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Abstracting Water to Extract Minerals in Mongolia's South Gobi Province

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ABSTRACT: The Oyu Tolgoi copper-gold mine has become a symbol of the promise of mining to revive Mongolia's struggling economy and to propel the nation into a new era of prosperity. Water resources are vital to the operation of Oyu Tolgoi, which is expected to be in operation for at least thirty years. However, local residents, particularly nomadic herders, have raised concerns about the redirection of water resources for mining. While the company claims that mining infrastructure has little to no impact on herders' water resources, herders regularly report decreasing well water levels. With increased mining development throughout Mongolia's Gobi Desert region, mining infrastructure and regulations are transforming local relationships to water and livelihoods. I argue that water infrastructure for mining symbolises the movement of water away from culturally embedded contexts towards water management practices that prioritise the needs of national development and corporate profits. This analysis contributes to the under-examined intersection of water and mining in the hydrosocial cycle literature and demonstrates the currency of 'modern water' in the context of global mining development. The research includes interviews and focus groups conducted with stakeholders, participant observation and document collection that took place in Mongolia from 2011 to 2012 with follow-up research conducted in 2015.

KEYWORDS: Water, nation, infrastructure, Oyu Tolgoi, Mongolia

INTRODUCTION

In 2009 the Mongolian government signed the Oyu Tolgoi Investment Agreement with Ivanhoe Mines and Rio Tinto. The investment agreement for one of the world's largest undeveloped copper-gold mines was welcomed as a symbol of Mongolia's entry into the global marketplace as a major mining destination, frequently and often pejoratively called Minegolia (Jackson, 2015a). As the international media, mining interests and many Mongolian central government officials celebrated the agreement, concern was growing in South Gobi Province, where many medium- and large-scale mining developments were underway, transforming local landscapes and waterscapes. Recent political events also demonstrate ongoing tensions within Mongolia over the economic, political and environmental implications of the mine (see Myadar and Jackson, forthcoming).

Harnessing nature for economic development was a prominent theme in 20th-century Mongolia, when deep and shallow wells were integral to the transformation of landscapes, including the Gobi Desert, into habitable pasture (Bruun, 2006; Upton, 2009). In the 21st century, around the world, groundwater represents a new frontier both of the nation and global capital (Bakker, 2010). This is also the case in Mongolia where groundwater is essential to expand mining industries, while weak environmental governance limits the involvement of state actors at multiple scales to monitor the impact on local communities and wildlife. With the building of pipes come fears that mining will drain the Gobi dry. Oyu Tolgoi argues that their mining-related water infrastructure poses minimal risk to local communities and wildlife, but critics, particularly nomadic herders, contend that water levels are decreasing and that the company is destroying culturally significant water resources.

How water resources are symbolically and materially abstracted to facilitate mining has received little attention in the literature on the political ecology of water. Only a handful of scholars consider mining and the hydrosocial cycle (Budds and Hinojosa, 2012; Perreault, 2013; Brooks et al., 2016; Patrick and Bharadwaj, 2016; Sosa and Zwarteveen, 2012, 2016; Vela-Almeida et al., 2016), heeding Bakker and Bridge's (2006) call to theorise the interaction of multiple resources. How states and corporations reroute water resources and infrastructure to mining industries away from more traditional forms of water resource management demonstrates what Linton (2010) calls "modern water". As pumping stations push ancient water resources through pipelines to Oyu Tolgoi and an ephemeral river is redirected away from the mine's open pit, the local context for those resources is diminished with infrastructure that prioritises national economic development and corporate profits. This paper analyses how local residents perceive transformations of their waterscapes from culturally embedded resources in contrast with processes that simplify and consolidate water resources for mineral extraction. At stake are the potentially devastating consequences for local populations and tensions between residents, various scales of government and corporate actors, which is an ongoing focus of negotiation and mediation in the area. The intersection of modern water, the privatisation of water, weak environmental governance and the nation is a gap that this paper seeks to bridge.

After more elaboration on the literature on 'modern water' I briefly provide the cultural, historical and environmental contexts of water issues in Khanbogd *soum*¹ in South Gobi province, where Oyu Tolgoi is located. I then examine two examples of Oyu Tolgoi's water infrastructure to demonstrate how mining transforms relationships between people, place and water. Finally, I conclude with thoughts on how the interconnections between resources highlight tensions between economic development, governance and the nation.

The research for this paper largely took place during Oyu Tolgoi's infrastructure construction phase in 2011 and 2012, with follow-up research in 2015. I conducted over 100 interviews and four focus groups with nomadic herders, company workers, government officials and civil society activists in Khanbogd, Bayanovoo, Tsogttsettsii and Manlai soums, in Dalanzadgad in South Gobi province and in Khatanbulag soum, located in Dornigovi province (see Figure 1). I also interviewed company staff and consultants, government officials, academics, nongovernmental organisations (NGOs) and former residents, as well as one focus group with young professionals in Ulaanbaatar. I found research participants by using NGO networks as well as random and snowball sampling in the soums. To supplement the interviews and focus groups, I conducted participant observation with human rights NGOs, attended mining-related events in Ulaanbaatar and collected documents for analysis.

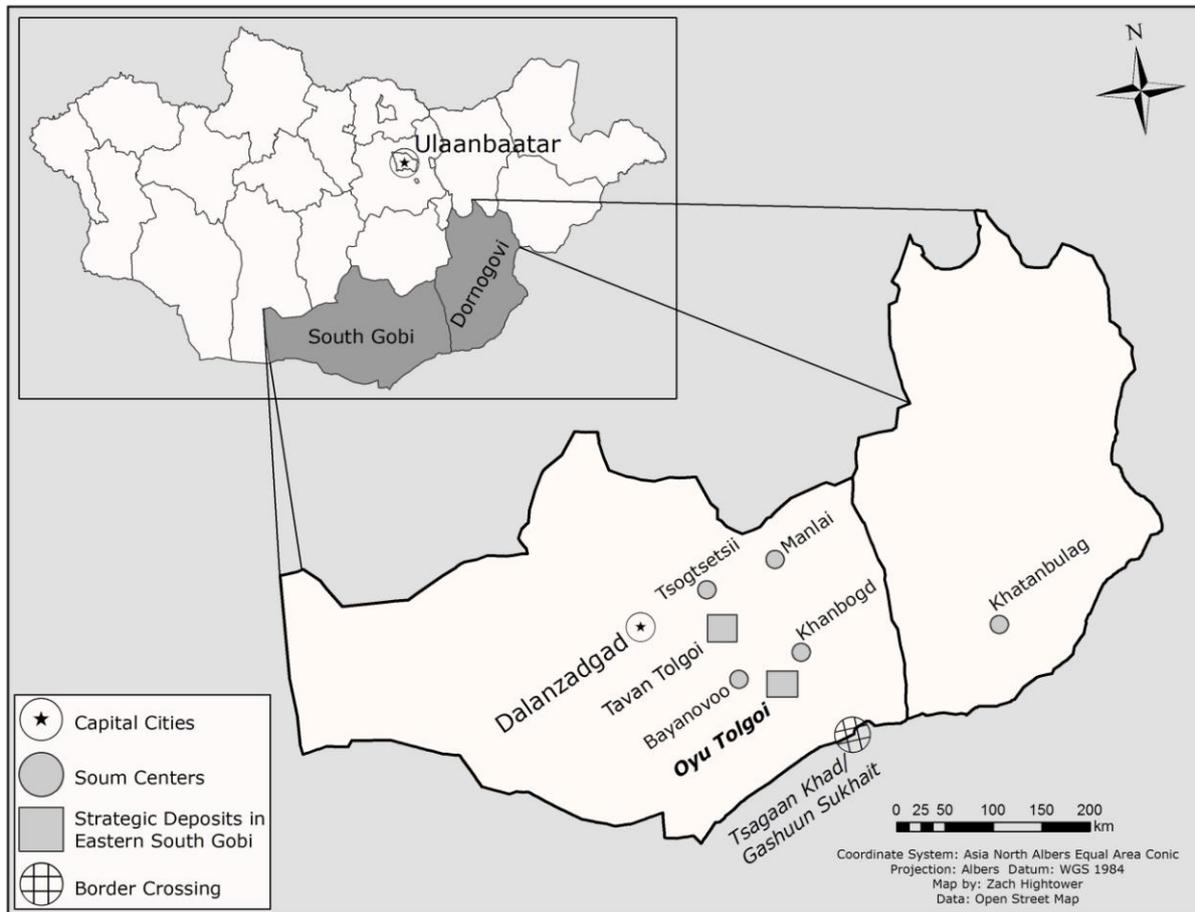
MODERN WATER AND MINING

A substantial literature establishes how water is harnessed and controlled to promote national development (Cosgrove et al., 1996; Swyngedouw, 1999, 2007; Baviskar, 2004; Desbiens, 2004a,b; Biggs, 2010; Banister, 2011; Forest and Forest, 2012; Mohamud and Verhoeven, 2016). During the 19th and 20th centuries ideologies of national improvement (Bakker, 2010), conquering nature (Kaïka, 2006) and putting unused or infertile nature to use for national goals (Caprotti and Kaïka, 2008; Gasteyer et al., 2012) motivated the transformation of waterscapes that demonstrated state legitimacy and national belonging (de Pater, 2011). Drawing on Scott's (1998) 'high modernism', scholars examine water infrastructure development as processes of "simplification, standardization, [and] homogenization" (Bakker, 2010: 40) for the material basis of economic and national development (Swyngedouw, 2004). Linton (2010) calls this 'modern water'. Separated from environmental and social contexts, modern water is abstracted materially and discursively, radically conflating the multiple

¹ A soum is the equivalent of a county in Mongolia.

meanings of water into the singular: water. Decontextualised, universalised and naturalised, all waters become the same – transformed to reproduce capital (O'Connor, 1998; Bakker, 2010). Modern water is measurable, countable and more easily put to work through water infrastructure. It alters relationships between society and the environment.

Figure 1. Map of research locations in Mongolia (Map by Zach Hightower).



Reduced to a singular meaning, water becomes subject to technical solutions, clouding power relations and depoliticising control (Swyngedouw, 2004). Bakker (2010: 33; 52) suggests that, during the 20th century, water infrastructure "represented the sinews of the nation-state", territorialising state power and emerging as "material emblems of citizenship". Similarly, Kaika (2006: 294) argues that the water network in Athens channelled the Greek state's modernisation drive. In Sudan the state discursively configured dams to symbolise a new national identity (Mohamud and Verhoeven, 2016). On the other hand, all of these expressions of modern water take place in different locations, governed by different cultural contexts, suggesting that modern water itself may be considered plural and "never modern" (see Latour, 1993).

Infrastructure projects also rescale local water resources as national, extending state power, enrolling waters and the territories through which they flow into national plans (Desbiens, 2004a,b; Alatout, 2008; Biggs, 2010; Harris and Alatout, 2010; Banister, 2011). Rescaling water resources renders them a target of national security and development policies (Alatout, 2008; Harris and Alatout, 2010). At the same time local costs of water infrastructure development are downplayed or even hidden (de Pater, 2011; Gasteyer et al., 2012).

While articulated as an unchanging source of power (Linton, 2010), Desbiens (2004a,b) argues that water infrastructure naturalises the nation, as states reference the past to articulate visions of the future (Cosgrove et al., 1996). In 19th- and 20th-century Netherlands de Pater (2011) contends that fishing village waterscapes became dual discursive targets as places in need of modernisation and as bastions of national heritage. And in 20th-century Athens modern urban water infrastructure was designed to conjure ancient Greece (Kaika, 2006). These large-scale water infrastructure projects evoke an imagined collective past, reminding citizens that modernity promises to renew the nation. However, the single-use purpose of mining infrastructure contradicts this symbolism (Barham and Coomes, 2005; Bunker and Ciccantell, 2005). McCarthy (2007: 316) argues that the structural violence associated with extractive industries, when articulated with "historical identities, emergent grievances, and other problems", delegitimises the state and extractive industries. New infrastructure is often constructed at the cost of pre-existing waterscapes, (Swyngedouw, 1999, 2007; Desbiens, 2004a,b; de Pater, 2011; Dallman et al., 2013), to varying degrees of controversy. Cosgrove et al. (1996) contend that, despite displacing several villages, the UK state received widespread support for a reservoir system that generated electricity for industry and the public. Gruffudd (1990: 172) argues that, while hydro-electricity in Wales was initially contested and subject to sabotage, it "became less controversial as electricity distribution improved in rural Wales". However, Israel's irrigation of kibbutzim became a means to claim territory by excluding Arabs (Alatout, 2008; Gasteyer et al., 2012). In Canada, First Nations have made waters publicly visible through protests and lawsuits to protect and control water resources (Desbiens, 2004a,b; Linton, 2010). The Dakota Access Pipeline (DAPL) standoff that took place at Standing Rock, North Dakota in autumn 2016 illustrates how Indigenous ontologies shape contested visions of water, nation, land and the state's obligation to protect citizens from pollution – or at least some citizens.² While Western ontologies view water as distinct from land (Howitt, 2001), claims to non-economic values supply Indigenous groups with the means to challenge infrastructure development and make claims for alternative visions of place and nation (Bebbington and Williams, 2008; Barber and Jackson, 2012; see also Dallman et al., 2013).

The literature on water governance explores how states provide the material and discursive foundations for the adoption of neoliberal policies that privatise, commercialise and commoditise water resources (see Bakker, 2010; Prudham, 2004; Swyngedouw, 2004, 2007). This reflects the "neoliberal turn in environmental governance" (Mehta et al., 2012: 198) that includes governing water resources to facilitate mining (Budds and Hinojosa, 2012; Patrick and Bharadwaj, 2016; Sosa and Zwarteveen, 2012, 2016). Meesters and Behagel (2017) have demonstrated how the discursive techniques of "social license to operate" have obfuscated this process in relation to the diversion of the Undain River away from the Oyu Tolgoi site. Weak environmental governance also plays an important role in water management strategies in Mongolia, which, on paper but not yet entirely in practice, decentralise the management of water resources to local governments and rescale resources to the river basin (Horlemann and Dombrowsky, 2012; Houdret et al., 2014).

A small but growing literature examines the institutions and mechanisms that transfer rights and resources from states and local communities to mining corporations (Bebbington et al., 2010; Budds, 2010; Budds and Hinojosa, 2012; Sosa and Zwarteveen, 2012, 2016; Patrick and Bharadwaj, 2016). As Budds and Hinojosa (2012: 120) suggest, the co-production of water and mining "configures waterscapes in distinctive ways", as governance structures facilitate mining and transform hydrologic systems. States intended modernist water projects to be permanent structures, providing long-term benefits to citizens and reflecting a timeless nation and state (Kaika, 2006; Bakker, 2010). However, mining infrastructure is rarely permanent and is generally not designed to directly benefit citizens. Similar to neoliberal policies, mining infrastructure forecloses alternative paths to development

² A proposed route north of Bismarck, ND was dropped due to concerns about the city's water quality.

(Barham and Coomes, 2005; Kaup, 2010). Bridge argues (2004: 237), "because taxes and royalty payments on mineral extraction generate revenue for national governments, the state frequently shares the economic interests of mining firms who want access to national mineral resources" and when that access depends on water, states grant water rights to mining companies over other users (Bebbington et al., 2010; Budds, 2010; Budds and Hinojosa, 2012; Sosa and Zwartveen, 2012, 2016; Patrick and Bharadwaj, 2016). Barham and Coomes (2005: 160) contend that a region and nation's "future prospects for growth" become contingent upon and propelled by infrastructure development decisions that favour mining. Populations negatively affected by mining infrastructure feel a sense of exclusion from economic development (Bebbington and Williams, 2008; Barber and Jackson, 2012; Vela-Almeida et al., 2016) and nation-building, as rights to land and water diminish. As I will discuss, a sense of corruption compounds these feelings in Khanbogd.

In Mongolia, state actors, including Parliament and the Ministry of Environment and Green Development (MEGD), facilitated Oyu Tolgoi's access to water resources, but local groups resist infrastructure development and studies on the hydrosocial cycle remain extremely limited (see Hawkins and Seager, 2010; Horlemann and Dombrowsky, 2012; Houdret et al., 2014; Meesters and Behagel, 2017). While the company insists their infrastructure will not damage local hydrology and that mitigation procedures are established, residents express ongoing concerns that mining activities deplete local water resources. Those who challenge mining often draw on pre-existing waterscapes to articulate their contestations. The extent to which local objections to Oyu Tolgoi's water infrastructure have the power to transform mining remains unknown. The affected populations' discursive rescaling of resources from local to national highlights the salience of the nation despite weak environmental governance by various state actors and the active role Oyu Tolgoi plays in managing regional water resources.

WATER SCARCITY, CLIMATE CHANGE AND RURAL WATER INFRASTRUCTURE

The relative non-abundance and variability of water and Mongolia's socialist and post-socialist rural water infrastructure contextualise disagreements about Oyu Tolgoi's water infrastructure. Khanbogd soum, where Oyu Tolgoi is located, is the hottest soum in Mongolia and receives relatively little snow and rainfall year-round. During the summer temperatures range from high 20s °C to low 30s °C. Compared to other regions of Mongolia, Khanbogd's winters are relatively mild with lows averaging in the negative teens and -20s °C. Precipitation mostly falls from May to September but varies annually from below 80 mm to over 170 mm. Dust storms are frequent, particularly in the spring. Ephemeral rivers (*zadgai*) flow during rainy months in late summer and early autumn, while several springs provide nearly year-round surface water. The most dramatic vegetation in the area are the Siberian elm trees (*hailaas*), which tap underground water sources in drainage basins and ephemeral streams.³ These factors shape the limited range of economic activities and wildlife that coexist in the area.

Climate change is a concern throughout Mongolia, and scholars have identified it as an explanation for decreasing water levels and a general sense of unease about water access (Marin, 2010; Upton, 2009). Fernández-Giménez (2000: 1421) found that herders sometimes attribute climate-induced vegetation changes to "an aging earth". Scientific findings, including surface water declines and changing plant composition of the grasslands, confirm herders' concerns about water levels and vegetation as water seepage depths in grasslands decrease (Bruegger et al., 2014).⁴ Infrequent rain

³ Hailaas trees provide long-term data on climate change, but, according to a dendrochronologist familiar with the region, it is too early to tell if mining will affect the trees (personal communication 2012).

⁴ Healthy grasslands have average water seepage depths at about 170cm, but in overgrazed areas seepage is shallower at about 120 cm, which leads to increased water runoff and soil degradation (Baasandorj, 2012).

events, which are cold, fast and hard, as opposed to gentle, warm showers, compound the perceived effects of overgrazing (Marin, 2010).

Many research participants attributed drying water reserves to climate change, but most suggested mining activities put added pressure on water resources. Particularly in Khanbogd, herders and other residents argue that mining and nomadic herding cannot coexist because of the demands for water resources and the effects of dust on the pasture (Jackson, 2015b), making drought an ongoing concern. While there is some debate about the effects of climate change in the Gobi Desert and expanding desertification (Sternberg et al., 2015), nearly every single South Gobi resident interviewed had observed decreased precipitation and drying surface water resources. Herders talked about rain becoming less frequent, contributing to drying surface and ground water resources. As one herder explained, their well used to be able to water 200 camels, but in 2012 he reported it could only sustain 20 camels. Provincial and soum officials said the government is concerned about drying wells and increased desertification throughout the South Gobi region (interviews 2012).

Unpredictable water resources parallel an unpredictable state and economy since the transition to capitalism in the 1990s with rapid destabilisation of centralised social and economic institutions, such as herding collectives (Rossabi, 2005; Bruun, 2006; Pedersen, 2011). Most of the research on water near Oyu Tolgoi has been conducted by the company and to a lesser extent by the World Bank and Mongolian government with few exceptions of publicly available independent research.⁵ Numerous audits (ERM, 2013) and stakeholder mediation reports (IFC/CAO, 2014; JSL Consulting, 2017) demonstrate that Oyu Tolgoi has not mitigated the impacts of its water infrastructure to ensure sustainable water resources for livestock and wildlife. While local residents, particularly nomadic herders, acknowledge that climate change affects water quantities in their wells, springs and ephemeral rivers, independent reports reflect concerns that mining places increased pressure on water resources. Oyu Tolgoi contends their technologies mitigate long-term impacts while the legal environment facilitates directing water towards large-scale mining development. The next section discusses how Mongolia's socialist state had very different attitudes towards water allocation.

THE MODERNISED AND DEGRADED 20TH-CENTURY RURAL WATERSCAPE

The increasing withdrawal of the state and growing role of the private sector due to neoliberal reforms must be contextualised within political and economic changes Mongolia experienced in the late 20th century. Throughout most of the 20th century the Mongolian state aimed to build a socialist nation through infrastructure development and industrialisation.⁶ Expanding pasture was central to Mongolia's national development plans from the socialist revolution in 1921 until the democratic, and ultimately capitalist, transition in the early 1990s. While initial collectivisation attempts failed in the 1930s in part because herders refused to give all of their livestock to the state, the second attempt was more successful. By 1959 herding collectives (*negdel*) had integrated all of Mongolia's herders into a centralised system that permitted herders to keep some livestock for personal use⁷ (Bruun, 2006; Upton, 2009, 2010).

During the socialist era the state is estimated to have built over 40,000 "shallow hand wells, semi-mechanical and deep mechanical wells" throughout Mongolia, opening new areas to livestock herding and facilitating "the rationalization, management and intensification of pastoral production" (Upton,

⁵ Exceptions include Meesters and Behagel (2017) and an MA thesis by Enkhmend Myagmarsuren (2016).

⁶ Building wells to expand state power through pasture has a long history. *The Secret History* describes how Chinggis Khan's son, Ogodei Khan, announced that his third decree was "to have wells dug in places without water and to bring [the water] forth, I provided the people [of] the nation with a sufficiency of water and grass" (Onon, 2001: 277).

⁷ Herders cared for small family herds (around 50 animals) and the collective herds (see Bruun, 2006).

2009: 79). The state upgraded water infrastructure to improve livestock husbandry, contributing to the Mongolian national economy through domestic food production and exports to COMECON states (Dupuy, 1970). Although nomadic herders are often romanticised as timeless and without technological modernisation (Tavares and Brosseau, 2006), the Soviet-influenced pasture expansion demonstrates how nomadic herders were integrated into high-modernist visions (Rupen, 1979; Sneath, 2003a; Bruun, 2006). Together with winter shelter construction, the building of wells regulated herders' mobility while increasing livestock production and reducing overgrazing (Upton, 2009).

Well building also signified control over the environment, making the desert more fertile. In Baasan's (1990/2010) book on Gobi geography, the following passage describes the Zag-Sujiin desert in Bayanovoo soum, located west of Khanbogd.

A long time ago large intestine worms,⁸ Przewalski's wonder geckos and so-called yeti, considered a savage family of animals that do not exist, lived in this waterless, desolate place. During the socialist era wells were created and animal families settled so that they could take advantage of resources throughout the pasture. (Baasan, 1990/2010: 184; my translation)

Baasan suggests supernatural creatures gave way to *ail am'tan* (livestock families) as wells were drilled across the desert. Domesticating and modernising the Gobi through wells reflects Pedersen's (2011) and Humphrey's (2005) contention that, by design, Soviet-era infrastructure controlled people to increase state power. Kaplonski (2004: 9) argues that the socialist regime developed national narratives and public spaces to support and legitimise the "right to rule".⁹ As water resources became more visible to Gobi residents so did state power and national belonging.

During the 1960s the Mongolian Water Economy Ministry produced 'pasture-capability maps', using hydrological surveys conducted by state, Soviet and Eastern European scientists (Dupuy, 1970: 15). The 1961 to 1966 five-year plan included the improvement of 'spring-fed pools' and 994 new wells. By 1970, 8,500 more well sites were to be constructed, 6,000 wells were slated for repairs and 600 springs were to be dammed. The national plan was to make water available for around 121.4 million ha of pasture nationwide (ibid: 15-16).

Extending the pasture was particularly critical in Gobi provinces where surface waters are scarce and residents depend on shallow and deep wells for domestic and livestock use. By the late 1960s 60% of Mongolia's Gobi pasture had water access and Hungarian geological surveys had revealed aquifers with fresh water (Dupuy, 1970). A former Khanbogd resident and socialist-era provincial government official said that in the 1970s building new wells was a state imperative with little concern about water levels, which at the time did not appear to be decreasing (interview, 2012). Because water availability determines herd size and migration patterns, wells were integral to the productivity and strength of the Mongolian state.

However, increasing the number of wells had negative effects on surface waters. Two elderly herders described how springs that cured diseases disappeared after the state established the soum centre and built more wells.¹⁰ Although one of the herders was concerned that mining drains her well, she was quick to point out that the 1960s wells had nothing to do with mining. The expansion of state power through the negdels and soum centres changed local hydrologic systems, and, combined with the impact of climate change, this is problematic for the claim that mining directly affects water resources. The herder suggests that socialist-era changes to local hydrologic systems did not threaten

⁸ Known as death worms in English.

⁹ Although, as Kaplonski (2004) argues, there is always resistance to these kinds of state and nation-making projects, this paper is unable to address how water resources during the socialist era were sites of contestation.

¹⁰ The former provincial officer quoted above also said that a river used to run near the soum centre but that it now runs dry and the river's desiccation had nothing to do with mining.

the sustainability of nomadic herding¹¹ and that local residents are familiar with the potential impact that infrastructure and increases in livestock populations have on water resources.

After the 1990 revolution the national well system declined. When neoliberal reforms swept across the country the loss of technological advancements throughout Mongolian society severely affected rural waterscapes (Sneath, 2003a,b; Bruun, 2006; Upton, 2009). In 1992 decollectivisation included the privatisation of livestock, vehicles, farming equipment and most other forms of state property. While water was not privatised, equipment such as pumps became private property – and some were stolen (Upton, 2009). During the collective era caretakers were appointed to maintain the wells, but, along with so many other state institutions, funding for them disappeared. By the early 2000s an estimated 40% of Mongolia's 48,000 wells had been abandoned (Upton, 2009: 80, cf. UNEP, 2002). Upton (2009) argues that privatisation debates have focused on land ownership, with little attention paid to water (see Fernández-Giménez and Batbuyan, 2004). At the national scale, water management institutions entered a period of relative chaos, leading to the weakened environmental governance seen today (Horlemann and Dombrowsky, 2012; Houdret et al., 2014). While common access to wells is written into post-socialist legislation, water access is a growing challenge for many rural Mongolians. Despite devolving water rights to herder groups, the development of community management plans in collaboration with NGOs and international institutions such as the World Bank, and the establishment of river basin councils (in law if not in practice), they have not been able to make up "for the failings of neoliberal or state-centred solutions to water scarcity" in South Gobi (Upton, 2009: 96; also Horlemann and Dombrowsky, 2012; Houdret et al., 2014).

A provincial environmental official stated in 2012 that mining would cause the region to run out of water in the next decade. When I asked herders and residents whom they would contact if they had complaints about water issues, many in Khanbogd said Oyu Tolgoi rather than the government. In Khanbogd the management of water resources for herding and mining was once the domain of the government but is now becoming that of a non-state actor, Oyu Tolgoi. While extending the pasture through wells was a socialist-era, state-driven activity, as mining becomes the focus of Khanbogd's and Mongolia's economic activities, private interests drive development and resource governance.

Two Oyu Tolgoi projects illustrate how weak environmental governance coupled with the privatisation of water infrastructure transforms relationships between local environments, people and the state: the Gunii Hooloi aquifer pipeline and the Undain River diversion. As we will see, the transfer of power from state to private interests – rather than to local governance as outlined in the water laws (Horlemann and Dombrowsky, 2012; Houdret et al., 2014) – elicits frustration from local residents and government officials, who challenge the legality of the infrastructure that symbolically and materially excludes them from their landscape and culture.

THE GUNII HOOLOI AQUIFER PIPELINE CONTROVERSY

To supply industrial-grade water, Oyu Tolgoi constructed a system of pipelines, boreholes and water pump stations to tap the Gunii Hooloi aquifer, which lies northwest of the mine site.¹² Located beneath

¹¹ We did not discuss changes in herd size or human population growth during the socialist era, which would also affect water use and access.

¹² To mine copper and gold Oyu Tolgoi requires water for domestic uses, to operate machinery and to concentrate mineral ores. Concentrate is a value-added product, which can be transported more efficiently than raw ores to market at the Chinese border. To concentrate copper and gold the ore is crushed and then mixed with water and other chemicals to create a mud slurry. The slurry is fed into flotation circuits that separate the gold and copper from waste material. In the dry tailings ponds, water pools at the top and is recycled. The dry tailings contain 70% solids. Water locked within the tailings comprises the company's main water loss. Overall, Oyu Tolgoi claims that their water system recycles 80% of the total water used to operate the mine.

camel pasture with only a few herder wells, there are no surface discharge points, such as springs or rivers. The Environmental Social Impact Assessment (ESIA) claimed that Gunii Hooloi *may* connect with the more ecologically sensitive Galbyn Gobi aquifer (Oyu Tolgoi, 2012, B6: 54) and that a clay layer (aquiclude) separates the deep aquifer (100-500 metres) from shallower herder wells (5-50 metres). However, the company has since retracted these claims, as several independent reports have highlighted a lack of data (ERM, 2013; JSL Consulting Ltd.; 2017). Nomadic herders have some access to water at pumping stations from troughs built for livestock. According to many local residents, Oyu Tolgoi describes Gunii Hooloi as a subterranean sea with no connection to shallower herder wells.

Although Oyu Tolgoi claims to recycle 80% of water drained from Gunii Hooloi and promises to supply water to local populations, the pipeline construction was controversial. First, Mongolia's Water Laws, implemented before and during the construction phase of Oyu Tolgoi, facilitated water access and use rights for mining, but local residents and government officials never granted full permission. As I explain below, however, the scale of the project determines whose permission is needed.¹³ Second, many local residents distrust Oyu Tolgoi's management of water resources and believe that draining the Gobi is the cost not only of the pipeline but also of national development.

Changing the legal environment to redirect water resources

While Oyu Tolgoi is economically worthless without the pipeline, the pipeline is worthless without institutional changes that facilitate water use rights. The Mongolian parliament and president facilitated Oyu Tolgoi's access and use rights to Gunii Hooloi through the Minerals Laws, the Water Laws and the 2009 investment agreement. Because Oyu Tolgoi is classified as a strategic deposit¹⁴ it has been able to secure water access for 30 years and can extend water use rights for periods of 20 years. Other users can secure access for only 20 years and must renew every five years.¹⁵ While strategic deposits refer to minerals, the category rescales Gunii Hooloi as a target of national interest, as water rights become a major source of economic development. Although Soviet scientists investigated other water resources, the state considers Gunii Hooloi self-discovered because Oyu Tolgoi funded its exploration. According to the investment agreement, only Oyu Tolgoi has the right to access and use self-discovered resources at quantities sufficient to meet the "project's operational requirements" at the state-approved volume, which is 870 litres per second (Oyu Tolgoi, 2009 6.13.1).¹⁶

According to the Water Laws that applied at the time of construction, and the majority of the research conducted for this paper, if Oyu Tolgoi were to make future water discoveries in excess of project requirements, the state may sell access to those resources to other economic entities, allowing the state to collect more fees without new investments. This channels water rights from a shared resource to mining interests, transforming water from place-specific, culturally and ecologically defined flows into abstract economic goods. The state reconstructs resource access and value using a matrix that determines water rights depending on profitability, providing another example of the erosion of Mongolia's customs of obligation and reciprocity (see Buyandelgeriyn, 2008; Pedersen, 2011).

While Oyu Tolgoi has the right to build and own water infrastructure, such as pipelines, boreholes and water treatment facilities, water remains public property and land possession does not equal water rights (Mongol Ulsiin Ikh Khural, 2004: 23.3). Oyu Tolgoi must pay fees to the state and share water

¹³ New Water Laws were implemented in 2013. However, this paper focuses on laws that were in place during the negotiation and infrastructure development phases, coinciding with the majority of research conducted for this paper.

¹⁴ A strategic deposit is any mine that can produce 5% or greater equivalent of Mongolia's GDP per year.

¹⁵ The agreement terms for Oyu Tolgoi's water access set a precedent for other large-scale mines in Mongolia with terms similar to large-scale mines elsewhere. See Budds and Hinojosa, 2012; Sosa and Zwartveen, 2012.

¹⁶ In early 2013 President Elbegdorj made public new draft Minerals Laws that included water resources as strategic deposits, but parliament never ratified the laws.

resources with local populations, but, in the investment agreement, water use fees are tax deductible (Oyu Tolgoi, 2009 6.14). A clause in the Water Law states that water users who fund exploration activities, ensure higher standards and use "environmentally friendly technology shall be rewarded" (Mongol Ulsiin Ikh Khural, 2004: 35.1.4). A reward for finding water resources, the tax-deductible fees subsidise mining. Rather than reinvesting fees in rural water infrastructure, the state requires the company to provide public access, devolving public water management to a corporation.

Water governance, according to law, should be decentralised (Horlemann and Dombrowsky, 2012; Houdret et al., 2014), providing local governing bodies some measure of authority over water resource management but with little effect on decision-making over the pipeline. Citizen representatives manage budgets and the soum governor may "terminate water utilization for industrial purposes" and prohibit water usage during shortages (Mongol Ulsiin Ikh Khural, 2004: 16.1.2). Applications for water use are made to soum governors and contracts for water use must include their decisions. At the time of construction, the central Water Authority made decisions when a water user requested more than 100 cubic metres per day (100,000 litres). This is how Oyu Tolgoi was granted water rights directly, circumventing local decision-making processes. Larger industrial projects require approval from MEGD, overriding local objections, rescaling local water resources as national and prioritising corporate over local interests. A representative from the Water Committee contended that it was Oyu Tolgoi's responsibility to monitor water resources and report any concerns to local government authorities. If the local government authorities cannot come to a compromise with the company, then they must report the issue to MEGD (interview, 2012). The 2004 and 2012 Water Laws give more authority to river basin councils to manage local water resources. However, as Houdret et al. (2014) contend, Mongolian institutions at all scales lack not only funding but also the human resources and technical capacity to monitor and control environmental impacts on water resources – a situation compounded by corruption, demonstrating a weak capacity for environmental governance. Further, as was the case during infrastructure development and construction, there was no river basin council in South Gobi Province.¹⁷ A Tripartite Council was established in 2015 to generate more dialogue and resolve disagreements between the company, soum government and herders, but that was well after the pipeline became operational.

As construction continued many residents and NGOs argued that Oyu Tolgoi did not have local permission to construct the pipeline. A citizens' representative contended that the local *khural*¹⁸ banned the use of land for the pipeline. He and three others advocated for local rights and protested against the pipeline at meetings with company officials. They said, "they can run their mine however they like; they can mine the gold and copper, but we didn't want them to use our water. Get their water from somewhere else".¹⁹ The leader also criticised the company for bringing in "government officials to show their political power" to force them to agree. After a gruelling 16-hour meeting with no resolution, the company later gained approval from the MEGD (interview, 2012). A worker for a contractor with Oyu Tolgoi contended that parliament members were responsible for the decision. The soum governor is "always driven by powerful political people" (interview, 2011). Both the citizens' representative and the worker argued that local opinions did not matter and the central government ignored local opposition. Confusion regarding the legality of the pipeline also implies a lack of consultation.

The story has an additional twist. In autumn 2011 a herder took me to see the pipeline construction. He said that Oyu Tolgoi had begun digging the pipeline the previous February but had not received

¹⁷ For more on the political and scalar challenges to implementing the river basin councils, see Houdret et al., 2014.

¹⁸ Governing council or committee.

¹⁹ This is similar to responses in the 2007 Center for Policy Research report conducted for Oyu Tolgoi on local perceptions of water use for mining.

permission until May, meaning the company had been digging without permission between February and May 2011. When the soum governor did not agree to the work, the central government sent someone who was not from South Gobi to represent the local government. This representative subsequently signed off on the pipeline on behalf of the soum. According to the herder, even by autumn 2011 the soum governor had refused to grant permission. I was told in an interview with a resident who worked with one of Oyu Tolgoi's construction contractors that the person sent to sign off on the pipeline has a company that was awarded a construction contract in the area. When the herder took me to a water collection station in autumn 2011 he said the station had local permission but that not all of the stations had received permission despite the construction underway. He and many other local residents expressed frustration that they could not participate in negotiation processes.²⁰ State institutions facilitated pipeline construction by trumping the public right to decide how water resources are managed, privileging mining over local, culturally embedded water use practices.

Fears of a drained Gobi

Contestations over the pipeline are not only due to the failure of the MEGD and Oyu Tolgoi to secure local permission. Local residents are concerned that the Gunii Hooloi pipeline will drain the Gobi dry, rendering it uninhabitable for future generations. By law and the investment agreement, Oyu Tolgoi must share water resources with the public. Its staff decide whether water levels have changed, according to their own baseline research, public documents and monitoring within the company's self-delineated mining-affected areas. Although the MEGD monitors South Gobi province's water levels, including some of Oyu Tolgoi's boreholes, the language in the investment agreement suggests that it is up to Oyu Tolgoi to decide whether or not mining operations are affecting local water levels. This contradicts the Water Law (Mongol Ulsiin Ikh Khural, 2004: 32.2), which states that South Gobi's governor, in collaboration with the MEGD,²¹ determines yearly drought and desertification conditions.

Local residents remain sceptical of Oyu Tolgoi's information and previous claims that Gunii Hooloi does not connect with the shallower groundwater supplies upon which herders depend – a belief that the company acknowledges. At the time of research nearly all residents and former residents stated they had experienced or heard about decreased water levels in wells.²² While Oyu Tolgoi tells residents throughout the region that their well water levels are stable, the majority of herders interviewed said that they must water fewer animals at a time, rotate which days they bring animals to wells and/or decrease herd sizes. The citizen's representative, who has benefited from a Gunii Hooloi water station, describes Oyu Tolgoi's attitude towards herders as patronising. When Oyu Tolgoi stated on television that the difficulties are due to the wells being old and filled with sand the representative became angry. He said,

²⁰ This timeline between permission and construction is also evident in the comprehensive Environmental Social Impact Assessment (ESIA) that the International Financial Corporation (IFC) and the European Bank of Reconstruction and Development (EBRD) required Oyu Tolgoi to produce for a loan package. Although construction for the pipeline was nearing completion when Oyu Tolgoi released the ESIA for public comment in late 2012, the document consistently portrays the project as though construction had not yet begun. For example, chapter D7 states "This Water Resources Construction Management Plan is designed to ensure the protection of water resources in the areas surrounding the Oyu Tolgoi Project during the Construction Phases of the Project" (Oyu Tolgoi, 2012: 2; my emphasis).

²¹ Throughout Mongolian laws, the Ministry of Environment and Green Development is not mentioned specifically as the government agency in charge – only an administrative body responsible for the management of the environment (*baigal орчни асуудал эрхэлсэн турин захиргаанii түв баигууллага*). See the flow charts in Horlemann and Dombrowsky (2012) and Houdret et al. (2014) for more on the structure of water governance in Mongolia since the 1990s.

²² This was the case not only in Khanbogd but also in surrounding soums where mining is occurring (Tsogtsetsii and Khatanbulag) and where there was no mining at the time of interviews (Bayanovoo and Manlai). According to a study conducted by JSL Consulting (2017), at the request of the Khanbogd soum tripartite council and the IFC, Oyu Tolgoi's lack of baseline data makes it impossible either to prove or disprove herder claims about decreased well water levels.

We Mongolians know and are educated well enough to have maintained many wells in our nomadic lifestyle for centuries and we clean that silt from erosion. We are not so stupid that we would destroy our wells by ourselves and try to blame it on others (...) We know how to take care of wells. We've been doing this forever. So, when Oyu Tolgoi shows up there's no way that we stopped knowing how to maintain our wells, right? (interview, 2012)

He rescales the herders' water infrastructure as part of Mongolia's history and landscape that defines alternative national visions, reasserting local relationships to water. Although scholars argue that nomadic herders have experienced a degree of technological loss from the pre-socialist and socialist eras (Sneath, 2002, 2003a,b, 2010; Bruun, 2006; Upton, 2009), he links Mongolian identity to nomadic herders' ability to maintain wells.

According to local residents and NGOs, the sudden loss of water in a few years suggests that well disrepair alone cannot account for decreased water levels. While Oyu Tolgoi recycles water, Sosa and Zwarteveen (2012) argue that company discourses asserting limited net losses obscure varied effects on hydrological systems. In interviews with Oyu Tolgoi staff, and in company documents, they largely deny any major changes in water levels that could affect local livelihoods. By downplaying herders' perceptions Oyu Tolgoi demonstrates a lack of interest in how local residents understand and value water resources, contributing to distrust and threatening the company's legitimacy (see also Meesters and Behagel, 2017).

While local residents see benefits from mining, including electricity, employment and a regular salary, they perceive local water depletion due to the pipeline as a major barrier to the region's future. A retired soum official said, "we will be a casualty of the Mongolian economy". He continued,

It is necessary for the development of Mongolia, the Gobi region and the improvement of peoples' lives. But if they use the underground pipeline water, our lives will be severely affected. That is why Mongolians have to re-negotiate water issues (interview, 2012).

He conveys a paradox discussed throughout Mongolia: the desire for development coupled with a desire to conserve natural resources for future generations. He rescales Gunii Hooloi as a national issue concerning the fate of several thousand long-term Khanbogd residents. Similarly, a provincial environmental official argued that, while herders would like to see Oyu Tolgoi shut down, the country must remain united. He pointed out that, "we are located between two big nations and there are things that we need to think about to keep Mongolia independent", including locating new water resources for mining (interview, 2012). He argues Gunii Hooloi is a national and geopolitical issue. Yet, as a consultant for Oyu Tolgoi's Cultural Heritage Programme suggested, "I don't know how they're going to mitigate the environmental impacts so that you can still be a camel herder and that's sustainable" (interview, 2013). These environmental impacts include altering the course of one of the region's most culturally significant rivers – the Undain.

THE UNDAIN RIVER DIVERSION CONTROVERSY

The Undain River begins northwest of the mine and runs south through Oyu Tolgoi's mining lease, including through the open pit. It is an ephemeral river that only flows above ground during heavy rains. The Undain's underground flows are accessed by shallow herder wells,²³ and feed smaller ephemeral streams, a hailaas forest and the sacred Bor Ovoo Spring. The river, forest and spring have historical and cultural significance. The spring was an almost year-round water source and a site of

²³ In spring 2013 one Mongolian NGO leader asked herders to make a list of wells located along the Undain. When she asked them about water levels only 3 out of 53 wells had sufficient water. Of the remaining 50 there were 27 without water and 23 with low or decreasing levels (personal communication, 2013).

Naadam (national sports festival) events. However, local residents said that the river had been cut and partially fenced off, which is why the Bor Ovoo Spring was dry in 2011 and 2012.

Despite concerns about the long-term environmental and cultural effects of the river diversion, Oyu Tolgoi cannot mine the open pit without diverting the Undain's surface and subsurface flows. The waste rock piles also cut across the river's course, but, according to an independent expert, there was not enough space within the mining licence area to relocate the waste rock (personal communication, 2013). In late 2012 the company began construction of an underground pipe to channel the water away from the mine. According to Oyu Tolgoi's construction phase ESIA, the impact of the diversion includes water loss through evaporation, sedimentation and downstream erosion, which affects aquifer recharge and "could impact the sustainability of local springs and herder wells as well as impacting local fauna and groundwater dependent flora" (Oyu Tolgoi, 2012: C5: 70).²⁴

To avoid increased evaporation Oyu Tolgoi installed a subsurface pipe, which a company official reassured me is sufficient to manage 1000-year flood conditions (interview, 2011). According to the ESIA, the pipeline would cause 6.2 kilometres of the Undain to become dry, and Oyu Tolgoi is uncertain whether the diversion will have a long-term impact on downstream groundwater resources and vegetation (Oyu Tolgoi, 2012: B6 and C5; see also ERM, 2013). The JSL Consulting (2017) report notes that there is insufficient data about pre-diversion flows to determine the effects on downstream flows. The pipeline also diverts water to a re-created Bor Ovoo Spring at the confluence of the Undain and Khuren Tolgoi rivers, around 500 metres south of the mining lease area.²⁵

According to Oyu Tolgoi, the goal of diverting the river and reconstructing the spring for all downstream wells and springs was "to have at least the same level of reliability as currently exists" (Oyu Tolgoi, 2012: C5: 22). To maintain community relations the company builds infrastructure that it argues will allow nomadic herding to continue in the area and facilitate wildlife conservation, including rebuilding Bor Ovoo Spring right outside the mine licence. By stating that the impact on downstream wells will be minimal Oyu Tolgoi claims to align mining with pre-existing cultural landscapes. The company asserts that their efforts ensure the sustainability of nomadic herding lifestyles, despite nomadic herders and independent reports suggesting otherwise (ERM, 2013; JSL, 2017). Using a technical solution, Oyu Tolgoi replaced a site of significant historical, cultural and ecological significance, physically and emotionally decontextualising water from local values attached to place. By rebuilding the spring, the company imposed a Western ontological split between water and land that assumes economic value outweighs non-economic relationships to the waterscape.

As discussed above, the parliament and MEGD facilitated the redirection of water (as well as the nation) through institutional changes and corrupt practices that granted mining companies the right to divert rivers – but not without some revisions. According to the Water Laws at the time of construction, mining operations cannot damage riverbanks and channels (Mongol Ulsiin Ikh Khural, 2004: 25.1) and special protected zones extend around water resources where activities such as mining are banned (ibid: 31.2).²⁶ However, companies can apply to the MEGD to divert rivers (ibid: 31.7). The Mongolian government undertook measures to protect water resources in summer 2009, when the parliament

²⁴ Including the Galbyn Gobi aquifer that runs beneath the river's subterranean flows.

²⁵ In winter 2013 a Rio Tinto community development staff member said Bor Ovoo was flowing without any issues. However, a local NGO leader reported that in spring 2014 Bor Ovoo was dry. According to an independent reclamation expert, due to lack of attention to underground geological formations the rebuilt Bor Ovoo spring may be draining into the soil rather than pooling at the surface as it did in its original location (personal communications, 2013, 2014). Water was pooling at the site in 2015. For more specifics see Meesters and Behagel (2017).

²⁶ The sanitary zone is 100 metres and the 'ordinary' zone is 200 metres. Special Protected Areas are also organised around water resources.

passed the Long-Named Law.²⁷ This attempt to address growing national concerns over the environmental degradation caused by mining²⁸ demonstrated a certain responsiveness on the part of the parliament.

Oyu Tolgoi is exempt from the Long-Named Law because it is a strategic deposit. Without the classification Oyu Tolgoi would be prohibited from mining the open pit because of the Undain River and the hailaas forest it feeds. The strategic deposit classification institutionalises the rights of Mongolia's largest mines to transform waterscapes over the rights of smaller mines and the objections of local populations. Similar to the laws that facilitated Oyu Tolgoi's access to Gunii Hooloi, the exemption from the Long-Named Law rescales the Undain as a national water resource and renders the river abstract in a national cost-benefit analysis. Simultaneously, the cultural significance of the river and the forest it feeds are potentially irrevocably lost.

Local residents perceive the river flows beyond abstract measurements of volume and speed, as the Undain carries many cultural meanings. These are not addressed in Oyu Tolgoi's ESIA and are only briefly mentioned in the company's Cultural Heritage Program design document (Gunchinsuren et al., 2011). According to one of the consultants, they were discouraged from asking local residents about the river (interview, 2013). Yet it is precisely these historical and cultural meanings that reveal how mining threatens pre-existing waterscapes.

According to residents, the river is not only an economic good that feeds wells throughout the area but also a source of national strength based on an ethos of environmental protection. In an interview an elderly herder explained the cultural significance of the Undain River, which she tied to controversies over the diversion plans:

Oyu Tolgoi is planning to divert the river and have it flow to the Gobi. But it will disappear. Then thousands of hailaas trees are at risk of extinction. A long time ago the river had flowing water. In the past mercenaries were fighting enemies and returned to their country by crossing the Gobi (...) The Gobi was stretched out. They and their horses were tired and thirsty. They saw the Undain River and it quenched the soldiers' and horses' thirst. There was a huge ovoos²⁹ on the steppe in the south of Javkhlant bagh and it still is there (...) Each soldier brought a rock and put it on the steppe, building the ovoos (...) The soldiers went back to the government and told them that there was this big river that quenched their thirst, saving many lives. The government had a worshipping ceremony performed for the river every year and offered silver yembuu [bullion] to the river. Once a messenger was greedy and took the silver. He did not offer the yembuu to the river. Then the river water disappeared and stopped flowing (interview, 2012).

This story weaves together Mongolia's imperial past, national values of environmental conservation and the struggle to protect the river from mining. Similar to other regional stories she describes the spiritual and political interconnections between rocks, minerals and water. Although she does not specifically mention the river as sacred or inhabited by water spirits (*lus*), the contrast between respect and greed in the story illustrates an erosion of the national ethos.³⁰

In Oyu Tolgoi's Cultural Heritage Program (Gunchinsuren et al., 2011) the Undain is mentioned in reference to hideaways used by traders, mercenaries and guards who were charged with preventing

²⁷ The Law to Prohibit Mineral Exploration and Mining Operations at Headwaters of Rivers, Protected Zones of Water Reservoirs and Forested Areas. The law was a response to actions taken in the late 1990s when the state granted mining exploration and exploitation licences without taking into account watersheds, forests or other sensitive ecosystems (Murray, 2003; UN, 2006).

²⁸ Byambajav (2010), Sneath (2010) and Upton (2012) point to the Onggi River Movement, which instigated national debate and institutional changes to protect water resources and whose leaders have sought to protect the Long-Named Law.

²⁹ Ovoos are stone cairns placed at mountain passes and other sacred sites where offerings are made.

³⁰ The story also explains the name of the river. *Undah* means to drink and *undaa* is a beverage. *Undain Gol* translates as *Drinking River*.

the Chinese from polluting the river. These stories rescale the Undain as part of the national waterscape, tying the river to national values of protecting nature and a long history of trade with and animosity towards China. They also challenge the abstraction of water into an economic necessity while reframing it within local contexts, making waters more visible not only to domestic but also international actors.

Similar to the Gunii Hooloi aquifer construction, local residents argue that the company began diverting the Undain without local permission. In 2012 the diversion began, but in 2015 the soum governor said he had not yet signed off on the diversion or the rebuilding of Bor Ovoo spring even though both projects were complete (interview, 2015). Gobi Soil, a local NGO working with the Ulaanbaatar-based NGO OT Watch, submitted a complaint to the International Finance Corporation (IFC) and the Multilateral and Investment Guarantee Agency (MIGA) Compliance Advisor and Ombudsman (CAO) on behalf of the herders. During the mediation process the CAO identified sources of complaints and stakeholders' shared interests. The CAO coordinates to resolve the complaints, which could alter how Oyu Tolgoi manages water resources and how the state facilitates mining interests by overriding local claims to the nation's nature.³¹

The NGOs first filed the complaint about the Undain diversion in October 2012, before construction began, with a second complaint filed in February 2013 after construction had begun. The 2013 complaint details how the nomadic herders living near the Undain are concerned that the diversion will blight the surrounding pasture and may result in over 20 families losing their livelihoods. They cite the Undain's significance, stating that, "we local herders worship, love and protect the river as sacred because the river saved the lives of Chingis Khan's soldiers with its waters" (Gobi Soil, 2013: 2). The herders also claimed that they had not been "properly informed or consulted about [Oyu Tolgoi's] activities or any potential negative impact" during the exploration stage that began in 2002 or the construction phase that began in 2006 and that no one had protected their interests (Gobi Soil, 2013: 3). The complaint captures many claims, including re-scaling the river as national, the reconfiguration of state laws and institutions to promote the interests of corporations and abstracting water from other contexts. However, rather than evoking the past as a means to articulate a modern future, herders use it to assert a pre-existing vision that values the conservation of resources.

The diversion of the main river channel was completed, but controversy remained.³² According to several NGO leaders, springs downstream from the river have dried out and herder wells have reduced water levels or are dried out completely (personal communications, 2013, 2014) – a situation that I also found when speaking to herders near the Undain in 2015. A Gobi-based NGO leader suggested the IFC had done nothing to improve the situation and the herders do not believe that the complaint will bring any positive changes (personal communication, 2014). Local actors experienced frustration, disempowerment and distrust of the mining company (Meesters and Behagel, 2017). They also expressed a lack of trust in state and international institutions, as corporate interests appeared to dominate national development efforts at multiple scales.

CONCLUSION

The Gunii Hooloi aquifer pipeline and the Undain River diversion demonstrate how state policies and corporate mining interests work together to privatise water resources, change governance structures

³¹ The CAO claims impartiality although it is part of the World Bank – an institution that represents the interests of capital as Oyu Tolgoi's lender.

³² A draft version was released in spring 2014, but it has yet to be agreed upon by all stakeholders. A tripartite council was formed, and JSL Consulting has conducted research, written reports and held stakeholder meetings to mediate tensions between the company, herders and local government.

and ultimately transform local and national landscapes. While the state governed water infrastructure projects in the 20th century, water for mining represents a transfer of power from public to private interests – particularly in the post-socialist context. This is not to say that private interests did not participate or even drive water infrastructure development in the 20th century (see Bakker, 2010; Biggs, 2010; Swyngedouw, 2007) but that directly serving the people is no longer the government's priority. At the same time public opposition to mining challenges the idea of modern water and complicates relationships between state, corporate and local actors. The proliferation of actors, such as the World Bank, demonstrates not only influence over Oyu Tolgoi but also the power to shape national resource policy and governance (Upton, 2009; Horlemann and Dombrowsky, 2012; Houdret et al., 2014).

The literature on water governance, particularly that related to mining, identifies the reconfiguring of state and corporate interests but leaves unexamined local and national cultural waterscapes as sources of discursive power. This gap exists despite extensive literature on the symbolic integration of water, nation and infrastructure, and points to Bakker and Bridge's (2006) call for an examination of the interconnections between different resources. Rescaling mineral resources as national focuses attention on other resources, particularly water, creating new targets of national development and security while abstracting multiple resources from local and cultural contexts. These relationships between resources are meaningful not only to discussions of economic development and neoliberalism but also to transformations of state and nation. Understanding the specific cultural (including spiritual [see Boelens, 2014]) contexts of the hydrosocial cycles illuminates how mining radically transforms waterscapes, making companies subject to protest through miscommunications and misunderstandings about the diverse meanings of water.

Controversies arising from the use of water for mining in Mongolia create new opportunities to consider the role of the nation and local cultures within the context of the corruption and weak environmental governance connected with the neoliberal policies that were imposed in the 1990s to transform the country's political economy. Examining local manifestations of what Linton calls "modern water" provides a "more dispersed, situated view of nation-building" that moves analysis away from the designers to consider how "new possibilities for local histories, the landscape, and individuals living in these areas (...) play into the broader narratives of modernization" (Biggs, 2010: 156-7) and, I would argue, neoliberal policies and practices. While national development is often conceived as a state-driven activity (Penrose and Mole, 2008), the interface between corporate, national, supranational and local actors in Mongolia shapes transformations and contestations over its waterscapes.

Finally, the difference between the Mongolian socialist regime's attitudes towards water management and those of more recent governments demonstrates diverse interpretations and uses of 'modern water'. This paper shows how nationalised, modern water has consistently been a source of state power from the 20th into the 21st century. However, at least as far back as the research participants' memories reach, the socialist infrastructure appears to have been much less controversial than contemporary mining infrastructure while still ecologically damaging. This points to a need to examine further how water as 'modern' is perhaps also plural and subject in its meaning to the particularities of place and time.

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