
“A beautiful soaking rain”: environmental value and water beyond Eurocentrism

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Abstract. Current approaches to valuing nature within environmental and natural resource management are based on and limited by Eurocentric knowledge and experience of northern temperate nature. Methods based on separation and domination marginalise other ways of knowing nature and thinking about value. The aims of this paper are to unsettle current ways of thinking about water values; to decentre Eurocentric thinking about water management; and to present a different way of thinking about values associated with water, based on an empirical study of the Lake Eyre Basin in central Australia. The paper takes a multidisciplinary approach, drawing on multiple knowledges of Australian water, including indigenous, local settler, and scientific knowledge, and on lessons from Australian Aboriginal people and the academic discourse of Aboriginal Studies. In particular, it considers how a focus on variability—a concept emerging from the Australian landscape (rather than from northern temperate landscapes)—might foster different thinking about water and value. Variability takes as a starting point the diversity, change, and complexity of water and values, as opposed to separation and domination. This focus highlights two points currently marginalised in dominant practice of environmental valuation: that the variability of Australian water regimes is valued, and that values themselves are characterised by variability.

Introduction

The town of Birdsville lies on the eastern fringe of the Simpson Desert, central Australia. Home to around 100 people, Birdsville services the surrounding cattle properties and an ever-growing tourism industry. Tourists are drawn to the sand dunes of the Simpson, the ephemeral inland waterways, and to outback driving (Schmiechen, 2004). The Diamantina River forms the focus for life in this dry and variable landscape. The river is fed by monsoonal rains in its northern headwaters; the southern reach of the monsoon varies from year to year, so the river flows episodically. In dry times it exists as a string of disconnected waterholes, but from time to time the river brings floodwaters which transform the landscape and isolate the town of Birdsville for months at a time. In October 2002 Birdsville was host to the Lake Eyre Basin Biennial Conference and Ministerial Forum. The conference sought to provide a forum for members of the Lake Eyre Basin community, government officials, scientists, and others with interest in the region to exchange information relevant to its sustainable management (Lake Eyre Basin, 2002). The conference focused on the values of water resources in the Basin, dividing proceedings into three sessions: ‘water for making a living’, ‘water for wildlife and nature conservation’, and ‘water for society and culture’ (Lake Eyre Basin, 2002).

The focus at this conference on values of water is part of a broad trend in environmental and natural resource management to assess the values of nature. In contemporary environmental management the concept of ‘value’ is most often discussed in terms of ‘valuation’, a process that aims to express a ‘value’ for goods and services provided by nature, in order to enable scientific observation and measurement (Farber et al, 2002). But valuation is also a process “through which invaluable and complex ecosystems are reduced to commodities through pricing” (Heynen and

Robbins, 2005, page 2), and has been described as one form of neoliberalisation of nature (Heynen and Robbins, 2005; Robertson, 2004). In this paper I argue that current approaches to valuing water within environmental and natural resource management are geographically and culturally specific, and are based on and limited by Eurocentric knowledge. Such approaches emerge from northern temperate landscapes and experiences of nature, and marginalise other ways of knowing the world and thinking about nature and value. In this paper I aim to unsettle current ways of thinking about water values; to decentre Eurocentric thinking about water resource management; and to present a different way of thinking about values associated with water, based on an empirical study of the Lake Eyre Basin, central Australia.

Valuing nature beyond Eurocentrism

The discourse of environmental value is broad. For example, research in the past decade has aimed to place a monetary value on nature (Costanza et al, 1997; Daily et al, 2000); to critique the commodification of nature (Bakker, 2003; Castree, 2003; Heynen et al, 2007) and specific methods of valuing nature (Burgess et al, 2000; Robertson, 2004; Spash and Vatn, 2006); to urge rethinking of the way in which environmental value is considered (O'Neill et al, 2007); and to investigate values associated with nature held by specific groups, including indigenous peoples (Jackson, 2006; Morgan et al, 2006). Yet the thinking and practice of environmental valuation within environmental and natural resource management favour a narrow approach that separates and categorises values in order to apply a common metric and to compare potentially competing interests.

This approach is geographically and culturally specific. It emerges from Eurocentric thinking about nature and value, and experience of northern temperate nature. Following Richard Howitt and Sandra Suchet-Pearson (2003, page 557), I understand 'Eurocentric thinking' as knowledge that draws on "Enlightenment science, industrial revolution technologies, market economics and/or Judeo-Christian philosophies", which assume "a naturalized and externalized truth founded on a belief in atomism, where the world is divided into distinguishable segments with essential differences." Definitional categories and boundaries are central to Eurocentric thinking, and the nature/culture binary is one of the core dualities of Western thought (Anderson, 1995; FitzSimmons, 1989; Gregory, 2001; Howitt and Suchet-Pearson, 2003). In this mode of thinking, nature is not only separate from culture, but humans are granted capacity for thought, agency, and intentionality while nonhuman nature is deemed irrational and lacking both agency and intention (Anderson, 1995). Kay Anderson argues that separation is part of the Western world's general logic and desire for classification and control of the nonhuman world; it "has implied no neutral relation between humans and the non-human world but rather entailed detailed and persistent disciplinary practices" (1995, page 276).

The concept of 'environmental management' fulfils both of these roles of separation and control (Howitt and Suchet-Pearson, 2006; Suchet, 2002):

"Not only do assumptions about separation, hierarchy and progress underpin concepts and practices of management, but the dominant discourses of management also assume their own universal legitimacy. This constructs a circular argument that legitimates deeply colonizing relationships" (Howitt and Suchet-Pearson, 2006, page 326).

Within environmental management, valuation practices often follow the popular model of the 'triple bottom line' of economic, environmental, and social sustainability, as was seen at the Lake Eyre Basin conference. This model conforms to the goal of Western science to categorise and compartmentalise, associated with

the Linnaean system of classification. The triple bottom line provides a framework for acknowledging values that are economic, environmental, and social, but it may provide no more than an ‘ideal of equity’ between the categories (Byrne et al, 2003; Jackson, 2006). Sue Jackson (2006) argues that setting up categories of values represents a means of exercising power over rights to define what is and is not valuable about environments. Notably, separation and compartmentalisation of values limits opportunities for talking across the divides created by these processes.

Thinking and practice of environmental valuation emerge from northern temperate landscapes and human experiences and practices in those landscapes (Gibbs, 2009a). Through Eurocentric thinking, European nature is defined as *temperate*—moderate and constant, without extremes or excesses (Gregory, 2001)—and temperate nature is normalised. Nontemperate natures are “diagnosed as abnormal, pathological, and even ‘unnatural’ natures” (Gregory, 2001, page 89). In colonial and postcolonial settings, such as Australia, landscapes have been ordered and transformed by European ideas and practices (Gibbs, 2009a); “progressively shaped and moulded with the elaboration of European colonialism and capitalism” (Anderson, 1995, page 278).

Such cultural and geographical specificity has implications for the institutions and practice of water governance. It presumes a degree of homogeneity in water regimes and in nature–culture relationships. Importantly, it leads to marginalisation of knowledge and experience of nature that do not conform to this way of knowing the world. For example, Australian Aboriginal epistemologies are characterised by interconnection and holism (Langton, 2002; Rose, 1996; 1999). The Aboriginal concept of ‘country’ incorporates humans, nonhuman animals, other living and nonliving sentient and nonsentient beings, spirits, and Dreamings, in dynamic interrelations that differ from Eurocentric and scientific ways of knowing and categorising the world. Separating ‘values of water’ into categories labelled ‘economic’, ‘environmental’, and ‘social’ is incompatible with this worldview. Australian Aboriginal ontology provides a clear example of this incompatibility, but the point has broader relevance among other communities.

In this paper I draw on knowledge and experiences of Australian nature in order to present a different way of thinking about water and value—a way that challenges the geographical and cultural specificity of dominant approaches to valuing water. I take a multidisciplinary approach, drawing on multiple knowledges of Australian water and landscapes, including indigenous, local settler, and scientific knowledge. Such work highlights the specificity of living with semiarid postcolonial landscapes, marked by variability and contested notions of belonging (eg Allon and Sofoulis, 2006; Gelder and Jacobs, 1998; Gibbs, 2006; 2009a; Goodall, 2002; Head, 2000; Head and Muir, 2007; Instone, 2004; Kingsford, 2000; Macfarlane, 2005; McManus, 2008; Powell, 2000; Read, 2000). Second, I draw on lessons from Australian Aboriginal people and from academic discourse of Aboriginal studies—much of which emerges from work by or with Aboriginal peoples and communities. This work provides an understanding of the world based on an ontology of interconnection, reciprocity, and responsibility, in which landscape is living and life giving, inseparable from human existence (Ah Chee, 2002; Howitt, 2001; Howitt and Suchet-Pearson, 2003; Jackson, 2006; Jackson et al, 2005; Langton, 2002; Morgan et al, 2006; Rose, 1996; 1999; 2004; Suchet, 2002; Toussaint et al, 2005; Weir, 2007). My approach is informed by the concept of ontological pluralism, and a recognition that “landscapes of cultural conflict are often as much about different knowledge systems as about contested claims to land, identity, resources or livelihoods” (Howitt and Suchet-Pearson, 2003, page 557). It is my hope that bringing different knowledge systems into conversation in this paper will support a move towards a more culturally and geographically nuanced and inclusive understanding of water than dominant environmental valuation processes make possible.

I focus on the idea of variability, a concept that emerges from the central Australian landscape. Variability is often used to describe the geomorphology and ecology of arid and semiarid landscapes and water regimes, such as those of the Lake Eyre Basin (Kingsford, 2000; Knighton and Nanson, 2002; Puckridge et al, 1998). I take ‘variability’ to refer to diversity, spatial and temporal change, and complexity (Gibbs, 2006). I am interested in how this idea might be extended from the physical realm to inform thinking about values associated with water. Applying variability in this way decentres Eurocentric thinking about nature by beginning from a different—non-European, nontemperate—nature, and taking as a starting point concepts of diversity, change, complexity, and interconnection, rather than separation, compartmentalisation, and domination. My focus on variability illuminates two points that are currently marginalised in the dominant practice of environmental valuation: first, that the variability of Australian water regimes is valued; and, second, that values are themselves characterised by variability, in that they are diverse, changing, and complex. These two points form the structure of the two substantive empirical sections of the paper.

This research draws on fieldwork in the Lake Eyre Basin, central Australia, which involved in-depth interviews with settler pastoralists, Aboriginal people, ecological scientists, tourism operators, and policy makers living or working in the Lake Eyre Basin. Interviews informed my understanding of how people think about and relate to water, and the values they associate with water and water places. Participant observation of water-management and catchment-management fora, as well as a review of historical and contemporary water-management documents, provided me with knowledge of water-management strategies in the Basin. In addition, my own observations and experiences of travelling in the Lake Eyre Basin further illuminated the ways in which water exists and is encountered in the Basin. Importantly, this included recognising the significance of the absence of water. I came to understand ‘water places’ as often-dry sites and paths that water flows through, emerges from, falls onto, or settles in temporarily, and how this impermanence, this variability, affects place and human interrelations with water.

I draw on this empirical research in order to move beyond a generic analysis of valuing nature to a study of a particular place and the conditions that make that place. Following Anderson (1995), I use this case study first, to speak to the general theme of the ways in which nature is valued, focusing on the domination of Eurocentric thinking, and second, to provide an account of the specific conditions that made this particular place and the relations that exist within it. In particular, I focus on the role of Eurocentric thinking in shaping contemporary environmental management practice in a colonial and postcolonial context. I consider how valuing water in this place has followed broad trends and principles developed elsewhere in the Western world. In addition, the case study has value in itself by providing an account of the specific expressions of global processes in this particular place. From this point of specificity I hope that it is possible to draw broader implications for other places. In particular, other colonised landscapes, in which the European gaze has been naturalised, and other desert landscapes, in which water is becoming an increasingly complex and contested issue. Experiences and knowledge of both of these groups of landscapes have been marginalised by the naturalisation of temperate European nature.

Valuing the variability of water regimes

The term ‘variability’ is widely used to describe the geomorphology and ecology of water regimes—rainfall and river flow—in arid and semiarid landscapes such as the Lake Eyre Basin. Variability has both spatial and temporal components, referring to change in rainfall and river flow over time, difference across a river basin, and the complex

responses of landscapes and living things to this spatial and temporal change and diversity (Kingsford, 2000; Knighton and Nanson, 1994; 2002; Puckridge et al, 1998). Compared with their northern temperate counterparts, highly variable desert rivers and catchments receive relatively little research attention, and implications of their variability for environmental governance remain poorly understood (Kingsford, 2000; Sheldon et al, 2002; Smith and Hesse, 2005). Models of environmental governance developed in temperate Europe and North America can overlook key characteristics of southern arid zone water regimes; arguably the most significant among these is variability.

In a study of justice in environmental decision making, Mick Hillman (2006) connects the hydrological and geomorphological variability of the Hunter Valley in south-eastern Australia to distributive, procedural, and ecological justice, and argues that the imposition of Anglocentric thinking has had a lasting affect on institutions and practice. Implications of variability for environmental justice include “the diverse perceptions of environmental problems and solutions, the lack of clear criteria for priority-setting [for just river management], and the varying outcomes at differing sites resulting from the application of a homogenous set of engineering principles” (page 700). Similarly, the variability of Australian water regimes has implications for the institutions and practice of valuing water, which continue to be shaped by Eurocentric thinking and experience. In the remainder of this section I consider the first of two points highlighted by a focus on variability: that variability is a quality of landscape and water regimes that is valued.

Variability is one aspect of water that many people living and working in the Lake Eyre Basin value highly. The variability of specific waters, in particular places and times, creates patterns that give rise to patterns of plant, animal, and human life. For example, in the Channel Country—the extensive floodplains of the Diamantina River and Cooper Creek—episodic flooding stimulates floodplain growth, upon which pastoralism in the region is dependent. The values that people attribute to these variable waters are not simply utilitarian: pastoralists speak with passion and curiosity about the flows, the landscape’s response, and their relationships to this variability.

When people who live and work in the Lake Eyre Basin talk about water they talk about specific water, not the generic water that is often invoked in water resource management. People develop understandings of and attachments to specific waters and water places. The variability of forms and patterns of rainfall and river flow are known intimately. Specific water influences grazing practice, and determines where pipelines are laid, bores drilled, and watering points established. Many people living in the Basin describe places in terms of how long water exists at a particular water site: waterholes are variously described as “six to nine month” or “three month” waterholes; a “permanent water” is “a pipeline running off an Artesian bore” to a trough (Oldfield, April 2003).⁽¹⁾ Inherent in this language is an understanding that water is ephemeral in this landscape. Pastoral practice throughout the Basin is designed around this impermanence. Similarly, rain is not known in an abstract or generic way: its varieties and their effects are well known by people living in the Basin:

⁽¹⁾References appearing in this form refer to interviews, and identify interviewee by surname, followed by date of interview. Where the phrase ‘field notes’ appears alongside such a reference, it identifies an interview that was not recorded. In these cases ‘quotes’ are taken from my detailed field notes, and do not necessarily represent the exact words used by the interviewee. Rather, they represent my best efforts to capture the interviewee’s language and intended meaning. Interviewees referred to by name gave permission to be identified in this research. I chose to use their names because, rather than being representatives of categories, the people I interviewed hold knowledge and thoughts that are intimately connected to the particular places they live or work. Some people explicitly requested that they be identified by name in my work.

“‘it was a beautiful soaking rain’. Have you heard that? ... ‘A beautiful soaking rain’.

But you know, it’s good to have the good soaking rain, but you’ve gotta have a big heavy rain in there somewhere to run the water” (Oldfield, April 2003).

This detailed observation of the forms of rainfall is important for production of beef cattle, but the language used to describe rain, including the word ‘beautiful’, points to value beyond utility. The values associated with variable rainfall and river flow cannot be neatly separated into categories of social, environmental, or economic: rather, these ‘categories’ are interconnected in untidy ways—an idea to which I return.

Ecologist Jim Puckridge works on the ephemeral wetlands of the Lake Eyre Basin. He spoke about his first scientific expedition to the area while the rivers were in flood:

“I couldn’t believe I could put a net in and all these extraordinary fish—catfish, great golden callop and all sorts of creatures—came up in the net. As you swam through the Cooper ... the fish would bump into you. I actually walked out of the Cooper with a rainbow fish in one pocket, flapping. ... There was quite a heavy rain with a local storm of some four inches of rain, and the river had been still and the flood had started slowly to move. The flow current began and all these tortoises’ heads went up. We counted possibly a hundred tortoises’ heads cruising slowly by on the current. Probably checking out the rain, whether the rain was an adequate event for nesting. The density of life is just overwhelming” (Puckridge, April 2003).

He went on to explain:

“There’s growing evidence that in fact these periodic great floods in the Basin are absolutely crucial for the recruitment and survival of major waterbird populations in Australia; major continental populations.”

His personal response to the event suggests that the value of this variability is not simply ecological: rather, ecological significance is coupled with scientific interest and a personal sense of wonder at the response of the system to flooding.

Sharon Oldfield, owner of ‘Cowie Station’, a cattle property on the Birdsville Track, told me about a major flood event on Cooper Creek. Her story highlighted the importance of ephemeral water in arid country:

“there’s nothing like when the Cooper ran in 89–90–91. When that Cooper hit the road, it had been the first time in thirteen years that that happened and we had The Great Cooper Splash, and everyone in the country went down and we just had a fantastic time. ... we would drive down from here every couple of days and see where the water is, ... how far across the road is it now, and it’s the most mind-boggling thing to see, ... three ks and it’s just under water. ... you go out and you can see it and it just lifts your heart, like you’ve got no idea” (Oldfield, April 2003).

The specific water and water place she spoke about were tied to family and social life, and to stories and memories. The central Australian floods of 1989–91 stimulated social gatherings of local people—remembered and referred to as ‘The Great Cooper Splash’—which were focused around ephemeral water. It was specific water, in a particular place and time that shaped these events.

Water’s variability creates patterns, and these patterns influence human interactions with water, water places, and country, and shape lives and livelihoods. Many people living and working in the Lake Eyre Basin demonstrate a love of and curiosity about the patterns created by water. At South Galway Station in the Channel Country station managers John and Helen Rickertt showed me John’s photographs of the property on display in the homestead. One in particular caught my eye: a flood front. Taken from the air, the photograph clearly showed the line of water—the ‘front’ of the flood—making its way down the dry network of channels and across the floodplain. Such an image is possible only in an ephemeral river. The photograph marked the transformation from dry to wet. Helen Rickertt spoke about huge mud cracks in the dry riverbed.

As the flood front approached, she and her children watched the water flowing between the cracks beneath the surface. She told me the kids used to love jumping from one section of the dry, cracked riverbed to another. They loved watching where the water would come up above ground between the cracks (field notes, H Rickertt, May 2003). Patterns created by water's variability have an important place in people's family life and memories, and shape people's experiences of place.

It is not simply the arrival of water—its presence after a period of absence—that is valued. For floodplain pastoralists, inundated rivers dramatically shrink the pasture available to stock; cattle can become stranded on the relatively high ground of sand dunes between anabranching channels; and it is only when flood waters recede that valuable pastures grow. Ecological scientists value the dry after the wet because desert flora and fauna are dependent on these cycles. For tourists, values associated with the presence or absence of water are complex. Tourists are attracted to water sites (Schmiechen, 2004), and variability affects their interactions with place. Tourist numbers increase dramatically during wet times. They come to see ephemeral wetlands such as Coongie Lakes, the bird life that is attracted to occasional water in Lake Eyre, desert flowers, and the water itself. But this is the most difficult time to travel, as rain and flood often make roads impassable. An understanding of water's variability is increasingly important in the context of growing tourism in the region, and associated impacts on water resources.

The variability of Lake Eyre Basin water was threatened in the mid-1990s by a proposal for a major cotton-irrigation development on Cooper Creek at the property 'Currareva Station' (Kingsford et al, 1999; Walker et al, 1997). The proposal was inconsistent with the river's variability: cotton irrigation requires a permanent, reliable water supply (Goodall, 2002; Kingsford et al, 1998). Many pastoralists, Aboriginal people, scientists, and others living and working in the basin (as well as some from elsewhere) opposed the proposal on the basis that a major irrigation development would damage the river system and the human and nonhuman lives dependent upon it (field notes, September 2002). Elsewhere in Australia, similar stories can be heard. In her account of cultural impacts of intensive irrigation on the highly variable Darling River floodplain in western New South Wales, Heather Goodall (2002, page 43) contends:

"The flow of waters is the basis of the order which [pastoralists] bring to working their properties, it is the foundation on which they have built their social, financial and political structures."

People objected to the Currareva proposal because it would compromise the variability of the river. But the irrigation proposal did more than threaten livelihoods by taking away water that could otherwise have been put to 'productive' use. It also threatened the patterns of people's lives, the lives of nonhuman others, and the ecological and social systems shaped by the river. An unexpected alliance of cattle graziers, conservationists, ecological scientists, and local people successfully fought against the irrigation proposal.

Many people living and working in the Lake Eyre Basin value variability, but this is only one aspect of water that is valued. Another is reliability. Water is essential for all life, it is vital for personal well-being, and it is central to the industries in the basin. In dry and changeable country, variability is not valued unproblematically. Artesian bores feature prominently in the landscapes of the Lake Eyre Basin. Each station I visited had at least one artesian bore for watering stock; many use bore water, or river water if available, for domestic purposes, reserving precious and more palatable rainwater for drinking. Birdsville and other towns in the basin are dependent on artesian bores.

Bores and boredrains have become 'permanent' or reliable water places, which tourists and local people alike have come to value. Bores were originally drilled in

the Lake Eyre Basin in the late 19th century. They enabled cattle grazing to take place on the otherwise dry stony plains that support perennial vegetation (the comparatively well-watered river country being characterised by seasonal growth). These early bores were ‘free flowing’: once water reached the surface, either unassisted under high pressure or pumped, it flowed out across the landscape, running to natural depressions in the ground, following creek-lines, or filling drainage ditches dug for that purpose. The result was a ‘boredrain’. Boredrains serve the function of dispersing water and allowing hot ground water—which is sometimes at boiling point—to cool sufficiently for stock to drink. Over time, boredrains have become much more than stock-watering points. This permanent surface water attracts plant and animal life, and local people and tourists visit these water places to swim, camp, picnic, birdwatch, or to cool down in the shade of a tree.

The variability of values associated with water

In this section I consider the second point of connection between values associated with water and variability: values themselves are characterised by variability, in that they are diverse, changing, and complex (Gibbs, 2006). Within the field of environmental valuation there are efforts to acknowledge and incorporate diverse values of nature (see below). However, values are represented as static rather than changing, and simple (discrete and readily categorised) rather than complex (interconnected, living and life-giving). In this section I consider the diversity, changing nature, and complexity—in particular, the interconnectedness—of values associated with water, and discuss each of these three themes in turn.

Sandy Toussaint et al (2005, page 61) describe “the considerable variation that exists in beliefs, practices, values and laws associated with water”, and explain how “Aboriginal people, lands and waters are in a continual and interconnected process of mutual transformation.” This point is central to Aboriginal ontology, but has relevance to a wider community. In this section I draw on indigenous, local settler, and scientific knowledge and experience in order to illustrate the variability of values associated with water and water places, and to address the binary of indigenous/scientific knowledge that is established in Western environmental management. I bring my empirical research into conversation with a multidisciplinary literature that shares an assumption that places, meanings, worldviews, and values are marked by diversity, change, and complexity.

Diverse values

“Water’s diversity is, in some respects, a key to its meanings. Here is an object that is endlessly transmutable, moving readily from one shape to another It has an equally broad range of scales of existence This process of transformation never ceases: water is always undergoing change, movement and progress. ... The ways in which humans experience these fluid qualities are as diverse as the contexts in which this interaction occurs.”

Veronica Strang (2005, pages 98–99)

Environmental and natural resource management practice commonly seek to incorporate diverse values. A range of ‘stakeholders’—presumed to hold different values—are frequently consulted. Consultation varies in extent and nature: stakeholders may be consulted on policy, or may be closely involved in ongoing participatory or deliberative processes. However, these efforts to consult can be tokenistic. The concept of diversity is also represented by the range of values described in management documents, including ‘recreation value’, ‘aesthetic value’, and ‘Aboriginal heritage value’. But these interpretations of diversity can oversimplify value and fail to acknowledge the diverse assumptions, meanings, and worldviews that underlie values.

In the context of central Australia's deserts, Lesley Instone presents a vivid image of the existence of multiple, simultaneous meanings of place:

"On the road between Alice Springs and Tennant Creek the notion of an unfixed and multiple landscape was all too apparent. Here was the harsh and empty land of the explorers, the homelands of Aboriginal peoples, the wilderness of contemporary environmentalism, and the economic landscape of cattle country. And the role of the traveller in 'making' the landscape through which they travel further diversifies the country" (2004, page 134).

The range of meanings that Instone touches upon feeds diverse values associated with land, water, and place. Diverse values of water emerge from different uses of water, such as drinking, irrigating, feeding cattle, fishing, resting beside. They are influenced by diverse backgrounds, histories, and livelihoods: for example, some people have lived in the Lake Eyre Basin all their lives; others moved to the basin for work or love; and others visit infrequently, studying or dreaming about it from afar. Some are connected to the area through multiple generations of kinship and totem, others through scientific interest, or general curiosity and wonder. And diverse values emerge from ontological diversity, or different worldviews. Ogbu Kalu (2001, pages 228–229) describes a worldview as "a mental construct that empowers peoples' actions and endows both rhythm and meaning to life processes. It is the foundation of customs, social norms, and law. Worldviews are embedded in people's experience and they are expressed or reenacted in their cultures."

An overly simplistic interpretation of diversity denies the embeddedness of power and privilege in society and, rather than opening possibilities by incorporating diverse meanings, it can reproduce and further marginalise particular peoples and values (Howitt and Suchet-Pearson, 2006). Hillman reveals some of the specific processes that exist in the context of river management to privilege certain forms of knowledge over others. He argues that "Most likely to be excluded are the views of those socially and economically disadvantaged groups with most to lose from river management decisions" (2006, page 702). Historically, the 'groups with most to lose' in Australia have been Aboriginal peoples, who have been displaced and dispossessed of land and therefore culture. Aboriginal people have historically been excluded from natural resource management and, despite some efforts, Aboriginal people and their worldviews continue to be marginalised in many contemporary management institutions and processes (see also Howitt, 2001; Howitt and Suchet-Pearson, 2006).

According to Reg Dodd of the Marree Arabunna People's Committee, the government and developers think of water as a resource, without thought of other meanings and values held by other people. He explained that, whether it is surface or ground water, Aboriginal people have a connection to water and to particular places. There is the daily use, such as waterholes and camping, and stories that go back to the creation of the Great Artesian Basin. Aboriginal people have a religious connection to water and places that forms identity and a sense of belonging. He says that "There needs to be an understanding of different cultures and cultural needs. You can't separate land from people; they are one" (field notes, Dodd, May 2003). Finding ways of facilitating mutual cultural understanding and recognition of Aboriginal issues and perspectives within the paradigm of 'water resource management' is a challenging process. Don Rowlands, an Aboriginal resident of Birdsville, explained:

"People are starting to understand a bit more now [about Aboriginal issues] but when they are writing it up, they still leave it out. Aboriginal people know about the history of the river systems. ... They might have been able to go out to the Simpson [Desert] and use water there while it lasted and give the river a rest. Now station people are starting to follow the same principles" (field notes, Rowlands, April 2003).

The concept of indigenous or traditional ecological knowledge has for several decades been a theme in the thinking and practice of development and environmental management (Agrawal, 1995; Briggs, 2005; Howitt, 2001). Discourse of the nature and role of indigenous knowledge is extensive; and the area of water management has received its own attention (eg Jackson, 2004; 2006; Morgan et al, 2006; Nabhan, 1982; UNESCO, 2006). Indigenous knowledge is frequently discussed in terms of its role in promoting local participation, and effective uptake of strategies in development and environmental management practice—particularly in contexts of scarce human resources. However, Western management practice presents indigenous knowledge in a binary relationship with Western scientific knowledge (Briggs, 2005; Johnson and Murton, 2007). Through this process, indigenous knowledge is oversimplified and romanticised (Jackson, 2006), and misrepresented as static rather than dynamic and complex (Briggs, 2005). Further, indigenous voices continue to be excluded from discourse, perpetuating colonial displacement (Johnson and Murton, 2007). Although there are efforts to include indigenous knowledge, other forms of local knowledge are largely left out of environmental management practice. In this paper I draw on indigenous, local settler, and scientific knowledge in an effort to blur the boundaries of the established binary of indigenous/scientific knowledge, and to address the associated oversimplification of knowledge types.

Changing values

In the short time scales of much management policy and practice, change is often overlooked. Adaptive management (Walters and Hilborn, 1978), which has gained increasing popularity in ecology and environmental management in recent years, explicitly seeks to incorporate change. But where *values* are considered in environmental management, they are usually represented as static. Change in values occurs at multiple temporal scales. Values associated with water vary seasonally and historically: seasonal change is illustrated by water's patterns (as discussed above); historical change is demonstrated by broader social processes of changing understandings, attitudes, and social movements. In the context of Australia and other settler societies—and, in different ways, *colonising* societies—colonisation is a key agent of change.

The varied processes of colonisation dramatically alter people's relationships with place, often with devastating effects. Meanings of place, knowledge systems intimately connected to place, and ways of knowing and being in the world, are changed both for the colonised and for the coloniser through displacement, dispossession, invasion, migration, and settlement. Colonialism is not simply an historical or singular event: its legacy is ongoing, and its complex processes are continuing. Luise Hercus writes of the implications of colonisation for the Wangkangurru of the Simpson Desert:

“one of the first effects of white occupation was the abandonment of the prohibitions regarding entry into other people's country. There was large scale migration in the Lake Eyre Basin. Wangkangurru people left their country altogether, and people from throughout the area congregated at Killalpaninna, and to a lesser extent at Marree and at Andrewilla in Yarluyandi country south of Birdsville. This meant that people became dissociated from their own ‘country’ and hence from their History” (1989, page 113).

The term ‘History’ here refers to the Dreamings and Creation stories that form landscapes, determine relationships, kinship, and law and, in so doing, form meanings, values, and worldviews. For the Wangkangurru, and other groups of the Lake Eyre region, colonial displacement has had irreversible effects on people's knowledge of place, language, and ways of knowing and being in the world.

In Australia colonisation set in train institutions and patterns of interaction between people, place, and the nonhuman world (Head, 2000). Landscapes and waterscapes have been transformed by ideas and practices imported from temperate Europe (Gibbs, 2009b; see also Davis, 2007). Control and domination of land and water have changed landscapes and the lives of humans and nonhumans. Environmental historian Geroige Main argues that “Since the beginning of British colonisation, settler efforts to master dynamic rural terrains blocked close learning. Powerful relationships tend to be monological. Understanding does not easily flow both ways” (2004). Colonisation blocked learning from Australian Aboriginal people and from the Australian landscape. Environmental management aims to reconcile competing demands on natural resources; however, it cannot hope to do so while it ignores the particular historical, cultural, and political conditions under which relationships with water are formed and maintained, and the (sometimes subtle) ways in which values associated with water change over time.

Artesian waters of the Lake Eyre Basin provide a salient illustration of changing values associated with water. Water places created by Artesian bores are variously known as ‘boredrains’, ‘boredrain wetlands’, ‘artificial wetlands’, and ‘Great Artesian Basin wetlands’ (Gibbs, 2009b). The use of language is significant; it reveals changing attitudes to these water sites. The addition of the term ‘wetlands’ to boredrains indicates a new meaning: no longer is this simply the place where a bore drains; it has gained the positive connotations of the ‘wetland’, established over recent decades with the Ramsar Wetlands Conference of 1974 and the more recent movement for biodiversity conservation (see Soulé, 1985)—a stark shift from earlier language of the ‘swamp’ and all of its negative connotations (see Giblett, 1996). Places that were once waterless are now visited by humans and other animals as ‘oases’ in the desert. Physical practice has created new water places, and meanings and values associated with these places are influenced by broader social processes.

The presence or absence, drilling or capping of a bore affects the surrounding landscape, ecology, and human way of life. Don and Lyn Rowlands recounted some of the changes that took place in Birdsville when the town bore was drilled in 1965:

“Before the bore was drilled all water had to be carted from the river. You had to manage it. Very little water was wasted. What you carted you used for drinking, cooking, and bathing. If there were five kids they’d all use the same water. When you carted your water you set your own restriction: how much you wanted to cart. A 200 litre drum would last you a week. The river wouldn’t suffer from that sort of extraction; you couldn’t cart that much. As kids we didn’t have toys, so carting water with a wheelbarrow was fun” (field notes, Rowlands, April 2003).

When the bore was drilled people no longer carted water from the river and people’s relationships with the river changed, as did the values they associated with water. People began to relate less to the variability of local water, and more to bore water as a generic resource.

Complex values: interconnection

In an effort to fit the world into the confines of natural resource and environmental management discourse and practice, and to develop achievable management goals, complex systems and processes, meanings and values are frequently oversimplified. It is easy enough to say ‘values are complex’, but complex in what ways? In the Lake Eyre Basin the complexity of values associated with water includes their diversity and change, discussed above. In this section I focus on a further aspect of complexity, that of interconnection, which I interpret in two ways: established categories of value are not discrete, as presented in Eurocentric environmental valuation, but are interconnected;

and water is interconnected with the rest of the world, directly shaping associated values. Ignoring these interconnections erroneously simplifies values associated with water, marginalises particular values, knowledges, peoples, and landscapes, and denies the living and life-giving qualities of water.

Values associated with water cannot be separated into discrete categories as described by environmental management discourse and practice. In the Daly River region of northern Australia Sue Jackson finds that natural resource management processes are characterised by compartmentalisation of culture, where cultural values are separated from economic, environmental, and social values, and refer specifically to values held by Aboriginal people. This 'reified' cultural category legitimises certain practices at the expense of others (Jackson, 2006). Jackson argues that "Cultural values cannot easily be separated from other social values of a landscape or riparian environment. The cultural element relates to a distinctive and preferred way of life of a group or groups of people" (2004, page 20).

Jackson's observation of the inseparability of values is not restricted to indigenous knowledge systems. For Aboriginal and non-Aboriginal Australians the values associated with water in the Lake Eyre Basin cross over the categories of the triple bottom line. For pastoralist Sharon Oldfield, "Social or moral commitment requires economic commitment; you can't separate them" (field notes, Oldfield, April 2003). As quoted above, Arabunna man Reg Dodd explains "You can't separate land from people; they are one" (field notes, Dodd, May 2003). Understood from the perspectives of these knowledge systems and experiences, values associated with water defy separation.

The interconnection of values stems from the interconnections between water and the rest of the world. Here, listening to and learning from Aboriginal ontologies provides an opportunity to challenge dominant and oppressive Eurocentric ways of thinking, and helps understanding of complex interconnected systems. In the Lake Eyre Basin, rain water, surface water, and groundwater hold deep significance for Aboriginal people. Dean Ah Chee is a Senior Ranger with National Parks and Wildlife South Australia; his cultural links are with the Southern Arrente and Pitjantjatjara Yankunytjatjara groups (Ah Chee, 2002). He lives and works at Witjira National Park on the western edge of the Simpson Desert, which incorporates Dalhousie Springs, the large mound springs complex. He describes the significance of this water and water place:

"This unique watercourse is now called the Great Artesian Basin but in my language, the main springs, Dalhousie Springs, is known collectively as Irrwanyere or 'the healing spring'. Well before my elders' time, it provided more than just a source of water for Indigenous people. For it was and remains a travel path, which connects many Indigenous groups within the trail of the GAB and is our Tjukurpa⁽²⁾ ... We have a holistic approach to water. For this water is a source of healing when we are sick, and it provides us with many spiritual and cultural interests. It is our lifeblood, which we need to survive. It allows us to continue our ceremonies, which incorporate our rich and unique culture that is still strong today. It is these sources of water that provide an adequate and valuable food source rich in fish and other foods for my people. As one of the traditional elders of this country ... says: 'We are in the middle of kwatye (water), it is all around us, we have to look after this place'" (Ah Chee, 2002, page 20).

(2) 'Tjukurpa' does not have a simple English translation; it refers to spiritual connection, law, culture, heritage, and the stories associated with the land; "It contains the reasons for how and why things such as water, fire and the landscape exist" (Ah Chee, 2002, page 20).

Marcia Langton explains that throughout Australia “Aboriginal waterscapes are construed not only as physical domains, but also as spiritual, social and jural spaces” (2002, page 44). Deborah Rose uses Levinas’s term to describe one’s country as “a nourishing terrain”; “a place that gives and receives life” (1996, page 7). The term “living water”, she says, “conveys the sense of water having its own life, and also of offering life to others” (Rose 2004, page 39). Jessica Weir, in her work with traditional owners of the Murray and Lower Darling Rivers in southeastern Australia, finds that practices such as fishing and collecting bush foods and medicines in the same places as did peoples’ ancestors is not simply recreation: these practices “also involve reaffirming relationships with country, connecting to intergenerational responsibilities, and practicing traditional knowledge and skills” (2007, page 49). She goes on:

“Traditional owners speak about how the enduring flow of the rivers connects them to their timescales and creation stories” (page 50).

Water is simultaneously valued as a site for recreation, a means of reinscribing cultural practice and environmental knowledge, and an opportunity (and responsibility) to pass that knowledge and practice between generations.

While the concept of country belongs to Aboriginal Australia, its significance extends far beyond. ‘Country’ alerts us to the assumptions that inform and structure natural resource management discourse and practice. The separation and compartmentalisation that characterise methods of valuing water are culturally specific: they represent *one way* of knowing and structuring the world amongst many ways that exist simultaneously.

Conclusions

In this paper I have considered the geographical and cultural specificity of approaches to valuing nature within the realm of environmental and natural resource management. Significantly, environmental valuation is shaped by thinking and practice that is inherently Eurocentric. The very notion of environmental ‘management’ belongs to a Eurocentric ontology that is based on separation and domination of nature. This ontology silences other ‘ways of being-in-place’ (Howitt and Suchet-Pearson, 2006; Suchet, 2002). Environmental valuation thinking and practice marginalises diverse, changing, and complex values; knowledge and experience of nontemperate landscapes; and knowledge that does not fit within Eurocentric ways of knowing nature. In this paper I have sought to demonstrate that the Eurocentric view is partial, not universal (Anderson, 1995; Howitt and Suchet-Pearson, 2003; 2006; Suchet, 2002).

Looking to other places for models of thinking and practice is instructive. The concept of variability considered in this paper, for example, emerges from the central Australian landscape, rather than from Europe and European relationships with nature. It takes as a starting point the concepts of diversity, change, and the complexity of interconnection. Focusing on the variability of water and values in the Lake Eyre Basin acts to unsettle current ways of thinking about water values; to decentre Eurocentric thinking about water resource management; and to present a different way of thinking about values associated with water. Through a close study of a particular place, this research challenges the universalising tendency of dominant environmental valuation methods, which marginalise diverse ways of knowing and living with water. In so doing, it points towards a general failure of environmental valuation theory and practice, and the likelihood that prominent approaches are also inadequate in other places, for different and particular reasons.

In this paper I argue for research and practice that draw on other knowledge systems, and experiences of other (nontemperate) places. Despite formal recognition of indigenous or traditional ecological knowledge within natural resource management,

such knowledge is most often presented in a binary relationship with Western scientific knowledge—a relationship that is itself constructed by Eurocentric thought. I call for a broader conceptualisation of environmental knowledge, which incorporates the diversity, change, and complexity of environmental knowledge forms, including indigenous, local settler, and scientific.

That said, indigenous peoples around the world continue to be among the most marginalised in environmental management practice. As such, listening to and learning from Aboriginal people is valuable in and of itself, as a step towards addressing and repairing this marginalisation. Further, attending to the marginalisation of Aboriginal peoples in environmental management points to the assumptions inherent in current management thinking and practice. It provides a way of challenging Eurocentric and dominant knowledge, and helps to develop understandings of other dynamic, interconnected values and ways of being in the world. As such, it is essential that we move beyond segregating ‘indigenous knowledge’, towards listening to and learning from people, in order to inform the limitations of current ways of thinking about value and water, and to improve future approaches.

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