



Australia's National
Science Agency

Green CREST Award



Science: Indigenous Research Methodology –
Water in our Environment

Created in collaboration with the Narran Lakes Aboriginal Joint Management Committee and CSIRO's Drought Resilience Research.

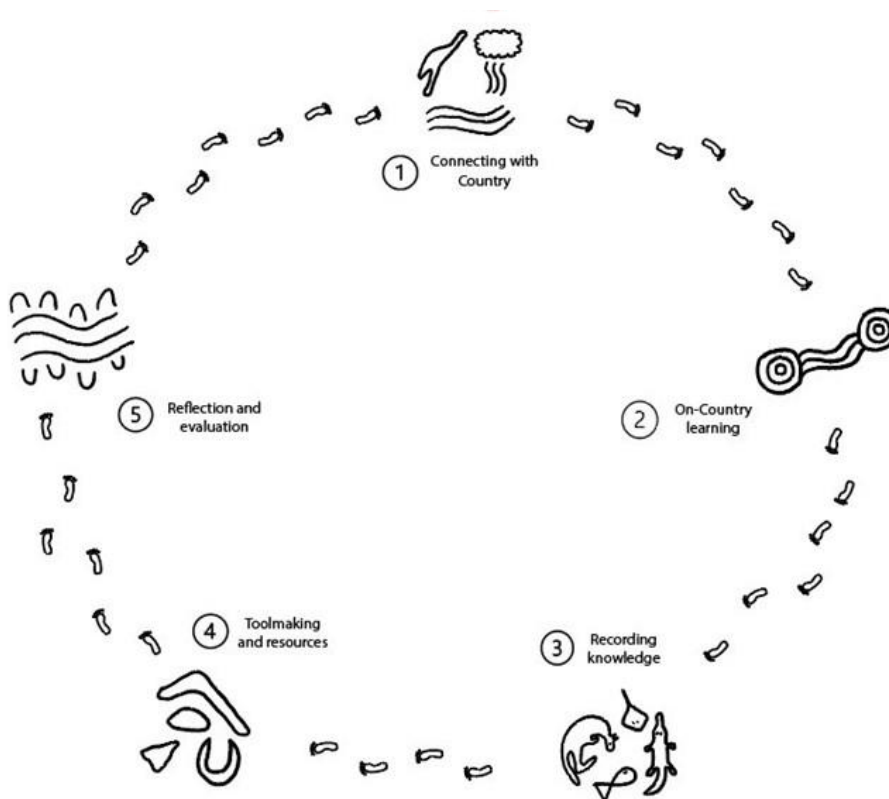
Image: Narran River, May 2025



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Science: Indigenous Research Methodology – Water in our Environment

Background information: Indigenous Research Methodology



Indigenous Research Methodology¹

“Our Culture is old. It’s ancient. It is the essence of this country, connects us all to living things such as place, flora and fauna, our waterways and skies, our ceremonies and lores, it’s part of who we are as Murri people.

Our rivers flowing and filtering on through to our lakes are the bloodline and life forms that run through our country, this creates the holistic importance of connection of all living things for survival.”

- Rhonda Ashby, Yuwaalaraay and Gamillaraay

¹ Fabila M, Moggridge B, Braedon P, Akeroyd M, Connolly M, Court Z, Gilbey S (2025). Indigenous research methodology for drought resilience, CSIRO, Australia.

CSIRO researchers and Indigenous Scholars are looking at how to decrease the effects of drought in Australia as they become more frequent and more severe. A key part of this research project is recognising Aboriginal and Torres Strait Islander (Indigenous) People's deep understanding of Country to collaboratively collect and share Indigenous knowledges in a way that both respects Indigenous Cultural Intellectual Property and is recognised by the western scientific community. CSIRO researchers and a Kamilaroi Scholar have worked closely with the Narran Lakes Joint Management Committee to apply an Indigenous Research Methodology (IRM) that captures their understanding of drought resilience.

The IRM is based on Moggridge et al. (2022)². In this activity, it will scaffold an investigation exploring how water moves on Country, embedded in Indigenous ways of knowing, being and doing. Students will consider their perspectives and positionality with reference to science, and conduct an investigation based around Indigenous Australian's deep connection to and understanding of Country.

*"Country encompasses land, waterways, seas and skies, as well as the energy and space in between. It also encompasses relationships. **Relationships with plants, relationships with animals and relationships with Ancestors** (to name a few)."*³

Aboriginal and Torres Strait Islander People's cultures are diverse, with more than 250 language groups, however, one commonality is connection to Country, seeing people as part of Country and enduring cultural practices of observing and understanding Country. "Indigenous Peoples have been observing Country since time immemorial. They comprehensively understand all elements of Country, including Land, Water and Sky Country."

- (Fabila et. al. 2025)

Take a moment to consider your own connection to and perspective of Country, and how your culture has influenced how you see the world around you.

"We don't own the land, we all belong to the land, it is part of us as much of us being part of it. In a family setting, it's like mother with her child, she will nurture its growth by being responsible for providing the care and this will continue on generation after generation. It's a cycle of respect, look after one another, look after our trees and waterways, our animals, we all have a place in this, we all have a responsibility with our mother, as she will always look after us and in return, we look after our mother. Take what you need, not what you want, as greed is a form of selfishness, you take, you give back, it's that simple!."

- Rhonda Ashby, Yuwaalaraay and Gamillaraay

² Moggridge, BJ, Thompson, RM, & Radoll, P (2022) 'Indigenous research methodologies in water management: learning from Australia and New Zealand for application on Kamilaroi country,' *Wetlands Ecology and Management*, 30(4): 853–868, doi: 10.1007/s11273-022-09866-4

³ Common Ground First Nations (n.d.) [What Is Country? | Common Ground](#) [website], accessed 5 June 2025.

Background information: Water in our Environment

Safety considerations: Slippery surfaces and weather exposure

The way water moves in our environment influences the shape of the environment, what life it can support and how severely the environment is impacted by major events, such as flood and drought.

In this inquiry, you will use the Indigenous Research Methodology (IRM) based on Moggridge et al. (2022) to implement an Indigenous way of knowing, being and doing, while you investigate the movement of water in your local environment. You take time to observe, understand and be part of the Country you are on, by paying attention to the way water moves.

The Yuwaalaraay People understand the movement of water through the local Narran Lakes system. They have built this understanding through stories and memories, passed down through thousands of years spent observing Country. They can predict with high levels of accuracy where water will flow and the impact it will have on Country.

One example of how long-term knowledge of water movement on Country is stored in stories, songlines and through oral memory keeping is the Yuwaalaraay Dreaming Story describing the creation of Dharriwaa. The Narran Lakes are an ephemeral lakes system that dries out between flooding events. It is part of the greater Darling catchment and a key element of the Murray-Darling Basin. The flow of water through this system commences with heavy rainfall events in Queensland, which feed the catchments for the Murray and Darling River systems, including the Narran Lakes. The Narran Lakes system and surrounding flood plains only receive significant water when there are very large flood events, usually caused by tropical storms. When the water does come, it initiates huge increases in plant and animal life.



Lush lignum flourishing when Back Lake is full, January 2025. Lignum is an essential nesting habitat for pelicans.



The same area of Back Lake, September 2024. The pelicans will not come to nest when there no lignum.

The Dreaming story of the creation of the Narran Lake depicts the flooding and drying events that occur in the Lakes system and demonstrates the Yuwaalaraay People's deep understanding of the water movement on Country. This Dreaming Story can be dated back to at least 30 000 years ago, and connected to fossilised crocodile remains found in the area.

Activity guide



Connecting with Country

What place in nature makes you feel connected or calm?

Introduce students to the deep, spiritual connection Aboriginal and Torres Strait Islander Peoples have with Country, and to reflect on their own sense of place.

- Acknowledgement of Country – find out the Traditional Owner and language groups of the Country you are living and learning on

Class Discussion – What does 'Country' mean to Aboriginal and Torres Strait Islander Peoples?

- Record key words, e.g. land, water, sky, spirit, family, language, care, belonging.
- See Appendix 1 for activity ideas and links

Discuss Dreaming Stories students have heard/know of – consider what they tell us about Country.

- Read the Dreaming Story of Narran Lakes (Appendix 1) , or watch it being told on Country:
- Part 2 – [Dharriwaa Living with Climate Change](#). (Dreaming Story: 3:00 – 5:00)
 - cue students to notice scientific concepts embedded in the story (eg. how the water moves and dries)
 - What do you think the Creation Story is telling us about the way the water moves through the region?
- Direct conversation to the Country you are on:
 - What happens on Country when rain falls?
 - Share stories of drought/rainfall/storms/cyclones.
 - Do puddles from anywhere on the school grounds? Or do sections get too wet to use?



On-Country learning

Students will learn on Country by investigating how water moves through and shapes their school grounds. They will model or observe rainfall and map the flow of water on Country (school grounds) using watering cans and observe water flow in different locations and on different surfaces.

Equipment (per student/group)

- School/Park map
- Watering can
- Access to water (refilling)



Recording Knowledge

Students can collect knowledge by:

1. collecting data in a table, and
2. recording observations on a site map.



Toolmaking and resources

Students create an integrated site map that includes data from their on-Country learning showing water movement on Country.



Reflection and evaluation

Students reflect on their inquiry and make recommendations on how water could be better managed on site. They recommend changes or next steps.

- Where did you see water going in the school grounds?
- Where would you expect to see water shaping the school grounds?



Additional Resources

- [Central Western Plains: Narran Lake creation story | Gather](#)
- [Bedtime Stories | Common Ground](#)
- [What Is Country? | Common Ground](#)

CSIRO Science Links

- [Indigenous Research Methodology for drought resilience - CSIRO](#)
- [Sharing knowledge of drought resilience on Country - CSIRO](#)
- [Cultural indicators for drought resilience - CSIRO](#)

Videos

Dharriwaa Living with Climate Change videos

- [Part 1 - Dharriwaa Living with Climate Change](#)
- [Part 2 - Dharriwaa Living with Climate Change](#)
- [Part 3 - Dharriwaa Living with Climate Change](#)

Professional Development

- [8 Aboriginal Ways of Learning](#)
- [Narragunnawali - Caring for Country](#)
- [Professional Development for Educators | Ngarrngga | Ngarrngga](#)
- [Narragunnawali - A Matter of Perspective](#)

Risk Assessment

- A risk assessment has been provided for this activity; however it is recommended to hold a class discussion regarding the possible risks and mitigation strategies prior to starting the activity.
- Appropriate PPE should be worn during this activity.
- **Caution** students should be supervised while collecting data outside.

Activity	Inherent risk	Elimination or control measures
Collecting data outside	Weather exposure	Take appropriate precautions according to weather conditions, eg. rain coat, hat, sun lotion, minimal skin exposure.
	Slips, falls, abrasions, insect bites	While outside, students be advised of possible risks- slipping on wet ground, trips and falls etc, advise all students to observe insects, arachnids and other animals but not to touch. Adults supervise students during data collection.
Collecting data in wet weather	Slips, hypothermia	Wear weather appropriate clothing, e.g. raincoats and covered shoes, have spare dry clothing.

Appendix 1: Connection to and observation of Country - Activities

Dreaming Story: Gali Gurunha and Narran Lake Creation

There is a massive songline that goes across this Country that connects us, not just to Narran Lake, but all across the landscape. And that is about having water within. There are sandhills, soaks, and gravel-bed springs that are in the landscape, which come from groundwater. In our language that's what Gali Gurunha means. Gali means water, Guru means hole, and the suffix at the end means in. Altogether, it means water in those holes. The little gilgaays (small, shallow waterholes) hold plenty of water. And when there's green grass in certain places, you know there's a water spring. We know that water on the surface, at some point, soaks into the ground, which returns to these holes to provide water for us. The combination of groundwater and surface water is all connected, and it is part of the Gali Gurunha story. These pathways are dotted all throughout the landscape. The [Gali Gurunha] story is about the serpent, or the crocodile in Yuwaalaraay language called Garriya, who took the water from the surface, and has to give it back. So he goes across the landscape and pops out in different places, including the rivers, the soaks and the beautiful springs. He can travel that way because he is mythical and magical... he can change shape. Gali Gurunha was called upon too, in drought time or whenever it was needed for that water to surface.

The Narran Lake creation story begins at one of the Gali Gurunha springs, where Garriya seized Baayami's wives. He [Garriya] kept shaking all the water down while he was tracked. As he took all the water from the waterholes, he created the riverbeds of the Narran River while on his path toward the main Narran Lake. And that's when the big flood happened, when they cut Gurriya open to get Baayami's wives back. The Narran River is a windy river, and in those bends of the river, that's where the deep waterholes are located. And when those waterholes in our rivers start drying up, we know we're in trouble. And that's why those waterholes are very special. Part of the ceremony is that you have to name the waterholes.

- Narran Lake Aboriginal Joint Management Committee

Observe Country

- Sit or lie down in an open area and close your eyes. What do you notice? Smells, sounds, light? Create art upon 'waking'.
- Make a soundscape, sit in silence with a book/sheet of paper. Position yourself in the centre of the paper and sketch/note the natural sounds you hear, positioning them on the page in the same relative position. If weather does not permit, consider a recording e.g. [Sounds of Narran: waterbirds calling at Narran Lakes \(Dharriwaa\) on the Lower Balonne floodplain - Flow-MER](#)
- Choose a feature of the ecosystem to draw – a tree, animal, rock formation. Make rubbings of rough bark, leaves or rock-faces.

- Go on a traces hunt. Some animals are hard to find, but you can see their traces – look for scratches in the dirt, chew marks in leaves or gumnuts or scat. Try to work out which animals left them.

Consider

“I grew up around the Walgett district with five brothers and four sisters, we spent a lot of time around the Namoi River with family and friends. I remember the river water being clear and you were able to see the bottom where we used to dive for mussels, fished, played water games and bathed. We collected snotty gobblers and gum sap off the trees nearby. Being on the riverbank was also a form of meditation, listening to the bird life, hearing the water flow and the smell of eucalyptus and gum trees. Rivers and lakes like the Narran provided life for the natural environment and its habitat, most importantly, the wellbeing of the people.”

Rhonda Ashby, Yuwaalaraay and Gamillaraay

- What non-living things did Rhonda pay attention to?
- What living things did she notice?
- What things did she know how to use?
- Consider the Country you grew up on – what did you notice? Are there similarities/differences?

Watch:

[Dharriwaa Narran Lakes Living with Climate Change](#)

- What did you notice about how Jason, Allan and Brenda spoke about Country?
- What plants/animals did you notice in the video?

[Through Our Eyes - Native Foods At Narran Lake with Brenda McBride \(Dharriwaa\)](#)

- What living things does Brenda notice?
- Do you see Country the same way as Brenda? What is similar or different to the way you look at Country?

Link:

[What Is Country? | Common Ground](#)



Discuss:

Class/small group discussion e.g. Think-Pair-Share

- What do you know about Country?
- Are there any indicators of Country that tell you changes are coming – e.g. when season change, leaves fall from trees, the smell before rain, when magpies swoop.