

From the other side of the knowledge frontier: Indigenous knowledge, social–ecological relationships and new perspectives

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Abstract. A river is like a mirror: it reflects the care given by people whose lives depend upon it. A scald on red ground or the slow death of a river reveals more than troubled ecological relationships – they are signs of broken social relationships. How people take care of social relationships and how they take care of ecological relationships are the same question.

In this paper we emphasise the importance that Aboriginal people place on social relationships for good ecological relationships. In the past few decades natural resource managers have sought Indigenous knowledge relevant to Western ideas of environment, and in doing so, created distinctions between ‘ecological’ and ‘social’ knowledge – this is an artificial ‘white-fella’ separation. Additionally, Indigenous knowledge has been treated as if it were a static archive that need only be extracted and applied to resource development and planning. Instead it is dynamic, adaptive and contextual. As a consequence of compartmentalisation and the assumption of timelessness, the importance of social relationships in ecological relationships has been overlooked.

Some research has explored similarities between Indigenous knowledge and the Western concept of adaptive management, and raised the possibility of synergy between them. We agree there are possible connections and opportunities for exchange and further learning between Indigenous knowledge and ecological resilience and adaptive management. However, Indigenous knowledge and Western science belong to different world views. An important task is to explore ways of grappling with this ontological challenge. We suggest a conceptual turn around that we believe could assist in opening a dialogue as well as creating a set of foundational principles for robust ecological and social relationships.

Additional keywords: environmental management, rivers, traditional environmental knowledge, water resources.

Introduction

‘My family tell me that the way to look after country, the way to look after the environment, is I got to look after my little brother, and I got to look after my little sister; and when I do that, I know country is going to come look after me.’ Phillip Sullivan, 23 July 2008, Bourke, NSW.

In this paper we draw upon our collaborative research into the meanings of the ecology of the Darling River for Aboriginal people in the Bourke region of semi-arid western NSW. We emphasise the importance that Aboriginal people place on social relationships for good ecological relationships. In the past few decades environmental managers and others seeking to learn from Indigenous knowledge have done so within a Western framework of ideas about environment. This has replicated distinctions between ecology, economy and culture in representations and use of Indigenous knowledge, and often forced Indigenous people themselves to work within these boundaries in collaborative work

with resource managers, and in response to policies that affect their lives (Weir 2009). Additionally, Indigenous knowledge has often been treated as if it were a static archive that need only be extracted and applied to resource development and planning (Cruikshank 1998; Goodall 2008). Instead it is dynamic, adaptive and contextual. As a consequence of compartmentalisation and the assumption of timelessness, the importance of social relationships in ecological relationships has been overlooked.

Two theories of ecology and natural resource management in Western knowledge offer possible connections and opportunities for exchange and further learning with Indigenous knowledge: ecological resilience and adaptive management. Similarities between Indigenous knowledge and adaptive management and the possibility of synergy have been noted (e.g. Berkes *et al.* 2000). However, Indigenous knowledge and Western science belong to different world views. The important task is to explore ways of grappling with this ontological challenge so that those concerned can facilitate good relationships, creative exchanges,

and productive partnerships. The approach we suggest rests on a conceptual turn around. Instead of perceiving society's current circumstances as a Western system that is starting to 'bring in' some Indigenous knowledge, we imagine it from the other side: that the non-Indigenous society and system has been accommodated into the more situated and longer established Indigenous system. This could be a powerful means of opening a dialogue as well as creating a set of foundational principles for robust ecological and social relationships.

Epistemological errors

Culture is not timeless

Take a walk down Bourke's main street and about midway, on the northern side, you will see a panoramic mural spanning the roofline of a simple brick building. It is a kind of timeline. At one end there is a single panel devoted to Aboriginal life and Dreaming before colonisation, while the rest of the panels show a sequence of European exploration, pioneer settlement, a changing pastoral industry, reminders of historic floods, and a modern outback town. Where are the Aboriginal people in the rest of this story? Where are the Ngemba, Morowari, Paarkinji, Weilwan, Barabinja, Ualarai, Kamilaroi, or any of the other people from 21 different language groups who have settled in Bourke? Where are the Aboriginal shearers, truck drivers and lawyers? There are multiple spellings for some of the above languages in the literature and among people who speak or identify with them. We use the spelling from the Department of the Environment, Heritage and the Arts (2005).

This mural is typical of perceptions of Indigenous culture as timeless and of Western culture erasing traditional culture. Forty-thousand years can be represented in one panel because traditional culture is unchanging; history begins with the arrival of white settlers. This perception has had broad implications for law and policy. For example, Native Title legalisation requires Indigenous people to not only prove that they owned the land (according to Western notions of ownership), but that they prove continuing practice of 'traditional' customs (Weir 2009). Historian Heather Goodall (2008) points out that pressure to construct Indigenous knowledge as a 'static repository of pre-colonial knowledge' also came from the environmental movements that emerged in the 1960s, where 'indigenous people were depicted as exotic "noble environmentalists" living "in harmony" with the non-human environment'. These perceptions have also shaped how environmental managers and policy makers have understood and made use of Indigenous knowledge for ecology.

Knowledge is more than data

For much of the 20th century Western ecological theory and management was dominated by the concept of equilibrium: that ecosystems return to a steady state, or balance, after disturbance. Adherents to this model rely heavily on quantitative measures for environmental management. They focus on maintaining the 'maximum sustainable yield' and on controlling resources to increase predictability from season to season, so that determining optimum stock numbers or yield targets, for example, are seen as important data guiding decision making (Berkes *et al.* 2000). Under this model different aspects of the environment are treated separately instead of holistically, whether in policies,

institutions or management structures, and knowledge is split between the dualistic concepts of production and protection (see Weir 2009).

This approach to ecology and environmental management, coupled with the perception that traditional cultures are fixed, and the underpinning of a Western epistemology which privileges formal and abstract articulation of knowledge (Lauer and Aswani 2009), has resulted in superficial engagements with Indigenous knowledge. Commonly, projects have been concerned with benchmarking (i.e. what was the environment like before Europeans?), and with listing and categorising Indigenous people's names for individual species, sometimes with a short description of the 'cultural' uses and meanings for particular plants and animals. Heather Goodall and Alison Cadzow (Goodall and Cadzow 2009) observe in *Rivers and Resilience*, 'This might record the valuable details of traditional stories, but it will miss the moral of such stories about life principles which will form the plot or the overall values of the story'. Indigenous knowledge is treated as a database or list, a form that fits comfortably within the methodological frameworks that scientists and environmental managers employ (Goodall 2008). Crucially, the contextual beliefs and alternate world views that critically and ethically challenge dominant knowledge regimes are ignored.

Management is not a toolkit

In recent years researchers engaging with Indigenous knowledge for ecology (often referred to as Traditional Ecological Knowledge or TEK) have recognised that Indigenous knowledge should not be viewed as 'content' ready to be extracted and applied to natural resource management, but instead it should be seen as a process – a set of practices and interactions between people, other living beings, and things; one that Rose (2005b) notes has been developed and tested over many generations, has enabled people to live in a changing and seasonally variable Australian environment for more than 40 000 years, and one that is underpinned by complex relational ethics. Indigenous knowledge is not unchanging, and policies and laws should not suspend it in a particular moment in time. It is adaptive to changing environments and changing social contexts. It is made and renewed through processes 'intrinsic to the socially situated activities of people engaging with one another and their biophysical environments' (Lauer and Aswani 2009). These processes are closely bound with local place.

One of the often stated benefits of drawing on TEK for management purposes is that it enables a larger and better toolkit – two knowledge sets, instead of one. In contrast, our research, like that of others around the world, shows that Indigenous knowledge is about connections and patterns. As a knowledge system, Indigenous knowledge is emplaced, recognises its own limits, does not create an artificial boundary between human and nonhuman systems, and therefore challenges many of the standards of Western science. It is not a toolkit for management, but an ethic for living.

Indigenous knowledge as situated, process

Aboriginal people overtly acknowledge the agency of place in everyday interactions and its role in constituting and maintaining knowledge. Human geographer Jessica Weir (2009) argues that

Aboriginal people's emphasis on 'knowledge coming from a specific place' has been one of the characteristics most commonly contrasted with Western thinking. Western science has tended to assert its universality, its 'placelessness'. David N. Livingstone (2003) points to the emergence of the laboratory as a site designed to remove the contaminating influence of local context. However, as Livingstone (2003) has so elegantly demonstrated in *Putting Science in its Place*, science is always 'a view from somewhere': the museum, the field, the botanical garden, the hospital, the human body, or a particular region. In contrast to Western language in which place is often concealed or the present environment goes unregarded, the importance of place, of the situated context of knowledge, is deeply embedded in Aboriginal people's language and in ways of speaking in and about country. In an essay in *Words for Country* Heather Goodall (2002) recounts a conversation in which Brad Steadman, an artist, teacher and researcher from Brewarrina, describes an audio recording of an elderly Aboriginal man from Walgett made in the 1970s. In the recording the non-Indigenous interviewer presses for the general word for river but the man will only say 'Barwon' because that is the country he is in.

Indigenous ecological knowledge is closely entwined with place. The characteristics of particular ecologies – and their temporally shifting qualities and indicators such as permanent and ephemeral features, the time of year, continuing drought or wetter seasons – provide the context within which knowledge is generated, maintained, and modified. Goodall (2008) describes how 'continued fishing' means 'continuing conversations about bait, habits of fish, troublesome or interesting insects on the bank, the state of the river and of course the stories about them all' and how in this process context often includes indicators of change. For example, people in the Barwon–Darling region talk about 'the river water being more or less turbid than it was in the past, having more or less of any species of reeds or mussels or the invasive carp and of the water itself moving in a different way' (Goodall 2008).

Similarly, Rose's (1992) research across several ecological zones in northern Australia provides further concrete examples of this widespread characteristic of Indigenous ecological knowledge. Events are ordered by connections: sequence and co-occurrence are of the first importance. For example, when the march flies start biting, the crocodiles are laying their eggs. When the Jangarla tree (*Sesbania formosa*) flowers, the barramundi are biting. When the seed pods of the baubinia tree (*Lysiphyllum cunninghamii*) turn dark red the really hot weather is here. Such communicative patterns can link events across a wide area with others that are localised. This has practical benefits: for example, it is not necessary to keep going to the waterhole to check to see whether or not the crocodiles have laid their eggs, 'it is simply enough to be bitten by a March fly' (Rose 2005a). Within this communication system, country tells you what is going on; it calls for action and invites engagement. One call leads to another, so that action is both a response and a message.

An illustration: the Darling River is a gift

On a map the Darling River is a long blue streak running diagonally across South-Eastern Australia. At Bourke the milky water is the colour of the soil it carries – a mix of yellow and black cracking clays. A scaled cartographical line also disguises the

complex meandering of the river. Its broad floodplains form a network of channels, lagoons, anabranches, billabongs, creeks and lakes. The Darling draws in the rain-fed rivers which flow west from the Great Dividing Range. These rivers often flow low and slow into the semi-arid inland, but sometimes surge with floods that can push annual flows many times higher than recorded averages. The Darling is one of the longest rivers in Australia, and has wildly variable annual flows. No dams regulate it; however, there are weirs all along its length, large private off-river storages in irrigation centres, and many of its tributaries are regulated.

The Aboriginal people's adaptation to and recognition of the variable and complex lowland riverine ecology of the Darling is evident in the multiple Dreaming stories for the region. The most significant and widely known is the story of Biaime, an ancestral creator spirit. Biaime's strides and tools left marks from Cobar to Byrock, Gundabooka, and the fish traps at Brewarrina, creating and setting aside important places for water and food in the dry environment. He shaped the land and he also provided lore and customs (Woodfield 2000). This means that physical environments and social responsibilities are intricately connected. Stories about *Ngatji* (Paakantji) or *Wawi* (Ngemba) are Rainbow Serpent stories that expand on the creation of the river, lagoons and waterholes, how these are connected to each other and to the different species that inhabit them, and how they function according to seasonal conditions. Importantly, they also link the different people along the river and show how mutual life-giving, connectivity and respect in the existing world of change are 'entangled with Dreaming and totem stories' (Rose *et al.* 2003). Knowledge to sustain ecological processes and the social roles and responsibilities between people, other living creatures, and the wider environment produce each other.

In contrast to non-Indigenous people, who view water in a river system as a material resource to be divided among various consumers (including the environment) and stakeholders (Weir 2009), Aboriginal people see water and its ecology as a gift. As Sullivan explains:

'Water to me is the essence of life. And I've got to respect life, and I've got to honour life. If I don't honour it and look after it, then it's going to take my life away from me. It's going to take the very essence of who I am away from me. So that's why I honour the river, the water, and give respect to it. Because in the end if I don't look after that... then me and my family and my tribe and the gift that's been given to us is going to be whittled away. I got to give honour and I got to give respect to that, first and foremost. And then everything else will fall into place. It's like a bit of a foundation.' Phillip Sullivan, 24 July 2008, Bourke, NSW.

The gift is the life-force that brings the world into being. Stories are ways of ensuring people retain the knowledge for how to allow life to flourish. So even though the Darling is in 'poor health' (Murray–Darling Basin Commission 2008), even though local Aboriginal and non-Indigenous people observe ecological degradation (Goodall 2002), there is still the potential for renewal. According to Sullivan:

'But in a traditional setting, if there was nothing there, there's still something there... Yes, it still flows. That place I'm talking about. The spiritual place. It's always there.'

There's a story that the river will always flow, it never stops. In spirit it flows.' Phillip Sullivan, 24 July 2008, Bourke, NSW.

However, without respect for the river and respect for the gift, without respect for each other, the story is diminished and so is the potential for life to flourish. If the story is lost so is the river. Losing that close knowledge and connection with the gift takes away your 'very essence'. Similarly, Weir (2009) documents how the Yorta Yorta further south on the Murray equate the death of the river with the death of a people. For many Indigenous people, the health of country is 'inextricably linked with human health' (Green *et al.* 2009). This is markedly different to Western knowledge and practices which keep research and policy for the environment separate from human health (Johnston *et al.* 2007). If Indigenous people are unable to fulfil their obligations to look after country then people and environment become sick.

Indigenous knowledge as resilience and adaptive management?

In Western ecological theory, 'resilience' encompasses an ecological model as well as a particular process or 'philosophy' of human interaction with the ecological systems in which people are embedded (Walker and Salt 2006). Ecological resilience and 'adaptive management' often go hand-in-hand in the literature. Ecological resilience is a model of ecological systems that focuses on describing the 'capacity of a system to absorb disturbance and still retain its basic function and structure' (Walker and Salt 2006), as well as its capacity for 'renewal, reorganisation and development' (Folke 2006). Adaptive management emerged from this systems model: if social-ecological systems are complex and adaptive, and if understanding various components of the system does not result in the ability to predict their behaviour (Walker and Salt 2006), then the management regime should also be adaptive. Resilience and adaptive management allow for the role of redundancy, respond to changing contexts, and recognise the role of humans in ecological systems.

Some researchers have pointed to similarities between resilience and adaptive management and Indigenous ecological knowledge (see Gadgil *et al.* 1993; Berkes *et al.* 2000; Rotarangi and Russell 2009). Berkes *et al.* (2000) suggest that adaptive management is a 'rediscovery' of traditional knowledge and management in Western culture. They outline some characteristics that are in common with Indigenous ecological management: multiple species management, resource rotation, succession management, landscape patchiness management, managing processes on multiple scales, nurturing sources of renewal, and managing pulses and surprises. Also in common are some social processes that generate and sustain these practices, such as reinterpreting signals for learning, integrated knowledge, geographically contextual knowledge, cross-scale institutions, taboos and regulations, and 'appropriate world views and cultural values' (Berkes *et al.* 2000).

Rose (2004) has developed a concept of resilience that is complementary to the ecological theory defined by Walker and Salt (2006). Significantly, Rose (2004) distinguishes between three broad types of human action in relation to resilience: the three types are anti-resilience, engineered resilience and facilitated resilience. The first type is one in which humans

actively oppose and seek to suppress nature's resilience. Typically these projects involve large schemes that result in significant disturbances to ecosystems. Large dams and clear-felling are examples of anti-resilience, and so are the monocultures that James C. Scott examines in *Seeing like a State* (Scott 1998). The second type, engineered resilience, comprises efforts to force nature to behave as humans would like nature to behave. Holling (1996) argues engineering resilience emerged from a disciplinary divide between ecological science informed by the biological sciences, and environmental science informed by the physical sciences and engineering. Engineering resilience focuses on efficiency, constancy and predictability: 'all attributes at the core of engineers' desires for fail-safe design' (Holling 1996). This type 'works selectively to promote aspects of resilience deemed valuable to humans' (Rose 2004). In contrast, facilitated resilience involves 'observing nature's own processes and then working to facilitate the conditions under which nature's resilience can flourish' (Rose 2004). Facilitated resilience adds to ecological resilience a description of the human actions necessary for good social-ecological relationships. These actions are underpinned by the central tenets of Aboriginal ethics and world view discussed earlier: a philosophy of mutual benefits, respect, connectivity, and an understanding that life is both for itself and for others (Rose 2005a). It is the 'appropriate world views and ethics' which is most distant in any comparative similarities between Indigenous knowledge and resilience and adaptive management.

Social relationships for good ecological relationships

'The environment is a reflection of who we are as human beings, and the environment is in a crappy way. And you know why it's in a crappy way? Because we're in a crappy way. That's the bottom line. The environment is terrible. The river is terrible. The water's still there, but the river's terrible. And it's in a crappy way because we as a people are in a crappy way. And when we get that right, when we get that relationship right, without forcing our issues on each other, I believe that the river will be right.' Phillip Sullivan, 24 July 2008, Bourke, NSW.

Most research informed by resilience theory has focused on describing the function of ecological systems and the characteristics that make a system resilient or vulnerable. Some work has also gone into mapping the connections between social and ecological systems. This research has focused on the ecological side of social-ecological systems, although the literature on the social dimensions for dealing with uncertainty and change is growing (Folke 2006). Some research, such as Adger's (2000) study of changing economic use of Vietnamese mangrove environments, has tried to show how ecological resilience affects social resilience. There is little work, however, on how the character of social relationships affects ecological resilience and social-ecological relationships. Indigenous knowledge for ecology emphasises the importance of good social relationships for good ecological relationships.

The riverine system of the upper Darling is in poor health not only due to past management practices, but also as a result of strained social relationships. The management regime for

the river has taken an engineering resilience approach, with its primary focus on maximum yield for irrigation. Social relationships have suffered under this regime. There are tensions between upstream and downstream water users, inequitable allocation and access, fear and mistrust about production practices (such as chemical use), and people feel they have no say in what is happening to their common resource (Goodall 2002); it is a social environment that has produced race riots, mental health problems, and as the population decline in recent years has shown, a lack of capacity to deal with stresses such as drought (see Burdon 2009). As the pressures of drought, structural reform, and failed land management regimes contribute to population decline in rural communities, often it is the Aboriginal people who decide to stay (Goodall 1999; also see Estens 2010), and yet Aboriginal people report being left out of decision-making processes. It is a place where individuals feel it is acceptable to take water from the town water supply for irrigation purposes with no authorisation (McHugh 1996). The environmental management regime has depended on a social framework centred on regulation, coercion, and partial privatisation. It is a regime that the Murray–Darling Basin Commission's (2008) *Sustainable River's Audit* indicates has failed.

Sustainable relationships with the ecological systems of which people are a part, especially collective resources such as the Darling River, depend on trust, cooperation, reciprocity and exchange, common understanding, and feelings of connectedness and belonging in groups (Pretty 2003). Tara McGee (1999) examined community and individual responses to chronic environmental contamination in the far west mining town of Broken Hill, NSW. The study found that degradation continued to occur because social relations were fractured and there was no strong community response to prevent it. In an article for *Science* Jules Pretty (2003) outlined the importance of strong social relationships for environmental management using the notion of social capital, a term popular in social sciences. Pretty presented a synthesis of literature in this area that demonstrates divisions within communities can result in environmental damage, but good social relationships based on trust and reciprocity contribute to 'the development of long-term obligations between people, which helps in achieving positive environmental outcomes' (Pretty 2003).

For generations of Ngemba people, successful living on the upper Darling required a complex ethics of mutual respect and generosity towards other groups living in the region. Access to the river would almost always be granted to other groups, but negotiating that access depended on formal displays of respect. Ngemba people are the custodians of the large fish traps at Brewarrina and it was part of their lore that other groups would share in the maintenance of the fish traps and in the fish caught there. The neighbouring Morowari, Paarkinjji, Weilwan, Barabinja, Ualarai, and Kamilaroi people were invited to share in 'great corroborees, initiation ceremonies, and meetings for trade and barter' (Department of the Environment, Heritage and the Arts 2005).

Further to the relationships among people, however, other species and non-living elements of the environment are incorporated into social structures. Sullivan, for example, is in a kinship relationship with the Yellowbelly or Golden Perch (*Macquaria ambigua*). To be in relationship with the fish is to be

responsible for everything connected with its well being: 'Having a "totem" is ... about looking after everything. Everything that's associated with the animal, like the yellowbelly, I have to look after the fish, the water, the reeds – everything to do with that fish.' Conceptual separations between humans and non-humans are not as distinct in Aboriginal culture as they are in Western culture. Other species can be regarded as relatives. Kinship with the non-human world, allowance for non-human sentience, and other aspects of Indigenous ecological knowledge challenge more than different management styles and paradigms; Indigenous knowledge creates an ontological challenge.

Turning around: accommodation, dialogue, and perspective taking

'The Yellowbelly always swims forwards, but he can turn around.' Phillip Sullivan, 24 July 2008, Bourke, NSW.

The theory of ecological equilibrium and the management regime of engineering resilience emerge from a broader set of historical and cultural perceptions. They are part of a Western world view that separates nature from culture conceptually, has an anthropocentric value system that perceives the non-human world primarily as a resource for humans, and devalues non-Western cultures and Indigenous knowledge. Any serious intention to learn from Indigenous knowledge for ecology requires more than getting past the construction of traditional knowledge as static data. It also requires more than choosing between ecological models and associated management regimes. Adaptive management might have some similarities to Aboriginal ecological management practices but it does not take other species as relatives, it does not allow for non-human sentience, it is not founded on the dynamics of love and respect. This is the ontological divide that needs to be negotiated for strong partnerships between resilience and adaptive management and Indigenous knowledge.

We suggest a way of grappling with this ontological challenge: consider it from the other side of the knowledge frontier. Instead of conceptualising current circumstances as a Western system that is trying to 'bring in' some Indigenous knowledge, the Western system might be considered to have been accommodated into the longer established and more situated Aboriginal system. Just as Henry Reynolds' book *The Other Side of the Frontier* asked non-Indigenous Australians to consider the process of invasion from the point of view of the colonised (Reynolds 1981), we are asking readers to try to see how the non-Indigenous knowledge system might look to Aboriginal people and how they perceive Western culture in relation to an established Aboriginal system. For Aboriginal people the act of accommodation is not simply about showing benevolence, the motivation is practical – good ecological relationships depend on good social relationships. This is why it is so important for Ngemba people that strained social relationships in the upper Darling region are repaired. Distrust, fear, isolation and inequity are not good for country.

How might this re-conceptualisation of the relationship between these two knowledge systems change the dialogue? How might negotiation take place differently? One important step for beginning this process would be to acknowledge history in any dialogue about place and ecological management. Heather

Goodall (2001) reminds us that dispossession did not occur evenly, completely, or at any one single point in time. Aboriginal people's work in the pastoral industry allowed custodial relationships with country to be maintained. Living on the stations in camps, droving, fencing and boundary riding 'allowed sites to be visited and cared for and children to be taught traditional stories as well as to learn the recent histories of those places' (Goodall 2001). Dispossession for Aboriginal people in the rangelands did not occur with the landing of Europeans at Sydney Cove, or with the crossing of the Great Dividing Range and the locking up of the inland to leaseholders – it occurred within the lifetimes of Aboriginal people currently living there. Goodall (2001) argues that the push for smaller, family-run grazing operations, and the protracted economic downturn that occurred in rural Australia in the second half of the 20th century disrupted patterns of dual occupation. Rural culture shifted – fences went up, environmental degradation continued, and demands for labour shrank. As Goodall argues, Aboriginal people living on the rangelands have a strong sense of 'a very recent loss of their country', and that this has been a 'powerful motivator' for land rights campaigning. This sense of a recent loss, and a recent denial of the opportunity to fulfil their obligations for country, shape Aboriginal people's approach towards cooperation on ecological management and creates a sense of urgency towards the goal of being able to repair social–ecological relationships.

Turning around perspectives would need to involve more than abstract commitments. Meetings would have to take place on country, on Aboriginal people's terms and according to Aboriginal people's customs, and not within Western frameworks for what constitutes negotiation. This is part of the ethics of respect. Another means of facilitating this process could be drawn from a pedagogical tool used in some United States universities called 'social perspective taking'. This was developed as a means of countering race, class and gender tensions in the United States. Activities are centred on story, because narratives serve as the 'primary acts of the mind' (Hardy 1977 quoted in Rios *et al.* 2003). Participants are asked to engage with narratives of 'others' and situate these according to their own narratives, gauging degrees of connectedness. One specific activity, for example, involved watching a video of marginalised people discussing their feelings at being ignored by a teacher or denied the opportunity to learn in their own language. In a role play response students write letters from multiple perspectives – the marginalised person, the teacher – explaining the situation from each imagined point of view.

Researchers found this type of activity forced deep reflexivity and challenged taken for granted assumptions and dominant world views (Rios *et al.* 2003). In many cases social perspective taking created teachers who continue to act as advocates for social justice, and students who gained a deeper understanding of complex relations and a desire to improve society. The fostering of a minimum understanding through structured training for environmental managers, scientists and policy makers, could incorporate some element of social perspective taking. All Aboriginal people are expected to understand and participate in the non-Indigenous system, whether or not they are 'experts' or 'specialists' in non-Indigenous Western culture, so it is not unreasonable to expect a similar standard of non-Indigenous people. There are many possibilities for turning around

perspectives. These are just two we have discussed in our collaboration and we hope it becomes an area that attracts further research. Eventually this process would reveal the extent to which a serious commitment to engaging with TEK requires more than a change in management styles – it requires a change in world views and ethics for living. However, it would also provide some tools for grappling with that challenge.

Conclusion

In *How a Continent Created a Nation*, historian Libby Robin (2007) describes a nation so obsessed with improvement and development that it 'was seldom able to acknowledge or learn from failure or accommodate new dimensions' and this has been particularly the case with Indigenous knowledge. 'In every era,' argues Robin (2007), 'Australian governments have funded "universal" science in the service of an international economy at the expense of distinctive sciences of Australian plants, animals and places'. Part of the missed opportunity to develop a distinctive Australian science includes the historical failure to acknowledge the important role Aboriginal people could play in developing knowledge for good social and ecological relationships in Australia. The future of our social–ecological systems depends on a change in this culture. Creative exchanges between diverse knowledge systems are an important part of challenging this approach that has dominated Australia's history.

At Bourke the vegetation is starting to return to the scalds at Gundabooka National Park. Sullivan explains this is the material evidence of improving social relationships: 'National Parks asked us to come and work with them to tell them how to look after this place. Now we see country come good.' The vegetation might be weeds mostly, but that is acceptable, because it is country telling him that it still has potential for life. The spirit is still there. Recent rain in Queensland and North-West NSW has filled the waterholes and creeks, and the Darling is flowing vigorously. Sullivan told us that when the rains came and the river started to move, he stood on the bank watching it, and started to cry. We wondered about our society, rain, and rivers, the flowing 'gift' – can we work together to foster productive, respectful partnerships?

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