Aboriginal Waterways Assessment program

Acknowledgement

The Murray–Darling Basin Authority (MDBA) recognises and acknowledges that the Traditional Owners and their Nations in the Murray–Darling Basin have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters.

The participants

The MDBA and the project's research team members acknowledge the dedication and accomplishments of the community members who contributed to the Aboriginal Waterways Assessment program including:

- **Dhudhuroa and Waywurru Nations:** Anthony Campbell, Cody Campbell, Luke Gardiner, Mark Gardiner, Tarlina Gardiner, Ronald (Macka) Hughes, Gary Murray, Jenny Ockwell, Craig Terrick, Jesse James Thorpe-Koumalatsos
- **Gamilaraay Nation:** Clem Dodd, Daiyen Fernando Green, Jason Green, Warren Kennedy, Dick Lake, Rodney (Skin) Morgan, Thomas Morgan, Jason Murray, Norman (Tracker) Walford, Neil Weatherall, Leon Winters
- **Wemba Wemba and Barapa Barapa Nations**: Leo Briggs, Jeanette Crew, Edgar Day, Deidre Hamilton, Harry Hamilton, Sharnie Hamilton, Tracey Hamilton, Clive Harradine, Antony Jones, James Lewis, Karen Mobourne, Russell Mobourne, Corey Nisbet, Warren Parsons, Stewart Taylor, Jon Till, Gary Walker

'We also acknowledge with respect and appreciation the significant generosity offered by ngā Iwi o Aotearoa, me Ngāi Tahu, Te Waipounamu (those tribes from New Zealand, the Ngāi Tahu tribe, Te Waipounamu – the South Island) who welcomed our Traditional Owners onto their land and shared their knowledge and expertise in Indigenous flow assessment.'

'Nō reira, noho ora mai i te wā kainga (The Traditional Owners wish the tribes of New Zealand and Ngāi Tahu, Te Wai Pounamu, to thrive in the well-being of their homelands and home waters).'

Dr Gail Tipa and Dhudhuroa Elder (Di Travis) with ceremonial possum skin cloaks in Melbourne 2014.

Nardoo an important wetland plant

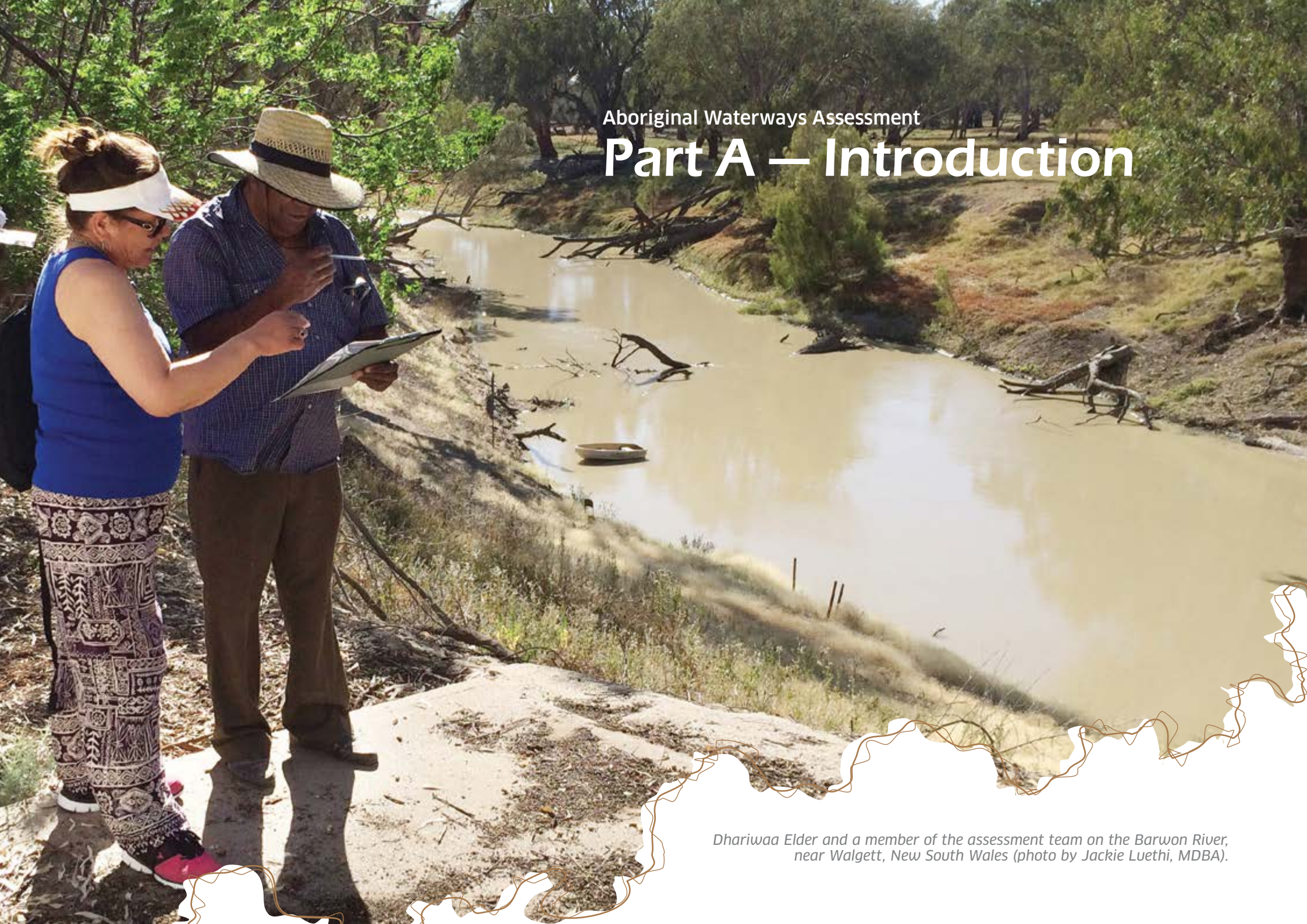
The Murray Lower Darling Rivers Indigenous Nations, Northern Basin Aboriginal Nations and the MDBA are very appreciative for the guidance and contributions to this project by Dr Gail Tipa. Her insights and wisdom were invaluable.

Intellectual property statement

Contents

Aboriginal Waterways Assessment

Part A — Introduction



Dhariwaa Elder and a member of the assessment team on the Barwon River, near Walgett, New South Wales (photo by Jackie Luethi, MDBA).

Explanation of the terms and language used

Aboriginal
Refers to people identifying with Aboriginal cultures in Australia and who are accepted as such by their Aboriginal Nation.

Aboriginal Waterways Assessment (AWA)
The name of the activity of Aboriginal peoples assessing the values of their waterways by using the tools and processes adopted from New Zealand Māori practices (Cultural Health Index) and modified in this study.

Assessment form
The series of AWA questions regarding the cultural, biodiversity and riverine health ratings of a specific place. There are three such assessment forms: for river assessments, wetland assessments and training.

Assessment process
The practices used to identify places within a Country, select the assessment team, learn about the Aboriginal Waterways Assessment, visit places, make assessments, synthesise and receive final results.

Assessment team
A group of (8 to 15) Traditional Owners who visit the places within their Country and carry out the cultural assessment of rivers and wetlands.

Research team
A multi-cultural team of Aboriginal, Māori and non-Aboriginal members with expertise in environmental and social sciences working in co-researcher partnerships with participating Aboriginal community members.

Traditional Owner(s)
Refers to Aboriginal people who identify and are recognised as speaking for Country.

The Aboriginal Waterways Assessment is made up of several elements:

Indicator
A question (in the assessment form) that measures an aspect of cultural use, biodiversity or riverine health.

Nation name
Used when information is specific to a particular Aboriginal Nation.

Place(s)
This term is used to describe the locations where assessments were made and is distinctive from the term ‘sites’, which often has particular archaeological/heritage/cultural meaning.

Matrix
A graph that integrates river health with cultural uses and values, as measured on the assessment forms, and compiled on the results table to provide an overall rating.

Results table
A table that compiles the scores from all the assessment forms, for each assessed place within a Nation’s Country, to generate totals using the metrics of the assessment form, for cultural significance, cultural uses and river health.

Summary of the project

The Aboriginal Waterways Assessment (AWA) project tested and adapted a Māori-originated water assessment tool to suit Traditional Owners' needs and preferences in the Murray–Darling Basin.

The purpose of the project was to develop a tool that consistently measures and prioritises river and wetland health so that Traditional Owners can more effectively participate in water planning and management in the Basin.

Building on long-term relationships between Aboriginal Nations in the Basin and the Murray–Darling Basin Authority, a Participatory Action Research strategy provided the inquiry framework for collaboration with Nations as they carried out the pilots.

The three participating Nation groups were: Wemba Wemba and Barapa Barapa Nations (Deniliquin); Gamilaraay Nation (Walgett); and Dhudhuroa and Waywurru Nations (Victorian Alps).

The research found: *each Nation group agrees that the Aboriginal Waterways Assessment tool and process is a culturally appropriate, safe and strengthening way to assess the health of river and wetland places.*

Additionally, the Aboriginal Waterways Assessment was found to:

- produce accurate, accessible and useful information
- be good for people's health and wellbeing
- increase Aboriginal peoples' confidence in using their knowledge in water planning and management environments
- enable members of Nations with limited knowledge of Country to contribute to river and wetland health assessment
- provide local knowledge of:
  - biodiversity and flow conditions
  - extended time-frames of flow characteristics
  - current observations of the local impacts of water policy and regulation on Nations
- help prevent further loss of Traditional Owners' knowledge of Country by:
  - providing an analysis of river and wetland health relative to cultural uses
  - recording the current state of cultural values and uses of Country
  - contributing to cultural transmission including historical stories
  - providing valid and locally-owned information for caring for Country.

A multi-disciplinary and cross-cultural team worked on this project in partnership with the MDBA's Aboriginal Partnerships team.

The teams provided technical expertise with regard to the original Cultural Health Index, river and wetland ecological management, social ecology and Participatory Action Research.

The Murray Lower Darling Rivers Indigenous Nations and Northern Basin Aboriginal Nations authorised the design and implementation of the Aboriginal Waterways Assessment project.

An assessment team from Walgett, New South Wales, using the Aboriginal Waterways Assessment tool (photo by Jackie Luethi, MDBA).

Summary of the research findings

1. To work with the AWA process participants need time and training. Modest support (for example a scribe) is needed for a local team to become self-reliant.
2. The final assessment form should have wide application. However, consistent with cultural safety, at times it will be appropriate for local communities to expand or add to the assessment form to meet their needs.
3. The selection of assessment team members influences how the assessment is made and the results it produces. This is consistent with social research which is situated in and drawn from people's unique experiences. This use of the tool does not compromise the reliability of the AWA process, tools, findings or their outcomes.
4. Providing a model and/or discussions of historic flow conditions before and during the place assessments enables Traditional Owners to better understand the impact of settlement and their experiences of rivers and wetlands.
5. In locations where a river or wetland is degraded, local knowledge can provide an important baseline.
6. Each community finds its own way to share cultural knowledge and to share the results of the assessment process.
7. If the upstream catchment is the same, the answer to questions about environmental conditions (Question 3.1 in the assessment form) can be agreed early in the process.
8. The AWA indicator questions allow a true and accurate cultural assessment of water-dependent places.
9. The validity of the assessment is maintained by identifying the familiarity, or otherwise, of the assessment teams with the place.
10. Assessment teams are free to make good judgements about the information they are creating without threatening the integrity of the assessment process.
11. Qualitative information, such as stories about local experience of the issues, is essential to understanding and communicating the assessment result.
12. The assessment process is a practice that requires concentration and discipline, which is supported through the combination of doing assessment and reflecting on how it was done.
13. Providing visual information about local species and environmental conditions may increase the self-reliance of assessment teams in using the assessment form.
14. The assessment process recognises the value of, and strengthens, cultural and cross-cultural knowledge transmission practices.
15. Inspecting and discussing each place improves the assessment process and is good for physical, cultural and social health.
16. Local communities appreciate the distinctive meanings of their knowledge. The comments section in the tool helps preserve the local knowledge and meaning of the place.
17. The results are an assessment of contemporary use, acknowledging that history and past practices influence how a place is used.

18. Where there are large-scale environmental influences on the waterway, the assessment process works at both local and landscape scales of Country.

19. In undertaking the assessment process there is potential to gather local intelligence about policy and regulatory impacts on environmental health and Nations.

20. Local communities will determine the best way to carry out and use the assessment process to get the best results for their people without compromising the AWA tools and results.

21. The assessment process is helpful to community decision-making about water allocations and water resource planning.

22. The assessment process gives Traditional Owners resources to engage more confidently with water planners.

23. The assessment process can affirm a Nation's connection to Country even when history and its current impacts continue to situate its members in dispossession.

24. The assessment process can increase the health of a river system through Traditional Owners' knowledge and values being recognised and implemented.

25. Traditional Owners will develop more confidence in the AWA following positive experience with agencies involved in water planning and management.

26. The assessment process has the potential to bring policy and regulatory realities into water planning and management.

27. Undertaking the AWA can help develop relationships, share knowledge and strengthen connection to Country.

28. Because of its focus on learning together while working together, embracing Action Research as part of the assessment process strengthens social relationships to enable ongoing engagement in caring for Country.

29. The assessment process and the assessment form can enable Aboriginal and non-Aboriginal sciences to work together for river health, if Nations so decide.

30. It is important that the Traditional Owners decide who is on the assessment team.

31. When selecting assessment places, ample lead-in time and the need for ecological and other information should be considered.

32. Gender balance in assessment teams is important to enable both men's and women's business to be respected in the assessment process.

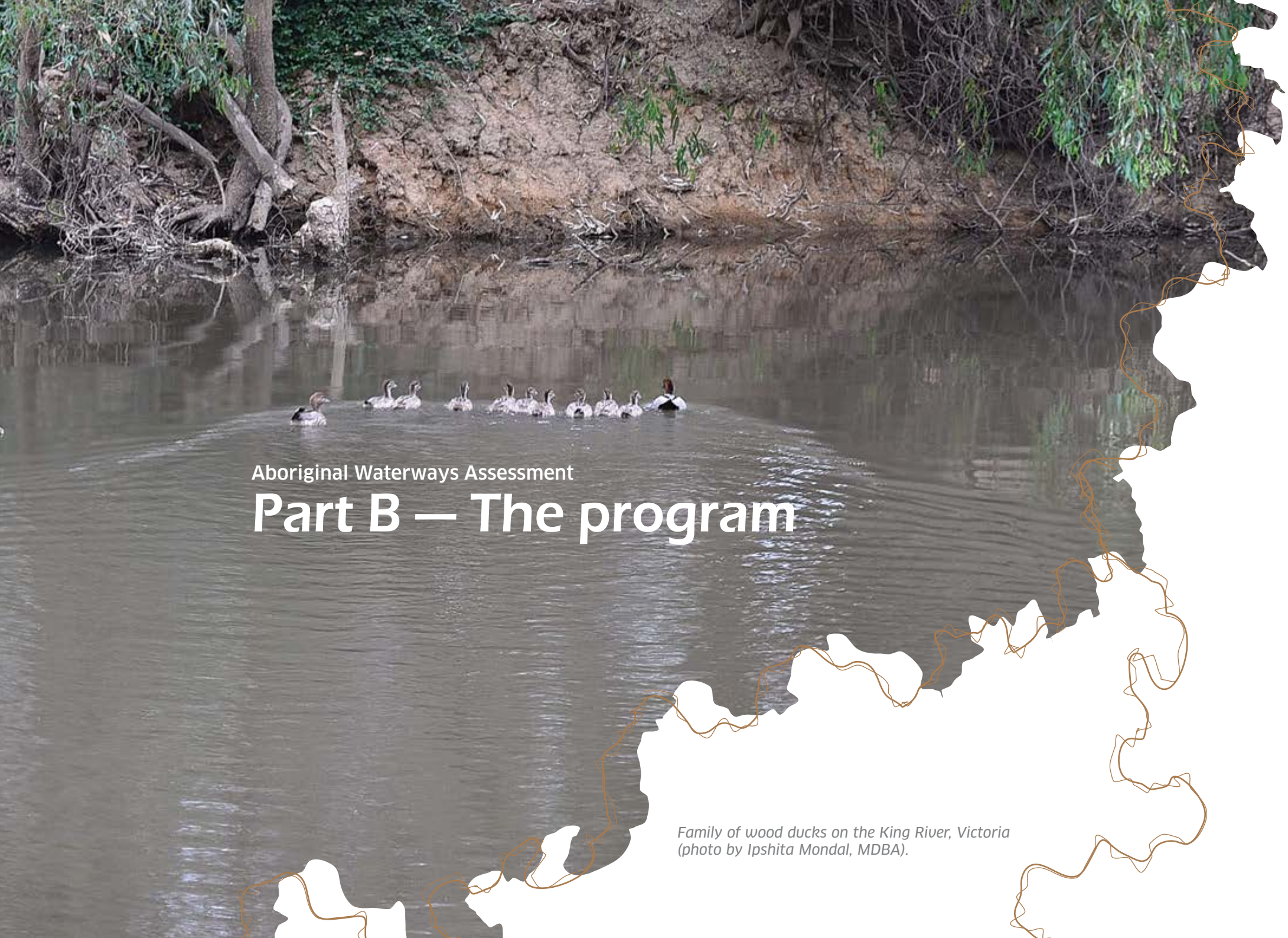
33. Intergenerational inclusion in an assessment team is important to enable cultural knowledge to be transmitted.

34. A combination of explanation and participant use of the assessment form is a good way for assessment teams to understand the AWA questions, rating scales and results during AWA training sessions.

35. Assessment is improved if the sharing of knowledge at each place occurs in ways that are agreed before visiting places to assess.

36. Reflection, while in the field undertaking the assessments, works well in some circumstances. However, in some situations, for example unfavourable weather, discussion back in community works better.

37. Recording Traditional Owners' observations is an important part of the evaluation process. Selecting the right location for recording these observations influences the quality of the recording.



Aboriginal Waterways Assessment

Part B — The program

Family of wood ducks on the King River, Victoria (photo by Ipshita Mondal, MDBA).

Purpose and background

Purpose of the project

The purpose of the Aboriginal Waterways Assessment program was to develop a tool for Aboriginal communities to consistently measure and prioritise river and wetland health so that they are better placed to negotiate for their Country's water needs.

Rigorous mechanisms (beyond the usual economic and environmental indicators) that help explain the importance of water to particular places are critical for effective involvement of Aboriginal peoples in water planning processes.

The research team

The research team was multi-disciplinary and multi-cultural in recognition of the diversity of Aboriginal and non-Aboriginal natural and social sciences required for the pilot program.

The team members were:

- Dr Gail Tipa of Tipa and Associates (international Indigenous co-management of natural resources)
- Rick James, Riparian Management Services (environmental consultancy specialising in river and wetland management)
- Dr Ross Colliver, Daisy Cutmore and Dr Susan Goff, CultureShift Pty Ltd (Participatory Action Research consultancy)
- Neil Ward, Jackie Luethi, Charmain McDonald, Noelene Edwards and Ipshita Mondal of the MDBA's Aboriginal Partnerships team.

Dr Susan Goff, Dr Ross Colliver and the Aboriginal Partnerships team prepared this document. The authors also acknowledge the contributions of Bradley Moggridge who reviewed a final draft of the report.

Project initiation

The Murray Lower Darling Rivers Indigenous Nations (MLDRIN), Northern Basin Aboriginal Nations (NBAN) and the Murray–Darling Basin Authority (MDBA) developed the Aboriginal Waterways Assessment collaboratively with Dr Gail Tipa, the Māori researcher who developed the Cultural Health Index.

MLDRIN and NBAN are the two peak Traditional Owner based organisations in the Basin with a primary focus on natural resource management. This makes them an invaluable partner in delivering better environmental outcomes.

MLDRIN was formed in 1998 and NBAN in 2010. They are independent, self-determining organisations comprised of delegates from 46 member Nations.

Both organisations share the common aim of seeking greater recognition and respect for Aboriginal knowledge and values regarding land and water management. These organisations promote the views and perspectives of Aboriginal peoples on water research, policy and management.

The introduction and testing of the Aboriginal Waterways Assessment was carried out in accordance with the principle of 'free, prior and informed consent'.

MLDRIN and NBAN's journey towards endorsing and using the Aboriginal Waterways Assessment began when

a search of academic literature revealed a report written by Dr Gail Tipa and Laurel Tierney (2006). It explained that the Cultural Health Index was developed by Māori because of their understanding of streams and waterways and as a way of arresting further mismanagement of customary resources.

The Cultural Health Index methodology incorporates qualitative Māori values into a quantitative assessment framework. This fuelled the interest of MLDRIN and NBAN to find their own systematic and culturally-appropriate ways to participate in water planning.

To help Aboriginal people do this and contribute to Basin Plan implementation processes, the MDBA organised for Basin Aboriginal leaders to visit New Zealand and meet with Māori scientists and leaders to learn about the Cultural Health Index.

This visit took place from 16 to 24 September 2013 and included delegates from MLDRIN, NBAN, the National Cultural Flows Planning and Research Committee, Aboriginal water professionals and the MDBA.

Support for the assessment methodology

The delegation learned that the Cultural Health Index is a framework for Māori to apply traditional methods and perspectives when assessing the overall health of waterways. It does this in a way that links Māori cultural values and knowledge to western scientific methods.

The delegates agreed that the Cultural Health Index would be a very useful tool to help their organisations and local Traditional Owner groups have input into water planning and implementing the Basin Plan. Some modifications were needed to suit Australian Aboriginal perspectives and Basin environments.

The visit to New Zealand also reinforced other important lessons including:

- the importance of good leadership to put into effect the research findings
- the role and value of high-performing staff in the Māori organisations
- the motivation and willingness of leaders and communities to take initiatives as well as some risks in order to achieve their aspirations.

Consistent with the principles of 'free, prior and informed consent', the New Zealand delegation committed to advocate for this approach in each of their organisations and with their local community members. With the agreement of MLDRIN and NBAN an initial pilot version of the Cultural Health Index tool and assessment approach was developed.

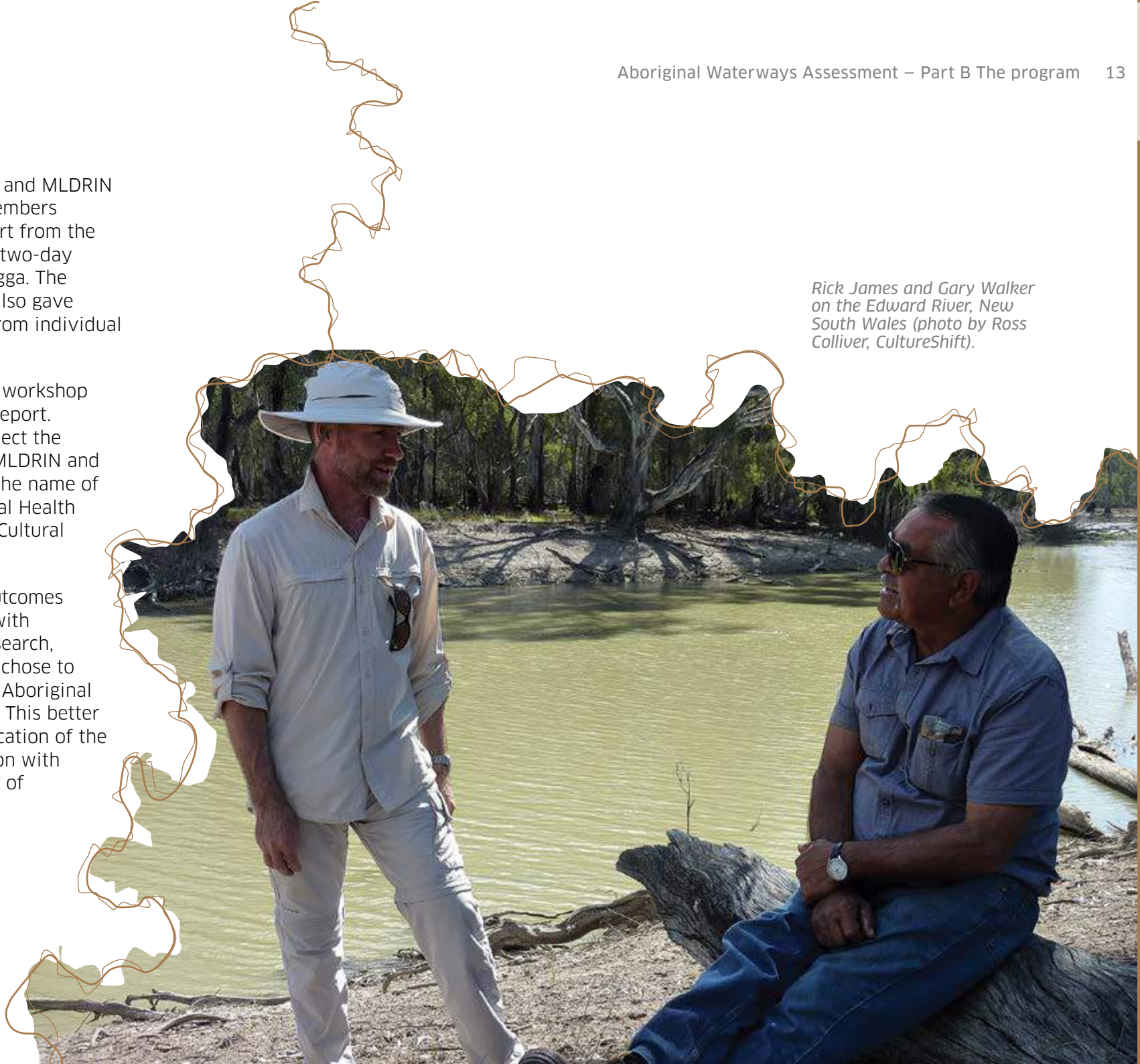
This prototype preserved the same components as the Māori Cultural Health Index, but changed the assessment indicators within each component to better fit Aboriginal Traditional Owner interests and Basin environmental conditions.

In August 2014 a joint MLDRIN and NBAN Executive meeting reconfirmed support for the program and pilot locations. The informed and sustained participation of local Aboriginal community members in piloting the prototype enabled modifications to be made to better-fit local conditions.

The project participants and MLDRIN and NBAN Executive members reviewed the draft report from the research pilot at a joint two-day workshop in Wagga Wagga. The workshop participants also gave permission for quotes from individual participants to be used.

The outcomes from this workshop forms the body of this report. At the outset of the project the Executive members of MLDRIN and NBAN voted to change the name of the tool from the Cultural Health Index to the Aboriginal Cultural Flows Health Indicator.

After considering the outcomes of the pilot and in line with Participatory Action Research, the Executive members chose to change the name to the Aboriginal Waterways Assessment. This better reflects the future application of the tool and avoids confusion with the theory and research of cultural flows.



Rick James and Gary Walker on the Edward River, New South Wales (photo by Ross Colliver, CultureShift).

Clive Harradine and Stewart Taylor (Wemba Wemba Nation) carring out an assessment at Werai Forest, New South Wales (photo by Neil Ward, MDBA).

Measures of success

Aboriginal people in Australia have not previously used the Aboriginal Waterways Assessment (AWA). The intention of the pilot program was to look at what adaptations are required for the Australian context and to determine the value of the AWA in helping Aboriginal people articulate their cultural values for input to water planning processes.

Success of the pilot program was assessed from four perspectives:

- **Basin Aboriginal leaders** – it must function as a systematic approach to articulating cultural values for contributing to water planning and management in a way that is culturally appropriate and effective
- **water managers** – the information generated by the Aboriginal Waterways Assessment would need to make a worthwhile contribution to water planning and management processes
- **cost** – putting the Aboriginal Waterways Assessment into practice needs to represent good value for money. It is anticipated that future routine implementation will cost substantially less than the pilot program. However, generating local information will involve some costs
- **'free, prior and informed consent'** – the research and reports carried out in the pilot program must be systematically consistent with the agreed methodology. It must also respect and include the voices of the participants as the primary source of authority in determining methodology and the knowledge that is produced (see the MDBA's Aboriginal Partnership Action Plan – engagement principles).

Expected applications

Aboriginal participants have full ownership of the intellectual property produced by the AWA. It is anticipated that the AWA information will help empower Aboriginal people to have input to the following areas of Basin Plan implementation:

- incorporating cultural values in environmental water management through the Basin annual watering priorities and the Basin-wide watering strategy
- assisting state governments in meeting their obligations to consult with Aboriginal people when developing their water resource plans (Chapter 10, Part 14 of the Basin Plan)
- assisting the Commonwealth Environmental Water Holder to take account of Aboriginal cultural values and uses when evaluating priorities.

Limitations of the research

While the Aboriginal Waterways Assessment tested three very different environmental and social situations, each Nation faces its own unique circumstances that must be taken into account and discussed prior to the use of the tool and its results.

Structure of the Aboriginal Waterways Assessment

The AWA form consists of three linked components:

Component 1 – place status – a statement of whether or not the place is an area of cultural significance and whether local Traditional Owners would return to the place in the future

Component 2 – current use of the place – a measure of the value of a river or wetland to Aboriginal people based on whether food and other resources are available and suitable for cultural use

Component 3 – cultural stream health – a measure made up of eight individual stream health indicators, such as vegetation, riverbed condition and water quality

Dhudhuroa and Waywurru Nation representatives on the Cherry Bridge, Ovens River, at Bright on the last day of field work (photo by Charmain McDonald, MDBA).

The research methodology

This section describes the research method and resulting research strategy used to explore whether a Cultural Health Index for cultural assessment of rivers and wetlands in the Murray–Darling Basin was possible – and if so, what it would look like and how it would work.

How to protect cultural knowledge: consent protocols in research practice

The MDBA's Aboriginal engagement principles guided the research team's activities. These require that people's 'free, prior and informed consent' be confirmed before proceeding with the strategy. This is consistent with the Australian Institute of Aboriginal and Torres Strait Islander Studies' recommendations for good practice research with Aboriginal communities (AIATSIS, 2012).

NBAN and MLDRIN have long-established community networks and working relationships with the Aboriginal Partnerships team of the MDBA (as well as other aspects of the MDBA's operations). These sustained relationships enable initiatives such as the AWA research strategy to continually build on an established history of respect and trust, as well as increasing cross-cultural understanding of how to work well together.

All Aboriginal participation in this pilot program was funded by the MDBA. This was in recognition of the level of risk associated with unsure outcomes and no guarantee of benefits for the participants or their Nations. There is no obligation on any party to continue funding in the rollout of the AWA.

The MDBA ensured that the place-specific assessment reports and the data on which they are based remain the intellectual property of each Nation. This practice of recognising Aboriginal intellectual property will continue for the rollout of the AWA.

Staged introduction

The staged approach to introducing the project began with MLDRIN and NBAN delegates visiting New Zealand in 2013, and learning from Māori researchers and community members about how cultural assessment of rivers and wetlands was developed in their Country. This was followed by presentations and deliberations at MLDRIN and NBAN delegates' meetings in early 2014. The deliberations authorised the research strategy, and were part and parcel of the way in which the inquiry was grounded in cultural and local legitimacy.

Once MLDRIN, NBAN and the MDBA gave authority to proceed, the principles of 'free, prior and informed consent' were carried out at carefully-timed local meetings. These were held with Aboriginal leadership at potential pilot places, which had been put forward by MLDRIN and NBAN.

At the meetings participants considered the purpose of the research, how it would be done, and what the potential consequences of engaging Traditional Owners in cultural assessments of rivers and wetlands would be for a specific Nation.

Months elapsed between the meetings, (interspersed with many informal conversations), to allow local communities to make an informed decision before progressing to the next stage of information delivery.

Once the decision to proceed was made,

there were visits (again months apart) to present the actual research method and prototype AWA.

Once the results of these meetings were incorporated by the research team, the week-long research visits to each location took place between August and December 2014. At these visits the local community's assessment teams participated in:

- training to use the AWA
- testing and adapting the assessment form
- making assessments of their local waterways
- engaging with the research team's tasks of making field notes, providing scientific information when requested and modifying the AWA process and tools.

Research questions

Research asks questions of validity (is the produced knowledge well-reasoned and accurate?) and viability (does the produced knowledge work?). Systematic research activities produce 'evidence' from which to make 'findings' which, in turn, inform 'conclusions'.

Conclusions are used to inform recommendations for further action, so the recommendations are based on evidence and reasoned thinking as discovered through research. The importance of good quality research is that any recommended action is based on considered evidence – so the action has a greater chance of success.

At each of the chosen locations in each of the three communities, the assessment team selected places and piloted the AWA. In briefing the assessment team, the research team set out three research questions:

1. *Does the AWA form work?*
2. *Is the AWA useful for communities?*
3. *Together, how should we conduct our research?*

These guiding questions were considered by both the participants and the research team at each place throughout the research strategy. This systematic reflection on the questions with all participants further realises 'free, prior and informed consent' as the underpinning approach to research practice.

The purpose of the pilot program was to deliver a form of the AWA that could generate a workable, comprehensive and credible assessment of waterways based on a community's knowledge of their Country.

Purple swamphen at Goolwa, South Australia (photo by Brayden Dykes, MDBA)

Research practice — piloting the Aboriginal Waterways Assessment

The Action Research methodology was designed to answer the three guiding questions:

Question 1 *Does the AWA form work?*

1.1 Are the assessment questions in the form clear?

1.2 Do the questions allow a comprehensive cultural assessment?

Both teams tested the AWA through cycles of action and reflection, in four steps:

- **assess the place** – the research team gave a short training session, and then began using the AWA in the field, to develop understanding through use
- **mulling it over** – members of the assessment team would think about the questions and the assessment task as they used the AWA. They would talk informally amongst themselves, bringing to the surface difficulties and insights that could then be discussed
- **how's it going?** – assessment team members clarified what was meant by each question, and what evidence was relevant. Clarification on each count would come from members of the assessment team as well as the research team
- **make changes** – after reflection, both teams would draw conclusions about how to use the AWA in the next cycle.

When the research team was planning the project, they had hoped to do this cycle once for each place assessed, but that wasn't possible. Instead they ran the 'how's it going' reflection session once a day, either at the end of the day, or at the start of the next.

As the week progressed, assessment team critique moved from what the questions meant, to the adequacy of the cultural assessment being made, and then to the strength of the assessment in the relationship between Aboriginal communities and the water planning system.

Question 2 *Is the AWA useful for communities?*

2.1 What is needed next in your community?

2.2 Will the AWA give the community a way to make the case for their water planning priorities?

2.3 What are the other benefits of using the AWA?

These questions were put to communities throughout the week. They asked if people thought the AWA would enable communities to influence water planners and others who control the resources needed to improve the condition of rivers and wetland places.

Question 3 *Together, how should we conduct our research?*

The research team's role was to:

- negotiate with the assessment team as to which places would be assessed
- help team members understand the questions in the AWA.

The Action Research facilitators (in the research team) recorded opinions and observations about the AWA and the assessment process as people used it. This role also facilitated review sessions to think about how things were going.

Both the assessment teams and the research team kept in view how to conduct business together. It was a question open to learning and negotiation as the research proceeded and three matters became the focus of that learning:

3.1 What is the best way to set up the assessment process?

3.2 What is the best way to recognise capacity and train the assessment team to use the AWA?

3.3 What recording of observation data is appropriate?

'Action Research' – an applied methodology

Research methodology is both a practical and ethical concern. It answers the questions:

- *how are you going to ask the research questions (practical concerns)?*
- *why are you doing it this way (ethical concerns)?*

Action Research is a specific methodology that combines real world action associated with the research subject (in this case, assessing river health), with reflecting on how the action took place. This is so issues identified during the research can be addressed, reflected on and improved at the time.

In this way knowledge that is owned by the assessment team can be combined with other knowledge sources, such as literature reviews, to improve the local situation and document the process. This not only advances practical knowledge locally but produces evidence about how to improve the way things are done for the benefit of others facing the same issues.

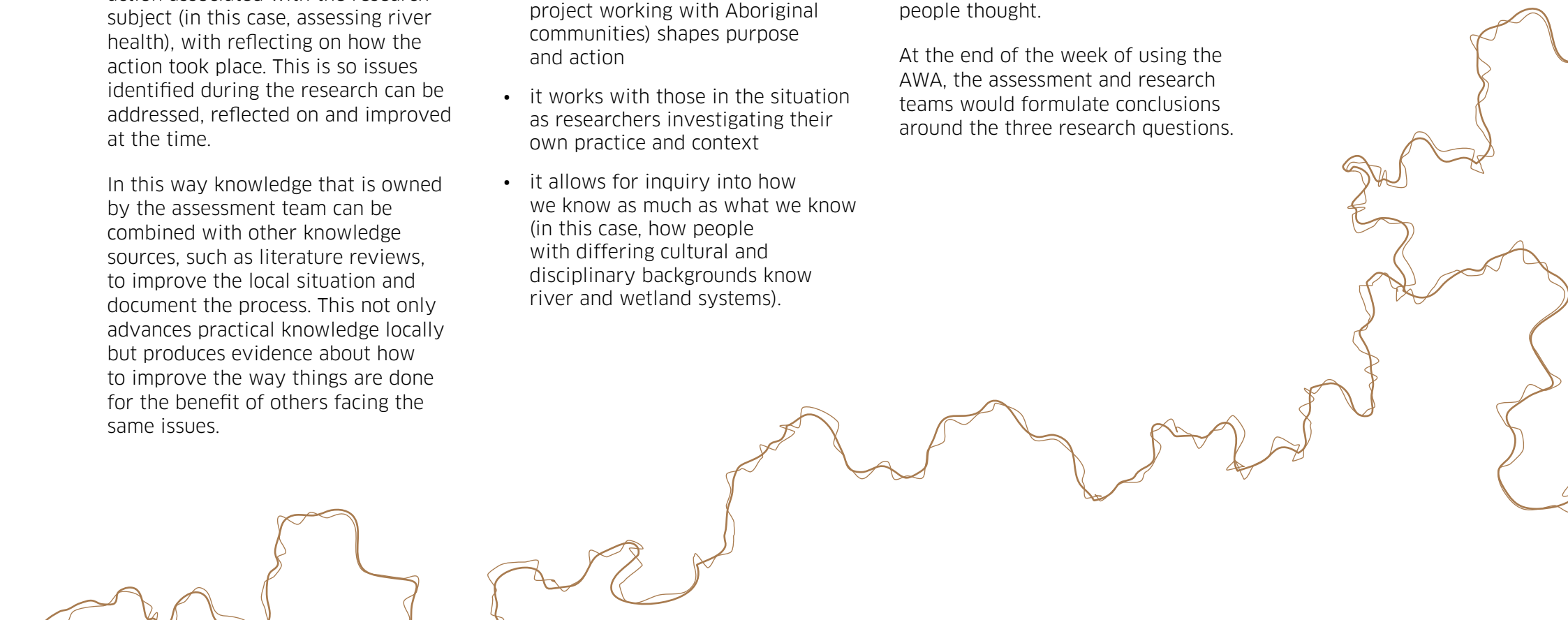
Action Research was chosen as the research methodology because:

- it allows investigation of practice – how well the action (in this case, assessment using the AWA) fits with purpose (in this case, of making a cultural assessment of river/wetland health, strengthening cultural knowledge, and supporting community decision making)
- it allows investigation of how the context (in this case, an MDBA project working with Aboriginal communities) shapes purpose and action
- it works with those in the situation as researchers investigating their own practice and context
- it allows for inquiry into how we know as much as what we know (in this case, how people with differing cultural and disciplinary backgrounds know river and wetland systems).

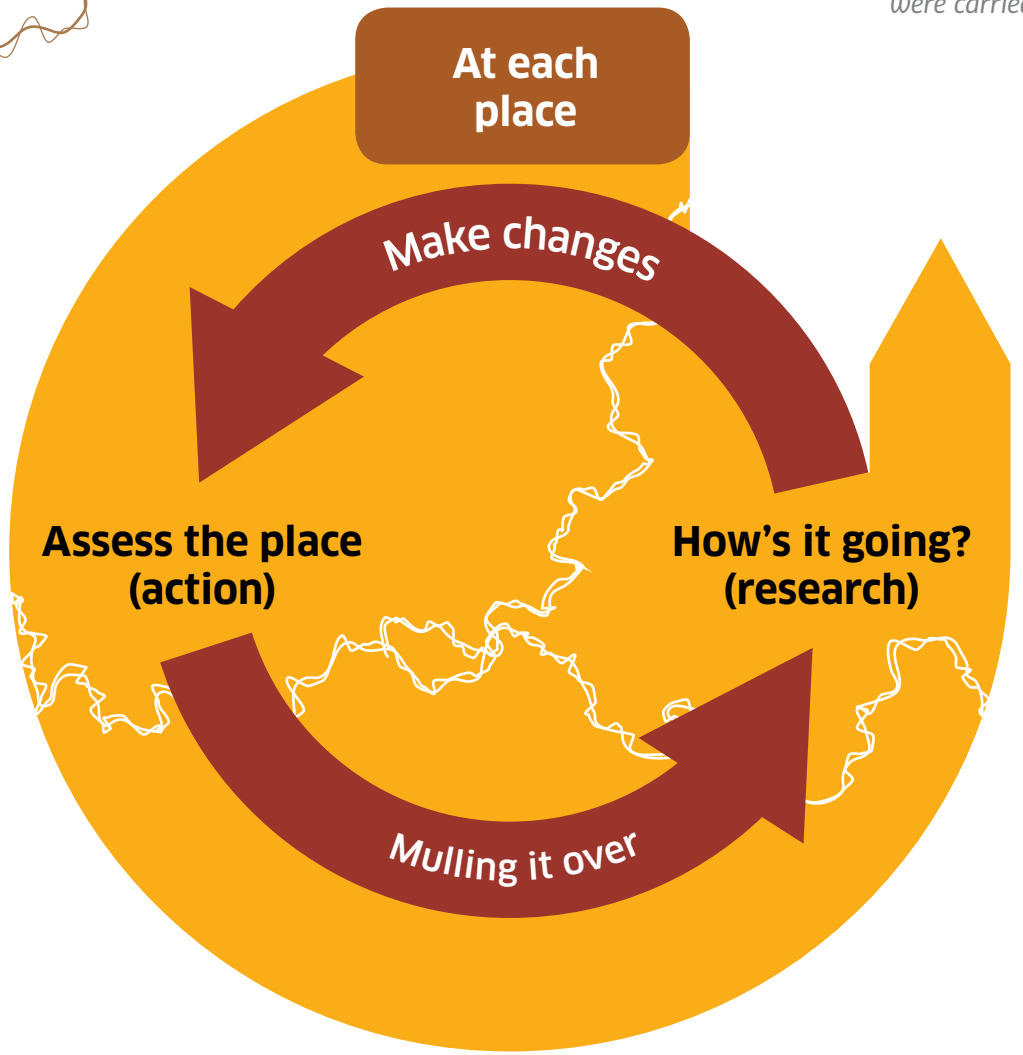
The approach proposed was that each assessment team would use an indicator, and then think about what it was like to be using the AWA to assess the indicator. This would throw up ideas about how the assessment process could be improved.

The assessment teams in each place would jointly reflect on the research questions throughout the week, with an action researcher facilitating discussion and recording what people thought.

At the end of the week of using the AWA, the assessment and research teams would formulate conclusions around the three research questions.



This diagram explains the methodology that was agreed to guide how assessments were carried out at each place.



Role of research team

1. Help with understanding questions
2. Record the process
3. Keep out of the way

Role of assessment team

1. Ask questions about the questions
2. Decide which questions work well, and which are hard to answer

Pilot activity

Local Aboriginal leadership groups in each pilot location selected, in advance, an assessment team of about 10 Traditional Owners. That team was responsible for selecting the places to be assessed and doing the assessment work.

To strengthen the ability to participate, the research team needed to introduce its role. This included:

- explaining the tools to the assessment team
- facilitating and documenting reflection on the day's experience of using the assessment form
- organising vehicles, food and other resources including local natural resource management information.

On day 1, as part of the training, the assessment team was introduced to the assessment form, and they tried out the AWA questions at a place close to town to set a benchmark for assessment. If possible, the place needed to be in good condition to introduce participants to an understanding of a healthy waterway.

At the conclusion of the training, places were selected by the assessment team to give a good spread of different kinds of Country. Decisions on which places to visit were made the day before, refined further in the morning, and sometimes as the day progressed. Decisions were often the subject of intense discussion about the relevance of places to an overall assessment of Country.

On arrival at a place, the assessment team split up to work with people they knew, or to work alone. They walked around to look at the place then worked through the questions in the assessment form. They talked over their thoughts with each other if they needed to, or with members of the research team. Each person was encouraged to make their own decisions on ratings and comments, but the research team did not cut across discussion within smaller groups.

At the end of each day in the week-long visit, the research team made up a map of the places assessed. They also began transcribing comments and entered the ratings into spreadsheets (used to calculate the scores for each place). Then a report was produced on each place with scores, photos and representative quotes.

The assessment and research teams discussed how the day had gone, what was and was not working with the assessment form, and how the teams were working together.

How did we gather research data?

Working to 'free, prior and informed consent' protocols throughout the strategy

Evaluating the assessment tool and its use drew on the following data-gathering activities – each based on assessment team participation and informed decision-making:

- place assessment forms completed by each assessment team for each place including team members' qualitative comments
- mapping of place by a research team member using a GIS mapping program
- photographs of assessment activity taken by a research facilitator with assessment team consent
- notes taken by an action research facilitator from discussions with the assessment team about observations from the day, as they used the assessment form in the field
- discussion with the assessment team in reflective sessions, at the host community centre, about the experience and the data gathered
- discussions within the research team.

Gary Murray, Daisy Cutmore, Jenny Ockwell, Cody Campbell and Rick James at Story Creek, Victoria (photo by Charmain McDonald, MDBA).

How to present the data?

Because at the time there was insufficient knowledge in local communities of the mapping technology and how to use it, the research team developed the approach to assimilating the data.

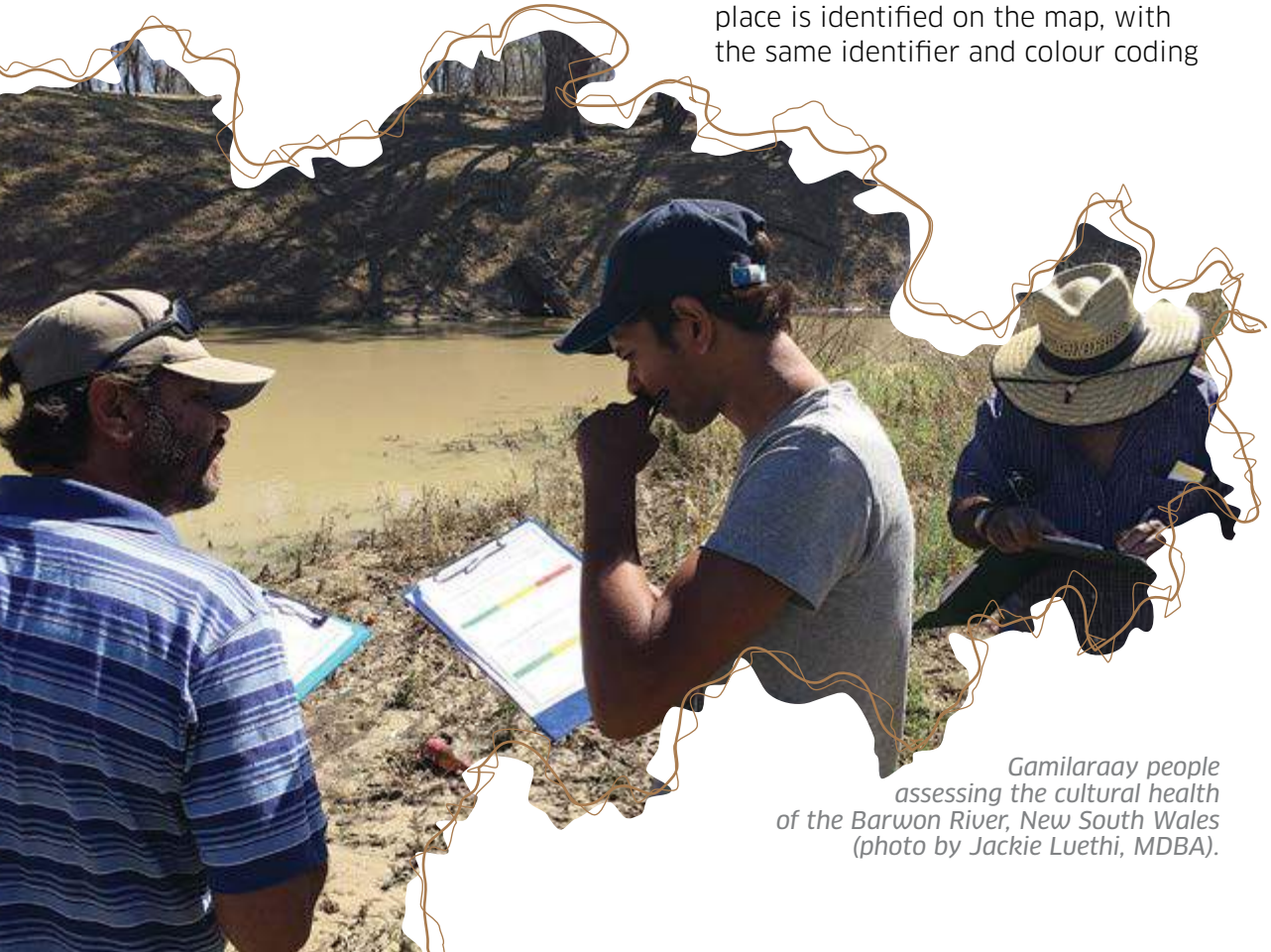
Scores from each place were recorded in a results chart, which were then transposed to a matrix. The matrix shows the assessment locations using the same identifiers that were used in the results table. The matrix presents scores that integrate river health with cultural uses and values to provide a 'high', 'medium' or 'low' score distributed across a graph.

The scores are also transposed onto an AWA regional map of the whole assessment location. Each assessment place is identified on the map, with the same identifier and colour coding for scores that are used in the results table and the map.

An average monthly natural river flow at or near the place is also provided in the place reports, to enable assessment teams, and other community members, to compare current flow conditions with modelled pre-development flows.

The scores are also presented on one-page place summaries. The summaries provide photographic evidence of the assessment team making their assessments, as well as the condition of the river at the place. Comments recorded on the assessment forms are included on these pictorial summaries, to preserve local observations about cultural, biodiversity and flow conditions of the place.

The process is done in a manner that does not change the words or the meaning of the qualitative data. The research data is handled in a culturally respectful way, which preserves the voices of the participant. It also ensures that Aboriginal community leadership holds the responsibility of deciding how to interpret the qualitative and quantitative data, and how to use it for a Nation's water planning interests.



Gamilaraay people assessing the cultural health of the Barwon River, New South Wales (photo by Jackie Luethi, MDBA).

Lessons learned – how the Cultural Health Index was adapted to meet local conditions and become the Aboriginal Waterways Assessment (AWA)

Research question 1 Does the assessment form work?

Are the AWA questions clear?

The questions start to make sense as people use the assessment form. In all three pilot projects, people found the AWA questions easier after the first few days. They had clearer understanding of what each question was asking, and they made more use of the 'comments' sections to give their thoughts about their rating on each question.

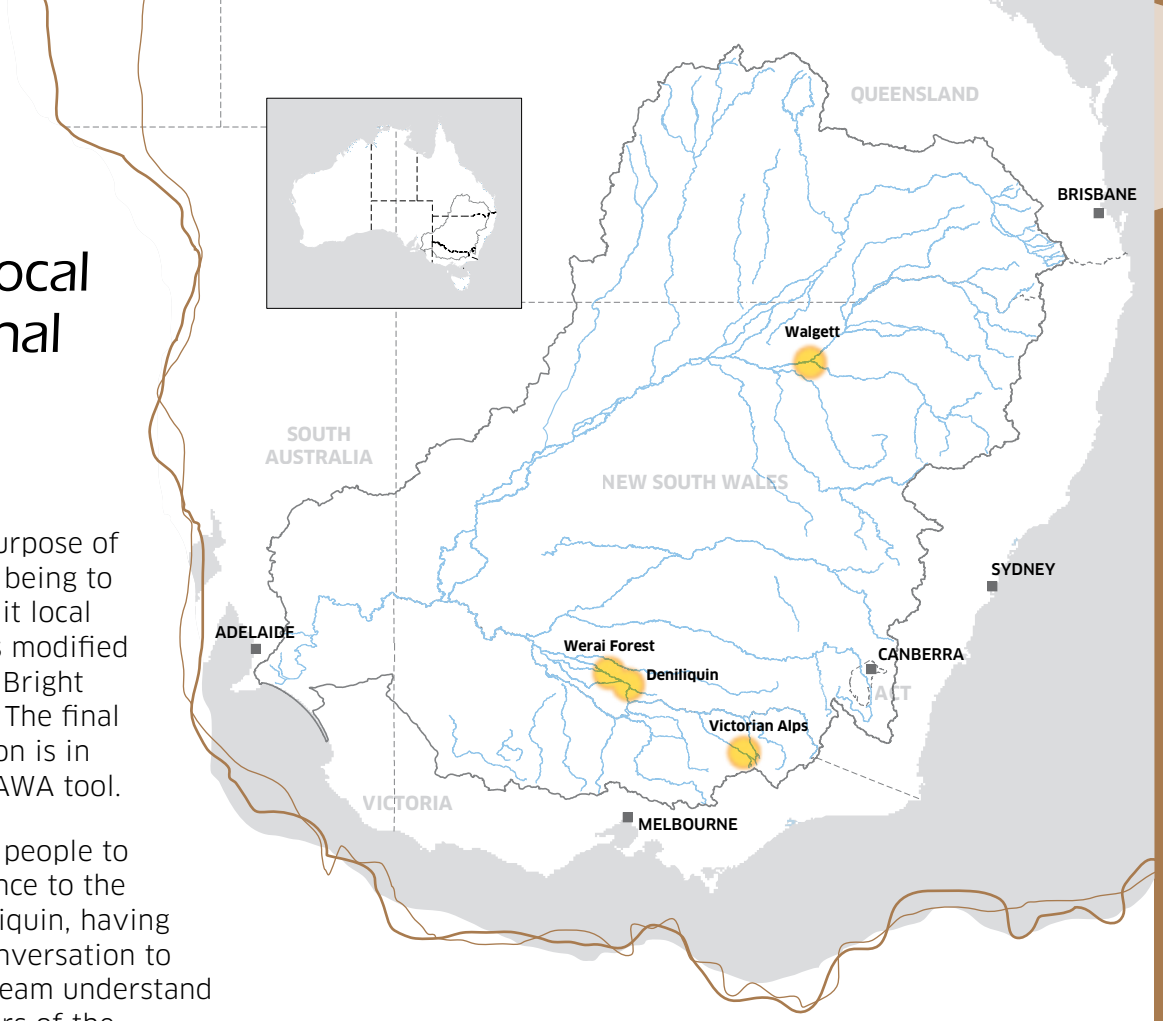
The time needed for confidence and familiarity is not a reflection on the difficulties of the questions, rather, doing water assessment is a new activity requiring new combinations of abilities such as getting used to a scientific activity, in a team, and being out and about in the landscape.

After the Deniliquin pilot project, the comments section was headed with the question 'What was in your mind when you selected your score?' This change was to give a clearer invitation to explain the reasons behind a rating.

Consistent with the purpose of the research program being to modify the AWA to suit local use, this question was modified a second time for the Bright location assessments. The final version of this question is in the final draft of the AWA tool.

Conversation enables people to connect their experience to the questions. After Deniliquin, having found the value of conversation to help the assessment team understand the questions, members of the research team worked with small groups in a more systematic way.

The need for this support should be identified at the time of selecting the team. By day 3, most people felt able to do the assessment on their own, though most still sat in small groups to discuss the questions. The research team helped some of the people by writing down their answers.



Finding 1

To work with the AWA process, participants need time and training. Modest support (for example a scribe) is needed for a local team to become self-reliant.

Did the AWA questions need revision?

The original options for answering question 1.1 'Does this place have cultural significance for you?' were not sufficient to distinguish situations where a person didn't know if a place had cultural significance because they didn't have knowledge of the place. They might never have visited or heard about the place, or knowledge of the place might have been lost to a whole community through dispossession. The options are better as: Yes A, Don't know B, No C.

The original 'yes/no' options for question 1.2 'Would you return to this place for cultural reasons?' failed to capture situations where a person might return for cultural reasons but things stood in their way. This could be because of the current condition of the place or its difficulty of access. The options are better as: Yes 1, Yes, if things improved 2, No 3.

Further details of how the place could be improved can be provided in the comment box.

Differences in experience of a place affect an individual's rating

The rating scale asks for comparison of the place being assessed against the best possible condition of such a place. However, individuals have different levels of knowledge of their Country, and this affects their scoring.

In Deniliquin, people who grew up when flooding was more frequent used a different baseline to assess the current condition of a place compared to people with no experience of flooding. In Walgett, most people were middle-aged to older, and the reduction in flow regimes that began in the 1970s was familiar to all of them.

Unaltered places are hard to find

Beginning the training by visiting and applying the assessment form to a relatively healthy place and a relatively unhealthy place would help to indicate the range of conditions being assessed. In the Deniliquin pilot projects, both the training places were on a regulated river that had been substantially changed, so this comparison could not be made. In Walgett, the first two places were also

Finding 2

The final assessment form should have wide application. However, consistent with cultural safety, at times it will be appropriate for local communities to expand or add to the assessment form to meet their needs.

Findings 3 and 4

3 The selection of assessment team members influences how the assessment is made and the results it produces. This is consistent with social research which is situated in and drawn from people's unique experiences. This use of the tool does not compromise the reliability of the AWA process, tools, findings or their outcomes.

4 Providing a model and/or discussions of historic flow conditions before and during the place assessments enables Traditional Owners to better understand the impact of settlement and their experiences of rivers and wetlands.

substantially altered, and this stayed true throughout the rest of the week.

Members of the assessment team had memories of the places when they were in better condition, and they used this as their baseline:

> *'Back in the days before cotton went out all around this region, we can remember the rivers and what they were like. They were always flowing. Now, we just don't have it. Water is stopped in places, backed up in other places, nothing at all in other places. That's what's changed. We used to go up to Wee Waa for cotton picking, then we started going all over for the cotton work.'*

Differences in experience, age and gender affect the sharing of knowledge within the assessment team

As more places were assessed, assessment team members who had some affiliation with each other walked, stood or sat together and talked as they made their assessment. This allowed for a shared baseline of knowledge about the condition of a place. The research team assumed that people were connecting as they needed, and did not try to organise groupings.

In Deniliquin, sharing of the history and past use of a place tended to be contained within four groupings: older men who grew up at or near the place; middle-aged men who grew up at or near the place; younger men who grew up in the district; women who grew up in the district.

As the week went on, there was more mixing across these groupings, and some people went off from time to time to work on their assessment sheets alone.

In Walgett, the groupings formed and reformed through the week, and were not based on age but on personal relationships, or the mood of the moment. People seemed happy to share their knowledge of a place with all in the team. Those considered older travelled in one vehicle, which ended up being called (light-heartedly) the 'Elders car', but there was an easy mixing of people when the teams reached each place.

Finding 5

In locations where a river or wetland is degraded, local knowledge can provide an important baseline.

Barwon River near Walgett, New South Wales, in 2009 during the millennium drought (photo by Arthur Mostead).

In the Victorian Alps, youths and Elders worked together during the assessment process, changing discussion groups and vehicles on a daily basis. There were no barriers of age or gender, because of the general enthusiasm motivating all team members to make the most of the experience.

Changes to the upstream catchment have impacts on many places

Question 3.1 asks about human disturbance of the upstream landscape. In both Deniliquin and Walgett, the disturbances were the same for most places. The Walgett team discussed the changes, and agreed that most places would rate as either 0 or 1 on question 3.1.

The assessments for the Victorian Alps varied in this regard. Some upstream catchment areas were in almost pristine condition, while others had significant disturbance. In the Alps it was necessary to think separately about question 3.1 in most places.

Do the AWA questions allow a true and accurate cultural assessment?

The assessment teams thought that the three parts of the form did, in total, allow them to give an Aboriginal cultural assessment of the cultural health of places that depend on water (given that most places are influenced by natural cycles of wetting and drying, and some are more heavily influenced by water management regimes). In answering this question, the assessment needs to take account of the impacts of water management.

Part 2 of the assessment form needs an indication of whether or not a person is familiar with the place

People who have visited a place a lot will make a different assessment of cultural use of the place, compared to people who haven't visited it. If people say in their comments that they don't know the place, then this can be taken into account when settling on the assessment of cultural uses.

Finding 6

Each community finds its own way to share cultural knowledge and to share the results of the assessment process.

Finding 7

If the upstream catchment is the same, the answers to environmental questions (question 3.1 in the assessment form) can be agreed early in the process.

Finding 8

The AWA indicator questions allow a true and accurate cultural assessment of water-dependent places.

Rating a place, and the feeling about a place, are different ways of knowing

The feelings about a place might influence assessment in unpredictable ways. In Deniliquin, in discussion at the end of day 2, the research team asked whether the AWA questions were fitting with people's sense of each place, and adequately reflecting their assessment of it.

Discussion focused on the difference between putting a number on a rating scale, and the personal experience of a place. The following contribution illustrates this:

> *'That place means a lot to me, but it might not mean a lot to other people. I can just go out there and drive and sit, and I can have the most problems in the world at home, but going out there, you know, like, the picture becomes clearer. You know, you can feel at home. I couldn't write comments in yesterday, because how do you write down how it makes you really feel … in a couple of lines?'*

The Deniliquin assessment team therefore thought that written comments were needed to understand what each person means by their rating on each question.

Some people need coaching and visual guides to support activities for Part 3 of the assessment form

During the first pilot project, at Deniliquin, the research team found that some assessment team members wanted someone from the research team alongside them, talking through each AWA question of part 3, and asking them what they thought. That practice continued in the other communities.

In the Victorian Alps, for example, the research team provided information about local weed species and some archaeology. Research team members mingled with the assessment team, and looked out for people who looked stuck or who asked for help. Their role was to describe the elements being addressed by the question, and to describe the rating scale, then invite the person to make an assessment using their knowledge.

In the Walgett pilot project, in consideration of seeing Country as a whole, the research team was explicit about the difference between how

Finding 9

The validity of the assessment is maintained by identifying the familiarity, or otherwise, of the assessment team with the place.

Findings 10 and 11

10 Assessment teams are free to make good judgements about the information they are creating without threatening the integrity of the assessment process.

11 Qualitative information, such as stories about local experience of the issues, is essential to understanding and communicating the assessment result.

a place felt as a whole, and looking at the parts that made it up. They became more aware of how 'the filling in of a form' had been part of the disempowerment of many Aboriginal peoples, and this reverberated into the experience of completing the assessment form.

The research team reinforced people's efforts with the questions, and coached those who wanted one-on-one help, so they could better think about each element in turn. The assessment team (as a whole) was given encouragement to stick with an unfamiliar use of an all-too-familiar process until they got used to it.

By the end of the week, most were holding their attention on each aspect of a place in turn. They said they realised there was more to each place than they had previously seen on visits there. They were also more able to keep their assessment specific to each question, rather than letting their feelings about a previous question influence their rating of later questions.

Each AWA question in Part C of the assessment form requires assessment of several related aspects of a place

The habitat question requires assessing tree cover, understorey and grasses, and the impact of these on the animals that depend on them. The question about geomorphology requires making the distinction between banks and bed as part of a channel. The question about aggressive weeds requires knowledge of a range of weeds – aggressive and less aggressive.

The assessment teams said that text explanations of what is to be assessed would make a lot more sense if supported by images of the elements of a question, for example, of typical aggressive and less aggressive weeds.

Telling stories about a place releases information relevant to assessment

Memories of a place provided data for assessment. Expressed as stories, and shared within the assessment team and with members of the research team as trust developed, stories held

Finding 12

The assessment process is a practice that requires concentration and discipline, which is supported through the combination of doing an assessment and reflecting on how it was done.

Finding 13

Providing visual information about local species and environmental conditions may increase the self-reliance of assessment teams in using the assessment form.

Finding 14

The assessment process recognises the value of, and strengthens, cultural and cross-cultural transmission practices.

data about past condition, changes over time in use and condition, and understanding of what had changed the river.

Walking around places needs to be included into each place visit

The research team was of the view that walking around helped the assessment process, revealing different aspects of a place not always visible from a car. This was suggested as a way of getting a feel for a place. Some members of the assessment team took this opportunity but others stayed pretty much where their vehicles stopped at each place, and made their assessment from what they could see.

Some people felt that the assessment process required more physical activity from them than usual, and that this was good for them.

What did get people looking around more was walking at least a little distance to a place. The research team observed that this also allowed more talking and for smaller groups to form and reform, both of which helped move knowledge about the place around the assessment team.

Comments are needed to understand the ratings in different kinds of Country

Comments help to contextualise the assessment. AWA questions on river and wetland health will mean different things in different landscapes:

> *'Stuff that works for us, won't work for alpine and it won't work for Walgett. We're talking about pretty much the same issue, but there's whole different things around it.'*

Part 2 of the assessment form assesses contemporary use

After Deniliquin, the research team thought the AWA question: 'Does this place have cultural uses?' was redundant, and it was deleted on this form. Rather, the question: 'How good is this place for cultural use?' was substituted as it was thought it would provide all the necessary information.

However, this led to the rating '0. No use at all' being sometimes taken to mean, 'we don't use it for this, because we can't get to this place'. The research team also heard the question: 'How good is this place for cultural use?' being taken to mean, 'If this place was

Finding 15

Inspecting and discussing each place improves the assessment process and is good for physical, cultural and social health.

Finding 16

Local communities appreciate the distinctive meanings of their knowledge. The comments section in the tool helps preserve the local knowledge and meaning of the place.

in good condition what use could an Aboriginal person make of it?' The research team therefore decided that the best AWA question for this part of the form is, 'What cultural uses does this place have now?'

The assessment can be applied to a small place or a much larger area

After visiting half a dozen places in the Werai Forest, the assessments showed little difference between many of the places – they were all in poor condition. In situations like this, both the assessment and research teams thought the assessment process could be used at a 'landscape scale', and not only at a local place level. That is, in situations where the landscape functions are biophysically the same and all parts of a landscape have been subject to the same history and conditions.

Ronald Hughes Dhudhuroa Nation, Luke Gardiner Waywurru Nation preparing a farewell ceremony in the Victorian Alps (photo by Ross Colliver).

Finding 17

The results are an assessment of contemporary use, acknowledging that history and past practices influence how a place is used.

Finding 18

Where there are large-scale environmental influences on the waterway, the assessment process works at both local and landscape scales of Country.

Finding 19

In undertaking the assessment process there is potential to gather local intelligence about policy and regulatory impacts on environmental health and Nations.

Research question 2 Is the assessment form useful for communities?

Returning to the three guiding research questions (as opposed to the AWA assessment questions) the criterion of appropriateness explores whether the assessment form enables communities to make decisions on their priorities or to influence water planners and other government agencies to improve the health of their Country.

While understanding about these matters may only become apparent in the medium-term, the research team asked about possible usefulness based on the week's experience of the assessment form.

What is needed next in your community with regard to the health of rivers and wetlands?

The research found that it is strongly advisable to bring Elders into the assessment process. In Deniliquin, the assessment team realised that Elders who hadn't been able to join the team had deep and valuable knowledge of some of the places. The Deniliquin team now wants to take those people out to places already assessed, and get their input. This would test the assessment just made, and deepen understanding of the cultural significance of each place.

Finding 20

Local communities will determine the best way to carry out and use the assessment process to get the best results for their people without compromising the AWA tools and results.

Little Rushy Swamp, Barmah Forest, Victoria (photo by Keith Ward, Goulburn-Broken Catchment Management Authority)

Only after this fuller assessment could the community consider priorities.

The learning from this is that in some instances, the community must use and understand the value of the assessment form before they can be in a position to invite Elders into the process. This approach ensures the right decision-making takes place.

Decide how water can best benefit the places important to the community

In Deniliquin and Walgett, most places needed higher levels of flow and more frequent flooding. When more assessments are done, the community's task will be to decide how a limited amount of water can have the best impact on the places that are important to them. All participants were of the view that completing the assessments gives local communities the data to make these types of decisions.

Draw the assessment together into a report of priorities and recommendations

For the assessment to meet Traditional Owner interests, it has to be drawn into a report that spells out what the community wants, in terms that make sense to local Aboriginal communities.

> *'Strategically, we've got to get the individuals [water planners] on Country doing the stuff we did all week. That's fine, but you've also got to go the next level.'*

Draw together the community's knowledge about their rivers

Doing a detailed assessment of rivers led some participants to see that the community knowledge about rivers needed to be drawn together:

> *'There's people around that we need to tap into, for our cultural knowledge of our rivers. You know, get back and learn about our river systems, and our area. We need to put it together. You don't know what I know, and I don't know what you know.'*

The Victorian Alps team, when asked what they wanted to do next, were quick to say they wanted to spend more time on Country and learn more about it:

Finding 21

The assessment process is helpful to community decision-making about water allocations and water resource planning.

Finding 22

The assessment process gives Traditional Owners resources to engage more confidently with water planners.

Finding 23

The assessment process can affirm a Nation's connection to Country even when history and its current impacts continue to situate its members in dispossession.

'Do this again.'

'Do it again, bring more people … and have more time out there.'

'Yeah before we fill out surveys and that, reconnect to Country. '

'Learn what it will take to put it back together again. '

'More sessions with people specific into other fields as well. Learning more about the native animals, the aquatic life and that.'

Learn what is needed to bring river and wetland places back to health

Water is the first and most essential need, but to return to health many places will need other conservation activities and support from more than one government program. The close assessment required by the assessment form made assessment teams more aware of the restoration tasks, and motivated to learn more about this:

'I'm happy and encouraged seeing that last place, but there's still a lot more we need to see, to see what's possible to bring the Country back.'

Teams also saw the need to work with landholders and water managers to agree on changes in use and action to rehabilitate rivers and wetlands. The Deniliquin and Walgett assessment teams were less optimistic than the Alps team about what this might deliver.

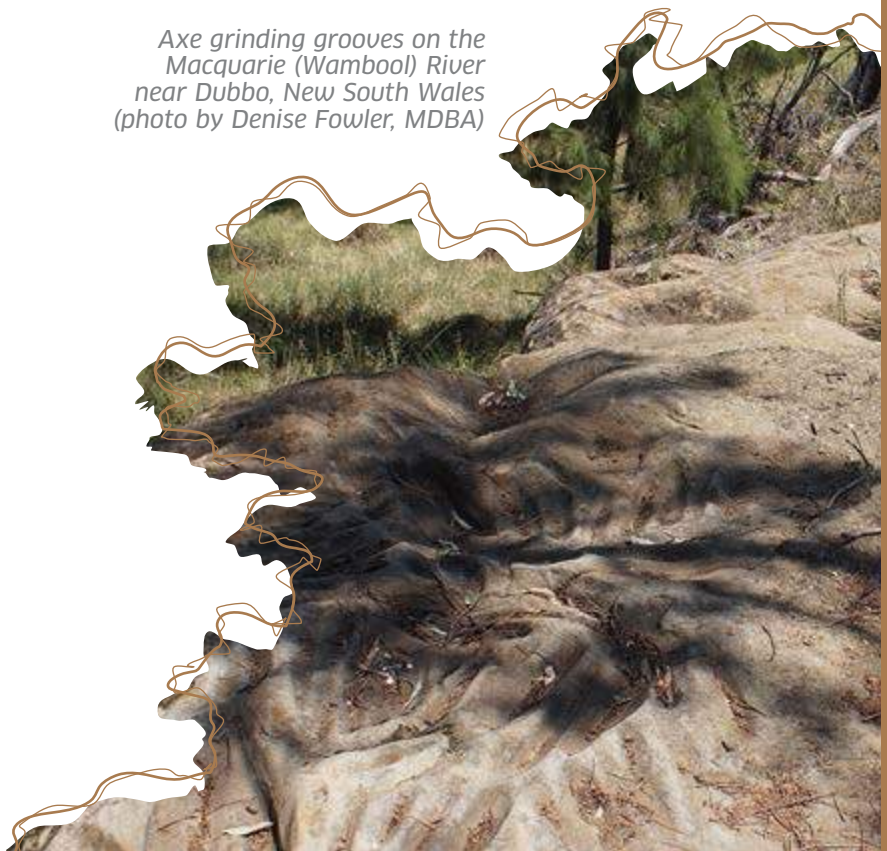
Will the assessment process give the community a way to make the case for their priorities?

Among all assessment teams there was a general concern that water planners aren't listening to Aboriginal people. To some extent this fuelled doubt that water planners would accept the assessments as valid science.

'I don't see they're listening to anyone, those water authorities. They've got their little bit of science, where if they went and had a look on the ground, they'd see that their practices aren't working, they're not. They killed a heap of fish not long ago with black water, and they thought they knew what they were doing. It's just getting worse and worse, and it won't be able to recover soon.'

Finding 24

The assessment process can increase the health of a river system through Traditional Owners' knowledge and values being recognised and implemented.



Axe grinding grooves on the Macquarie (Wambool) River near Dubbo, New South Wales (photo by Denise Fowler, MDBA)

'Yeah, can't we try it and fail, like they do? Oh no, we can't do that! We've got to go to university for that! That's what it all comes down to.'

Assessment teams will feel more confident in the value of the assessment process in influencing decisions once it has been used in successful negotiations with water planners. Traditional Owners would then have some assurance that there is value in assessing more places.

Aboriginal communities need to know how water planning works

Repeated exposure to places in poor condition raised questions about the institutional arrangements that have led to and maintained the current distribution of water.

The Walgett assessment team did not raise doubts about the value of an Aboriginal assessment of river health. However, there was limited understanding of who makes decisions about water. In the Wednesday afternoon debrief, discussion of how the results might be used led to the research team setting out where responsibilities lay across local, state and national levels.

One person in the assessment team knew some of this, but to the rest, it was a bureaucratic mystery.

Communities need to understand the basics of water resource planning, sustainable diversion limits and environmental watering. They need to know what opportunities they have to be involved and the roles of MLDRIN, NBAN, state agencies and the MDBA. They need to meet face-to-face with water planners, on their own terms.

What are the other benefits of using the assessment process?

The assessment process enables the community to draw its knowledge together.

An objective of all the communities participating in the pilot program and their supporting organisations (Werai Aboriginal Negotiating Team in Deniliquin, Dharriwaa Elders group in Walgett, and the Dhudhuroa and Waywurru Native Title groups in the Victorian Alps) is to ensure that Traditional Owner knowledge is cared for and kept for future generations.

Finding 25

Traditional Owners will develop more confidence in the AWA following positive experience with agencies involved with water planning and management.

Finding 26

The assessment process has the potential to bring policy and regulatory realities into water planning and management.

The Werai Aboriginal negotiating team invited the Werai Forest works team (which works under a contract with NSW National Parks and Wildlife Service) into the assessment team. Yarkuwa wanted the young men in this team to learn more about the forest, by assessing places using the assessment form and by listening to older community members as the assessments were underway.

The presence of three generations, and of people knowledgeable about different parts of the river system, made the assessment team aware of the extent of change in the health of river-dependent Country.

This awareness reinforced their concern, and provided an opportunity for sharing knowledge of how water moves in flood conditions. This is knowledge that younger people have had little exposure to. There was also knowledge that could be used to guide water releases:

> *'That first section of Werai, before you cross that junction, I wouldn't mind something done there on that first section, so at least we can give that a decent flooding. The only way with that little bit of flooding they're getting there now, that's coming out the end of the Tumudgery, and it goes across to the Edward, through that Rookery we had a look at, and then it goes down a gully into the Collagen. There's a hell of a lot of water going straight back into the rivers and it's not covering the forest floor… it's there one minute and gone the next. It's not sitting there long enough.'*

Stevens Weir on the Edward River near Deniliquin, New South Wales (photo by Brayden Dykes, MDBA)

The Dharriwaa Elders Group brought together people who had lived all their lives around Walgett, people who had moved to Walgett in their adult years and people who had lived there through to their early adulthood, then moved away. Each had a piece of Walgett's history and the stories of the rivers, and the conversations on Country brought out that knowledge.

With the Dhudhuroa and Waywurru Nations of the Alps, most of the team were city residents who had not spent much time in their Country. Two members of the team who knew the Country well were able to share their knowledge.

As the team travelled up and down the Ovens and Kiewa valleys, they gathered knowledge from the research team of how the valleys had been used since occupation. This helped them understand the condition of the rivers, and they could then imagine how the places might have been used traditionally:

> *'I really enjoyed it today. I got a better understanding of how events like the dredging have affected the river. And I can visualise how the last place wouldn't have been a camping site, because the water wasn't flowing fast enough.'*

When asked what they had got out of the week, every member of this assessment team said:

> *'I've got more connected to my Country.'*

Using the assessment process brings the community together

In Deniliquin, there were big differences in knowledge between older and younger people, and long-term residents and newer arrivals. Discussing ratings together would have brought attention to differences in experience, in particular the view of some that younger members of the team were listening more to their Elders than others.

The research team listened to concerns, expressed individually, of differing life experience of places. As the week progressed, the older and middle-aged men began to speak about these differences. Inappropriate behaviour from the younger men (not filling in assessment sheets seriously, being abusive of older men) provided the spark for this, and the reflection sessions provided a place to talk about this.

Ronald Hughes Dhudhuroa Nation, in Dhudhuroa Yaitmaithang Country, Falls Creek, Victoria (photo by Ipshita Mondal, MDBA)

In Walgett, the older and middle-aged men seemed to be familiar and had a comfortable relationship with each other. There was only one young man, who came with his father, so there wasn't the age difference in the team as there was in Deniliquin. All had grown up in the area, though some had returned more recently, or had come back specifically for the assessment. They were interested in other participants' recollections of each place, and used the discussion to fill in gaps in their knowledge and to build a shared understanding.

The ongoing work of the Elders Centre in capturing Aboriginal knowledge and acknowledging Elders may well have helped to create the ease felt between members of the assessment team.

With the Dhudhuroa and Waywurru Nations, the knowledge of the Elders present was reaffirmed but younger people were also learning to take responsibility within the group – to be organised and on time, to follow protocol in relation to each Nation's Country, to keep a record of what the group was doing to communicate to the rest of the Nation, and to look after each other when travelling.

Using the assessment process draws in non-Aboriginal knowledge

The AWA has been built to use Aboriginal knowledge of place, but it draws on non-Aboriginal knowledge as well. The AWA part 3 questions lay out a way to understand rivers and wetlands, and this could allow further knowledge to be drawn in alongside local knowledge.

The Deniliquin community was sceptical about the value of non-Aboriginal science, based on their experience of having their Country studied and managed by government bureaucracies.

The Walgett and Victorian Alps teams were keen to learn how non-Aboriginal science could assist them. In the Victorian Alps for example, the assessment team was surprised by how their first impressions of a place changed once they learned more about the vegetation.

Finding 27

Undertaking the AWA can help develop relationships, share knowledge and strengthen connection to Country.

Finding 28

Because of its focus on learning together while working together, embracing Action Research as part of the assessment process strengthens social relationships to enable ongoing engagement in caring for Country.

Finding 29

The assessment process and the assessment form can enable Aboriginal and non-Aboriginal sciences to work together for river health, if Nations so decide.

Research question 3 Together, how should we conduct our research?

The research team's stance was that it was the community's pilot of the assessment form. The assessment team should only make the major decisions about how to go about all aspects of assessment and what the assessment form should look like.

The research team presented what they thought needed attention, and assessment teams decided if attention was needed and how to deal with each issue. As the week progressed, three issues emerged. These observations are framed below as questions, with a summary of the learnings on each.

What is the best way to set up the assessment process?

In Deniliquin, the process of selecting places each day was influenced by weather and accessibility, and raised awareness of the need for local knowledge. As the week progressed, it became clearer that some people had more knowledge of certain parts of Country. Sitting behind that was the question of who could speak for Country.

During the final debrief, the assessment team agreed that the process for their selection is important. They strongly endorsed the approach to having the selection undertaken by Traditional Owner leaders and/or organisations before the training and pilot week started.

> *'You can't have self-appointed Elders or community leaders. It has to be the community who decides. The community knows who goes where and does what.'*

Traditional Owners made the selection of assessment team members locally, but in Deniliquin it was clear the process could have been communicated better.

In Walgett, the issue of who could speak for Country did not arise, though there were differences in knowledge of different areas. The Elders Centre chose the assessment team, based on a shared understanding of who had authority within the community.

This may have been influenced by work of the Elders Centre in documenting Elder's stories, so there was an understanding of families and their history in the area.

Similarly, the issue of speaking for Country and respect did not arise in the Victorian Alps.

Assessment places are best chosen ahead of time

Selection of places is linked to who can speak for Country and what areas are important to the community.

In Deniliquin, there were differences in 'who knew what'. In Walgett, the teams began with a list of 37 places identified through 'brain-storming'. The assessment team chose from this list without a full appreciation of the application of the tool. The teams therefore visited several places on the same river, in the same part of Country that were in the same condition and had the same cultural use. In the Alps, the Traditional Owners consulted cultural heritage management plans to choose places for assessment.

Visiting potential assessment places prior to training would build understanding of which places best represent the condition of the Country, this best tests the assessment process under a range of conditions. Discussion of the variety

of rivers and wetlands would help the assessment process. Places could be chosen with an understanding of their significance to the community as well as an understanding of river reaches, not just points on the river.

Decisions made prior to a training week would allow time to contact private landholders. The precise schedule for the week could be left flexible to cope with changing weather. Starting the week with a list of places would make deciding each day's places easier.

It's good to have a mix of generations and genders

The Deniliquin team had older and middle-aged men and women, and young men. The older participants brought knowledge of how the Country has been lived in prior to significant change in river flows:

> *'At Moona there, we used to get the mussels out of there, make a fire on the banks, and cook them there. The water was pristine. They were good eating mussels. Thirty years later, me and one of my brothers went there, and come across all these mussels, cook 'em up, hey, chuck them on the coals, they looked beautiful. One bite – oh! We just spat it out, all you could taste was mud. And that was a lot different to the '50s when the water was pristine. Those mussels were beautiful, just like you get out of the ocean.'*

The Walgett team had mainly older and middle-aged men, but there were no women. The Dharriwaa Elders Group and the research team felt the assessment may have been adversely impacted by the absence of women's voices. The research team needs to understand what will allow a community to consider women when they choose their assessment team.

The Alps assessment team was predominantly younger people led by Elders, and included both men and women. The Elders brought knowledge and leadership, which was complemented by the energy and enthusiasm of the younger team members. This relationship contributed to the positive vibe experienced by both the assessment and research teams.

Finding 30

It is important that the Traditional Owners decide who is on the assessment team.

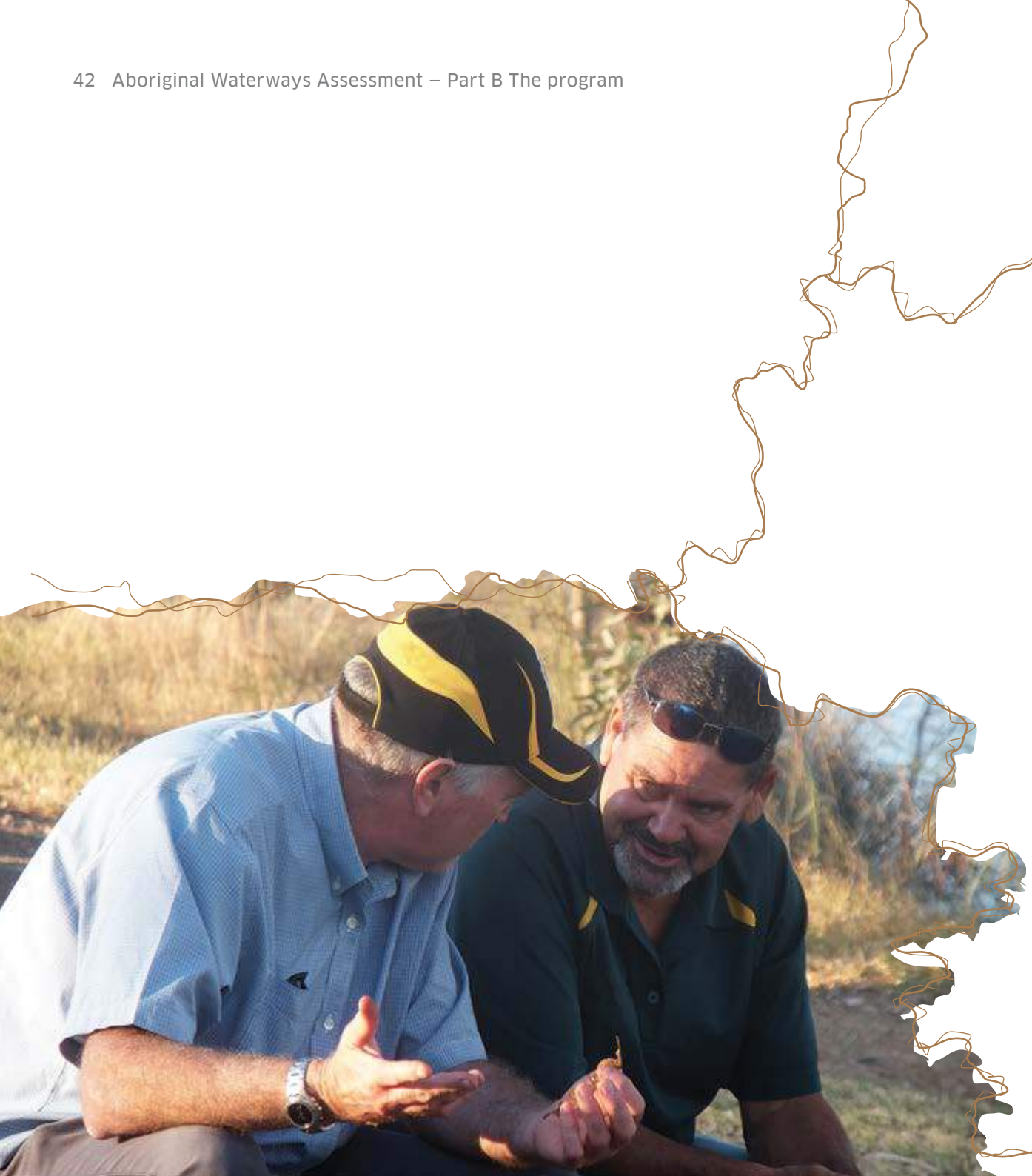
Finding 31

When selecting assessment places, ample lead-in time and the need for ecological and other information should be considered.

Findings 32 and 33

32 Gender balance in assessment teams is important to enable both men's and women's business to be respected in the assessment process.

33 Intergenerational inclusion in an assessment team is important to enable cultural knowledge to be transmitted.



'That last spot we went to today, it's a beautiful place, even with the carpark and the road, the human structures, it still looks like the river isn't interfered with. There's those willows, but you don't understand what they're doing... In the space of 200 or 300 metres, I only saw one or two gum trees, and all the undergrowth was weeds.'

Neil Ward, MDBA and Northern Basin Aboriginal Nations Chair Fred Hooper (photo by Charmain McDonald, MDBA)

What are the optimal conditions for two-way learning when making assessments?

In the research team's initial visits to all three Traditional Owner groups, they described the project and talked through the AWA questions. At the beginning of each pilot project, the assessment teams were presented with the questions and rating scales. This was briefly carried out in a meeting place, then discussed in more detail and applied at the first assessment place. This allowed the assessment teams to immediately apply what they heard.

There were two versions of the assessment form. Initially a prototype or training version was used which contained background information to each question. This helped stimulate conversation or allowed assessment team members to think about the background in their own time.

As the teams worked through the assessment forms, members of the research team were available for clarification. People also talked to each other to work out what things meant. Once the assessment team was familiar with the questions a more concise version of the form was used.

As the week progressed, understanding of the questions and confidence in using the assessment form increased. However, the research team felt that understanding could be improved through ongoing facilitated discussion of people's scores at each place or at the end of each day. At times this also provided the opportunity to have further discussion on the background to the AWA questions.

Assessment team near Walgett, New South Wales (photo by Jackie Luethi, MDBA)

How does assessment start?

At Deniliquin and Walgett, the assessment teams arrived at each place, took their assessment forms, and got to work. But individuals on the assessment team had different levels of knowledge of a place – some had visited often, some had never been there. Those with more knowledge often teamed up to do their assessment, and this meant that others in the assessment team didn't get their stories about the place.

In Deniliquin for example, at the start of the week, the men who had lived in Deniliquin all their lives and had visited places as children, teamed up as they did their assessments. The younger men mostly kept to themselves and stayed on the periphery in discussions before and after visits. One younger man put himself forcefully into discussions at every opportunity, and the older men thought he needed to listen more. When he didn't show up on the last day, they were disappointed:

> *'He mightn't think that people were listening, but people were listening. We've got to have the young fellas' input and how they see it.'*

In Walgett, the research team observed that discussion in the small groups that formed brought stories and new information to the surface, but these weren't heard across the whole group. During the week, there was intermingling of these early groupings, and more sharing of knowledge between team members as they got to know each other better.

Finding 34

A combination of explanation and participant use of the assessment form is a good way for assessment teams to understand the AWA questions, rating scales and results during AWA training sessions.

Finding 35

Assessment is improved if the sharing of knowledge at each place occurs in ways that are agreed before visiting places to assess.

Bridge across the Darling River (Barka) Wilcannia, New South Wales (photo by Denise Fowler, MDBA).

In the Victorian Alps, where very few assessment team members had past experience of the places, it was decided that each assessment would start with members of both teams sharing what they knew about the place 'Where are we? What is the history of this place? Who lived here? Where is this place within the river system?' This worked well as a way of orienting the team to the place, and to indicate which members had direct experience of the place, so that others could draw on this.

How to manage reflection on the action?

In Walgett, as in Deniliquin, the research team found it difficult to reconvene the assessment team for discussion of their ratings. Completing the assessment was demanding, and when finished, the teams wanted to take a break and then move on to the next place. They did not want to stand in the sun and talk through the questions again.

Instead, at the end of each day, the research team returned to the Elders Centre for discussion. They asked how the assessment team members were going in understanding and answering questions in the form, and what they thought about the places they had visited. This drew together the team's knowledge about the places.

Both teams also discussed aspects of the assessment that, from the research team's observations throughout the day, seemed to need clarification. For example, when it became clear that upstream catchment land use had a similar and profound effect on most of the places the teams visited, they discussed the history of extraction of water for cotton and its effects on river health. After the visit to a wetland place, they discussed the variations in the wetlands form.

In the Alps the team did manage reflection on-site, which worked very well for them.

> ***Finding 36***
>
> *Reflection, while in the field undertaking assessments, works well in some circumstances. However, in some situations, for example unfavourable weather, discussion back in the community works better.*

Gary Murray, Ross Colliver and Jenny Ockwell on the King River, Victoria (photo by Ipshita Mondal, MDBA)

The importance of recording observations

With the informed consent of assessment teams, the research team recorded images and sound at each place – how the assessment form was used, and the limitations and difficulties encountered – without intruding on the assessment process. Towards the end of each week one of the action researchers began to record team members talking about places.

During the end-of-week debrief in Deniliquin and the Alps, the teams thought more audio recording of people's associations and impressions at each place would have been good. This is only possible once the team is familiar with using the assessment form and the individuals in the project and assessment teams know and trust each other (which takes time to develop). Recording also requires good conditions – a meeting room would give better quality sound, but lacks the freedom people feel outside.

In the Alps pilot an attempt to review the day over the evening meal failed because people were too distracted by the meal and the 'comings and goings' of café staff.

It was considered that another useful activity would be to establish photo points at each place that could be revisited over time to record trends.

Finding 37

Recording Traditional Owners' observations is an important part of the evaluation process. Selecting the right location for recording these observations influences the quality of the recording.

Fish traps (in centre) near Brewarrina, New South Wales (photo by Josh Smith)

Conclusions

The conclusions are drawn from the findings as distributed throughout the text. They are based on the evidence produced by the research strategy and are validated claims regarding the viability of the Aboriginal Waterways Assessment.

1. Assessment teams from all three places thought that the assessment form and process was a culturally appropriate, safe and strengthening way to assess the health of river and wetland places.
2. The AWA provides accurate, accessible and useful information for caring for Country.
3. Using the AWA is good for social, cultural and physical health and wellbeing.
4. Using the AWA helps build people's confidence in using their knowledge to participate in water planning when there is understanding of Aboriginal science in water planning environments.
5. Communities with limited local knowledge of their Country can make a valid cultural assessment of rivers and wetlands if they have technical support.
6. Depth of local knowledge is desirable in the assessment team but what is essential, is a considered selection of assessment team members with a clear understanding of the purpose of the AWA, to generate commitment to the assessment task.
7. Aboriginal peoples' knowledge of their Country contributes to water planning by providing local knowledge of biodiversity and flow conditions, extended time frames of flow characteristics, and current observations of the local impacts of water policy and regulation.
8. The AWA contributes to Traditional Owners' knowledge of Country by providing an analysis of flow conditions relative to cultural uses, recording the current state of cultural values and uses of Country, contributing to cultural transmission including historical stories, and providing valid and locally owned information for caring for Country.
9. Good outcomes from use of the AWA requires adherence to the MDBA's Aboriginal engagement principles and adequate resourcing and support of communities for 'free, prior and informed consent' throughout the engagement.
10. The pilot program reinforced the importance of support from people with technical and natural resource management expertise. This includes investing time to explain the AWA, building relationships with the community, valuing the expertise of local people, and actively participating in two-way learning to enable the assessment team's self-reliance to emerge.
11. The AWA is a generic process and tool that can be adapted to local conditions as long as the indicators inform cultural, biodiversity and river flow characteristics.
12. Combining qualitative, quantitative and visual and audio information in both the way data is assimilated and presented is important for effective communication and learning about river health.

Jesse James Thorpe-Koumalatsos assessing fish stocks on the Owens River, Oxley, Victoria (photo by Ipshita Mondal, MDBA).

Aboriginal Waterways Assessment tools

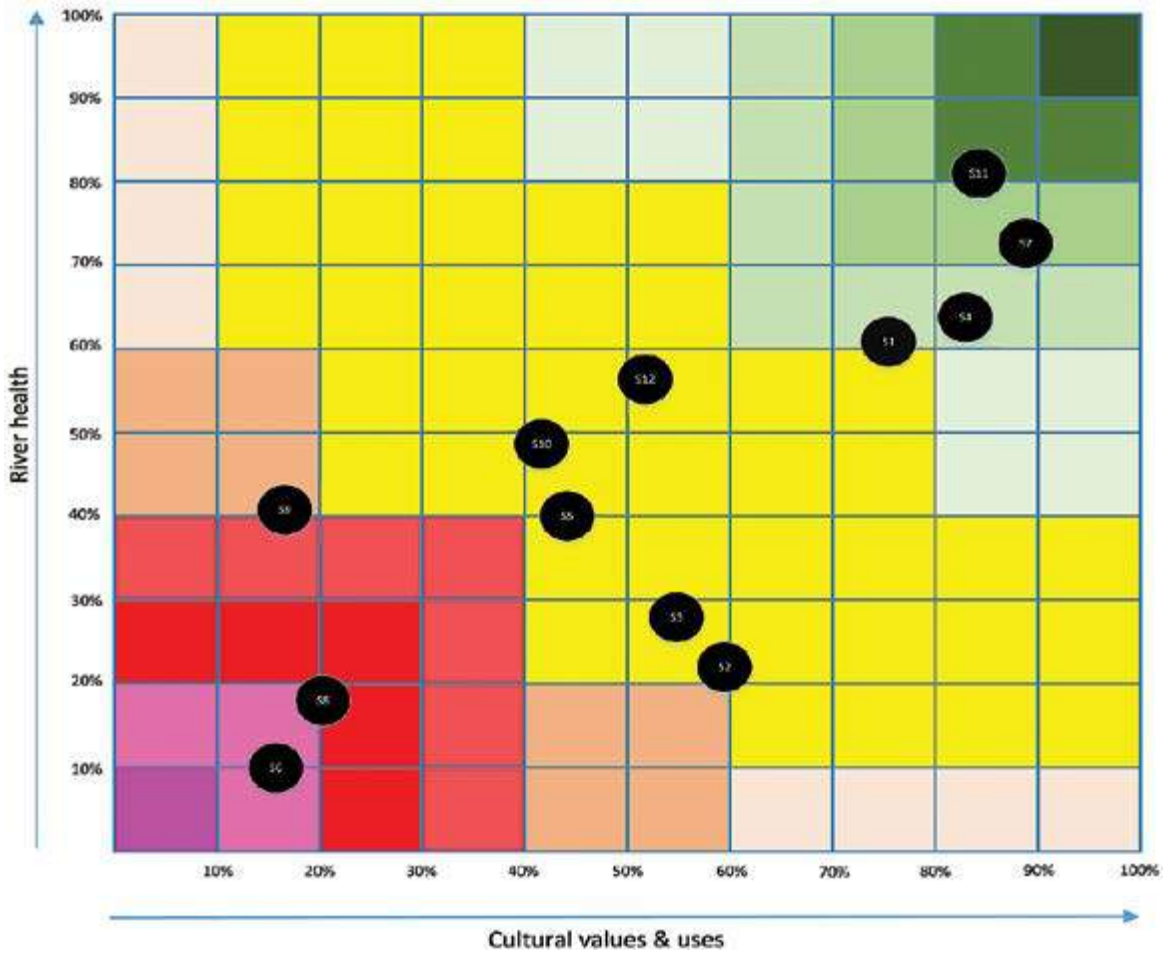
A generic results table

Individual assessments are collated and calculated to produce a results table.

Place identifier	Name of place	Cultural significance	Cultural uses	River health
W1	Elbow Bend – Smith River (Lone Mountain township)	C	39%	32%
W2	Weir – Black Tea Stream	A1	62%	49%
W3	Picnic Point – Smith River (Lone Mountain township)	A1	54%	48%
W4	Smith River – The Old Bridge	A1	53%	37%
W5	Shallow Crossing – Taragalo Creek	A3	41%	37%

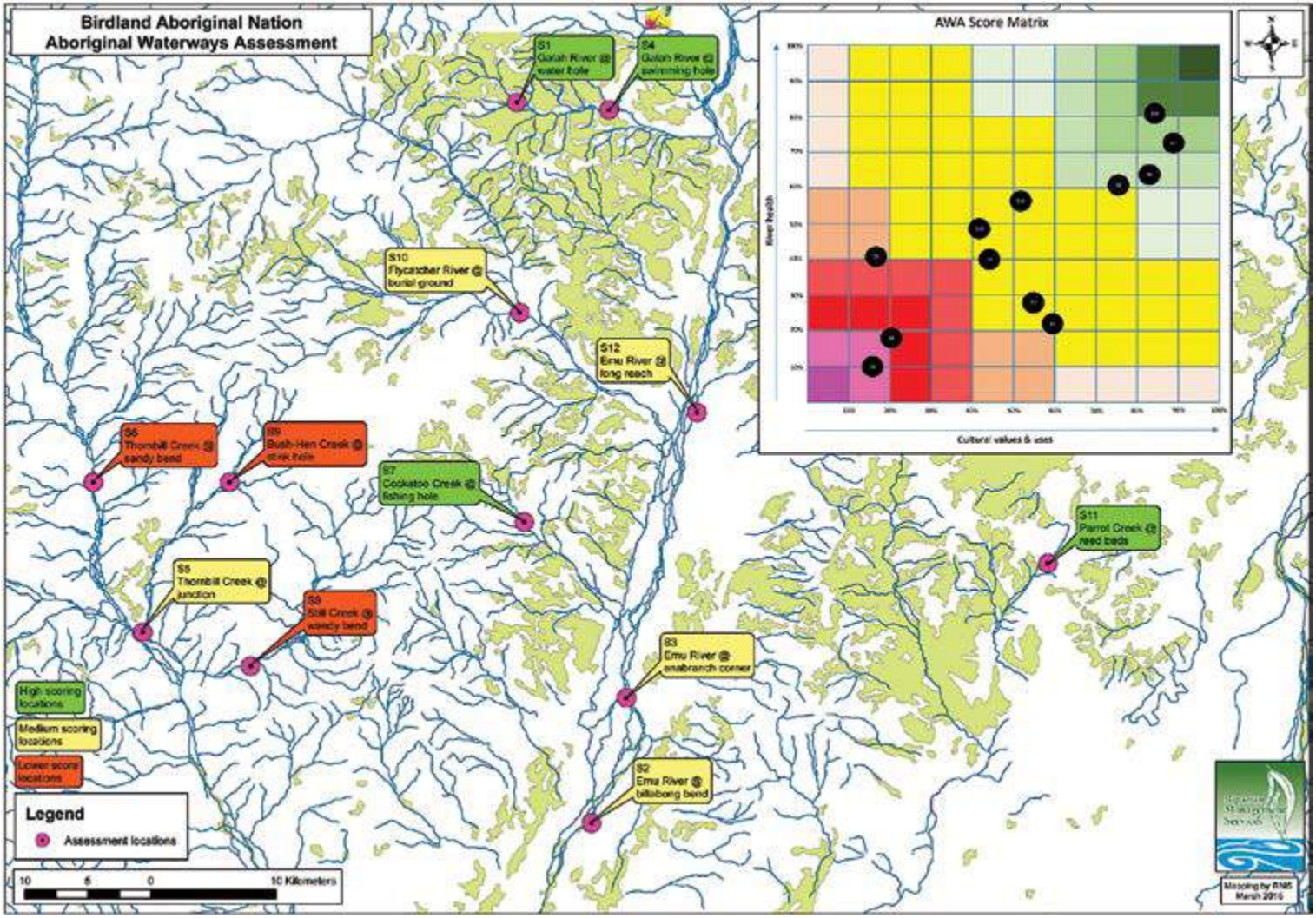
The Aboriginal Waterways Assessment score matrix

The scores from the results table are plotted on the score matrix.

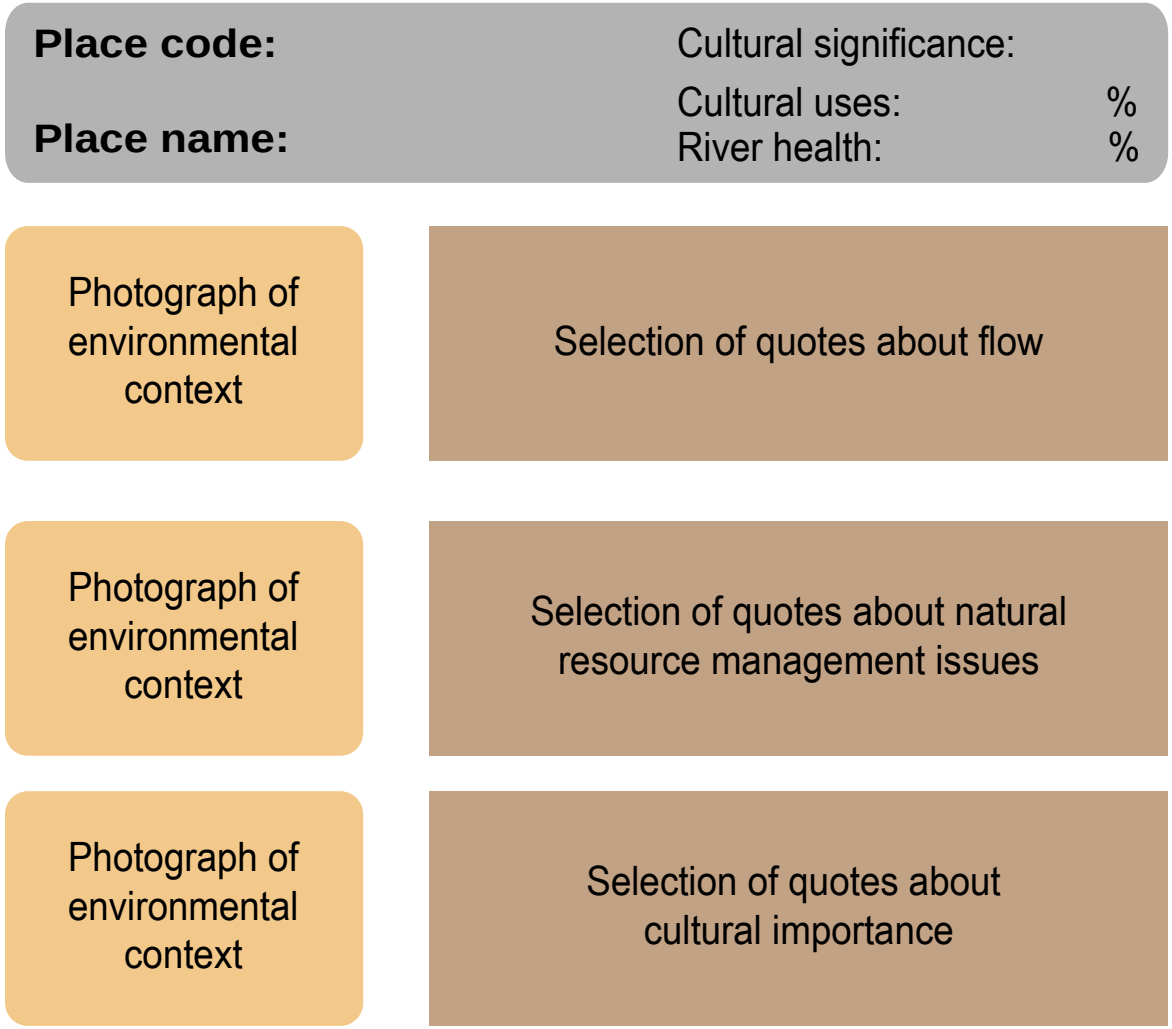


The Aboriginal Waterways Assessment regional map

Each place is mapped and colour coded in-line with the score matrix.



The one page summary



Jenny Ockwell and Tarlina Gardiner at the junction of the King and Ovens rivers, Victoria (photo by Ross Colliver).

Aboriginal Waterways Assessment

Part C — Literature review

by Dr Susan Goff

Literature review (summary)

Assessment and Indigenous knowledge – what do we know from other research?

Forty sources were analysed for the literature review. Aboriginal scholars and practitioners authored 19 in part or in full.

The review begins by accounting for Traditional Owners' customary authority in the Basin to hold and use water assessment knowledge in customary terms. This is followed by a brief description of the difficult regulatory history and context in which this customary authority struggles to be recognised.

The literature leads to a finding that while statutory recognition of Aboriginal rights and expertise in water planning and management in Australia is very recent, there is a clear realisation by regulators and scholars that:

- recognising Traditional Owners' expertise in water is essential to significantly improve water management and planning practices
- there is early work taking place to practically increase recognition, and improve water planning and management for Aboriginal and non-Aboriginal interests.

Authors maintain that for such gains to be realised, Aboriginal participation needs to be culturally safe. At the core of the design and use of assessment tools and practices, cultural safety involves two-way learning so that Aboriginal world-views regarding a systemic approach to flow management within current regulatory and technical frameworks can be understood and safely included in western water planning.

Comparative studies in New Zealand, India and Brunei Darussalam illustrate that, while separated by distance and experiencing very different histories of colonisation, Indigenous knowledge systems in relationship to water management show strong correlations with each other.

These similarities arise from a direct relationship between ecosystem characteristics and peoples' livelihoods. Riverine seasonal flow regimes are included in these relationships in everyday life.

This direct relationship produces a 'heuristic' form of knowledge, which is a different order of knowledge (epistemology) to a technical form of knowledge as used in western water planning and management.

The literature informs us that heuristic knowledge comes about (in the context of Indigenous participation in assessing riverine health) by a person being situated in the environment and using attuned skills of observation over extended time scales. These skills are required to use resources from the ecosystem without extinguishing the capacity of resources to maintain a level of regeneration that will continue to sustain life.

This 'situated science' develops both intuition to know the patterns of how an ecosystem functions, and cultural practices of transmitting this science for maintaining a balance between human and natural viability. Such knowledge is given sacred meaning because of its close association with maintaining life. It is also used in the cultural practices of harvesting and using water-related resources in ceremonial and everyday life.

Indigenous knowledge systems do not separate out elements of an

ecosystem, nor separate an ecosystem from the cultural practices associated with the social and economic life that the ecosystem supports. Additionally, the cultural practices of maintaining and transmitting the knowledge to keep an ecosystem and these cultural practices this way remain within the Indigenous knowledge system that exists within a specific ecosystem.

While existing water planning tools and practices may be unable to understand or include this form of heuristic knowledge, the literature shows that Indigenous knowledge and uses of river systems tend to converge with western technical approaches to ecosystem health.

In this context, assessment tools and processes are more than tools of observation and measurement, they are also 'boundary objects' which enable flows of understanding and co-working arrangements across culturally distinctive boundaries of knowledge.

There is evidence in the literature that strengthening customary culture that is still in direct relationship with ecosystems also benefits ecosystem viability. This has direct relevance to issues such as biodiversity conservation, water quality and food security.

The intention of cultural assessment of rivers and wetlands is to show the direct link between riverine flows and their relationship to Indigenous peoples' ability to live their lives according to their customary and contemporary cultural beliefs, values and practices.

There are many additional benefits associated with Indigenous cultural assessments. These include arresting the further erosion of Indigenous knowledge, and significantly improving non-Indigenous water management and its outcomes for both Indigenous and non-Indigenous peoples' interests. The way knowledge of cultural assessments of rivers and wetlands is used may have either (or both) cultural and ecosystem benefits.

A brief analysis of the literature's account of the development of the concept of cultural assessment of rivers and wetlands is given in the full body of the literature review, recognising its origin with the Traditional Owners of the Murray and lower Darling River systems.

The analysis affirms the imperative that, globally, Indigenous peoples' forms of participation in cultural assessment must be reflective of local cultural beliefs, values and practices, if Indigenous knowledge is to be used in water planning and deliver outcomes for Australian Traditional Owner values and uses of water.

The review then provides an indicative description of a Māori Cultural Health Index strategy in use, in the Kakaunui Catchment of the South Island of New Zealand. It gives an overview of the tool's properties of observation and measurement and the approach used by Māori to deliver the assessment strategy.

The review concludes with a suggestion regarding the use of 'breach of confidentiality' clauses in assessment contracts, to protect the Intellectual Property of collectively-owned Aboriginal knowledges.

The full literature review

Traditional Owners' claim to Country

While the historical intervention into Aboriginal knowledge in the Basin (Yalmambirra, 2006) presents multiple difficulties for co-cultural science and water planning activities, Traditional Owners claim that Aboriginal peoples have an inalienable relationship with their Country. This relationship has existed for millennia prior to the arrival of non-Aboriginal interests in their land, continues throughout their impacts, and for some will survive the consequences of this history.

Currently estimated at around 10,000 individuals on Country and half as many in nearby urban centres, the Yorta Yorta have maintained social, spiritual, economic and cultural links with Country for over 1,600 generation (Griggs et al., undated, p. 1).

The twenty-two Aboriginal corporate submissions to the draft Basin Plan now included in the Aboriginal Submissions Database make these claims with evidence of ownership under customary law of unique Country, landscapes and waterscapes, through Ancestors and Descendent Clans and despite ongoing dispossession (Annuscheit, 2012; Barraparrapara, 2012; Dhudhuroa, 2012; Dja Dja Wurrung, 2012; Gardener, 2012; Kennedy, 2012; Murray, 2012; MLDRIN and NBAN, 2012; Ngarrindjeri Regional Authority, 2012; Nichols & Patten, 2012; Tati Tati Traditional Owners, 2012;Taungurung, 2012; Wamba Wamba Sovereign First Nation, 2012).

This position is given international legal recognition by the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) to which the Australian Commonwealth was a signatory in 2009. It underpins Aboriginal knowledges in the Basin (Weir, 2008) and how they are used in assessment tools for the health and wellbeing of Country.

A brief history of Aboriginal participation in non-Aboriginal water planning and management

Deploying Aboriginal knowledges in water assessment activities is a difficult intention. Non-Aboriginal considerations regarding the management of what is understood as 'natural resources' in general, and water in particular, have recognised Aboriginal presence and Traditional Owners' claims only in the recent past.

Bound into western legal concepts of common law, property and land ownership, it was the landmark of the Mabo Decision (1992), which recognised customary economies and the right of access to resources to practice them (Jackson, 2008; Tan & Jackson, 2013). Mabo provided the ground for Common Law recognition of Native Title (1993).

In the years that followed, state and Commonwealth governments have repeatedly shifted their position resulting in ad hoc, limited and compromised Aboriginal participation in the water sector (Hill & Williams, 2009; Hunt, 2013; Tan & Jackson, 2013; National Water Commission, 2014).

It was not until the Council of Australian Governments Intergovernmental Agreement on a National Water Initiative in 2004 that Aboriginal interests in, and local knowledge of,

water were formally recognised in Commonwealth legislation. Even so, the recognition was only discretionary (Tan & Jackson, 2013).

Hill and Williams (2009) reviewed Aboriginal participation in water through the National Heritage Trust, to find that 'improved Indigenous engagement in natural resource management was urgently required' in order to achieve some parity for Aboriginal socio-economic development (pp. 161–2). The authors went on to note that between 1996–2005 Aboriginal participation was limited to 3% of the Nation's total natural resource management budget, in relationship to 20% recognition of the Aboriginal Estate.

Finn and Jackson (2011) argue for locating Aboriginal harvesting at the centre of water planning and management to overcome the persistence of ad hoc approaches, not only to benefit Aboriginal peoples but also to sustain healthy ecosystems. This approach is also consistent with Māori engagement in natural resource management, where harvesting brings people and nature back into a two-way relationship between people and land, fundamental to a healthy ecosystem and food security (Panelli & Tipa, 2009).

While the matter of recognising and including Aboriginal knowledge in water management activities such as assessment remain at the early stages of development in Australia (Hoverman & Ayre, 2012; Tan et al, 2012), two transforming trends are clear:

- that Aboriginal participation in water management is now expected, not only as a social value but because it significantly improves water management practices and outcomes with regard to flow-ecology relationships (Jackson et al, 2014; Maclean & the Bana Yarralji Bubu Inc, 2015)
- substantial, practical advances in progressing Aboriginal participation in water management activities must be made to improve water management practices and their outcomes. This includes the capacity of outcomes to reflect Traditional Owners' values and uses (Griggs et al, undated; Bark et al, 2015).

Recognising Traditional Owners' expertise in water planning and management

Aboriginal types of knowledge can be distinctive from non-Aboriginal knowledge. This is a matter that requires consideration in the water-planning context:

> *'Can the way in which non-Aboriginal water managers and participating groups tend to categorise values into use and non-use, for example, be amenable to Indigenous world-views and underlying values that see far less division between land and water, do not polarise humans and nature, nor privilege the role of detached, objective scientific knowledge and constructions of nature?' (Jackson, 2008, p. 884).*

The 2014 review of the *Water Act 2007 (Cth)* recommends the use of the 'Akwe: Kon voluntary guidelines' in advising water planners regarding the participation of Aboriginal peoples in water planning. These guidelines originated in Canada, and recommend the recognition and support of

Indigenous and local 'expertise' (Secretariat of the Convention on Biological Diversity, 2004, p. 10–11).

Accordingly, the *Water Act 2007 (Cth)* makes first mention, in reference to Australian laws of 'Aboriginal expertise' with regard to water management. For Aboriginal peoples, as much as this recognition and inclusion is a matter of justice and social equity, it is also primary to the realisation of a healthier people in a healthier Country (Hill & Williams, 2009). Such an intention is congruent with the goals of Australia's 'Closing the Gap' strategy to redress extreme socio-economic disadvantage in Aboriginal population groups (Hunt, 2013; National Water Commission, 2014).

With regard to 'how to know the health of Country', Tipa & Associates (2012) determine that a Māori perspective of a healthy river is one that has all of the components of landscape that are directly linked to a river considered as 'the river'. These include the source and the whole length of the river to the sea, groundwater, wetlands, floodplains, estuaries, and near-shore marine ecosystems (p. 47).

Consistent with Australian literature as illustrated in the Sovereign Nations' responses to the draft Basin Plan, the Basin's Aboriginal Nations promote a conceptualisation of 'river' that includes land, water, biodiversity, culture and people.

Māori understand river in terms of its Indigenous peoples' traditional practices of gathering, harvesting and sharing food throughout seasonal change. The discussion includes pre-colonisation and up to present day practices, and how western government policies and practices are impacting on them.

Ulluwishewa et al (2008) conducted a comparative study between Māori and the Dusun in Brunei, exploring different Indigenous knowledge systems and found that despite distance, there were strong similarities.

The authors identify 'Indigenous knowledge' as being local and being bound to the place where it originated. Even though the study groups had different histories of colonialism, both were described as 'ecosystem people' who rely directly on ecosystems to provide resources for everyday needs.

This relationship includes a sacred appreciation for the value of the ecosystem in sustaining life – an appreciation that is lost in less direct relationships where resources are regarded as 'raw materials' for manufacturing and other processes.

Indigenous peoples who are still living as 'ecosystem people' see themselves as custodians of ecosystems with sacred obligations because of this life-sustaining understanding.

Both Māori and Dusun share three kinds of heuristic knowledge, which is drawn from direct observation and interaction with the ecosystem and also affords intuitive knowledge:

- a knowledge of spatial and seasonal distribution of plant and animal species
- a knowledge of sustainable harvesting so as not to destroy the regenerative balance capabilities of a habitat
- a knowledge of habitat maintenance to restore and keep such a balance.

The authors note that loss of these 'knowledges' can lead to loss of natural resources and create conflict.

In northern Australia, Aboriginal knowledges that are made available to western water planners are locally inherited through storytelling and observation (White, 2010 in Watts, 2012). Kinship systems and governance practices are integrated into these cross-cultural knowledge transmission practices to guide their development.

Unlike Australia's north, the Murray–Darling Basin's Traditional Owners have experienced over two hundred years of the full impact of colonial settlement (Weir, 2009) and the resulting over-extraction of water from the Basin's systems. While Traditional Owners' relationships to Country remain, their customary economy is still active and they actively seek increasing engagement in natural resource management:

> *'These traditional identities have been transformed by the disruption and influence of colonialism, and today an important part of being a contemporary traditional owner involves building on and reviving cultural practices from earlier generations, such as teaching the local traditional languages and the performance of welcome ceremonies (Sutton 1995:47).' (Weir, 2009, p. 183).*

Assessing at Goangra on the Namoi River, New South Wales. In locations where the river is degraded, local knowledge can provide an important baseline.

Two-way learning and doing: safe engagement

Developing culturally-informed and safe, effective tools and practices of Aboriginal water management, in this historical and policy context, turns the focus of engagement towards a clear and mutual understanding of Aboriginal expertise (Aboriginal science) in water planning and management that can be realised by all parties, in practical ways:

> *'Effectively identifying and valuing Indigenous water requirements is of national significance given the imperatives established by current Australian water policy to improve Indigenous access to water and protect Indigenous water cultures and traditions.' (Bark, et al, 2015, p. 3).*

As a comparative study to the Australian case, a project researching the inclusion of cultural values in flow assessments took place in the upper Ganga River, India (Lokgariwar, Ravi Chopra, Smakhtin, Bharatic and O'Keeffe, 2014).

The team found that ecological and cultural needs are similar wherever a people is still in direct socio-economic relationship with their ecosystems. With regard to two-way learning and doing, Lokgariwar et al found that integrating community requirements for rivers in assessment processes can produce a common language for government planners and peoples' local interests.

Ross and Ward (2009) discuss Use and Occupancy Mapping, a tool for identifying both traditional and contemporary cultural uses of landscape originating with Canadian Aboriginal peoples. The authors promote the need for Aboriginal participation in assessment strategies.

Consistent with the need for two-way learning, Aboriginal participation in assessment promotes cross-cultural understanding of the meaning of cultural values in both specific locations as well as at regional scales.

Tan et al (2012) also promote tools that provide two-way communication in the context of deliberation and to some extent with regard to Aboriginal and western sciences. They recommend visits to Country and holding community workshops as being the most effective way of including Aboriginal participation in decision-making.

Hoverman and Ayre (2012) describe how Australia's first formal freshwater planning allocation in the Tiwi Islands were acknowledged as Aboriginal lands by the Australian Government. The authors note how the project involved mutual learning from planners and participants as 'institutional buy-in for approaches that are unfamiliar to western planning has to happen throughout to avoid hurdles within financial, corporate or legal sectors (p. 55).' The project used an internal working party to enable this institution-level learning to take place.

Jackson et al (2012) also recommend Aboriginal engagement throughout a water assessment strategy. They value informal conversation as it allows for 'inclusiveness, scope and ways in which sensitive information' can be managed (p. 60). The Yorta Yorta Aboriginal Corporation (2010) identifies and describes critical success factors that make two-way learning possible in natural resource management.

Indigenous peoples' engagement in diagnosing flows

Accepting an understanding that mainstream approaches to water

assessment are not 'indigenous' to Australia, the literature is sparse with regard to Indigenous water knowledge and its explication through diagnostic tools.

Commentators observe that while there may be differences between Indigenous and western forms of assessment, such as assessing water to be potable depending on contaminate load as compared to its spiritual pollution, western and Aboriginal sciences regarding Indigenous cultural uses and ecosystem health largely converge (Tipa & Teirney, 2006; Watts, 2012).

A key issue of contention is the inability of non-Indigenous natural resource sciences and their related policy environments to see Country as an integrated set of systems on multiple levels of dimensions including, people, water and culture (Guilfoyle et al, 2009).

Jackson et al (2015) advise that considerations must be given to a 'systems' view of flow regimes, consistent with Aboriginal world-views. For example:

- the interactions between extended time frames
- a broad range of locations for observations to allow for a systemic understanding
- a considered use of local Aboriginal knowledge with western sciences
- sustained dialogue and negotiation regarding scientific inquiry.

Maclean and the Banna Yarralji Bub (2015) promote the use of 'boundary objects' – artefacts that are developed at the meeting places of two culturally distinctive ways of seeing the world and working. Their argument is that products such as a report (or in the case of this project, a diagnostic tool) that is framed as a boundary object can do the work of translating Aboriginal knowledge, values and management interests to maintain cultural integrity in non-Indigenous planning environments.

In most cases these settings continue to omit spiritual, social and customary objectives, even when Aboriginal peoples provide planners with the information to do so (p. 143). The authors note that other benefits of using boundary objects include recording Aboriginal cultural knowledge for Aboriginal peoples' benefit.

Participants using Indigenous approaches to natural resource management cannot lose sight of the realities of history, and the policy and legislative environments in which their assessments are taking place (Ross and Ward, 2009).

Hunt (2013) reviews Aboriginal participation in government and business activities in consideration of policy, history and relationship with Country and recommends:

- an appreciation of, and the cultural competency to respond to, Indigenous history, cultures and contemporary social dynamics, and the diversity of Indigenous communities: valuing the cultural skills and knowledge of community organisations and Indigenous people
- clarity about the purpose and the relevant scale for engagement, which may call for multi-layered processes: engagement needs to relate to Indigenous concepts of wellbeing
- long-term relationships of trust, respect and honesty as well as accessible, ongoing communication and information
- effective governance and capacity within both the Indigenous community and governments themselves

- appropriate time frames (including for deliberation and responsive funding, where applicable) (p. 2).

Hoverman and Ayre (2012) found that Aboriginal participation in all aspects of the planning activity, including the development of tools, was essential in securing planning outcomes that reflected Aboriginal uses and values of water. A three-stage process was used to:

- determine appropriate working arrangements
- reach agreement about engagement approaches and goals of the strategy
- pilot selected tools.

The only Basin-situated source of Aboriginal authored advice regarding engagement, other than that which is held in the MDBA's Aboriginal Submissions Database, is the Yorta Yorta Nation's critical success factors with regard to joint management of land (Yorta Yorta Nation Aboriginal Corporation, 2010).

This report is concerned with Yorta Yorta Country. The authors recommend the use of 'free, prior and informed consent' as described in the United Nations Declaration on the Rights of Indigenous Peoples.

They also recognise that for authentic partnerships in land management to occur, government and business needs to: be culturally informed; recognise the infrastructures that are already in existence in Aboriginal governance settings; ensure that there is adequate resourcing in projects for regular meetings; do health checks of the partnerships; have the ability to learn about and use two-way knowing and ways of working together (pp. 10–1).

Consistent with Guilfoyle et al (2009), the authors also require government projects to see Yorta Yorta Country as a whole interdependent set of relationships between land, water, natural resources, culture and people.

Cultural flows: participation as well as Indigenous knowledge systems

Most of the literature understands the term 'cultural flows' through a cultural anthropology frame – a study of the ways in which cultures cross national borders in the contexts of globalisation, internet communications or population movements, for example. This meaning has relevance to the way the research strategy was conducted, with international Indigenous collaboration between New Zealand and Australia, but at this point in time, this meaning of the term 'cultural flows' is not what is meant by Traditional Owners in the Basin.

Lokgariwar et al (2014), with reference to the Ganga River research, describe how over thousands of years people develop rituals and practices that are related to a river's flow, which in turn are reflected in lore. Failure to consider these matters in flow assessments threatens the cultural identities of whole communities, causes the loss of traditional knowledge and alienates large sections of communities with interests in water.

Cultural flow assessment therefore requires planners to understand a river system from the perspectives of those who live on the rivers, so that competing uses can be addressed at the local level. To enable this perspective to happen the project developed a natural flow model as a baseline with which to evaluate cultural flow requirements.

Tipa and Associates (2012) give a

history of the development of cultural flows as a concept, discussing how they are not to be confused with, or replaced by, the global discussions regarding environmental flows (p. 41). The authors state that the practices of managing environmental flows impose non-Indigenous conceptualisations of natural resource management on Indigenous peoples, their lands and their knowledge.

Morgan (2004, cited in Tipa & Associates, 2012) attributes an initial definition of flows with a cultural assertion at its centre, and that this concept originated with 'the Indigenous Nations of the Murray' (p. 39). Tipa's reports on assessing cultural flows through a Cultural Health Index are at pains to account for the cultural assertions at their centre, enabling distinctive tribal conceptualisations of water that in her examples, Māori hold. Inappropriate approaches to water management risk losing such cultural strengths.

The authors also assert that participation in cultural flow assessment was driven by three 'imperatives':

- participation approaches had to be grounded in cultural beliefs, values and practices
- the process had to explicitly enable the examination of flow related issues and the identification of satisfactory flows as perceived by Māori in reference to their range of cultural interests
- the process had to be culturally safe and also defensible given the contentiousness of setting environmental flows (Tipa & Associates, 2012, p. 5).

With regard to Traditional Owner authors within the Basin, the Yarkuwa board recently built on the definition of cultural flows that was created by MLDRIN and endorsed by NBAN to incorporate participation and also Traditional Owner perspectives of Country:

> *'cultural flows' are water entitlements that are legally and beneficially owned by the Indigenous Nations of a sufficient and adequate quantity and quality to improve spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations;*
>
> *cultural flows involve the full and meaningful participation of Indigenous Nations, using 'free, prior and informed consent' processes in all water management, including, but not limited to, environmental flows and cultural water licenses.'*

At the same meeting, the Yarkuwa board also developed principles to give greater context to their definition of cultural flows. These principles are:

- Country as a meaningful framework for water
- Indigenous Nations as an essential part of cultural flows
- recognition of Indigenous ecological knowledge as science
- capacity building as central to Indigenous Nations' full and meaningful participation (Weir, Ross, Crew & Crew, 2013, p. 17).

A Cultural Health Index

A Cultural Health Index is a diagnostic tool that provides the means for Indigenous peoples to communicate with mainstream water management in a practical and comprehensive way (Ministry for the Environment, 2006, p. 2).

Originating in New Zealand and created by Māori scientists working with their tribal communities, the tool provides Indigenous peoples with a culturally informed and safe way to take an active role in assessing the overall health of their rivers and their biology. It

provides a means for mainstream water planners to engage with Indigenous water values and perspectives so that such values and perspectives may be included in water management decisions. As well as assessing current river health, an Index can be used to monitor river health over time.

The Cultural Health Index that was developed in New Zealand by Tipa et al, is made up of three components:

- site status in terms of its cultural status and cultural use
- an account of indigenous animals and plants at a site with particular reference to those natural resources that contribute to the cultural economy of the Traditional Owners of the site
- an assessment of stream health which includes catchment land use, riparian vegetation, riverbed condition and sedimentation, channel modification, flow and habitat variety (pools, runs and rapids), water clarity and water quality (Ministry of Environment, 2006, p. 4).

Each indicator has a set of measures, which are completed by Māori whose tribal connections are situated at specific river reaches, as selected by them. The scores are then added to give a reading of site status, biodiversity measure and stream health measure.

Using the Māori cultural health assessment form involves a sustained strategic approach so that participation and use of Indigenous knowledge systems take place in a manner that is congruent with a local community's cultural values. This approach is described in the case of the Kakaunui Catchment of the South Island of New Zealand. For example:

- initiating the project to identify the body representing tribal leaders and their authority
- documenting the community's association with the river system to identify the multiple dimensions that collectively represent cultural association with the river system
- incorporating cultural opportunity mapping: identifying cultural values in specific locations – and the opportunities that hydrological characteristics offer for practicing culture
- carrying out cultural opportunity assessments – to assess if environmental flows sustain cultural values and provide the opportunities sought
- focusing the investigation to critically review the data on environmental flows and their effects on waterways
- involving analysis to inform decision-making regarding flow thresholds, flow related issues and management priorities (Tipa & Nelson, 2012, drawn from Table 3, p. 663).

An index identifies specific hydrological issues such as sedimentation; damage to cultural places that flow issues may be causing; timing of floods, flushes, and low flows; and mapping of river characteristics such as springs, tributaries and wetlands including seasonal variations.

However, an index also maps historical information associated with these characteristics, including 'flow-related triggers' for ranges of species in the location.

This information is presented in reference to cultural practices such a food gathering of key food species. As well as informing flow-related decisions, this use of Indigenous knowledge also

contributes to other aspects of natural resource management such as restoration activities.

The knowledge generated through the use of a Cultural Health Index is a key interest to tribal leaders with regard to the cultural life of their communities. For the Kakaunui case, six places were assessed on a weekly basis for six months resulting in 18 assessments for each site.

'The analyses are intended to progress beyond descriptions of how Indigenous communities attribute meaning to water… to an understanding of how river flows affect these meanings and associations' (p. 669). In this way, and as the authors note, consistent with Weir (2009) Indigenous communities have hydrological knowledge that has broad value to both cultures.

Intellectual property protection

A final observation necessary in this literature review is the matter of respecting and protecting Indigenous knowledge when it is made explicit through such tools as a Cultural Health Index, and available to parties other than those who own the knowledge.

Guilfoyle et al (2009) note this issue, and recommend the inclusion of 'breach of confidence' clauses in any contracted information regarding Indigenous cultural knowledge and natural resource management. Breach of confidence has to do with transgressing agreements regarding confidential information, information given in confidence, and further unauthorised use of information (p. 155).

The authors recognise the collective ownership of Aboriginal knowledge and how this characteristic was not, at the time of writing the paper, protected in copyright law. The breech of confidence clause is a step towards this protection and, as the authors suggest, is reflective of customary obligations to control heritage and knowledge (p. 156).

River red gums enjoying a drink, near the Darling (Barka) river (photo by Denise Fowler, MDBA).

Good practice — how the research project reflects the literature

As noted in the literature review the interest in including Aboriginal knowledge in assessing environmental and cultural values in a practical manner is a relatively new one. The Aboriginal Waterways Assessment research strategy has much to offer with regard to contributing to this important new field.

The following table identifies where the activities taking place in both the research approach and the assessment activities reflects current good practice in this area as discussed in the literature exemplified by selected quotations.

Activity	Good practice	References in the literature
Involving Aboriginal people in negotiating their Country's water needs	Credible, viable and valid knowledge of how to address indigenous water requirements contribute to the technical ability of specifying volumes, contributing to Aboriginal and government agency capacity, and better policy to resolve competing interests	Tan & Jackson, 2013 – Indigenous initiation and control of planning are key to sharing equitable intercultural space for ongoing negotiation of co-management (p. 148)
Developing an approach that accesses international Aboriginal Knowledge	Re-conceptualising water to comprehensively respond to over extraction and pollution of fresh water by recognising the value of Aboriginal knowledge systems in natural resource management and water in particular	Tipa, Panelli & the Moeraki Stream Team 2009 – As Castree 2004 argues, Indigenous groups can mobilise local and global connections afforded via indigenism to pursue 'situational pragmatism' associated with 'place projects' as they seek to redress past dispossessions and pursue diverse 'property' claims (p. 97) Somerville 2014 – Rethinking ways of researching water knowledges, different practices of language and representation, and recognition of the possibilities of radically different epistemologies (p. 410)

Activity	Good practice	References in the literature
Use of Action Research in Aboriginal policy and research arenas	Action Research enables the principles of 'free, prior and informed consent' to be attained in two-way learning which generates trust, respect and localised good practice	Hunt, 2013 – Other studies of Participatory Action Research with Indigenous people indicate how free, prior and informed consent can be attained in a context of mutual learning, where researchers and Indigenous people bring their different world views and knowledge systems to the research endeavour, enabling effective engagement (Claudie et al. 2012; Cleary 2012) (p. 22)
Providing capacity building to support local communities to make cultural assessments of rivers and wetlands through two-way and informal learning	All team members and participants use formal and informal reflective processes of learning to build capacity across cultures to carry out the assessment	Tipa, Panelli & the Moeraki Stream Team 2009 – The team started with a workshop session at the marae to discuss different conceptualisations of well-being. This was followed by a reflective session where the team discussed the practical organisation of the fieldwork component of our Cultural Health Index assessments (p. 101)
Recognising the value of Aboriginal knowledge in water planning and management	Traditional Owner participation in water management and planning is organised to enable participants' contributions to ecological knowledge and complement non-Aboriginal sciences	Somerville 2014 – Fifteen academics from different disciplines and locations around the world draw on the concept of the Anthropocene… They provide substantial evidence of the significance of local ecological knowledge expressed as stories, ceremonies, and discourses that potentially enable humans to live in balance with the environment without the need for catastrophic learning in the event of major resource depletion (p. 403)

Activity	Good practice	References in the literature
An assessment process and form that is able to be adapted to local conditions	The Aboriginal Waterways Assessment is designed to adapt to local knowledge and capacity to participate. As long as the three elements of cultural value, biodiversity status and riverine flow are maintained, along with on site observation and assessment by Traditional Owners, the Indicator questions can be modified	Maclean et al 2015 – Notably, the research shows that a boundary object [such as the AWA] can provoke new boundary work, facilitate new negotiations and knowledge partnerships and thus result in the creation of new boundary objects (p. 151)
Including cultural, biodiversity and riverine flow assessments in the one assessment tool and approach	An assessment tool and process that integrates social (cultural) and environmental values better incorporates Aboriginal world views to produce better quality water planning and management	Jackson et al 2012 – Water resource assessments for plans will need to significantly increase the attention given to sociological factors in their environmental flow assessment techniques (p. 63)
Ensuring that the results remain exclusively with the Traditional Owners who created them and ensuring Intellectual Property stays with Traditional Owners	Returning the synthesised results for ownership, local interpretation and use in Traditional Owners' ongoing engagement in water management	Maclean et al 2015 – The ramification is that a boundary object created with a focus upon one aspect of natural resource management (water), may be used by the Indigenous co-researchers as a tool to facilitate boundary work – knowledge translation, network development, knowledge partnerships – for improved natural resource management in general. In addition, Indigenous co-researchers may use the boundary object to advise non-aboriginal planners on how best to engage with Indigenous groups from other regions for improved water planning (p.151)
The assessment tool and process strengthens culture	The Aboriginal Waterways Assessment strengthens cultural transmission, arrests ongoing erosion of local knowledge, builds connection to culture, and Country, and is good for health and wellbeing	National Water Commission 2013 – It is recognised that the provision of cultural flows will benefit Indigenous people in improving socio-economic health, wellbeing and empowerment to be able to care for their country and undertake cultural activities (p.8)

Activity	Good practice	References in the literature
Participation in rigorous cultural assessment of rivers and wetlands adds to capacity and confidence in intra- and cross-cultural participation in water planning and management	Having a systematic basis for observing and measuring rivers and wetlands, supported by GIS mapping and two-way learning enhances engagement in water planning for all concerned	Griggs et al (undated) – The fact that the Indigenous knowledge in the GIS database has been created by and is owned by the Yorta Yorta means that they have something of value to bring to policy and regional management discussions, so that they are able to participate in those discussions on equal terms. Also, the increased knowledge and capacity developed within the community now means that they are much better informed and confident in those discussions. This is valued both by the Yorta Yorta and the Victorian Government equally, the latter now feeling they are able to have a more informed dialogue about shared management of natural resources (p.10)
Making assessments on site	The Aboriginal Waterways Assessment requires Traditional Owners making assessments in direct observation of places; place visits to carry these assessments out can include water planners to enable comprehensive understanding of local water values and uses	Hoverman et al 2012 – Visits to Country therefore promoted relationship building and mutual learning. This mutual engagement helped the parties identify and record water sites of value; assess, confirm or select new places for water monitoring; examine the condition of water monitoring infrastructure, and undertake water sampling. As a direct outcome of the visits to Country, we recorded Tiwi knowledge and perspectives on water resources and, along with the Water Planner, learned about Tiwi water values and management objectives (p. 52)

Mark Gardiner (Waywurru) assessing Reedy Creek, Victoria (photo by Ipshita Mondal, MDBA).

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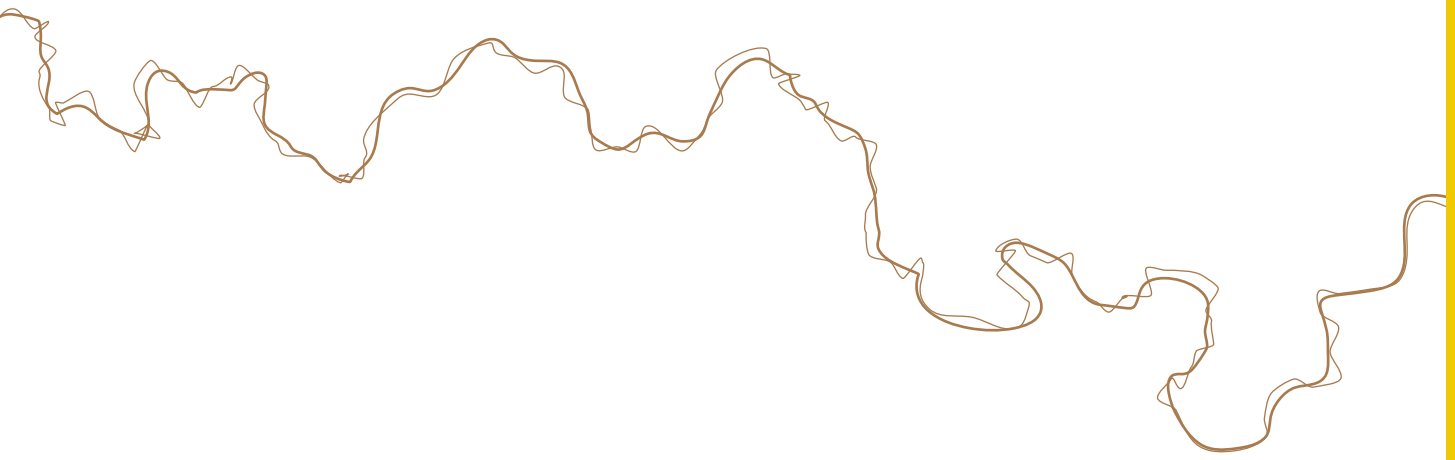
‘Our vision is to increase our knowledge and respect of Aboriginal values, which will help strengthen our connections with the Traditional Owners of the Murray–Darling Basin. We believe the health of the Basin will benefit from meaningful partnerships with Traditional Owners.’

MDBA Strengthening Connections Reconciliation Action Plan 2015–18



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Front cover image: Rick James, Tarlina Gardiner and Craig Terrick (Waywurru) at the junction of the Ovens and King rivers, Victoria (photo by Ipshita Mondal, MDBA).

Back cover image: Wemba Wemba and Barapa Barapa assessment team at Werai Forest, Edward River, New South Wales (photo by Ross Colliver, CultureShift).

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