

'Nature/the environment' and Indigenous knowledge in Ord River water planning

Abstract

I consider the case of water planning in the Ord River region in northern Australia and consider the possibilities for Indigenous water knowledge/s in this context. I focus on 'environmental water' accounting and how this performs and sustains a particular version of the Ord River—the 'post-dam' Ord River. The Ord River 'post-dam' and the water provided to sustain its so-called 'environment' are achieved through an ontological management strategy, or what Law might call 'ontological politics' (Law 2004), of *particular universalism*. This ontological strategy is common to Western-styled environmental management which privileges a sentient, *apriori* universal Nature or 'the environment'. I argue that we need to consider the ontological strategies embedded in technoscientific water policy and management in order to properly credit Indigenous knowledges in Australian water reform.

This paper is developed from a presentation given as part of the Teaching from Country seminar in July 2009 at Charles Darwin University in Darwin, Australia. It is based on research that I did working at CSIRO in Darwin on a project involving Griffith University and CSIRO through the Tropical Rivers and Coastal Knowledge Research hub. This project was supported by the Australian Government through Land and Water Australia, the National Water Commission and the Department of the Environment, Water, Heritage and the Arts.

Background

Australian Commonwealth, state and territory governments have agreed to a framework for water reform—the *National Water Initiative* (NWI) which came into effect in 2004. The NWI is a prescription for allocating and sharing Australia's water resources among multiple users through a system of water access entitlements and water allocation planningⁱ. The objective of the Parties in implementing the NWI is to 'provide greater certainty for investment and the environment' (NWI Para 5). A programme of water planning is proposed by the NWI to achieve sustainable management of water resources, stipulate water sharing objectives and deliver security of entitlements to water for both human users and 'the environment'.

The NWI recognises *indigenous needs in relation to water access and management* (paragraph 25 (ix)) and also states:

...water plans will incorporate indigenous social, spiritual and customary objectives and strategies for achieving those objectives wherever they can be developed (paragraph 52 (ii)).

Whilst the aim of incorporating indigenous values and interests in water is discretionary, the NWI is, nevertheless, as a progressive step towards formal acknowledgment of these rights and values in water policy.ⁱⁱ

Environmental water

In water planning in Australia, it is recognised that river systems support a range of different values or uses of water; or what the NWI terms 'outcomes'. The NWI makes a distinction between 'consumptive' and 'non-consumptive' uses of water. Consumptive use of water is use for private benefit purposes including for example, irrigation, industry and domestic use (Schedule B (i)). Non-consumptive uses are described as *environmental and other public benefit outcomes*. Under the NWI, water

accounting forms the basis for water markets created through tradeable entitlements to water. Water allocated to meet *environmental outcomes*—things like maintaining ecosystem function, biodiversity, water quality and river health targets (Schedule B (i))— is often called ‘environmental water’ or ‘environmental flows’.

Table 1: Non-consumptive water uses as described by the Australian Government’s *National Water Initiative (NWI) 2004.*

Environmental outcomes	Other public benefit outcomes
maintaining ecosystem function, biodiversity, water quality and river health targets	mitigating pollution, public health, indigenous and cultural values , recreation, fisheries, tourism, navigation and amenity values

‘The environment’ in modern water planning is an object-actor with considerable presence: it is both object/subject of the enterprise of water planning. It is identified in the NWI as a ‘user’ of water and thus imbued with a moral character: it is described as having ‘needs’ (Schofield 2003), one of which is greater ‘certainty’ (paragraph 5). The concept of ‘environmental water’ is part of a strategy for repealing the over-allocation of water resources. As Schofield notes in a report for Land and Water Australia, the now defunct national research and funding body: ‘Discussion of the concept of environmental water usually occurs where there is competition between the needs of the environment and society.’ (Schofield 2003). Promoting ‘the needs’ of the environment is a project of raising the status of what I call our ‘object of management’ (see (Ayre 2002) in water planning—emphasising its active participation in a competition for scarce water.

Along with prescribing water for ‘the environment’ in water planning, water planning processes under the NWI are also required to identify ‘other public benefits’ as outcomes of water use and management. These benefits are named as: ‘mitigating pollution, public health, *indigenous and cultural values* (my emphasis), recreation, fisheries, tourism, navigation and amenity values’ (NWI Schedule B (i)).ⁱⁱⁱ In this framing, we see that the category of ‘Indigenous values’ in water is a sub-category of ‘other public benefit[s]’ in water. In addition to this, Indigenous people are identified in the NWI as having: ‘...needs in relation to water access and management’ (paragraph 25 (ix)). We have, therefore, on the one hand, ‘the environment’ and literally on the ‘other’, ‘indigenous values’ as part of a suite of values and uses of water. What does this categorisation mean for water planning and achieving the goal of the NWI: to deal with changes in Australia’s water management regimes ‘responsively and fairly’ (NWI Para 5)?

The Ord River and water regulation and planning

In many parts of Australia, consumptive and non-consumptive uses of water are highly contested due to water scarcity. In the case of the Ord River, whilst scarcity is not (yet) an issue, the regulation of the River has generated debate about which values or, what might be called under the NWI, ‘outcomes’, the River should support.

The Ord River Irrigation Scheme (ORIS) comprises two storage dams, associated irrigation infrastructure and irrigated farmland in Western Australia and the Northern Territory. The Diversion Dam, also known as Lake Kununurra was built in 1962 and a large storage dam, Lake Argyle (the Main Dam) was completed ten years later. Water from the Ord River is used to generate electricity for the townships of

Kununurra and Wyndham and the Argyle Diamond mine and to irrigate approximately 70,000 hectares of agricultural land in the Ord River valley.^{iv}

Plate 1: Lake Argyle (Main Dam)



Plate 2: Lake Kununurra (Diversion Dam)



Two Ord Rivers come to life through water regulation and planning...

There are two different rivers that emerge through water regulation and planning in the Ord River valley: the Ord River ‘pre-dam—or ‘pre-regulation’, before the construction of the two dams—((Department of Water 2006)p. 12) and; the Ord River-‘post-dam’ or ‘since regulation’ (Ibid:18).The changes to the flow regime in the Ord River as a result of regulation are identified as ‘substantial’ (Department of Water 2006: 18) and the Water Management Plan for the River describes ‘pre-dam’ and ‘post-dam’ flows (Ibid: 20) which represent changes to the hydrology of the system since the construction of the two dams.

Two performances of the Ord River

Performance of Ord River as ‘Pre-dam’

The ‘pre-dam’ river [lower Ord River] was characterised by intermittent dry season flows with wet season flooding (Baker, Davies et al. 2001). This ‘pre-dam’ river had seasonal variability in climatic and hydrological factors driving its condition/state. At times of low rainfall in the Dry season the lower reaches of the River were reduced annually to a series of pools connected by narrow conduits of water. In the Wet season major flood pulses flushed out the Ord River and scoured the vegetation on its banks. This river was the homeland of the Miriuwung/Gajerrong peoples of the Ord River valley and was for them complete, constant and satisfying (see Barber and Rumley 2003).With the construction of the Ord River Irrigation Scheme in the 1950s, and in particular the construction of the dams, some traditional owners suffered immediate displacement and loss of their custodial homelands and estates (Barber in (Jackson 2006): 66.

Performance of Ord River as ‘Post-dam’ ...

The ‘post-dam’ Ord River is: ‘a substantially regulated and altered river system’ (Doupe and Petit 2002: 317). The ‘post-dam’ river [lower Ord River] is characterised by increased dry season flows, continuous flows throughout the year and a reduction in the frequency of downstream flooding during the wet season (see DoW 2006: 4). It has become a perennial system since regulation (Ibid: 18). As a response to changed flow regimes in the lower Ord River since the construction of the two dams, the riverine environment of the lower Ord has become characterised by thick riparian vegetation in some places. The lower Ord River, along with Lakes Argyle and Kununurra, is now recognised as a wetland of international significance under the RAMSAR international convention for the protection of wetlands (RAMSAR convention). The lower Ord River is also noted for its recreational and tourism (ibid: 43) values and is navigable almost all year round by boat.^v

Table 1: Two Ord Rivers

<i>Ord River Water Allocation Plan 1999</i>	<i>Ord River Water Management Plan 2007</i>
Ecological Water Requirements based on ‘pre-dam’ environment	Ecological Water Requirements based on ‘post-dam’ environment and new values since Ord River Irrigation Scheme

Table 2 below summarises the ‘pre-dam’ and ‘post-dam’ performances of the Ord River.

Plate 3: Dam wall at Lake Argyle with hydroelectric power station at its base



Water planning in the Ord River valley

How do the 'pre-dam' and 'post-dam' Ord Rivers relate to one another? And which one should we be managing for?^{vi} The planning process designed to address this question emerges from a policy context of water reform in the mid-late 1990s (See (Council of Australian Governments 1994)). In this context, multiple values of rivers were recognised and a burgeoning policy imperative (related to scarcity concerns) was that of the provision of water for 'the environment' (see (Water and Rivers Commission 2000b), known as an 'environmental water provision' (WRC 1999) or 'environmental water allocation'.

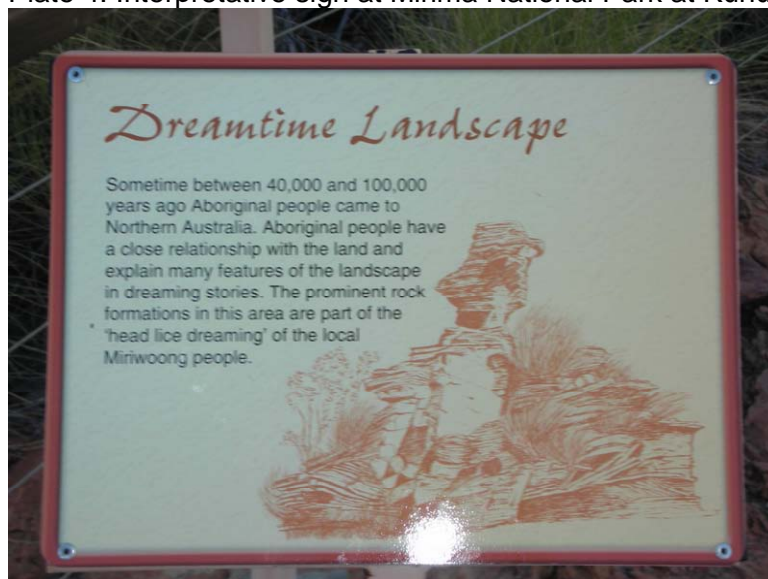
The initial iteration of a water allocation plan for the Ord River (released in 1999) made an estimate of water to be provided to 'the environment' based on historical discharge records of 'pre-dam' flows (WRC 1999: 20; EPA 1999: i). However, advice from the Western Australian Environmental Protection Authority (EPA), an independent body commissioned to review the draft Plan, compelled the Western Australian Government's Water and Rivers Commission (WRC) to amend their original provisions and base the environmental flows regime for the River on the 'post-dam' ecological values, including those recognised through listing Lakes Argyle and Kununurra and the lower Ord Wetlands under the RAMSAR convention (EPA 1999: 8-9). The EPA also cited uses or 'social values' including recreational boating, fishing and tourism activities as other important considerations in maintaining 'post-dam flows' in the Ord River.^{vii}

In contrast to this, however, Aboriginal people in the Ord River valley argued that environmental water allocations proposed in a water allocation plan for the Ord River

should support and restore 'pre-dam' river values for the Ord River environment and include 'short periods of dry out and wash out' (DoW 2007: 45). The Mirriuwung-Gajerrong people continue to hold knowledge and custodial responsibilities for the 'pre-dam' environment of the River as sacred place, homeland and kin (see Barber and Rumley 2004). Exhaustive Miriuwung-Gajerrong systems of kinship and land ownership, and the knowledge that embeds these, is derived from the *Ngarangani* (or Dreaming (Ibid: 14). These systems bestow rights and responsibilities for management and ongoing stewardship of lands and waters. Miruwung-Gajerrong peoples know the *Ngarangani* to be a 'continuing force' (p. 16). The knowledge and prescriptions of the *Ngarangani* do not apply only to a long-distant past as signs at the Mirima National Park in Kununurra might suggest. An interpretative walk at the National Park has several signs along its length, beginning with one entitled 'Dreamtime Landscape' (see Plate 4) and ending with one, 'The Landscape Today' (see Plate 5). The messages on these signs suggest a continuum of development, with 'irrigated farms' contrasted with 'dreaming stories' as the modern 'interpretation' of Ord River landscapes.

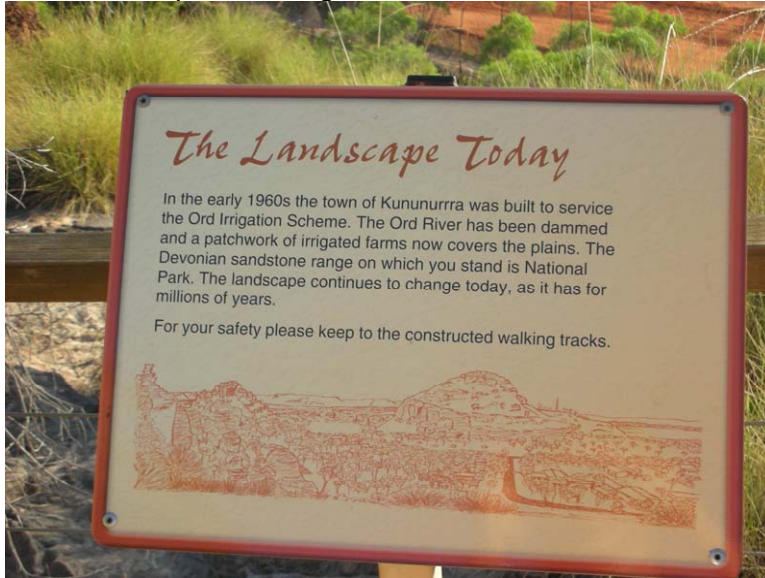
Mirriuwung-Gajerrong people have expressed their desire to participate more fully in the contemporary management of water resources in the Ord River valley.^{viii} A Mirriuwung-Gajerrong representative asks: *The question is: how do you protect your values including the health of the river in the face of development you can't control? If you are a traditional owner, how do you manage the river, how do you make decisions?* (Kim Barber in Jackson 2006: 68).^{ixx}

Plate 4: Interpretative sign at Mirima National Park at Kununurra, Western Australia.



(source: Western Australian Department of Environment and Conservation).

Plate 5: Interpretative sign at Mirima National Park at Kununurra, Western Australia.



(source: Western Australian Department of Environment and Conservation).

The 'post-dam' Ord River as 'natural environment'

In 2006, the Western Australian Department released its *Ord River Water Management Plan* (DoW 2006) for the Ord River which enshrined the incumbent uses of the River water including for: irrigated agriculture, hydropower and mining. The Plan also proposed an allocation—a specified volume of water called an 'Ecological Water Requirement (EWR)'—to 'the environment' to sustain identified ecological values attributed to the 'post-dam' environment of the Ord River.^{xi} The 'post-dam' Ord River is thus nominated at the desirable river-state. The ecological values of such a river-state are defined as: 'the *natural* [my emphasis] ecological processes occurring within the ecosystems and the biodiversity of those systems' (Ibid.)^{xii} The Water Management Plan for the Ord River enshrines a 'post-dam' river that is performed as 'natural' through the work of the science of ecology: the description, enumeration, inscription and mobilisation of biological things-in-the-world. And the status the Plan affords to the 'natural' contrasts with what it describes as the 'cultural values' of the Miriung-Gajerrong people (DoW 2007: 46)

Whist acknowledging 'cultural values' of the Miriung-Gajerrong documented in a report commissioned as part of the water planning process (see Barber and Rumley 2003), the *Ord River Water Management Plan* at the same time denies them in nominating the river-state upon which to base environmental water provisions:

The Dreaming of the Miriung Gajerrong people include stories associated with the pre-dam flow regime of the lower Ord River and...Miriung Gajerrong elders suggested a drying out period of lower flow during the dry season. Unfortunately, it is not possible or desirable to re-establish the pre-dam flow regime [in the Ord River]. (DoW 2006: 49).

The so-called 'natural' ecological processes—appear to be in conflict with the knowledges, (or what the *Ord River Water Management Plan* describes as 'cultural values' (DoW 2007: 46)) of the Aboriginal traditional owners and custodians of the River. And in this contestation the 'post-dam' environment of the Ord River has triumphed! Turning to another relevant document, the *Environmental Water Provisions Policy for Western Australia* enshrines this privilege given to 'ecological values' over 'social values' in water accounting and management:

Water regimes identified to meet social values will form part of Ecological Water Provisions where they do not unacceptably impact on significant ecological values (WRC 2000: 4)

It also mandates that:

Ecological Water Requirements/Provisions are determined by a set of hydrological and ecological criteria and then the community is to be consulted on scenarios and options for the provision of water to the environment (WRC 2000: 4).

This deference to ‘community consultation’ in the broader policy discourse on environmental water, appears to offer the ‘social’ some chance of mediating the relationship between the ‘environment’ and the ‘social’ in water accounting. However, in the case of Ord River water planning, there were no Aboriginal people involved in the Scientific Reference Panel that determined the interim environmental flows provisions for the River. Although environmental flows scenarios were discussed with the Community Reference Panel for the Ord River water planning process, there was no adjustment to the flow regime proposed as a result of the recommendations of Miriwung-Gejerrong people. Jackson has identified the problem of participation and use of Indigenous knowledge in environmental water assessments and determining environmental flows in Australia:

Indigenous knowledge is currently under-utilised in water resource assessments, especially environmental flows research. Instead of adequately resourcing Indigenous participation in water assessments and ongoing monitoring of plan implementation, it is common to see agencies rely on Indigenous representatives on water allocation committees for Indigenous engagement and values assessment. (Jackson 2009): 4.

Crediting Indigenous knowledges in water planning: dealing with ‘nature’

I want to suggest that interrogating the concept of ‘environmental water’ allows us to render visible the strategies used to produce the so-called natural ‘environment’ in the discourse and practices of water planning and management. And that we need to reconsider and re-formulate the category of ‘environmental water’ to prevent the marginalisation of indigenous knowledge in water management as just another ‘public benefit outcome’.

I suggest that in order to properly credit Indigenous knowledges in water planning we need to focus on the objects of our management endeavours including the objects of technoscience, in particular, ‘nature’ and its corollary ‘culture’. To assume that there is an idealised and somehow ‘natural environment’ out-there that we can measure and map and account for in water planning as distinct from our interventions in it—socio-material and technical interventions—is false. As we see in the case of the Ord, ‘the environment’ of the River is in constant co-evolution with the practices of water planning and the development imperative and infrastructure of the Ord River Irrigation Scheme. It is as a result of these socio-material-literary practices that our ‘post-dam’ river emerges and the ‘pre-dam river’ recedes.^{xiii}

Weir (2008) notes in her study of human-ecology relations in the Murray-Darling Basin, there is a ‘need for profound change in our intellectual traditions...a[s] part of the current re-examination of water management in the Murray-Darling Basin’ (p. 153). I want to suggest here that the need to change our intellectual traditions is a call to recognising our ontologies—our methods and justifications for particular realities and the objects that they sustain. In water planning, we see a version of

ontological management or what John Law might call 'ontological politics' (Law 2004)—that I identify as Latour's 'particular universalism'—where (what I call) the universal object of management 'Nature/the environment' is taken as the locus of human action—an *a priori* reality, a constant, definable (measureable, mappable) state 'out-there. In 'particular universalism', 'Nature/the environment' is performed within technoscience as the foundational basis upon which humans act, intervene and manage. In this framing, Aboriginal knowledge and technoscience are held apart, existing alongside one another, but always and ever separated by what Latour calls the 'External Great Divide'(Latour 1993: 99). And, particular privilege is given to a technoscientific, external 'Nature/the environment' as the universal object of management.

We see in the case of Ord River water planning that the universal object of management, 'Nature/the environment', requires active intervention to perform the object of management: the 'post-dam' 'Ord River environment'. Local residents of Kununurra recognise this when they question the rationale for establishing an allocation to 'the environment' for the Ord River—a system that, in their view, has been drastically changed by the technologies of the dams and flow releases for irrigation and hydro power generation. For example:

The environment got a huge chunk of allocation [environmental flow requirement] to keep an unnatural environment going...I expected more water for irrigation.

And:

That [environmental] flow/allocation has only become available to the ['post-dam'] environment because the land isn't already developed for irrigated agriculture [refers to Ord Stage 2]. It's also only become available to the environment because the dam [Lake Argyle] is there.^{xiv}

A researcher in Australian water planning, Hamstead, has suggested that the emphasis in environmental water accounting '...should shift to setting measureable objectives...rather than trying to account for environmental water as volumes' (Hamstead 2007).¹ This is what I want to suggest as a way forward for considering indigenous knowledges in water planning...that, rather than compartmentalising Indigenous knowledges as 'culture' (see Jackson 2006(Law 2004)) in an oppositional relationship to a technoscientific, universal 'Nature/the environment' and specifying water allocations for 'the environment', that we negotiate water management objectives for which particular water regimes are specified. This recognises that our river and water 'environments' are socially, culturally and materially mediated and performed through human-non-human interactions. To reify the river 'environment' as an object of management is to marginalise other ways of knowing our rivers and waters, including Indigenous knowledges.

I am currently working with Tiwi landowners and freshwater managers, the Northern Territory Government and the Tiwi Land council on the development of a water resource management strategy for the Tiwi Islands. It will be interesting to see how the ontological politics (Law 2003) of environmental water play out there...in a situation where Tiwi people assert the primary basis for planning as their custodial and legally incumbent rights and interests in water: this is Tiwi freshwater country planning, an emergent set of socio-material-literary practices...^{xv}

Table showing the ‘pre-dam’ and ‘post-dam’ performances of the Ord River

Pre-dam river	Post-dam river
Unregulated	Regulated: flows created by controlled water releases from dams; ‘Substantially modified’ (EPA 1999: 9)
Periods of drying out; water pooling in billabongs and water holes; flood pulses in rainy season	Year-round flow; Water regime....changed significantly (WRC 1999: 20); ‘New ecological regime’ (EPA 1999: i)
Variable but predictable. Water features and landscapes and seasonal and cyclical changes were known to Aboriginal owners and custodians (Barber and Rumley 2003: 20)	Constant; some ‘certainty’ provided by ‘the Dreaming’ due to altered landscape/processes (Barber and Rumley 2003: 24)
Flood events scoured the channel of the lower Ord River. Access to river banks for camping and hunting (fishing in water holes); Aboriginal people described a clearing or opening (Barber and Rumley 2003: 19)	Flood events diminished and thick vegetation established on banks of lower Ord River; Thicker riparian vegetation in lower Ord River prevents access to the banks of the river in some places along with fencing. Hunting and gathering of fauna and flora by Aboriginal people is not as effective or efficient in the post-Dam environment’ (Barber and Rumley 2003: 22).
The Miriuwung, Kulawaring and Gajerrabeng peoples have native title rights and interests that lie in the lower Ord River valley, downstream from Lake Argyle. Other groups have rights and interests in the area also. Homelands of Gidja, Malnging, Miriuwung, Wadainybung, Dulbung, Kuluwaring clans. Through ritual activity Traditional Owners maintain the water sources in their country and the environment and natural species in general (Barber and Rumley 2003: 18) the landscape is ‘understandable [known] and predictable’ (Ibid.)	Some traditional homelands submerged; Immediate displacement and loss of country from inundated areas (see Barber in Jackson (ed) 2006: 66)
‘Ord River and valley is a complex of cultural values...[which] vary from location to location depending on the activity that occurred there during the the <i>Ngarangan</i> [the time/place/people that created the known land/waterscape and bestowed ownership rights, interests and governance institutions] (Barber and Rumley 2003: 15-16).	Recognised as ‘unnatural’ (Ord River valley resident). Traditional owners still responsible for country and the values it contains (Ibid. : 24) Continues to be embedded with ‘cultural values’ however land use since the inception of the ORIA has ‘removed the certainty provided to the TO’s by the Dreaming’ (Ibid: 24).
	‘New recreational and commercial opportunities that did not exist before the dams’ (EPA 1999: 3); (‘important recreation site’ (EPA 1999” 11)); Ecological values of the new wetlands of Lake Argyle, Lake Kununurra and the lower Ord River are

	recognised under the RAMSAR international convention; 'enhanced water-bird areas' (EPA 1999: 3); 'international value of the wetlands of the Ord River' (EPA 1999: 3)
Annual flood pulses scour riparian vegetation in the Ord River below the dams.	

References

- Ayre, M. (2002). *Yolngu Places and People: Taking Aboriginal Understandings Seriously in Land and Sea Management*. PhD Thesis, Department of History and Philosophy of Science. Melbourne, University of Melbourne.
- Baker, R., J. Davies, et al., Eds. (2001). *Working on Country: Contemporary Indigenous Management of Australia's Lands and Coastal Regions*. Melbourne, Oxford University Press.
- Barber, K. and Rumley, H. (2003) *Gunanurang: (Kununurra) Big River Aboriginal Cultural Values of the Ord River*, Report to the Water and Rivers Commission, June.
- Council of Australian Governments (1994). *Water Reform Framework*. Extracts for Council of Australian Governments: Hobart, 25 February 1994 Communique.
- Department of Water (2006). *Ord River Water Management Plan*. Water Resource Allocation Planning Series Report No WRAP 15, Government of Western Australia.
- Environmental Protection Authority (EPA) (1999). *Draft Interim Water Allocation Plan, Ord River*. Report and Recommendations. Bulletin 965. EPA. Perth. December.
- Doupe, D. G. and N. E. Petit (2002). 'Ecological Perspectives on Regulation and Water Allocation for the Ord River, Western Australia.' *River Research and Applications* 18: 307-320.
- Hamstead, M. (2007). *Defining 'environmental flows'*. Land and Water Australia. Canberra, Land and Water Australia. Fact Sheet 1.
- Jackson, S., Ed. (2006). *Recognising and protecting Indigenous values in water resource management: A report from a workshop held at CSIRO in Darwin, , 5-6 April 2006*. CSIRO Sustainable Ecosystems.
- Jackson, S. (2009). *Background paper on Indigenous participation in water planning and access to water*. A report prepared for the National Water Commission. Winnellie, Northern Territory, CSIRO.
- Law, J. (2004). *Mess After Method: Mess in Social Science Research*. Abingdon, Routledge.
- Schofield, N., Burt, A., and Connell, D., (2003). *Environmental water allocation: principles, policies and practices*. Canberra, ACT.
- Weir, J. 2008. 'Connectivity'. *Australian Humanities Review*. Pages 153-164
- Water and Rivers Commission (2000). *Environmental Water Provisions Policy for Western Australia*. Water and Rivers Commission.

ⁱ Water allocation plans are developed through water allocation planning and are statutory documents under the NWI that stipulate how water is to be shared amongst water users.

ⁱⁱ NWI requirements are for water plans to include: Indigenous representation in the planning process, to incorporate Indigenous social, spiritual and customary objectives, and to allocate water to native title

holders. The primary mechanism in the NWI to 'addressing indigenous water issues' is through a programme of water planning.

ⁱⁱⁱ Under the NWI, the Australian States and Territories also commit to 'recognising indigenous needs in relation to water access and management' (NWI paragraph 25 9ix)) and incorporating indigenous social, spiritual and customary objectives and strategies for achieving these objectives wherever they can be developed (paragraph 52 (i) and (ii)).

^{iv} Need to source location map of the Ord River region.

^v The Ord River 'post-dam' is recognised as 'modified' yet imbued with new and important values related to its ecology, aesthetics, social and economic uses. The 'pre-dam' Ord River is performed as 'past' and 'intractably changed'.

^{vi} Doupe and Petit in their reflections on regulation and water allocation for the Ord River, note the questions that underpin the 'management challenge' for the Ord River: 'What is being sustained and for how long? And for whose benefit and at what cost?' (2002: 318). I am interested in how this question might be answered in ways that accounts for indigenous knowledge and indigenous people's interests in freshwater places in the Ord River valley. Was there an attempt to do this in the case of the Ord River?

^{vii} The Summary of Issues Raised in [Public] Submissions on the *Draft Interim Water Allocation Plan, Ord River* is appended to the Draft Interim WAP and includes statements relating to the interim Ecological Water Requirements proposed in the Draft Plan:

1.11 The current flow regime in the Lower Ord is very different to the pre-dam situation and its is therefore inappropriate to base the interim EWPs on a percentile of pre-dam flows as this would result in a radical change in the lower Ord and its ecosystems, from year round flows to almost no flow in the dry season.

1.12 The adoption of the 20th percentile of the 'pre-dam' monthly flow at the Dunham River confluence as an interim EWP will result in a river that is drier year round than now. The likely consequence of this is a dramatically altered environment.

1.13 It may be more appropriate to base the EWPs on the post dam flow regime as much of the current ecosystem and recreational/tourist development is a product of the flow regime of the last 30 years. (EPA1999: Appendix 3).

^{viii} They understand that they: '...are still responsible for their country and for the values it contains' (Barber and Rumley 2004: 24). Some Miriuwung-Gajerrong knowledge, however, has altered with the changes to the environment of the lower Ord River. A Miriuwung-Gajerrong man notes: 'The whole country has changed and no one quite knows the consequences. The Ord River is an altered system' (Ephrem Kennedy in Jackson 2006: 68). '*[Miriuwung/Gajerrong Aboriginal] people don't have the detailed knowledge of this new vegetation and areas. Access to the river has also become more difficult...*' (Ibid: 67).^{viii}

^{ix} Arthur has made a textual analysis of the developmental and colonising project of the ORIS and describes: 'an indifference to the original shape of the indigenous landscape as it can be correlated with the lack of valuation of indigenous knowledge, with the indifference to the cultural loss represented by the 'finished dreamings' (Arthur in Rose and Clark (eds). 1997: 46)

^x In many jurisdictions water plans implicitly assume that environmental flows will meet Indigenous social, cultural or spiritual requirements. In these cases these 'non-consumptive' uses or instream values, are protected by limits on water extraction, rather than by an entitlement. Traditional owner groups are challenging the exclusive focus given to ecological criteria in determining these flows. (Jackson 2009 <http://waterplanning.org.au/presentations/indigenous-participation-in-water-planning-and-access-to-water>)

^{xi} The first iteration of a water allocation plan for the Ord River was released in 1990—the *Draft Interim Water Allocation Plan (WAP), Ord River*. It did not contain any information or actions relating to uses or interests in the Ord River of the Aboriginal traditional owners and custodians of the River and its surrounding places, the Miriuwung-Gajerrong peoples.

^{xii} More precisely, EWRs is the 'water regime need to maintain ecological values of water-dependent ecosystems at a low level of risk'. (DoW 2007: 185). The definition of EWR in the NWI is: 'Water that is set aside for the environment in order to maintain or restore water-dependent ecosystems' (NWI Schedule B (i) and (ii)).

^{xiii} The proposal to expand the ORIS is still on the table with a recent Australian Government Taskforce reigniting interest in the development of water resources in northern Australia. The unfulfilled potential of the ORIS (expand) and commitments to provide water for electricity production for the expansion of the Argyle Diamond mine and the township of Kununurra are imperatives with hydrological and ecological consequences: they help justify and perform the 'substantially modified' (EPA 1999: 9) environment of the lower Ord River. The 'post-dam' river is a product of these practices, embodied as 'water uses' and of the 'environmental water' accounting that the water planning process legislates.

^{xiv} Another respondent noted regarding the EWR in the *Draft Interim Water Allocation Plan, Ord River*:

As far as the planning process is concerned, the original flow rates that X put up...they based it on a naturalness thing that was mimicking pre-dam Dry season flows and to me the whole thing was

an absolute farce. Because to me the River...you can't get 365 days of constant supply and then take it away when you're adding the town sewerage and agricultural runoff. You'll end up with a green crock pot of smouldering waterway. Not to mention the fact that it would severely impede my business.

^{xv}For example, we can look inside the practices of 'river science' to see that the 'post-dam' river is manifest through efforts of simulation and prediction based on a number of flow parameters. A report on defining the Ecological Water Requirements for the Ord River states:

Flows on the Ord River are highly variable. Aspects of this variability are statistically defined indices including predictability, constancy and contingency are used to help describe seasonal patterns in river flow. The impacts of the dams on these parameters was unknown in 2002 (Doupe and Petit 2002: 307-320)

The work of hydrological modelling and ecological understandings is used to painstakingly calculate the 'environmental water requirements' of this new 'post-dam' river in order to re-produce its new ecological values. These efforts of simulation and prediction are actively creating and re-creating the Ord River 'post-dam'. Or to put it another way, the Ord River 'environment' with its attendant values, emerges through and by the EWRs defined in the water planning process.