


Shadow waters: Making Australian water cultures visible

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Connections between people and water have received considerable attention within geographic research. This paper draws on cultural and historical geographies, political ecology and the environmental humanities to extend understandings of the hydrosocial cycle by focusing on the cultural dimensions of society–water relations through the concept of shadow waters. Shadow waters centres attention on the cultures that privilege certain waters while rendering other waters invisible and marginalised. Inspired by Val Plumwood’s notion of “shadow places,” shadow waters brings to light the way power intersects with cultural practices. We bring this concept of shadow waters into conversation with Indigenous water knowledges. Shadow waters can be conceptualised vertically, with surface water receiving more policy and research attention than ground water, and also horizontally, as some sub-catchments, uses and values have been ignored or undervalued in macro-catchment processes. Temporally, in considering the past, complex and contested histories of human–environment relations are often overlooked in favour of simple historical narratives that ultimately reinforce dominant management structures and trajectories. Shadow waters are thus historically created as particular power structures and narratives are reinforced and “normalised” over time. This paper examines shadow waters in southeastern Australia, elucidating the way two rivers are interwoven and co-determined in cultures of water use in this context. We show how the rethinking of dominant water cultures, made possible by cross-cultural engagement, generates new possibilities for reconnection, restoration and protection; a different water ethics based on care and responsibility that addresses power relations and injustices.

KEYWORDS

Australia, hydrosocial cycle, Indigenous, shadow places, water cultures, water values

1 | INTRODUCTION

Water holds cultural, spiritual and economic values for Indigenous peoples (Jackson, 2005; Weir, 2009) and continues to be a central part of Dreamings across the continent (Strang, 2002). As noted by Maclean, Bark, Moggridge, Jackson, and Pollino, “[w]ater plays a central role in Australian Indigenous societies” (2012, p. viii), including in cultural economies, livelihoods and in caring for country. However, significant shifts in water policy and planning are required for institutional, and wider socio-cultural, recognition and accommodation of Indigenous water values. While Indigenous water values have

been recognised in the National Water Initiative (McFarlane, 2004), they are still only incorporated in water planning on an ad hoc basis, or not at all. The diversity of Indigenous water values and practices throughout Australia reflect different cultural, social, economic and environmental factors, prior to and following colonisation. Moreover, diverse experiences of Indigenous participation in water management across Australia are apparent due to the different circumstances of settler–Indigenous relations and differences in the institutional architecture for water management in each state and territory. This diversity, rather than being seen as an opportunity, is too often ignored and marginalised, with current state and national management structures largely failing to genuinely engage with Indigenous values, knowledges and practices.

This discussion has stemmed from a shared research project that focuses on the water cultures of the Goulburn and Cudgegong Rivers in southeastern Australia. This paper is therefore co-authored by a research group, which includes Indigenous and non-Indigenous authors. The co-authorship reflects the growth of a collaborative research relationship, which we reflect further on in the Methodology section. We emphasise here that the insights in this paper are co-produced by five women: a Wiradjuri woman (Lonsdale) who is a Traditional Owner of country around the town of Mudgee in central west New South Wales, the site of our research; and four academics (McLean, Hammersley, O’Gorman and Miller) from Macquarie University of a mixed European ancestry who are Sydney-based. The research design and process has pursued a decolonising geographic approach (Radcliffe, 2017) from the beginning and this will continue as the project progresses. Co-production of research outputs is a contribution to the decolonising of research relationships, but it is not sufficient to achieve decolonising of the country in which we work. Future work includes plans for a cross-cultural festival at one of the key sites of this research. Again, this is only one step in a decolonising of the spaces we engage with herein.

Conceptually, this paper introduces a new term to the water research literature with the notion of “shadow waters,” bringing Plumwood’s (2008) idea of “shadow places” into conversation with geographies of water relations. Shadow waters draws attention to the cultures and relations that privilege certain water values and knowledges while rendering other water values invisible and marginalised in mainstream water management practices and planning processes. Shadow waters are metaphorical, in the sense that particular water values are “hidden” or “demoted” in favour of others, and literal, for instance ground water is not as visible to most humans as surface water. In engaging with Plumwood’s work on “shadow places,” this paper brings to light the way power intersects with cultural practices to develop a critical politics and ethics of water akin to Plumwood’s call for a critical politics of place that is more attentive to interconnections between places.

Shadow waters can be conceptualised vertically, with surface water receiving more policy and research attention than ground water, and also horizontally, as some sub-catchments, uses and values have been ignored or undervalued in macro-catchment processes. There are also temporal dimensions to shadow waters: for example, in decision-making for water allocation processes, complex and contested histories of human–environment relations and Indigenous temporalities are often overlooked in favour of shorter term scientific investigations. Decision-making processes can thus perpetuate the historical creation of shadow waters, and associated environmental justices, which emerge and become entrenched as particular power structures and narratives are reinforced and “normalised” over time. By centring culture and politics in our analysis of water, we seek to challenge the dominant and taken-for-granted nature of contemporary water management by tracing the ways in which shadow waters, and even sacrificial waters, have been historically created and continue to be created. Through this analysis we also draw attention to the limitations associated with less reflexive approaches to water management, that treat it as a technical, a historical and politically neutral endeavour. As such, this paper considers the connections between dominant and shadow waters as a way to acknowledge the implications of particular water cultures in generating inequalities, and the potential roles that relations of responsibility, care and ethics towards water, humans and non-humans may contribute to more just and sustainable futures. Drawing on Bakker (2003) and Gibbs (2010), shadow waters capture the uncooperative and variable qualities of water, moving between horizontal, vertical and temporal planes. The shadow waters idea, as with the idea of shadow places, reminds us that technical efforts to dis-place water, for market and other human-defined purposes, have ethical, ecological and cultural consequences.

The way “shadows” are constructed is also examined in this paper. A shadow is inherently contingent as it is produced by the play of light and form, depending on interactions between light and other objects that may at certain times be static or mobile, earthbound or airborne. Often the term “shadow” is used pejoratively, suggesting that something is diminished, but we seek to explore the strategic use of shadows. What may be shadow water to one actor in a geographic space may act as a valued water place to another. The situated nature of shadow waters works as an important theme in this paper then, to explain the multiple positions that shape water engagements.

This paper begins with a discussion of three bodies of literature relevant to the shadow waters concept. We examine research on Indigenous water values around Australia, before considering political ecologies of water and how culture is conceptualised in this work. Last, we look at the possibilities provided by Plumwood’s shadow places work to highlight the way that power intersects with cultural practices and makes visible often hidden colonising practices. We describe the methodology

used to build the research relationship underpinning this paper and discuss the major findings at this stage of a new and ongoing research relationship. The paper concludes with a summary of the theoretical and policy-related implications of this research, including the potential use of the shadow waters concept as a way to identify, examine and address gaps in water planning, with the aim of hopefully achieving better recognition of Indigenous water values at multiple scales.

2 | BACKGROUND AND CONTEXT

The Cudgegong is the west flowing river and the Goulburn is the east flowing river, so it's kind of unique compared to other places that we've got both rivers flowing both ways, and it's also two different bio-regions so that's why we've got a lot of resources even when it comes to Wiradjuri resources. (Sam,¹ Wiradjuri woman and community leader, January 2016)

These words were spoken on the banks of the Cudgegong by Sam, a Wiradjuri woman who cares for country around the heavily settled area of Mudgee, one of the earliest towns occupied west of the Blue Mountains by the expanding Sydney colony with increasing numbers of colonists arriving from the 1820s. Sam is highlighting water-related interconnections between different places, and the special relationship that Wiradjuri people have with these two diverging rivers. Also evident in this quote is the importance of place-based analysis of water values and the collective framing of these water cultures. The focus of this paper is on one part of Wiradjuri country, an area that covers approximately 80,000 square kilometres of New South Wales in southeastern Australia. The geographic scope of this paper incorporates two neighbouring river catchments – the Goulburn and Cudgegong (Figure 1) – that flow in opposite directions and, hydrologically and geomorphologically speaking, are not closely connected. However, social, economic, cultural and environmental values and processes do connect these two rivers. We draw on, and extend, the literature on hydro-social cycles to explore water cultures in this area while simultaneously challenging the prevailing focus on *social* aspects of water values.

Wiradjuri water knowledges and values include economic, cultural, social and environmental aspects. During our discussions of what water meant to Wiradjuri people around Mudgee, Tara, a traditional owner who speaks for country around The Drip, said that:

... water is life. Water is woman. It's everything. It's about creation and where the tributaries come from and the flows and their tributaries and the connections between the landscapes from one to the other. It's water and it's life. Meeting places to trade ...

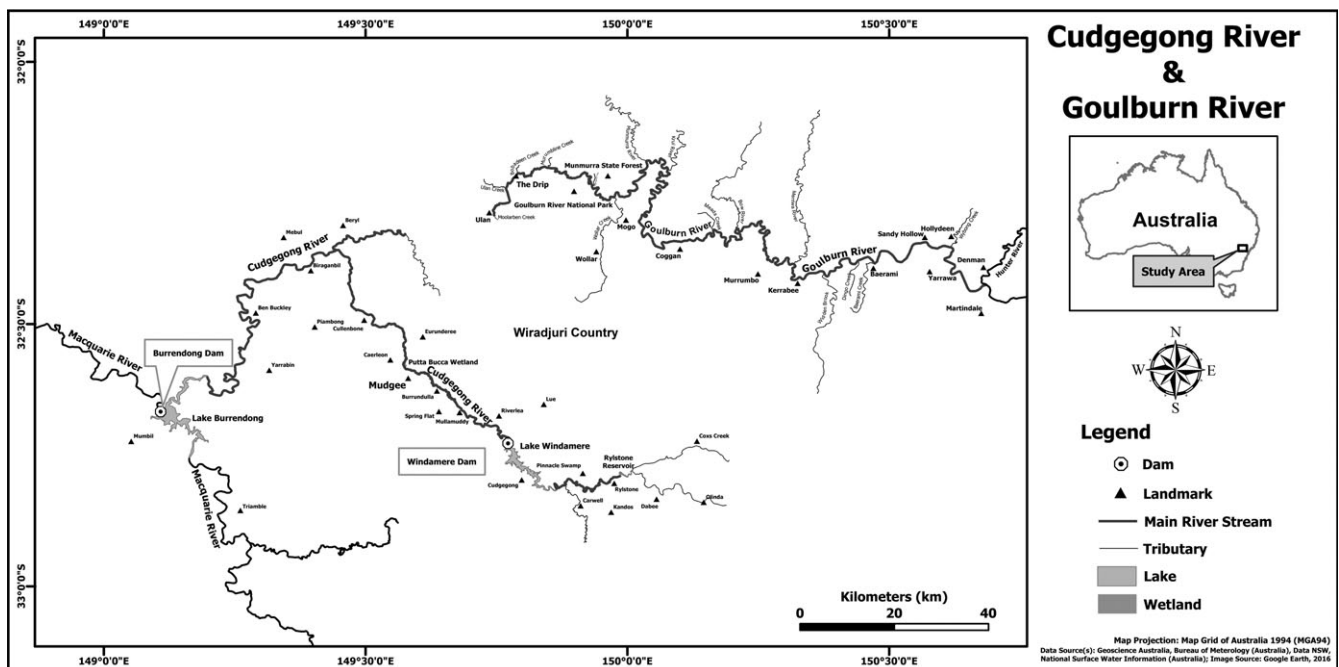


FIGURE 1 The Cudgegong and Goulburn Rivers in Wiradjuri country.

The “shadow waters” idea that frames this paper emerged from conversations with Tara, Sam and others, along the Cudgegong and Goulburn Rivers in Wiradjuri country, and engages with emerging debates in interdisciplinary geographies of water and environmental humanities literature. A key contribution of this paper is foregrounding the resilience of Indigenous water cultures in an entrenched settler colonial (Veracini, 2013) landscape. The research presented in this paper builds on an emerging collaboration between Indigenous and non-Indigenous researchers. Such research collectives (see for example Bawaka Country et al., 2015; Muir et al., 2010; Woodward & Marrfurra McTaggart, 2016) challenge and seek to decolonise existing epistemologies and methodologies through the co-production of water-related knowledges (discussed further below).

Within the broader geographical scope of this paper, we especially focus on The Drip, a hydro-geologic feature widely noted for its beauty, which is located in a deep canyon near the headwaters of the Goulburn. The Drip was gazetted as a National Park in the lead up to the 2015 state government election, extending the Goulburn National Park area in response to ongoing campaigns from local environmentalists and Indigenous people to protect the area from the impacts of coal mining (Hannam, 2015).

3 | COLLABORATIVE RESEARCH RELATIONSHIPS: METHODOLOGY

Methodologically, the research underpinning this paper builds on cross-cultural research traditions. Geographers and anthropologists, along with other social science and humanities researchers, sometimes in collaboration with Indigenous peoples as co-researchers, have described Indigenous water values around Australia. Exemplifying cross-cultural research in the writing of their paper, Woodward and Marrfurra McTaggart (2016) presented reflections on a cross-cultural research project that examined Ngan’gi seasonal knowledges and water values in the Daly River (Northern Territory). They detailed the intricacies of multi-dimensional relationship building and collaborative research practice in their water research. Trust was a crucial aspect of Woodward and Marrfurra McTaggart’s research relationship, and is a foundation principle of ethical cross-cultural research.

The research informing this paper is built on an emerging collaborative research relationship between Indigenous and non-Indigenous researchers who are interested in understanding, and building recognition of, Indigenous water values associated with the Cudgegong and Goulburn rivers. Many conversations, some at the Mudgee Local Aboriginal Land Council (MLALC) office and others on the banks of the Cudgegong, preceded the creation and endorsement of a research agreement that established what the research would be about, how it would happen, who would be responsible for different aspects of the research and what Wiradjuri people would get from the research relationship. Initial discussion of mapping water values along the Cudgegong and/or Goulburn rivers was abandoned in favour of conversations along the rivers and planning for an event that shares cross-cultural perspectives on The Drip. That research relationship became formalised in a research agreement with the MLALC that grounds the ethical framework for this research and lays out how the partnership will grow.

On the basis of this research agreement, several research activities have been undertaken with Indigenous and non-Indigenous people in the greater Mudgee area. As well as holding interviews, we have engaged participants in walking conversations along the Cudgegong and Goulburn, attended major community events such as the Small Farms Field Days, and recorded reflections on lived experiences of local water cultures.

Similarly, the research relationship emerged from the trust that grew out of those conversations (Woodward & Marrfurra McTaggart, 2016). One of the non-Indigenous researchers involved in this research (McLean) grew up in Mudgee and was known to the MLALC board and members before approaching the group for a possible research relationship. Complex insider–outsider research relationships (DeLyser, 2001) thus form an important part of the background to this research. The principles that have guided this research partnership include mutual respect, patience and a commitment to reciprocity; a commitment to decolonising methodologies (Smith, 1999) accompanies every aspect of this research, from conceptualisation to enactment.

4 | ENGAGING CROSS-CULTURAL WATER KNOWLEDGES AND SHADOW WATERS

This research on cross-cultural water knowledges and shadow waters is informed by three broad bodies of literature: Indigenous water knowledges; political ecologies of water; and Plumwood’s shadow places idea and its application. These bodies

of work provide rich theoretical ideas to interpret the conversations held with research partners and participants along the Cudjgong and Goulburn rivers, interwoven and co-determined water bodies.

4.1 | Indigenous water knowledges

Indigenous water research has proliferated over the last 25 years (Maclean et al., 2012) and there is now a substantial body of research on Indigenous water knowledges within Australia (among others, see Gibbs, 2010; Jackson, 2006; Jackson & Langton, 2012; McLean, 2007, 2014; Toussaint, 2014; Weir, 2007, 2009; Yu, 2000) and globally (for example, Boelens, 2014; Guelke & Shell, 1992; O'Regan et al., 2006; Palmer & Tehan, 2006). This array of research has drawn attention to the multiplicity of Indigenous water knowledges as well as the impacts of global forces of change such as colonialism, neoliberalism and Indigenous rights movements. The impacts of colonialism, and differences in how it has manifested and been resisted in different places, form strong themes in this work. More specifically, the resilience of Indigenous water knowledges in the face of dramatic and often violent interventions from external and invading forces has become a central motif in this literature. As Strang (2009) notes, the permanent reciprocal relationship that underpins co-becoming with country continues as a strong principle in Indigenous ontologies, including with respect to water relations.

Within Australia, Maclean et al. (2012) differentiate between cultural, environmental, recreational and subsistence water values in their study of Ngemba water knowledges of the Darling. The multiplicity of Indigenous water knowledges is crucial here: it is not just cultural water values that matter, but how water fulfils a wide range of essential roles in country. Specifically for Wiradjuri knowledges, MacDonald wrote that “Wiradjuri landscape is also contested space, space which defines contests between different groups of people: Wiradjuri and colonisers, Wiradjuri and Aboriginal migrants who have moved into Wiradjuri country, Wiradjuri who are local and those who are from other parts of the region” (1998, p. 164). Wiradjuri water values capture and reflect this contestation and the ongoing, complex and dynamic effects of colonialism.

Indigenous water knowledges are positioned in this literature as process, rather than archive, in order to emphasise the enduring as well as “the contested and relational nature of indigeneity” (Goodall, 2008, p. 355). Goodall’s (2008) research focused on the Darling River floodplain and reflected on the histories of violent invasion of Indigenous spaces that began in the 1830s and often centred on control of waterholes and rivers, as the colonisers’ survival in new territory was tied to control of vital water supplies. Dreaming stories of the Darling River floodplain captured Indigenous water knowledges as a central and recurring theme (Goodall, 2008). Similarly, Macdonald (2011) describes how water is key to understanding Riverine Wiradjuri knowledges.² For instance, social relations such as marriages were delineated along main rivers and across social boundaries (Macdonald, 2011).

Indigenous water knowledges reveal the confrontation between Indigenous peoples and colonisers, and the ways in which this conflict upset and reconfigured water relations. Colonialism is just one force that has threatened Indigenous water relations, yet what much of this research demonstrates is not only the multiplicity of knowledges that Indigenous peoples have of water as part of caring for, and co-becoming with, country (Bawaka Country et al., 2015), but also the enduring and resilient nature of the relations this knowledge sustains.

Indigenous water knowledges are negotiated, learnt and shared in country, within what Rose (1999) terms “nourishing terrains.” Country is a noun and a verb: being simultaneously something to care for and a living thing that nurtures (Rose, 1999). Water – in all its variability – is a key part of healthy country that can take care of people. To contextualise Indigenous relations to country, we can draw on Yusoff’s (2015, p. 402) recognition of humanity as “constituted through the negotiation of non-human and inhuman forces and entities” rather than bounded and oppositional framings. Water is one such force and entity that humans negotiate and contend with and Indigenous water knowledges capture this way of knowing through connections to country.

4.2 | Political ecologies of water and cultural geographies of water

In the introduction to the evocative text *What is Water?* Linton states that “Water is what we make of it, but it seldom stays that way for long” (2010, p. 4). He goes on to write that water transforms, shifts and changes, resisting being locked into human-driven categorisations and containments. In addition to contributing to a growing body of scholarship on Indigenous water knowledges, this paper draws on cultural and historical geographies, political ecology and the environmental humanities to extend understandings of the hydrosocial cycle by focusing on the cultural dimensions of society–water relations. The “hydrosocial cycle” has focused on the inherently interconnected social, political and physical dimensions of water (Bakker, 2012; Boelens, 2014; Linton & Budds, 2014; Sultana, 2009; Swyngedouw, 2004, 2007, 2009). Despite the recent growth of scholarly work exploring the diverse meanings, values and practices related to water and water places,

the cultural and social-political aspects of human–water connections are often held apart (Gibbs, 2009; Weir, 2007). For instance, Swyngedouw mentions “protection of local livelihoods and regional cultures” (2007, p. 9) in the introduction to his landmark account of hydro-social cycles and state building in Spain, but cultural aspects of water values are not explored in any depth in that paper. Our research compels us to argue here that there is a need to acknowledge and understand the broader cross-cultural and political dimensions of water and, in particular, bring to the fore water cultures that have been “hidden” or “demoted” in favour of others over time, space and place.

McLean (2017, p. 82) defines a “water culture” as “an assemblage of physical and cultural dimensions, material and immaterial facets, that intertwine to produce a particular form of human–water connections.” Diverse knowledges and understandings of water are context dependent and culturally situated. In the conceptualisation and political application of “hydro-cosmological cycles,” Boelens (2014) for example, explores the Indigenous knowledge systems and cultural politics embedded in the water management practices and water rituals of Quachua communities in the Andean highlands. Strang (2002, p. 22) similarly explores how engagement with water is conceptualised in an Indigenous cosmology and cultural landscape, connecting the “Dreaming cycle” of the Kowanyama peoples in Cape York Australia, with the “hydrological cycles between earth and sky.” Strang’s work demonstrates how, both physically and metaphorically, the spiritual water homes from which ancestral beings are believed to have emerged and remain define clan identities, story lines and socio-spatial kinship networks. Distinct patterns of water use and management, along with diverse connections to different forms of water, underpin collective social and spiritual identities as well as community health and cohesion (Boelens, 2014; Strang, 2005a, 2005b, 2008; Wilson, 2014).

Attention to cultural practice through engagement with different worldviews allows us to develop diverse, complex and nuanced understandings of water places (Gibbs, 2014). Gibbs refers to water places as “the sites and paths where water flows, sits, sinks, falls, emerges, passes through, and evaporates from, and where histories of interaction between humans, non-humans, water and landscape *form* places” (2009, pp. 361–362). The use of the term “water places” (Gibbs, 2009) also attempts to bring together the social, cultural and more-than-human dimensions and understandings of nature and water. Through the lens of contemporary water places, Gibbs explores the layers of interaction that result in the reconfiguration of “old” water places and the complex and multi-dimensional process whereby “new” water places unfold and merge into existing cultural landscapes. Some local ecologies, local knowledges and local practices have been lost through these processes, while others have remained and adapted over time. Gibbs (2010) develops her work on water places in a close analysis of multiple water values in the Lake Eyre region, a central Australian catchment. In valuing water beyond Eurocentric framings, Gibbs argues that

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. (2010, p. 375)

The shadow waters notion extends this understanding of the variability of water and highlights the injustices and power relations that often flow with unpredictable and uncooperative water (Bakker, 2003). Macfarlane (2005) similarly focuses on the historical dimensions of water places and practices in order to understand the dynamic nature of people’s relations to each other and to a particular body of water. For Macfarlane, water places are “places of memory and renewal, not simply of bodily needs, but of stories and connections, of identity, of the past, and of future possibilities” (2005, p. 323). In this way, water is always cultural as it interweaves into people’s lived experiences and understandings of the world.

In this paper, we engage with the diverse cultural meanings, values and practices associated with water and how these influence, and are influenced by, the institutions, structures and processes that create and regulate shadow waters (i.e., privatisation, commodification and governance). Research focusing on the diverse cultural ideas, values and practices associated with shadow waters provides practically-applicable ways of rethinking water relations that can reshape water governance towards more just and inclusive approaches.

4.3 | Possibilities provided by Plumwood’s shadow places idea

Plumwood (2008) moves beyond disconnected, self-sufficient, singular and fragmented notions of place to recognise the implications of our relations with a particular place for other places. She argues that this actively constructs shadow or even sacrificial places. Plumwood draws attention to places that are often hidden, overlooked, degraded and exploited for their resources; places that allude knowledge and responsibility. Building on a longer tradition of respectful engagement between feminist scholars and custodians of Indigenous knowledges, Plumwood, as explained by Deborah Bird Rose, “found

courage and wisdom in Australian Aboriginal concepts of belonging” (2013, p. 106). Engaging with the ideas of Big Bill Neidjie, an Aboriginal Elder from Arnhem Land in the Northern Territory, Plumwood argues for the importance of acknowledging the diverse material goods, the human and non-human connections that, in the words of Neidjie, “grow you” (Neidjie, 1989, p. 166). She argues for a situated, relational ethics of responsibility, a politics of place, that is both social and ecological (2008; Rose, 2013).³ Plumwood encourages us to value not only those places we identify as special and aesthetically beautiful to us but also places “that we don’t have to know about but whose degradation we as commodity consumers are indirectly responsible for” (2008, para. 24). Shadow places, as an idea, resonates strongly with the themes of connection, ethics and responsibility that emerge from engagement with Indigenous water knowledges. The idea of shadow waters progresses environmental justice concerns by bringing into focus the environmental, political and economic connections that contribute to social injustices for Indigenous peoples, as well as pointing towards a different kind of ethics of responsibility.

In this context, shadow places are often isolated, detached and devoid of sentiment or worthiness outside of their economic implications. Plumwood, however, gets us to question “what it would mean to acknowledge and honour all the places that support [us], at all levels of reconceptualisation, from spiritual to economic, and to honour not just this more fully-conceived ‘own place’ but the places of others too” (2008, para. 26). Drawing on Plumwood, Cameron Muir has argued that “[s]ites of agricultural production are the world’s primary “shadow places”” (2014, p. 7). He uses Plumwood’s idea as one of the points of departure for his examination of the agricultural history of Western NSW, which focuses on areas close to the Cudgegong and Goulburn Rivers. At the global, national or state scale, the Cudgegong and Goulburn rivers could be considered shadow waters as they are implicated in and impacted by extensive agriculture and coal-mining operations – reflecting the multi-scale processes contributing to environmental injustices. The Cudgegong is regulated by dams premised on the provision of water security primarily for industry and agriculture, entailing high environmental and social costs. Yet, in thinking with and responding to Plumwood, this paper demonstrates that these shadow waters can also be “affective” places alive with emotions, values and responsibilities. For many, these shadow waters are sacred, spiritual places that should be protected, restored and nurtured. What and who contributes to the construction of shadow waters, and with what consequences, can be a shifting, highly situated and complex process.

The absent presence is a related idea in Plumwood’s discussion of shadow places and the politics of dwelling; consideration of a sense of place often elevates the value of a proximate place, while concurrently diminishing the value of peripheral or distant places that are necessary for the continued valuation of “local” spaces. Translating this to the “shadow waters” idea, we reveal that the Goulburn River is often viewed as a watery shadow place by many in Mudgee, that people “don’t know about, don’t want to know about, and in a commodity regime don’t ever need to know about or take responsibility for” (Plumwood, 2008, pp. 146–147). In contrast, many value the Cudgegong; yet local Wiradjuri people, while valuing both rivers, have an inverse view, regarding the Cudgegong as unhealthy and the Goulburn as important, including as a women’s sacred place. The construction of shadow waters is contingent and situated, depending on which perspective is considered. In this paper, we move from binary constructions of shadow places versus dominant places, and explore the contradictions that co-exist in the making of shadow waters.

5 | DISCUSSION: SHADOW WATERS

Flowing from the above review, the paper now discusses how the multi-positionality of water knowledges creates shadow waters along three axes in the Goulburn and Cudgegong rivers. First, time/space relations produce shadow waters by historicising Wiradjuri water knowledges and the false erasure of Indigenous presences. Second, the diverging and entangling of the Goulburn and Cudgegong rivers occurs on a horizontal plane as local governance and landholder actors situate the Goulburn as distant and diminished by mining, while the Cudgegong is turned towards for leisure. The vertical shadowing of water occurs when groundwater systems are subject to extractive practices and re-engineering in a future frontier for coal-seam gas exploration (de Rijke et al., 2016). Vertical shadow waters relates to the emerging geographic literature on subterranean (Bebbington & Bury, 2013) and vertical geopolitics (Elden, 2013). Bebbington and Bury’s (2013) edited collection of essays on extractive industries in Latin America emphasises the value in looking beyond the surface at the values embedded in resource management practices, while Elden (2013) suggests that space is volumetric and that geographers have neglected to adequately consider this fact when theorising geopolitics, tending to look from above rather than below when thinking vertically. Further, Lehman argues that “geographic and other scholarship on the sea has the potential to show the ways in which the vertical and horizontal spaces of this volume create a politically vital relation between spaces and their qualities” (2013, p. 52). While Lehman (2013) is discussing the ocean and geopolitics of climate change, her

argument that volumetric approaches should be used to draw in more than state actors to achieve effective climate change action is relevant to our thinking on shadow waters. Drawing on these useful developments in geographic thought, the vertical aspects of shadow waters offer another avenue to explore the underground. Each of these aspects of shadow waters – the horizontal, temporal and vertical – is constructed by institutional and individual water values in distinct ways. By illuminating these processes, opportunities to creatively resist can be identified, allowing an engagement with different water ethics.

5.1 | Time/space relations

The way time and space relations forge shadow waters is tied to historical society–water relations that continue to be renegotiated and contested today. Indigenous water knowledges have been subject to the same processes that have rendered Wiradjuri people non-visible in Wiradjuri country, despite their continuing presences and shaping of country (Macdonald, 1998). Multiple temporal and spatial relations have produced continued settler colonial (Veracini, 2013) narratives of Wiradjuri water knowledges as marginal and/or extinct, casting them in a time/space shadow. Glimpses of Wiradjuri knowledges are captured in place names around, and including, Mudgee, but beyond this, little visibility is present within formal governance processes. As Wiradjuri research participant Sam described the temporal and spatial relations that have combined to form this marginal positioning:

Because of Mudgee’s contact history, like there were massacres and they moved people out and people who were here, married in with non-Aboriginal people. There has never been a big community like in Dubbo or Bathurst or Orange and we’re sort of in a time warp behind everyone else so we got our land council like 20 years behind everyone else. (Interview, January 2016)

While Sam is referring specifically to the minimal Indigenous consultations that mine operations have historically pursued in the Mudgee area, it is also clear that the attempts at erasure of Indigenous presences during early colonisation have ongoing reverberations today.

Research by historians in the last few decades has helped to reveal the extent of violence associated with British colonisation in the early to mid 19th century, as well as Wiradjuri resistance in this region (Pearson, 1984; Roberts, 1995). The expansion of grazing and associated settlements in the region in the 1820s, including the establishment of the township of Mudgee, initiated a period of intense violence and retaliation on both sides, although the overall losses of Wiradjuri lives was much greater (Pearson, 1984; Roberts, 1995). In the late 19th and 20th centuries, the dispossession of Wiradjuri from their lands and waters continued. In broad terms, the settling state’s modes of water and land management became dominant and Wiradjuri knowledge was marginalised in these processes. Modes of management have shifted over time and particular approaches have been inscribed in the landscape, creating physical as well as cultural legacies that shape lives and livelihoods today. These include enduring as well as changing European farming practices (Strang, 2009), mining of a variety of substances (most recently coal), and major water infrastructure such as Windamere Dam, sited at the headwaters of the Cudgegong (completed in 1984) and Burrendong Dam sited at the junction of the Cudgegong and Macquarie rivers (completed in 1967). These dams supported the expansion of industries: Windamere Dam was built to supply water to develop coal industries and for private irrigation as well as to supplement town water; Burrendong Dam was built partly to mitigate floods and supply water for irrigation farming in the downstream Macquarie River region, ultimately supporting the development of cotton industries there, as well as to deliver water to the Macquarie Marshes (which has its own controversial history) (Lloyd, 1988; McHugh, 1996; O’Gorman, 2012).

Histories of colonisation around Australia share similar narratives of violent and persistent settler invasions, and ongoing dispossession and marginalisation, such as the experiences of Indigenous people that Goodall (2008) described around the Darling River in far west New South Wales and Strang’s (2009) account of colonisation in the Brisbane River catchment in Queensland. The control of waterways was crucial to establishing and maintaining settler presence. However, Indigenous knowledges have adapted to settler invasion in the upper Darling and Goodall (2008) provided an account of how people remember country through water, invoking lists, networks and ecologies as tools for doing so.

Mudgee is in a “time warp” according to Sam because of the severity of attempts at Indigenous erasure, including the massacres and removal of Wiradjuri people from their country. This intense colonisation has produced a time lag in establishing infrastructure and institutions that might support Indigenous peoples, such as local land councils. Relatedly, cultural studies scholar Christopher Lee has argued that a public-facing local history in Mudgee has been slow to meaningfully

acknowledge the Aboriginal past of the area as this challenges historical settler narratives that inform a sense of rural heritage and identity that is marketed to tourists (Lee, 2005).

While this temporal dissonance is problematic in terms of the lack of widespread recognition of Indigenous peoples' rights in this region, including with respect to water, it has also provided opportunities as relatively new relationships can be forged between Indigenous and non-Indigenous peoples and institutions that function differently to those that may have started at earlier times. Sam gives the example of their growing relationship with the National Parks and Wildlife Service as an exemplar of how the "time warp" can work to the advantage of multiple interests:

... the consultants that they got to come in were a bit spun out that like we actually talk to National Parks and we trusted them and that we wanted them at the meeting. They were like: 'we don't have to have them there' and I was like why? 'Oh because communities don't talk to them' and I'm like we got no problem with them, we always talk to them. That must have been an unusual thing for them to actually see people where they will talk to National Parks. They have always been pretty good here, so yeah. (Sam, January 2016)

Sam highlights some of the widely held assumptions about modes of engaging with Indigenous communities, but also the flexibility and contingency that characterises resource management issues in the Mudgee region, at least from an Indigenous perspective. Indigenous people consider this time warp as a potential opportunity for water relations to shift now and in the future, and for the MLALC to learn from what has and has not worked in other areas. Wiradjuri people and local environmental groups, such as the Mudgee District Environment Group and the Running Stream Environment Group, reported productive and friendly relationships in working together on water management processes (MDEG representative, personal communication).

Similarly, functional and productive relationships were reported between local Indigenous people and environmentalists when discussing negotiating access to land with mining companies. In building what seem to be positive relationships with National Parks and environmentalists, Wiradjuri people are rewriting narratives of engagement with institutions that have been interpreted as marginalising or deeply colonising Indigenous knowledges elsewhere (Howitt, 2001; Rose, 1999). National parks in Australia were first introduced unilaterally by the settling state in a social and cultural context of deep conflict with Indigenous peoples and official state policies of protectionism that intended to segregate social groups (Moorcroft, 2016). National parks were an arm of the settling state to further territorial control and attempt to legitimate colonial power. Global, national and regional differences exist in how national parks have been established and negotiated and Goodall (2006) points out that local specificities, state motives and international pressures and processes shape these variations. In recent times, Indigenous people in Australia have tended to strategically engage with the conservation agenda, emergent since the 1960s, to further their social justice goals (Moorcroft, 2016) and there are some echoes of this positioning in negotiations around The Drip. The binaries that national park designations reproduce in determining particular areas of "cultural" and/or "natural" value are also relevant to The Drip (Lee, 2016). By portioning one part of a complex songline as suitable for a national park, the integrated Wiradjuri notions of country are only partially acknowledged, but it is a step forward in forging new Indigenous and non-Indigenous society–nature relations (Adams, 2004). It is important to note, then, the pragmatic positioning of the national park extension to include The Drip within the Goulburn National Park's borders addresses only some of Wiradjuri people's goals for the area.

6 | DIVERGING RIVERS

Differing water values exist for the Cudgegong and Goulburn and these are shaped by cultural and economic dynamics. In a physical sense, the rivers are divergent as the Cudgegong flows west and contributes to the Murray Darling, while the easterly flowing Goulburn is unregulated and forms a headwater for the Hunter system. But it is not just in this directional, catchment-bounded sense that the rivers diverge as engagements with the two rivers vary along cultural and economic lines. The Goulburn and Cudgegong are positioned as valued or marginalised at certain times by a range of actors. These rivers are constructed as shadow places, depending on the perspective of the individual, institution or group and these constructions can produce material and discursive divergences. For instance, Wiradjuri people value The Drip and the Goulburn more broadly as a highly important place, a women's sacred place that is healthier than the Cudgegong and crucial to communication along songlines.

Like out that way [the Goulburn] is all of our, like it's on the edge of trade route, ceremonial trade route, that sort of area. Where here is more habitation, so this is where people live, that's why there are so many camp-sites around town where they want to put houses and stuff like that. (Sam, January 2016)

However, even The Drip is also understood as a damaged place that needs healing ceremonies due to frequent tourist traffic. As a Wiradjuri women's sacred site, only those who have been welcomed to country by Elders should access The Drip, and certainly not men. The Drip is located along a songline that travels down to Lithgow. Other sacred sites are protected from public access while access to The Drip is ongoing. The physical health of the Cudgegong captures the diminished value of that river for Wiradjuri people and echoes the second dispossession that Weir (2009) acknowledged in respect of the water-related experiences of the Murray Lower Darling Rivers Indigenous Nations. From our conversations with Wiradjuri people, the Cudgegong is too interfered with, too managed and too far gone. It has become a sacrificial place.

At the same time, there is a "turning-back" to the Cudgegong by the township of Mudgee and the local council of the area, the Midwestern Regional Council (MRC). Over the past five years, the MRC has spent council resources building and landscaping a pathway alongside the Cudgegong River, extending existing footpaths from Lawson Park where the first town swimming pool was built. The walkway includes a bridge to cross the Cudgegong and take walkers to the sporting fields on the northern edge of town and the racecourse. Well-manicured lawns line much of the path and it is a well-used facility. The tensions between the MRC management and Councillors who direct activity was hinted at during an interview with a senior administrator of the MRC who noted that the ethos of the elected representatives was "Development at any cost" (senior administrator, July 2015 interview). The same senior administrator was pleased with the manicured lawns and removal of unruly dead wood along the banks of the Cudgegong to make the walk more desirable. The sculpted landscape along the Cudgegong is now reminiscent of the pastoral gardens (Strang, 2009) achieved by settler colonial practices that have resulted in the destruction or high modification of over 99% of southeastern Australian native grasslands (Instone, 2014).

The relationship between the Cudgegong and Goulburn is also articulated as connected but divergent with respect to industry activities. For instance, the aforementioned MRC senior administrator stated how "They [coal mines] are out in another catchment area, the Goulburn Valley area, and I think we are very blessed that they are in marginal country" (senior administrator, July 2015 interview). The senior administrator of the local government's framing of the Goulburn as a sacrifice river is evident in this perspective on the way coal mining affects townships and visitors. In almost inverse relation to how Wiradjuri people value the Goulburn as a vital water place (Gibbs, 2009, 2014), many local townspeople tend to view the Goulburn as a remote, intense resource use zone and orient the Cudgegong as a valuable water place. For instance, in an interview with a landholder who lives in the Goulburn catchment, the political ecology of the Goulburn is framed as "edge" country.

All those mines are on the edge of nowhere, like they're out of sight and out of mind for Mudgee. Everyone drives back and spends all their money in Mudgee but all its impacts are out there, it's right on the edge of electorate, it's right on the edge of everything. (Local environmentalist, July 2015)

Proposals to mine under the Goulburn emerged in 2015 when the Moolarben mine was seeking to expand its activities. Concerned local landholders and Wiradjuri people were alarmed at the potential impacts of such resource extraction on a relatively unregulated river; the Goulburn River does not have any dams or major weirs along its main stream, which is a rare occurrence in a country with one of the highest rates of regulated rivers in the world. While from certain perspectives the Goulburn River is horizontally shadowed, a water place that is a sacrifice zone for the purposes of extractive industry, it is also a valued natural area that holds strong connections to country for Wiradjuri people and environmental values for others. These tensions can be held within, and challenged by, the conceptualisation of shadow waters.

7 | GROUND WATER AND SURFACE WATER, CONNECTIONS AND DISCONNECTIONS

The creation of shadow waters is discernible when Indigenous people, environmentalists and farmers discussed the interactions between ground and surface waters during our walks along the riparian banks of the Goulburn and Cudgegong rivers. The vertical shadowing of water occurs when groundwater is rendered insignificant in planning processes and physically disconnected from surface water in water management practices. For both the Cudgegong and Goulburn rivers, knowledge

of groundwater dynamics differs according to multiple actors' interests and water values. Variation in water knowledges is shaped in relation to awareness of interconnected systems and the extent that these interconnections are valued.

The disturbance of connections that constitute the complicated hydrology of the headwaters of the Goulburn River began with the building of a channel in the early 1980s to divert the headwaters of the Goulburn River (Stanford, 2015), allowing the mine to begin coal extraction. Goulburn River groundwater continues to be extracted for mine activities. Rehabilitation works on that original channel have begun, in order to meet the contractual obligations formed between the mine and state government bodies (Stanford, 2015).

The interactions with water and resource extraction are conceptualised as an emerging frontier for resource management in the region. A wine grower in the Cudgegong catchment who runs a non-irrigation operation commented on the challenges in negotiating fair water allocations and the lack of understanding of groundwater dynamics in the area:

The biggest battle we've got, the question you haven't asked which no one asks, is how do you restrict the water allocation to the farmers who think that it's a god given right and no one can answer that to our knowledge but we sorted out the river really easily by this buy back. What we haven't done is ground water, it's too tricky and a wonderful way to study ground water would be to do coal seam gas at the same time. It's the next big big answer. (Local landowner and wine producer, Sept 2015)

The potential insights into groundwater patterns that could come from exploiting coal seam gas from the catchment are positioned as worthwhile despite the unspoken environmental risks associated with this intrusive activity. The invisibility of underground water flows would be overcome at the same time as another carbon producing fuel is accessed. Here water knowledge is valued only for its economic utility. Of further interest is that the frontiers of resource extraction – groundwater, coal seam gas – are mentioned in quick succession after critiques of farmers' perceptions of a "god given right" to water allocations. Following from Linton and Budds, it is clear that 'social relations around groundwater can be entirely different from those around surface water. Groundwater flows and volumes are invisible to the observer, which makes them more complex to assess and measure, either by hydrologists or by users' (2014, p. 177). The invisibility and complexity of groundwaters has resulted in their shadowing in water planning in preference of the more visible surface waters. In Australia, exploitation of groundwaters as a resource frontier is largely being pursued by companies and governments in ignorance of the interconnections between surface and groundwaters. While scientific knowledge of aquifers and recharge rates are far from certain, there is a general understanding (based on a variety of local and general indicators) that extraction has exceeded rates of replenishment (Lamontagne et al., 2005, pp. 3077–3078; Thoms et al., 2004, pp. 338–341; O'Gorman, 2012, p. 8). Further research could focus on the political reasons that support and entrench such exploitation of resources in the absence of such scientific knowledge.

To understand the underground as more than a place of extraction and vertical territorial exploitation, de Rijke et al. (2016) acknowledge multiple other "undergrounds" that shape and are shaped by surface socio-cultural processes. Exploring these other undergrounds provides new insights into vertical colonial and postcolonial relations (de Rijke et al., 2016; Munro & Melo Zurita, 2011). Wiradjuri knowledges of groundwater systems, for example, acknowledge the interactions of surface and subterranean waters, while often simultaneously looking at future impacts of ignoring these relations in the short term. The following conversation from January 2016 shows this nuanced appreciation:

Tara: And a lot of the women's sites, groundwater is sacred to them as well and even some of the women's business is to do with groundwater as well and caretaking of that.

McLean: So how does that work?

Sam: They reckon they don't affect it . . . mines don't affect it; what are you talking about? So it's really hard getting them to understand that it might be under the ground and it might be just water to you but it affects people and community. When the rivers get sick we get sick people and [this affects] their ability to pass on knowledge and enjoy those places. Even though they are going to do all this stuff with The Drip, in the back of your mind you think well what is it going to be like in 10 or 15 years' time? Is it going to be that overrun with people that it takes away from it? I know that they want to fix it up so more people can enjoy it, but then you think well how far does that go?

Wiradjuri women are suspicious of using the same systems to repair damaged water places in The Drip and Goulburn River more broadly. If a resource extractive process has resulted in impaired waterways, then how reliable is a solution that stems

from the same management praxis? Rose (1999) recounts similar concerns with respect to Eurocentric resource management practices in her analysis of Indigenous philosophies.

8 | CONCLUSIONS

Returning to Plumwood's work, what might it mean to honour and acknowledge all the shadow waters that support us? What happens when we do choose to know and care about water planning practices that persistently ignore Indigenous knowledges and then decide to do something about that? The research presented in this paper shows that the shadow waters concept opens up new conversations about how we engage with water and each other. Shadow waters provides room for a focus on water cultures that is sometimes not afforded by hydro-social perspectives that may not examine the trivalent ways in which diverse water values can be marginalised: horizontally, vertically and temporally.

The intention of the shadow waters idea as applied here, beyond contributing to the significant body of work on society–water relations including the literature on Indigenous knowledges and cultural political ecology, is to demonstrate the multiplicity inherent to the way water values are constructed and recognised or ignored by different actors. Formal water planning processes, and the water cultures they represent, can produce shadow waters, but marginalised stakeholders, such as Wiradjuri people in the Goulburn and Cudgegong river contexts, can also take advantage of such “shadowing” to protect important places, thus maintaining connections to country. In places like Mudgee, where frontier expansion was intensely violent and settler colonialism is persistent, this strategic action becomes crucial for survival and resistance, demonstrating the resilience of Indigenous water knowledges.

Shadow waters run along temporal, horizontal and vertical planes. Attention on shadow waters, and the processes underpinning their construction, reveals the persistence of Indigenous connections to water despite the ongoing impacts of settler colonialism. Attempts to position Indigenous water knowledge as marginal or extinct, swept away by history, are thwarted by new alliances between Indigenous people and environmentalists, certain government institutions and others. The concept of shadow waters allows us to recognise pre-existing and ongoing connections and opens up opportunities to imagine different connections that shift the dominance of water management premised on displacement and dis-connection for human-defined purposes.

The horizontal shadowing of waters is captured in the way the Cudgegong–Goulburn west–east flowing geomorphology correlates with a framing of “trashed” and “treasured” systems. For Wiradjuri people, environmentalists and some local farmers, the Cudgegong is not a healthy system and has become of lesser value than the Goulburn. For many local Mudgee residents, town governance actors and tourism operators, the Cudgegong is a pleasant river to walk along worthy of certain investments, yet the Goulburn River is less visible and considered. As such, the multiplicity of water values comes into sharp relief along this horizontal plane. Recognition of the situated nature of water values challenges the maintenance of exclusionary governance systems that prioritise certain values, knowledges and actions in the service of particular patterns of industry and settlement to the detriment of other interests. The consequence of such exclusionary systems is the creation of sacrificial waters that are resistant to all but the most radical and concerted efforts of revaluing.

Vertical shadowing is apparent in how the complex and largely hidden flows and connections to and from groundwater systems are disturbed and degraded by dominant economic interests with little concern or understanding of the consequences of such interventions. Knowledge of the interconnections between component parts of the complex hydrology and ecology of the Goulburn River system, held by certain Wiradjuri people and local environmentalists, challenges the vertical shadowing of groundwaters associated with their incorporation into national and global resource economies. This situated knowledge has the potential to halt the expanding frontier of industrial water use that transforms valued water places into industrial landscapes devoid of complex interconnections and relations of responsibility and care. Similarly to Strang's (2009) exploration of Australian water values with her metaphor of colonisers producing a mega-garden riven with water crises, the shadow waters concept unpacks patterns of persistent marginalisation of particular water knowledges and examines power relations. The multi-dimensionality of the shadow waters idea and the co-authorship of this paper to incorporate Wiradjuri knowledges extends that argument.

Through our research and consideration of the idea of shadow waters in southeastern Australia, we have found ongoing contestations over water but also emerging connections between people and water places. Future research could investigate whether shadow waters are useful in other contexts to explain entrenched marginalisation of Indigenous water knowledges and point to ways of changing such oversight. New research, in this and other contexts, that draws on the shadow waters concept may highlight power relations in productive ways that could draw out histories and spatialities of inequality. By making visible the temporal, horizontal and vertical planes by which shadow waters are apparent with respect to rivers,

opportunities for engagement with diverse water values, knowledges and cultures become possible. The rethinking of dominant water cultures made possible by such cross-cultural engagement generates new possibilities for reconnection, restoration and protection; a different water ethics based on care and responsibility that addresses power relations and injustices explicitly. As such, the shadow waters idea can inform policy processes elsewhere, as it constructively reveals the complex socio-cultural practices that marginalise or disguise vulnerable water values. It unsettles the dominant language of complex, scientific water management and encourages engagement with explicitly political and cultural matters. Our own everyday experiences of producing shadows, and how these can protect or hide, should encourage us to enquire as to why some things remain hidden while others are visible, and to recognise how this can so easily change with a shift in perspective. Through the co-production of knowledges made possible by cross-cultural research relationships, such a perspective can hopefully contribute to decolonising efforts.

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ENDNOTES

- ¹ Pseudonyms are used in this paper to protect the identity of research participants at their request and as per our research agreement.
- ² While Macdonald's (2011) research is further south than the Goulburn and Cudgegong Rivers, it is nevertheless relevant to this analysis in terms of general insights into Indigenous water knowledges.
- ³ See Rose (2013) for a broader discussion of Plumwood's developing philosophies at the time she wrote "Shadow places." Plumwood was influenced by both Aboriginal and Western philosophical traditions at this time.

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REFERENCES

- Adams, M. (2004). Negotiating nature: Collaboration and conflict between Aboriginal and conservation interests in New South Wales, Australia. *Australian Journal of Environmental Education*, 20, 3–11.
- Bakker, K. (2003). Archipelagos and networks: Urbanization and water privatization in the South. *The Geographical Journal*, 169, 328–341.
- Bakker, K. (2012). Water: Political, biopolitical, material. *Social Studies of Science*, 42, 616–623.
- Bawaka Country, Wright, S., Suchet-Pearson, S., Lloyd, K., Burarrwanga, L., Ganambarr, R., Ganambarr-Stubbs, M., Maymuru, D., & Sweeney, J. (2015). Co-becoming Bawaka: Towards a relational understanding of place/space. *Progress in Human Geography*, 40, 455–475. <https://doi.org/10.1177/0309132515589437>
- Bebbington, A., & Bury, J. (2013). *Subterranean struggles: New dynamics of mining, oil and gas in Latin America*. Austin, TX: University of Texas Press.
- Boelens, R. (2014). Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands. *Geoforum*, 57, 234–247.
- de Rijke, K., Munro, P., & Melo Zurita, M. D. L. M. (2016). The Great Artesian Basin: A contested resource environment of subterranean water and coal seam gas in Australia. *Society & Natural Resources*, 29, 696–710.
- DeLyser, D. (2001). "Do you really live here?" Thoughts on insider research. *Geographical Review*, 91, 441–453.
- Elden, S. (2013). Secure the volume: Vertical geopolitics and the depth of power. *Political Geography*, 34, 35–51.
- Gibbs, L. (2009). Water places: Cultural, social and more-than-human geographies of nature. *Scottish Geographical Journal*, 125, 361–369.
- Gibbs, L. (2010). A beautiful soaking rain: Environmental value and water beyond Eurocentrism. *Environment and Planning D: Society and Space*, 28, 363–378.
- Gibbs, L. (2014). Freshwater geographies? Place, matter, practice, hope *New Zealand Geographer*, 70, 56–60.

- Goodall, H. (2006). Exclusion and re-emplacment: Tensions around protected areas in Australia and Southeast Asia. *Conservation and Society*, 4, 383–395.
- Goodall, H. (2008). Riding the tide: Indigenous knowledge, history and water in a changing Australia. *Environment and History*, 14, 355–384.
- Guelke, L., & Shell, R. (1992). Landscape of conquest: Frontier water alienation and Khoikhoi strategies of survival, 1652–1780. *Journal of Southern African Studies*, 18, 803–824.
- Hannam, P. (2015). *New South Wales election: The Drip Gorge carved out of coal lease to Yancoal*. *Sydney Morning Herald*. Retrieved from <http://www.smh.com.au/hsw/nsw-state-election-2015/nsw-state-election-2015-the-drip-gorge-carved-out-of-coal-lease-to-yancoal-20150313-1438rv.html>
- Howitt, R. (2001). *Rethinking resource management: Justice, sustainability and Indigenous peoples*. London, UK: Routledge.
- Instone, L. (2014). Unruly grasses: Affective attunements in the ecological restoration of urban native grasslands in Australia. *Emotion, Space, and Society*, 10, 79–86.
- Jackson, S. (2005). Indigenous values and water resource management: A case study from the Northern Territory. *Australasian Journal of Environmental Management*, 12, 136–146.
- Jackson, S. (2006). Compartmentalising culture: The articulation and consideration of Indigenous values in water resource management. *Australian Geographer*, 37, 19–31.
- Jackson, S., & Langton, M. (2012). Trends in the recognition of Indigenous water needs in Australian water reform: The limitations of “cultural” entitlements in achieving water equity. *Journal of Water Law*, 22, 109–123.
- Lamontagne, S., Leaney, F. W., & Herczeg, A. L. (2005). Groundwater–surface water interactions in a large semi-arid floodplain: Implications for salinity management. *Hydrological Processes*, 19, 3063–3080.
- Lee, C. (2005). Settling in the land of wine and honey: Cultural tourism, local history and some Australian legends. *Journal of Australian Studies*, 29, 47–59.
- Lee, E. (2016). Protected areas, country and value: The Nature–Culture Tyranny of the IUCN’s protected area guidelines for Indigenous Australians. *Antipode*, 48, 355–374.
- Lehman, J. (2013). Volumes beyond volumetrics: A response to Simon Dalby’s ‘The geopolitics of climate change. *Political Geography*, 37, 51–52.
- Linton, J. (2010). *What is water? The history of a modern abstraction*. Vancouver, BC: UBC Press.
- Linton, J., & Budds, J. (2014). The hydrosocial cycle: Defining and mobilising a relational-dialectical approach to water. *Geoforum*, 57, 170–180.
- Lloyd, C. J. (1988). *Either drought or plenty: Water development and management in New South Wales*. Parramatta, NSW: Department of Water Resources.
- Macdonald, G. (1998). Master narratives and the dispossession of the Wiradjuri. *Aboriginal History*, 22, 162–179.
- Macdonald, G. (2011). Territorial boundaries and society in the NSW riverine: A Wiradjuri analysis. In T. Bauman & G. Macdonald (Eds.), *Unsettling anthropology: The demands of native title on worn concepts and changing lives* (pp. 62–81). Canberra, ACT: The Australian Institute of Aboriginal and Torres Strait Islander Studies.
- Macfarlane, I. (2005). A water history of the western Simpson Desert, Australia. In M. Smith & P. Hesse (Eds.), *238S: Archaeology and environmental history of the southern deserts* (pp. 308–323). Canberra, ACT: National Museum of Australia Press.
- McClean, K., Bark, R. H., Moggridge, B., Jackson, S., & Pollino, C. (2012). *Ngemba water values and interests: Ngemba Old Mission Billabong and Brewarrina Aboriginal fish traps (Baiame’s Nguunhu)*. Canberra, ACT: CSIRO. Retrieved from <https://publications.csiro.au/rpr/download?pid=csiro:EP127320&dsid=DS1>
- McFarlane, B. (2004). *The National Water Initiative and acknowledging indigenous interests in planning*. Paper presented to the National Water Conference, Sydney 29 November 2004. Retrieved from <http://www.nntt.gov.au/Information%20Publications/Speeches%20National%20water%20initiative%20McFarlane%20November%202004.pdf>
- McHugh, S. (1996). *Cottoning on: Stories of Australian cotton-growing*. Sydney, NSW: Hale & Iremonger.
- McLean, J. (2007). Water injustices and potential remedies in Indigenous rural contexts: A water justice analysis. *The Environmentalist*, 27, 25–38.
- McLean, J. (2014). Still colonising the Ord River, northern Australia: A postcolonial geography of the spaces between Indigenous people’s and settlers’ interests. *The Geographical Journal*, 180, 198–210.
- McLean, J. (2017). Water cultures as assemblages: Renegotiating development trajectories in northern Australia. *Journal of Rural Studies*, 52, 81–89.
- Moorcroft, H. (2016). Paradigms, paradoxes and a propitious niche: Conservation and Indigenous social justice policy in Australia. *Local Environment*, 21, 591–604.
- Muir, C. (2014). *The broken promise of agricultural progress: An environmental history*. London, UK: Routledge.
- Muir, C., Rose, D., & Sullivan, P. (2010). From the other side of the knowledge frontier: Indigenous knowledge, social–ecological relationships and new perspectives. *The Rangeland Journal*, 32, 259–265.
- Munro, P. G., & Melo Zurita, M. D. L. (2011). The role of cenotes in the social history of Mexico’s Yucatan Peninsula. *Environment and History*, 17, 583–612.
- Neidjie, B. (1989). *Story about feeling*. Broome, WA: Magabala Books.
- O’Gorman, E. (2012). *Flood country: An environmental history of the Murray-Darling Basin*. Collingwood, Vic.: CSIRO Publishing.
- O’Regan, T., Palmer, L., & Langton, M. (2006). Keeping the fires burning: Grievance and aspiration in the Ngai Tahu settlement. In M. Langton, O. Mazel, K. Shain, L. Palmer & M. Tehan (Eds.), *Settling with Indigenous people: Modern treaty and agreement-making* (pp. 44–66). Sydney, NSW: The Federation Press.

- Palmer, L., & Tehan, M. (2006). Shared citizenship and self-government in Canada: A case study of James Bay and Nunavik (Northern Quebec). In M. Langton, O. Mazel, K. Shain, L. Palmer & M. Tehan (Eds.), *Settling with Indigenous people: Modern treaty and agreement-making* (pp. 19–43). Sydney, NSW: The Federation Press.
- Pearson, M. (1984). Bathurst Plains and beyond: European colonisation and Aboriginal resistance. *Aboriginal History*, 8, 63–79.
- Plumwood, V. (2008). Shadow places and the politics of dwelling. *Australian Humanities Review*, 44, 139–150.
- Radcliffe, S. A. (2017). Decolonising geographical knowledges. *Transactions of the Institute of British Geographers*, 42, 329–333.
- Roberts, D. (1995). Bells falls massacre and Bathurst's history of violence: Local tradition and Australian historiography. *Australian Historical Studies*, 26, 615–633.
- Rose, D. B. (1999). Indigenous ecologies and an ethic of connection. In N. Low (Ed.), *Global ethics and environment* (pp. 175–187). London, UK: Routledge.
- Rose, D. B. (2013). Val Plumwood's Philosophical Animism: Attentive interactions in the sentient world. *Environmental Humanities*, 3, 93–109.
- Smith, L. T. (1999). *Decolonizing methodologies, research and indigenous peoples*. London, UK and New York, NY: Zed Books Limited.
- Stanford, L. (2015). *First stage of clean water project complete*. *Mudgee Guardian*, August, 12, 2015. Retrieved from <http://www.mudgeeguardian.com.au/story/3272376/first-stage-of-clean-water-project-complete/>
- Strang, V. (2002). *Life down under: water and identity in an Aboriginal cultural landscape*. Goldsmiths College Anthropology Research Papers No. 7. London, UK: Goldsmiths College.
- Strang, V. (2005a). Common senses water, sensory experience and the generation of meaning. *Journal of Material Culture*, 10, 92–120.
- Strang, V. (2005b). Knowing me, knowing you: Aboriginal and European concepts of nature as self and other. *Worldviews: Global Religions, Culture, and Ecology*, 9, 25–56.
- Strang, V. (2008). Wellsprings of belonging: Water and community regeneration in Queensland. *The Australian Journal of Anthropology*, 16, 366–381.
- Strang, V. (2009). *Gardening the world. Agency, identity, and the ownership of water*. Oxford, UK: Berghahn.
- Sultana, F. (2009). Community and participation in water resources management: Gendering and naturing development debates from Bangladesh. *Transactions of the Institute of British Geographers*, 34, 346–363.
- Swyngedouw, E. (2004). *Social power and the urbanization of water: Flows of power*. Oxford, UK: Oxford University Press.
- Swyngedouw, E. (2007). Technonatural revolutions: The scalar politics of Franco's hydro-social dream for Spain, 1939–1975. *Transactions of the Institute of British Geographers*, 32, 9–28.
- Swyngedouw, E. (2009). The political economy and political ecology of the hydrosocial cycle. *Journal of Contemporary Water Research and Education*, 142, 56–60.
- Thoms, M., Sheldon, F., & Crabb, P. (2004). A hydrological perspective on the Darling River. In R. Breckwoldt, R. Boden & J. Andrew (Eds.), *The darling* (pp. 332–349). Canberra, ACT: Murray-Darling Basin Commission.
- Toussaint, S. (2014). Fishing for fish and for Jaminjarti in northern Aboriginal Australia. *Oceania*, 84, 38–51.
- Veracini, L. (2013). "Settler colonialism": Career of a concept. *Journal of Imperial and Commonwealth History*, 41, 313–333.
- Weir, J. (2007). The traditional owner experience along the Murray River. In E. Potter, A. Mackinnon, S. McKenzie & J. McKay (Eds.), *Fresh water: New perspectives on water in Australia* (pp. 44–58). Melbourne, Vic.: Melbourne University Publishing.
- Weir, J. (2009). *Murray river country: An ecological dialogue with traditional owners*. Canberra, ACT: Aboriginal Studies Press.
- Wilson, N. J. (2014). Indigenous water governance: Insights from the hydrosocial relations of the Koyukon Athabaskan village of Ruby, Alaska. *Geoforum*, 57, 1–11.
- Woodward, E., & Marrfurra McTaggart, P. (2016). Transforming cross-cultural water research through trust, participation and place. *Geographical Research*, 54, 129–142.
- Yu, S. (2000) *Ngapa kunangkul: living water*. Report on the Indigenous cultural values of groundwater in the La Grange sub-basin. Perth, WA: Water and Rivers Commission of Western Australia.
- Yusoff, K. (2015). Geologic subjects: Nonhuman origins, geomorphic aesthetics and the art of becoming inhuman. *Cultural Geographies*, 22, 383–407.

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