



Phase 4: Technical Recommendations Report

Incorporating First Nations Knowledge

Department of Environment and Science



Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
01	Draft	Daryl Lam	-	5 April 2023
02	Draft	Kay Blades, Bec Barnett	-	15 May 2023
03	Final	Ben Tate	Ben Tate	7 June 2023
04	Public version	Steve Clark	Steve Clark	7 December 2023

Project Details

Project Name	Incorporating First Nations Knowledge
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Document Number	22020191_R04_V04_Technical_Recommendations_Report



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ACKNOWLEDGEMENT

Water Technology acknowledges the Jagera people and the Turrbal people as the Traditional Custodians of Meanjin (Brisbane), the lands on which our office is located and where we meet, work, and learn. We pay our respects to Jagera and Turrbal Elders past, present, and emerging.

The technical recommendations made in this report are based on the engagement conducted on the lands and waters of the Mandandanji people, and we acknowledge the wisdom, knowledge, and connection to Country that we strive to learn from.



Aunty Kay Blades at Munga Lake, Mandandanji Country (Source: Relative Creative 2022)

“Munga Lake is a significant site for Aunty Kay Blades, Mandandanji Traditional Owner. Munga is ear in Mandandanj, the lake is a ‘Listening Place, a place to listen to learn’”. The site was traditionally a significant learning ground used for hunting, fishing, and camping.”

Phase 3 Report – St. George Engagement Report, prepared by Relative Creative



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1 INTRODUCTION

The title of this project is *Incorporating First Nations Land Management into Technical Approaches to Water Modelling: A Pilot Study to Establish Frameworks to incorporate Indigenous Knowledge*, funded by the Queensland Water Modelling Network's 2022/23 Research, Development, and Innovation Strategy for the Department of Environment and Science.

This project is a collaboration between Relative Creative, Water Technology, Firesticks Alliance and advised by Mandandanji Traditional Owner, Aunty Kay Blades.

1.1 Purpose of project

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 1-1). 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.

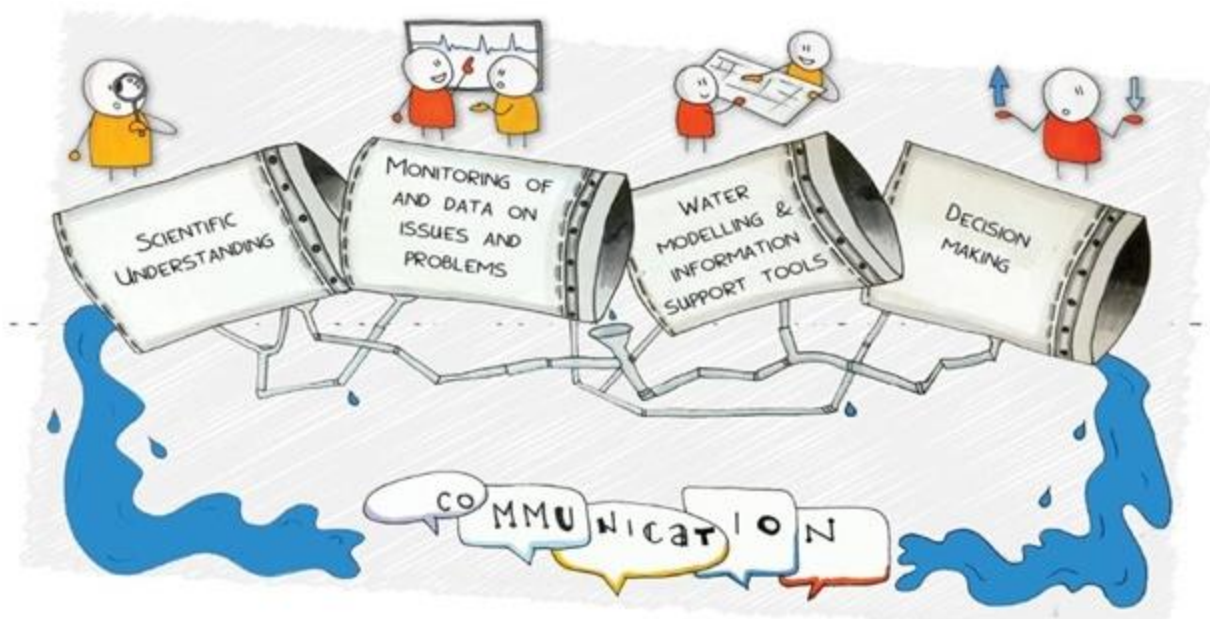


Figure 1-1 The Water Modelling Pipeline (QWMN)

Designed as a pilot project, this involves 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.

Future work can be done to implement the findings of this pilot project, such 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. This pilot project was designed into 5 phases.

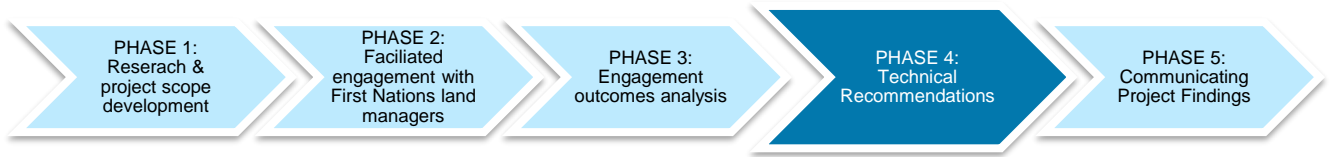


Figure 1-2 Project phases of the Incorporating First Nations Knowledge Pilot project

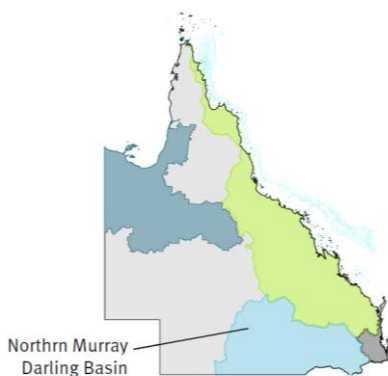
Building off the findings from Phases 1 to 3, Phase 4 details the technical recommendations from the perspective of standardised technical approaches to landscape rehabilitation projects and how First Nations knowledge can be incorporated, through meaningful collaboration with knowledge holders on technical projects. This project explores possible frameworks that could be applied to the water modelling pipeline to:

- Facilitate government and industry recognition of the value of First Nations Knowledge, and that enhanced landscape outcomes can be achieved through collaboration with First Nations knowledge holders.
- Better understand First Nations Knowledge, including:
 - Types of knowledge First Nations Peoples hold, and how this could be paired with technical and scientific knowledge in modelling-related projects.
 - What type of knowledge can and can't be shared (respecting Indigenous Cultural Intellectual Property), and how First Nations Peoples can be equitably remunerated for knowledge sharing.
- Identify the touchpoints for meaningful engagement and collaboration with First Nations Peoples throughout the water modelling pipeline.
- Ensure First Nations Peoples are respected, empowered, remunerated, and their impact on decision making is increased through collaboration in technical projects; and that implementation is demonstrated.

1.2 QWMN priority actions

This pilot project was designed in response to the QWMN 2022 Research, Development, and Innovation Strategy, which identifies a number of challenge statements (CS) and priority actions to work towards. Alignment with these goals defined in the strategy and the work of this project is shown in Table 1-1. Project reporting has included consideration of priority actions to guide focus in analysis findings and discussion provided.

1.2.1 Regional priority – Northern Murray Darling Basin



The QWMN RDI Strategy also identified the Northern Murray Darling Basin as a regional priority area.





Located within the Northern Murray Darling Basin, the Balonne River and its tributaries in and around St George was selected as a case study site due to an existing relationship between Firesticks Alliance, Aunty Kay Blades (Mandandanji Traditional Owner) and the local Aboriginal Rangers.

Further, the site covers all of the aspects, from a cultural lens, of the problems with our waterways and the work we need to do to look after our water, on a national scale.

Conducting this project with a focus on Munga Lake enables testing of the integrating water modelling with on-ground impacts and identification of possible collaboration frameworks.



Table 1-1 QWMN research, development and innovation priority actions underpinning this project

Challenge	Priority actions applicable to this project	Phase
 CS1 Climate change & variability	Priority action 1.4 – Undertake communication and engagement with end users and other stakeholders to ensure models are understood, valued and used appropriately	Phase 3 & 5
 CS2 Landscape Rehabilitation & resilience	Priority action 2.1 – Undertake gap analysis and dependency mapping to understand where key knowledge gaps are and what work is required to underpin future requirements	Focus of project – all phases
	Priority action 2.2 – Progress model development, integration, and improvement to ensure models are robust, and fit-for-purpose, including helping address multi-disciplinary needs of restoration and rehabilitation planning and evaluation.	Phase 4 & 5
	Priority action 2.4 – Increase capacity building and investment to ensure access to the water modelling tools and capability needed to support restoration and rehabilitation projects into the future	Phase 3
 CS3 Building trust & confidence	Priority action 3.1 – Develop guidance and communication materials to increase understanding and transparency of models, techniques, uses and limitations.	Phase 3 & 5
	Priority action 3.2 – Foster collaboration between modellers and decision makers to increase mutual understanding of the strengths and constraints of models in addition to their application and use in decision-making. (Particularly, <i>Incorporate Traditional Knowledge into models through co-design and co-development</i>).	Focus of project – all phases
 CS4 Model improvement & integration	Priority action 4.2 – Develop data and approaches to ensure water models are relevant, effective, and efficient and capitalise on technological developments and consider non- traditional information sources	Focus of project – all phases

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2 PROJECT CONTEXT

2.1 Key findings from Phase 1 – Background review

2.1.1 Literature review

As a part of Phase 1, a review of publications was completed by Relative Creative, and reviewed by the project team. This is titled: ***‘Engaging First Nations Land Management Practices, within landscape rehabilitation and resilience projects, including in the Murray Darling Basin’***.

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 relates 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 through to self-determined application of FNLM.

2.1.2 Gaps analysis

In addition to reviewing literature, government publications and other sources, a gaps analysis was conducted based on industry experience and perspectives, led by Water Technology and reviewed by the project team. Key findings included:

- 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.



Refer to the full Literature Review and Gaps Analysis documents for further details.



Refer to ‘Incorporating First Nations Knowledge into Water Modelling’ document for a summary of Phase 1 findings.





2.1.3 Industry consultation findings

Between phases 1 and 2, the 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.

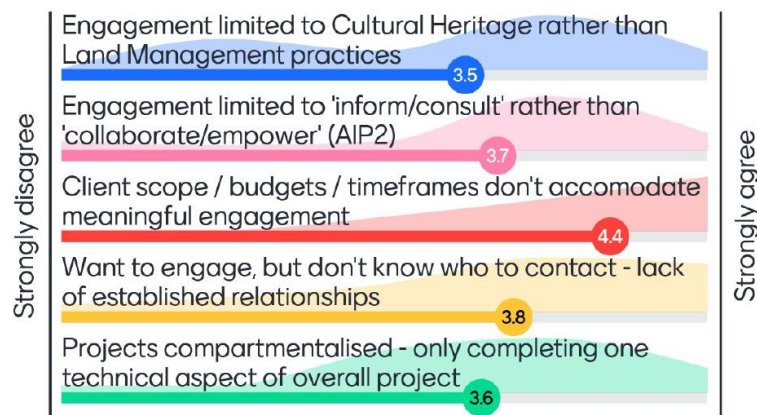
The gaps analysis findings were simplified into the following 5 statements, and participants were asked to indicate to what degree they agree or disagree with the statement being a key gap preventing meaningful engagement of First Nations peoples and knowledge holders in technical landscape rehabilitation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

The results are shown in Figure 2-1. 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.



Slide to scale bar on each identified gap:

Mentimeter



22

Figure 2-1 Ranking of identified gaps by participants during the QWMN Forum, October 2022

While this consultation was limited to a short activity, two questions, and a small number of participants (22 people), it provided a useful snapshot of industry perspectives and experience. Further consultation with industry representatives could be conducted to return more in-depth gap analysis, identification of barriers and discussion of opportunities. Anonymous comments received through this forum are presented in **Error! Reference source not found.**



2.2 Summary of Phase 2 – Engagement approach

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, between 21-22 November 2022. Munga Lake (known as Lake Munya by others) 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.

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. The following activities were conducted on site:

- Listening at Munga Lake (past state, present state, current approach, what needs to change).
- Conversation with Victor Steffensen about lessons from Cultural Burning over the last few years.
- Conversation with Queensland Murray Darling Catchment Ltd. (QMDCL) Aboriginal Rangers about potential opportunities afforded by water modelling.

■ ■ ■
*Refer to 'St. George
Engagement
Outcomes Report' for
detailed Phase 3
methodologies and
findings.*
■ ■ ■

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 have been developed in response to Phase 1 and 2 findings.

The following section provides a brief summary of the key points identified through background review and engagement, and what opportunities could be explored to address gaps and barriers to meaningful engagement and collaboration with First Nations knowledge holders for landscape rehabilitation projects.



3 RECOMMENDATIONS BASED ON ENGAGEMENT FINDINGS

Based on the Munga Lake Engagement Outcomes Report authorised by Relative Creative as the Phase 3 deliverable, the following opportunities and recommendations have been identified for a governmental, technical, or professional services audience.

3.1 Key outcomes

This section refers to the 'key outcomes' in the Phase 3 report (page 7 – 9).

3.1.1 Action and application

WHAT WAS FOUND: Further funding for Aboriginal Rangers to implement practical landscape rehabilitation works on the ground is likely to have positive environmental and social outcomes.

WHAT WE THINK: To test-case how data gathered by Rangers could be implemented into technical projects and models, further investigation could be completed by DES to determine:

- What type of data specifically Rangers currently collect and could share with government, research and/or industry.
- Whether it was of interest or fitting for Rangers to receive training to undertake project-specific data collection independently or alongside project partners for a specific project purpose (e.g., flow data, water quality data etc.).

■ ■ ■
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.

Table 3-1 Action and application progression

QWMN priority action	Engagement findings	Technical perspectives
PA2.1/PA 3.1 Understand where key knowledge gaps are	The pre-colonial state is a major gap in available data.	<p>There is a need to understand what the desirable state is to which a project seeks to work towards. Also, it's important to keep in mind the previous state may not be ideal with climate change increasing the pressure on landscapes and ecosystems.</p> <p>Typically, technical approaches / industry consider pre-colonial as 'natural', when in fact it should be thought of as 'First Nations managed'.</p> <p>For certain sites, this distinction could be important to consider in setting objectives and informing rehabilitation works.</p>
PA2.2 Address multi-disciplinary needs of restoration and rehabilitation planning and evaluation	Models could provide information around adjustments necessary to respond to climate change and re-establishing flows despite changes to the landscape.	Multi-disciplinary, multi-stakeholders collaboration is vital.

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3.1.2 Conservation versus active land management

WHAT WAS FOUND: 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.

WHAT WE THINK: Early consultation and whole-of-project collaboration with First Nations knowledge holders could adjust project aims and approaches to be more reflective of active management principles for enhanced landscape rehabilitation outcomes. This could achieve:

- Greater awareness and value of First Nations knowledge and land management practices.
- An understanding of differences between a First Nations managed state vs an unmanaged state.
- Greater collaboration on technical projects between government, industry, research, and First Nations knowledge holders for relationship building, greater trust and confidence in modelling, and knowledge exchange.
- Increased climate resilience of natural landscapes to adapt to climate variability, warming, and species shift trends.
- This could occur throughout the water modelling pipeline and rely on a co-design approach to set project aims, objectives and processes rather than compartmentalised approaches to technical projects, in the scientific understanding, data collection and decision-making phases).

■■■
Inclusion of First Nations knowledge holders in setting project aims could be implemented by governments and industry in landscape restoration projects.
■■■

Table 3-2 conservation vs active land management progression

QWMN priority action	Engagement findings	Technical perspectives
PA2.1/PA 3.1 Understand where key knowledge gaps are	Data is often drawing on data from ecosystems already altered or in decline, rather than detail of a pre-colonial state.	It is important to understand the ecosystem is not in a stationary state.
CS2 The design, monitoring and evaluation of management interventions...	Projects need to be designed with continued management in mind.	Rehabilitation plans and actions will likely be unsuccessful without continuous management and maintenance.

3.1.3 Valuing and modelling Indigenous knowledge

WHAT WAS FOUND: More work needs to be done across the industry to support culturally responsive 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 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

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- Use of local Indigenous Knowledge to update vegetation mapping and the relationship between vegetation and soil.

WHAT WE THINK: Similar to the approach shift described under 3.1.2 Conservation vs active management, a more collaborative approach to technical projects that includes First Nations knowledge holders in designing the project scope would assist.

This could include:

- Project approach to be collaborative and use co-design principles rather than compartmentalisation.
- First Nations Knowledge to be sought as a key project input (such as setting waterway buffers and identifying critical environmental and cultural values for protection such as parent trees).
- Revision of state mapping through consultation and collaboration with First Nations knowledge holders, government, and research partners.
- Increased requirements to consult and include First Nations inputs to technical projects similar to cultural heritage requirements.
- This could be a touchpoint on the water modelling pipeline in the scientific understanding, data collection and communication phases).

■ ■ ■

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.

■ ■ ■

Table 3-3 valuing and modelling Indigenous Knowledge progression

QWMN priority action	Engagement findings	Technical perspectives
PA2.4 Increase capacity building and investment to ensure access to the water modelling tools and capability needed	Working with TOs and Aboriginal Ranger groups to understand water modelling and support the use of collected data in models where relevant	Collaboration and frequent communication is key.

3.1.4 Mapping the impacts of climate change and changes to landscape and flows

WHAT WAS FOUND: 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.

WHAT WE THINK: This is the current practice and standard use of water modelling and technical projects. This commentary from Aboriginal Rangers highlights the opportunity for knowledge exchange between First Nations Knowledge holders and technical and modelling professionals for great collaborative potential. This could include:

- Increasing opportunities for knowledge exchange to occur generally, and for site-specific and/or project-based applications. This would advance the potential for effective project-based collaboration to occur.
- This would also align with QWMN's identified priority to build trust and confidence in modelling and identifies a new audience that trust, and confidence building could be focused towards.

■ ■ ■

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.

■ ■ ■



- Alignment with other recommendations to increase opportunities for First Nations peoples to complete environmental studies to further participate in landscape rehabilitation projects and in shaping the approach used for projects.
- This is a touchpoint for communication activities that underpin the water modelling pipeline.

Table 3-4 Climate change and flows progression

QWMN priority action	Engagement findings	Technical perspectives
PA2.2 Address multi-disciplinary needs of restoration and rehabilitation planning and evaluation	Potential to use water models to provide detail around impacts of climate change and other altered states.	Collaboration between technical professionals and First Nations Knowledge holders would enable enhancement of knowledge sharing and exchange.
PA2.4 Increase capacity building and investment to ensure access to the water modelling tools and capability needed	Investing in training to support TOs and Aboriginal Ranger groups to access water modelling could help benefit projects.	Educating on climate change through providing more information to TOs and rangers can equip them with knowledge that can help them evolve their current management practices.

3.1.5 Funding, jobs, and training

WHAT WAS FOUND: 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.

WHAT WE THINK: there are several cross-overs between the key outcomes from engagement, including:

- Creating further opportunities for First Nations peoples to be involved in data collection and technical approaches (action and application), and in technical projects to be run collaboratively with First Nations inputs into project design (active land management, valuing First Nations Knowledge).
- Encouraging a ‘values shift’ to greater respect, include and learn from First Nations knowledge for landscape management and rehabilitation practices (active land management, valuing First Nations Knowledge).
- Creating further opportunities for knowledge exchange between First Nations knowledge holders and technical professionals to increase collaborative capabilities and practice and build trust and confidence in modelling.

The need to increase funding, jobs and training is identified as a key finding from engagement in Phase 2. This could be achieved through several possible mechanisms:

- Government investment in increasing policy and guideline requirements to include First Nations knowledge in landscape rehabilitation projects.

■■■

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.

■■■



- Research into best practice for remuneration and protocols for engaging First Nations knowledge holders, and how this can be achieved on a project-by-project basis.
- Investment in supporting and recruiting First Nations peoples into university courses that lead to careers in landscape management and rehabilitation.
- Government and industry recruitment focus and internship programs supporting First Nations entering the workforce in landscape management and rehabilitation.
- Industry bodies raising awareness of collaborative project approaches including First Nations knowledge holders in technical projects, including drivers, benefits, and practical information for engagement and remuneration.

Table 3-5 Funding, jobs, and training progression

QWMN priority action	Engagement findings	Technical perspectives
PA2.2 Address multi-disciplinary needs of rehabilitation and rehabilitation planning and evaluation	Consideration for how water modelling can support the justification of increased employment in the landscape rehabilitation space.	Professional and technical service industry could consider how they can facilitate and enhance more inclusive workplaces and workforces within their scope of influence.
CS2 The design and monitoring and evaluation of management interventions, to focus investments and efforts for maximum impact.	Supporting continued funding for landscape rehabilitation through modelling the difference First Nations land management practices make to landscapes.	This will provide further scientific evidence to the benefit of First Nations land management practices being further funded and integrated in projects.

3.1.6 Data sovereignty

WHAT WAS FOUND: 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). Establishing co-designed guidelines around the use of data should be considered.

WHAT WE THINK: Data agreements are standard practice for technical projects and modelling processes which details the ownership and permitted use of the data shared; however, this typically relates to quantitative data. Further work could be done, including:

- Data definition and further identification of the types of data that could be generated for technical projects could be investigated, as First Nations data could be largely qualitative.
- Development of data agreement incorporating ‘Indigenous Cultural Intellectual Property (ICIP) for the protection, management and use of confidential information, intellectual property, cultural information, moral rights, knowledge, data and research material’¹ could serve as a template for managing data sovereignty for First Nations peoples yet enable inclusion in 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.

■ ■ ■

¹ Referenced from the Aboriginal Ownership of Indigenous Cultural Intellectual Property and Project IP Agreement drafted by Firesticks Alliance, and circulated / signed for the initiation of this project.



- More education was sought about what water modelling is and how it could be used by Rangers and communities to further the work the Rangers complete. An important next step is clarifying the role of water modelling and how it differs from information already available, which includes the QWMN priority of building trust and confidence in water modelling to a range of audiences.

Table 3-6 Data sovereignty progression

QWMN priority action	Engagement findings	Technical perspectives
Develop data and approaches to ensure water models are relevant, effective, and efficient and consider non-traditional information sources	Aboriginal Ranger groups have the ability to (and in many cases already are) collect data that could be used in models. Co-designing guidelines around data sovereignty is an important step to engage with this data.	Better understanding and clarification is required in terms of data ownership, management and use.

3.1.7 Engagement practices and protocols

WHAT WAS FOUND: 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. This could be supported through requirements in tenders to show how meeting protocols has been considered in the project budget and timeline.

Additionally, consultation fatigue and a lack of accountability and follow-through is a critical flaw in projects, and if perpetuated, is likely to form barrier to First Nations peoples continuing to engage in projects.

■ ■ ■

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 RFQ scopes.

■ ■ ■

“This is one thing that happens all the time right now. You go in as a group of Aboriginal advisors, you share your stories, you share your knowledge... you get a space for it in an action plan or a strategic plan, but next to nothing comes from it.”

Aunty Kay Blades – Mandandanji Traditional Owner

WHAT WE THINK: Recommendations made in the Phase 2 report should be considered and implemented, and require collaboration across government, research, and industry sectors.

There needs to be additional requirements to engagement practice that decrease the occurrence of consultation fatigue, regulate the use of best practice principles, further accountability, transparency and implementation. This is a systemic issue and a broad challenge in engagement practice. Organisations like the International Association of Public Participation have a role in lobbying update of best practice, providing training to engagement practitioners, and providing a framework for governments and industry to use.

Part of this challenge is the frequent occurrence of technical professionals undervaluing the role engagement and communication practitioners play as subject matter experts, and engagement being conducted by those who may be technical experts, who do not have skills in engagement or communication.

Technical projects can decrease the occurrence of engagement malpractice by:



- Valuing the role trained and experienced engagement practitioners bring to a project (rather than it being deemed acceptable for engagement to be conducted by technical professionals without engagement training or skills).
- Investing time and budget in the scope of technical projects to include adequate resources for engagement planning, implementation, reporting and ongoing communication throughout the project (including requiring best practice frameworks to be used).
- Additional consideration when projects engage with First Nations peoples, that a First Nations advisor and project review role is included, and that all engagement activities have been designed to be culturally appropriate, respectful, and responsive.
- Increasing accountability of decision-makers for post-project communication and implementation of recommendations.

Table 3-7 Engagement practices and protocols progression

QWMN priority action	Engagement findings	Technical perspectives
PA3.3 Develop resources, guidelines and standards to ensure water modelling in Queensland is best practice	Further work to consider how budgets, timelines and engagement approaches are best practice.	Increase accountability of technical projects that include engagement to follow best practice frameworks, by trained engagement practitioners, and conducted in partnership with First Nations advisement.

3.2 Conversation with QMDCL Aboriginal Rangers

Discussions with QMDCL Aboriginal Rangers occurred at their base in St George. As part of this conversation some of the video from the discussion with Water Technology about water modelling was shown to provide further context. The conversation was broad, however key points included:

- **More education around water modelling** required – desire to further understand the role of water modelling, when it can be used, and how it could benefit Aboriginal Rangers’ work.
- **‘Our knowledge, our data’** – desire to maintain ownership and control of data if used in technical projects.
- **‘Valuing our knowledge’** – consultation fatigue and the experience of needing to prove the worth of First Nations knowledge with every new project consultation process.
- **Adequate support and funding** needed to train new Aboriginal Rangers and implement action.
- **Cultural flows – where are they?** This is a point of contention and allocated water is either not seen or is in a degraded state of poor water quality that doesn’t enable First Nations land management practices to be applied to rehabilitate damaged waterways.

“(Even if water is allocated through cultural flows), why would we want to take water from a sick river?”

QMDCL Aboriginal Rangers engagement – St. George, November 2022

3.2.1 Considerations for technical projects

These key points reiterate the findings of the engagement summarised in section 3.1. key actions relate to establishing a data agreement considering ICIP, expanding knowledge exchange and building awareness of



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

Concern over cultural flows reiterate literature review findings relating to water justice and the lack of water entitlements. While cultural flows are separate to environmental flows, it is understood a healthy river system is important for cultural uses. Reduced flows are a major component of degraded riverine landscapes, which can be investigated through water balance modelling, to identify pre-development catchment flows (hydrology), and to test changed hydrological regimes to improve environmental health values.

Poor water quality is part of why landscape rehabilitation is needed, alongside vegetation removal, and biodiversity loss. Investigation of leading causes of degraded water quality, for example through source modelling, can identify mitigation measures to be implemented.

A challenge to improving environmental health values is contemporary land tenure and water allocation divisions, whereas water quality, vegetation and flow improvements benefit from an integrated, catchment-wide approach. This highlights both a challenge to address, as well as the need for stakeholder engagement for effective landscape rehabilitation.

3.3 Lessons from Cultural Burning

Discussions with Victor Steffensen of Firesticks Alliance about the growing recognition of the role Cultural Burning plays in landscape management, regeneration and resilience was considered for the case study site of Munga Lake.

Key points included:

- **Munga Lake is an applicable case study** - many of the issues present at Munga Lake can be observed on a national scale in degraded waterways connected to modern livelihoods and practices such as land clearing and agriculture.
- **Indigenous Principles around caring for Water** - lagoons are significant as a seeding ground for plants and animals, as well as having cultural significance and uses. Lore ensured that Country was managed so as to maintain the cleanliness of lagoon waters. Cultural Lore principles include:
 - Plants to filter water and provide shade.
 - Sand and soil health is vital.
 - Burning the right Country.
 - Water and land are connected.
 - Springs are sacred.
 - Buffer zones around waterways are vital.
- Perception that **'Fire modelling often gets it wrong'** - incorrect inputs into models means the applied management response is not fit for purpose (e.g., incorrect vegetation layers used, oversimplification of the use of back-burning resulting in the wrong areas being burnt at the wrong time etc.).
- **Concern about technical and modelling approaches and Indigenous Land Management practices being in opposition** – including a conflict between the western technical approach and lived experience of a landscape held by First Nations peoples.

■■■
The literature review and gap analysis findings from Phase 1 are confirmed by engagement findings in Phase 2 & 3.
■■■



“A key concern was that modelling sits in opposition to Indigenous Land management. Instead of getting started with the work of practical application that Indigenous Knowledge and lore identifies as being necessary, time is spent making graphs using data viewed through a western lens. Concern was raised that modelling acts as an artificial intelligence rather than being based on a human experience of a landscape, rooted in local Indigenous values and knowledge, developed from lived experience and lore.”

Phase 3 Report – St. George Engagement Outcomes

This is a critical issue to address if effective collaboration for landscape rehabilitation is to be possible.

3.3.1 Considerations for technical projects

The principles described reinforce alignment between First Nations knowledge practiced over long timespans and relatively recent western scientific thinking about how to sustainably manage landscape and the functions and benefits of natural systems. Perspectives and practices from First Nations knowledge holders can strengthen the planning and implementation of landscape rehabilitation projects, particularly to inform:

- Plant species to use in revegetation for effectiveness, indigeneity, and cultural significance.
- Management practices and protocols in monitoring and management frameworks for ongoing works on the site, including soil health and burning regimes.
- Protective measures for riparian zones and springs (such as exclusion).
- Recommended widths for riparian vegetation and waterway buffers for ecosystem health and cultural use.

The sentiment that cultural practices and technical approaches should be carefully considered and further investigated through listening to First Nations knowledge holders. A component of this may be facilitating knowledge exchange to further identify:

- Types of First Nations knowledge that could be incorporated into landscape rehabilitation projects.
- Points of tension between First Nations knowledge and technical approaches.
- Greater awareness of what water modelling is, how it is used, and what it can achieve.
- Ways to improve trust and confidence in water modelling can be built with First Nations audiences (QWMN priority action).
- Opportunities for meaningful, respectful, and accountable engagement, consultation and collaboration between First Nation knowledge holders and technical professionals can be maximised.

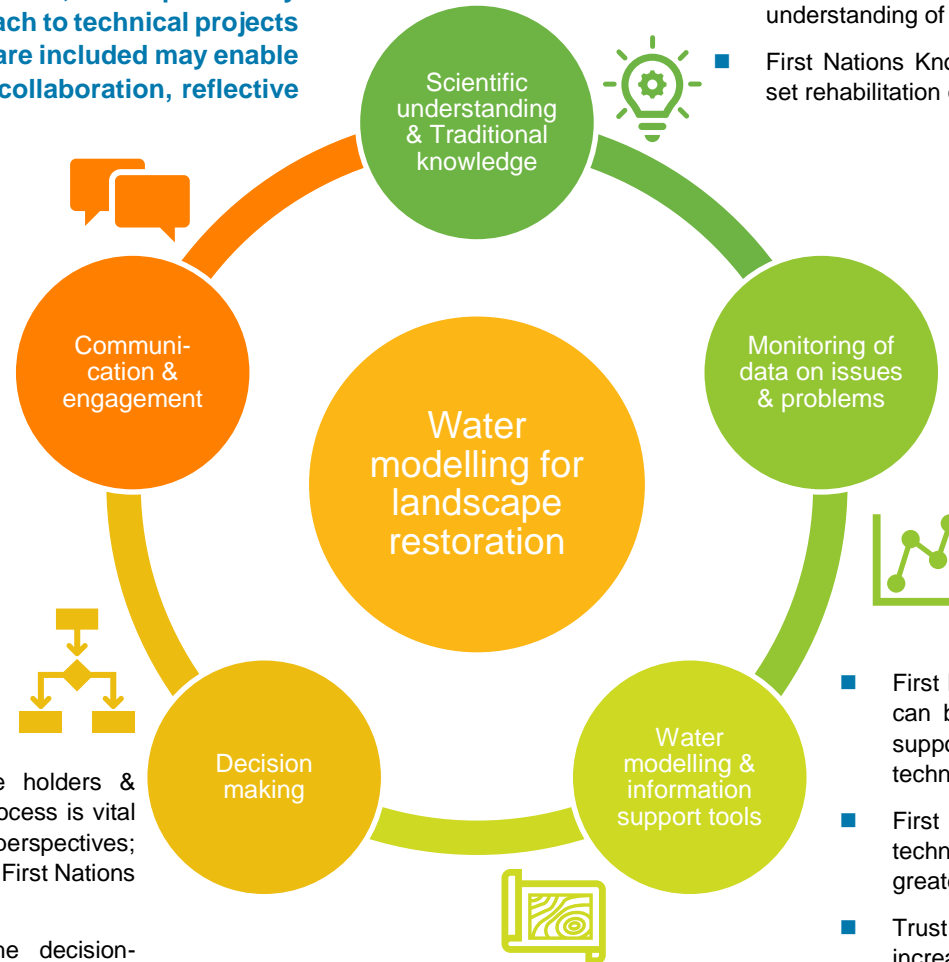


THE 'WATER MODELLING PIPELINE' REIMAGINED

The pipeline concept is a linear process, underpinned by communication. Reimagining the approach to technical projects where First Nations knowledge holders are included may enable an increased focus on integration and collaboration, reflective of Indigenous knowledge systems.

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- Communication underpins all stages of the existing water modelling pipeline concept.
- Project-related communication with First Nations knowledge holders and communities should follow best-practice procedures, be throughout a project, aim to be inclusive & build trust in modelling & be transparent & accountable to mitigate consultation fatigue.
- Inclusion of First Nations knowledge holders & communities in the decision-making process is vital respect knowledge, inputs & perspectives; particularly if decisions are in relation to First Nations lands, waters, and communities.
- Transparency & accountability in the decision-making process, who are the decision-makers, & how engagement outcomes will be used is vital.



- Co-design of project scope & inclusion of First Nations knowledge holders throughout projects can increase understanding of issues & enable enhanced outcomes.
- First Nations Knowledge can inform pre-disturbance state to set rehabilitation objectives/targets.
- Increasing First Nations participation in data collection & monitoring can be enabled through further training, funding & support through the tertiary education, industry & government sectors (including education, internships & other programs).
- Upskilling of First Nations roles & organisations (such as Aboriginal Rangers) should be invested in for enhanced project outcomes.
- First Nations participation in technical approaches can be increased directly by training, funding & support to increase First Nations peoples in technical workforce.
- First Nations knowledge and participation in technical projects can be increased by co-design & greater collaboration throughout projects.
- Trust & confidence in modelling can be built by increasing awareness & creating opportunities for knowledge exchange with First Nations peoples.



4 MUNGA LAKE CASE STUDY

4.1 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.

“ My vision and my hope for this place...is to come here and be able to enjoy this place once again. And we can come here without having to fight our way through the weeds, down to the water and we could have the little ones dipping their toes in the water, swimming in the water... So for me, if I can get this place back to what it should look like with all the shade, the healthy trees, the native grasses, the native plants, that's what I hope that we can do one day.”

AUNTY KAY BLADES



Figure 4-1 Excerpt from Phase 3 report, prepared by Relative Creative 2022



4.2 Collaborative approach to rehabilitation

To consider how a technical consultancy could work with Traditional Owners, Aboriginal Rangers and the Department of Environment and Science, an implementation scope to further the work of this pilot has been provided as a case study application of the recommendations in this report.

In this case study, the following process can be used to employ a co-design process and facilitate two-way knowledge exchange between technical professionals and First Nations knowledge holders. The objectives may include:

- 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.

Key project stages and tasks are summarised in Figure 4-2.

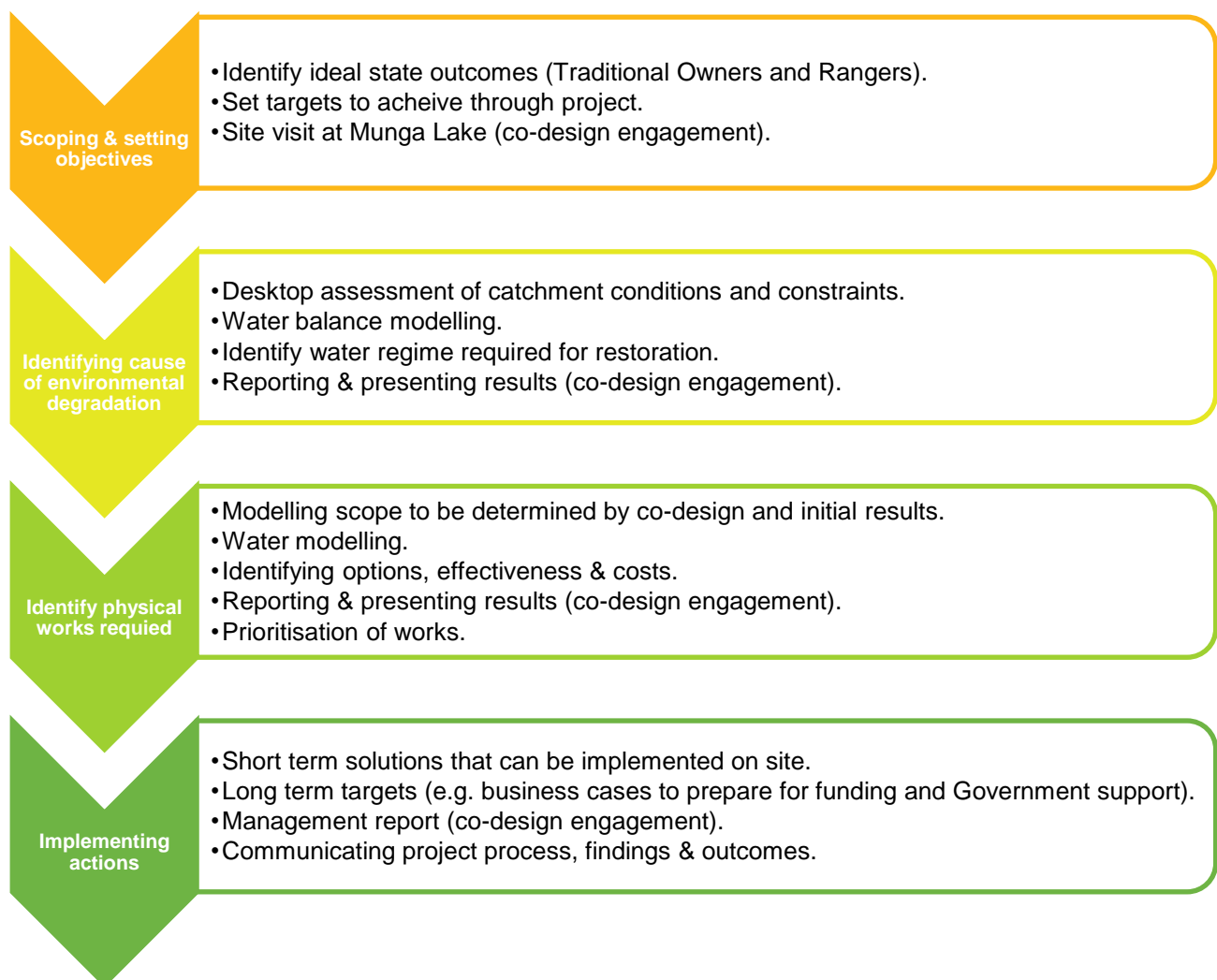


Figure 4-2 Approach for co-designed landscape rehabilitation of Munga Lake through integration of technical approaches and traditional knowledge



4.3 Applying the 'reimagined water modelling pipeline' for Munga Lake

The following sections provide an example of how First Nations knowledge and technical approaches to landscape rehabilitation can be incorporated in an implementation project. In this example, we consider how this would be approached to conduct knowledge exchange, data collection, modelling, and rehabilitation works at Munga Lake, if this pilot project was to receive additional funding to continue.

This aims to provide a case study of the practical ways First Nations knowledge holders and technical professionals can work together on landscape rehabilitation projects.

4.3.1 Scientific understanding & traditional knowledge

Example objectives for Munga Lake Implementation Project:

- 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.



Example of understanding pre-development environmental state:

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-development* 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 can be used to set objectives for rehabilitation, in conjunction with technical knowledge about climate change risk to species shift, changing rainfall patterns and temperature increases.

4.3.2 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 can enable 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.

4.3.3 Decision-making

In the context of this case study project, decision making can be considered to be relating to decisions that need to be made by the project team about what implementation actions can be completed that will be most effective to rehabilitate the site, based on early project findings and modelling results.

- Decision making to be done collaboratively between technical professionals and First Nations knowledge holders through co-design.
- First Nations knowledge about landscape rehabilitation, plant species selection, ongoing land management practices can inform implementation methods.
- Technical professionals can contribute knowledge about landscape rehabilitation, hydrological regimes and monitoring and evaluation frameworks can be integrated with other knowledge inputs.
- An agreed list of short-term and long-term actions to be achieved on the site during the project and post-project can be agreed during co-design engagement.



Wider decision-making processes regarding funding, ownership, use and future works may be made by Commonwealth, State and Local governments. It is hoped First Nations knowledge holders and technical professionals are consulted during future decision making.

4.3.4 Communication & 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.
- 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.

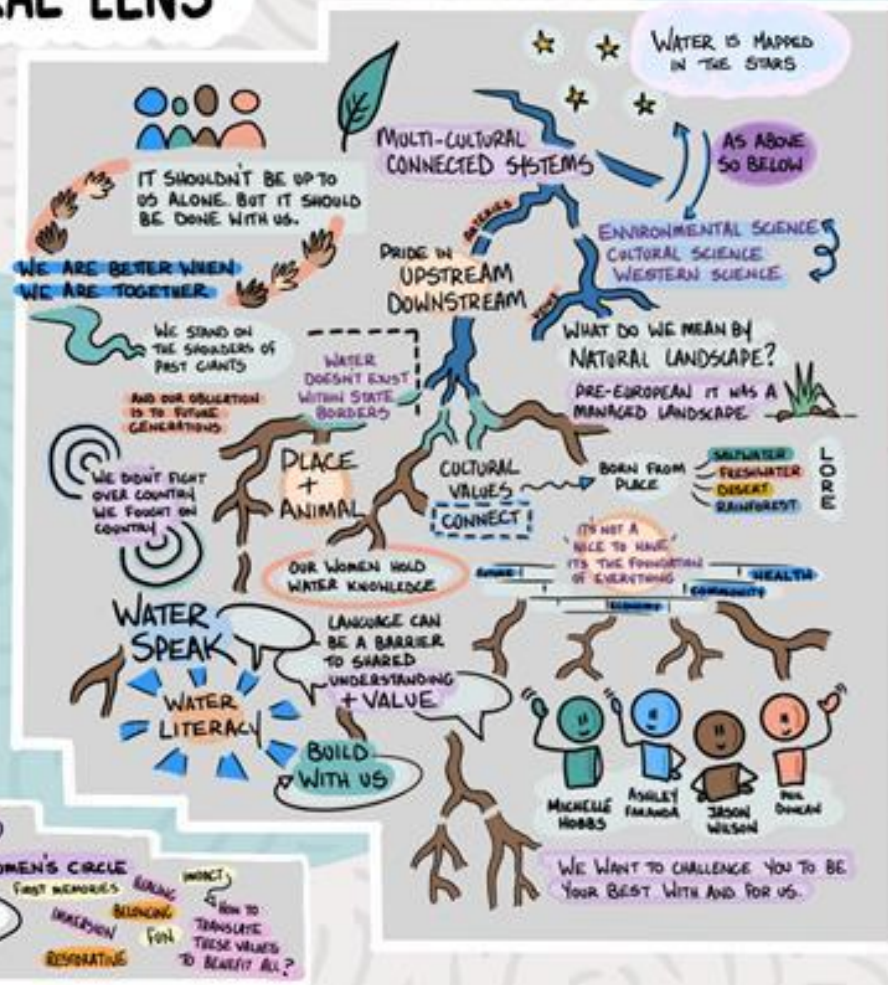
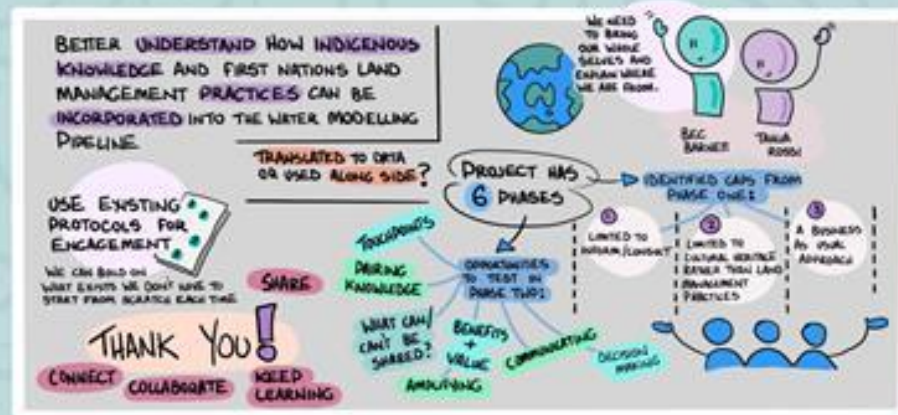


APPENDIX A
QWMN FORUM VISUAL SUMMARY – THOUGHTS
DRAWN OUT





WATER MODELLING THROUGH A CULTURAL LENS



SKETCHNOTE CREATED ON YUGGERA COUNTRY BY THOUGHTS DRAIN OUT

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