



# An Indigenous-Led Approach for Regional Knowledge Partnerships in the Kimberley Region of Australia

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## Abstract

Scientists, Indigenous peoples, and local communities are increasingly seeking to combine their expertise to support sustainable management of social-ecological systems for diverse values, from local to global scales. In this paper we present an Indigenous-led approach to enable multiple evidence-based research, monitoring, and evaluation of the health of ‘Saltwater Country.’ This highlights the need to ensure knowledge can be shared, used, and co-developed to care for coastal and marine social-ecological systems within and across the Kimberley region of north-western Australia in an ethical and equitable manner. Structured yet fluid knowledge networks need to be negotiated and supported to enable Indigenous communities to implement this approach, which also requires coordinated institutional support and resourcing to produce useable knowledge that is easily translated into programs of action. We here present a process for regional-scale collaboration between Indigenous and local knowledge systems, western science, and other knowledge systems for the purpose of collaborative natural and cultural resource management and sustainable Indigenous futures.

**Keywords** Indigenous peoples · Research ethics · Local knowledge systems · Regional collaboration · Kimberley · Australia

## Introduction

Western scientists have developed a range of frameworks to enable multiple sources of evidence to be shared and woven to collaboratively design strategies for sustainability and conservation. At the same time there is growing evidence that Indigenous estates, knowledge systems, and ethics of care provide considerable insight and hope for sustaining social-ecological systems. Indigenous peoples’ in situ knowledge practices and beliefs have the potential to make significant contributions to meeting contemporary sustainability challenges

locally and globally (Brondizio and Le Tourneau 2016; Clark *et al.* 2016; Mistry and Berardi 2016; Parsons *et al.* 2016; Miard *et al.* 2017; Sousa and Luz 2018). Yet Indigenous peoples’ knowledge contributions, human rights, and claims to traditional estates are often violated or simply overlooked in collaborative practice (Johnson *et al.* 2016; Kealiikanakaoleohaililani and Giardina 2016; Murray and Burrows 2017). Part of the problem is that there are few Indigenous-led frameworks to guide the generation and sharing of knowledge from multiple sources of evidence. This prevailing bias risks missing important opportunities for Indigenous people to mobilise their knowledge to safeguard their rights and contribute to co-designing solutions (Sutherland *et al.* 2014; Folke *et al.* 2016).

Local knowledge systems are diverse and highly adaptive as they are constantly reassessed to meet the needs of the changing contexts in which they are implemented. They are constructed and revised in response to interactions of local knowledge holders and their immediate social, cultural, and environmental contexts (Athayde *et al.* 2017; Harrison *et al.* 2018). Though differing in this respect from the slower pace of western science’s knowledge production, verification, and validation processes, the focus of local knowledge on current, often frequently changing circumstances offers significant potential for connecting western science with local contexts, as well as producing highly innovative and applied sustainability

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solutions that can achieve timely impacts (Johnson *et al.* 2016; Kealiikanakaoleohaililani and Giardina 2016).

In this paper we present the results of a two year Indigenous-led project to design a new approach to integrating Indigenous knowledge and western science to support decision-making, policy development, research and management of the Kimberley region in north-western Australia. In an effort to weave different knowledge systems across the region yet maintain linkages to both local and global communities, we build on the multiple evidence-based approach developed by Tengö *et al.* (2014, 2017). In addition, we highlight unique aspects to Indigenous-led approaches including the ethics that drive knowledge care, sharing, and use and the ways in which Indigenous-led approaches can be linked to national, regional, and global frameworks for integrating knowledge systems. Our research suggests that these processes must always be bottom-up, locally driven, and adapted to specific social-ecological systems and local cultural contexts.

## Indigenous Knowledge Systems and Multiple Evidence Based Approaches

Approaches that link scientists and local Indigenous Australian communities in partnership for sustainable social-ecological systems do exist (e.g., Horstman and Wightman 2001; Gratani *et al.* 2011; Prober *et al.* 2011; Robinson and Wallington 2012; Bohensky *et al.* 2013; Holmes and Jampijinpa 2013; Walsh *et al.* 2013; Ens *et al.* 2015; Robinson *et al.* 2016). However, there are few examples of regional approaches to ‘knowledge partnerships.’ Subjectivities related to context, aspirations, and the answers being sought determine each process. This is problematic in that it limits the extent to which such approaches can influence change in western science-based knowledge institutions. A possible solution, proposed by Coombes *et al.* (2014) and Kealiikanakaoleohaililani and Giardina (2016), is to develop collaborative research ethics and approaches that are Indigenous-led and inclusive of the people-places known to Indigenous Australians as ‘Country.’

Internationally, the Multiple Evidence Base (MEB) approach has had considerable impact through global biodiversity and ecosystem service assessments and regional conservation processes. Tengö *et al.* (2014, 2017) argue for this approach for its potential to work with diverse knowledge systems to produce an enriched picture of any given phenomenon. It encompasses the notion of ‘science *and* other knowledges’ building more comprehensive knowledge bases than can be achieved by any one knowledge system alone. The MEB approach is helpful for guiding transdisciplinary processes which require knowledge that is legitimate, credible, and salient, as well as usable for moving towards sustainability (Clark *et al.* 2016). It is being used in pilot projects around

the world (e.g., Ali 2016; Daguitan *et al.* 2016; Mburu 2016; Trakansuphakon and Research Team in Hin Lad Nai community 2016) and has helped frame the work of the Intergovernmental Panel for Biodiversity and Ecosystem Services (IPBES) (Tengö *et al.* 2017). In a practical sense, the MEB approach allows for accurate, efficient identification of gaps in the knowledge base and opportunities for collaborative research engagements.

However, the MEB was developed with an aim of bringing Indigenous and local knowledges into global (and associated national) science-policy processes (e.g., IPBES, CBD (Tengö *et al.* 2017)). The result has been a framing that recognises and promotes bottom-up processes to inform national and global process although provides limited insight into practical mechanisms. This presents a risk that the MEB, although implemented with good intentions may produce problematic outcomes as local knowledge and beliefs are scaled up using science-policy processes. Some of the possible consequences are that:

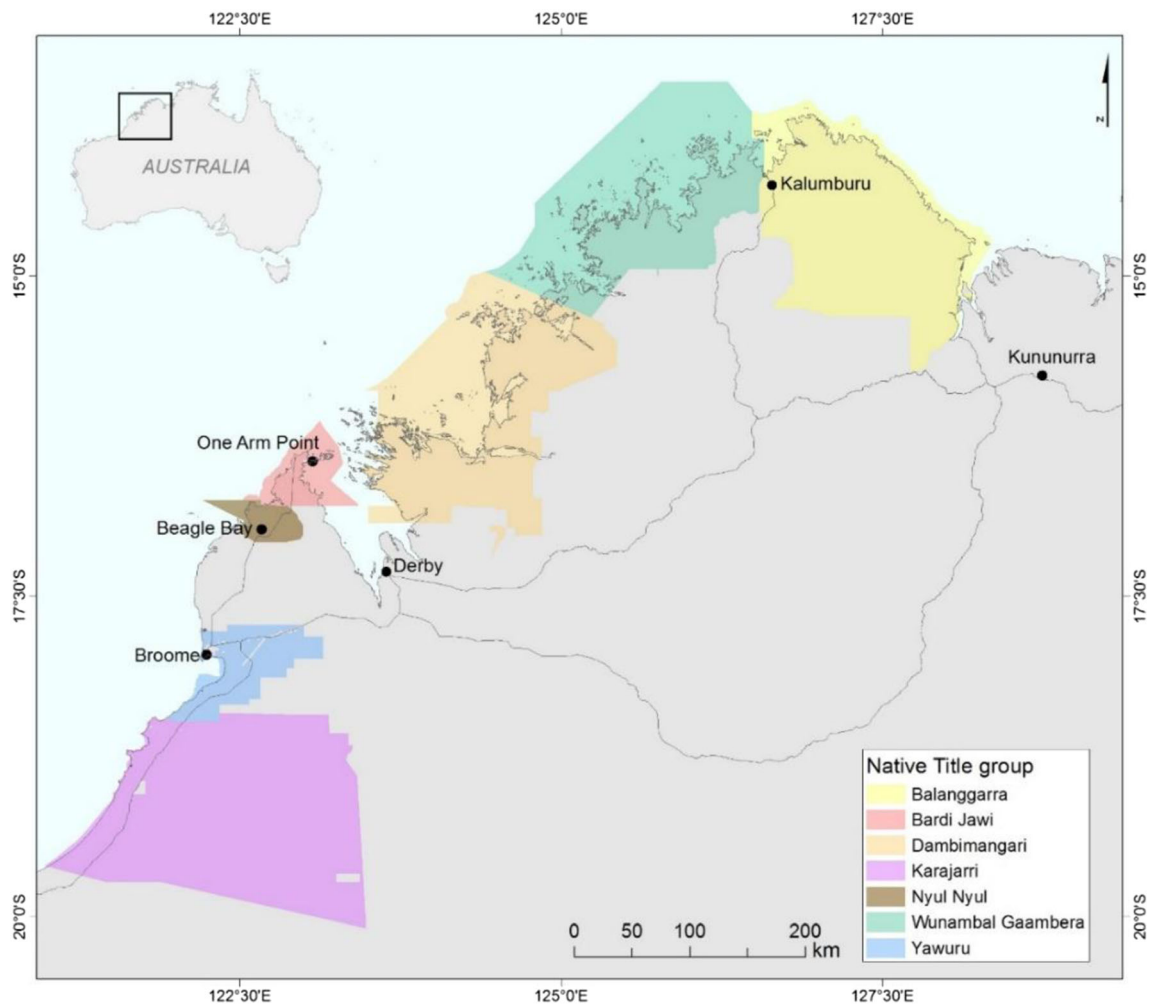
1. Knowledge/information becomes disconnected from place and context, rendering it illegitimate from a local perspective.
2. The types of non-scientific knowledge seen as permissible may be limited through the need to demonstrate validity.
3. Indigenous peoples and local communities are presented as a diverse though homogenous group by employing concepts of ‘pan-indigeneity’ or ‘pan-local community’ as key categories of engagement. This error in application may create misalignment between those who own, control, and benefit from the sharing of knowledge/information.

These problems are avoidable if more effort is taken to ensure that global science-policy processes are supported to engage with Indigenous peoples and local communities (IPLCs) in ethical and equitable ways that promote Indigenous and local knowledge systems (ILK) as useable for the task of informing sustainability and conservation policy.

## Research Context

The Kimberley is a large region of tropical savanna, coastal, island, and marine ecosystems in the northwest of Australia (Map 1). It is globally significant for its biodiversity (some unique), relatively intact ecosystems, and aesthetic and recreational values (Brown *et al.* 2016). The Kimberley coast is among only 4% of marine ecosystems in the world to have experienced ‘very low impact’ from humans (Halpern *et al.* 2008), and is an important refuge for many threatened species (Vigilante *et al.* 2013).

Local Indigenous people (almost 50% of the region’s population) are connected to the Kimberley social-cultural-ecological



**Map 1** Traditional Owner Groups that participated in the Kimberley Indigenous Saltwater Science Project

landscape through intertwined dualities of people and place that are both ancient and central to contemporary Indigenous Australian worldviews (Rose 1999). They are caretakers of a diverse cultural landscape dating back at least 80,000 years, their ancestors being some of the first humans to arrive on the Australian continent (Mulvaney and Kamminga 1999).

At present, Indigenous people have formed partnerships with the Western Australian Government to establish six joint managed marine protected areas covering ~3.26 million hectares: North Kimberley Marine Park (1,845,000 ha), North Lalang-garram Marine Park (110,000 ha), Lalang-garram/Camden Sound Marine Park (673,000 ha), Lalang-garram/Horizontal Falls Marine Park (353,000 ha), Yawuru Nagulagun/Roebuck Bay Marine Park (78,800 ha), and the Eighty Mile Beach Marine Park (200,000 ha). Supporting the growth of local Indigenous livelihoods (such as fishing [subsistence and commercial], tourism, natural resource management, research, etc.) across the Kimberley coastline will be crucial to ensuring that these marine protected areas have the capacity to function effectively (Allison *et al.* 2012). Further,

subsistence harvesting of coastal and marine resources will continue to be a significant contribution to the livelihoods and wellbeing of Traditional Owners.

## Methods

The Kimberley Indigenous Saltwater Science Project (KISSP) was initiated in response to the implementation of a large, externally-driven research project that sought to engage Indigenous people of the Kimberley in producing scientific impact. However, after a ‘not unexpected’ period of difficulty engaging Traditional Owners in the project (2012–2016), a forward thinking group of local Indigenous leaders exercised their authority and brought together an Indigenous-led Working Group to govern, implement, and assess the KISSP. The Working Group consisted of two representatives from each of the seven participating Indigenous Traditional Owner groups (the Balangarra, Bardi Jawi, Dambimangari, Karajarri, Nyul

Nyul, Wunambal Gaambera, and Yawuru peoples) and key staff from local Indigenous organisations. The 14 Working Group members collectively identified research that was of highest priority for the collaborative management of Kimberley Saltwater Country, identified a research approach, and recruited a team of trusted researchers with whom they had experience of working with on numerous projects in the region.

One such priority was the development of a way to link local knowledge systems into a regional approach to share and weave Indigenous knowledge and western science for collaborative management of the area's natural and cultural resources. Subsequently, to facilitate the design of an Indigenous-led framework to guide multiple-evidence based planning for their region, the Working Group and co-authors of this paper collaboratively outlined an approach that included: 'On-Country' research activities; an online survey of scientists; and several targeted dialogue workshops. These collaborative research activities took place between May 2015–November 2017 and are discussed in more detail below.

### Research on-Country

The seven Indigenous groups were funded to work with their local Indigenous rangers, the Working Group, and the hand picked researchers to co-design research activities. Through this process it was decided that there would be five participatory workshops<sup>1</sup> conducted on the Country of each of the Traditional Owners, while the Wunambal Gaambera people felt confident that there had been wide consultation on this topic previously and they could rely on the representation of key Knowledge Holders through a series of interviews. Local organisers of the research activities on-Country were responsible for identifying who the *right people* were to participate in the workshops, which mostly included Traditional Owners, Indigenous rangers and staff from local Indigenous organisations. In total there were 103 Indigenous participants in five On-Country workshops and one Knowledge Holder interview ( $n = 16$ ). The activities were held mostly in community meeting places, although some of the interviewees identified their homes or other public places as more suitable. The autonomy of the local Indigenous groups to decide appropriate methods for engagement was secured through the transfer of funds to facilitate the meetings with flexibility and trust.

Both the workshops and interviews were structured in two parts. First, it was decided by the Working Group that the best option for investigating the prospects and pathways for enhanced knowledge integration was to establish a shared

<sup>1</sup> The Yawuru and Karajarri Traditional Owners are neighbours with close cultural connections who chose to hold a single joint workshop in Broome.

understanding of what is meant by 'Indigenous knowledge' by Indigenous people themselves. The second part of the activities focused on developing Indigenous-led guidelines to ensure that Indigenous knowledge and western science could be used in equitable and accurate ways. To facilitate conversation, participants were asked to comment on what they thought needs to happen before, during, and after collaborative knowledge work takes place.

### Online Survey of Scientists

In the spirit of collaboration, the Working Group suggested that it was important to gain the perspectives of researchers from western science institutions with whom they had worked or are likely to work with in the future. Thus the research team conducted an online survey of scientists who had experience working in the Kimberley region. Invitations were sent through working group networks to individual scientists and research groups who have collaborated with Traditional Owners in Kimberley Saltwater Country in the past. The survey was designed to solicit the opinions of experienced scientists on the challenges of working in knowledge collaborations with Indigenous peoples in the Kimberley. The survey was made up of multiple choice and open-ended questions. A total of 78 invitations were sent and 26 responses received (return rate of 33%). All survey respondents remained anonymous.

### Dialogue Workshops

Key to maintenance of dialogue among the KISSP Working Group, the Research Team, and Traditional Owners was the constant guiding (and at times disciplining) presence of the Working Group who, in addition to meeting monthly via teleconference, held a total of four workshops to assist the collation, analysis, interpretation, and communication of project outcomes. Though technically tasked with ensuring the accountability of the research project to Traditional Owners and their interests, the emergent good-faith between Working Group members ensured that these engagements became crucial knowledge sharing and trust-building mechanisms, that grew to form the central pillar of the project's success.

## Results

### Traditional Owner Perspectives

Indigenous people in the Kimberley want to work with both local knowledge holders and western scientists to care for their traditional estates. Almost all of the participants (99%) agreed that the best way forward was a collaborative partnership approach. In particular science should be used to extend local

knowledge bases to support informed decision-making for healthy people and healthy Country.

One of the key messages from Indigenous participants in this research was that the way they know Saltwater Country comes from lived experience, stories passed on across generations, much of which is secret and/or sacred, and much of which cannot be separated from the actual practices and beliefs that ‘hold’ or ‘embody’ knowledge in Country. It was routinely described as: “lived knowledge,” “doing,” “living our lives in the saltwater,” “part of *liyarn burr*,” “relationships,” and “looking after Saltwater Country.” This limits the capacity for conducting a western scientific knowledge (WSK)-style ‘stock take’ of knowledge in that this requires the knowledge to be recorded, interpreted and written down. This turns it into something it is not – i.e., *Western Scientific Knowledge of Indigenous Knowledge* (Agrawal 2002). Indigenous knowledge cannot be separated from local practices and/or beliefs that relate to Saltwater Country, which then has implications both for the potential of collaborative knowledge work and the approaches or methods employed (Table 1).

Workshop and interview participants spoke with clarity about how collaborations between ILK and WSK practitioners should work. This is likely due to a long history of Traditional Owners attempting to bridge knowledge systems. In total there were 44 guidelines identified by workshop participants. For the sake of brevity, we highlight only those guidelines mentioned by a majority of Traditional Owner groups (i.e., at least 4 out of 7 groups). This is not to suggest guidelines that did not meet this threshold are insignificant – hence their inclusion in appendices for reference.

In general, participants were somewhat frustrated by the lack of awareness of some of their non-Indigenous research partners about how to form fair, equitable and collegial relationships with local Indigenous people, and how to behave when on Country. Participants emphasised

that the guidelines would need to be: i) clearly explained to prospective, and many current, outside researchers, and ii) more strictly adhered to by visiting knowledge collaborators. Workshop participants made it clear that the guidelines described were not simply ‘aspirational’ but should be seen as minimum standards to be met if collaborative knowledge projects are to be pursued.

### Online Survey

For 79% of researchers from western science-based institutions, Indigenous knowledge was at least partially mobilised in the following ways:

- produce useable data;
- influence research design;
- plan and implement field campaigns;
- interpret data and results;
- identify research topics;
- translate research results into management recommendations.

While there is no independent, empirical data to support this, it at least signifies that there is a strong desire among non-Indigenous scientists to engage with and mobilise ILK to enhance and complement their research.

All respondents said that integration played a beneficial role in their research; with 59% stating that it was ‘very important,’ ‘critical,’ ‘integral,’ or ‘essential’. Only 18% suggested that, though useful, Indigenous knowledge had no potential to contribute to their scientific work. In later discussions among the KISSP Working Group, it was suggested that this latter result may be due to the fact that some scientists see the technical requirements for methodological validity within their particular disciplines as presenting a significant enough barrier to collaboration that there was no perceived benefit to be gained from collaboration with ILK-holders (for example,

**Table 1** Traditional Owner identified guidelines for knowledge collaborations

Source of Guideline	Before	During	After
Local Authority and Responsibilities	<ul style="list-style-type: none"> <li>• Respect Local Law</li> <li>• Empower Local Indigenous Governance</li> <li>• Obtain Permissions and Permits</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise TO Authority</li> <li>• Follow Cultural Protocols</li> <li>• Include Knowledge Holders</li> <li>• Include Young People</li> <li>• Use the Right Language</li> </ul>	<ul style="list-style-type: none"> <li>• Clean Up After Yourself</li> <li>• Follow Cultural Protocols</li> </ul>
Intercultural Partnerships	<ul style="list-style-type: none"> <li>• Take Building Relationships Seriously</li> <li>• Empower Local Intercultural Governance</li> <li>• Ensure Free, Prior, Informed Consent (FPIC)</li> <li>• Facilitate Local Participation</li> <li>• Begin with Knowledge System Equity</li> </ul>	<ul style="list-style-type: none"> <li>• Build Balanced Teams</li> <li>• Stick to the Plan</li> <li>• Do Training Both Ways</li> <li>• Communicate Clearly</li> </ul>	<ul style="list-style-type: none"> <li>• Use Information Appropriately</li> <li>• Make Outputs Accessible</li> <li>• Facilitate Feedback</li> <li>• Interpret Results Together</li> <li>• Present Achievements Together</li> <li>• Share Benefits Equally</li> <li>• Store Data Properly</li> <li>• Plan for the Future Together</li> </ul>

in the case of core sampling of coral reefs to determine age), though this was unclear from survey responses.

Western science-based researchers suggested that their usual first point of contact when commencing collaborative research projects was with an Indigenous-led governance structure, such as an Aboriginal corporation or regional land council. However, these groups and organisations have varying degrees of capacity to engage in negotiations concerning research agreements. This may be a contributing factor that led respondents to identify that, as a whole, there was a need for:

- Clearer processes, expected timeframes, and identified points of contact for negotiating agreements;
- A need for faster processing of approvals (especially to take advantage of funding opportunities as they arise);
- A greater level of consistency in research agreement processes across the Kimberley region.

The main drivers of collaborations were non-Indigenous research institutions (60%). The focus of the research conducted was in most cases (46%) initially defined by external, non-Indigenous organisations (e.g., research institutions, large research programs and/or government). However, these initial topics were negotiated by 64% of responding researchers during the engagement phase of projects with Traditional Owners and/or ranger groups. Researchers said that negotiation of research topic and approach had positive effects, such as:

- ensuring relevance of the research to local people;
- making researchers accountable to Traditional Owners;
- ensuring research integrity;
- incorporating training/skills/capacity development into the projects.

### Indigenous-Led Guidelines for Knowledge Collaborations

Based on these results, it was found that there were no apparent conflicts in the interests of WSK and ILK practitioners in collaborative knowledge projects. There is a significant level of good faith and willingness to reach ‘good enough’ ways of working together. Improvements sought by WSK practitioners were more concerned with a desire for more information, not necessarily a negotiation/modification of Indigenous peoples’ expectations. This meant that, in a practical sense, it was possible to identify a set of Indigenous-led guidelines for conducting research, monitoring, and evaluation in Kimberley Saltwater Country that would have a high probability of being adopted if practical tools could be produced and a process of socialisation among western science-based institutions could be conducted (Fig. 1).

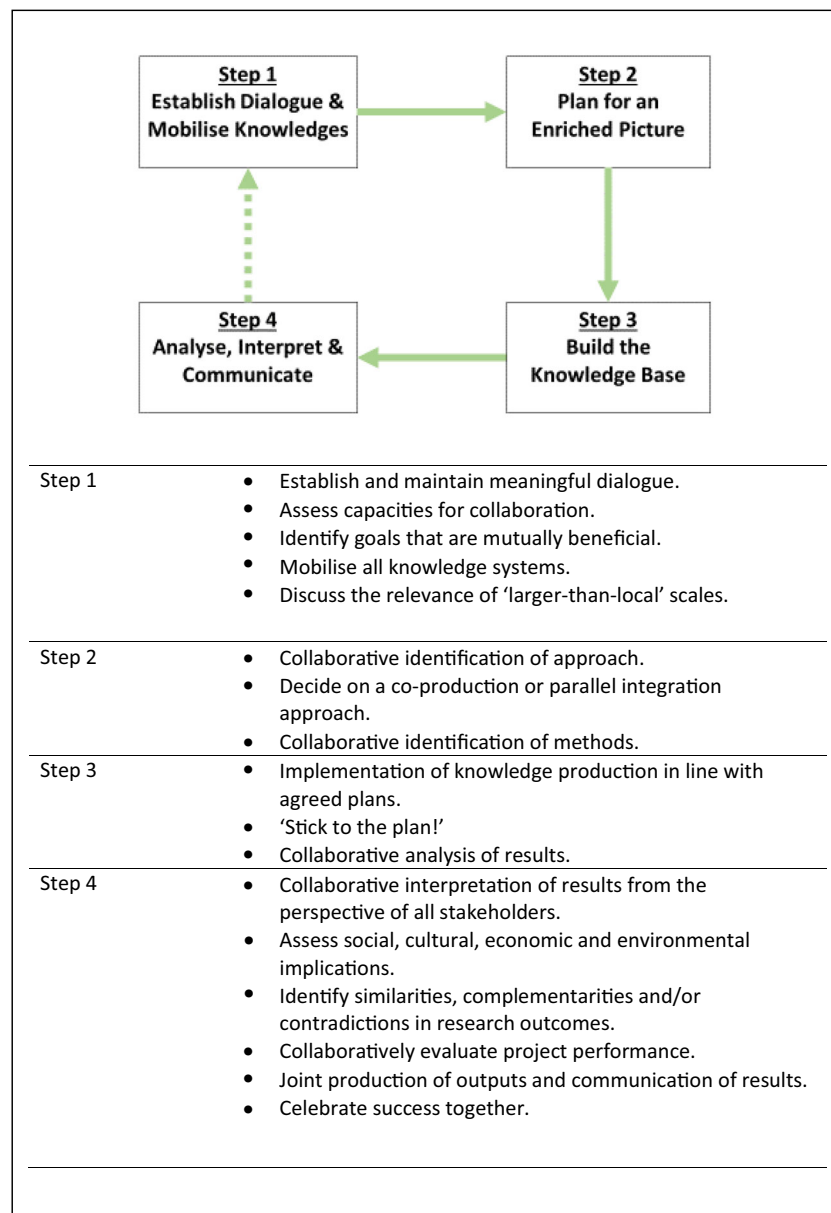
## Discussion

Through dialogue with Traditional Owners, rangers, and their organisations, the KISSP was able to develop a bottom-up, Indigenous-led approach and set of guidelines to support collaborative knowledge production for the use, maintenance, and protection of the social-ecological entity known as Kimberley Saltwater Country. Throughout the process, the KISSP Working Group was able to consider how best to articulate their work to other Indigenous peoples and local communities, and to support policy-makers, decision-makers, and scientists to adopt this regional approach. The KISSP experience supported learning for the Indigenous-led Working Group and collaborative research team. Some of these insights will be shared to support others involved in similar ground-up regional processes.

### The Challenge of Working with Radical Difference

Working with multiple knowledges is complex, but need not be complicated. Mistry and Berardi (2016) make the point that only *information* can be shared, and that the acquisition of *knowledge* entails processes of learning, re-framing, and understanding. In this process of negotiation, tensions can arise at the interface between actors with different views of what constitutes reliable or useful knowledge. Those tensions must be managed effectively if the potential benefits of knowledge are to be realized (Clark *et al.* 2016).

This can be challenging when initially confronted with the, often incommensurable, nature of IK and WSK. As an example, Bawaka Country *et al.* (2015) outlines the need for decentring humans through the process of relating with, knowing about, and looking after Country. Verran (2002) highlights the difficulty of reconciling the observation of plants in-the-flesh that are phenotypically different yet named identically due to radically different approaches to taxonomy. Such radical difference in epistemic practice can be challenging and unsettling for those who build and govern knowledge with different assumptions (Verran 2002; Wehi *et al.* 2018). Western scientific knowers tend to respond almost immediately with distrust based on concerns about validity and reliability. However, this distrust is based on fundamental assumptions that either there are no checks on validity and reliability in knowledge systems other than those of western science, or that these checks are not as reliable or valid as those in western science. These assumptions are based on suspicion and a lack of familiarity with the Other, a colonial process that continues to undermine and disenfranchise Indigenous Australians. This ‘bad-faith’ is exactly the opposite of the good faith that was exercised between the KISSP Working Group and, we argue, is vital to ensuring ethical and equitable engagements between and across knowledge systems.



**Fig. 1** Steps for collaborative knowledge work in the Kimberley

## Normalising Good-Faith

If Indigenous knowledge holders are to be able to participate on an equal playing field in collaborative knowledge making activities, they need to have equitable capacity to mobilise their own knowledge systems – including the process and belief components (Berkes 2015). Taking knowledge sharing seriously, the cultural practices of science and ILK could be used and adapted to confer normative authority on regional standard setting in a way that resonates with local people, whose commitment might also ensure compliance. If this were the case, ‘postcolonial moments in science’ (Verran 2002, 2013, 2014) would no longer be the exception, they would become the norm. However, whether expressed publicly or not, scepticism remains about the

contemporary existence and/or effectiveness of ILK (Johnson *et al.* 2016). Equally, Indigenous people are often sceptical about the motives and intent of scientists who want to ‘capture’ their knowledge or ‘communicate’ it in ways that are not appropriate (Nadasdy 1999; Christie 1990, 2006; Verran 2008). These concerns both influence and are influenced by power relations. As such, collaborative knowledge producing projects must offer solutions to relative power imbalances between local Indigenous peoples’ and their partners (Nadasdy 1999; Murray and Burrows 2017; Turnhout 2018). Indeed, they must promote egalitarianism and ensure that all parties begin and remain on an equal footing (Nadasdy 1999; Ribot 2002; Chalmers and Fabricius 2007; Tengö *et al.* 2014, 2017; Murray and Burrows 2017). Ignoring power imbalances makes it likely that attempts

at knowledge integration will reinforce rather than break down western cultural biases in natural resource management (Nadasdy 1999; Verran 2013; Murray and Burrows 2017; Major *et al.* 2018) and there is much at stake for Indigenous people whose knowledge continues to be colonised.

One way of dealing with this mutual scepticism is to employ ‘good faith’ in recognising different theoretical, methodological, and practical approaches to understanding and interacting with the biophysical world (Verran 2013, 2014). The effectiveness of Indigenous peoples’ knowledge-practices-beliefs should be assessed based on the outcomes of looking after Country activities, in truly postcolonial contexts where diverse ‘program logics’ or ‘conceptual models’ are accepted as legitimate and useful by knowledge authorities who obtain recognition of their authority through internal mechanisms of validation. As Johannes (1998: 245) rightly suggests, “Management should be judged by its fruits, not by its roots.” Effective collaboration largely depends on the degree to which partnerships are underpinned by relationships of good-faith (Verran 2002, 2008, 2013, 2014; Christie 2006; Muller 2014), which requires dialogue and long-term commitment, and equates to ensuring that Indigenous knowledge holders are able to organise collectively and mobilise their knowledge appropriately at organisational and institutional levels.

For the KISSP, we were able to institutionalise good faith through the formation and maintenance of dynamic, mutually respectful sets of relationships between individuals, groups, and their institutions (Table 2). This took coordination, effort and, ultimately, belief in the potential

for success of the partnership. It also required a genuine commitment to long-term collaboration, irrespective of the fact that all parties were fully aware that project funding was secured for only two years.

To suggest that there was a smooth trajectory of good-faith throughout the duration of the project would be to over-romanticise a project that initially commenced with conflict due to considerable bad-faith. It was only after a failed initial engagement that the funder of this research relinquished control and facilitated the establishment of the KISSP Working Group. If anything, this proves that relationships can be remedied to produce positive outcomes if those with power can be brave enough to engage ethically and for equitable outcomes.

Further, the process of bringing together the individuals, their groups, and institutions was a careful one that involved the development of research agreements, ethics approvals, interviews, and financial contracts. Good faith does not require blind-faith. However, these formal instruments can only guarantee trust up to a point, just as the guidelines for collaboration identified within KISSP are limited by peoples’ willingness to embrace them. Bad faith is often still exercised within limitations set by formal agreements, policies, and laws. Indeed, on more than one occasion the Working Group engaged in robust discussion when bad faith was exercised among the group. For example, during a dialogue session, it was assumed by some representing research interests that Indigenous rangers could simply give monitoring data to western scientists for analysis and interpretation in the state capital (some 3000 km away) – perhaps assuming it to be in

**Table 2** Examples of good faith in the KISSP collaborative knowledge partnership

Indigenous Peoples and Organisations	Research Partners and Other End Users
Engagement with a large, external designed science project that, initially, was insensitive to local Indigenous peoples’ agendas for managing and benefiting from Kimberley Saltwater Country.	Acknowledgement of the important role of Indigenous people in research and management in Kimberley Saltwater Country.
Maintenance of dialogue throughout the project, even after the ‘bad faith’ manifest in the initial engagement.	Eventual relinquishment of control over decision-making and resource allocation within the partnership.
Contribution of the time, knowledge and skills of Traditional Owners, Indigenous rangers and their representative bodies beyond the limits of remuneration.	Financial support provided to all organisations involved in the partnership (though Indigenous rangers and representative bodies contributed significantly in-kind in addition)
Use of social capital to connect the research project to the ‘right people’ (knowledge holders, rangers, leaders, etc.) to be engaged in the project.	Researchers engaged in the project embraced collaboration and gave the Working Group considerable control over design of research approach.
Provision of a western science-based stocktake of categories of local Indigenous knowledge (with requisite disclaimers as appropriate) in an effort to demonstrate the on-going existence and validity of their knowledge system.	Mobilised the organisations and institutions (i.e. state and national government, universities, research institutions, industry) to attempt to implement key outputs from the collaboration.
Overwhelming openness and support for working with western scientists to complement local IK for Kimberley Saltwater Country and, where desirable, fill knowledge gaps.	Facilitated co-contribution of all in the development and communication of project results/outputs at conferences, industry meetings, media, reports and academic publications.
Consideration of the needs of western science practitioners in the development of guidelines for collaborative knowledge work.	Strong internal advocacy by state government staff was used to influence decision-makers (within government), which was crucial to establishing the Working Group to function autonomously and thus provide a solid foundation for good-faith partnerships.



the name of the science and the greater good of the Kimberley region. The Working Group were naturally not in favour of this due to its lack of recognition or reward for the Indigenous rangers, along with the apparent ignorance of the potential benefits of local people being involved in the data analysis. However, rather than erupting into conflict, the Working Group gave the individual the benefit of the doubt, assertively corrected the conversation and (due to the previously established good faith) was able to move on to finding ‘good enough’ solutions to these shared problems. Good faith allowed mutual benefits to be produced regardless of isolated instances of mistaken assumptions.

### Sharing Power, Weaving Institutions

Without necessarily being aware of it as we were focused on developing effective mechanisms for knowledge partnerships, the KISSP partners were also integrating their respective institutions through good-faith engagements and the emergent trust among the group. Much the same as the MEB approach, for knowledge to be moved spatially and across knowledge systems, institutional mechanisms are needed to support knowledge holders and their organisations to participate as equals and with equitable results (Murray and Burrows 2017; Tengö *et al.* 2017). Given their deep embeddedness in local geographies, a shared history of colonisation, and the highly heterogeneous social and cultural make up of local communities and their environments, Indigenous knowledges are difficult to ‘scale up’ (Nadasdy 1999; Gagnon and Berteaux 2009; Wohling 2009; Tengö *et al.* 2014). Scaling up is highly dependent on complementarities and relationships across the many ‘locals’ and varies depending on the issue being discussed, definitions of key terms, and the nature of identified outcomes (Reid *et al.* 2006; Tengö *et al.* 2014). In the Kimberley region, for example, connections between neighbouring Traditional Owner groups means that some knowledge practices and beliefs are shared or related, although this is not necessarily the case. Ranging from minor variations in linguistic terminology to major differences in concepts and beliefs, there is a level of complex diversity that must be acknowledged. Attempts at doing knowledge collaborations at scale must proceed with significant caution, ensuring free prior and informed consent in every step of the process, as there is significant risk involved for Indigenous people (Agrawal 2002; Williams and Hardison 2013; Austin *et al.* 2018). Indeed, it is better to think of this as a process not of expanding spatial scales, but expanding to include multiple diverse actors, institutions, and processes through the development of relationships of trust. The diversity and geographic scale that should be a strength of global science-policy processes like the IPBES and the IPCC present a challenge to collaboration that is multiplied many-fold in comparison to the Kimberley. Nonetheless, the challenge to weave good

faith-based engagements through institutions to create opportunities for postcolonial moments in science is worthwhile given the potential benefits that could be produced (Sutherland *et al.* 2014; Brondizio and Le Tourneau 2016; Folke *et al.* 2016).

As mentioned previously, the good work of the IPBES and its promotion of the MEB approach has achieved a shift in the narrative concerning the role of ILK in global policy concerning sustainability and conservation. However, the challenge of mobilising ILK for practical development of assessments has met with only limited success (see: IPBES regional assessments for example). There is no doubt that on an individual level the thousands of scientists engaged in the IPBES are exercising good faith in their attempts to engage with ILK-holders. However, the privileging of WSK at an institutional level occurs in three primary ways:

1. The use of peer-reviewed publications as the gold standard for establishing the validity of evidence.
2. A lack of financial and administrative resourcing for IPLCs to participate, and often a failure to recognise transaction costs incurred by IPLCs when they do.
3. A lack of consideration for the benefits (or costs) for IPLCs in their engagement with global processes and the impacts on local socio-politics beyond the scope of the IPBES.

The institutionalisation of good-faith, and the subsequent weaving of individuals, groups and institutions through the IPBES is required to ethically and equitably mobilise ILK for global assessments. Further, this approach may offer some assistance in moving beyond other intractable, bad-faith-based debates within the academic community that serve to severely undermine the collective potentiality of science to respond to sustainability and conservation challenges with global solutions (Díaz *et al.* 2018; Peterson *et al.* 2018). Normalised and institutionalised good faith would create considerable opportunity to embrace dissensus to harness the power of diverse disciplines and knowledge systems and, in-so-doing, identify innovative ‘good enough’ solutions to global sustainability problems, moving beyond the apparently intractable contemporary debates while global environmental health continues to degrade.

### Conclusion

To use the metaphor of weaving that is often recruited to describe the task of working across and between knowledge systems (Johnson *et al.* 2016; Tengö *et al.* 2017). We present here an Indigenous-led approach that aims to take care of people, nature, and spirit in the production, sharing, and

management of knowledge that has the potential to positively impact the lives of all forms of life on the planet.

All too often, large research projects with significant scientific vested interest approach the task of integrating Indigenous knowledge into the mainstream scientific agenda without proper consultation and co-development of project questions, goals, approaches, and resourcing prior to commencement. This is more than unfortunate, as Indigenous people have patiently been requesting good faith-based engagement for hundreds of years. It is hoped that the lessons learned in KISSP and the co-produced guidelines for knowledge collaborations make a significant contribution to high quality partnerships that avoid the costly mistakes of the past. Indeed, we suggest that postcolonial moments in science can not only be produced through knowledge collaborations, but the enriched and highly useable information they produce can more efficiently inform policy and decision-making.

Frustrations and confusions between Indigenous knowledge holders and western science practitioners are in many ways a good sign – they suggest that there is a tremendous willingness to collaborate based on the acknowledgement of the utility of employing multiple evidence bases. Non-Indigenous western science practitioners are attempting to increase their understanding of Indigenous knowledge systems and local Indigenous governance mechanisms. Indigenous knowledge holders are figuring out ways of articulating their knowledge practices and beliefs to non-Indigenous and non-local audiences in ways that make obvious their importance and usefulness for looking after Country. At the heart of it is the co-creation of innovative knowledge governance mechanisms that have the potential to address the paucity of non-scientific knowledge in contemporary academic discourses on sustainability and conservation. What is needed is increased capacity for each party to articulate their knowledge and practices to each other and to collaborate through intercultural partnerships that are supported by a foundation of good faith that promotes Indigenous self-governance, advocacy, and coordination.

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### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

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