# Extraction as abstraction: the survival of sustainability on a d(r)ying chalk river

## Introduction

Concerns about the sustainability of water supplies in the South-East of England have risen to prominence in the last fifteen years. Growing populations, increased water usage per head, and unpredictable weather patterns connected with climate change have been formulated as threats to the viability of water as it is currently supplied. If these concerns are left unattended, the Environment Agency has warned that by 2040 water supply may no longer meet demand[1], with implications for agricultural industry, domestic activity, and public health.

The sustainability of water supplies is rendered visible by concerned local parties at the same time as it is obscured by the local water company in the county of Hertfordshire where this research takes place. This commuter greenbelt maintains a sizeable farming industry and its population consumes more water per head than anywhere else in the country. Particular to this area are concerns from conservationists and wildlife charities around the type of water used for domestic and agricultural supply; water derived from chalk environments. Not serviced by any reservoirs, the entirety of water supply for the area comes from underground water sources known as aquifers, and surface river water. These are chalk aquifers and chalk rivers, globally rare environments overwhelmingly found in the UK, and most densely concentrated in the South-East of the country. Hertfordshire is characteristic of many parts of South-East England where chalk environments are struggling under the pressure of soaring human demand for water, and yet the water supply system and practices of water usage continue unchanged, demonstrating an enduring faith in water as inherently sustainable. It is this phenomenon that the research seeks to explicate.

This paper draws on ethnographic observations and interviews conducted in offices, in and along stretches of chalk river, at conferences, fundraisers and annual general meetings, with water company representatives and scientists, the Environment Agency, wildlife charities and local river conservationists. It situates this fieldwork alongside historic and current documentary analysis. The research took place over twelve months from August 2019 to August 2020. This paper explores the oscillation that occurs between macro-level presentations of water as naturally replenishing and the localised reality of pervasive drought, and how changing temporal priorities both across, as well as within water-concerned and interested parties, influence this oscillation. I situate these positions within a wider emerging debate in the UK about water as a sustainable industry of 'abstraction', or an unsustainable industry of 'extraction'. I argue that the macro-level presentation of the hydrologic water cycle underlies the water industry's framing of its practice as one of abstraction – that is an industry that takes or moves water spatially, with the implicit assumption that water will return and the process will be sustainable. However, the localised micro-context of Hertfordshire invites us to consider what insights can be gleaned when the water industry is considered as one of extraction – that which removes natural resources more finitely. Through this lens the paper asks, how can water be naturally replenishing and yet at the same time sparse? What besides water is being taken in the name of human water supply? And how, in spite of extracting water to the point of environmental death, does the discourse of abstraction and its supposition of sustainability survive? By following these questions, we can explicate who or what, human or nonhuman, is served by the discourse of

[1] https://www.bbc.co.uk/news/uk-47620228 Climate Change: Water shortages in England 'within 25 years'

abstraction. In turn, by working to maintain the 'visibility' of extractive practices and suffering chalk environments we might foreground less anthropocentric water resource solutions for the future.

**Defining abstraction as opposed to extraction**

The discourse of abstraction has been a crucial way in which the water industry has demarcated itself and its practices from extractive industries. Abstraction is a term explicitly used by the water industry and refers exclusively to the way it removes and re-places water, moving it from environmental spaces such as rivers and underground aquifers, to water treatment plants and on to domestic spaces. I argue that abstraction has been considered separately from the extractive industries because it is built upon the logic of the hydrologic cycle. This cycle is a diagrammatic depiction of water's movement through the environment as one which is cyclical and naturally replenishing.

This argument has been inspired by the approach of anthropologist Christos Lynteris who has interrogated historical archives of models of infectious diseases paying close attention to the role of diagrams in understandings of disease transmission (Lynteris 2017). He points out how important the cycle diagram is within biomedical epistemological infrastructures and what kind of 'work' such diagrams do. One might imagine these diagrams then, as heuristic devices. This approach resonates with the work of anthropologists who have tuned in to material semiotics, demonstrating that 'it matters what matters we use to think other matters with' (Haraway 2016:9). It also takes inspiration from Jamie Linton whose extensive book on the production of modern water highlights the role of the hydrologic cycle and traces how this heuristic device contributes to the production of water as an abstract resource (Linton 2010:149). The argument I make resonates with work by historian Yi-Fu Tuan whose analysis states 'in 18$^{th}$ century England the idea of a well-watered earth was a unexamined article of faith to those who have fallen for the pervasiveness of the hydrologic cycle' (Tuan 1968:144). Through the paper I show not only how the faith highlighted by Tuan continues into the 21$^{st}$ century, but crucially who that faith serves. Finally the paper builds upon works by social geographers Linton and Budds who have criticised the simplicity of the hydrologic cycle arguing for a more accurate 'hydrosocial cycle' that makes visible how 'water is made known' (Linton and Budds 2014:179).

With these works as a backdrop, I ask what the hydrologic cycle as a heuristic device does for the water industry, arguing that it helps to both create and sustain an image of abstraction as an inherently sustainable form of industry. For this reason, the water industry has avoided being labelled as an extractive industry. The discourse of abstraction serves the water industry by allowing it to take large quantities of water from the environment without suffering the kinds of critiques levelled at the extractive industries like oil and gas, and large sums of money from customers who are able use as 'much water as they want'. Abstraction in the UK works through a process of licensing whereby the Environment Agency determines how much water a company is allowed to take from a water supply source. These licenses are subject to change and are meant to reflect the availability of water resources, keeping in mind human demand as well as the need to retain water in the environment for nonhuman life and natural habitats. These licenses play a tacit role in ordering species and environments. In the face of an environmental drought the Environment Agency can put an emergency cap on how much water a water company can take. The water company can respond that there is a 'supply demand' drought. In this case the environmental drought order loses out to the human supply demand drought order, and despite depleting environmental water resources, the water company may abstract up to the original full licensing

amount. This legal system thus prioritises human demand and human environments over nonhuman and environmental need.

**Abstraction: Water as present and sparse**

So, having briefly described what abstraction is, how it demarcates the water industry from extractive industries and how its licensing prioritises the human over the nonhuman, I now want to explore how water is presented as being both present and sparse, in my field-site of Hertfordshire, and to explore what oscillating between presence and scarcity does for the water company there.

As mentioned, the hydrologic cycle is a hugely important part of the discourse of abstraction. Individuals at the local water company continually referred to it when communicating their activities as 'abstractive' and not 'extractive'. It is interesting to note that abstraction derives from the Latin abstrahere, meaning to draw away, while extraction derives from the Latin extrahere, meaning to draw out. This linguistic difference resonates with the way water industry professionals understand their practice. I was repeatedly told that while factors such as population growth and consumption would affect stocks of water, ensuring water supplies was about balancing these pressures. These pressures were framed as challenges and yet I was told, there would always be 'more water to move', due to the hydrologic cycle. Thus water industry professionals used the hydrologic cycle as a heuristic device. It allowed them to explain how water could be both sparse due to pressures of population growth and human use, and abundant due to natural cycles of replenishment. This heuristic device was thus intimately linked to the infrastructure of water supply, which following Dewey's insights on publics (Dewey 1991 (1927)) and anthropologists such as Collier who have revisited his work in light of infrastructural relations, bring particular 'publics into being'(Marres 2005, Collier 2016). The water company through this infrastructural arrangement could call upon local people to act as 'water heroes', to turn off their taps when brushing their teeth, to not water their gardens, to save water – without worrying that these customers might question the sustainability of their supply. The public 'called into being' is the conscientious consumer who does not question water supply, because he or she believes in its inherent sustainability. Thus, moving between these scales of macro-natural processes and local contextually based pressures allowed the company to present abstraction as a sustainable process of movement and balance. This oscillation was a crucial way in which the company avoided criticism. It was also an interesting way in which the company mitigated blame, while being, under closer inspection, a demonstration of internal tension. While the hydrologic cycle was used to facilitate the discourse of sustainability, where rainfall was low and water supply was threatened, the company turned back to the weather, and specifically to a lack of rain as the cause of such issues. These climactic events were 'beyond their control', climate change was everyone's fault and the company could not make it rain. In this case presence and scarcity could be attributed to nature and anthropogenic change, and the company could avoid the kind of 'blame' so often levelled at extractive industries. It wasn't that the company was taking 'too much' water – there just wasn't enough water there in the first place.

**Extraction: what is being 'taken'?**

Although shifting registers between macro-level natural processes and local contextual processes allowed the water company to retain an image of abstraction, or at least to mitigate association with the extractive industries, the internal tensions between the discourse of sustainability and the reality of drought were ever-present. These tensions came to a head during the summer of 2019. That

summer, the Environment Agency, local river conservation groups and wildlife charities sounded the alarm. Stretches of local rivers, fed by aquifers abstracted by the local water company were barren and these dry stretches were rapidly extending. These groups were particularly concerned about the chalk streams of the area, prized as pristine habitats for wildlife and worth protecting as globally rare natural entities. The groups speculated about what further damage would be done to these aquifers, rivers and the non-human life they supported, if a fifth dry winter ensued. While water company professionals cited geomorphology of the landscape and human rerouting of river channels as potential reasons for this dryness, the concerned parties were not convinced and fought hard, drawing attention to what was being 'taken' as a result of water re-placement. The notion of extraction, or what these groups termed, 'unsustainable abstraction', disrupted the understanding of abstraction as a process of merely 'moving water'. What they were highlighting was a dual process of 'taking out' and 'drying out', made synonymous with the death of river channels and nonhuman life. It became difficult at this point for the water company to sustain the discourse of abstraction, as these nonhuman forms of life and potential future forms of life had been taken away through their moving of water at unsustainable levels. Abstraction here as 'drawing away' was failing to fully encompass the reality it purported to describe. Through lobbying MPs, local and national media, these concerned groups were able to bring to the fore the localised, context-specific nature of water supply, and made it much harder for the water company to rely on the macro-level hydrologic image of replenishment that was so crucial to their identification as a business of abstraction. In the face of mounting pressure, media attention and ongoing drought, the water company declared that if its central region of supply experienced its fifth dry winter, a hosepipe ban would be announced in April of 2020. Through this set of events the discourse of sustainability that had previously separated the water company from the extractive industries broke down. The company could not 'take water' if that meant taking away globally rare rivers and taking away the life such rivers house. If there was not 'enough water' due to climate change, the company should prioritise the environment and 'take less'. It could not avoid blame because it was effectively 'taking life'. The local conservation groups and charities described this series of events as chalk rivers finally 'having their moment'. They felt they had successfully utilised the discourse of unsustainable abstraction, and with it, drawn attention to the irreplaceable life that was being extracted from these river channels.

**The surviving discourse of abstraction**

So how could the discourse of abstraction survive following this chain of events? How, once the extractive practice of taking water, synonymous with taking away life and its future potential had been highlighted, could the water company be considered abstractive?

The first thing that helped this discourse survive was unexpected but not extraordinary. The fifth dry winter did not arrive, in fact what arrived was a very wet winter. This large body of rain 'recharged' the underground aquifers and thus the hydrologic cycle as heuristic device was back in play. Although many of the rivers fed by these aquifers did not begin to flow again until well into March, the water company was satisfied that the environment had recovered and it was decided that no hosepipe ban or extra conservation efforts would be needed in the Spring. Customers should still of course be 'water heroes', but it would be their choice to use or not use their hosepipes. The local conservationists used their own statistics to decry this move. They highlighted that while water flow might be 'visible', the invisible damage of such a dry stint was all too real. The problem was, without the stark visuals of barren riverbeds, washed up fish and the likes, their call of unsustainable abstraction was a much harder sell. The crisis of extraction, or unsustainable abstraction had

ultimately been 'put off'. While even the water company in publishing its 2020-2050 Water Resource Management Plan acknowledged the impending challenges of water supply, the wet winter allowed it to resume its successful oscillation between the macro and micro processes of replenishing waters and localised pressures. The discourse of abstraction was safe for another few years at least…

The second thing that helped this discourse survive was albeit more extraordinary. On Monday the 23rd of March 2020, the English Prime Minister Boris Johnson announced that the UK would be entering a strict lockdown in the fight against the coronavirus. Individuals were not to leave their homes except for food essentials and exercise. Along with this severe limitation on movement came a strong public-health message surrounding washing. The public were being told to wash their hands for at least twenty seconds and to do this multiple times a day. They should also be washing their homes and clothing more regularly. Water was situated as a crucial asset in the fight against the virus and was central to many lockdown hobbies as hundreds of thousands of people found themselves furloughed, redundant, or working from home, with children to entertain and gardens to tend to.

This situation posed both novel challenges and opportunities for the water company. In an email titled 'life has changed' the company explained to its customers that the pandemic coincided with the driest Spring since records began and had caused a three-day stint of highest water demand ever seen by the company. The company was in an awkward situation though, how to ask its customers to be water heroes, while also reassuring them that the company had 'more water than ever' to allow adherence to government guidelines, and some amount of fun during what for many would be an incredibly miserable period. These were the challenges, what were the opportunities? Well in this case, the challenge was synonymous with the opportunity. It was an opportunity through the prioritising of human vitality to continue to supply water with less criticism and pressure. The dry Spring and high demand meant that by June many of the rivers which had begun to flow for the first time in eighteen months were dry again. But the pressure on the company to conserve water was muted compared to the summer before. In fact, it felt non-existent. Why was that? because now, the life to be potentially saved was human, and what this relied on was a discourse of abstraction, and in turn domestic water supply, as inherently sustainable – sustainable through this pandemic crisis. The water crisis again was pushed further into the future – a post-pandemic future when the taking of non-human life from river environments might once more be prioritised – but as was the case with the wet winter, the discourse of abstraction seemed safe for another few years.

**Conclusion**

This paper has explored the ways in which the water industry, as a self-identified business of abstraction, finds itself entangled with extractive practices, oscillating between a narrative of macro-level natural processes of replenishment, and local-level contexts of drought. It has explored how the discourse of abstraction flourishes despite what would appear to be tensions between notions of water as present and scarce. It also demonstrates how local conservationists have been able to develop and utilise a narrative of unsustainable abstraction; that of 'taking away life' to highlight extraction at work in the water industry. Finally, the paper has shown the ways in which despite its destabilisation, the discourse of abstraction and its connotation of sustainability continues to survive. Highlighting these tensions and showing their temporal instability encourages us to tune into these registers of abstraction, not just acknowledging what is being 'taken' in a physical sense, but when it comes to the discourse of abstraction, thinking about what in the imaginary is always 'remaining' and who or what, human and otherwise, benefits from this enduring narrative.

It becomes clear that the remaining discourse of abstraction serves the interests of the water industry in terms of avoiding criticism as an 'extractive' industry, ensuring ability to take water from the environment and continuing to earn large profits through customers water usage. This makes clear that the discourse of abstraction prioritises the human, over the nonhuman and the environmental. While localised actions of concerned environmental groups and climactic events destabilise this narrative, the research demonstrates their lack of ability to do so in a lasting way. Thus it appears those practices of the water industry that extract water and life from chalk environments must be foregrounded in more stable and enduring ways if we are to find less anthropocentric solutions to makes water sustainable for the future in the South of England.

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