Mapping a Developing Governance Space: Managing Drought in the UK

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Abstract: Climate change is associated with severe weather events also in the UK, such as alternating periods of flooding and drought. This article discusses how this increasingly important environmental challenge can be regulated. Current key regulatory tools for preventing and managing drought are drought planning, drought orders and permits, as well as the revocation and modification of abstraction licences. The article develops the metaphor of a governance space in order to understand how environmental science and economics knowledge practices inform the mobilization of these key regulatory tools. This builds on literature about the regulatory space metaphor, and further advances it by conceiving of law and information, two key resources for institutional actors in a governance space, as mediated by discourses. The article develops this argument by, first, reviewing in the introductory sections key provisions of European Union (EU) and English law in relation to regulatory tools for preventing water shortages and managing drought. It further develops this analysis in the subsequent section by examining what environmental science and economics knowledges are generated when particular regulatory tools for preventing or managing drought are applied. In the following main section the article then critically reviews literature about the regulatory space metaphor. It identifies a positivist understanding of information and law as a limitation of some of this literature. By building on contributions to this literature that adopt a discourse perspective, it suggests that law and information should be understood as discursively mediated. Building and maintaining reputations for effective drought management is one example of a discourse that mediates linked legal and information resources for drought management.

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Drought is now also a significant environmental challenge in the UK. In April 2015 the Met Office announced that halfway through the month just a third of normal rainfall had occurred, though the Environment Agency (EA) for England declared water levels as adequate. Before that a serious drought in the UK occurred in 2010–12. It affected especially the South-East of England, including agricultural production in this area and the Midlands. But even before the onset of man-made climate change, droughts have been a feature of the hydro-meteorology of the UK for some time. A long drought occurred eg between 1890 and 1910. Moreover, droughts occur even if—like ground water droughts—they are not very visible, and it may take only two dry winters for groundwater resources to become depleted.

But what is drought? It is often understood as a distinct ‘natural’ event of limited duration. This chimes with a legal ‘definition’ of drought for England, Wales, and Northern Ireland (NI) that is implicit in the definition of a drought order, a key regulatory tool for ensuring continued public water supply during drought. A drought order can be obtained if due to an ‘exceptional shortage’ of rain a serious deficiency in water supplies or in water flows in rivers occurs or is threatened. From a

6 There is less emphasis on the ‘natural’ causes of drought in the definition of the water shortage order in s 38(1) of the Water Resources (Scotland) Act 2013 also because drought, ‘understood as a natural event’, is rare in Scotland given significant rainfall in Scotland. I am grateful to Sarah Hendry for pointing this out: Small rural supply schemes in the North East and Fife in which there is also irrigated agriculture, may be prone to the risk of water scarcity. Scottish Water can apply for a water shortage order merely on the grounds that there is an actual or threat of a ‘serious deficiency of water supplies in an area.’ ‘Drought’ is defined in NI as in England and Wales, but in NI the DoE rather than a Secretary of State specifically operationalizes the definition by deciding upon applications for drought orders (Reg 137(1) of the Water and Sewerage Services (NI) Order 2006, SI 2006/3536).
7 S 73(1) WRA 1991. In contrast to this, water scarcity refers to a shortage of water in relational terms as a structural, enduring lack of supply of water compared to demand for a
socio-legal perspective, however, drought is socially constructed through the statutory provisions that define it and the particular assumptions that underpin these. For instance, drought can be understood not just as the result of ‘natural’ factors, such as changed rainfall patterns, but also as the result of ‘social’ factors, such as housing and transport policies that have contributed to changed rainfall patterns.

Knowing Drought

The legal framework for drought in the UK provides for specific regulatory tools, but we know little about how decisions about the use of these tools are actually made. Environmental science and economics knowledges can become important for applying the legal provisions, and deciding, for instance what constitutes a ‘serious deficiency in water supplies’ or knowing how much water company customers are prepared to pay to avoid interruptions in water supply. Some of these knowledge practices are required by law to be taken into account in decisions about preventing and managing drought. For example, the European Union (EU) Strategic Environmental Assessment Directive may require that the environmental impacts of various drought management options proposed in the drought plan of a water company are assessed. Similarly, it may be


8 There is no sharp distinction between ‘natural’ and ‘social’ factors causing drought, since eg policies in relation to transport, changed land use, and the burning of fossil fuels contribute to climate change, and thus altered patterns of precipitation (accessed 18 August 2015).

9 A range of other water supply failures are beyond the scope of this research, such as those due to burst pipes during normal operating conditions or cold weather, as this happened in NI during the winter of 2011.

10 The research draws on an analysis of qualitative empirical data obtained from public policy documents and semi-structured interviews with regulators as well as water companies. Interviews are referenced through acronyms, such as A2.DP (drought planning), WC (Water Company), or REG (Regulator).


necessary for a water company to assess whether the drought management options they propose in their drought plan may jeopardize the achievement of objectives in relation to enhancing or protecting the quality of rivers and groundwater bodies under the EU Water Framework Directive (WFD). But not just such environmental science knowledge practices, but also economics knowledge practices matter. They can provide accounts of the economic impacts of drought and regulatory tools adopted to prevent and manage drought. While not always explicitly prescribed by the regulatory framework, such knowledges can be also important for thinking about what constitutes ‘good’ drought management. Drought management affects what level of service customers of a water company—in terms of continuous or interrupted water supplies—may receive.

But how relevant are such knowledges in practice for those who have to implement the legal framework? When specifically does the law prescribe their use and how do they shape what becomes understood as the risk of drought? Asking these questions about the relationship between knowledge practices and the interpretation of legal provisions explores a puzzle at the heart of state law. On the one hand, state law as applicable also to water resources is powerful in its own right. Law’s distinct nature that allocates rights and duties, often backed by sanctions, can create effective regimes of ordering. But on the other hand, state law can be powerless, unless informed and rendered legitimate by relevant environmental scientific and economic expertise, a theme further explored below. To begin with, the next section clarifies which state law provisions are particularly relevant.

Key Regulatory Tools for Preventing and Managing Drought in the UK

Drought plans, drought orders and permits, as well as more general powers for environmental regulators to limit the abstraction of water from ground and surface water bodies in the environment are key regulatory tools for preventing and managing drought.

14 We gratefully acknowledge funding for the research discussed in this article by the UK Natural Environment Research Council (NERC) grant no NE/L010364/1. This research is part of the NERC funded MaRIUS project, led by the Environmental Change Institute, University of Oxford.
Drought Planning

Drought planning carried out by water companies is a relatively new regulatory tool, having been introduced for England and Wales through the Water Act 2003.15 A plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water, with as little recourse as reasonably possible to drought orders or drought permits.16

While in Scotland drought planning is not required by statute, Scottish Water nevertheless engages in voluntary drought planning.17 In NI secondary legislation requires water undertakers to prepare and publish drought plans18 and NI Water is currently preparing its Water Resources and Supply Resilience plan, which will integrate in an innovative way drought with water resources planning.19 Drought plans are currently considered to be operational plans that set out the specific drought management options a water company intends to use ‘during a drought’, with those water companies in the UK for whom drought is a significant issue also setting out their strategy20 for tackling drought. The content of drought plans is shaped also by soft law guidance, in particular the EA Water Company Drought Plan Guideline.21

Most importantly, drought plans specify ‘drought triggers and scenarios’.22 These provide a water company definition of when drought is considered to begin and to end, and thereby flesh out what is only an implicit definition of drought in the statutory framework.23 Water companies set out ‘control curves’ in their drought plans, which indicate, for

17 Scottish Water has an overarching strategic drought plan and a number of local drought plans that cover specific water resource zones.
18 Reg 73(1) of The Water and Sewerage Services (Northern Ireland) Order 2006, SI 2006/3336 (NI 21).
22 ibid 22.
23 Through the definition of drought orders in s 73(1) WRA 1991 which considers drought as the result of an ‘exceptional shortage of rain’ that has led to an actual or threatened ‘serious deficiency in water supplies or in flows in rivers’.
instance, for reservoirs at what level of water shortage a drought is considered to exist. A drought ‘trigger’ then identifies a specific shortage in water supplies that will trigger the implementation of particular drought management actions by a water company.

Statutory water company drought planning is supplemented by ‘voluntary’ drought planning carried out by the environmental regulators in England, Wales, and Scotland. These also define drought through control curves and provide triggers for the regulator to take drought management actions, such as publicity campaigns or applications for drought orders. But these plans focus more strongly on ‘the impacts of drought on the natural environment’ given the environmental regulator’s statutory duties to protect the environment, while the water companies are subject to statutory duties to maintain public water supply during a drought.

Drought Permits and Orders

The EA Water Company Drought Plan Guideline lists various demand- and supply-side tools for managing drought. While a drought permit—issued by the EA for England, or Natural Resources for Wales—enables to increase supply of water abstracted from the natural environment, a drought order straddles the traditional demand/supply distinction because it can authorize increased abstraction from the environment by water companies or any other abstractor, in order to meet, for instance, statutory duties for public water supply, but it can also authorize the restriction of demand from commercial users of water, or limit abstraction by a water company or the EA. Backed by the force of law, a drought order can be an important tool for allocating water to priority uses during a drought. It is, however, meant to be a last resort, and thus

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24 Such as applications for drought orders and drought permits.
25 Water companies often develop drought triggers at different levels such as the water company level, at a water resource zone level or for more specific drought management areas (EA, Water Company Drought Plan Guideline (n 21) 22).
26 Interview A2.DP1.WC8, 6 January 2015.
27 There are no ‘drought permits’ in Scotland, but similar to these Reg 18(1) of the Environment (Controlled Activities) (Scotland) Regulations 2011 enables SEPA to quickly grant authorizations or vary or suspend existing ones in the case of an emergency, such as drought.
28 S 74 (1) WRA 1991.
29 Non-essential uses specified in the Drought Direction 2011. A drought order can also authorize the EA to limit industrial or agricultural abstractions. In addition, it can enable the EA to suspend, vary, or attach conditions to any consent that has been issued for the discharge of effluent by anyone which can increase the amount of water flowing back into the natural environment.
30 S 74(1)(c) and (d) WRA 1991.
seldom used in practice\textsuperscript{31} in comparison to appeals for voluntary reductions by domestic and commercial users. The Secretary of State for the Environment, Food and Rural Affairs (DEFRA) or the Department of the Environment for NI (DoENI), or the Welsh or Scottish Ministers decide whether a drought order will be granted.\textsuperscript{32}

### Modifying and Revoking Abstraction Licences

Drought planning as well as drought orders and permits deal specifically with drought. But there are also legal powers to modify or revoke abstraction licences—which are an element of on-going water resource management by environmental regulators—that can help to ‘prevent’ drought. Licence modifications can occur through ‘voluntary negotiation’ between the environmental regulator and agricultural,\textsuperscript{33} commercial and industrial abstractors, including water companies,\textsuperscript{34} or through ‘compulsory’ modification or revocation by the environmental regulator. The latter usually triggers rights to compensation for licence holders. But environmental regulators’ powers to modify or revoke existing abstraction licences have been significantly enhanced, which also illustrates that the governance space in relation to drought in the UK is being developed. Rights to compensation\textsuperscript{35} have been restricted. First, if a licence has been granted before 1 April 2006, is not time limited and is causing ‘serious damage’ to the environment or has the potential to do so, the EA or Natural Resources Wales can modify or revoke the licence without having to pay compensation.\textsuperscript{36} Secondly, losses arising from modifications or revocations of abstraction licences ‘of water or sewerage

\textsuperscript{31} The www.legislation.gov.uk site lists 11 drought orders that were authorized and have been captured in electronic format between 1996 and 2011 accessed 18 August 2015.

\textsuperscript{32} Drought orders are called ‘water shortage orders’ in Scotland. They are issued under pt VII of the Water Resources (Scotland) 2013 Act. In contrast to English drought orders these are not statutory instruments, but simply administrative orders which can authorize a range of limitations on water use and increased abstractions similar to drought orders in England and Wales.

\textsuperscript{33} During drought the EA and Natural Resources Wales can compulsorily restrict the volume of water abstracted by spray irrigators under s 57 WRA 1991, but in practice this is seldom invoked (Pers Comm, Interviewee 1, 19 May 2015).

\textsuperscript{34} S 51 WRA 1991.

\textsuperscript{35} S 52 WRA 1991.

undertakers’ no longer require compensation. There is now also an institutional framework for modifying and revoking abstraction licences. Environmental regulators have set up the Restoring Sustainable Abstraction (RSA) programme which systematically reviews ca 600 abstraction licences in catchments that are classified as over-abstracted according to EA Catchment Abstraction Management Strategies (CAMS). But these key regulatory tools are dependent on the gathering of various types of information before they can be applied.

Knowledge Practices that Inform the Use of Key Regulatory Tools

Why do Knowledge Practices Matter?

We define environmental science and economics knowledge practices as the use of specific, formalized bodies of knowledge that represent environmental and economic impacts of drought and regulatory tools for preventing and managing drought. In public policy discourse this is the ‘evidence’ base for legal decision-making. From a sociological perspective, knowledge practices render the natural and economic environment in which drought management occurs ‘legible’ and thus enable decision makers to take regulatory action at a distance from the actual events. By generating specific representations, ie ‘facts’, these

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39 The EA has also established a second programme—Review of Consents—for modifying, in particular, water company abstraction licences. The review is required by art 6(1) and 6(2) of the EC Habitats Directive 1992, as implemented in the UK also through Reg 63 of the Conservation of Habitats and Species Regulations 2010 (SI No 490) (as amended).
40 James Scott, Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed (Yale University Press 1999) 11.
42 ‘Regulatory facts’ can be political because they often strike a balance between maintaining confidence in regulatory processes and thus the reputation of those being regulated and regulators, while also having to uncover lack of compliance with standards in order to justify regulators’ activity (Young (n 41) 67).
knowledge practices socially construct the ‘problem’ of drought and the impact of regulatory tools. This includes, for instance, economics knowledges about the positive impacts of drought and distributional consequences of water supply restrictions. Such restrictions can require ranking claims to water, eg by electricity generation, tourism and recreation, agriculture, and various household activities. Knowledge practices also matter because they import ‘specific assumptions’ about water into decision-making about the use of regulatory tools. For instance, a foundational, but also controversial assumption of neo-classical economic reasoning is a conception of water as a commodity. This is important because it makes economic analysis tractable to standard approaches and methodologies that are used for forecasting demand and supply interactions and their associated costs and benefits. Finally—and most importantly—knowledge practices influence the distribution of power between key actors in the governance space of managing drought. Information asymmetries between regulators and regulated organizations arise in particular when the activities of a regulated industry, like the water industry are complex. Hence, regulators’ scope for action may also be shaped by limitations to accessing information about water resources.

But inquiry about the use of environmental science and economics knowledges for applying regulatory tools starts with a paradox. On the one hand, there is a vast range of knowledge practices that inform the use of regulatory tools for preventing and managing drought. But, on the other hand, decision makers still do not have all the ‘right data’ for making the best use of existing regulatory tools. For instance, climate change is rendering forecasts of precipitation and thus available water resources more uncertain. In addition, the law may even skew what knowledges are available. It requires significant knowledge to be produced about the environmental and

43 Restrictions on commercial car washers in one water resource zone may benefit commercial car washers in neighbouring zones as a result of consumers switching their demand.
44 Chris Decker, Modern Economic Regulation (CUP 2014) 86.
45 For instance, the recent EA Literature Synthesis report, ‘Monitoring and Assessment of Environmental Impacts of Drought’, notes that environmental science knowledges about the environmental ‘impacts’ of drought are lacking or incomplete, because they do not take into account pre-drought situations and then compare these with in- and post-drought scenarios. Existing data are also limited because they are mainly based on ‘naturally’ intermittent rivers and streams, where dry phases are a natural feature of the river ecology (EA: Evidence Monitoring and Assessment of Environmental Impacts of Droughts; Literature Synthesis Report: SC120024/R1, 2013).
46 <http://www.metoffice.gov.uk/climate-guide/climate-change> accessed 18 August 2015. There may also be insufficient historical hydrological data in order to test the effectiveness of contemporary drought management options against a sufficiently large range of historical ‘worst case’ scenarios.
economic impacts of drought orders and permits. These are, however, only to be used as a last resort.\textsuperscript{47} This reflects a risk-based approach with extensive knowledge generated in relation to those drought management options that have more negative environmental and economic impacts. But this also means that the legal framework currently does not require extensive environmental science and economics knowledges to be generated about the wider benefits of demand-side drought management options.

Against this backdrop of simultaneously too much and too little information it is important to understand how knowledges become mobilized in particular two situations.\textsuperscript{48} First, when ‘fundamental decisions’ are taken that provide the basis for deploying regulatory tools. These are definitions of drought—provided by water companies in consultation with environmental regulators—in water company drought plans through so-called ‘drought control and trigger curves’. These are also decisions taken by the economic regulator\textsuperscript{49} as part of the price review process about what financial resources a water company will have in order to prevent and manage drought. Secondly, when decisions about the use of regulatory tools become contested, for instance during licence modifications or an actual drought, knowledges are mobilized in order to justify a case either for or against the use of a regulatory tool. For example, an economic impact analysis may reveal the consequences of a drought order for small- and medium-sized businesses. It is important to realize, however, that environmental science and economics knowledge practices can also be linked.

**Links Between Environmental Science and Economics Knowledge Practices**

Environmental science and economics knowledges draw on different types of reasoning. While environmental science knowledges are based

\textsuperscript{47} Also supply-side measures such as re-commissioning unused sources, lowering of pumps or deepening boreholes and inter-company bulk transfers will require substantial environmental knowledge, often in the form of environmental assessments. Moreover, for each supply-side intervention, a water company must develop an environmental monitoring plan and provide details of any further surveys needed to support the environmental assessment, as well as in-drought and post-drought monitoring requirements (EA, *Water Company Drought Plan Guideline* (n 21) 42).

\textsuperscript{48} In some cases decisions about the use of regulatory tools are taken without resort to knowledge practices. For instance, a water company may decide to impose non-essential use restrictions on its commercial customers on the basis of a general policy commitment that no firm will go out of business due to these restrictions (A2.DP1.WC11 Economics, 14 April 2015).

\textsuperscript{49} In response to water companies’ submissions and in consultation with the environmental regulator.
on data about the physical state of the environment, economics knowledges draw on data about the impact of droughts and regulatory tools on economic activity. But environmental science and economics knowledges do not operate in separate silos. They can be linked in drought management. For instance, both economics and environmental science knowledges inform the ‘level of service’ that influences what drought management actions a water company will take:

the standard of service that water company customers can expect to receive from their water company, commonly setting out the frequency of restrictions that a company expects to apply to its customers.50

For instance, Willingness to Pay (WTP) surveys can inform how often over a 20-year period a water company plans to impose a drought order on its customers. Drought orders, in turn, may trigger the production of environmental science knowledges that assess their impacts on the natural environment. Moreover, most economic analyses of drought encompass both ‘market’ and ‘non-market’ losses, ie losses which cannot be directly monetized.51 The latter include impacts associated with environmental degradation or poor health conditions, which over time can impact on the behaviour and responses of economic agents in ways which has wider effects on economic welfare such as reduced productivity.

Similarly, environmental science and economics knowledge practices can become linked when aspects of environmental and economic regulation of the water industry are integrated. For instance, the costs of limiting water undertakers’ abstraction licences, through so-called sustainability reductions, should be considered during the water companies’ business planning. Proposed new investments in response to sustainability reductions will be considered by the economic regulator, the Water Services Regulation Authority (Ofwat) during its five yearly price review of water companies’ business plans. The next section will examine in more detail key environmental science knowledge practices.

Environmental Science Knowledge Practices

The EU legal framework steers towards the use of three key knowledge practices: Strategic Environmental, Habitats Regulation, and WFD Assessments.

WFD assessments

WFD assessments inform the drafting of water company drought plans, and the justification of drought orders and permits proposed in these, only to a limited extent, also because these assessments require to make difficult links between the environmental impact of drought management and the deterioration of water bodies. Moreover, the EA Water Company Drought Plan Guideline refers only briefly to WFD assessments, but these assessments are an important criterion for selecting abstraction licences for the Restoring Sustainable Abstraction Program (RSA).

In outline, a WFD assessment involves a water company to consider how their drought management actions may affect the ‘programs of measures’ that are adopted under the WFD. These programmes of measures are intended to improve the quality of water courses. Greater abstraction of water from the environment during a drought, eg in order to maintain public water supply, may lead to low flows in rivers, and thus higher concentration of pollutants in ground- and surface water bodies. This, in turn, may breach the WFD standard that EU Member States must achieve good status of ground- and surface water bodies by 2015. But such breaches during drought may be justified under article 4.6 WFD. Effective activation of drought plans during a drought constitutes a lawful ‘temporary deterioration’ under the WFD. The WFD, however,

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53 Interview A2.DP1.CNS2, 12 February 2015.
54 EA, Water Company Drought Plan Guideline (n 21).
55 Interview A2.DP1.WC11, 28 January 2015.
56 Art 3 (4) WFD. In practice in England and Wales, WFD assessments begin with a review of the WFD Environmental Objectives for the water bodies that may be affected by a drought order or drought permit to determine the potential impacts of the proposed drought actions on those WFD objectives and the status of the water bodies at issue. A supply-side drought management option that lowers the residual flow of a water body may cause a deterioration in status as a result of changes in flows, velocity, and water quality. (Eg Essex & Suffolk Water Drought Plan (2013) 92–94) <https://www.eswater.co.uk/your-home/environment/drought-plan.aspx> accessed 18 August 2015.
57 Art 4 (1)(a)(ii) and art 4 (1)(b)(ii) WFD.
58 The exemptions under art 4(6) WFD have been used in five river basin districts, situated in Spain, Bulgaria, France, and Belgium, for reasons including prolonged
may require that water companies can no longer just use spare water that they have available under their existing abstraction licences during times of drought. That water may be required on an on-going basis to maintain compliance with the WFD. In the case of adverse environmental impacts resulting from the use of that spare water during drought, water companies may have to apply for drought permits in order to use it. Moreover, water companies would have to show through environmental assessment reports that the impact of the additional abstraction of water under the drought permit would not cause a deterioration of water bodies under the WFD. WFD assessments may thus prompt water companies to identify other water resources or modify an existing proposal for a drought permit in a drought plan.

While WFD assessments gauge the impact of regulatory tools on both water quality and nature conservation interests, Strategic Environmental Assessments (SEAs) seek to ensure that a whole range of environmental impacts are considered when plans of strategic importance are prepared.

SEAs

SEAs provide information about significant environmental impacts of plans and programmes—rather than specific projects. An SEA should
also prompt proponents of a project, such as a drought plan, ‘to consider various alternatives’ for achieving the project’s objectives, ultimately choosing that which has the least environmental impact.\(^{65}\)

But in practice the scope and value of SEAs is contested. Ministerial guidance suggests that also broader social effects of water resource planning, such as impacts on vulnerable social groups and population trends, in addition to environmental effects should be considered.\(^{66}\) Some water companies adopt this as best practice.\(^{67}\) But some local economic operators have criticized that SEAs are not more broadly defined as ‘sustainability assessments’ that also take into account impacts of drought management options proposed in drought plans on local businesses.\(^{68}\)

Only seven out of 21 water companies in England and Wales have carried out SEAs for their drought plans, and ‘there is some uncertainty in the water industry over whether a SEA is strictly required for an operational plan such as the Drought Plan’,\(^{69}\) also in light of the cost of carrying out SEAs. The EA, DEFRA, and Natural England,\(^{70}\) the main statutory nature conservation body, recommend\(^{71}\) that water companies conduct SEAs for their drought plans.\(^{72}\) Whether they are legally required is arguable. A SEA is necessary for a ‘plan or program which is likely to have significant environmental effects’\(^{73}\) and falls into either of two

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\(^{70}\) In its representation to Anglian Water’s Draft Drought Plan in 2012, Natural England stated that a ‘SEA is required, regardless of the requirement (or not) for a HRA, if the Drought Plan is a statutory plan, and could influence a development plan’ (Anglian Water, Drought Plan 2014 (2014) 99) <http://www.anglianwater.co.uk/environment/our-commitment/our-plans/drought-plan.aspx> accessed 18 August 2015.

\(^{71}\) The wording in the soft law EA, Water Company Drought Plan Guideline (n 21) 18, however, goes further: ‘Government expects water companies to produce drought plans which are informed by Strategic Environmental Assessment (SEA) and Appropriate Assessment of its environmental impact, where appropriate.’

\(^{72}\) If a SEA is conducted for a drought plan the water company will provide an ‘environmental report’ which contains an assessment of the environmental effects of the implementation of the plan.

\(^{73}\) Art 3(1) SEA Directive.
categories. The first refers to plans or programmes for a range of uses,\(^{74}\) including ‘water management’ and which set the framework for future development consent of projects listed in Annex I to the EIA Directive.\(^{75}\) The second category comprises plans and programmes which ‘in view of the likely effect on sites, have been determined to require an assessment pursuant to Art. 6 or 7 of the EU Habitats Directive’.\(^{76}\)

Some water companies suggest that being operational plans, drought plans are not strategic enough ‘to set the framework for future development consent of projects’. A housing development, for instance, may not be much affected by a drought plan that will only be implemented during the exceptional scenario of a drought. Moreover, a plan or programme provides the framework for future development consent of a project if it ‘sets the criteria’ by which ‘the project is to be determined by the authority responsible for approving it’ which is something that drought plans do not do, unless the definition of drought in a drought plan indicates that e.g. a further housing development is likely to lead to drought.\(^{77}\) Most importantly, if a plan or programme—such as a drought plan—is part of a wider framework of rules which themselves have been subject to an assessment of their environmental effects, a SEA may not be required.\(^{78}\) Water companies carry out SEAs for Water Resource Management Plans (WRMPs) that provide a framework for drought plans also because the WRMPs set out strategic options for preventing a deficit of water supply in relation to demand.\(^{79}\)

Water companies whose drought plan includes drought orders/permits that may affect protected sites are more likely to be covered by the second category of plans subject to the SEA Directive, ie a plan or programme that ‘is likely to have a significant effect on the environment’ (article 3.1) and will require an assessment under article 6 or 7 of the Habitats Directive (article 3.2(b)).\(^{80}\) In that case, water companies usually prepare

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\(^{74}\) Other uses listed in art 3(2)(a) SEA Directive are agriculture, forestry, fisheries, energy, industry, transport, waste management, telecommunications, tourism, town and country planning or land use.

\(^{75}\) Referred to in the text of the SEA Directive as Directive 85/337/EEC.

\(^{76}\) Directive 92/43/EEC. Art 3(2)(b) SEA Directive.

\(^{77}\) Simply a definition of the project or a description of its merits is insufficient. \(R\text{ (HS2 Action Alliance Ltd) v Secretary of State for Transport [2014]}\) UKSC 3, para 36.

\(^{78}\) Case C–567/10 \(\text{Inter-Environnement Bruxelles ASBL, Pétitions-Patrimoine ASBL v Région de Bruxelles-Capitale, [2012]}\) para 42.

\(^{79}\) A2.DP1.WC8 interview, 6 January 2015.

\(^{80}\) Office of the Deputy Prime Minister (n 66) 13, Figure 2. The research organization of the UK water industry provides further guidance on when drought plans are considered to have significant effects on nature conservation sites. See \(UKWIR, \text{Report No 12/WR/02/7 Strategic Environmental Assessment and Habitats Regulations Assessment - Guidance for Water Resources Management Plans and Drought Plans (2012)}\) <https://www.ukwir.org/web/ukwirlibrary/94834> accessed 18 August 2015.
first a scoping and then a full SEA Report.\textsuperscript{81} Other water companies may determine that a SEA is not legally required, but to manage relationships with statutory authorities, will prepare a SEA anyway.\textsuperscript{82}

But the effects of SEAs on the content of a drought plan seem limited. They do not lead to a revision of a water company’s drought management ‘strategy’, but rather prompt the tweaking of the details of a specific drought order or drought permit in order to minimize their environmental impacts, i.e. by reducing the quantity of water that can be abstracted through a drought permit or by relocating its abstraction point.\textsuperscript{83} Hence, for some water companies a SEA can help to make a case for the limited environmental impact of a drought plan and its management options. Teasing out issues in advance can contribute to a robust defence in the event of a later inquiry.\textsuperscript{84} If an abstraction licence or a drought management option, such as a drought order or permit, affects a nature conservation site, there may be a separate requirement to carry out a Habitats Regulation Assessment (HRA).

\textit{HRAs}

HRA\textsuperscript{85} shed light on whether drought management options or abstraction licences will adversely affect sites protected under EU nature conservation legislation, such as Special Areas of Conservation (SAC), sites that are candidates for designation as SACs, as well as Special Protection Areas (SPAs).

The water company must conduct a ‘screening exercise’ to determine the likelihood of any option proposed for inclusion in the statutory drought plan having a significant effect on any European site either alone or cumulatively with other plans and projects.\textsuperscript{86} If the ‘screening report’ determines that certain drought management options are likely to have a significant effect they will be taken forward to an Appropriate Assessment (AA) which reviews the impact of the proposed drought

\textsuperscript{81} Interview A2.DP1.WC4, 10 December 2014.
\textsuperscript{82} Interviews A2.DP1.WC1, 1 December 2014; A2.DP1.CNS3, 15 April 2015.
\textsuperscript{83} Interview A2.DP1.WC1, 1 December 2014.
\textsuperscript{84} Interview A2.DP1.CNS3, 15 April 2015.
\textsuperscript{85} In the UK, the EU Habitats Directive has been implemented through the Conservation of Habitats and Species Regulations, 2010 (as amended by the Conservation of Habitats and Species (Amendment) Regulations 2011 and the Conservation of Habitats and Species (Amendment) Regulations 2012 (No 1927)).
\textsuperscript{86} If the screening report determines that certain drought management options are likely to have a significant effect, they will be taken forward to an AA which reviews the impact of the proposed drought management options in light of the conservation objectives of a European site.
management options in light of the conservation objectives of a European site.

But it needs to be borne in mind that if there are ‘imperative reasons of overriding public interest’[87], including those of a social or economic nature, a European site may be harmed though this may trigger a duty to provide compensatory measures.[88] Some water companies find value in carrying out HRAs for the drought management options included in their drought plans, while others consider this to be just another regulatory requirement to be fulfilled, without significant substantive value for their drought plans.[89] Across the 21 drought plans of the 21 water companies in England and Wales, 12 HRA screenings and only one AA have been carried out.

Environmental assessment reports and environmental monitoring

Where the legal framework does not require one of the specific comprehensive environmental science knowledges to be produced, such as a WFD assessment, a SEA, or HRA, water companies should—according to EA guidance—prepare in any case:

an assessment of likely environmental impacts relating to possible drought permits and drought orders as part of the water company’s drought plan.[90]

The objective is to identify potential issues and develop mitigation measures before a drought order or permit is applied for.[91] This requires striking a balance between, on the one hand, advance preparation of these reports so that they are ready when a drought occurs. On the other hand, these reports need to be up-to-date and capture the state of the environment when the drought actually begins.[92] Environmental

[87] Reg 62 (1), provides guidance on what might be considered as an overriding public interest (Conservation of Habitats and Species Regulations (n 85)).
[88] Habitats Directive 92/43/EEC, art 6(4); Fisher, Lange and Scotford (n 64) 953.
[89] Interview A2.DP1.WC6, 18 December 2014.
[91] Such environmental reports should include the expected changes in flow/level regime, the likely impacts on sensitive features, and mitigation options to prevent or reduce impacts of the proposed drought order or permit; as well as monitoring requirements during and after the drought. Some water companies have begun to collect annual baseline data to build a dataset to demonstrate potential impacts of a particular supply-side option (Interview A2.DP1.WC3, 2 December 2014).
[92] Interviews A2.DP1.WC1, 1 December 2014; A2.DP1.WC3, 2 December 2014; A2.DP1.WC12, 23 March 2015.
assessment reports draw on risk-based routine monitoring of the state of the environment, such as river flow and rainfall data, abstraction returns, groundwater levels, water quality data, and environmental survey data. In the past the EA has significantly contributed to the collection of these routine monitoring data, but cuts to its grant-in-aid are likely to reduce this in future.

Economics Knowledge Practices

Economics knowledge practices feature at different stages, and to different degrees, in drought planning, the choice of drought orders and permits as well as the modification of abstraction licences through the RSA programme. Economics knowledge practices are deployed by a range of different actors within the governance space, including: DEFRA and Ofwat, but also the EA, as well as trade and research bodies, such as Water UK and UK WIR, and economic consultancies undertaken on behalf of water companies. Economics knowledges inform decisions about the use of regulatory tools for preventing and managing drought in two main ways. First, they shed light on the various economic impacts of drought, and this can feed into decisions about what to focus drought management on. For instance, economics knowledges can identify impacts on aggregate welfare, which assesses the overall effects of drought on society as a whole or a specific community. They can also provide data about the impacts of drought on different groups within society, such as commercial and industrial, as well as household consumers of water. Other users of water include those who gain amenity from recreational activities associated with the use of water, such as fishing, boating, or visual or other types of amenity, such as tourists visiting lake areas, or ecosystem services provided by wetlands. In considering users of water the inter-temporal aspects of water usage need to be taken into account, and in particular, the fact that decisions relating to water allocations today can impact on the availability, or quality, of water available for use in the future. Secondly, economics knowledges can also shed light on the economic impacts of different regulatory tools.

Economics knowledge practices for drought planning

Economics knowledge practices not only inform in particular the drafting of water company’s WRMPs, but they also inform the drafting of

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drought plans. Economics knowledges feature especially in selections of demand-side restrictions of water use in drought plans. Willingness to Pay (WTP) surveys conducted among its customers are used to inform water company’s decisions about the levels of service promised in a drought plan.\textsuperscript{95} These specify how often over a period of time customers are willing to accept, for instance a Temporary Use Ban (TUB), a ban on commercial non-essential water uses or emergency drought measures, such as rota cuts and use of standpipes.

These economics knowledge practices inform how water companies exercise discretionary powers granted to them by the regulatory framework. This framework sets out the different categories of water use to which temporary water use restrictions and non-essential use bans can apply. There are 11 categories of use for temporary water use restrictions which apply principally to households,\textsuperscript{96} and 10 categories of non-essential use that apply mainly to non-households.\textsuperscript{97} Hence, water companies have some discretion to regulate whose access to water to prioritize.\textsuperscript{98} They decide which temporary water use restrictions to introduce and when to introduce them. This can involve to decide how valuable savings in water use are in comparison to the adverse impacts these may have on customers and their businesses. A self-regulatory Code of Practice provides limited guidance on how to exercise this discretion.\textsuperscript{99} It recommends that water companies consider the potential economic and social costs upon businesses, communities, and individuals when deciding when and how to implement restrictions, and to introduce restrictions in a phased manner. More specifically, it suggests that domestic customers should be subject to restrictions before commercial or business customers in order to minimize the economic impact of restricting water use. But

\textsuperscript{95} Some water companies state in their drought plans that they have used WTP surveys among their customers in order to determine levels of service.

\textsuperscript{96} These include using a hosepipe to: water a garden; clean a private motor vehicle; water plants on domestic premises or non-commercial premises; filling or maintaining a domestic swimming or paddling pool.

\textsuperscript{97} These include: filling or maintaining a non-domestic swimming or paddling pool; filling or maintaining a pond; operating a mechanical vehicle-washer; cleaning any vehicle, boat, aircraft, or railway rolling stock; cleaning non-domestic premises; cleaning a window of a non-domestic building; cleaning an industrial plant; suppressing dust and operating cisterns.

\textsuperscript{98} The EA, \textit{Water Company Drought Plan Guideline} (n 21) 32 recommends that the public consultation process for the draft drought plan provides an opportunity for customers affected by temporary water use restrictions to make representations, also about economic impacts.

\textsuperscript{99} This Code of Practice has been published by the trade association (Water UK) and has been endorsed by water companies in the UK. It was developed by the research organization of the Water Industry, and incorporates the experience of the 2010–12 drought.
the relevance of economics knowledges for drought planning has to be understood in the context of their use in Water Resource Management Plans (WRMP).

**Economics knowledge practices in WRMP**

WRMP is a long-term process that is required by statute.\(^{100}\) It looks at demand—supply balances over 25 years. In a WRMP water companies are required to show the results of their research in relation to ‘levels of service’, including the cost implications of these.\(^{101}\) Guidelines for the preparation of these plans recognize that delivering high levels of service can be expensive, and that companies should consider flexible options such as increasing operating expenditure, by reducing leakage, or bringing forward investment.\(^{102}\)

Consideration of costs also matters in addressing any potential demand–supply imbalances in the future through WRMPs.\(^{103}\) The regulator Guidelines suggest that the water company should decide on the best option for its customers, on the basis of cost and what customers would like, taking into account also global and local environmental considerations. The process for assessing the merits of alternative options involves consideration of both monetary and non-monetary costs and benefits.\(^{104}\)

This WRMP planning intersects with drought planning. For instance, a water company had proposed in its drought plan upgrading the capacity of water treatment works which had been assessed as a least cost strategy in its WRMP, and business plan submitted to Ofwat. Ofwat, however, rejected the proposal and authorized only costs associated with a smaller upgrade.\(^{105}\) In its drought plan, the company notes that this had ‘marginally increased’ the risk of having to restrict water supply during a drought through supply-side restrictions.\(^{106}\)

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\(^{100}\) S 37A(1) WIA 1991.

\(^{101}\) EA, Ofwat, DEFRA, Welsh Government (n 50) 29.

\(^{102}\) ibid 30. I am grateful to Sarah Hendry for pointing this out: Bringing forward investment, in turn, can also lead to significant costs for a water company.

\(^{103}\) Before proposing supply-side options companies are required to demonstrate that they have thoroughly explored and tested all demand management options and fully considered and presented the costs of water trading with other companies (neighbouring or not) and other parties with supplies, to ensure best value for their customers (EA, Ofwat, DEFRA, Welsh Government (n 101) 14).

\(^{104}\) ibid 100.


\(^{106}\) ibid 10.
Finally, the use of economics knowledges in WRMPs has to be understood in the context of water companies’ business plans. A business plan sets out the strategic objectives of the company, and its proposed investments, so that the water company can fulfil its general licence duties to maintain an efficient and economical system of water supply, including making arrangements to ensure that supplies are available for meeting its legal obligations.107 These business plans estimate the forward-looking revenues necessary to cover total efficient expenditures (both capital and operating expenditures) over a five-year period and are submitted for review and approval by Ofwat.108 Knowledge practices feature in these plans as calculations of the costs of the ‘outcomes’ that the company seeks to achieve over the next five years. A particularly salient example is attempts to calculate the costs associated with achieving greater levels of resilience to drought and water scarcity.109 But economics knowledge practices do not just inform various planning processes that seek to prevent drought, they are also mobilized during actual droughts, e.g when drought orders are applied for.

**Economics knowledge practices for drought orders**

When companies seek to implement a drought order they have to apply to the Secretary of State for DEFRA for authorization of such an order. Drought orders can be contested, and thus may be further examined during a public inquiry. The hearing provides objectors with an opportunity to put their case to an inspector, and allow the water company to respond to the objections.110 During these inquiries, representations are made by various parties—such as commercial users affected by any water use restriction. This may entail economics knowledge practices, such as claims that restrictions imposed on water-intensive businesses will cause

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109 In some cases, water companies identified ‘less’ and ‘more resilient options’ which were then subject to a WTP survey. For example, a water company might ask customers whether they are willing to pay an extra £5 on top of the average bill by 2020 in order to accelerate a resilience programme, or alternatively, to stop the resilience programme which would reduce the average bill by £3 (Sutton and East Surrey Water, 2013, ‘Summary of our Business Plan 2015-2020’, 22) <http://www.waterplc.com/userfiles/file/Business_Plan_2015-2020-SGL.pdf> accessed 18 August 2015.
110 However, in circumstances where a drought order is urgent the Secretary of State or the Welsh Ministers can dispense with the requirement to hold an inquiry (Reg. 4 of the Drought Orders (Inquiries Procedure) Rules 1984, SI 1984/999).
them to fail and have a detrimental knock-on effect on employment.\textsuperscript{111}

When applying for a drought order that involves a ban on non-essential water uses companies are required to assess the costs and benefits of the order.\textsuperscript{112} In some cases, companies present regulatory impact assessments (RIAs), or specific economic impact analysis of the economic effects of the introduction of different levels of restriction.\textsuperscript{113} RIAs set out the water supply situation, the consultation that has been carried out, and the available drought management options, with an estimate of the likely reduction in water demand to be achieved by the drought order. While RIAs detail the benefits associated with various non-essential use restrictions, ‘they do not always assess the wider costs’ in terms of loss of recreational amenities or employment.\textsuperscript{114} But when drought orders are particularly contentious, economic impact assessments can provide quite extensive analysis. The approach adopted to measure economic impacts in these assessments varies. At a general level they assess four different categories of economic impact. First, direct costs are considered, such as financial losses of those firms affected by water supply restrictions and any welfare losses borne by their employees. Secondly, indirect costs are captured which refer to the second-order or knock-on effects on others’ welfare. Thirdly, adaptive costs are included which are expenses incurred to reduce the impact of continuing or future water supply restrictions. Fourthly, costs or welfare losses incurred through environmental impacts are taken into account.

In some cases, the benefits associated with the introduction of a lower level of restrictions on water supply are defined as not having to incur the costs associated with the introduction of a higher level of restriction, such as rota cuts and standpipes. This approach is based on general opportunity cost reasoning: water conserved today and stored is water that can be used later. The specific tools used to assess the costs of different levels of restrictions on water use are WTP surveys of households and businesses. These surveys typically ask both residential and business customers

\textsuperscript{112} ‘This should include an estimate of the water savings that would be achieved as a result of these measures and an assessment of the impacts as a result of the measures, for example the number of households or businesses affected and how they are affected’ (Department of Environment, Food and Rural Affairs, Welsh Assembly Government and the Environment Agency, 2011. \textit{Drought Permits and Drought Orders} (May 2011)) 44.
\textsuperscript{113} These RIA’s or economic impact assessments sometimes include reports commissioned by economic consultancies. In some drought order applications water companies have presented Regulatory Impact Assessments in accordance with ‘Cabinet Office Advice’.
\textsuperscript{114} Application by Sutton and East Surrey Water (n 111) 15.
whether they would be prepared to pay to avoid a specific number of days of different levels of restriction. These WTP estimates are then scaled-up to provide an estimate of the WTP over a wider supply area. In the next section we explain how we analyse the mobilization of environmental science and economics knowledge practices as they relate to regulatory tools for managing drought in the UK.

Knowledge Practices and Related Regulatory Tools: Two Key Resources in a Developing Governance Space

Knowledge practices which inform the use of regulatory tools for managing drought are one crucial aspect of governing drought. In this section we add a spatial turn to the analysis by arguing that we should understand such knowledge practices as an aspect of a governance space for managing drought in the UK. Knowledge practices and linked regulatory tools are key resources for institutional actors in this governance space.

From a Regulatory to a Governance Space

Key features of the regulatory space metaphor

The regulatory space metaphor is an established institutionalist approach to analysing regulation that goes beyond a dichotomy between private and public interest theories of regulation. It is an ‘analytical device’ and at most a concept, but not a full-fledged theory. In contrast to private interest theories, the regulatory space metaphor does not understand regulation simply as a response to private interests, or as informed by these. Nor does it understand regulation as state ‘command and control’ intervention in private economic exchange relationships in the interests of a wider community, as public interest theories do. Instead the ‘regulatory space’ metaphor is a conceptual lens that aids small-scale empirical analysis of both public and private actors, their roles and


117 ibid 18.
aims, within a specific regulatory regime.\textsuperscript{118} It builds explanations of regulation by paying particular attention to relationships between key institutional actors in a regulatory space and how these shape the distribution of power in that space and thus any actor’s capacity to steer.\textsuperscript{119}

**Systemness of regulation**

The key feature that distinguishes the regulatory space metaphor from public and private interest theories of regulation is its focus on the ‘systemness’ of regulation. Hence, regulation is not understood in terms of discrete, binary, hierarchical relationships between regulators and regulated.\textsuperscript{120} Instead it is considered as a ‘force field’, constituted by ‘a range of relationships between key institutional actors’ that are finely calibrated, changing, and keep each other in balance. One example of this is ‘extensive co-operation’ between institutional actors.\textsuperscript{121} Hence, a regulatory space can be ‘self-correcting’, which means that the exercise of regulatory power by an actor in this space will lead to adjustments and movements elsewhere in the regulatory space.\textsuperscript{122} This idea of the ‘systemness’ of regulation is further reinforced by accounts which draw on historical institutionalism. These consider relationships between regulatory actors as path dependent, and thus as stable over time.\textsuperscript{123} But other accounts develop a less strong version of the systemness of regulation. Vibert, for instance, focuses on the ‘integrity’ of systems of authority relations, and social co-ordination.\textsuperscript{124} He further emphasizes a spatial perspective by suggesting that regulatory space cuts across all other

\textsuperscript{118} Kaye and Gibbons ((n 115) 122) point to professional associations and research funding bodies as key ‘informal’ actors in the regulatory space in relation to steering biobanks in England and Wales. Contrary to criticism raised in the literature, the regulatory space metaphor, therefore, does not have to lead to overly complex accounts of a regulatory regime, that identify too large a number of actors and too many variables that shape the formation of public policy (for such a criticism see Julia Black, ‘Decentring Regulation: Understanding the Role of Regulation and Self-Regulation in a “Post-Regulatory” World’ (2001) 1 CLP 54, 103, 109).

\textsuperscript{119} Hancher and Moran (n 115) 272.

\textsuperscript{120} Mary Canning and Brendan O’Dwyer, ‘The Dynamics of a Regulatory Space Realignment: Strategic Responses in a Local Context’ (2013) 38 Account Org Soc 169, 172; Kaye and Gibbons (n 115) 112.

\textsuperscript{121} Hancher and Moran (n 115), Canning and O’Dwyer (n 120) 169, 188.


systems of authority relationships,\textsuperscript{125} such as the mobilization of law in courts and the co-ordination of behaviour through markets and social norms.\textsuperscript{126} But he also qualifies this point by leaving it open whether analysis of regulation should be conducted from a ‘societal or systemic view’, or whether researchers should ‘work up from the level of the individual actor or institution’.\textsuperscript{127} Similarly, accounts that foreground the specific strategies of actors, including their resistance to regulation, emphasize the ‘systemness’ of regulation less.\textsuperscript{128}

The spatial image is central to regulatory space analysis. It signals that ‘place matters’ and that the exercise of regulatory power hinges on the ability to exclude and include who can enter a specific regulatory space.\textsuperscript{129} Regulatory space analysis is thus not merely a descriptive mapping device but also provides a critical gloss on relationships of power between key institutional actors. It does this also because it captures how regulatory space ‘evolves over time’,\textsuperscript{130} a point particularly salient in light of new regulation for drought and water scarcity in the UK. Understanding regulatory space as evolving over time entails to reject a ‘static container’ notion of space and thus to recognize that space is socially produced.\textsuperscript{131} Asking how space ‘is made’ involves considering how social relations both constitute and shape space. This facilitates critical analysis by opening up perspectives on how regulatory space could be configured differently.\textsuperscript{132}

\textbf{A Governance Space}

We use the term ‘governance space’ rather than regulatory space\textsuperscript{133} in order to highlight two distinct features of managing drought in the UK,
that are usually associated in the literature with ‘governance’. These are first, the importance of networks composed of hybrid public–private actors for steering behaviour and secondly, steering across different levels of political and legal authority.

**Networks composed of hybrid public–private actors**

Since the privatization of the water industry in 1989 in England and Wales, water and sewerage services are now provided by companies rather than public authorities. Companies in England are privately owned, while the main suppliers in Scotland and NI are publicly owned or, as in Wales provided by a company that has no shareholders and is run for the benefit of its customers. Water companies are profitable organizations. They occupy a central, powerful position in the governance space also because they carry out statutory regulatory functions, such as granting consents for industrial and commercial discharges into the public sewers. Water companies are also required to ensure that both their domestic and commercial customers use water efficiently. It is this key role of water companies that generates significant interdependence between private and public actors in the governance space.
Hybrid private–public networks inform the management of drought, from the onset to its end. For instance, water companies and environmental regulators exchange and thus co-produce data in relation to routine monitoring of water resources. Such data benchmark ‘normal’ water availability in rivers and groundwater, which, in turn, helps to identify water shortages and thus the onset of a ‘drought’. During drought water companies and the EA co-ordinate their work in joint drought fora, also to disseminate water saving messages.

Managing drought in the UK through a sub-national multi-level governance space

Secondly, the concept of governance is often applied to steering of behaviour below and above the nation state. It thus captures steering across various levels of political and legal authority, in a multi-level governance space. This chimes with the fact that managing drought in the UK occurs through a complex web of relationships that cross national, regional, and local levels. Such relationships are not fixed but evolve over time also because political and legal competencies in relation to drought can shift between different levels of governance. For instance, the EA’s voluntary drought planning will move from a regional to a local level due to its recent re-organization. Having explained why we use a distinct concept of a governance space, we discuss in the next section some of the challenges posed by applying the governance space lens.

Where do we draw the boundaries around the governance space?

The boundaries of a governance space can be drawn with reference to two dimensions. First, with reference to a ‘horizontal dimension’, the governance space since these water companies implement some regulatory mandates in relation to private domestic and commercial customers.

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141 Also new hybrid organizational fora comprising both private and public actors, in particular water companies, industrial and agricultural abstractors, and environmental regulators as well as regional development agencies have been set up in order to strategically manage water resources and to prevent drought. Examples are the Water Resources East Anglia project and the Water Resources in the South East Group. The latter engages also in joint modelling of availability of water resources (Anglian Water, Water Resources Management Plan, 2015, 13 <http://www.anglianwater.co.uk/environment/our-commitment/our-plans/water-resource-management.aspx> accessed 18 August 2015 and Thames Water, Final Water Resources Management Plan, 2015–40, 6 <http://www.thameswater.co.uk/about-us/5392.htm> accessed 18 August 2015).
142 Chowdhury and Wessel (n 133) 357.
143 Interview A2.DP1.REG2, 25 November 2014.
question arises where does one governance space end and another one begin.\textsuperscript{144} As a starting point the regulatory space literature suggests that we should look to the ‘issue arena’ at stake in order to identify a specific governance space.\textsuperscript{145} This means that the ‘objective or subject’ of regulation defines who is within a specific governance space and who is outside it. More specifically, we can identify the boundaries of a governance space by mapping them onto the boundaries of key ‘decision-making arenas’\textsuperscript{146} or the interpretative communities that are central to implementing a regulatory regime,\textsuperscript{147} with a governance space often cutting across various independent but interconnected legal systems.\textsuperscript{148}

Secondly, how do we identify the boundaries of a governance space ‘vertically’? Is there one common, unified governance space, as Hancher and Moran suggest,\textsuperscript{149} or can a governance space be subdivided into several, distinct subspaces? For instance, Malsch and Gendron found that the creation of new independent institutions for the regulation of accounting practices of large companies in the aftermath of Enron and the collapse of Arthur Andersen—such as the Canadian Public Accountability Board—engendered resistance \textit{in a variety of ‘audit regulatory sites’}.\textsuperscript{150} Their analysis also hints at the existence of multiple regulatory spaces by suggesting that the regulatory space in relation to accounting ‘is embedded’ in a ‘field of power and international relations’,\textsuperscript{151} and thus ‘surrounding regulatory spaces’.\textsuperscript{152} So, where


\textsuperscript{145} Hancher and Moran (115) 277.

\textsuperscript{146} Melville (n 136) 388.


\textsuperscript{148} Chowdhury and Wessel (n 133) 340.

\textsuperscript{149} Hancher and Moran (n 115) 283.


\textsuperscript{151} ibid 471.

\textsuperscript{152} ibid 472. Similarly, Kaye and Gibbons ((n 115) 115) consider the regulatory space of steering bio banks in England and Wales as a subset of the space that regulates medical research in the UK.
should we draw the boundaries around the developing governance space of managing drought in the UK?

*A distinct governance space for drought in the UK*

A distinct governance space for drought in the UK can be identified with reference to three criteria. First, there is a separate body of legal rules in relation to drought that demarcates the boundaries of this governance space. Key examples of this are the three regulatory tools discussed above. Secondly, the boundaries of this governance space can be mapped onto groups of staff within DEFRA, the EA, Nature Conservation organizations, and water companies whose work is concerned with managing drought. These are distinct groups of staff because work related to drought, flooding, and water pollution control in water companies and environmental regulators is currently not much integrated. Thirdly, a specific set of policy ideas marks out a distinct governance space for managing drought. Key here is developing policy in relation to efficient services for water supply. The introduction of competition in the retail sector for water services is one element of this. For instance, in England, Scotland, and Wales there is now competition in the retail sector of supplying water services. Public sector, charity, and business customers can choose between different companies providing water and sewerage services, with such services covering the administration of their supply rather than raw water treatment. Where this is linked to successful initiatives for water saving, these wider policy developments

153 And the Scottish Ministers, and Welsh Ministers as well as the DoENI.
154 There is a distinction of roles in the EA and SEPA between staff who deal with water pollution and those who deal with water scarcity and drought (Pers Comm EA, 19 May 2014).
155 Interviews: A1.DP1.WC1, 1 December 2014; A2.DP1.WC8, 6 January 2015; A2.DP1.WC11, 28 January 2015; A2.DP1.WC12, 23 March 2015.
157 This had been introduced earlier in 2008 in Scotland through the Water Services etc (Scotland) Act 2005, with, however, limited uptake in practice. Ch 1 of the Water Act 2014 will introduce competition in the retail market for business, charity and public customers of water supply and sewerage services in England and Wales once its main sections come into force. There is also an opportunity for cross-border trade and thus a governance space for the retail sector for water services is developing that spans England and Scotland. Eg Anglia Water was awarded a contract for the administration of services related to water supply for public sector organizations in Scotland, such as billing and servicing of water supplies in March 2015.
can be linked to the prevention of water scarcity. But similar to a Venn diagram we can also identify various overlaps between a distinct governance space in relation to drought in the UK and the governance spaces of pollution control and flooding.

Overlap of governance spaces for drought, water pollution, and flooding in the UK

There is clearly a long-standing overlap between the governance spaces for drought and water pollution. Two main types of overlap can be identified. First, there are shared cause–effect relationships, because water pollution can cause water scarcity and water scarcity as well as drought can increase the concentration of pollutants in water courses. Secondly and following from the first type of overlap, the two governance spaces share regulatory tools. Sustainability reductions in water companies’ abstraction licences can both improve water quality and reduce water shortages.

Similar types of overlap can be identified in relation to the governance spaces for drought and flooding. Also here shared cause–effect relationships can be observed. Flooding can cause water scarcity and water scarcity can cause flooding. Flood waters can overload water treatment works, so that they can no longer supply usual volumes of drinking water.

159 The environmental regulator imposes restrictions on the volume of water a water company can abstract under its licence.
Moreover, reduced flow of water through sewers during drought can lead to the build up of debris in sewers. In the case of sudden heavy rainfall, flooding can occur due to blocked sewers. Moreover, the governance spaces of drought and flooding are now sharing some legal resources. The new resilience duty imposed by the Water Act 2014 is likely to be interpreted as covering water company operations both in relation to flooding and drought resilience. This new primary duty is formulated as an objective that Ofwat and the Secretary of State have to achieve when they exercise their public powers:

The purpose of the objective is ‘to secure the long-term resilience of water undertakers’ supply systems and sewerage undertakers’ sewerage systems as regards environmental pressures, population growth and changes in consumer behaviour, ‘and to secure that undertakers take steps for the purpose of enabling them to meet, in the long term, the need for the supply of water and the provision of sewerage services to consumers’. ‘Environmental pressures’ can be interpreted as referring to both challenges of either too much or too little water. Both these challenges increase the need to secure the supply of water and the provision of sewerage services. Finally, the governance spaces in relation to flooding and drought share also policy ideas. UK government policy towards both flood and drought control is risk based. This means that regulatory resources are focused on those hazards that are the most serious and most likely to materialize. This is further advanced, however, in relation to flooding, with flood risk maps pinpointing the greatest flood risks in the UK. Similar drought risk maps have not yet been developed in the UK. To summarize, while there is a distinct governance space for managing drought and water scarcity in the UK, its boundaries are fuzzy and

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160 This occurred, for instance, during the 1976 drought when heavy rainfalls occurred during August 1976 in the West Country (Western Morning News, 31 August 1976, front page).
161 S 2A (e) WIA 1991.
164 ‘We aim to be a good practice regulator and are required to follow the principles of better regulation. This means that we take a risk based and efficient approach to water company drought planning’ (EA, Water Company Drought Plan Guideline (n 21) 2).
165 S 2(1) Flood and Water Management Act 2010.
hence there are various types of overlaps with governing water pollution and flooding.

A fragmented governance space for managing drought in the UK

There is a common governance space for drought that covers the UK. This is because EU legislation in relation to SEAs, nature conservation, and water pollution—which provides a framework for drought management—creates binding legal obligations for the UK as a whole. But this common governance space is fragmented into various subspaces, that do not always map onto one of the four polities in the UK, England, Scotland, Wales, and NI. Instead, there is a ‘variable geometry’ of subspaces for managing drought. Some of these map onto a specific polity, such as Scotland, others span two polities, such as England and Wales. For instance, key water legislation that also deals with drought, the Water Resources Act 1991 and the Water Industry Act 1991, apply to England and Wales only. Hence, the governance space is characterized by a variable geometry also because jurisdictional space does not always map neatly onto a specific polity within the UK.

How these subspaces for managing drought in the UK are configured varies along several dimensions. There is variation, for instance, in the scope of powers that regulatory agencies have and in their constitutional position. Also the ownership and organizational structure of water companies varies. Again these differences in drought governance lead to a variable geometry of the governance space. Some features of drought management are specific to a particular polity in the UK, while others can be found in more than one polity. The key implication of this for the purposes of the analysis here is that within these subspaces—that exist

168 Scotland and Wales have distinct jurisdiction to implement EU law. Hence, there are some differences eg in how the EU Habitats Directive has been implemented in the four polities. For instance, there have been different degrees of non-governmental organizations’ (NGO) involvement in site designations, with less involvement of NGOs and thus less transparency in Northern Ireland (NI) than in Wales. Moreover, multiple conservation interests were not considered during site designations in NI (Sharon Turner, Implementation of the Habitats Directive in the United Kingdom, <http://www-user.unibremen.de/~avosetta/repgb2006.pdf>, 3, 4) accessed 18 August 2015.
169 The term has also been used in relation to different speeds of integration in the EU: <http://aei.pitt.edu/7378/2/7378.pdf> accessed 18 August 2015.
below the overarching UK governance space of managing drought—relationships of power between key institutional actors vary.

For instance, some economic regulators in the UK deal only with water resources as well as water and sewerage companies, while others cover a range of utilities. There is a dedicated economic regulator for the water industry in Scotland, the Water Industry Commission, and in the case of England and Wales, Ofwat. But in NI the utility regulator deals with the water and sewerage industry, as well as electricity and gas. Similarly, environmental regulators vary according to the range of environmental issues they cover. Natural Resources Wales deals not only with pollution control in relation to water, air, and land, but also covers nature conservation and forestry management. In contrast to this, in England and Scotland the nature conservation and forestry management functions are carried out by separate institutions, Natural England and Scottish National Heritage, as well as distinct Forestry Commissions, one for England and one for Scotland. It remains to be explored whether integration of the nature conservation function with the environmental regulator that also deals with water resources leads to greater attention to effects of drought management on nature conservation.170

Environmental regulators also vary in terms of their constitutional position. While the Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA) are non-departmental executive agencies, the Northern Ireland Environment Agency (NIEA) is an executive agency within the DoENI.171 Hence, the NIEA may be less of an independent counterweight to environmental policymaking by the DoENI, than the EA for England in relation to DEFRA’s policies, or SEPA in relation to the Scottish Government’s policies.172

Secondly, ‘water companies vary in their ownership and organizational structure’. Scottish,173 Welsh, and NI Water174—monopoly or near

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170 Interviews so far suggest that the limited resources of distinct Nature Conservation Organizations may be associated with limited influence in the governance space (interviews: A2.DP1.WC11, 28 January 2015, A2.DP1.REG5, 8 April 2015).
172 Such as those of the Cabinet Secretary in relation to Rural Affairs, Food, and Environment.
173 Scottish Water is a public corporation that is directly accountable to the Scottish Government. Its key sources of revenue are customer charges and funding from the Scottish Government, with some of this obtained through the Scottish Government borrowing funds.
174 Northern Ireland Water is a Government Owned Company set up in April 2007 to provide water and sewerage services in NI.
monopoly suppliers for domestic customers in these three polities—
are publicly owned companies or, as in the case of Welsh water, run for the
benefit of its customers. In contrast to this, the 20 water companies in
England are privately owned. For instance, Severn Trent and United
Utilities are public limited companies with private shareholders.

Variation in the organizational structure of the water companies is also
associated with different financing models. For instance, the way and the
extent to which customers influence the pricing of the supply of water,
including the costs of preventing and managing water scarcity and
drought, varies significantly across the four polities. In NI, domestic
customers do not pay for water and sewerage services, while in
Scotland charges for these are included in Council Tax bills.

To summarize, there is a common, overarching governance space in
relation to the ‘issue arena’ of drought in the UK, but within this space we
can also identify several subspaces. Some of these subspaces map onto a
distinct polity within the UK, others span two or three polities. In the
next section we further develop the governance space metaphor in two
main ways. First, different from the regulatory space metaphor we suggest
that key resources available to institutional actors in this governance space
are not necessarily fragmented. Secondly, and, most importantly, we con-
sider law and information—two key resources in the governance
space—as mediated by discourses.

A Distinct Concept of a Governance Space

According to the regulatory space metaphor there are four key ‘frag-
mented’ resources available to institutional actors in the space.

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175 There is a dominant supplier in Wales, Welsh Water. Welsh Water is a company
limited by guarantee. Dee Valley Water plc is supplying water only in the North East of
Wales. Severn Trent, located in the English Midlands, supplies water across the border into
mid-Wales.

176 Affinity Water Ltd, Anglian Water Services Ltd and Thames Water are owned by
consortia of investors. Affinity Water is mainly owned by Infracapital Partners and Morgan
Stanley Infrastructure Partners, Thames water is owned by Kemble Water Limited, with
various institutional investors investing in Kemble Water.

177 In relation to the discursive mediation of information in a regulatory space see also
Ingrid Cloete, ‘Don’t Mention the Law: Marginalising Liability for Acid Mine Drainage in

178 Kaye and Gibbons ((n 115) 123) add to these four resources ‘shared cultures, attitudes
and understandings’ as underpinning the regulation of biobanks through formal standards
and procedures. They also work with a broad understanding of ‘information’ that includes
the effective publication and dissemination of materials, that come to be considered as
authoritative among relevant stakeholders (Kaye and Gibbons (n 115) 117).
These are law, information, finance, and organizational capacity. As discussed above, legal and associated information resources, are to some extent shaped by EU law. Organizational capacity refers, for instance, to the structure of an organization and how it organizes its work tasks, which—in turn—influences its position in a regulatory space. In the regulation literature these four resources are depicted as ‘fragmented’, in the sense that no one institutional actor in a regulatory space has sole control over any or all of these resources. But as argued above, we consider knowledge practices as closely linked to legal resources and central to their mobilization.

Most importantly, we develop the governance space metaphor by conceiving of law and information not in positivist terms, as pre-given, taken for granted representations of legal and social realities, but as mediated by discourses. From this perspective, wider discourses shape how a particular meaning is attributed to both legal provisions and information. This is different from some applications of the regulatory space metaphor which do not inquire into how legal rules acquire meaning. Instead legal rules are considered—in more instrumental terms—as devices for structuring membership in the regulatory space, with legal resources often understood—from a positivist perspective—as statutory provisions, secondary legislation, case law, and soft law codes whose meaning can be ascertained through doctrinal analysis. Also ‘information’ is understood in some of the regulatory space literature in realist terms, with inquiry being directed at how accurately it reflects the activities of the regulated.

Seeds of the idea that legal regulatory tools and knowledge practices are mediated by discourses can be detected in some of the literature on the regulatory space metaphor. For instance, Scott recognizes the importance of ‘interpretative communities’ in the regulatory space, and Jonnergard and Larsson analyse ‘regulatory conversations’, defined as ‘discursive activity between involved actors, organizations and interest groups’ in order to understand the ‘transfer and implementation of new regulation’.

\[179\] Hancher and Moran (n 115) 286.  
\[180\] Scott (n 130) 334.  
\[181\] ibid.  
\[182\] Melville (n 136) 387.  
\[183\] Kaye and Gibbons (n 115) 111, 114.  
\[184\] Melville (n 136) 388, 389, 393.  
\[185\] Scott (n 130) 341. See also Jonnergard and Larsson (n 147) 471.  
\[186\] Jonnergard and Larsson (n 147) 471.  
\[187\] ibid 461. Similarly Shearing suggests that what counts as relevant ‘information’ in the regulatory space for trading securities is also informed by the ‘lay theories’ of market...
But in contrast to these accounts, we define discourses in Foucauldian terms as historically specific and situated knowledge regimes that shape what can be thought and said about a topic at a particular time.\(^{188}\) Hence, we understand power as associated with particular governmentalities,\(^{189}\) an ‘art of governing’ associated with specific practices, including self-regulation through the ‘conduct of conduct’.\(^{190}\) For instance, developing the ‘right’ regulation within a governance space ‘disciplines’ not just regulated organizations but also regulators.\(^{191}\) Hence, we do not understand power dynamics as the outcome of contests between opposing key institutional actors in the governance space. Attention to the pursuit of key institutional actors’ interests and preferences provides only a limited take on relationships of power.\(^{192}\) Conceiving of information and legal resources as mediated by discourses adds a critical edge to the governance space metaphor because identifying such discourses is the first step towards developing new discourses about managing drought.\(^{193}\) In the next and final section, we explain how ‘information’ and linked legal resources can become mediated in the governance space by a discourse of reputation management.

participants rather than just the professional theories of regulators, civil servants, consultants, and policy makers (Clifford Shearing, ‘Chapter 5: A Constitutive Conception of Regulation’ in Peter Grabosky and John Braithwaite (eds), *Business Regulation and Australia’s Future* (Australian Institute of Criminology 1993) 76).

\(^{188}\) Michel Foucault, *The Archaeology of Knowledge* (Tavistock 1972) 49. Similarly, Young introduces elements of Foucauldian discourse analysis into regulatory space analysis in her account of the regulation of accounting practices in the USA in the context of the savings and loan crisis (Joni J Young, ‘Getting the Accounting “Right”: Accounting and the Savings and Loan Crisis’ (1994) 20 (1) Account Org Soc 55). Her account, however, works with a stronger conception of agency as innate to actors in the regulatory space rather than constructed by discourses (Young (n 188) 76–78).

\(^{189}\) Young (n 188) 76.


\(^{191}\) Young (n 41) 55.

\(^{192}\) Malsch and Gendron (n 150) 458.

\(^{193}\) Drawing on Foucauldian discourse ideas shapes the nature of the explanatory account provided by the concept of the governance space. It sheds light on ‘conditions of possibility’ for regulation, but does not provide causal explanations. This is different from existing literature which assumes more agency for institutional actors in the regulatory space by exploring ‘conditions of possibility’ for regulation from the perspective of sociological institutionalism. This examines how actors orient themselves to a ‘logic of appropriateness’ within a regulatory space (see eg MacDonald and Richardson (n 144) 489). Young (n 144) 104.
Building and maintaining reputations: a discursive frame for information and legal resources

Building and maintaining reputations for effective drought management is a concern for both regulatory and regulated actors in the governance space. The EA, for instance, points out several times in its Head Office Drought Plan that it is important to manage the impact of drought on its reputation as an environmental regulator.  

Reputation management is also a well-established theme in the regulatory space literature. It matters, in particular, if ‘information’ relied upon for regulation is complex, because regulated organizations will seek to create confidence in their activities among regulators. In that case the management of information flows may become a significant aspect of governance, rather than the actual steering of the fundamental, underlying conditions, e.g. of a natural resource or a market.

Also water companies seek to build and maintain reputations for effective drought management, for instance through drought planning. This is relevant not only for water company customers, regulators, and investors, but also for a wider public, since the statutory framework requires public consultation in relation to drought plans.  

To be ‘effective’ drought managers, water companies need to be seen to take appropriate action to prevent water shortages. This also depends on whether customers think that water companies have sufficiently reduced leakage from pipes:

We recognise that credible leakage performance influences customers’ belief in times of drought.

In Foucauldian terms the discourse of building and maintaining reputations thus generates a specific effect of power, that is, to promote customer co-operation with regulatory tools, such as demand management, for managing drought. This matters because water companies have to show that they have taken sufficient action for demand management and leakage reduction, before they can apply for a more impactful regulatory tool, such as a drought permit. Moreover, a discourse in relation to building and maintaining reputations can enable water companies to comply with their statutory duty to ensure the efficient use of water by

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194 EA, Head Office Drought Plan (n 5) 13, 33, 34, 57.
195 Shearing (n 187) 77.
198 Interview, A2.DP1.WC8, 6 January 2015.
both their domestic and commercial customers. Water companies do not have many compulsory levers in order to achieve this. Hence, exemplary performance of their own operations in relation to efficient water use can support wise water use initiatives for their customers. Finally, a discourse of reputation management also frames the use of legal regulatory tools by the economic regulator. Ofwat had intended to introduce economic incentives for water companies to reduce unsustainable abstractions during the last 2015–20 price review process. But given a ‘lack of data’, Ofwat decided instead to rely on ‘praise and criticism’ of individual water companies in order to promote voluntary restrictions of unsustainable abstractions.199

Linking Drought, Discourse, and Space—Understanding the Governance of a New Environmental Challenge in the UK

Key legal regulatory tools contribute to drought management in the UK. How these tools are applied—also during specific droughts—depends crucially on the production of a range of, sometimes linked, environmental science and economics knowledges. We have argued that the deployment of these legal provisions and linked knowledge practices can be best understood when they are imagined as key resources for institutional actors in a governance space. This governance space in the UK partly overlaps with water pollution and flood control. It is also characterized by a variable geometry. It is fragmented into various subspaces that do not neatly map onto each polity in the UK: England, Wales, Scotland, and NI. The article further developed this conceptual framework of a governance space by arguing that—in contrast to traditional regulatory space analysis—legal and linked information resources should be understood as linked and as mediated by discourses. This linguistic twist to the spatial analysis enables to trace effects of power of discourses that form the background conditions which, in turn, contribute to explanations of why regulatory tools may or may not alleviate drought and water scarcity.