

Enacting multiple river realities in the performance of an environmental flow in Australia's Murray-Darling Basin

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Abstract

In 2018, a large, coordinated environmental flow was instituted along the Barwon-Darling (Barka) River to connect ecosystems and restore public confidence in water regulation in the Murray-Darling Basin. This article examines the multiple river realities enacted by this event—environmental flow, regulated flow, unregulated flow, shut-up flow—as a conflict over what constitutes the character of water during substantial change in Australia's settler colonial systems of water governance. Geographical analyses of event spaces from military contexts assisted in unpacking the ontological and spatio-temporal matters germane to this situation in which managers needed to heed the dynamism of the river at both material and institutional registers. The article describes the scientific and regulatory practices and visual technologies through which management of an “event-ful” river brought together some waters (but not others) into something ontologically secure and coherent, and therefore governable. It shows how the naturalising discourse constrained and enabled what could be said about the relations deserving of water and who gets to decide what socio-material connections water might make. Aboriginal leaders interviewed during the flow chose to emphasise a wider relational set of connections than did state water managers, and to accentuate dysfunctional and destructive relations, thereby inviting others to think and feel differently about environmental flows.

KEYWORDS

Barwon-Darling (Barka) River, environmental water, event, ontological politics, performativity, settler colonial water governance

1 | INTRODUCTION

In May 2018, government water agencies restarted the Barwon-Darling (Barka¹) River in New South Wales, Australia. The river was then experiencing the most severe drought on record. Rain that had fallen a few months earlier in upstream Queensland had failed to

generate enough runoff to make the river flow. So, in April 2018, the Australian and New South Wales governments ordered the release of 23 gegalitres² (GL) of water stored in dams on tributaries close to the Queensland border (MDBA, 2018a). The objective of that large-scale coordinated intervention was to “benefit native fish and other aquatic life along several rivers in the northern

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Murray-Darling Basin by providing longitudinal connectivity between refugial waterholes” (Department of Agriculture, Water and the Environment, 2018, p. 3). The highly orchestrated production of an environmental flow of this scale was new to the northern Basin, which had been in the national spotlight for the illegal extraction of water by irrigators. Over the next three months, the moving waters, called the Northern Connectivity Event (hereafter the NCE), encountered the full length of the “flow-stressed” Barwon-Darling (Barka) and its northern tributaries (MDBA, 2018a, p. 23) (Figure 1).

The slow drying river had made itself felt on the region’s communities. Far-west local councils had appealed to higher governments for water, calling on them to provide “environmental water”³ to replenish weir pools and meet the needs of towns such as Bourke, Walgett, and Brewarrina. Multiple alerts were in place for harmful outbreaks of blue-green algae, fish were showing signs of stress, and no one had witnessed water-bird breeding on a large scale since 2012 (CEWO, 2016). Public protests at Wilcannia had drawn attention to the drying of the ephemeral Menindee Lakes, which threatened the town’s ailing fruit industry and its tourism base (Jackson & Head, 2020). The voices of Barkandji traditional owners were prominent in the media; theirs were not the only expressions of concern for river health from First Nations who make up a significant proportion of the outback population, and include the Murrawarri, Ngemba, and Ngiyampaa (Hartwig et al., 2018; Muir et al., 2010). Widely reported allegations of theft of environmental water, lax regulations that enabled irrigators to divert water intended for environmental purposes, and poor compliance by government agencies, cast further doubt on the legitimacy of water governance in the state, and throughout the Murray-Darling Basin (MDB). Flowing water was especially unruly in this intermittent river system (Linton & Budds, 2014; O’Gorman, 2012).

Many saw the environmental flow as a positive step in implementing the controversial inter-governmental project of restoring the health of the Basin’s rivers. An allied objective was to restore public confidence in water governance in the MDB, with new technologies of surveillance deployed to improve irrigator compliance with water laws. Yet, for others, and especially for those Aboriginal traditional owners who referred to the waters coming down the river as a “shut-up flow,” the water flowing on this occasion represented something altogether different to the waters of interest to environmental scientists. As I will show, by using this acerbic, subversive term they problematised techno-scientific knowledge claims to an environmental flow and openly questioned its reliability—both in terms of its material effects (doubting that it would endure or sustain important

Key insights

Environmental flows have emerged from neoliberal reforms to water governance that have radically shifted how water is conceived and the regulatory frameworks that control its distribution. A study of the material and institutional context of an environmental flow event on the Barwon-Darling River shows how many waters were brought into existence by regulatory and visual technologies, practices of scientific knowledge production, and a discourse of resistance to a restoration project and its environmental politics. Here, I explore the geographies of connection maintained by Aboriginal people that are denied, sidelined, or disrupted by settler-colonial water governance and its asocial, modernist performances of environmental flows.

socio-ecological relations) as well as its political origins (masking the woeful state of the river and providing cover for mismanagement by governments and water users).

Rivers are agents of change and, as part of one of the most variable rivers in the world (O’Gorman, 2012), moving water in the Barwon-Darling (Barka) is undeniably eventful. It is eventful in two senses, where the verb, *move*, denotes the act of making water move across space and through time in a sequence of actions or interventions, and the adjective, *moving*, denotes water’s essential property of fluidity and embodied motion (Strang, 2006). Water regulators acted on these meanings of event in planning and actualising the NCE, which entailed two choreographed performances, rather than the one suggested by its name. First, was the movement of waters from dams that in their momentary presence would connect thousands of kilometres of riverine ecosystems. Second, was a socio-political occasion, or happening, involving real-time monitoring and evaluation of the environmental flow to involve the public in its movement, inform them of the ecological effects of the connections it made, and demonstrate settler state powers of regulation and control.

In what follows, I examine the multiple river realities enacted by the NCE as a conflict over what constitutes the character of water at a time of substantial change in Australia’s settler colonial systems of water governance. Environmental flows have emerged from a set of wide-reaching neoliberal reforms to Australian water

to use that moment to explore the disregarded geographies of connection—the hydrosocial relations maintained by Aboriginal people that settler colonial water resource management continues to deny, sideline, or disrupt (Gibbs, 2009; Hemming et al., 2019; McLean et al., 2018; Taylor et al., 2016; Weir, 2009). The third aim is to challenge the asocial, modernist understanding of environmental flows (Anderson et al., 2019; Jackson & Head, 2020) and reveal how flows of water are always situated, contingent and emergent. Environmental flows are not representations of the world waiting for scientists to describe or reveal, but are constructed in and through social action, emerging from processes, practices, or performances that have social and political effects (Fernandez, 2014; Lavau, 2011, 2013; Weir, 2009).

In the following section, I elaborate on the empirical context for the environmental flow of 2018, before describing three distinct practices through which sustainable management of an “event-ful” river brought together some waters (but not others) into something ontologically secure, whole, and coherent, and therefore governable. Acts of optical distancing enabled by visual technologies and other processes of abstraction were central to the assertion of control over moving water. The analysis described in those sections relies on secondary literature research conducted since witnessing the NCE over a period of 4 days in 2018. These sources include media reports and documents relating to the NCE, particularly the monitoring reports and public updates produced by water agencies, as well as a submission from Aboriginal elder, Badger Bates, to the Royal Commission into water management in the MDB (2018–2019).

Interviews with six Aboriginal people who locally hold leadership roles in the region were undertaken during the flow as it passed through the northern towns of Walgett, Brewarrina, and Bourke. Interview participants, some of whom were known to the author who has worked in partnership with the Ngemba and Barkandji communities of northern New South Wales (see, for example, Hartwig et al., 2021; Jackson et al., 2015), were selected on the advice of two Indigenous water specialists from northern New South Wales. Interviews included core questions that specifically addressed attitudes to the environmental flow witnessed. The open-ended interviews were conducted in accordance with human ethics standards of Griffith University and were recorded and analysed for themes that emerged during the conversation. In the final section, I discuss the exclusions enacted by this flow and wider technologies of water governance, showing how the naturalising discourse of the NCE constrained and enabled what could be said about the relations deserving of water, as well as who gets to decide on what socio-material connections water might make.

2 | SETTING THE SCENE FOR THE NCE

Dams on tributaries and rates of water extraction for irrigation have increased markedly in the northern MDB since the 1960s, dramatically altering the historical pattern of flow and the aquatic ecology (AAS, 2019; O’Gorman, 2012; Thoms & Sheldon, 2000). Climate change has also contributed to the drying that has seen the river “stopped more often and for longer than previously in living memory” (CEWO, 2018, Update 8). In the flow nomenclature of techno-science, the recent behaviour of the Barwon-Darling (Barka) River signals an observable shift from the “natural hydrology” (MDBA, 2018a), which has been heavily modified, to one characterised by an:

... increase in the number of cease-to-flow events, a reduction in the time between cease-to-flow events, and a reduction in frequency of medium-flow events. (NSW Department of Industry, 2018a, p. 5)

In response, several reports pertaining to the northern Basin have recommended greater protection of environmental water, and particularly low flows, because they serve important ecological and social functions and are vulnerable to extraction (for example, MDBA, 2016).

In 2017, allegations over water theft aired on national television and the slow decline of river health achieved public prominence. The ensuing controversy threatened to undermine the fragile consensus needed to address widespread environmental degradation in the Basin, as well as the “integrity of the water market” that relies on the security of the allocation system (Commonwealth of Australia, 2018). Seven government inquiries into water governance recommended a host of internal regulatory changes, including improvements to “science-based specification of, and public awareness of, the specific environmental objectives and outcomes of water dedicated for environmental purposes” (Matthews, 2017a, p. 23). The latter was to be achieved through greater use of “event-based” environmental water mechanisms. Event management represents a “policy shift away from the passive management of take [water extraction] through long-term averages to more active” management of single flow events (MDBA, 2019, p. 3). Under this approach “water access is announced, monitored and reported in an open and transparent way,” allowing environmental water to be protected (AAS, 2019, p. 9). To facilitate event-management, six government agencies (MDBA, 2018a) took action to protect certain waters. In 2018 the first regulation of its kind was introduced for this region to

improve compliance and enforcement and restore public confidence in water governance.

For at least the past decade, the intention of policy makers and water managers of the MDB has been to return “a more natural pattern to parts of the flow regime” (MDBA, 2017, p. 9). Much effort therefore went into naturalising this environmental flow and legitimising its dedicated use for aquatic ecosystems. Some of that work predates the NCE, requiring substantial investments in buying water entitlements, acquiring, and building on knowledge of flow-ecology, forging social relationships with recreational fishers, for example, negotiating protocols between levels of government, deploying, and calibrating scientific tools and apparatus, as well as the “ontological work” described by Lavau (2013). In her study of Victoria’s Goulburn River, in which irrigation and environmental water “intermingle,” sustainable management practices work to draw together, as well as hold apart, ontological multiplicity. Similarly, in the 3 months taken for the environmental flow of the NCE to travel its course from the dams to where it stopped at Menindee, many different flowing waters were enacted, some “intermingled” while others were “held apart” (Lavau, 2013, p. 416).

When ordered down from the dams by water regulators, the act of mobilising a volume of stored water with sufficient force to sustain movement over thousands of kilometres of flat and dry country was described as a *watering event*, and the flowing waters, an *environmental flow* or *environmental water*. Those using these terms were mostly government water managers, scientists, and people from sectors that interact with water managers, such as cotton farmers, and who are familiar with the flow idiom of water management. Frequently, these same people described the moving water as a *regulated event* and distinguished it from other forms of flowing water, like rain that is mobilised into a flow within the river’s channel. Such a flow had occurred the previous month when rain in central Queensland ran overland into the channel of the Barwon-Darling (Barka) and made its way to Menindee on a largely dry riverbed.

In the written and online materials generated for the NCE, managers consistently referred to flowing water sourced from rainfall as an *unregulated event*. Newspaper reports described the rain-sourced flow of March 2018 as “natural” and noted it was marked for “social use” by dry townships and thirsty stock along the river, with irrigators precluded from accessing this water. However, the distinction of importance to the water managers was not so much the hydrological origins of these flows but the legal context and its techniques of regulation. In April 2018, in response to the controversy over water regulation, the NSW Government placed a temporary

restriction order on withdrawals of water by irrigators, codifying *regulated water* released from dams for the exclusive use of the environment (NSW Department of Industry, 2018b). Without these measures, some of the waters of the NCE would not have passed through the Barwon-Darling (Barka); instead, they would have been diverted for irrigation (CEWO Update 8, 2018).

Aboriginal leaders I interviewed referred to the water moving across their country in terms different again to those used by bureaucrats, water managers, ecologists, and irrigators. In this region, the flows of the Barwon-Darling (Barka) have been managed for centuries longer than the discourse of environmental flows suggests (Bark et al., 2015; Jackson & Head, 2020; Muir et al., 2010). My focus is on the regulatory and scientific technologies of the settler state but Aboriginal practices and technologies, such as the heritage listed fish traps at Brewarrina, attest to long histories of interacting with river flow before it was conceived as a resource for irrigation or an object of scientific management (Jackson & Head, 2020). The rock formations placed in the riverbed by Aboriginal people to trap fish have long been integral, practically, and symbolically, to Ngemba Aboriginal identity, for example (Bark et al., 2015). During the NCE, moving water was frequently referred to as “a rise,” a phenomenon that builds excitement in Aboriginal people, particularly for its affordance of fishing. A “rise is a rise ... once a rise comes then we’re all on the riverbank, it doesn’t matter where it comes from, whether it’s rain or has been a release from a dam,” said Rod Knight, a Barkandji and Kunja representative of the Bourke Aboriginal Land Council.

The events of April to June affirmed the distrust in settler colonial water governance amongst Aboriginal people I interviewed and a desire to go below the surface of the NCE. For Ngemba community elder Feli McHughes and his sister Doreen McHughes, as well as Barkandji leader Badger Bates, the environmental flow was a *shut-up flow*. Feli McHughes, who said the environmental flow was “great,” also suspected it was:

just a flow to satisfy the whingers, the people holding rallies, complaining about no water. We’ve got this attitude that it won’t last long because we have seen it come up and the rivers go ... water in it and water not in it.

Ike (Isaac) Gordon, a pastor from Brewarrina, also commented on the speed at which river levels now drop after a rise, attributing that drop to pumping by irrigators.

For peoples who have their own long-standing practices of water control, have been dispossessed of land and

water, and are today engaged in a struggle over water rights distribution and governance (Hartwig et al., 2020; Hartwig et al., 2021; Taylor et al., 2016), much work is going into resisting state endorsed patterns of water extraction and into politicising the practices that naturalise river flows. The most recent articulation being the Aboriginal campaign for cultural flows (Jackson, 2017; Mooney & Cullen, 2019; Weir, 2009). According to Mooney and Cullen (2019, p. 200) “Cultural flows denote water rights (or entitlements) that sustain First Nations’ social, cultural and economic needs, including self-determination and cultural sustainability.” Here on the Barwon-Darling (Barka), traditional owners I interviewed distinguished the *environmental water* we watched flowing down the river from a *cultural flow*.

For water agencies, the NCE was simultaneously a testing ground for hydro-ecological outcomes and an experiment in new forms of water governance under the rubric of event-based management. It will become evident from the analysis to follow that in managing the flow as event, the river was viewed as operating in ways that are detached from its socio-material context: its waters objectified, compartmentalised, and represented as apolitical. In the next section, I discuss the practices and technologies through which the performance of this environmental flow secured an event-space of management and regulation.

3 | FLOWING WATER AS EVENT-FUL SPACE

Following the release of dam water into the Border and Gwydir Rivers and downstream (Figure 1), the flowing waters were talked about as “the event.” For example, a report by the Murray Darling Basin Authority (MDBA) stated that “The event then travelled through the Dumaresq River, into the Macintyre River and then entered the Barwon River” (MDBA, 2018b, p. 29). In the same report, the “flow data was closely monitored as the event travelled through the Barwon–Darling system to ensure the event properties were not undergoing any sudden, unexpected and significant changes” (MDBA, 2018b, p. 33). Even a dry portion of the river was conceptualised in these dematerialising, alienating terms. For example, a place beyond the reach of the environmental flow south of Wilcannia, where the event had *not* yet happened, was photographed, and captioned as follows: “The cease-to-flow event persists in the reach of the Darling River between Wilcannia and the Menindee Lakes” (CEWO Update 4, 2018).

Geographical analyses of event-spaces in military contexts illuminate the part played by scientific and

regulatory practices, and importantly, visual technologies. While embedded in a very different context, one can observe similarities in the inflections of a security agenda in the water management discourse (cf. Croser, 2007) and the techno-managerial scientific and regulatory practices used to stage and actualise the environmental flow. Studies of event highlight the performativity of the visual field, especially the power of maps, which Kitchin and Dodge (2007) have argued should be seen as events rather than objects, emergent and always transitory. Gregory (2010, p. 266) has applied a performative interpretation to the United States’ military’s reconfiguration of Baghdad under occupation, revealing it as a “space of events rather than purely objects.” He examined the ensemble of practices within which military strategists activated mappings to “invoke the ontological security of the map as a rhetorical substitute for the operational security of the city” (p. 267). For instance, mapping systems “tracked the real-time movement of troops and the incidence of events to produce the city as what Croser ... calls an ‘event-ful battle space’” (Gregory, 2010, p. 269).

In the case of the NCE, achievement of territorial control relied upon and reinforced ontological distinctions between different waters however, instead of securing the area, regulators had to contend with volume (Elden, 2013; Lavau, 2013). Water managers needed to create an event-space that would fix waters to administrative regimes and make it governable between points in time and space (Norman, 2012). They did so by regulating, mapping, charting, and visualising the flow, and mobilising the public, shaping the waters so enacted and legitimating state assertion of control and command of moving water.

3.1 | Regulating and reifying flows

The moment that the environmental water was delivered to the northern rivers from dams it was no longer considered a stored resource, “held in place and managed for consumptive use” (Lavau, 2013, p. 419). Most of the stored water on tributary rivers is allocated to irrigators but the waters purchased by the Australian Government were deemed useful for Nature and once released, and moving, were opposed to the “consumptive” water used in agricultural production. At first, the ontological quality of naturalness was muted. When called down from the dams, the flow was conceived as a 23 GL unit of water and an event regulated through infrastructure, and as well through law. A mechanical metaphor suggests that the managers saw themselves in the driver’s seat mobilising the river rather than the asocial forces of

nature, which is how environmental flows are usually configured:

It takes quite a large volume of water to restart the Darling between Bourke and Wilcannia with dry sections of riverbed, and to top up water holes. (CEWO Update 1, 2018)

Restarting and maintaining the flow was to take more than water. For the environmental flow to be effective and credible, the waters moved by government mandate required legislative protection because they were potentially accessible to irrigators for use on farms. Most irrigators have developed their own water storages to hold water when flows are available, and pumping permitted. Water access rules in this part of the Basin allow irrigators to extract environmental water from the Barwon–Darling (Barka) River when certain flow rates are met, such as water quantum or river height⁴ (MDBA, 2018a). When the environmental flow coincides with significant rainfall, irrigators can meet river height conditions and capture large volumes of water. The regional Water Sharing Plan (Barwon–Darling Unregulated and Alluvial Water Sources, 2012, <https://legislation.nsw.gov.au/view/html/inforce/current/sl-2012-0488>) has been widely criticised for failing to provide “event-by-event based protection of environmental flows” (Wentworth Group of Concerned Scientists, 2017, p. 27; see also AAS, 2019; MDBA, 2016). That means irrigators can legally “take advantage of elevated water levels as a result of environmental water arriving from Queensland and rivers of northern New South Wales” (Wentworth Group of Concerned Scientists, 2017, p. 27).

To make provision for this contingency, in April 2018, the NSW Government restricted access to irrigators⁵ to the Northern Connectivity environment flow for the entire Barwon–Darling (Barka) from 27 April to 22 June 2018 (an action referred to as water shepherding⁶). The State Minister for Regional Water acknowledged it was a “direct response to criticisms last year regarding the management of environmental water” (NSW Department of Industry, 27 April 2018) and dedicated extra resources to compliance monitoring. Restricting access to this kind of flowing water relied on mechanisms of the Water Sharing Plan. The Plan divides the river into 14 management zones to which a range of flow classes can be applied: very low flows, low flows, A class flows, B class flows, and C class flows. Each of these classes governs access to licence holders; for example, an irrigator with a C-class licence can pump water only when the river is flowing at 11,000 ML per day. The Plan establishes the height thresholds at which the river must

flow before pumping can begin and volumetric limits. In the case of the NCE, spatial and time-bound regulations keep the moving water in the channel by controlling extractions at points between gauges on the river (Figure 1). By managing the flow in this way, managers could govern moving water much like a stored unit of “regulated” water that sits behind a dam, where it is fixed in time and space.

To regulate water use in response to the eventualities of the flow, these technologies, and the associated discourse, created and reinforced ontological distinctions between different waters. For example, during the NCE, rain could potentially muddy the environmental water by rendering some of the moving water accessible to irrigators:

If significant rainfall should occur during the watering event, Water NSW will assess the inflow volumes and advise licensed water holders as to what access they have to those flows. (Water NSW, 17 April 2018)

Irrigators had worked hard to protect their “parcels” of water from the waters “owned” by the Australian or State Governments and allocated to environment use (see NSWIC Submission to Water Shepherding Policy, n.d.). The NSW Irrigators Council had a few years earlier expressed opposition to shepherding, preferring to see trading of entitlements do the work of moving water between regulated and unregulated water resource areas (NSWIC Submission to Water Shepherding Policy, n.d.). Just prior to the NCE, irrigation representatives saw flows generated by rain, or “ordinary unregulated flows” (Barwon–Darling Water Inc, 2017, p. 13), as ones they should be able to access under the rules established by the Water Sharing Plan:

Protection of environmental flows from the public dams in the headwaters of the tributaries is an issue because this water will be piggybacked on, or shandied⁷ with, ordinary unregulated flows.

In their words, “separation of the environmental components for protection” would be a costly exercise that would require “daily event management” at great expense and effort. Given the “extra environmental portion” would normally be small, and there were flow rules as well as a cap on total consumption, “all environmental flows” could be guaranteed and the extra effort to distinguish the waters was not warranted (Barwon–Darling Water Inc, 2017, p. 13).

When the Northern Connective flow was enacted in 2018, environmental managers reassured the public that there was a low likelihood of rainfall during its duration: “Given travel times, there is unlikely to be any significant unregulated flow event that will mix with the northern connectivity event” (CEWO Update 3, 2018). Here, and in Update 8, managers affirmed environmental water as ontologically different water to Natural water, being the rainwater that flows over land and into the river or ground. As it eventuated, there was no significant rain over the course of the event and the waters did not mix. River operations were described as “simpler in this case that they could have been” and environmental water was secured (CEWO Update 8, 2018).

3.2 | Mapping and charting the eventful river

Water managers and regulators employed other technologies to objectify the environmental flow and distinguish its waters from others designated as unregulated or consumptive water (for irrigation or town water supplies). In addition to using stream gauges and on-ground visits, regulatory authorities generated and circulated hydrographs that represented the pattern of hydrological response, as well satellite images (CEWO Update 1, 2018). New spatial technologies enabled scientists and water managers to monitor the movement of the reified event as it “progresses downstream” and observe its

environmental properties from space (MDBA, 2018b). In public updates, the moving water that water managers watched did not flow with other waters for it could be seen and projected as separate. The image and accompanying text from Update 3 indicate that the separate waters and their mixing were observable from space (Figure 2).

The NCE also provided an opportunity to trial satellite-based surveillance of water extraction thereby demonstrating regulatory competence in securing water and boosting confidence in water governance. Using more than 130 Sentinel 2 satellite images, water managers and regulators could measure “the degree to which water was present in farm dams and storages” during the NCE and changes over time in the “total area of water present” (MDBA, 2018b, p. 4). These publicly available images, which have a resolution of 10m² and cover the whole Basin every few days (CEWO Update 3, 2018), underpinned a new scopic regime (Gregory, 2010) of transparency and compliance that allowed water regulators to “see what was happening in farmers’ dams and paddocks along the way” (Galletta, 2018, n.p.). With a temporary limit in place on consumptive extraction, “no sudden and significant increases to water present in storages would be expected to occur” (MDBA, 2018b). Agency staff physically measured river gauges to provide an accompanying “analysis of the properties of the flow itself” (MDBA, 2018b, p. 5) and the New South Wales government regulator also put “boots on the ground” to inspect properties (MDBA, 2018a).



FIGURE 2 Satellite images and photographs from Northern Connectivity Event. *Source:* CEWO Update 3, 2018. Caption in the update reads as follows: As the flow arrived, algal blooms in the Collarenebri weir pool were broken down. Using satellite technology, algal blooms (bright green on the top image) can be seen from space. When the flow arrived, the algal blooms were dispersed. On the ground photos looking downstream of Collarenebri Bridge are also below. The location of the bridge is indicated by the yellow asterisk

Although no cases of water theft were identified, news outlets took an interest in the new technique of compliance, especially its visuality, which Gregory (2010) defines as techno-culturally mediated ways of seeing. While the NCE was being evaluated, the national public broadcaster reported on the productive power of satellite technology to “stop water theft” (Galletta, 2018). The article employed military metaphors to reference its powers of detection and the validity of the truth claims that the images register (Gregory, 2010), describing them as “weapons” in the “arsenal” of regulators. A water manager’s comment also underscored the performativity of the satellite mapping, productive of a lively, life-giving flow configured for nature:

“We were able to see the water passing down the rivers, filling up water holes and connecting billabongs on the way through,” Mr Williams (MDBA General Manager Compliance) said. (Galletta, 2018, n.p.)

Other visual artefacts, such as hydrographic charts or hydrographs, were circulated (Figure 3). Alongside satellite images and photographs, these visualisations further verified the distinction that managers sought to make between the environmental flow and the rain-fed *unregulated flow* that had moved down the river 3 months earlier. Water managers described those waters as “the flow protected for town supplies” (CEWO Update 4, 2018). An update mid-way through the NCE stated that “the NCE, currently in the Barwon, will build on this unregulated event, and replenish these waterholes” (CEWO Update 4, 2018). It was later reported that the NCE is “currently flowing down the Darling, on a bed that had been wetted by the preceding unregulated flow event” (CEWO Update 7, 2018).

3.3 | Mobilising the public in the construction of the environmental flow

The Office of the Commonwealth Environmental Water Holder held a series of engagement activities in the major towns along the river and launched a media campaign with fact-sheets, frequent and detailed updates, including tweets, maps, and links to real-time flow-tracking data from stream flow gauges to measure travel times between milestone locations. By tracking and narrating how the river travelled agencies moved the “focus of engagement” downstream with the flow as local people “looked forward” to its arrival (Department of Agriculture, Water and Environment, 2018). Opportunities were afforded people to interact, materially or virtually, with the eventful river (Figure 4). In update 5, the public was informed that the “watering event is being shared with riverside communities,” including Aboriginal communities. One of the open days was held at the cultural museum at the Brewarrina fish traps.

The audience could also scrutinise the performance of the river online—what it would do, when and how it would flow, the spaces that were to be watered and the effects. The website encouraged this involvement, riding a wave of affective attachments:

Come, learn and share about this important [sic], participate in activities with river scientists and meet with other people who care about the health of these important rivers, and the fish and ecosystems which depend on them. (CEWO, 2018)

The intention of the updates was for water managers and readers to share moments of interaction as materials were read, interpreted and observations discussed. Thus, the agencies turned the flow into a social event, anticipating

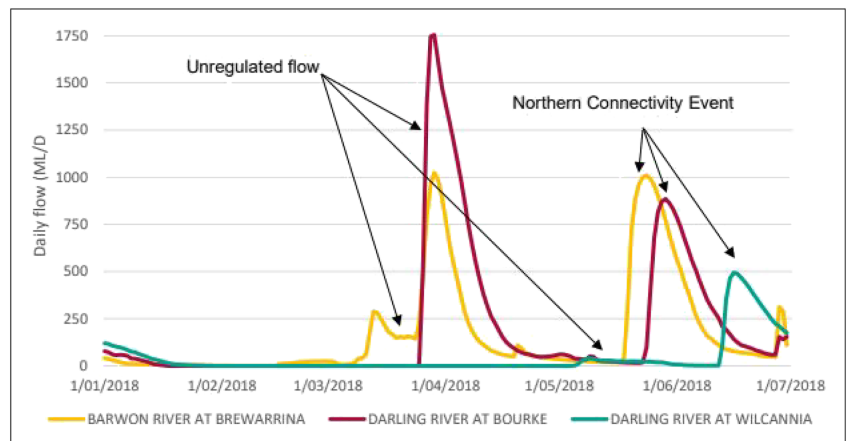


FIGURE 3 Daily flow at Brewarrina on the Barwon River, and Bourke and Wilcannia on the Darling (Barka) River: January–July 2018. Source: Department of Agriculture, Water and Environment, 2018



The Northern Connectivity Event

Bourke Wharf

THURSDAY May 31, 2018

9am to 2pm

Come, learn and share about the environmental flow that is currently making its way through over 2000km of some of the great rivers of the northern Murray-Darling Basin.

- participate in activities with river scientists,
- meet and talk with others who also care about the health of the Darling

For information : 0437 141 495



Engagement opportunities to share information on northern rivers are being planned for Walgett (15 May), Collarenebri (16 May), Mungindi (17 May) and Brewarrina (24 May). Activities in Wilcannia, Goondiwindi and Moree will also occur in coming weeks.

FIGURE 4 Poster advertising “engagement opportunities” at Bourke, New South Wales. Source: Office of the Commonwealth Environmental Water Holder

public interest in the interactions and connections that would unfold. Working on the public imagination as much as its knowledge-base, water managers described acts of celebration to generate enthusiasm and interest (Updates 6 and 7). Update 5 reported that so far 60 attendees were:

... interested in the flow event, what environmental water managers “do,” carp, and how the water in the river is shared. Commonwealth and New South Wales agency representatives enjoyed sharing information with them.

Updates 7 and 8 respectively reported that the “rise in community spirit as the northern connectivity event has arrived has been palpable” as “five face-to-face functions

were held with riverside communities as the flow moved along the system.” The updates also evoked an unfolding drama as the tributary waters moved along eventually uniting at Collarenebri:

The flows in the Mehi River at Moree started to rise on Sunday 22 April, and the first of the flow is to arrive in the Macintyre at Boggabilla in coming days. The flows will merge at Collarenebri in the Barwon from early May, and it is expected that the flow will reach Bourke by mid to late May (about 500–700 ML/d for about 2 weeks) if current estimates (sic) and Wilcannia by early June (about 200–400 ML/d for about 2 weeks). (CEWO, Update 1, 2018)

In these public announcements and other communications (Figure 5), water managers reinforced the nature/society dualism, yet signs of ambivalence emerged as they attempted to communicate knowledge of the river in relation to some stereotypically cultural associations (poetry, Aboriginal relationships). Update 8 afforded the Office of the Commonwealth Water Holder with the opportunity to pay homage to the river's symbolic value to settler literature and its importance to Aboriginal people. Here the flowing water was configured as natural (Lavau, 2013) by virtue of what it does for “environmental values” and media representations were designated as the place in which social dimensions play out:

Whilst water for the environment is used to protect and restore environmental values, the updates provided an opportunity to acknowledge important social dimensions associated with the flow: such as the relationship of Aboriginal communities with the river, river navigation and transport, and some of the poetry of Henry Lawson.⁸ (CEWO Update 8, 2018)

Ontological differences in waters surfaced throughout these events too. Public information sheets sought to deconstruct the hydrologic concept of flow with the question “what makes up a flow”? In the explanation (Figure 5), distinctions were drawn between the waters sourced from rainfall runoff and groundwater that constituted the “natural flows” and water releases from dams for towns, farms, and environment figured as “regulated

flows.” Those waters of the regulated flow were again portrayed as a material expression of human agency (Strang, 2006), whereas the environmental flow was naturalised as the flows of waters that sustain undiscerning fish. Readers were reminded in this poster that “fish don't care what flows are called, they use flows where and when they meet their unique needs.”

The final evaluation of the NCE drew attention to the power it had to focus the public on the river's movement and ecological effects, even unite it in a shared temporality: “The community was interested to discuss what was happening in the river, rather than what happened in the past or may happen in the future” (Department of Agriculture, Water and Environment, 2018, p. 19). This observation seemed to welcome the exclusion of social and historical phenomena, endorsing the rightful absorption or immersion of a homogenous public in an eventful river. The author(s) did not reveal what issues the flowing water had or might eclipse, but the conclusion raises the questions of what part the agencies played in amplifying its capacity to achieve such an outcome, if it had indeed done so, as well as who is coming together through this event and under what conditions?

As the next section shows, Aboriginal people I interviewed confronted the tendency of techno-scientific management to bracket the historical processes that had dried the river over decades, the social structures that had excluded First Nations from its governance, and the ongoing contestation over its degradation (Hartwig et al., 2021; Muir et al., 2010; Weir, 2009). In their commentary, and elsewhere, such as submissions to government inquiries, they emphasised a multitude of



FIGURE 5 Photograph of pamphlet titled “Different Flows Have Different Names,” Office of the Commonwealth Environmental Water Holder. Source: Author

connections disregarded by governments, water managers and many others.

4 | CHALLENGES TO THE LEGITIMACY OF THE NCE AND ITS ONTOLOGICAL POLITICS

Flowing water enables and in places demands exchanges and interactions between people; through technologies and practices it binds people and things into complex heterogeneous relations with other life. The NCE sought to make connections but in it, we can see the boundaries that continue to be erected to maintain the separation between the social and the natural, as well as between different waters that discursively align to those categories. Moving water was conceived as the physical agent or medium of connection, linking pools of water, transporting fish and insects across space, or storing carbon on floodplains. Water managers and scientists monitored physical changes that depicted connection, focusing on the matter to be moved longitudinally, down the river, latitudinally, on to the floodplain, and vertically between the surface and below the ground. To evaluate the physical outcomes of the NCE, extensive monitoring of flows, habitat condition, water quality, and fish was undertaken (Department of Agriculture, Water and Environment, 2018). Scientific instruments were set in place before the event and monitored throughout. Fish were physically enrolled when they were tagged and their movement tracked (CEWO Update 1, 2018) and a variety of qualitative and quantitative measures were reported, such as a change in colour of the river observable via satellite imagery, or a volumetric threshold of discharge, such as >100 ML/day.

In public statements, and in other practical ways, water managers made plain their intention to attend to the hydrologic and ecological, and not social, responses to the rise in the river. The matters to which the water managers attended was never just natural however, and the Aboriginal people interviewed as the Barwon-Darling (Barka) flowed again with the assistance of government agencies and “their” water, readily made all manner of connections between physical and socio-political processes, human bodies, other bodies, infrastructures, and places. Their perspectives resonate with those of other Indigenous peoples in response to the significant, interconnected impacts of flow alteration in similar settler colonial contexts (Andrews et al., 2018; Jackson & Barber, 2013, 2016; McLean, 2014).

According to Weir (2008, 2009), Aboriginal people of the MDB with whom she has worked express connectivity as an embodied experience, placing themselves

“within a relationship of connectivity” with the river (2008; emphasis in original). This “connectivity thinking” reflects an understanding that:

We do not simply live together, side by side, as a matter of coincidence, but our form and being are interconnected. Our being and the environment are active, alive, and respond to each other through multiple fields of relations, and these interactions influence the form of the relations. (Weir, 2008)

Interview data and other sources (Gibbs, 2009; Muir et al., 2010) reinforce this relational perspective. For instance, the flows in the Barwon-Darling implicate water users and governments in the physical and mental health of Aboriginal people, directly or indirectly. Speaking from within these relationships, Ike Gordon said “what makes me sick is when our rivers are sick ... you’re slowly killing us.” Ike proceeded to identify the causal and connective processes of wasting water during flood irrigation and poisoning drinking waters with farm chemicals. He could see the poor health of the river in the graphs that map the dire health of Brewarrina’s population:

There were some graphs for one of the meetings here last year, graphs of the river, and how it had deteriorated over a number of years, and [those graphs] also coincided with the deterioration of people’s health in this area, with the death rate of the people ... the health of the river determines the health of our people. For Indigenous people, that’s our life, that’s our veins, we live in Brewarrina because of our river and we’ve been here for a long time ... I really wonder how the people below us survive, like Wilcannia, they say their death rate is worse than ours ... we were the worst in Australia for our health. The average age [of death] for a male here is 47 and female 52.

We always knew, because of the kidney failure, our water wasn’t really healthy you know, we’ve seen the blue green algae more than ever, and we’ve seen our people with kidney failure. I know kidney failure is everywhere, but the amount, the enormous size of it ... something about realising it, Feli was one of the main blokes that helped, Feli [McHughes] had great ideas mate, but they wouldn’t listen to him, he saw the

connection and we shared it, we talked. What Feli said made sense about the [Old Mission] billabong, he talked about the billabong, how it was the kidneys of the rivers, how it cleaned the river.

The billabong Ike Gordon spoke of is a wetland of heritage significance to the Ngemba (Jackson et al., 2010; Maclean et al., 2012). From 1876 to 1967, it was the site of the Brewarrina Aboriginal Mission established by the Aborigines Protection Board to segregate and control Aboriginal people (Jackson et al., 2010). It was declared an Indigenous Protected Area in 2010 and is the site of a restoration project initiated by Feli McHughes at that time. The intention of that project was to test the filtering role of the billabong as water returns from the land to the river after rain, as explained by a Ngemba participant in a study by Jackson et al. (2010, p. 122):

... the Billabong is the kidneys of the system, and what they aim to achieve through a Cultural Access Licence is fill the Billabong with unhealthy river water, run it through the Billabong, clean the water up and allow it to get back into the Barwon Darling River. The important thing is that this process can also provide healthy water to the downstream Brewarrina Aboriginal Fish Traps.

Despite a significant research effort (Maclean et al., 2012) and a trial that won the community second place in a Landcare Award, the community has been unable to secure the water or infrastructure required to restore the billabong (Feli McHughes, pers comm). The billabong's needs, and those of the Ngemba who "keep company" with river places and their more-than-human relations (Maclean et al., 2012, p. 43), cannot be met under current water regulations. Increases in water extraction have reduced the frequency of inundation and there are no regulatory structures in place to hold or capture water for the billabong (Jackson et al., 2010). Environmental water releases from storages, like the NCE, have not filled the billabong because the Ngemba do not own any pumps.

Which connections were to be made by the flowing water and who was to benefit were questions asked most directly by Doreen McHughes, when the environmental flow passed Brewarrina:

Connectivity? They use words that don't mean nothing [sic] to traditional owners. Every creek and billabong has gone. Those creeks and billabongs filter the river. That

was their function before white man. Now, in 200 years, they've totally devastated it and they don't care, not for their future ... They've taken everything off us, and now they've taken the water. They've fenced off all the rivers. They've got us secluded and confined to the levee banks. Our people are on the highway to extinction.

Linking the flow to the de-watering of the river for capitalist agricultural systems, brings to the fore water's role as a factor in settler systems of production, dispossession, flows of finance, and the accumulation of wealth (Hartwig et al., 2021; O'Gorman, 2012). Badger Bates, Chairman of the Barkandji Prescribed Body Corporate, submitted to the MDB Royal Commission (2017) that Aboriginal tourism businesses are suffering from the drying (https://www.environment.sa.gov.au/files/sharedassets/public/river_murray/royal-commission/submissions/william-badger-bates-barkandji-nsw-mdb-rc-gen.pdf). He said, "because most of the time the river is dry or has pools of toxic water with signs up everywhere warning people not to go near the water or catch fish or yabbies" (p. 6). Similarly, the small farm his community owns at Wilcannia is unable to pump water because "it has all been pumped out up past Bourke" (p. 6).

In that same submission, Badger Bates offered a compelling critique of environmental flows and their politics of nature, how transforming the river into an environmental flow privileges water-dependent and vulnerable features of the environment recognised by settler society (amongst them endangered species), or authorised by scientific conservation frameworks (for instance, biologically representative habitats) (Finn & Jackson, 2011; Jackson, 2017; McLean, 2014; Weir, 2009). In his example, he explained how hard it is to get environmental flows to sustain the vital more-than-human relations of Barkandji life:

Kularku (brolgas) are Barkandji people, they are our relations, they tell us things and they dance for us. We don't kill them or eat them because they are family, they mate for life and they cry if one is killed. Brolga is the totem of one our Barkandji families. When I was very young ... we thought of the Brolgas exactly as if they were our elders, we had respect and love for them, and they showed us their dances. But now there are seldom any Brolgas in Barkandji country because they need water on the floodplains and swamps for food and shelter for their nests, and these days the floodplains don't get the

water. To MDBA they think it is all OK if there is somewhere where the brolgas can live, but they don't understand how it breaks our heart if they can't come and live on Barkandji country like they used to. They just don't get that at all. At Toorale National Park near Bourke the Commonwealth water people wanted to stop the Western floodplain getting any floodwater, but this is the only remaining place for brolgas in our country. So, we played up over the last 10 years and we have negotiated an agreement that some floodwater will still go to the Western floodplain on Toorale for the brolgas. But we only managed to get this small concession because National Parks fought long and hard with us, we could not have done it on our own because they don't listen to us or respect us and our cultural values.

5 | DISCUSSION AND CONCLUSION

Throughout the NCE, moving water was constituted as a product of hydrologic processes and a requirement of nature; a hydrological unit regulated over time and space for human use by laws and other technologies; and a neo-colonial agent of social organisation and change. These many waters were brought into existence by regulatory and visual technologies, practices of scientific knowledge production that construe moving water as an event, and by a discourse of resistance to a restoration project and its environmental politics. Through the practices of event-management (in its broadest definition as both the performance of moving environmental water and real-time monitoring), the NCE conformed to the requirement of environmental management systems to secure water to administrative structures and boundaries, thereby overcoming the difficulties of managing moving water at a fixed territorial scale (Norman, 2012).

While still flowing, the event-ful river was staged as an “ordered, coherent totality,” with public displays stabilising the river “visually, imaginatively and rhetorically” (Gregory, 2010, p. 273). In organising the NCE and running it as a campaign, water managers went to considerable lengths to respond to public expectation for transparency in the regulation of water use. Differences between before and after the flow commenced served this need. Visual representations of the flow (hydrographs, photographs, and satellite images) accompanied the materials produced to inform the public and test as well as demonstrate the competence of environmental

managers and regulators. In the managerial discourse, flowing water was transformed from a dynamic fluid moving through both space and time—making relations at the same time as it drew in and dispersed materials along its course—to a contained and governable event-space. It was an event-space of shared temporality (Croser, 2007; Knorr-Cetina & Bruegger, 2002), created by an atmosphere of collective anticipation and a moment in which “the community” could share a sense of immediacy.

In acts of optical distancing and other processes of abstraction, water was conceived as the connecting medium, not the intimate or embodied relations or embedded social interactions spoken about by Aboriginal people, where for instance, a flow might be a rise rather than an event. The succession of maps and spatial representations produced over the course of the NCE suggests that the event-ful river was known by virtue of being mapped (Gregory, 2010). No other mechanisms were put in place to allow for local contributions of more closely textured knowledge, or other ways of relating with the river, other than the effort made to enrol recreational fishers in monitoring fish. The perspective from space was privileged, as was the centralised analysis of images.

Legally enforceable rules and the scientific quality of satellite and other visual images served as a means by which state water agencies asserted command over the unruly flows, water that might be extracted should it rain and mix with the water purchased for the environment, produce a large enough rise, or even break from the river's banks. With new regulations, managers could assert “visual and—at least in principle—physical control over the contingent” (Gregory, 2010, p. 269). Controlling contingency is the “fulcrum of late modern security practices” (Gregory, 2010) and in this case, phenomena such as rain or public controversy needed to be controlled. Head et al. (2018) have similarly made the link to water security discourse in their study from the MDB, identifying a refrain of “rain as risk” amongst irrigators.

From the water agencies' standpoint, the complex performance was a success as it improved the condition of river habitat and water quality, attracted a positive community response, and demonstrated regulatory proficiency and operational competence (CEWO Update 8, 2018; Department of Agriculture, Water and Environment, 2018). Notwithstanding the orchestrated nature of the flow, it still, however, maintained its capacity to exceed expectations, showing that the way that the event-ful river unfolds is both unpredictable and unique. For example, more water made it past several places than hydrological models predicted and the duration of flow at some sites was less than targeted. The waters flowing under the auspices of the NCE also instigated a response

from Aboriginal leaders in a manner that the water management community almost certainly did not anticipate, thereby illuminating the numerous ways in which “water’s materiality intersects with, embodies and reproduces forms of social power” (Perreault, 2014, p. 235).

Ontological differences were drawn between unregulated flows, regulated flows, and environmental flows, indeed they were codified, because the variously configured waters are understood to be in competition with each other (Head et al., 2018; Lavau, 2013). In water management discourse, these waters are conceived as adversaries: town supply versus environment; environment versus irrigation. Distinguishing the environmental water from others would secure and protect it through acts of surveillance, regulation, and public celebration. As for the shut-up flow, which was also configured in opposition to other flows but from outside the formal discourse and legal structures of the state system of governance, it shows that some Traditional Owners did not celebrate this event as a politically neutral act of environmental restoration. Instead, they chose to stress a wider relational set of connections and to accentuate the dysfunctional and destructive relations of settler colonial water governance, inviting those who were listening to think and feel differently about environmental flows.

Since the NCE, the drought has broken and in combination with a range of other forces, the institutional landscape of water governance has changed again, although the need environmental restoration is unabated and the imperative for water justice for First Nations still urgent. The eventful river of this account maintained its capacity for political controversy when millions of fish died at Menindee less than 6 months after the NCE (AAS, 2019) and many New South Wales towns ran out of drinking water, calling into question again the significant limitations of current structures and processes of water governance and their settler colonial foundations.

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ENDNOTES

- ¹ Barka is the name the Barkandji people give the Darling River. Barkandji means “belonging to the Barka” (Hartwig et al., 2018).
- ² A gigalitre, or GL, is one billion (1,000,000,000) litres or 1000 megalitres.
- ³ Defined by the Australian Government as water “used to keep our rivers healthy” (Department of Agriculture and Water, 2021).
- ⁴ These “flows” are expressed as a flow in Mega Litres per day through two sets of nominated river gauges—one upstream of the Water Access Licence holder’s access point, and one downstream (Barwon-Darling Water Inc, 2017).
- ⁵ The order excluded town water supply, stock and domestic use and basic landholder rights.
- ⁶ Water shepherding is “where a particular volume of water, which may otherwise be entitled to be taken upstream, is allowed to flow to a downstream location for environmental purposes” (Matthews, 2017b, p. 10).
- ⁷ The word shandied is not defined in the submission but it seems reasonable to assume the authors were referring to a mixing of waters, as per the dictionary meaning where a shandy is a drink made by mixing beer and lemonade.
- ⁸ Henry Lawson wrote “The Song of the Darling River” in 1889.

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