is largely disjointed
2. Knowledge of cultural use of species covers on a small number of species. It is inconceivable that 12 species represent the full extent to which First Peoples used the natural resources found around Heathcote Ridge
3. Understanding of purpose, frequency, timing and duration of visitation at sites is non-existent. Although there is some evidence that suggests a few of the shelters may have been used multiple times or for ceremony, the evidence is far from conclusive
4. The value of re-introducing cultural burning has yet to be demonstrated
5. The Provenance of materials used to manufacture the small tools found has not been demonstrated. Addressing this can provide us with a more detailed understanding of travel and trade routes around the region
6. Spiritual values attributed to species, ceremony and specific landscape locations have yet to be defined. This information allows us to understand the meaning of places and species.

Addressing these streams of knowledge is crucial for the implementation of restoration systems that integrate ancient and contemporary knowledge.

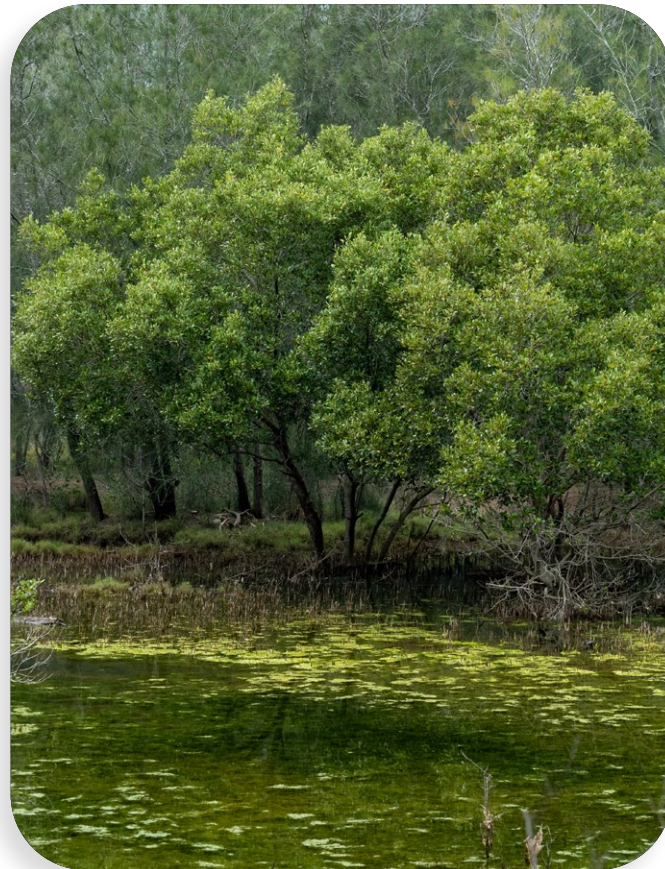
Acquiring the level of knowledge required can only be done through a much longer-term and focused study (or studies) of TEK that considers each of these streams individually, and how they inter-connect with each other.

The following recommendations are therefore made:

1. Establish an internal GLALC Governance Group dedicated to guide cultural and scientific research of interest to Gandangara First People
2. Establish a detailed long-term strategy that describes how GLALC will fund and utilise its Ranger group to routinely gather and apply TEK as part of their normal work routine
3. Acquire additional sources of funding to expand the TEK project beyond Heathcote Ridge and across the Gandangara estate. Extension of the work to include neighbouring First Peoples groups should also be considered
4. Establish close connections with local Universities to broaden the scope of TEK to be collected and integrated into future cultural and environmental management programs.

Successful completion of these recommendations should allow GLALC to expand its TEK program to produce a more comprehensive outcome for Heathcote Ridge and apply the findings to the broader Gandangara estate, and beyond.

Doing this would create leading-edge outcomes for cultural and environmental management that are mutually acceptable to First Peoples, planners, and regulatory authorities. In turn, this will demonstrate the true value of 'Connecting with and Caring for Country'.



5. References

Albuquerque U.P., et al, (2024). Why is traditional ecological knowledge (TEK) maintained? An answer to Hartel et al. (2023), Biodiversity and Conservation, 8pp, <https://doi.org/10.1007/s10531-024-02794-0> 30 January 2024.

APEX Archaeology, 2023: Aboriginal due diligence assessment for Kurrajong Road, Beech Road and Lyn Parade Intersection. Report to Liverpool City Council, March 2023.

Attenbrow, V., 2012. The Aboriginal prehistory and archaeology of Royal National Park and environs: a review, Proceedings of the Linnean Society of New South Wales 134, B39-B64.

BBC Consulting Planners and Cumberland Ecology, 2013: Program report for the strategic assessment of the Heathcote Ridge development, West Menai, under the Environment Protection and Biodiversity Conservation Act (1999), Sydney, New South Wales, February 2013.

Bird, N and Associates, 1984. West Menai release area environmental study, volume 2: appendices, Shire of Sutherland EIS 767, 1984.

Brown, O (2010). Aboriginal cultural heritage and mapping: aspects of cultural boundaries, sub-regions and site distribution in the Sydney Basin. Archaeological Heritage 2 (1) 9-16.

Jackson, G. and Forbes, P., (undated). Biddy Giles' Home on Mill Creek

Clarke, P. A. 2007. Aboriginal people and their plants. Rosenberg Publishing, Dural Delivery Centre, New South Wales, Australia.

Clarke, P. A. 2009. Australian Aboriginal ethnometeorology and seasonal calendars. History and Anthropology 20(2):79-106.

Federal Court of Australia (2018): The Applicant on behalf of the South Coast People v Attorney General of New South Wales (South Coast People), Federal Court of Australia NSD1331/2017.

Haq S.M., Pieroni A., Bussmann R.W, Abd-ElGawad A., and El-Ansary H.O., (2023). Integrating traditional ecological knowledge into habitat restoration: implications for meeting forest restoration challenges. Journal of Ethnobiology and Ethnomedicine 19: 33, 19pp. <https://doi.org/10.1186/s13002-023-00606-3>

Hartel T, Fischer J, Shumi G, Apollinaire W (2023) The traditional ecological knowledge conundrum. Trends in Ecology and Evolution, 38:211–214. <https://doi.org/10.1016/j.tree.2022.12.004>

Koettig, M. and McDonald, J., 1984. Archaeological Survey for Aboriginal Sites in the Upper Mill Creek Area, An Alternative Site for the Lucas Heights Waste Disposal Depot. Report prepared for the Metropolitan Waste Disposal Authority.

Koettig, M., 1985. Archaeological investigations of Three sites on Upper Mill Creek: Near Lucas Heights, Sydney. Report prepared for Metropolitan Waste Disposal Authority.

Koettig, M., 1990. Report on Salvage Excavations at M14, Upper Mill Creek, Near Lucas Heights, Sydney. Report prepared for Waste Management Authority.

KNC, 2020. Heathcote Road Bridge Widening: Preliminary Archaeological Survey Report – Stage 2. Report prepared for Transport for NSW. Kelleher Nightingale Consulting Pty Ltd, Sydney NSW.

Laudine, C. (2009). Aboriginal Environmental Knowledge: Rational Reverence. Vitality of Indigenous Religions Series. Surrey GB: Ashgate Publishing Ltd., H.B.K.

Madgwick J., 2004: in Native Title Tribunal Proceedings: Gale v Minister for Land & Water Conservation for the State of New South Wales [2004]. Federal Court of Australia 374, 31 March 2004.

Mariani M. et al (2022). Disruption of cultural burning promotes shrub encroachment and unprecedented wildfires, *Frontiers in Ecology and the Environment*, 20 (5) 292-300.

Mason K., 2024. What does the life of Biyarung reveal about the participation of Indigenous people in Indigenous and colonial society and economy in the 19th century? Ron Rathbone Local History Prize, 2024.

O'Connor, R. 1997. The Kombumerri: Aboriginal people of the Gold Coast: ngulli yahnbai gulli bahn bugal bugalehn: we are still here. Self-published, Brisbane, Australia.

Russell-Smith, J., D. Lucas, M. Gapindi, B. Gunbunuka, N. Kapirigi, G. Namingum, K. Lucas, P. Giuliani, and G. Chaloupka. 1997. Aboriginal resource utilization and fire management practice in Western Arnhem Land, monsoonal northern Australia: notes for prehistory, lessons for the future. *Human Ecology* 25(2):159-195.

Schilling K, 2025: Personal Communications

Sefton, C., 1990. 1989-1990 Archaeological Survey of the Cordeaux River and Woronora River by the Illawarra Prehistory Group for the Australian Institute of Aboriginal and Torres Strait Islander Studies.

Sinthumule N.I., (2023). Traditional ecological knowledge and its role in biodiversity conservation: a systematic review. *Frontiers in Environmental Science*, 11:1164900, doi: 10.3389/fenvs.2023.1164900

Walsh, F. J. 2008. To hunt and to hold: Martu Aboriginal people's uses and knowledge of their country, with implications for co-management in Karlamilyi (Rudall River) National Park and the Great Sandy Desert, Western Australia. Dissertation. University of Western Australia, Perth, Australia.

Whyte K.P. (2013): On the role of traditional ecological knowledge as a collaborative concept: a philosophical study. *Ecological Processes*, 2 (7) 1 – 12 (online version) <https://ecologicalprocesses.springeropen.com/articles/10.1186/2192-1709-2-7>

6. Attachment A: AHIMS Site Card Data

1 Statistics

Shelters

46 rock shelters/overhangs/outcrops
28 shelters contain evidence of artwork, predominantly charcoal
19 shelters were reported to contain artefacts, predominantly manufactured from quartz and quartzite, with fewer examples of chert.

Artwork

143 art records
69% are black, 14% white, 8% red and <1% yellow.

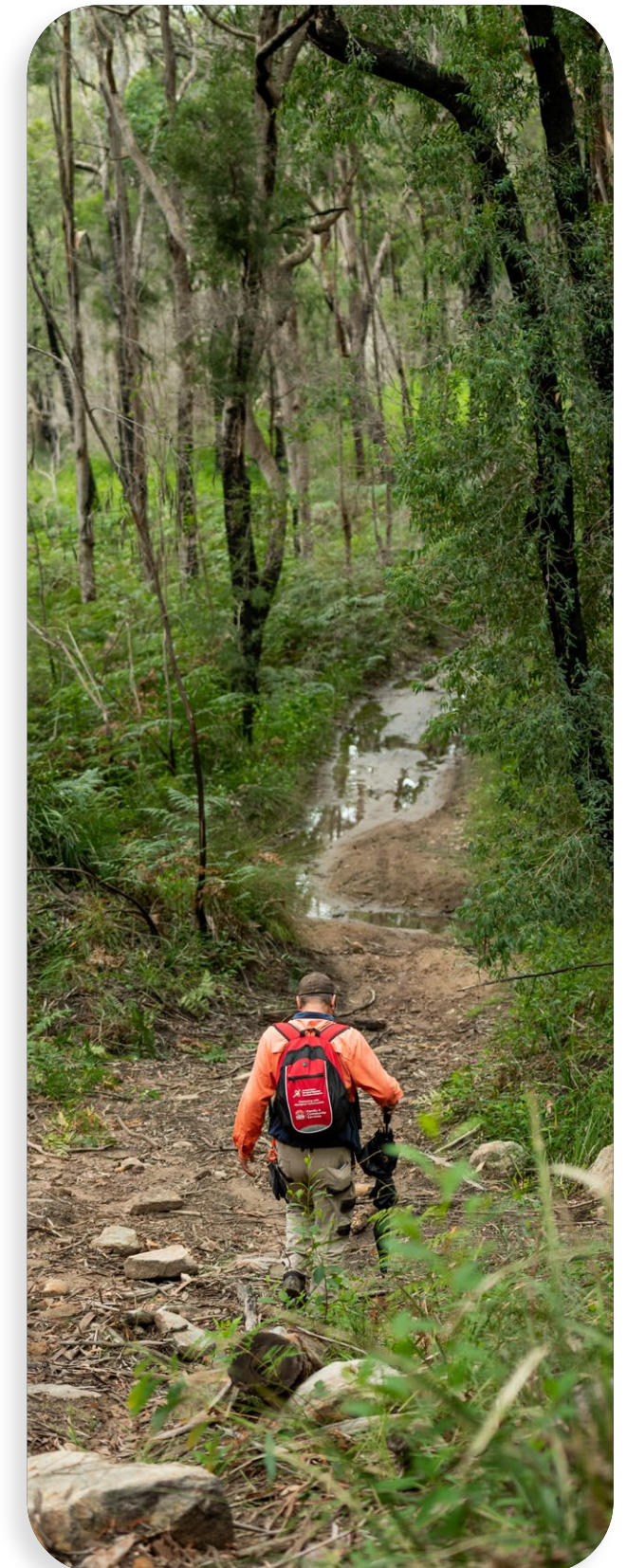
47% are classified as indeterminate, 22% represent anthropomorphs/humans, 14% were hand stencils and 14% animals, birds or fish and 3% lines.

50% of the art presents as outlines, 18% as outlines with infill, 18% as stencils, 13% was not defined and 1% as engravings.

Artefacts

Over 1000 stone artefacts in total collected over the years, 68 artefacts identified in the site records 44% quartz, 12% quartzite, 10% chert, 7% fine grained silicious material or silcrete, 18% shells and midden material. The remaining 9% constituted a range of different materials.

>73% were flakes and pieces, 18% were shell fragments, 6% possibly remnants used for art and 3% were cores.



Site identifier	Contents
45-5-5885	A circular concavity with two faint parallel charcoal lines.
45-6-0959	Four surviving charcoal figures in silhouette, with possible faded remnants of others within the caves. At least one of the figures has been interpreted to have a posture commensurate with ceremony.
45-6-0960	A broad 'boomerang'-like figure drawn in white pipeclay in the presence of several charcoal figures and indeterminate scratching. There are faint traces of charcoal on the roof, and some pecking of sandstone at the rear. The site has been interpreted as having some religious (or ceremonial value).
45-6-0961	Scattered materials from a thin midden.
45-6-1654	Two small chert flakes recovered from floor at the rear along with assorted quartz chips and seven fragments of oyster shell.
45-6-2898	One small oyster shell fragment.
45-6-2900	Site is highly disturbed with no art or archaeological remnants visible.
52-2-0210 (sandstone outcrop)	2 side by side human figures located close to an engraving of a kangaroo
52-2-0770	One dark chert flake and two fragments of a Sydney cockle.
52-2-0771	Red and yellow outline figurines are present on the roof, a yellow human stick-figure and at least four handprints. There are also several instances of indeterminate shapes mainly in yellow clay. Crayfish observed in the creek.
52-2-0773	Charcoal drawings of two animal figures (possibly kangaroo or dingo) and an abstract drawing on the rear wall. The artwork was faded but visible.

Site identifier	Contents
52-2-0774	Several indeterminate and faded charcoal drawings are present in the larger of the two shelters. There are two charcoal figures on the rock wall between the shelters under a small overhang. Some chalk drawings, engraved initials and European graffiti are also visible. Over 800 artefacts were recovered during a previous excavation by Attenbrow.
52-2-0776	Two red and two charcoal figures visible on the rear wall. No evidence of occupation. Materials used appear to be charcoal, red ochre and yellow clay.
52-2-0777	1 well-defined but faint, infilled charcoal figure associated with several charcoal lines.
52-2-0778	Numerous charcoal drawings along the rear wall. Most of these are indistinguishable but a set of approximately 12 human figures with upraised arms are visible within a shallow niche. It is suspected that additional figures exist behind a translucent layer in the shelter. Several quartz flakes were found on the floor.
52-2-1029	The site contained no art but 31 quartz, silcrete and chert artefacts were recovered from a test pit (site now destroyed).
52-2-1030 – M12	The site contained no art but 100 quartz and silcrete artefacts were recovered from a test pit (site now destroyed).
52-2-1031 – M11	7 white hand stencils on ceiling and stencils of one pair of a kangaroo's back feet. The stencils are faded, with only 2 now being clear. One of these includes the person's forearm. (site now destroyed).
52-2-1060	Chips and flakes of quartz, quartzite, silcrete and fine-grained siliceous material
52-2-1604	Eight white stencils, 7 of which are hands, the other being a hand and forearm, all of which are in good condition.
52-2-1606 – M17	9 quartz and quartzite flakes and pieces were located at the back of the shelter.
52-2-1613 – M19	2 faint but undisturbed charcoal drawings of macropods on the overhanging roof. Motifs are depicted in profile consistent with the usual style for the area. One is an outline and the other is an infilled outline. A quartz bipolar flake was also present.



52-2-1614 – M20	2 quartz bipolar flakes.
52-2-1615 – M24	9 faint motifs visible, only two of which can be identified. One is a charcoal male anthropomorph and another is a bird. 8 of the 9 motifs are charcoal, the remaining being red ochre.
52-2-1846 (Holsworthy)	A series of very clear charcoal drawings of dancing figures, presented in two phases (one superimposed on the other).
52-2-1855 (Holsworthy)	At least 3 charcoal stick figures on the rear wall. A circular engraving with a hole in the middle, possibly of European origin, is on a rock near the shelter's entrance.
52-2-1870 (Holsworthy)	Grinding grooves with evidence of occupation
52-2-2291 (Holsworthy)	4 quartz and 1 chert flakes or pieces, and 1 red outline of a macropod.
52-2-2296 (Holsworthy)	6 poor quality black (likely charcoal) figures of which 1 is identified as anthropomorphic, 1 as a quadruped and 4 indeterminate. All are outlines with linear infill.
52-2-2297 (Holsworthy)	3 core-based artefacts consisting of 1 core, 1 cortex and 1 bipolar core. 16 freehand black (likely charcoal) motifs, 4 of which are Anthropomorphs, 1 macropod and 11 indeterminate. 3 are outlines, 9 have linear infill and the remainder are linear and solid.
52-2-2319 (Holsworthy)	2 quartz flakes. 8 outlines of motifs, 6 of which are black and two red. 7 are indeterminate, the remaining being a black macropod.
52-2-2564 (Holsworthy)	1 indeterminate red stencil.
52-2-2689 (Holsworthy)	1 quartzite flake and 2 quartz flakes.
52-2-2916 (Holsworthy)	3 quartz, and 1 petrified wood flakes, and 1 bipolar core.
52-2-3593	Contents not described but potential PAD.
52-2-3594	Contents not described but potential PAD.

Site identifier	Contents
52-2-3655	5 faint, mainly indeterminate charcoal drawings located on the roof near the back. One of the motifs has an appearance like a bird.
52-2-3656	1 Quartz core.
52-2-4539	1 faint charcoal outline and indeterminate infilled drawing.
52-2-4540	5 faint charcoal outline and infill drawings depicting an echidna, 3 fish and one indeterminate motif. The smallest of the fish has an incomplete outline.
52-2-4545	3 chert and 3 quartz flakes and chips.
52-3-0735	4 white and yellow-white stencils in association with a black (presumably charcoal) emu and a red ochre emu with linear fill.
52-3-0736	1 siltstone flake and 1 quartz flake.
52-3-0737	1 red hand stencil and 13 black indistinct motifs.
52-3-0738	4 faded black outline motifs, 1 of which is a fish and 1 of which is a macropod.
52-3-1487	1 indeterminate charcoal motif consisting of about 8 lines. There is some evidence of superimposition by 3 to 4 red lines. Angular pieces of charcoal and red ochre are present on the floor, along with a small amount of residual midden materials.

6. Attachment B: Interview with Ranger Manager/Team Leader, Kelly Barton: Path to renewal - A journey to reconnect with Country

1. Practical skills & training

- Can you tell us about some of the new land management or conservation skills you've learned during your role?

"My favourite skill I have learned it how to identify natives from non-natives as it's something I've never taken notice to before this job as most of the pretty flower plants are either weeds or non-natives."

- What formal training or certificates did you complete, and what did you learn from these?

"I recently completed my Cert 2 in conservation and ecosystem management and the skills I gained are how to identify flora and fauna, treat weeds, read and interpret maps and to perform basic ecological restoration works."

2. Cultural knowledge, Traditional Ecological Knowledge (TEK) & Caring for Country

- How has your role deepened your understanding of cultural land management practices?

"It has made me have a better understanding of how my ancestors used to look after mother and how mother looked after us."

- Can you share an example of how you've helped incorporate traditional knowledge into your day-to-day work on Country?

"Learning about certain native plants which tell me if its women's or men's business or a certain animal is starting to breed."

- What does "Caring for Country" mean to you now compared to when you first started?

"Caring for Country means so much more to me to when I first started. When I started I knew only the surface stuff about my culture which is fine but once I opened myself to culture that's when my connection started. We were and are still one with mother and our connection to the land is still strong. To care for country, you have to be out on country and take time to listen to country, to our elders and knowledge holders to understand the dreaming and our traditions because we did things for certain reason."

3. Environmental impact

- Can you describe any weed management, bush regeneration or habitat restoration work you've been involved in?

"Prestons is the first project I've worked on and so far we've put up and fence to keep the native wildlife safe from cars and trucks as it's in between a lot of warehouses."

- How do you think this work is helping to protect or heal the local environment?

"I think it's working out well there since it's fenced no one can go in and throw rubbish in there so it's like a little sanctuary for them."

There is a few more things we need to do out there but one thing I'd like to do it make some possum and bird houses for the natives that do live there"

4. Personal growth & future pathways

- Looking back, how do you think you've grown personally or professionally during this role?

"I have grown so much since working here personally and professionally. Personally, I have found myself more in culture and have found a purpose in what I do and have realised everything I've ever done in life has led me to where I am today. Professionally I have found a job that has turned into a career, and I love coming to work every day as I'm never doing the same thing once its always changes which is the best learning experience I could ever ask for. I also found out that my nan's little sister my great Auntie Elvina Oxley Paulson is the First Aboriginal female Ranger in Australia. It's in my blood my family has been intertwined with this for years and I'm following some big footprints which I hope to leave my own someday."

- Has this experience shaped what you'd like to do in the future? If so, how?

"I would like to continue in what I do learn about how I can bring both traditional knowledge and modern science to look after our beautiful country and to educate people on why this needs to be done. Our culture is a one of the most beautiful ways of life I have ever seen, and I want to share that with the rest of the world. Being a ranger to me is being an advocate for the land, waterways, animals and sky. Teaching people how to understand our connection to the land as its different from many cultures but we love to share our knowledge so everyone can feel connected."

5. Contribution to the community & legacy

- How do you feel your work has made a difference to the community or to Country?

"I feel like it made a difference to community by showing them how passionate someone can be to look after country. I grew up in Redfern I'm not from southWestern Sydney, but I have always had connections out here. I hope to inspire the next generation and show them that the world is your oyster, and you can do whatever you want in life even if you feel lost our ancestors are always with us and will show you to the right path."

- What part of your impact on the team are you most proud of?

"I'm most proud of how much I've learnt and how much I've grown as a person. The cultural knowledge and understanding of connection to country I have is something I will forever be grateful to GLALC as I've had some deadly role models and mentors since working here. I love to tell everyone about everything I have learnt I feel like I'm taking them along the journey with me which I love as everyone here is so supportive in what I do."

6. Are there any further comments or insights you would like to share?

"Culture is something that I've always said its important but until I truly understood what we do, why we did things and how we made our tools I look at life differently. I used to say I was lost I did so many different jobs I had interest in them, but it never stuck not until this one. The ranger traineeship gave me the opportunity to find myself and figure out what I want to do for the rest of my life. I have the best of both worlds I get to learn so much about how earth works with understanding science but then I get to learn about my ancestors which make me feel so grateful and blessed to be able to do what I do for work. I want to inspire my people to get involved and learn about culture listen to our old peoples stories and understand how connected we are to the land."



.....

Successful completion of these recommendations will allow GLALC to expand its TEK program to produce a more comprehensive outcome for Heathcote Ridge and apply the findings to the broader Gandangara estate, and beyond.

Doing this would create leading edge outcomes for cultural and environmental management that truly reflect our ongoing 'Connection with Country'.

.....



Contact Us

Contact can be made by phone, email, in person, or
by referral.

Phone - (02) 9602 5280

Email - reception@glalc.org.au

Level 1, 64 Macquarie Street,
Liverpool NSW 2170

www.gandangara.org.au