

1 **Securing Supply: Governing Drinking Water in the Northern Territory**

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3 **Abstract**

4 *This article considers the spatial and material implications of drinking water*  
5 *regulation in the Northern Territory (NT) of Australia. Responding to water*  
6 *contamination and scarcity events in remote NT communities, we argue that the*  
7 *politico-bureaucratic edifice of uniform drinking water governance and service*  
8 *provision across the NT is a state-curated fiction. The article outlines the*  
9 *available legislative protections for drinking water supply in the NT, which*  
10 *include minimum quality standards, water allocation mechanisms, testing*  
11 *regimes, and so on. These are shown to vary significantly between geographic*  
12 *locations and we argue that this produces a racialised ‘archipelago’ of*  
13 *differentiated islands of drinking water governance (Bakker 2003). Using the Gulf*  
14 *country town of Borroloola as a case study, the article then examines the colonial*  
15 *and land rights bases of this spatial variegation, and its significance for drinking*  
16 *water infrastructure provision and remediation. In doing so, we consider how the*  
17 *entropic materialities of ageing infrastructures work to further confound effective*  
18 *drinking water regulations and their practical enactments. The article argues that*  
19 *it is crucial to understand the limits of drinking water regulation in the NT, in*  
20 *order to elucidate the racialised distribution of potential environmental harms,*  
21 *and to mitigate further toxic inheritances.*

22 **Key words**

23 Water, governance, geography, infrastructure, law, materiality

## 1    **Securing Supply: Governing Drinking Water in the Northern Territory**

2

3    On 19 April 2018, the Northern Territory (NT) Department of Health issued  
4    precautionary drinking water advice to Garawa 1 and Garawa 2 camps, two of the  
5    four Indigenous ‘town camps’ in the remote NT township of Borroloola. Routine  
6    testing had revealed elevated lead and manganese in the water supply above safe  
7    levels. Residents were told not to drink, cook, or brush their teeth with the water,  
8    while assured that the contamination was a short-term problem. Although never  
9    publicly confirmed, brass fittings in the decades-old reticulated piping were  
10    blamed, with the acute problem resolved by a combination of water flushing and  
11    spot replacement of fittings at the most stubborn points. The advice was lifted two  
12    months later on 15 June 2018. It was, according to the authorities, a minor  
13    incident.

14

15    Across the NT, and exacerbated by drought conditions and extreme heat in recent  
16    years, remote Indigenous communities are experiencing frequent failures in  
17    drinking water supply and quality. In August 2019, the groundwater supply to  
18    Yuendumu in Central Australia was reportedly at severe risk of total depletion  
19    (Beaven 2019). In the remote outstation of Mudginberri in Kakadu National Park,  
20    a five day water outage resulted in emergency drinking supplies trucked in while  
21    residents were unable to flush toilets, shower, or wash laundry (Gibson 2019).  
22    Other recent incidents include a toxic algal bloom in the water supply at Yuelamu  
23    in February 2016 (Maddocks 2016), the failure of water chlorination equipment in

1 Yarralin in January 2017 (NTG 2017), and the depletion of the bore water supply  
2 at Ngukurr in December 2017 (McLellan 2017). While some water provision  
3 failures in Australia generate national outcry – such as those arising from  
4 mismanagement of the Murray-Darling basin – the smaller scale of these  
5 continuing crises in the nation’s more remote regions escape sustained attention.  
6 However, considered collectively, these incidents highlight the precarity of  
7 reliable water supply in regional and remote Indigenous communities in the NT.  
8 This has direct implications for the health of people living in contexts that are  
9 relatively more vulnerable to climate change risks (Hennessy *et al.* 2004; Pittock  
10 *et al.* 2013), and which depend on the availability of water that is safe to drink, of  
11 adequate supply, and distributable to homes (Healthabitat 2019).

12  
13 This article examines the spatial and material implications of drinking water  
14 regulation in the NT. Adopting Tess Lea’s ‘policy ecology’ analytic, we analyse  
15 the legal and policy environments of drinking water regulation, as well as the  
16 ‘connections that stem from and flow through the alive, inhabited worlds that  
17 policy is entering into’ (Lea 2015, 378). This requires analysis of not only legal  
18 and policy regimes and their colonial origins and spatial effects (Bartel *et al.*  
19 2013, 340), but also the confounding material agencies of the deteriorating  
20 infrastructures through which drinking water governance is enacted. Our analysis  
21 is based on two key methods. First, it draws on ethnographic fieldwork in  
22 Borroloola and Darwin in October 2018 and May 2019. This involved  
23 investigating the site of contamination and localised remediation work, and the

1 distributed sites of bureaucratic administration. Second, the analysis depends on a  
2 critical ethnographic reading of archival materials and contemporary legal and  
3 policy documentation regarding drinking water governance and service provision  
4 in the NT (Sullivan 2012). Through both approaches – augmented by a public  
5 seminar and radio and television interviews (Lavery 2019) – our chief aim has  
6 been to determine who is responsible for drinking water provision in what NT  
7 contexts; according to what standards; what procedures are enacted when those  
8 standards are not met; and the legal, geographic, and practical limits to such  
9 regimes.

10

11 Our central argument is that the politico-bureaucratic edifice of uniform drinking  
12 water governance and service provision across the NT is a state-curated fiction.  
13 Drinking water regulation in the NT is in fact spatially heterogeneous, producing  
14 different forms of responsibility, accountability, attention, procedure, and  
15 intervention between contexts. Making legible the social and environmental  
16 harms currently enmeshed in drinking water legislation is crucial for any attempt  
17 to institute more coherent or stringent regulations (Neale 2019). Following Karen  
18 Bakker (2003) on law’s spatial effects, we suggest that a fragmented and  
19 hierarchised ‘archipelago’ of drinking water regulation governs remote and  
20 urban/town populations and their relations to drinking water differently. The first  
21 section of this article analyses the *Water Act* (NT), and the important but  
22 infrequently considered *Water Supply and Sewerage Services Act 2000* (NT)  
23 (WSSS Act), to show their patchwork application across the NT. We then

1 illustrate how the 'islands' in the NT's water governance archipelago are  
2 hierarchised to the relative detriment of Indigenous remote communities and  
3 homelands, with regard to guarantees of water supply and quality, intervention by  
4 authorities, and legal accountability to residents. Following Nikhil Anand, this  
5 regime produces differentiated forms of 'hydraulic citizenship' (2017, 8).  
6  
7 The second section of this article employs the 2018 contamination event at  
8 Borroloola as a case study to illustrate how contemporary archipelagic  
9 governance depends in part on the colonial and post-land rights appropriation and  
10 alienation of territory and the allocation of attendant property interests.  
11 Geographically differentiated forms of testing and remediation are complicated  
12 further, and undermined, by the entropic characteristics of the ageing bores,  
13 reticulated pipes, storage tanks, taps, and houses through which water flows. We  
14 suggest that especially where subterranean infrastructure is involved, empiricism  
15 is often replaced with guesswork in the day-to-day implementation of water  
16 governance. This issue is of particular relevance to contemporary decolonising  
17 demands for services and infrastructures to be returned to Aboriginal control as a  
18 governance solution to systemic state neglect in the NT. This is a shift we support.  
19 However, this article's examination of the material infrastructures subject to  
20 variegated regulatory regimes suggests that careful consideration must be given to  
21 the specific terms of re-inheriting legacy infrastructures with the potential to  
22 generate future toxic events.  
23

1 **Part One: Guaranteeing Supply**

2

3 *The Legal Geography of NT Water Governance*

4 Ninety percent of the NT’s water supply – including for nearly all remote  
5 Indigenous communities – comes from groundwater aquifers, recharged by wet  
6 season rainfall and seepage from rivers and floods, and accessed by humans via  
7 some 35,000 known bores. The underlying purpose of the NT’s key water  
8 planning legislation is similar to other Australian states and territories, treating  
9 water as an extractive resource to be allocated to competing users and exploited  
10 for different purposes.<sup>1</sup> The purpose of the *Water Act* is to allocate, manage, and  
11 assess water resources in the NT, supported by the *Water Regulations*, and other  
12 policy instruments.<sup>2</sup> Within this legislative paradigm, current and potential  
13 conflicts over water are selectively ‘managed’ in discrete areas in response to  
14 stressors such as the intensification of agricultural, pastoral, extractive, and other  
15 human uses of water, and the location of denser human populations.  
16

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<sup>1</sup> Though foreshadowed, a key difference from other jurisdictions remains the inability to trade water entitlements.

<sup>2</sup> These include the “First-in-first-served” Policy, the Northern Territory Water Allocation Planning Framework (the 80:20 Rule), the Strategic Aboriginal Water Reserve Policy Framework, and the Darwin Rural Area Licensing Policy.

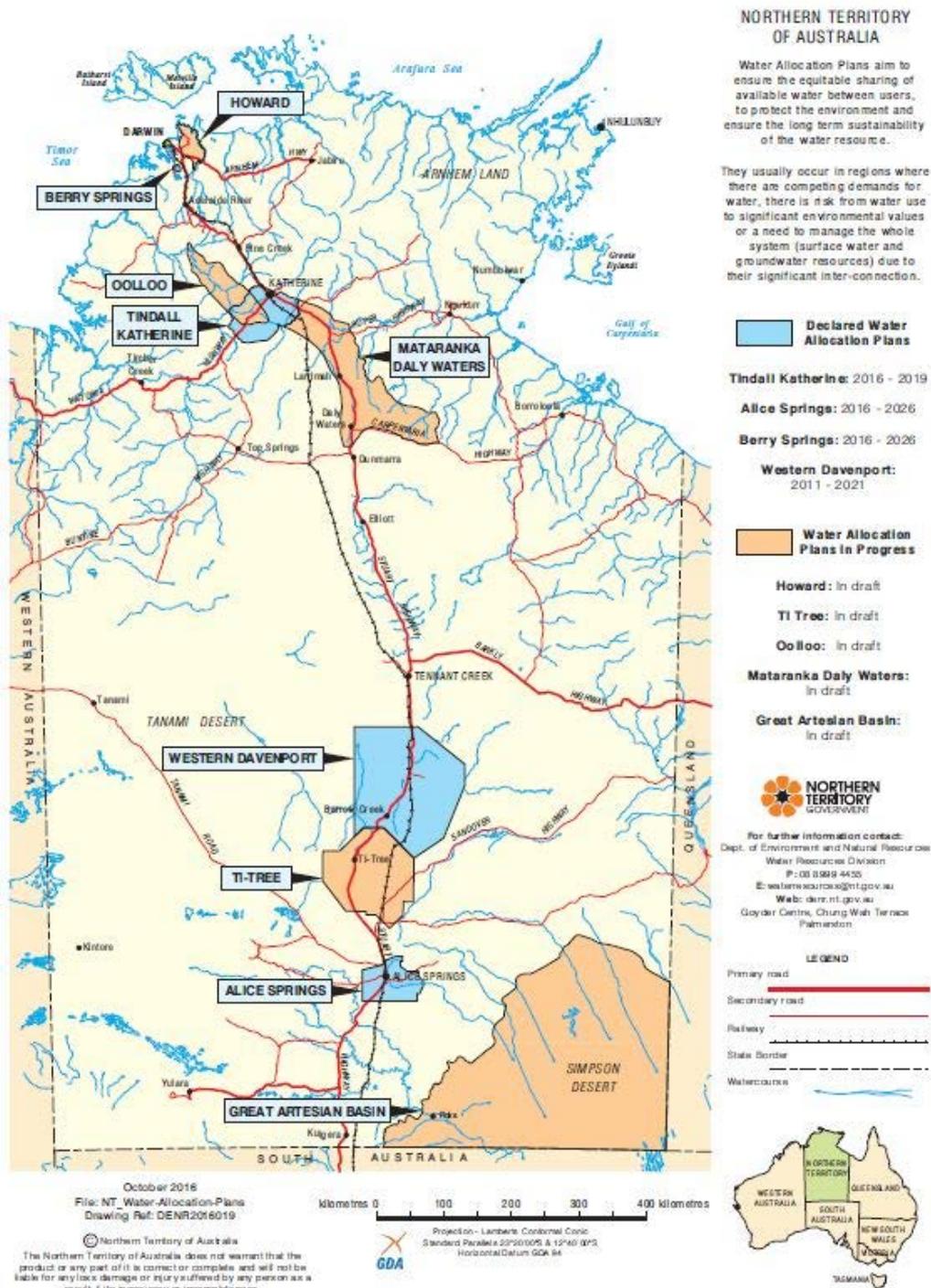
1 One of the key functions of the *Water Act* is to stipulate where and when statutory  
2 water extraction licences are required, and to provide decision-makers with the  
3 power to decide where and when more intensive water resource management is  
4 needed. For example, the legislation enables the declaration of Water Control  
5 Districts (WCDs), of which there are currently eight. Such districts are typically  
6 in more heavily populated areas with higher competition for water and thus higher  
7 risk to overuse of groundwater reserves, river flows, and wetlands. A licence is  
8 required for extracting groundwater within a WCD, though not elsewhere,  
9 provided groundwater is extracted at a rate of less than fifteen litres per second.

10

11 The declaration of WCDs enable the development of Water Allocation Plans  
12 (WAPs) within those districts. WAPS apply in specific areas within the eight  
13 WCDs across the NT; to date, only four such plans have been instituted, though  
14 more are planned (see Figure 1). These allocate water between various non-  
15 consumptive uses (environmental and cultural) and consumptive uses (including  
16 rural stock and domestic, public water supply, aquaculture, industry, and  
17 agriculture). Public water supply is one of many ‘consumptive uses’. There are  
18 generalised exemptions to the requirement to obtain water extraction licences  
19 across the NT (including in WCDs) for ‘stock and domestic purposes’ (*Water Act*,  
20 S14), and road construction and maintenance.

21

# NT WATER ALLOCATION PLANNING AREAS



1

2 Figure 1 – NT Water Allocation Planning Areas, Northern Territory Government

3

1 Scholarship about NT water resource planning has predominantly focused on the  
2 distributive justice of the water planning framework, including water allocation to  
3 Indigenous landowners for cultural and commercial purposes (Altman 2004;  
4 Jackson 2006; Jackson and Barber 2013; Jackson and Langton 2012). While  
5 indebted to this literature, our focus here is with how drinking water is protected  
6 (or not) in the NT. For while the *Water Act* purports to provide an NT-wide  
7 framework for the sustainable management of water resources, its geographic  
8 application with respect to public drinking water is fragmentary. Public drinking  
9 water supply is only protected or ‘allocated’ in areas both declared as a WCD and  
10 where a WAP applies. There is no general power in the *Water Act* to reserve  
11 water for current and future public water needs. Other users may extract water in  
12 accordance with the requirements of the *Water Act*, often without a licence or  
13 regulatory oversight, and even when such use might impact drinking water  
14 sources.<sup>3</sup>

15  
16 This means that an adequate drinking water supply is not currently guaranteed to  
17 residents in the vast majority of the NT not covered by WAPs, including in most  
18 Indigenous communities. Although the licensed utility provider, Power and Water

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<sup>3</sup> Until November 2018 mining and petroleum activities were exempt from the *Water Act*’s licensing requirements. Removing this exemption was one of the recommendations of *The Scientific Inquiry into Hydraulic Fracturing in the Northern Territory* (Pepper 2018).

1 Corporation (PAWC), is required under the *Water Act* (S90) to obtain water  
2 extraction licences to utilise water for public supply,<sup>4</sup> it appears to hold very few  
3 groundwater extraction licences outside of declared WCDs. As Sue Jackson and  
4 Jon Altman (2009) have noted, this means areas outside of WCDs – where most  
5 Indigenous communities are located on Aboriginal land – constitute spaces  
6 beyond the ‘frontiers’ of settler colonial water management (Povinelli 2018).  
7 Groundwater in these places is neither reserved for public supply, nor is much of  
8 its extraction licensed or regulated against other uses.

9

#### 10 *Minimum Standards*

11 Establishing this absence of water planning regulation for large swathes of  
12 Indigenous-owned land, we ask: what regulatory arrangements *do* exist for the  
13 supply and quality of drinking water in the NT? Some answers are contained in  
14 the *Water Supply and Sewerage Services Act 2000* (NT) (*WSSS Act*), which  
15 regulates the provision of public water supply. The *WSSS Act* requires that

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<sup>4</sup> Under the *Water Act* (S90), license applications are considered against criteria such as the availability of the water resource and the current and future demand for water for domestic purposes. It is not clear how these criteria are assessed given a proportion of water extraction is exempt from licensing and therefore unknown to authorities .

1 provision of ‘water supply services’<sup>5</sup> in what are known as ‘water supply licence  
2 areas’ be licensed by the NT Utilities Commission, a government-established  
3 regulator which oversees essential services provision to NT consumers of water.  
4 PAWC is the current and sole licensee under the *WSSS Act*, and it must ‘provide  
5 water supply or sewerage services to customers who own land with an authorised  
6 connection to [its] water supply or sewerage services infrastructure’ (S41[2]).  
7 Other requirements are imposed on PAWC through the legislation and its licence,  
8 regarding asset management plans for water supply infrastructure (S48), licence  
9 compliance reports (S49), and service plans (S51). Direct accountability to the  
10 customer regarding these requirements is established in part via a mandated (S47)  
11 and standardised ‘customer contract’ published in the NT government gazette  
12 which, among other matters, stipulates that PAWC will provide water at a  
13 pressure and flow-rate suitable for normal day-to-day usage.

14

15 Unlike other Australian jurisdictions where a corporate entity is licensed to supply  
16 drinking water<sup>6</sup> – the NT has not set minimum standards for water supply. Under

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<sup>5</sup> ‘Water supply services’ means supplying water to paying customers (including operating water supply infrastructure and distribution infrastructure) and includes retailing water supply services (S4).

<sup>6</sup> Safe drinking water legislation exists in South Australia (*Safe Drinking Water Act 2011*), Victoria (*Safe Drinking Water Act 2003*), NSW (*Water Industry*

1 the *WSSS Act*, the Minister can specify minimum standards that PAWC must meet  
2 (S45), and a similar power to prescribe minimum water quality standards exists in  
3 the *Water Act (S73)* and the *Public and Environmental Health Act 2011 (NT)*  
4 (S133). However, instead of enforceable standards, the Department of Health  
5 (2011) and PAWC have entered into a memorandum of understanding (MOU),  
6 which concedes that ‘no minimum standards for drinking water have been set’,  
7 although the *Australian Drinking Water Guidelines (ADWG)* ‘will be used as the  
8 peak reference’ (Department of Health 2011, clause 4). The MOU allows the  
9 Department to vary the quality criteria drawn from the ADWG ‘in specific  
10 circumstances . . . as long as public health is not compromised’ (2011, clause 4).  
11 The MOU contains criteria for the administration and implementation of the  
12 ADWG, the safe treatment of water, water testing regimes, responses to public  
13 health incidents and events, and annual public reporting of drinking water quality  
14 across the NT. However, in strict legal terms, despite the appearance of regulation  
15 of drinking water quality and a measure of public transparency, the MOU is  
16 unenforceable. The MOU also expired in 2015, but appears to have been used  
17 since that date. This regime involves a voluntary program couched in aspirational  
18 terms.  
19

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*Competition Act 2005*), and Queensland (*Water Supply [Safety and Reliability]  
Act 2008*).

1 But even these limited protections do not extend across the NT. The *WSSS Act*  
2 applies only in water supply licence areas, which currently comprise eighteen  
3 gazetted towns: including the major centres Darwin, Alice Springs, Katherine,  
4 and Tennant Creek – and Borroloola, for reasons we explain below. The seventy-  
5 two larger Indigenous communities and over 600 Indigenous outstations located  
6 on Aboriginal land owned under the *Aboriginal Land Rights (Northern Territory)*  
7 *Act (Cth) (ALRA)* and other forms of Indigenous-owned tenure, are not water  
8 supply licence areas and therefore the *WSSS Act* does not apply. These mostly  
9 regional and remote communities and sixty-six of the outstations – in which about  
10 half the NT’s Indigenous population live – are serviced by Indigenous Essential  
11 Services Pty Ltd (IES), a not-for-profit subsidiary of PAWC established in 2003.  
12 While PAWC is overseen by the Utilities Commission, IES is a private  
13 proprietary limited company and its operational structure and legal obligations are  
14 opaque, with no legislation mandating licensing or particular levels of service or  
15 standards. Further, the standards, duties, accountability, and transparency  
16 mechanisms that do exist within the *WSSS Act*, licence, and customer contract do  
17 not apply to IES. The MOU between the Department of Health and PAWC  
18 referred to above does, however, apply in the communities that IES services,  
19 providing a framework (albeit unenforceable) for working cooperatively,  
20 including regular testing of drinking water supplies in remote areas and public  
21 reporting of results. Neither IES nor its parent company, PAWC, operate at all in  
22 the vast majority of outstations on Aboriginal land. Here, water infrastructure is  
23 typically managed in an ad hoc manner by outstation resource centres who

1 compete for annual funding from a very limited, and perennially under threat, NT  
2 budget allocation (Marks 2015).

3

#### 4 *Archipelagic Water Governance*

5 Across the NT, then, legal regulation of both drinking water supply and quality  
6 are fragmented. Making legible the detailed spatial effects of water governance  
7 reveals how the law, far from being universal in application, differentiates how  
8 particular populations are governed along racialised lines (Riles 2005). Karen  
9 Bakker characterises the public water supply systems of Jakarta in Indonesia as an  
10 ‘archipelago’, comprising ‘spatially separated but linked “islands” of networked  
11 supply in the urban fabric’ (2003, 337), as the consequence of ‘attempts by  
12 colonial and postcolonial governments to differentiate people by class and race’  
13 (Kooy and Bakker 2008, 1844). This metaphor aptly describes the differentiated  
14 and hierarchized ‘islands’ of NT drinking water governance, which produce  
15 differences between urban and town (predominantly non-Indigenous) and remote  
16 (predominantly Indigenous) populations. Within this archipelago, we suggest that  
17 there are at least six different ‘islands’ of drinking water governance (see Figure  
18 2). These are:

- 19 1. Towns within WAP areas. The *Water Act* reserves public water supply and  
20 PAWC is licensed and regulated under the *WSSS Act*.
- 21 2. Towns outside WAP areas. Public water supply is not able to be reserved  
22 under the *Water Act*. PAWC is licensed and regulated under the *WSSS Act*.

- 1 3. Town camps within towns. PAWC is licensed and regulated under the *WSSS*  
2 *Act* but is not legally responsible for reticulated infrastructure beyond town  
3 camp bulk water meters.
- 4 4. Major Aboriginal communities located within WAP areas. The *Water Act*  
5 reserves public water supply. IES is an unregulated private entity owned by  
6 PAWC that provides services pursuant to an unenforceable MOU with the NT  
7 Department of Health.
- 8 5. Major Aboriginal communities on Aboriginal land (excepting category 4).<sup>7</sup>  
9 Public water supply is not able to be reserved under the *Water Act*. IES  
10 provides services pursuant to an unenforceable MOU with the NT Department  
11 of Health.
- 12 6. Outstations and homelands on Aboriginal land.<sup>8</sup> Public water supply is not  
13 guaranteed under the *Water Act*. Drinking water supply is privately managed  
14 and unregulated.

15

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<sup>7</sup> 64 of the 72 communities are located on Aboriginal land. IES also services 66 outstations.

<sup>8</sup> 540 of the 612 outstations are located on Aboriginal land.

1

2 Figure 2 – Drinking Water Regulation in the Northern Territory, Housing for

3 Health Incubator

4

1 In the case study which follows, we reveal how different ‘islands’ of drinking  
2 water governance are grounded in the colonial reterritorialisation of land and the  
3 consequent post-land rights property regimes operating in the NT. We examine  
4 how the Borroloola water contamination incident, far from minor, exposes the  
5 shortcomings of legal protections for remote communities, and we consider how  
6 particular material processes affect the enactment of water governance.

7

## 8 **Part Two: Responding to Water Contamination**

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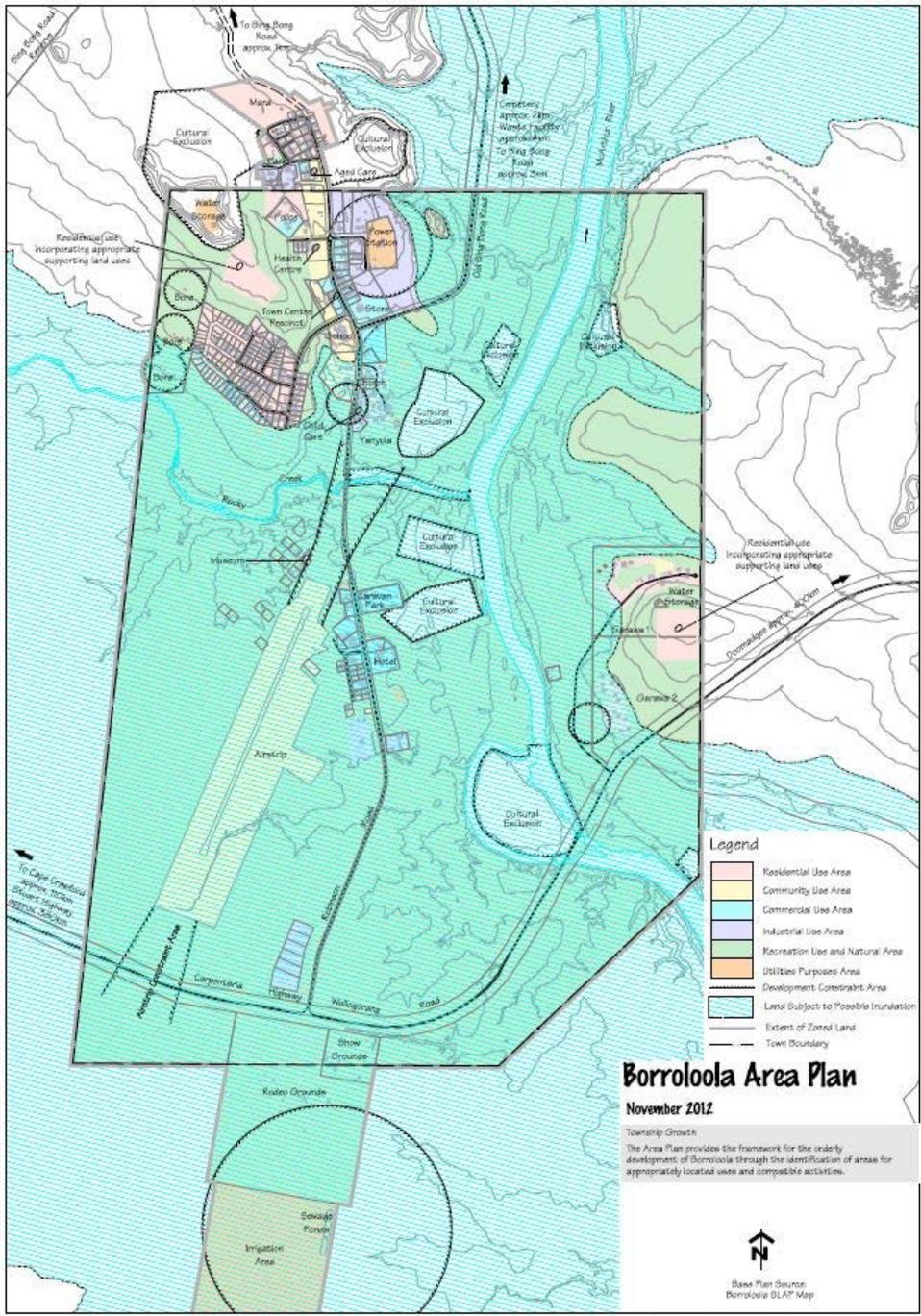
### 10 *Precautionary Advice at Borroloola*

11 Borroloola is a very remote town located approximately 970 kilometres drive  
12 southeast of Darwin in the Gulf region of the NT. Seventy-five percent of its 900  
13 residents are Indigenous. Borroloola was gazetted as a township in 1885, as a rest  
14 stop for drovers on the Gulf stock route between Queensland and northern  
15 Australia and as a service hub for surrounding pastoral stations (Baker 1992;  
16 Avery 1988). Following the establishment of the upstream McArthur River Mine  
17 in the early 1990s, it became a town closely imbricated with the nearby lead-zinc-  
18 copper deposit. Today, Borroloola includes four areas designated in NT  
19 bureaucratic-parlance as ‘town camps’, which describes housing areas for  
20 Indigenous residents usually located on town peripheries (and ordinarily  
21 distinguished from remote Indigenous communities, which are generally located

1 on Aboriginal land).<sup>9</sup> As Figure 3 shows, Yanyula, Garawa 1, and Garawa 2  
2 camps are located within Borroloola's township boundary, while Mara camp is to  
3 the north. The McArthur River courses through the township towards the Gulf of  
4 Carpentaria, with Garawa 1 and 2 camps to the east, and Yanyula camp to the  
5 west.  
6

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<sup>9</sup> We note that the terminology 'town camps' does not properly reflect the permanence and stability of such living areas, which is better reflected by the description of 'community living areas'. This article uses 'town camps' as the most commonly used terminology by government and utility providers.



1

2 Figure 3 – Borroloola Area Plan, Northern Territory Government

3

1 As a gazetted town, Borroloola was excluded from claim with the advent of  
2 statutory land rights in the NT under the *ALRA*. This differs from nearly all other  
3 NT Indigenous communities and outstations, which were located on either  
4 Aboriginal reserves or vacant crown land and therefore available for claim and/or  
5 transfer to Aboriginal freehold ownership under the *ALRA*. Borroloola township is  
6 now landlocked by Aboriginal land (formerly vacant crown land) successfully  
7 granted under the *ALRA*, including Mara Camp, which is owned by the Narwinbi  
8 Aboriginal Land Trust. In 2016, the Federal Court recognised that native title  
9 continues to exist within Borroloola where it had not been extinguished by prior  
10 government actions.<sup>10</sup> Yanyula, Garawa 1, and Garawa 2 camps are located on  
11 Crown Leases in Perpetuity.

12  
13 In its colonial and post-land rights histories, then, Borroloola was a stock route  
14 town converted to a mining town which is now also a part-Indigenous owned  
15 town. Distinct from most other NT Indigenous communities, Borroloola's  
16 colonial origins as a gazetted town means the *WSSS Act* applies there as part of a  
17 water licence supply area. This means that PAWC, rather than IES, is responsible

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<sup>10</sup> The High Court's recognition of native title in Australia in its 1992 *Mabo* decision and subsequent *Native Title Act 1993* enabled traditional owners to claim in 2003 that native title existed within the Borroloola township. See *Rrrumburriya Borroloola Claim Group v Northern Territory* [2016] FCA 776; 255 FCR 228; 339 ALR 98.

1 for the provision of water supply services and the associated infrastructure. The  
2 nineteenth century act of surveying and subdividing Borroloola brought the town  
3 within the NT's colonial frontier, the survey arbitrating 'between an  
4 acknowledged regime and those forms of property deemed to lie "outside" the  
5 frontier' (Blomley 2003, 128). This is the cartographic source of the NT's  
6 contemporary 'archipelagic' water governance. Land located beyond former  
7 frontiers subsequently reterritorialised as Aboriginal freehold ownership is now  
8 subject to less stringent legal and monitoring regimes, such as public water supply  
9 by IES. Although contemporary regulatory frameworks and instruments  
10 encourage an interpretation of comprehensive and consistent governance within  
11 the jurisdiction (Kahn 2017), multiple regimes of property law and water  
12 governance in fact operate simultaneously and at different scales. Such regimes  
13 mutually constitute one another through what Boaventura de Sousa Santos (1987)  
14 describes as a process of 'interlegality', which is typically blackboxed by public  
15 assurances and the fiction of universal law (Valverde 2009). However, this  
16 multiplicity of legal regimes is only part of the story.

17

18 After precautionary drinking water advice was issued in April 2018, a water  
19 tanker was provided by Mabunji Aboriginal Resource Indigenous Corporation,  
20 with residents also purchasing bottled water and hauling water from a public tap  
21 across the McArthur River. On 4 May 2018, Garawa 1 was advised its water was  
22 safe for human consumption, following two rounds of testing. However, the  
23 presence of lead, at 0.011Mg/L, and manganese, at 0.65Mg/L, in Garawa 2 water,

1 remained above safety limits specified by the AWDG (0.01Mg/L and 0.5Mg/L  
2 respectively) (Davidson 2018). The precautionary advice for Garawa 2 was  
3 finally lifted on June 15 2018.

4

5 A statement from a PAWC representative outlined that ‘it is suspected that . . .  
6 legacy infrastructure (not belonging to Power and Water) contributed to the  
7 elevated levels of lead that were detected during routine sampling’ (Northern  
8 Territory Legislative Assembly 2018). A radio interview of the Chief Health  
9 Officer in response to our research also inferred this cause (Lavery 2019). The  
10 water supply to the Garawa camps is separate from the main Borroloola supply  
11 network, which opened a new water treatment plant in October 2018 (see Figure  
12 4). Water is drawn from a nearby bore and pumped north to an elevated tank,  
13 which drains via reticulated piping to housing at Garawa 1 and Garawa 2 (Water  
14 Resources Division Assessment Branch 1986). PAWC testing across the two  
15 month period determined that the issue could most likely be attributed to a stretch  
16 of reticulated infrastructure, specifically a pipe between Garawa 2 camp housing  
17 and the sewerage pump station located just outside the camp boundary. While the  
18 use of lead water service pipes has not been common in Australia since the 1930s,  
19 lead solder was used in some copper pipes and fittings until the late 1980s, and  
20 according to Mark Taylor *et al.* (2018), Australia’s *National Construction Code*  
21 continues to allow 4.5 percent lead content in brass alloys used in plumbing.  
22 Reticulation in the camps uses a combination of PVC pipes with brass  
23 components. Though the government has not provided a definitive explanation,

1 the contamination was most likely caused by these brass fittings, in combination  
2 with corrosive water from the Borroloola aquifer. This is unsurprising: a bore  
3 report for Garawa water supply notes that ‘Due to the low pH and low alkalinity  
4 the water is corrosive to metal fittings’ (Water Resources Division Assessment  
5 Branch 1986, 3). In this case, corrosion was likely exacerbated by a recent  
6 chlorination process in response to an *E. coli* outbreak. While no emergency plan  
7 was activated as would occur in a metropolitan area, the acute problem was  
8 resolved by PAWC’s replacement of sections of the reticulated infrastructure.  
9

10

11 Plate 1 – Borroloola Water Treatment Plant, Liam Grealy

12

13 *Tenure: Who Owns the Pipes?*

1 Resolving the acute contamination issue illuminated various impediments to the  
2 security of Borroloola’s domestic water supply, including the condition of  
3 housing stock, of infrastructural assemblages, and the legal capacity of particular  
4 authorities to attend to both. Housing in Borroloola’s town camps has received  
5 inadequate government attention for a long time, is functionally failing due to  
6 insufficient maintenance and repairs, and is subject to overcrowding. Until March  
7 2019, the last new houses in Borroloola town camps were supplied in 2006 by the  
8 Australian Defence Force under the Army Aboriginal Community Assistance  
9 Program (AACAP). In the intervening period, despite \$14.6m secured in 2009  
10 under the *National Partnership Agreement on Remote Indigenous Housing*  
11 (NPARIH), houses did not appear (Grealy 2018).

12

13 Official explanations for why available funding for housing in Borroloola was not  
14 expended emphasise ‘tenure’, or the Commonwealth government’s requirement to  
15 secure leases before it funds housing and infrastructure – what is known as the  
16 ‘secure tenure’ policy (Terrill 2010). Until the late 2000s, public assets and  
17 infrastructure were constructed on Aboriginal land and within town camps on  
18 native title land without formal property arrangements. In 2008, under NPARIH,  
19 parties agreed that Commonwealth funding for remote housing was conditional on  
20 secure land tenure being settled by states and territories. This was supposed to  
21 standardise service provision arrangements. In practice, this has proliferated forty-  
22 year leases over housing precincts and other government assets in remote

1 communities located on Aboriginal land. Despite such mainstreaming, it is clear  
2 that differentiated services still apply.

3

4 If we accept that lead and manganese contamination emerged via corroded pipe  
5 fittings, (rather than, say, nearby mining operations), we might ask why it was so  
6 difficult to have these replaced. In part, the answer concerns tenure. No one  
7 government agency has legal responsibility for the reticulated infrastructure that  
8 circulates water through the Garawa camps. The *WSSS Act* outlines the use of  
9 water meters by a licensee (PAWC) to determine water consumption and  
10 associated costs (S7.1), while PAWC's customer contract clarifies that the  
11 customer, or landowner (in this case the town camp association), is responsible  
12 for 'all the plumbing from the property side of the meter' (2007, 8), 'and for all  
13 water that flows through the meter' (2007, 10). This division of responsibility for  
14 water infrastructure between public utilities and private landowners via water  
15 meters is common (von Schnitzler 2018), including where tenants lack the  
16 financial means, security of tenure, or social power to conduct necessary  
17 remediation on private land (Fennell 2016). In Borroloola's town camps, meters  
18 functionally employed for billing are located at the boundaries of the community  
19 lease area, meaning it is possible for PAWC to disavow itself of responsibility for  
20 repairs beyond those points.

21

22 Land in Garawa 1 and Garawa 2 camps is owned as leasehold title granted to two  
23 Aboriginal corporations: 'Garawa No. 1 Camp Aboriginal Corporation' and

1 'Garawa No. 2 Housing Aboriginal Corporation'. While these corporations exist  
2 as legal entities, they are not resourced to maintain subterranean infrastructure.  
3 Without such capacities, and without this legacy infrastructure being leased to  
4 government, the responsibility for its maintenance and repair remains legally clear  
5 but practically ambiguous. This is despite the required repairs and upgrades  
6 identified in these town camps by the recent *Town Camps Review* (DHCD 2017).  
7 Recalling the typology of islands of water governance above, the Borroloola town  
8 camps represent category three – town camp corporations are legally responsible  
9 for reticulated infrastructure, as an artefact of tenure arrangements, but lack  
10 adequate resources for necessary upgrades and installations. PAWC is licensed  
11 and regulated under the *WSSS Act* but has no responsibility beyond the bulk meter  
12 at town camp boundaries.

13

14 Despite this landscape of differentiated legal authority, we are not suggesting the  
15 state is absent from the town camps. PAWC discovered the contamination while  
16 implementing the testing regime agreed in its MOU with the Department of  
17 Health. Following the precautionary notices and media attention, PAWC  
18 investigated the cause and replaced sections of reticulation it presumed to be at  
19 fault. However, to reiterate, this is not the legal responsibility of PAWC. It is  
20 informal care where attention is not mandated, and this informality helps explain  
21 the sporadic and reactive mode of provision. While PAWC has the licence to  
22 provide drinking water to the Borroloola township, its labour in response to the  
23 contamination in town camps was provided by the understanding that if they did

1 not, who would? While such an intervention might be welcomed during a crisis, it  
2 highlights the lack of attention to town camp infrastructures in general, alongside  
3 the broader absence of enforceable regulatory regimes governing drinking water  
4 at outstations or IES' communities on Aboriginal land.

5

### 6 *Governing with Guesswork*

7

8 Despite the shortcomings of existing protections, legal and policy reform will not  
9 necessarily guarantee against similar contamination incidents in the future. The  
10 material qualities of the objects being governed – subterranean water and  
11 infrastructure, or the 'systems of substrates' (Star 1999, 380) underpinning  
12 Borroloola town camps' water supply – and their interactions, confound the  
13 effective governance of water supply (Anand 2017). While the *Town Camps*  
14 *Review* (DHCD 2017) acknowledged that the water supply infrastructures in  
15 Borroloola town camps was upgraded during the Australian Army led  
16 'Connecting Neighbours' program in 2006, these upgrades were evidently  
17 inadequate to prevent a contamination event twelve years later, to say nothing of  
18 like situations across the 'splintered' (Graham and Marvin 2001), typically  
19 discrete, water infrastructures in other NT remote communities and town camps.  
20 We argue that the illegibility (Neale 2019) of subterranean infrastructures is  
21 compounded by historic policy decisions that failed to formally make any  
22 government entity responsible for their maintenance. This included the NT  
23 Government's decision to implement the archipelagic drinking water governance

1 regime across the NT described in this article, but also implicates the  
2 Commonwealth. Specifically, across the NT in the late 1970s and 1980s as part of  
3 the Indigenous policy of ‘self-determination’, the Commonwealth funded the  
4 installation of drinking water and sewerage infrastructure in town camps and  
5 outstations without the need for ‘tenure’ (Marks 2015), and without adequate  
6 funding for ongoing maintenance. Of that provisioning, inconsistently detailed  
7 public records are available today (noting, again, that the NT Government has  
8 only been responsible for town camps and outstations since 2008).  
9  
10 This lack of documentation to mediate between the thing itself and the authorities  
11 charged with its maintenance and repair is one part of the legacy of ‘legacy  
12 infrastructure’ in the NT. It is also a significant impediment to the hydraulic state,  
13 for which ‘seeing like a state means looking at records more often than the things  
14 they represent’ (Hull 2012, 166). This combines with the inevitability that  
15 infrastructures will crack, corrode, and deteriorate, and the difficulty of  
16 determining the state of sunk infrastructure without intrusive excavation or  
17 potholing. For Akhil Gupta, infrastructure is always already undoing itself, or in  
18 motion, ‘ephemeral, shifting, elusive, decaying, degrading, becoming a ruin but  
19 for the routines of repair, replacement, and restoration (or in spite of them)’  
20 (2018, 62). This dynamic conception highlights the labor of system maintenance,  
21 which is especially difficult to determine and enact for underground reticulation.  
22 Water management – flow, pressure, quality, and so on – is a matter of testing and

1 approximation with experts ‘only too familiar with both the ubiquity of leakage  
2 and the difficulties of repairing it’ (Anand 2015, 308).

3

4 We call this situation ‘governing with guesswork’. Water is notoriously difficult  
5 to manage, taking into account competing demands on the available resource,  
6 their fluctuations, chemical and biological characteristics, shrouded  
7 infrastructures, and the regimes required to manage relations between these  
8 things. In most contexts, infrastructural interruption and disturbance is the norm  
9 rather than exception (Graham 2010). The interaction at Borrooloola between  
10 corrosive water, metal fittings, chemical treatments, and ageing materials signals  
11 the potential for unpredictable outcomes following standard practices. One issue  
12 here is how to challenge the ‘slow violence’ (Nixon 2011) of infrastructural  
13 entropy as a naturalised expectation for Indigenous communities. In other words,  
14 how can we recognise infrastructural breakdown as inevitable without  
15 consolidating the already entrenched position of reduced expectations for policy  
16 success and material conditions in remote communities? (Povinelli 2001) How  
17 can normal accidents be anticipated and assured against?

18

### 19 **Conclusion: Guarding Against Toxic Inheritances**

20

21 Critical analyses of infrastructure frequently note that infrastructures and our  
22 reliance on them become most visible during breakdown or failures (Larkin  
23 2013). Similarly, democratic governance depends on both the application of

1 relatively consistent standards across a state's jurisdiction and the collection of  
2 data assessing the safe and effective provision of infrastructure and resources  
3 (Dillon *et al.* 2017). Inevitably, such forms of provisioning and audit are subject  
4 to frontiers, exceptions, elisions, and other techniques of illegibility (Neale 2019;  
5 Anand 2015). In the analysis above, questions of visibility and legibility are  
6 doubly relevant. First, the geography of archipelagic drinking water governance  
7 across the NT means that the lack of regulatory accountability in major  
8 Aboriginal communities and outstations is concealed from the public. Second, and  
9 partly as a consequence of this racialised spatial variegation, the entropic objects  
10 of governance themselves (including the reticulated infrastructure, bores, pipes,  
11 and the corrosive water flowing through them) are often only partly visible to  
12 both the state and local residents. That is, the state is aware of its regulatory  
13 limits, but its substantive knowledge is relatively circumscribed to the  
14 geographies in which it has determined to set and enforce legal standards.

15

16 Analysing NT drinking water governance as a policy ecology reveals the  
17 interactions between complex legal geographies subject to various 'islands' of  
18 water supply services and legacy infrastructures that are unpredictable in their  
19 slow decay. Any reforms must engage with 'a wider field of non-human  
20 connections, both re-fleshing the policy arena and returning the more-than-human  
21 to policy framings' (Lea 2015, 379). Drinking water provision in the NT is not  
22 straightforward terrain to govern, but the difficulty of the task does not excuse the  
23 failure to set, test, and enforce standards that apply across the NT, as is pursued

1 by other Australian states and territories. A contemporary decolonising discourse  
2 on Indigenous community control rightly argues for the control of town camps  
3 and other community assets to be returned to Aboriginal corporations as a  
4 governance solution to systemic state neglect. What kind of toxic inheritances  
5 might this involve for Aboriginal residents? And what resources are required to  
6 mitigate their effects? We argue that it is important that the demand for  
7 community control does not provide an opportunity for governments to divest  
8 responsibility for dilapidated infrastructures that it has thus far failed to  
9 adequately inspect and maintain. At the very least, the management of drinking  
10 water networks, by whatever authority, requires guaranteed state resourcing of  
11 ongoing planned maintenance and repair, lest infrastructural legacies inevitably  
12 (albeit erratically) become visible as ruin and crisis.

13

14 In the coming decades, assessments of water security may become increasingly  
15 significant in debates about the ‘viability’ of remote NT Indigenous communities.  
16 A critical view of viability discourse is needed, which in addition to employing an  
17 economic logic regarding the costs of infrastructural provisioning per capita,  
18 typically infers assumptions about sustainability and self-sufficiency that are  
19 rarely applied to urban centres. We also note that differentiated standards for  
20 drinking water supply imply that viability determinations have already been  
21 made, at least by *de facto* techniques of withdrawal and neglect. It is important  
22 that such neglect does not promote engagement with issues of water precarity as a  
23 mode of ‘settler apocalypticism’ which positions Indigenous communities as

1 destined for environmental devastation (Whyte 2018, 234). Instead, we argue that  
2 it is crucial to make visible the limits of contemporary drinking water regulation,  
3 and the potential of those limits to allow social and environmental harms to  
4 eventuate, visible only in moments of crisis or unfolding without government  
5 record. Such gaps and absences must be addressed by present regulations and in  
6 any shift to Indigenous community control of assets and services.

7

## 8 **Acknowledgements**

9 [Removed for anonymity]

10

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3

4 **Figure Captions**

5 Figure 1 – NT Water Allocation Planning Areas, Northern Territory Government

6 Figure 2 – Drinking Water Regulation in the Northern Territory, Housing for  
7 Health Incubator

8 Figure 3 – Borroloola Area Plan, Northern Territory Government

9 Plate 1 – Borroloola Water Treatment Plant, Liam Grealy

10

11