

Incorporating First Nations Knowledge into Technical Water Projects

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Key Points

- This project sought to identify how First Nations Knowledge and practices be meaningfully incorporated within technical water projects.
- Based on an understanding of current barriers and challenges, a framework was developed for meaningful collaboration on water issues with First Nations Knowledge Holders.
- This project has identified a process and opportunities for First Nations knowledge to be incorporated into water modelling, and how modelling can be used by First Nations peoples to identify the limitations and opportunities of implementing culturally appropriate practices in restoration activities.
- A case study is being undertaken at Munga Lake near St George in Queensland.

Abstract

A project was undertaken in Queensland to address the research question: ‘How can First Nations Knowledge and practices be meaningfully incorporated within technical water projects?’. Collaborative research and engagement were undertaken with a focus placed on how government, research and the water industry can champion the integration of First Nations Water and Land Management knowledge and practices within typical approaches used in the water industry.

Based on an understanding of current barriers and challenges, a framework was developed for meaningful collaboration on water issues with First Nations Knowledge Holders. This framework is now being trialed in a two-year implementation project.

This project has a number of findings including: the need for funding to support Aboriginal Ranger to implement practical landscape rehabilitation works; western concept of landscape conservation contrasts with First Nations land management practices; culturally responsive engagement, on Country, is required to ensure Indigenous Knowledge is valued within landscape rehabilitation projects; work is required around First Nations data sovereignty to develop data agreements incorporating ‘Indigenous Cultural Intellectual Property (ICIP)’. Later stages of the project involved a case study at Lake Munga near St George, south-west Queensland where consultation and a field visit helped to identify rehabilitation objectives for the site. Water modelling was used to understand and demonstrate how historic actions had affected the site, and to inform restoration actions based on Indigenous Knowledge and practice.

This project has identified a process and opportunities for First Nations Knowledge to be incorporated into water modelling, and how modelling can be used by First Nations peoples to identify the limitations and opportunities of implementing culturally appropriate practices in restoration activities.

Keywords

First Nations knowledge, land management practices, water modelling, collaboration, meaningful engagement

Introduction

Aboriginal and Torres Strait Islander Nations and communities have a long history of managing, observing, interacting, and connecting with land and water throughout Australia, with invaluable land and water management knowledge, shaped over thousands of years of practice. The Queensland Department of Environment and Science (DES) funded a pilot project with the objective of understanding how First Nations Knowledge, including Water and Land Management Practices, could more effectively be incorporated into technical water modelling projects. This pilot was managed by Relative Creative, alongside project partners

Water Technology, Firesticks Alliance and under the cultural guidance of Mandandanji Traditional Owner Kay Blades.

Project Purpose

The project intention is to better understand how Indigenous Knowledge (IK) and First Nations land management practices (FNLM) could be incorporated into technical projects for landscape management, rehabilitation and resilience outcomes.

This project is also closely aligned with the water modelling pipeline framework used by Queensland Water Modelling Network (QWMN), which conceptualises the inputs and processes of modelling projects (Figure 1). This includes scientific understanding, data monitoring, modelling and information support applications, decision making, and is underpinned by communication. This project considers where and how First Nations engagement fits into this model.

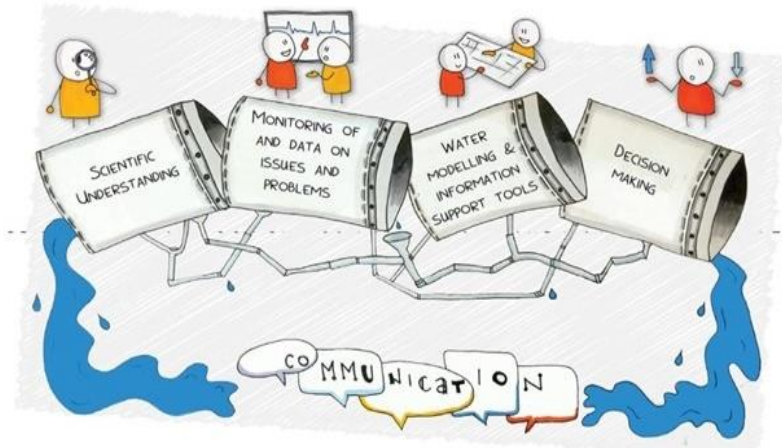


Figure 1. The Water Model Pipeline (QWMN)

Designed as a pilot, the project involved a literature review and gaps analysis, in-person engagement with First Nations land managers, analysis of outcomes, technical recommendations for industry and government to consider, and communication of project findings.

Work is currently being undertaken to implement the findings of this pilot project as a case study in meaningful collaboration between First Nations knowledge holders, and technical professionals to integrate approaches and knowledge to restore environmental values in the landscape. The pilot project was designed into 5 phases:

- Phase 1 – Research & project scope development
- Phase 2 – Facilitated engagement with First Nations land managers
- Phase 3 – Engagement outcomes analysis
- Phase 4 – Technical Recommendations
- Phase 5 – Communicating Project Findings

The pilot project concluded in June 2023. This paper provides a summary of the approach and findings of the pilot project touches on how this is now being applied in a case study.

Key Findings From Each Phase

Phase 1 - Research & project scope development

Literature Review - This review focused on water justice, inclusion of First Nations practices in land management, and current principles, protocols, and practice of engagement with First Nations peoples in relation to ‘on-Country’ projects. The key findings include:

- Colonisation continues to have an impact on the way First Nations peoples and communities are engaged in water-based projects and the extent to which they benefit from project outcomes.

- Engagement of First Nations peoples within the water space focusses on the cultural use of water rather than IK and its application through FNLM practices.
- There has been extensive engagement, frequently led by First Nations peoples, to establish principles and/or protocols for engaging First Nations peoples and communities (at a project, state and federal level).
- Projects exist on a scale of benefit from acknowledgement of First Nations peoples through to self-determined application of FNLM.

Gaps analysis – A gaps analysis was conducted based on industry experience and perspectives, with the key findings including:

- Engagement is often limited to the topic of Cultural Heritage (noting there is policy requirements to undertake this) rather than land management practices or First Nations knowledge.
- Engagement with First Nations peoples is typically limited to inform / engage modes (IAP2), in a limited capacity, without remuneration and without accountability to implement actions beyond the engagement.
- From governments and requests for quotations to industry, a business-as-usual approach is taken (a preference to ‘do-nothing’ rather than risk ‘getting things wrong’). Industry is responsive to requested scopes.
- Technical consultancy project budget and timeframes often don’t accommodate meaningful engagement or collaboration. There can be a lack of relationships built to facilitate meaningful engagement and collaboration.
- There are differing models of thinking with systems approaches compared to compartmentalised technical approaches.
- Consultancy businesses are generally structured to be specialised, working within one-two components of the water modelling pipeline.

Industry Consultation - Between Phases 1 and 2, the Queensland Water Modelling Network (QWMN) held two public-facing industry events, where representatives from the project team presented an overview of the project scope, objectives and findings from Phase 1. These events were:

- QWMN Research, Development, and Innovation 2022/23 Showcase – 26th October 2022
- QWMN Water Modelling through a cultural Lens – 27th October 2022

Feedback and questions were welcomed from attendees during both presentations. During the second presentation, focused specifically on water modelling and First Nations perspectives, an engagement activity was completed to understand respondents perspectives and experience with the findings of the gaps analysis and seek open-ended feedback on additional gaps or barriers experienced.

The gaps analysis findings were simplified into the following 5 statements, and participants were asked to indicate to what degree they agree or disagree with the statement being a key gap preventing meaningful engagement of First Nations peoples and knowledge holders in technical landscape rehabilitation and/or water modelling projects.

The results are shown in Figure 2. This activity had 22 industry participants from a mix of State and local government, research, and consultancy. Results show agreeance that the gaps identified in Phase 1 have been experienced by participants.

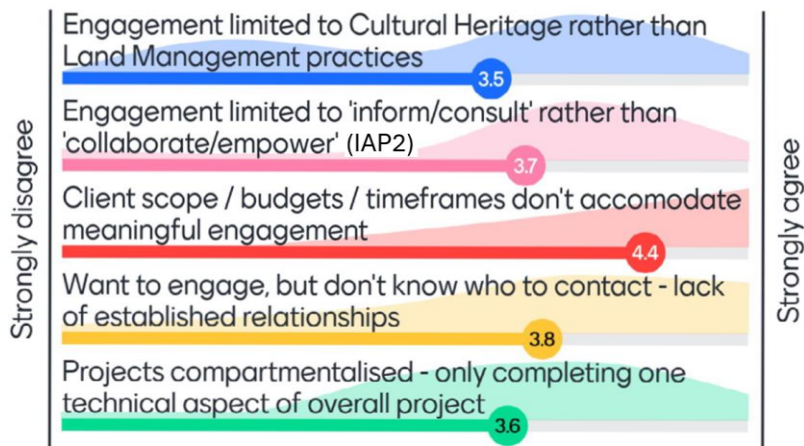


Figure 2 Ranking of identified gaps

The 3 highest rankings gaps were as follows:

- #1 – Clear scope / budgets / timeframes don't accommodate meaningful engagement.
- #2 – Want to engage but don't know who to contact – lack of established relationships (don't know where to start).
- #3 – Engagement limited to 'inform/consult' rather than 'collaborate/empower' modes (IAP2).

These aligned with the perceived gaps identified during the gaps analysis and outcomes of the literature review.

Phase 2 - Facilitated engagement with First Nations land managers

The engagement was designed as an opportunity to understand the types of information that might be included in the water modelling pipeline, limitations to the use of knowledge (such as significant knowledge) and where else engagement could occur and under what frameworks.

Engagement was conducted over two days in St George Queensland, in November 2022. Munga Lake (also known as Lake Munya) was selected as a case study due to an existing relationship between Firesticks Alliance, Aunty Kay Blades (Mandandanji Traditional Owner) and the local Aboriginal Rangers.

With a cultural lens over the Munga Lake site, it has many of the typical problems with our waterways and provides an opportunity to assess how we can better work in collaboration with First Nations people to look after our water and waterways.

Prior to the engagement, Relative Creative met with members of the Water Technology team to discuss water modelling in more detail and seek insights to share during engagement activities with Mandandanji Traditional Owners, Firesticks Alliance, and the Local Aboriginal Rangers.

An engagement outcomes analysis report was prepared by Relative Creative and identified key findings from all engagement activities completed in St. George. Technical recommendations that governments, research, industry bodies and consultancy may consider were developed in response to Phase 1 and 2 findings.

Phase 3 – Recommendations based on engagement findings

Based on the Phase 3 Munga Lake Engagement Outcomes Report, the following opportunities and recommendations were identified for a governmental, technical, or professional services audience.

Action and Application - Further investigation into providing funding & training for Rangers to collect data for technical landscape restoration projects could be considered by DES. This would form a touchpoint with the water modelling pipeline framework where Aboriginal Rangers would be involved at early stages of a project, in collecting and supplying data for technical landscape rehabilitation projects, in the scientific understanding, and data collection phases.

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Conservation versus active land management - The western concept of landscape conservation wherein landscapes are maintained in their most ‘natural’ state contrasts to the millennia of First Nations land management practices that use a wide variety of techniques and practices to actively alter and manage landscapes and landforms for sustainable use and ecosystem health.

Valuing and modelling Indigenous Knowledge - More work needs to be done across the industry to support culturally responsive¹ engagement and values shift to ensure Indigenous Knowledge is valued within landscape rehabilitation projects. While it was noted that knowledge would vary from region to region and culture to culture, a few core principles were identified as being key things that could be created as spatial layers or given consideration within modelling exercises, including:

- Extending buffer zones around waterways and bodies of water
- Identifying, mapping, and protecting parent trees
- Cultural burning and weed eradication
- Use of local Indigenous Knowledge to update vegetation mapping and the relationship between vegetation and soil.

Mapping the impacts of climate change and changes to landscape and flows - Interest in the ability of water models to provide further insights to Aboriginal Rangers was highlighted, including to identify the limits of rehabilitation works, the impacts of climate change and the use of modelling to inform decision making and funding applications for landscape rehabilitation projects.

Funding, jobs, and training - Incorporating First Nations land management practices into landscape rehabilitation requires funding for First Nations peoples to apply their knowledge to Country. To be effective, funding needs to be ongoing and support job opportunities for long-term landscape rehabilitation and management.

Further support could occur in the training space, ensuring opportunities for Country-based knowledge to be shared and practiced, and engagement with water modelling can occur.

Data sovereignty - Concerns were raised around losing control of First Nations data were it to be shared. Data sovereignty is a theme we have noticed as recurring in many recent engagements. In this context it relates to “the right of Indigenous peoples to govern the collection, ownership and application of data about Indigenous communities, peoples, lands, and resources” (AIATSIS, 2019). Data agreements are a standard practice for technical projects. Communication and development of a First Nations specific data agreement template could be investigated by research and industry professionals, considering Indigenous Cultural Intellectual Property (ICIP) protocols.

Engagement practices and protocols - While there are guidelines and protocols published for best practice engagement, including ICIP, remuneration, timeframes, cultural responsiveness, understanding who to engage with, and advocacy, further work is required to train and support industry representatives in meeting these protocols. Additionally, consultation fatigue and a lack of accountability and follow-through is a critical flaw in projects, and if perpetuated, is likely to form barriers to First Nations peoples continuing to engage in projects.

Considerations for technical projects

The literature review and gap analysis findings from Phase 1 were confirmed by engagement findings in Phase 2 & 3. Key actions relate to establishing a data agreement considering ICIP, expanding knowledge exchange,

¹ Cultural responsiveness is the effective engagement and promotion of the socioeconomic, political and cultural needs of Aboriginal peoples and Torres Strait Islander peoples. It is having the ability to effectively forge relationships with people from other cultures, actively engage in ongoing learning, reevaluation and participation. Cultural Responsiveness moves beyond the ideas of cultural awareness and cultural competence. It recognises that cultural safety is not static and that organisations must continue to ensure that they continue to adapt to the changing needs of staff, clients, collaborators, and community. Being culturally responsive includes acknowledging when someone feels culturally unsafe and undertaking actions to address such situations.

building awareness of water modelling and technical approaches commonly used models, and prioritising training, funding, and job creation for First Nations peoples participation in landscape rehabilitation projects.

Phase 4 – Technical Recommendations

This phase detailed the technical recommendations from the perspective of standardised technical approaches to landscape rehabilitation projects and how First Nations Knowledge can be incorporated, through meaningful collaboration with knowledge holders on technical projects. This project explored possible frameworks that could be applied to the water modelling pipeline for:

- Government and industry recognition / realisation that First Nations Knowledge is highly valuable, and collaboration could lead to enhanced landscape outcomes.
- Where the touchpoints for meaningful engagement and collaboration along the pipeline with First Nations Peoples are.
- What type of knowledge First Nations Peoples hold and how this could be paired with or complement technical / scientific knowledge in modelling-related projects, what type of knowledge can/can't be shared and Indigenous Cultural Intellectual Property (ICIP), and how First Nations Peoples can be remunerated for knowledge sharing.
- What type of benefits / enhancements in landscape rehabilitation projects can be made through First Nations knowledge.
- How First Nations Peoples are respected, empowered, remunerated, and their impact on decision making is increased through collaboration in such projects; and that action and implementation is seen rather than consultation fatigue and inaction being perpetuated.

The 'Water Modelling Pipeline' approach has been 'Reimagined' and is currently being applied to a Pilot Study at Munga Lake near St George in Queensland. The reimagined approach is described in Figure 4.

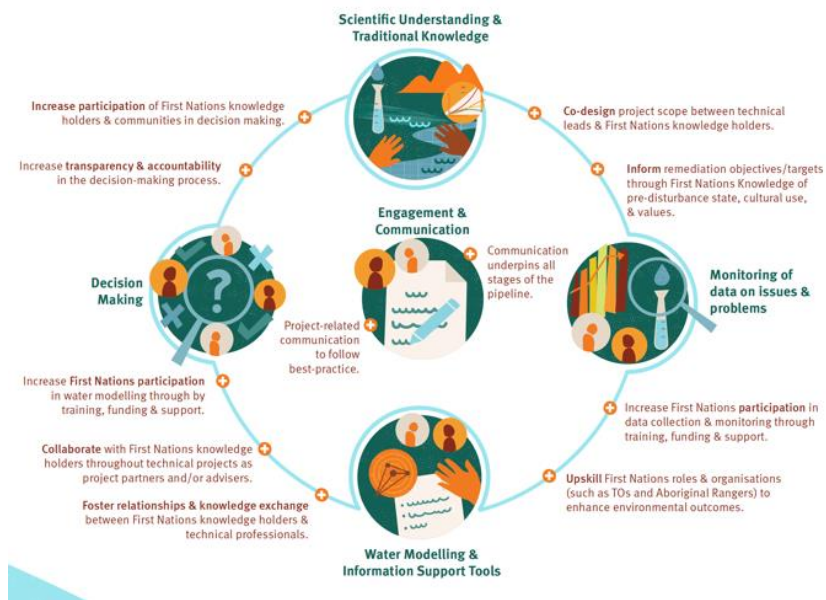


Figure 4. The 'Water Modelling Pipeline' Reimagined

Pilot Study – Munga Lake, St George, QLD

Identified environmental issues at Munga Lake - Water quality in Munga Lake and the surrounding catchment has deteriorated, including recreational and visual amenity being diminished to a point that it is no longer visited. This was identified through desktop analysis, an understanding of surrounding land use, and qualitative inputs during engagement with Aunty Kay at Munga Lake during the Phase 2 visit to the St. George region.

It is understood the site has lost:

- Riparian and mature vegetation resulting in loss of bank stability and removal of shade.
- Clear water free from excessive silty sedimentation in shallows.
- Biodiversity values, including birdlife and other fauna.
- Waterway flows from before weir was in place.

It is understood from conversations with Aunty Kay that *‘Munga means ear in Mandandanji, the lake is a ‘listening place, to listen to learn’. The site was traditionally a significant site for hunting, fishing, and camping.’* The vision to rehabilitate the landscape to enable these practices to continue can be supported by technical and modelling applications, however, would rely heavily on an effective co-design process throughout the project to inform objectives, approaches for implementation and facilitate knowledge exchange.

Collaborative approach to rehabilitation – In this case study, the following process was used to employ a co-design process and facilitate two-way knowledge exchange between technical professionals and First Nations knowledge holders. The objectives included:

- Traditional Owners to see on ground improvements to the environmental and cultural values of Munga Lake and be involved from start to finish in the project.
- A demonstration of how First Nations Knowledge and technical consulting approaches to landscape rehabilitation can be implemented, through a co-design process for DES to showcase and consider.



Figure 5. The project team at Munga Lake

Applying the ‘Reimagined Water Modelling Pipeline’ for Munga Lake

The Munga Lake pilot provides an example of how First Nations knowledge and technical approaches to landscape rehabilitation can be incorporated in an implementation project. In the design of the pilot we considered how this would be approached to conduct knowledge exchange, data collection, modelling, and rehabilitation works at Munga Lake.

Scientific understanding and Traditional Knowledge – Objectives were set for Munga Lake Implementation Project including:

- Traditional Owners to see on the ground improvements to the environmental and cultural values and uses of Munga Lake and be involved from start to finish in the project.
- A demonstration of how First Nations Knowledge and technical consulting approaches to landscape rehabilitation can be implemented, through a co-design process for DES to showcase and consider.

Preliminary insight into historical environmental state of Munga Lake was gathered during Phase 2 engagement. While pre-colonial state is usually set as a target for rehabilitation, as environmental degradation of this environment is understood to be relatively recent, pre-damming is used. This was summarised from Aunty Kay’s own experience and stories passed down from her Uncle about qualitative characteristics of Munga Lake including:

- River had clear water and a sandy bed. Water was safe for drinking, fishing, and swimming.
- Sand was a significant feature of the area and surrounding waterways also had large amounts of sand.
- Tall River Red Gums shaded the riparian zones.
- Ground-cover and riparian vegetation was plentiful, including species known as gumby gumby, naipan, bush lime, snottygobbles and bumbles, as well as aquatic species such as lilies.
- The lake had high biodiversity, including wildlife, birdlife and fish. Species included black ducks, broilga, shag, yellowbelly, cod, yabbies, shrimp, and mussels. Kangaroos and echidnas also frequented the area.

These inputs are used to set objectives for rehabilitation, in conjunction with technical knowledge about the changed hydrology, climate change risk to species shift, changing rainfall patterns and temperature increases.

Data monitoring, water modelling & information support tools - Desktop analysis and water balance modelling can be conducted to identify the cause of environmental degradation.

- Gathering further inputs from First Nations knowledge holders in the project team can inform environmental degradation assessments.
- Presentation and translation of modelling processes results during workshops enables knowledge exchange between First Nations knowledge holders and technical professionals.
- Discussion of what this means for the site can be facilitated through co-design workshops during the water modelling stage of the project.
- This is a key opportunity to raise awareness of what water modelling is, how it works and how its outputs can be used for landscape rehabilitation.

Communication and Engagement - Communication, engagement, and a co-design approach need to be incorporated at every stage of the project. Considerations for this project (and best practice) include:

- Who to engage with and how to engage should be advised by Traditional Owners in the project team and engagement planning should be done by a suitably qualified and experienced practitioner.
- Engagement methods should consider on-site meetings to ground-truth understanding of the site and listen to First Nations knowledge holders on Country if invited.
- A Traditional Owner should be appointed as a part of the core project team to review plans and approaches throughout the project. Their time and knowledge should be appropriately remunerated.
- Visual and plain-language resources should be produced throughout the project to communicate the approach and enable learning and application for future projects.
- All engagement activities need to be respectful, accountable and transparent to communicate with participants the purpose of the engagement, how the inputs will be used, and what action will result from the project.

These considerations aim to reduce consultation fatigue, value all inputs, and practice co-design to collaboratively set objectives, discuss findings, and make decisions about what actions should be implemented at Munga Lake to improve its environmental health, connectivity, biodiversity and increase opportunities for cultural use of the area.

Conclusion

In conclusion, the key actions identified in the Pilot study are as follows:

- **Further investigation into providing funding & training for Rangers** to collect data for technical landscape restoration projects could be considered by DES.
- Several recent guidelines for engagement practice and protocols are available, however **awareness and use of guidelines could be further supported for government and industry uptake**, including requirements to follow best practice in Request For Quotes (RFQ) scopes.

- **Inclusion of First Nations knowledge holders in setting project aims** could be implemented by governments and industry in landscape restoration projects.
- Data agreements are a standard practice for technical projects. **Communication and development of a First Nations specific data agreement template could be investigated** by research and industry professionals, considering ICIP protocols.
- **Greater awareness of First Nations practical knowledge and the value of this for landscape management and restoration could be a focus for government-run networks** such as QWMN, and industry bodies to communicate to industry and promote a values shift over time. This could be achieved by inclusion as industry webinars, conference themes and case studies.
- **A collaborative program to increase intake & support First Nations students** in environmental science & engineering courses, industry placements, & employment in landscape management could be considered by DES.
- This commentary from engagement reinforces the **need to build awareness, trust and confidence in water modelling and technical approaches** for optioneering and their role in informing decision-making.

Acknowledgment

The project team would like to acknowledge and thank Aunty Kay Blades (Mandandanji Traditional Owner) and the local Aboriginal Rangers for sharing their knowledge and insights to the project to date, and we look forward to ongoing collaboration to help reach our environmental, social and cultural objectives for Munga Lake.

This project has received funding support through the Queensland Water Modelling Network (QWMN), an initiative of the Queensland Government that aims to improve the state's capacity to model its surface water and groundwater resources and their quality. The QWMN is led by the Department of Environment, Science and Innovation with key links across industry, research and government.

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