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Indigenous Engagement in Tropical River Research in Australia: The TRaCK Program

Sue E. Jackson
Australian Rivers Institute, Griffith University, sue.jackson@griffith.edu.au

Michael Douglas
michael.douglas@cdu.edu.au

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Abstract
The literature on scientific-Indigenous ecological knowledge collaborations rarely analyses programmatic efforts undertaken by multi-disciplinary research groups over very large geographic scales. The TRaCK (Tropical Rivers and Coastal Knowledge) research program was established to provide the science and knowledge needed by governments, industries, and communities to sustainably manage northern Australia's rivers and estuaries. A number of policies and procedures were developed to ensure that the needs of Indigenous people of the multi-jurisdictional region were addressed and to enhance the benefits they might derive from participating in the research. An overarching *Indigenous Engagement Strategy* undergirded the program's engagement activities, providing guidance on matters relating to the protection of intellectual property, negotiation of research agreements, remuneration for Indigenous expertise, and communications standards. This article reviews the achievements and shortcomings of the TRaCK experience of Indigenous engagement and highlights lessons for researchers and research organisations contemplating applied environmental science initiatives of this scale and scope.

Keywords
Indigenous ecological knowledge, research partnerships, Indigenous collaboration

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Indigenous Engagement in Tropical River Research in Australia: The TRaCK Program

The challenges and ethical implications of conducting research at the community level are well rehearsed within a number of social science disciplines (Holcombe & Gould, 2010; Kobayashi, 2001; Newton, Franklin, Middleton, & Marsden, 2012). Many authors have commented on the tensions between the research sector and local communities, often in relation to the demands of participatory research and the limitations of circumscribed and rigid funding cycles and programs (Clark, 2008; Ens, Preuss, Finlayson, Jackson, & Holcombe, 2012; Newton et al., 2012). Cloke, for example, noted that "the unwillingness to promote and fund long-term, longitudinal research has created the conditions for 'flip' ethnographies by which researchers too often breeze in and out of research situations, with insufficient commitment to the people and issues concerned" (cited in Newton et al., 2012, p. 588).

In Australia over the past two decades, the social impact of academic research on Indigenous communities has been the subject of considerable attention as Indigenous organisations and individuals voice concerns about research ethics and the practices of research organisations (Barbour & Schlesinger, 2012; Henry et al., 2002; Humphrey, 2000; Orr et al., 2009). A parallel discussion has been occurring within the broader knowledge literature that seeks to better understand the similarities and differences between local knowledges, Indigenous knowledges, and traditional ecological knowledges (Berkes, Colding, & Folke, 2000; Sillitoe, Bicker, & Pottier, 2002).

Indigenous societies are recognised as the holders of Indigenous ecological knowledge (IEK), defined by Berkes et al. (2000) as a cumulative body of knowledge, practice and belief about the relationships living things (including people) have with each other that is handed down through generations by cultural transmission. IEK forms part of governance and cultural systems that encompass language, naming and classification systems, resource use practices, rituals, spirituality and worldviews. Surveys of the literature on IEK emphasise the means by which it is transmitted and the longevity of its utility; there is an emphasis on continuity and cumulative acquisition of knowledge generated by communities heavily reliant on natural resources. Knowledge is passed down through generations over many hundreds of years, although many authors stress its dynamic nature in response to populist images of traditional knowledge as static or unchanging (Butler, 2006; Hill et al., 2012).

Since the mid-1990s, international and interdisciplinary scholars have been writing about Indigenous perspectives on research as the number of studies that apply IEK to contemporary resource management problems increase globally (Bohensky & Maru, 2011; Stephenson & Moller, 2009). A range of collaborative methods are now being utilised by government agencies, universities, research institutes, and NGOs to recognise and harness Indigenous knowledges and deliver benefits from research to Indigenous experts and their communities (e.g., Cullen-Unsworth, Hill, Butler, & Wallace, 2011; Garnett et al. 2009; Louis, 2007; Woodward, Jackson, Finn & Marfurra McTaggart, 2012). Hviding (2006), for example, sees great value in partnerships that seek an understanding of similarities, differences, and complementarities between knowledge systems, arguing, "where there is contrasting knowledge, there is also potential for dialogue and convergence" (p. 71). In Melanesia, where he has conducted decades of research, Hviding observes a strong interest in living things that is representative of a regional cultural preoccupation and suggests that "scientists, managers, and environmentalists engaged in biodiversity conservation are well advised to engage in such fields of potential epistemological convergence and everyday enthusiasm" (p. 82). Otherwise, he argues, we deny ourselves a "mutual engagement with the people of the place" in a "deep empirical quest" in

which "local knowledge and western science have a potential for convergence in their shared interests in different and yet, complementary classifications of that which constitutes biodiversity" (p. 85).

With collaborative partnerships growing in number so too has the quantum of ethics resources, particularly resources pertaining to protecting Indigenous knowledges when applying them to land and natural resource management (Australian Institute of Aboriginal and Torres Strait Islander Studies [AIATSIS], 2003; Holcombe & Gould, 2010; Janke, 1999). Holcombe and Gold (2010) define ethics resources as tools such as "guidelines, protocols, agreements, memorandums of understanding (MoUs) and strategic plans that seek to ensure an equitable and negotiated approach to research and/or working with Indigenous peoples" (p. 108).

This article contributes to the growing literature on ethical engagements in research but with a focus attuned to the programmatic scale. The bulk of IEK analyses derive from project level case studies or single issue inquiries. This article, however, describes the efforts of a large, ambitious multidisciplinary, multi-site research program involving over 80 researchers to effectively and ethically engage with Indigenous communities in research on the tropical rivers region of Australia's north. The TRaCK (Tropical Rivers and Coastal Knowledge) Research Hub was conceived in 2005 to provide the science and knowledge needed by governments, industries, and communities to sustainably manage northern Australia's rivers and estuaries.[1] Engaging with Indigenous Australians was a critical feature of TRaCK. The original TRaCK funding proposal acknowledged that Indigenous knowledges are vital to the management of northern Australia and that research investment has not been at a sufficient scale to fully address the multi-faceted challenges facing the remote north.

The commitment manifest in the TRaCK program aligns with international acknowledgement of the important influence of Indigenous people's knowledge and their profound relationship to land on the sustainability paradigm. It also directly responds to Australian environmental policy imperatives. Conserving biodiversity in the tropics in ways that sustain and improve Indigenous livelihoods is one of this century's foremost challenges. The significant role of Indigenous land owners and managers is reflected in Australia's key piece of environmental legislation, the *Environment Protection and Biodiversity Conservation Act* (1999), which acknowledges "a partnership approach to environmental protection and biodiversity conservation," and promotes "Indigenous peoples' role in, and knowledge of, the conservation and ecologically sustainable use of biodiversity" (s 3(2)(g)(iii)). More recently, focus has turned to the water management sector and the need to ensure that the public mandate for aquatic biodiversity conservation reflects Indigenous values and perspectives.

The TRaCK program sought to contribute to the "research–implementation gap" as it is experienced in north Australia (Knight et al., 2008; Shackleton, Cundill, & Knight, 2009) by redressing the historical legacy of low rates of Indigenous participation in research and state environmental management processes. TRaCK researchers set out to gain a much better understanding of Indigenous interests in tropical rivers and discussed ways to collaborate with Indigenous people to ensure their research needs were addressed and that their knowledge contributed to research projects. In a manner consistent with other research efforts designed to improve collaboration between researchers and Indigenous people (Davidson-Hunt & O'Flaherty, 2007; Ens et al., 2012), TRaCK placed considerable emphasis on procedural issues regarding ethics,

[1] For more information see www.track.org.au

participatory methodologies, and intellectual property rights. TRaCK's efforts were guided by an Indigenous Engagement Strategy (IES) (see Jackson, Golson, Douglas, & Morrison, 2013).

The article is structured as follows. First, we provide introductory and background descriptions of the context and the tropical rivers research agenda. The TRaCK program's objectives, governance, and research structures are then briefly described before turning to the program's IES. The key findings of an evaluation of the Strategy are then presented. The implications for research programs of this kind are drawn out in the final section where we consider lessons that should be of interest to researchers new to collaborative research efforts and/or those considering expanding and scaling up their efforts to a multi-site, multidisciplinary program of relevance to Indigenous peoples.

The Tropical Rivers Research Agenda

Due to the fact that the aquatic ecosystems of northern Australia contain one of the last major networks of free-flowing tropical rivers on Earth (Vorosmarty et al., 2010), these landscapes are of particular scientific interest to conservationists, aquatic ecologists, and non-government organisations (Blanch, 2008; Kennard et al. 2010). The region's 56 river systems (see Figure 1) are of high conservation value because the vast majority are unregulated (not having been dammed) and important ecological connections between the catchment, the river, the floodplain, and the estuary remain intact (Douglas, Bunn, & Davies, 2005). Northern river systems are considered to be the most biologically diverse and healthy aquatic ecosystems in Australia (Australian Tropical Rivers Group, 2004; National Land and Water Resources Audit, 2002).

Australia's tropical rivers flow through the customary estates of scores of Indigenous language groups and in any catchment there may be numerous Indigenous language groups with rights and interests in particular river locales, and a high reliance on riverine environments and aquatic resources (Jackson, Finn, & Featherston, 2012; Jackson, Stoeckl, Straton, & Stanley, 2008); a reliance that Langton (2002) attributed to the "multivalence" of water in Indigenous traditions (p. 46). Water supports the material needs of many Indigenous communities and it is a key constituting feature of Indigenous cultural landscapes. Indigenous people conceptualise water sources and rivers, as with the land, as having derived from the actions of mythic beings during the Dreaming, when the world attained its present shape and the socio-cultural institutions governing water use were formed (Langton, 2002; Toussaint, Sullivan, & Yu, 2005).

Australia's common and statutory laws have recognised customary tenures for over 20 years such that more than 20% the continental land mass has been returned to Indigenous ownership (Altman & Jackson, 2014). A large proportion of that land base is in the tropics and controlled by Indigenous institutions under programs that give effect to local priorities for land and water management (Altman & Kerins, 2012) and contribute local ecological knowledge to solving environmental problems (Hill et al., 2012; Jackson, Finn, & Scheepers, 2014; Storrs, Yirbarbuk, Whitehead, & Finlayson, 2001).

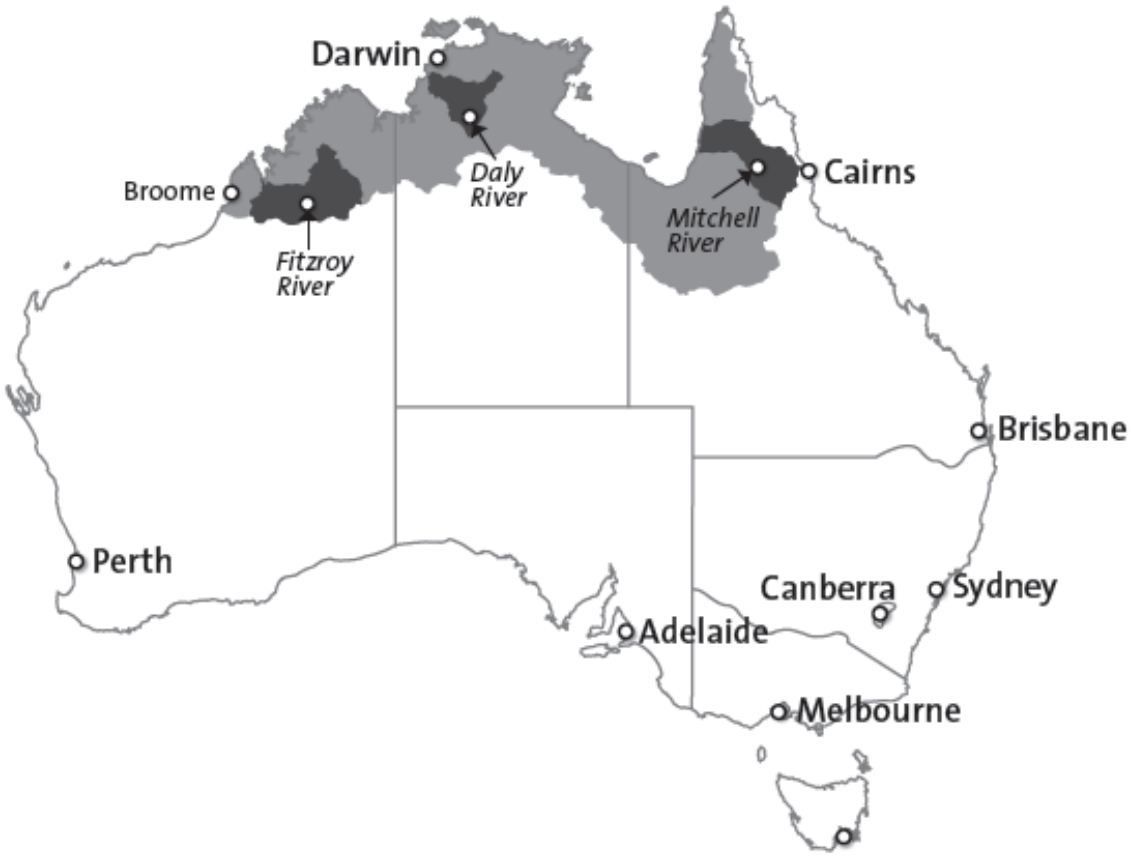

Figure 1. **Map of TRaCK region (light grey) showing focal catchment areas (dark grey).**

Indigenous resource management practices draw "mostly on long-standing customary knowledge and skills" (Altman & Whitehead, 2003, p. 3) and are inspired by obligations to care for country (Jackson & Palmer, 2014). Practices include living on customary estates (on country) at small settlements referred to as "outstations" and utilising the landscape to exploit resources, hunting and gathering, conducting ceremony and ritual, fire management, and obtaining and distributing resources according to local rules. Some management activities may be unrecognised by the formal resource management sector and Indigenous communities face significant and entrenched impediments to having their knowledge accepted by management and scientific institutions and the wider society (see Howitt et al. 2013; Jackson & Barber, 2013; Muller, 2014; Palmer, 2007). Multiple methodological and epistemological barriers to integrating Indigenous knowledge are evident in the region in which our study is located and as a result, a general scepticism towards research can be found in some sectors of the Indigenous community.

Although Indigenous people have been managing the northern Australian landscape for millennia, European settlement introduced many of the processes that now threaten global freshwater ecosystems. Overgrazing by cattle, altered fire regimes, feral animals, and weeds threaten north

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Australian river systems, and combined with increasing water resource development and climate change, the future of these river systems is certainly in question (Pusey et al., 2011), as are the livelihoods that depend on their health. Freshwater systems are particularly vulnerable to human-induced changes, and are regarded as the most threatened ecosystems on the planet (Postel & Richter, 2003). Research is needed because the tropical river region's socio-ecological systems are not well understood by scientific institutions or management organisations and because significant, pervasive threatening processes are well entrenched in the region (Douglas et al., 2011). Furthermore, Indigenous communities are looking for ways to retain and valorise their knowledge in the face of massive social change brought about by colonisation (Barber, Jackson, Shellberg, & Sinnamon, 2014; Hill et al. 2012). Loss of ecological and ritual knowledge is a significant issue that confronts possibly every language, clan, or family group (Bradley, 2001; Ens et al., 2012; Jackson, Finn et al., 2014).

TRaCK: Aims, Governance Structures, and Research Activity

Aims

In 2005, TRaCK established a collaborative consortium of over 80 of Australia's tropical river and coastal researchers from 18 institutions and disciplines including law, hydrology, economics, geography, geomorphology, and ecology. It took two years to consult Indigenous communities, government agencies, and other stakeholders and develop the research program (2004 - 2006). Over $20 million was secured to support five years of research (2006 - 2011) into the assets and values of tropical rivers and the ecosystem processes that underpin them.

When formed, TRaCK aimed to:

- Increase understanding of the environmental, cultural, economic, and social benefits provided by tropical rivers and coasts;
- Develop methods and tools for assessing the implications of current use and potential developments;
- Identify opportunities to develop sustainable enterprises; and
- Build the capacity and knowledge of the community to manage Australia's tropical rivers and coasts.

TRaCK's program of research had seven interconnected themes as a means of organising and coordinating 27 research projects. The key guiding questions for the research were:

- Why do people value tropical rivers?
- How do tropical rivers differ across the region?
- How do tropical rivers work?
- What are the economic opportunities for Indigenous people?
- How can we make good decisions about managing tropical rivers?

Governance

The research consortium was led by Charles Darwin University, the University of Western Australia, Griffith University, Land & Water Australia (LWA), the Commonwealth Scientific Industrial Research Organisation (CSIRO), and an Indigenous NGO, the North Australia Indigenous Land and Sea Management Alliance (NAILSMA). A Memorandum of Understanding guided the parties in the consortium as did contracts between research organisations and funding bodies. These documents demanded compliance with the standards of Indigenous engagement adopted by TRaCK and outlined in its Indigenous Engagement Strategy (IES).

A Project Management Committee (PMC) comprised of major funding partners, one Indigenous representative and an independent chair, was formed to monitor progress against contracted milestones. The scientific program was led by a Research Executive Committee (REC), comprising the principal researchers with an elected chair. This Committee reported directly to the Project Management Committee and led the development and delivery of the research program.

An Indigenous Engagement Strategy Committee made up of three REC members was set up after the Strategy was endorsed. Its role was to assess projects and advise on the appropriate level of Indigenous engagement for each project. After fulfilling this initial task, it rarely met, but proved valuable on two occasions in the resolution of conflict between researchers and Indigenous community members.

TRaCK's Indigenous Engagement Strategy

Developing the Strategy

With nearly 30 interrelated projects it was apparent to research leaders that TRaCK needed an Indigenous engagement policy statement that expressed its objectives and was transferable across the program area. Researchers planned to draw on Indigenous knowledge and perspectives on the region's ecology to better understand how changes brought about by water resource development could affect Indigenous values and livelihoods in the region, either positively or negatively. Furthermore, much of the research would be conducted in places where Indigenous people maintain customary ties to their estates and some of it would be carried out on tenures under the legal control of Indigenous people.

The REC agreed that every TRaCK project was required to engage with local communities. Engagement was expected to benefit the affected communities and also provide researchers with local geographical and historical knowledge that would help them tailor their research to meet local needs. A workshop was held in September 2006 (in Darwin) to obtain Indigenous perspectives on the strategy, which was later adopted at the first full meeting of the TRaCK consortium in December 2007. In preparing the IES, principles from the Guidelines for Ethical Research in Indigenous Studies, authorised by AIATSIS (2003), were consulted. These guidelines provide a coherent and clear national standard and were endorsed by TRaCK and its Indigenous partner, NAILSMA.

An implementation plan was appended to the Strategy to ensure ongoing oversight from the REC. Efforts were made to develop resources to assist in implementing the strategy (e.g., copies of standard research agreements were made available to researchers, information on cross cultural

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courses was provided, as were examples of completed applications for approval for research under national Human Research and Ethical Conduct protocols).

Although the REC sought transferability of principles and of approach across all northern jurisdictions, it did not want the approach to be overly prescriptive or to encourage researchers to merely comply with rules or "tick the boxes." With such a diverse program of research encompassing markedly different disciplines, the REC appreciated that there were considerable differences in project objectives, methods, scales of operation, and information sources, and that these had a bearing on the level of engagement that could be anticipated. For example, most of the social science projects drew on survey or interview methods that required community consent to the research setting and were designed to meet community information needs, whereas a similarly high level of Indigenous engagement was not warranted in projects that were based solely on desktop studies of existing biophysical or socioeconomic data (e.g., the projects investigating river classification systems).

Projects therefore needed to tailor their efforts to meet reasonable expectations while taking into account other pressures on communities and their likely levels of interest in the underlying research questions. The REC believed that more would be achieved from an approach that sought dialogue and negotiation than mere compliance with procedure. The IES sought high standards, provided resources to assist researchers to achieve or surpass the standards, and oversight of project implementation as projects progressed.

Attempts were also made to build Indigenous engagement requirements into the research projects as early as possible. Project plan templates were made available on the TRaCK intranet in 2006 and researchers were required to report against the Strategy's objectives in their initial funding proposals. All projects were required to allocate a portion of their funding for Indigenous engagement and report on progress in each six-month milestone report. Implementation of the Strategy was given a high priority at all levels of TRaCK governance and constant attention was given to the objectives by the TRaCK leadership.

Review of Indigenous Engagement Strategy Outcomes

In 2011, by the end of the program's first phase, the REC was aware from informal and formal feedback that a relatively high standard of Indigenous engagement had been achieved (Coutts & Coutts, 2011). To evaluate performance in this area, the authors undertook a review of strategy implementation and achievements (Jackson et al., 2013). TRaCK's PMC also saw value in a systematic understanding of Indigenous engagement believing that it would serve to promote insights and lessons to other researchers, and government research and development agencies undertaking or contemplating similar initiatives. By this time, many of the partners had been successful in attracting funding under a new federal government environmental research program and the need to adapt the lessons from TRaCK provided further impetus for the review.

The review examined the model of Indigenous engagement applied during TRaCK's first phase (2006 - 2011) and

- Identified key success factors, constraints, and areas for improvement;
- Analysed TRaCK's funding arrangements, protocols (e.g., employment and training), relationships with Indigenous organisations and communities, research experience; and

- Sought the views of Indigenous participants in TRaCK projects.

TRaCK documents (project proposals, policies, communication products, research outputs) were reviewed and compared against the objectives of the IES (see Table 1). Two small independent consultant reports were commissioned, one by Smyth (2012) and one by Golson (2012)[2]. For Smyth's review, the IES Steering Committee nominated for interview 14 Indigenous participants or representatives of TRaCK partner Indigenous organisations. The 14 were chosen on the basis of a high level of involvement in TRaCK research. Efforts were made to contact participants by phone and/or email and similar efforts were made to contact project research leaders (Jackson et al., 2013). Interviews followed a semi-structured format based on the five objectives of the IES listed above. Efforts were made to contact a total of 24 people, resulting in 12 successful interviews.

Golson's review is based largely on an assessment of the TRaCK milestone reports, PMC minutes, an evaluation of the entire TRaCK program (Coutts & Coutts, 2011), knowledge and adoption documents, and workshop notes that formed the basis for the TRaCK IES. Golson undertook five interviews, two with biophysical researchers and two with social researchers from projects covering all the research themes except Theme 6 (sustainable enterprises). The fifth interview was with a member of the group that sought to communicate research findings. The questions focused on the IES objectives and the perspectives of the researchers.

Results

From the accounts recounted by the consultants, TRaCK achieved a high level of Indigenous engagement in its program (Jackson et al., 2013). In summary, independent reports offered over-arching observations of the program's record:

> The Indigenous engagement protocols established by TRaCK have demonstrated their effectiveness in achieving a degree of Indigenous participation in research that otherwise would not have occurred, given the current focus within research institutions on measuring research success primarily through monitoring academic publication outputs, with little emphasis on monitoring social impacts and benefits of research.
>
> The overall response from interviewees was very positive. Indigenous participants and representatives of Indigenous partner organisations reported multiple benefits in participating in TRaCK research, including opportunities to return to country, exchange traditional and scientific knowledge, learn new skills, strengthen pride in culture and identity, and stimulate interests in strengthening Indigenous involvement in researching and managing country. TRaCK researchers reported largely enthusiastic responses from Traditional Owners who participated in the projects, including a desire for extending the partnerships beyond the life of TRaCK. (Smyth, 2012, p. 3)

The summary of performance against the objectives and outcomes (Table 1) supports the overall comments about the program's success and helps to identify areas where there was a high level of performance.

[2] The consultants' reports are available from the authors.

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Table 1. Objectives, Outcomes, and Performance Measures of the TRaCK Indigenous Engagement Strategy

Objectives and outcomes	Performance measures	Summary of performance
1. **Ensure TRaCK research is relevant and beneficial to Indigenous communities and organisations**—To build the capacity of Indigenous people to undertake research that will answer important questions being posed by Indigenous communities.	Number of Indigenous people leading the development of research.	NAILSMA led the Indigenous livelihoods theme, which included 5 projects: 2 led by Indigenous people or organisations, and 2 directed by NAILSMA's Indigenous Water Policy Group. Two other projects provided high levels of Indigenous input to their direction although were not entirely led by Indigenous organisations.
	Number of people (both non-Indigenous & Indigenous) acting as mentors to local Indigenous researchers.	Difficult to quantify but there were numerous examples reported of mentoring through participation in research activity and joint conference presentations, and informal training on monitoring.
	Number of researchers engaged by Indigenous people to support their local initiatives.	More than 20 researchers were involved in supporting the establishment of local catchment groups; providing technical support and training for recording of Indigenous knowledge and monitoring of river and wetland health; supporting livelihoods planning, governance training, and developing research protocols.
2. **Ensure TRaCK research is conducted according to the highest ethical standards**—All TRaCK research projects will be conducted with an appropriate level of Indigenous involvement and undertaken according to written research agreements.	Number of research projects initiated by Indigenous parties.	5 projects in Livelihoods theme initiated by NAILSMA or partners, 2 major components of other projects initiated by Indigenous parties.
	Number of Indigenous co-authored papers, reports, and presentations.	6 co-authored journal articles or book chapters, 2 co-authored articles in TRaCK newsletter; an Indigenous Engagement Guide developed in collaboration with over 30 Traditional Owners from north Queensland, 12 co-authored conference presentations.

	The proportion of TRaCK projects with Indigenous collaborators operating under a written research agreement.	All projects with Indigenous collaborators were operated under written research agreements.
3. **Provide opportunities for Indigenous employment, and to transfer skills, share knowledge, and increase cultural awareness amongst all parties**—Greater understanding and acceptance by non-Indigenous researchers of Indigenous people's knowledge systems, cultural values, perceptions, and rights; and greater understanding by Indigenous people with insight into and understanding of research methods and institutions.	Majority of Indigenous partners remain interested and committed to the project after the first year of project operation.	NAILSMA and its affiliate partner organisations remained partners in TRaCK for the duration of the program. All other indigenous organisations involved in projects remained partners through to completion. At an individual level, there was a very high level of continuing interest and involvement at the project level.
	Number of jobs stays constant or increases.	No evidence of major increases in the number of jobs over time.
	Types of jobs and roles that Indigenous partners are fulfilling are increasing in variety, complexity, and responsibility.	Most employment remained as short-term contracts as field assistants and cultural advisors. In year two, two Indigenous leaders were employed to lead the Indigenous livelihoods projects and, in the third year, an Indigenous co-ordinator position was created in the Knowledge and Adoption team.
	Perceptions and attitudes amongst Indigenous people towards research are increasingly positive.	Many examples of positive attitudes towards research.
	Number of non-Indigenous people completing a cross-cultural awareness course.	21 researchers completed cross-cultural awareness courses.
4. **Effectively communicate research results and share knowledge with Indigenous people**—Establish robust & longstanding relationships between Indigenous & non-Indigenous research communities & universal application of appropriate Indigenous communication strategies.	Number of joint projects & co-authored publications.	6 co-authored journal articles or book chapters, 2 co-authored articles in TRaCK newsletter; an Indigenous Engagement Guide developed in collaboration with over 30 Traditional Owners from north Queensland, 12 co-authored conference presentations.

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	Number of collaborations that lead to additional externally funded projects.	At least 8 additional external projects arose from collaborations developed through TRaCK.
	Number of projects undertaken by same collaborators over a period of time.	4 projects had sustained collaborations that extended beyond TRaCK resources or timeframes.
	Uptake of communication products.	Evidence of a high level of uptake of communication products.
	Number of projects completed on time.	Most projects with Indigenous collaboration experienced delays due to research agreement negotiations or delays in project scoping and approval. All projects met their revised project timelines.
5. **Ensure meaningful Indigenous participation in TRaCK governance**—Indigenous participation in TRaCK governance.	Number of Indigenous people represented in TRaCK governance structures.	1 Indigenous person out of 7 on the Research Executive, 1 Indigenous representative out of 7 at the Program Management Committee level, 2 out of 30 project leaders was Indigenous.

The following comment on the IES illustrates a researcher perspective:

> . . . in hindsight we can say these protocols were good (if overly bureaucratic).
>
> We had good leadership on Indigenous engagement in TRaCK, which made all the difference. (Smyth, 2012, p. 19)

Perceptions and attitudes amongst Indigenous people towards research were reported to be positive, according to Smyth (2012):

> At the heart of successful Indigenous engagement in research is the nature and strength of the relationships between researchers and Indigenous people—individuals, communities, and organisations. Interviewees by and large reported that relationships between TRaCK researchers and their Indigenous partners were and are very sound, respectful, harmonious and productive. Factors contributing to these successful relationships, as reported by interviewees, included:
>
> - Appropriate time and effort devoted to communicating and developing rapport with potential Indigenous partners—including making several trips to visit a community prior to commencing research;
> - Building in components or outputs of research of particular relevance to the Indigenous partners, including assisting with school projects, developing traditional calendars, and communicating the outcomes of research through appropriate mechanisms, such as community visits and posters;
> - Transferring scientific and technical skills to Rangers[3] as a lasting legacy of the research experience;
> - Offering joint authorship of publications with Indigenous partners;
> - Maintaining relationships beyond the life of the project, including, for example, sharing photographs of family. (p. 5)

Table 1 also highlights a number of areas for improvement. Of particular note is the conclusion that there are overarching challenges for Indigenous engagement in north Australia that centre on capacities and priorities:

> The challenges reported by interviewees relate one way or another to the capacities and priorities of researchers, the capacities and priorities of Indigenous partners, or the capacities and priorities of both parties. (Smyth, 2012, p. 6)

[3] An Indigenous person employed by a community-based organisation to manage Indigenous land.

These capacity and priority issues are elaborated in the following comments:

- Researchers funded to achieve specific research aims have limited capacity to substantially achieve employment, training, and other community development aspirations—potentially leading to frustration and disappointment for some Indigenous partners;

- By and large, recognition of research achievement with research institutions does not encourage researchers to devote time and effort to Indigenous engagement and preparation of effective communication tools, such as plain English reports of outcomes;

- Researchers may not have the capacity or priority to provide long-term support to local governance arrangements established during a project —again potentially leading to frustration and disappointment for some Indigenous partners.

Meeting these challenges in a research program of the size and scale of TRaCK requires that expectations are realistic. Where possible, efforts were made to coordinate the employment activities undertaken within the research program with the requirements of vocational education courses. Building capacity, however, takes many years and, in the case of training in research skills, there are a number of pre-requisites that are largely beyond the control of a research program such as TRaCK. First, building research capacity requires a standard of education that is not widespread amongst the regional Indigenous population: a long educational pathway culminating in research expertise is not present in many remote areas. Second, it requires specialist training skills within the researcher community that are not likely to be held by every research leader or their staff (Garnett et al., 2009).

Although overall the TRaCK research was considered relevant and beneficial to Indigenous communities and organizations, this observation is qualified. One of Smyth's (2012) interviewees made the important point that there is never perfect alignment between community interests and academic interests:

> For us and our Indigenous partner (Kowanyama Aboriginal Land and Natural Resource Management Office), overlap in interest occurred in understanding impacts of cattle and pigs on wetlands, in understanding the importance of floods to ecosystem functioning, and in determining whether mercury was an issue for fish consumption. Beyond that, they are concerned with many other issues, including weeds, which we did not cover very well in our research. (p. 19)

From the outset we were aware of misalignment of various kinds between researchers and community priorities or objectives. For example, community interests were sometimes much broader than the scope of the research program, which was to some extent constrained by the priorities of funders and of the expertise in the consortium. Notwithstanding efforts to shape the research to maximise its relevance to Indigenous people, by the time that projects were finally approved the program was somewhat constrained by funding agency priorities. Researchers faced a "chicken or egg" situation: In order to attract funding for the entire program, the project scope and impact had to be agreed upon, but this restricted the extent to which Indigenous people could subsequently shape project objectives and design.

There were sometimes major differences in the spatial scale of community interests, which were often local, whereas the scale of research programs focused on the wet-dry tropical region. Differences also arose in the topics that were considered to contribute to theoretical questions and therefore capable of advancing the research discipline, compared with those topics that might address a localized problem. In other cases, there was a lack of alignment between the need for livelihoods research compared with the community need for funding to develop livelihood opportunities like small enterprises.

The TRaCK approach focused heavily on procedural issues, an approach that is common to reforming research practices, according to Davidson-Hunt and O'Flaherty (2007). Less effort was given to epistemological inquiry within the program's research projects, although efforts were made in two projects with varying rates of success. With the benefit of hindsight, it would have been very worthwhile to have included more ethnographic studies of Indigenous ecological knowledge and to have explicitly examined the challenges of knowledge integration in project design (Bohensky & Maru, 2011; Jackson, Douglas et al., 2014). However, giving knowledge production and integration a more explicit focus would have been risky if not quite difficult for TRaCK for two reasons: (a) for many of the researchers, this was their first experience working with Indigenous people, and (b) the skill base of the consortium did not lend itself to a strong sociological and philosophical approach.

On a more practical level, it is important that researchers and Indigenous organisations are aware that research collaborations may be accompanied by expectations for ongoing support that may be difficult to deliver. Whatever the current level of capacity, the process of collaboration undertaken by TRaCK has shown that research can provide a catalyst for positive change—in knowledge, relationships, opportunities, and visions. Although hard to measure, it appears that the process of carrying out the research should be regarded as potentially as valuable as the findings (Newton et al., 2012) and can in themselves generate further positive impacts. Rather than nurture unrealistic expectations, all parties should encourage honest discussions about what is practicable and achievable given the constraints that they all face. There is a particular need to consider the capacities of Indigenous people to engage with and benefit from proposed research collaborations and to tailor the level of engagement accordingly. There is also a need to build the internal capacity of Indigenous organisations to engage more effectively in the governance and management of research programs like TRaCK.

The employment of Indigenous people in the program occurred across a large number of projects in all three jurisdictions including beyond the focal catchments. Another study from this region argues that community employment in research provides direct and indirect benefits and is essential to collaborative projects (Garnett et al., 2009). The main opportunities that the TRaCK Program offered for the employment of Indigenous people were as cultural advisers and field research assistants. However, the field research conducted by the majority of projects was short and sporadic and did not necessitate long-term work contracts. The typical duration for a contract was a week or less on one to two occasions over the life of the project and this often involved different individuals on each trip.

Therefore, the program generally provided short-term employment of a relatively large number of people, rather than a small number of full-time positions. This was the case even for projects that undertook field activities over a longer period in one or a few locations—mainly the social research projects. For example, in the project that worked most intensively with Indigenous research participants (project 2.2), researchers engaged 144 Indigenous informants and research assistants over 3 years. The

research assistants helped in the face-to-face delivery of household surveys in the Daly and Fitzroy river catchments, as well as establishing contacts, facilitating introductions with researchers, setting up interviews, and facilitating discussions.

There were exceptions. Indigenous researchers leading the two Indigenous livelihoods projects held full-time contracts for the duration of their projects. Two other projects (scenario planning and Indigenous participation in water planning) employed an Indigenous research associate for 3 years. In addition, the "Knowledge and Adoption Theme" employed an Indigenous coordinator for the Mitchell River catchment initially part-time and then full-time for a year.

The IES aimed to increase the variety, complexity, and responsibility of the jobs and roles filled by Indigenous partners but this proved difficult to achieve given that most positions were short-term rather than continuous over an extended period. There were, however, a few examples where this did occur (described above). Otherwise, the research imperatives of the majority of projects provided few opportunities for skills development and further employment in more challenging roles within the program, which demanded extended formal training and technical skills (see also Garnett et al., 2009).

Research, like that conducted by TRaCK, generates many benefits for Indigenous people, and not all benefits are realised through employment. For example, Smyth (2012) concluded that research practice that involves and respects Indigenous knowledge provides a means to give contemporary value to cultural traditions, knowledge and practices, and in doing so supports their maintenance and transmission between generations. Field-based research methods in particular can provide welcome opportunities for custodians to visit country, demonstrate knowledge, transfer understanding to young people, and in doing so help strengthen attachments to significant landscapes.

All projects should be able to undertake activities that can allow these processes to occur, no matter what their scientific focus. The depth of the interaction may well differ depending on the level of interest expressed by the community, but gains can be made in visiting country with traditional owners, allowing for exchange of information, and considering the contributions local knowledge can make to addressing research questions and management implications. The following comment by Smyth (2012) illustrates this point:

> While each interviewee reported a unique combination of issues, central to each of them was the opportunity the TRaCK projects provided to enable traditional owners to return to country. For remote, low-income communities with little access to transport and other resources where there were logistical barriers to returning to country, field-based research trips involving traditional owners bring immediate benefit to them, independent of the purpose of the research. That this benefit is regarded as such a significant one is an indication of how rare the opportunity to return to their country is for many traditional owners, and how little policy and financial support is available to meet this aspiration. (p. 4)

A traditional owner offered this comment:

> Working with TRaCK was a good experience—it was an opportunity to tell my stories about my country. I only got a chance to tell some of my stories about some of my country—I'd like the

> opportunity to tell more of my stories to the researchers if they come back. Stories about my country are part of my heritage, and it's my job to keep the stories strong. (Smyth, 2012, p. 18)

Discussion

It is from these comments and other reported outcomes that we can see that TRaCK worked widely with community members to build capacity and ensure that the research was relevant and useful to Indigenous people. For the reasons outlined above, TRaCK was less successful in achieving a high degree of Indigenous control of the projects but nonetheless it is clear that respectful and trusting relationships were the hallmark of most interactions.

Institutional structures resulted in some barriers to research, however. The authors found that the negotiation and execution of research agreements usually required more time than was reasonable. TRaCK researchers accepted that the process of relationship building and negotiating over research scope and goals would take time, but they were not prepared for delays of up to 2 years to execute research agreements with legally incorporated bodies. Although the points of resistance in concluding research agreements were eventually overcome, as Newton et al. (2012) experienced in securing access to communities in the UK for sustainability research, success was not the result of a linear process, "rather, it required continuous attention to the building and maintaining of relationships, with regular reinvestments of time and effort" (p. 589).

Good rapport needs to be maintained throughout the project and there is evidence that TRaCK projects were able to sustain successful communications over a number of years and, in some cases, build on relationships in the interests of addressing new and emerging goals. As should be expected in any social interaction, some researchers developed strong connections with community members as evidenced by assistance with higher education course work and personal job references. A number of TRaCK researchers attended community events such as a regional festival on the weekend to support the event and be seen doing so: not for cynical reasons of gaining and maintaining access to the community, but rather out of a sense of reciprocity and ethical commitment to the community's interests. Spending significant periods of time "hanging out" proved essential (Newton et al., 2012).

Relationships were not always harmonious. In two cases, there was conflict over researcher conduct. One case related to the commencement of research before the agreement was signed (although it had been finalised and the researchers were invited by the representative body to commence research) and, in the other, an Indigenous casual employee felt that another member of the project team had not shown sufficient respect for other individuals in planning and conducting field work. In both cases, the TRaCK Indigenous Engagement Committee met and recommended an appropriate response to the project leaders involved. The first case, for example, resulted in the immediate cessation of fieldwork and withdrawal of the research team, despite substantial cost to the project. Further effort was put into re-building these relationships and they remain very sound.

This observation points to the need for research programs to aim for a high standard of Indigenous engagement and to actively seek to improve on what has been achieved. Review and evaluation are key steps in this process. During the lifespan of the TRaCK program, the TRaCK Indigenous Engagement Committee did not formally review performance against the indicators identified in the Indigenous

Engagement Strategy. Instead, milestone reports to the funding agencies included progress against key performance indicators in the strategy and these were monitored by the REC and the PMC on a six monthly basis. Regular review of progress against the strategy by the IEC would have been helpful in identifying broader issues in Indigenous engagement and for discussing approaches to resolve these.

Future programs should regularly review strategies and report and reflect on the impacts of research collaborations, including immediate positive and negative impacts, as well as longer term catalytic impacts that lead to changed visions, expectations and opportunities. Researchers and Indigenous collaborators should share results to encourage reflection on this issue amongst researchers at annual meetings and to provide opportunities for Indigenous partners to participate in discussions and publish papers on engagement methodologies and practice.

The TRaCK experience confirms Holcombe and Gould's (2010) observation that reliance on institutional regulation and codification alone are unlikely to generate or sustain ethical and collaborative relationship with Indigenous peoples. In the "intimate" ways described above, TRaCK researchers were involved in processes of continual dialogue and genuine negotiation that extended beyond mere adherence to procedure:

> Formal instruments (e.g., a research protocol) are needed to confront power relations in research, but achieving intimacy also requires researchers and their Indigenous colleagues engage in the difficult work of establishing and maintaining trusting relationships that will enable the effective coproduction of knowledge. (Davidson-Hunt & O'Flaherty, 2007, p. 294)

The authors found these experiences very satisfying and have used the insights gained from the TRaCK experience to effect change in other scientific institutions. As noted above, institutional capacity to engage effectively with Indigenous peoples has been a significant constraint in the environmental management field (Howitt et al., 2013). Concerted efforts are required to address the legacy of dispossession and marginalisation that settler nations face in their land restitution, environmental management, and restoration efforts.

The first author, Sue Jackson, played a key role in the development and implementation of the Indigenous Engagement Strategy for Australia's largest national research organisation, the Commonwealth Scientific Industrial Research Organisation (CSIRO). That national strategy, which included employment targets and IEK integration initiatives, ran in parallel with the TRaCK program. It was endorsed at the highest corporate level, signalling to organisation's 6,000 scientific staff that Indigenous knowledge and partnerships were valued by the organisation.

The experiences gained from developing and implementing TRaCK's IES and collaborating with Indigenous people in its research projects had an important influence on the second author, Michael Douglas. TRaCK provided Michael Douglas with his first experiences of the benefits and the challenges of Indigenous engagement and the positive experience has encouraged him to become active in promoting Indigenous engagement among other biophysical scientists and their institutions.

Douglas has used the TRaCK experiences to foster Indigenous engagement at Charles Darwin University among members of his research group and more widely through his positions as Director of the National Environmental Research Programme (NERP) Northern Australia Hub, which succeeded

TRaCK (> 80 researchers from 13 organizations across Australia). Under his direction, the NERP Hub has provided cross-cultural training for researchers from the Hub and for the broader freshwater research community via courses run after national conferences. In concert with Indigenous collaborators, he also been involved in organizing some of the first Indigenous sessions at national freshwater science meetings and has presented at graduate student session at national conferences to promote Indigenous engagement among early career researchers.

Conclusions and Recommendations

This article has described the efforts of a large research consortium to engage ethically with Indigenous communities across a large region and to generate lasting benefits from an improved understanding of tropical rivers socio-ecological systems. In the interests on improving standards of ethical research, we reiterate the key recommendations Jackson et al. (2013) made to researchers, funding bodies and Indigenous communities considering improvements to their Indigenous engagement activities. These were: (a) provide more support for Indigenous leadership of research projects; (b) explore ways of retaining flexibility to respond to Indigenous research priorities that may emerge during the course of the research; (c) allow plenty of time for research protocols to be negotiated and finalised with potential Indigenous partners; (d) ensure ethics approval is granted before the research starts and allow time and funds for communities to influence research design; (e) investigate and support opportunities for longer term employment and skills development; and (f) insist that cultural training for researchers is an essential part of future research programs. Where possible, this training should be delivered by local Indigenous groups involved in the research.

The lessons learnt from the approach to Indigenous engagement adopted by the TRaCK program have influenced the conduct of publicly funded environmental research in Australia and, for this reason, should be of interest to other initiatives of this scope and scale. Following the completion of TRaCK, the authors and other researchers involved in the program now lead the Northern Australian Hub (NAH), one of five research hubs established under the National Environmental Research Programme (NERP, 2011 - 2015). The NAH developed an Indigenous Engagement Strategy based on the TRaCK strategy and the recommendations from Smyth (2012) and Golson (2012) described in part above. This Strategy guides the Hub's 13 research projects, which involve more than 80 researchers conducting terrestrial and aquatic biodiversity research across northern Australia. It was endorsed by the Federal Environment Minister's Indigenous Advisory Committee and was recommended to all other Hubs across this national Programme, forming the basis for an Indigenous Engagement Strategy developed by one other Hub in the program and adopted as part of standard research protocols for Kakadu National Park, Australia's largest national park. An evaluation of the NERP highlighted the benefits of Indigenous engagement in environmental research. The Australian Government's current environmental research program, the National Environmental Science Programme (2015 - 2021), now requires all research Hubs to develop an Indigenous engagements strategy as a condition of funding.

References

Altman, J. C., & Jackson, S. (2014). Indigenous land and sea management: Recognition, redistribution, representation. In D. Lindenmayer, S. Dovers & S. Morton (Eds.), *Ten commitments revisited* (pp. 207-216). Melbourne: CSIRO Publishing.

Altman, J. C., & Kerins, S. (Eds). (2012). *People on country: Vital landscapes, Indigenous futures*. Sydney: The Federation Press.

Altman, J. C., & Whitehead, P. (2003). *Caring for country and sustainable Indigenous development: Opportunities, constraints and innovation* (Working Paper No. 20). Canberra: Australian National University Centre for Aboriginal Economic Policy Research.

Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). (2003). Guidelines for ethical research in Indigenous studies. *Australian Indigenous Law Reporter, 8*(1), 85-93.

Australian Tropical Rivers Group. (2004). *Securing the North: Australia's tropical rivers. A statement by the Australian Tropical Rivers Group.* Sydney: WWF Australia.

Barber, M., Jackson, S., Shellberg, J., & Sinnamon, V. (2014). Working knowledge: Characterising collective Indigenous, scientific, and local knowledge about the ecology, hydrology and geomorphology of Oriners Station, Cape York, Australia. *The Rangeland Journal, 36*, 53-66.

Barbour, W., & Schlesinger, C. (2012). Who's the boss? Post-colonialism, ecological research and conservation management on Australian Indigenous lands. *Ecological Management & Restoration, 13*, 36–41.

Berkes, F., Colding, J. & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications, 10*, 1251-1261.

Blanch, S. (2008). Steps to a sustainable northern Australia. *Ecological Management and Restoration, 9*, 110-115.

Bohensky, E. L., & Maru, Y. (2011). Indigenous knowledge, science, and resilience: What have we learned from a decade of international literature on "integration?" *Ecology and Society, 16*(4), 6. Retrieved from http://dx.doi.org/10.5751/ES-04342-160406

Bradley, J. (2001). Landscapes of the mind, landscapes of the spirit: Negotiating a sentient landscape. In R. Baker, J. Davies, & E. Young (Eds.), *Working on country: Contemporary Indigenous management of Australia's lands and coastal regions* (pp. 295–308). Melbourne: Oxford University Press.

Butler, C. (2006). Historicizing Indigenous knowledge: Practical and political issues. In C. R. Menzies (Ed.), *Traditional ecological knowledge and natural resource management* (pp. 107-126). Lincoln: University of Nebraska Press.

Clark, T. (2008). We're over-researched here: Exploring accounts of research fatigue within qualitative research engagements. *Sociology, 42*(5), 953–970.

Cloke, P. (2002). Deliver us from evil? Prospects for living ethically and acting politically in human geography. *Progress in Human Geography, 26*, 587.

Coutts, J., & Coutts, R. (2011). *Evaluation of TRaCK knowledge and adoption theme* (Stage 1: Defining the ground—Scoping and benchmarking report). Brisbane, Australia.

Cullen-Unsworth, L. C., Hill, R., Butler, J. R., & Wallace, M. (2011). A research process for integrating Indigenous and scientific knowledge in cultural landscapes: Principles and determinants of success in the Wet Tropics World Heritage Area, Australia. *The Geographical Journal, 178*, 351-365.

Davidson-Hunt, I. J., & O'Flaherty, M. R. (2007). Researchers, Indigenous peoples, and place-based learning communities. *Society & Natural Resources: An International Journal, 20*(4), 291-305.

Douglas, M. M., Bunn, S. E., & Davies, P. M. (2005). River and wetland food webs in Australia's wet-dry tropics: General principles and implications for management. *Marine and Freshwater Research, 56*, 329- 342.

Douglas, M., Jackson, S., Setterfield, S., Pusey, B., Davies, P., Kennard, M., Burrows, D., & Bunn, S. (2011). Northern futures: Threats and opportunities for freshwater systems. In B. Pusey (Ed.), *Aquatic biodiversity in Northern Australia: Patterns, threats and future* (pp. 203-220). Darwin: Charles Darwin University Press.

Ens, E., Preuss, K., Finlayson, M., Jackson, S., & Holcombe, S. (2012). Australian approaches for managing country using Indigenous and non-Indigenous knowledge. *Ecological Management and Restoration, 13*(1), 100-107.

Environment Protection and Biodiversity Conservation Act. (1999). C2004A00485 No. 91, 1999.

Garnett, S., Crowley G., Hunter-Xenie, H., Kozanayi, W., Sithole, B., Palmer, C., Southgate, R., & Zander, K. (2009).Transformative knowledge transfer through empowering and payingcommunity researchers. *Biotropica, 41*(5), 571–577.

Golson, K. (2012). *TRaCK Indigenous Engagement Strategy: Report on the findings of the desktop evaluation.* Unpublished manuscript.

Henry, J., Dunbar, T., Arnott, A., Scrimgeour, M., Matthews, S., Murakami-Gold, L., & Chamberlain, A. (2002). *Indigenous research reform agenda: Rethinking research methodologies* (Links Monograph Series 2). Darwin: Cooperative Research Centre for Indigenous and Tropical Health.

Hill, R., Grant, C., George, M., Robinson, C. J., Jackson, S., & Abel, N. (2012). A typology of Indigenous engagement in Australian environmental management: Implications for knowledge integration

and social-ecological system sustainability. *Ecology and Society, 17* (1), 23. Retrieved from http://www.ecologyandsociety.org/vol17/iss1/art23/

Holcombe, S., & Gould, N. (2010). A preliminary review of ethics resources, with particular focus on those available online from Indigenous organisations in WA, NT and Qld. *Australian Aboriginal Studies, 2*, 107-125.

Howitt, R., Doohan, K., Suchet-Pearson, S., Cross, S., Lawrence, R., Lunkapis, G. J., Muller, S., Prout, S., & Veland, S. (2013). Intercultural capacity deficits: Contested geographies of coexistence in natural resource management. *Asia Pacific Viewpoint, 54*, 126-140.

Humphrey, K. (2000). *Indigenous health and Western research* (Discussion Paper No. 2). Melbourne: Vic Health Koori Research and Community Development Unit.

Hviding, E. (2006). Knowing and managing biodiversity in the Pacific Islands: Challenges of environmentalism in Marovo Lagoon. *International Social Science Journal, 58*(187), 69-85.

Jackson, S. & Barber, M. (2013). Indigenous water values and resource governance in Australia's Northern Territory: Current progress and ongoing challenges for social justice in water planning. *Planning Theory and Practice, 14*(4), 435-454.

Jackson, S., Douglas, M. M., Pusey, B. J., Kennard, M. J., Huddleston, J., Harney, B., Liddy, L., Liddy, M., Liddy, R., Sullivan, E., Huddleston, B., Banderson, M., & Allsop, Q. (2014). 'We like to listen to stories about fish:' Combining Indigenous and scientific fisheries knowledge to inform environmental flow assessment. *Ecology and Society, 19*(1), 43. Retrieved from http://www.ecologyandsociety.org/vol19/iss1/art43/

Jackson, S., Finn, M., & Featherston, P. (2012). Aquatic resource use by Indigenous Australians in two tropical river catchments: The Fitzroy River and Daly River. *Human Ecology, 40*(6), 893-908.

Jackson, S., Finn, M., & Scheepers, K. (2014). The use of replacement cost method to assess and manage the impacts of water resource development on Australian Indigenous customary economies. *Journal of Environmental Management, 135*, 100-109.

Jackson, S., Golson, K., Douglas, M., & Morrison, J. (2013). *Indigenous engagement in the TRaCK program: A review of policies, strategies and research activities*. Darwin: TRaCK.

Jackson, S., & Palmer, L. (2014) Reconceptualising ecosystems services: Possibilities for cultivating and valuing the ethics and practices of care. *Progress in Human Geography, 39*(2), 1-24.

Jackson, S., Stoeckl, N., Straton, A., & Stanley O. (2008). The changing value of Australian tropical rivers. *Geographical Research, 46*(3), 275-290.

Janke, T. (1999). *Our culture, our future: Report on Australian Indigenous cultural intellectual property rights* (report prepared for AIATSIS and ATSIC). Sydney: Michael Frankel & Company. Retrieved from http: //www.icip.lawnet.com.au

Kennard, M. J., Pusey, B. J., Olden, J. D., Mackay, S. J., Stein, J. L., & Marsh, N. (2010). Classification of natural flow regimes in Australia to support environmental flow management. *Freshwater Biology, 55*, 171–193.

Knight, A. T., Cowling, R. M., Rouget, M., Balmford, A., Lombard, A. T., & Campbell B. M. (2008). Knowing but not doing: Selecting priority conservation areas and the research-implementation gap. *Conservation Biology, 22*, 610–617.

Kobayashi, A. (2001). Negotiating the personal and the political in critical qualitative research. In M. Limb & C. Dwyer (Eds.), *Qualitative methodologies for geographers* (pp. 55-72). London: Arnold.

Langton, M. (2002). Freshwater. In *Background briefing papers: Indigenous rights to waters* (pp.43-64). Broome: Lingiari Foundation. Retrieved from www.atsic.gov.au/issues/Indigenous_Rights/Indigenous Rights_Waters/docs/layou_oonshore.pdf

Louis, R. P. (2007). Can you hear us now? Voices from the margin: Using Indigenous methodologies in geographic research. *Geographical Research, 45*(2), 130–139.

Muller, S. (2014). Co-motion: Making space to care for country. *Geoforum, 54*, 132-141.

National Land and Water Resources Audit. (2002). *Australian catchment, river and estuary assessment* (Vol. 1). Canberra: Land and Water Australia.

Newton, J., Franklin, A., Middleton, J., & Marsden, R. (2012). (Re-)negotiating access: The politics of researching skills and knowledge for 'sustainable communities.' *Geoforum, 43*, 585-594.

Orr, M., Kenny, P., Gorey, I. N., Mir, A., Cox, E., & Wilson, J. (2009). Desert Knowledge Cooperative Research Centre Aboriginal knowledge and intellectual property protocol: Community guide. Alice Springs: Desert Knowledge Cooperative Research Centre and Waltja Tjutangku Palyapayi.

Palmer, L. (2007). Interpreting nature: The politics of engaging with Kakadu as an Aboriginal place. *Cultural Geographies, 14*, 1-19.

Postel, S., & Richter, B. (2003). *Rivers for life: Managing water for people and nature*. Washington DC: Island Press.

Pusey, B., Warfe, D., Townsend, S., Douglas, M., Burrows, D., Kennard, M., & Close, P. (2011). Condition, impacts and threats to aquatic biodiversity. In B. Pusey (Ed.), *Aquatic biodiversity in Northern Australia: patterns, threats and future* (pp. 151-172). Darwin: Charles Darwin University Press.

Shackleton, C. M., Cundill, G., & Knight, A. T. (2009). Beyond just research: Experiences from southern Africa in developing social learning partnerships for resource conservation initiatives. *Biotropica, 41*, 563–570.

Sillitoe, P., Bicker, A., & Pottier, J. (Eds.). (2002). *Participating in development: Approaches to Indigenous knowledge*. London: Routledge.

Smyth, D. (2012). *Reflections on Indigenous engagement in TRaCK*. Unpublished manuscript.

Stephenson, J., & Moller, H. (2009). Cross-cultural environmental research and management: Challenges and progress. *Journal of the Royal Society of New Zealand, 39*(4), 139-149.

Storrs, M., Yirbarbuk, D., Whitehead, P., & Finlayson, C. (2001). The role of Western science in contemporary Aboriginal community wetlands management in the Top End of Australia. In M. Carbonnell, N. Nathai–Gyan, & C. Finlayson (Eds.), *Science and local communities: Strengthening partnerships for effective wetland management* (pp. 7–13). Memphis, Tennessee: Ducks Unlimited Inc.

Toussaint, S., Sullivan, P., & Yu, S. (2005). Water ways in Aboriginal Australia: An interconnected analysis. *Anthropological Forum, 15,* 61–74.

Vörösmarty, C., McIntyre, J. P., Gessner, M., Dudgeon, D., Prusevich, A., Green, P., Glidden, S. Bunn, E., Sullivan, C., Liermann, C., & Davies, P. M. (2010). Global threats to human water security and river biodiversity. *Nature, 468,* 334-334.

Woodward, E., Jackson, S., Finn, M., & Marfurra McTaggart, P. (2012). Utilising Indigenous seasonal knowledge to understand Indigenous aquatic resource use and inform water resource management. *Ecological Management and Restoration, 13*(1), 58-64.