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Water Scarcity in England and Wales as a Failure of (meta)Governance

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ABSTRACT: The water crisis is often said to be a crisis of governance failure rather than of availability per se; yet the sources of this failure are poorly understood. This paper examines contemporary water scarcity in England and Wales as a failure of ecological modernity, in which technical and institutional innovation is promoted as a means of increasing economic efficiency in the allocation and use of water resources. The role of the state in fostering this innovation is explored through exploring a shift from 'government' to 'governance'. The paper employs Jessop's theory of meta-governance to examine governance failure. Meta-governance represents the capacity of the state to flank or support the emergence of specific forms of governance through mobilising material or symbolic resources. Three sources of governance failure are explored: (1) the nature of capitalist exchange and its resulting production of nature, (2) the political dimensions implicit in meta-governance, and (3) the nature of governance as a task of self-organisation. The model is then applied to the rise of water scarcity in England and Wales from the 1970s to the present day. The utility of the model in analysing governance failure is discussed.

KEYWORDS: Water scarcity, water governance, meta-governance, water privatisation, England and Wales

INTRODUCTION

The English and Welsh landscape is not an arid one, rarely are river beds left exposed or flora bleached by lack of water. Drought and water scarcity, seemingly incongruous with such a 'rainy island', are more readily associated with conventionally dry nations. In the spring of 2012, with an unprecedented amount of rainfall leading to widespread flooding, significant economic damage, and in some cases loss of life, scarcity seemed all the more distant. Yet only months prior, in February 2012, a government minister held an emergency summit to arbitrate water rights disputes between agriculture and utilities (BBC, 2012a). By March, restrictions were effective on domestic consumption (BBC, 2012b). By April, the Environment Agency (EA) warned that the drought in parts of England and Wales would most likely remain past December (BBC, 2012c); this was negated only by the record-breaking period of rainfall which would soon follow. On a broader timescale, policy and research abound with comparisons of per capita availability in England's southern regions to that of Spain (EEA, 2005), Mexico (WRI, 2005) or even Morocco and Egypt (EA, 2008). The EA classifies much of southern England as water-stressed (EA, 2007a), while the European Environment Agency (EEA) identifies the Thames Catchment as one of the most water-stressed in Europe (EEA, 2005).

The nature of water scarcity is problematic; it is notoriously difficult to unpack and isolate from its socioeconomic context (Rijsberman, 2006). For instance, why was it that when net inland freshwater abstraction in England and Wales was higher in 1976 than in 2012 and was projected to grow exponentially there were no concerns over scarcity voiced by planners at the time (Walker, 2012)? A decline in national demand does not rule out intensified demand at a river-basin level, yet scarcity metrics of per capita availability (Falkenmark, 1989) or relative rates of abstraction and recharge

(Alcamo et al., 2003) still leave unattended discrepancies in the changing metrics and drivers of water scarcity over time and place. This paper attends to these discrepancies through situating water scarcity in England and Wales within a shift from a state-coordinated, supply-driven approach to resources planning to governance-based approaches based on economic efficiency and demand management in the late 20th and early 21st centuries (Guy and Marvin, 1995; Maloney and Richardson, 1995; Hassan, 1998; Taylor, 1999; Bakker, 2003; McCulloch, 2009).

Jessop's model of governance and meta-governance failure is adapted to provide an explanatory framework. Jessop emphasises that ultimately the analysis of governance failure must be in a constant flux between the "abstract and simple to the concrete and complex – with natural necessities on the one side, contingent events on the other" (Jessop 1990b: 189). In other words, to avoid economic determinism, economic history is best understood through asking how economic processes generate the material conditions under which possible social forms may emerge (Schumpeter, 1962). The paper argues that English and Welsh demand management policy risks such determinism through viewing demand management as a direct and largely technical response to a natural and external water scarcity. Demand management is presented in policy as a depoliticised question of 'governance' and governance is, in turn, presented as an alternative or successor to government or to "a neutral third term" (Jessop, 2003a: 148). Through focusing on naturalised accounts of water scarcity and promoting technical solutions of institutional and regulatory reform, the role of the state and state politics is largely omitted from each government's account of water scarcity.

In order to include the social and political dimensions of water scarcity, this paper examines how the projects and ideologies of successive governments revise, destabilise, and instigate successive water governance systems. In examining how the state pursues political projects, Jessop's theory of the modern state is employed. In particular, the paper employs Jessop's approach to analysing the limited ability of the state to affect governance change which he terms 'meta-governance'. Meta-governance ascribes limits to state hegemony through observing that institutions act differentially upon different actors and their strategies, offering a decentralised and dispersed understanding of state power. Within water resources management, this becomes useful in assessing how successfully governance projects can be taken up in the wider economy and how they are affected by the competing strategies of non-state or partisan forces. This strategic interplay between social structure and agency allows research to examine how the institutional arrangements, material infrastructures, discourses, and practices associated with water utilities in England and Wales have had significant and often unexpected path-shaping effects on state-sponsored reforms.

SITUATING WATER SCARCITY WITHIN ECOLOGICAL MODERNITY

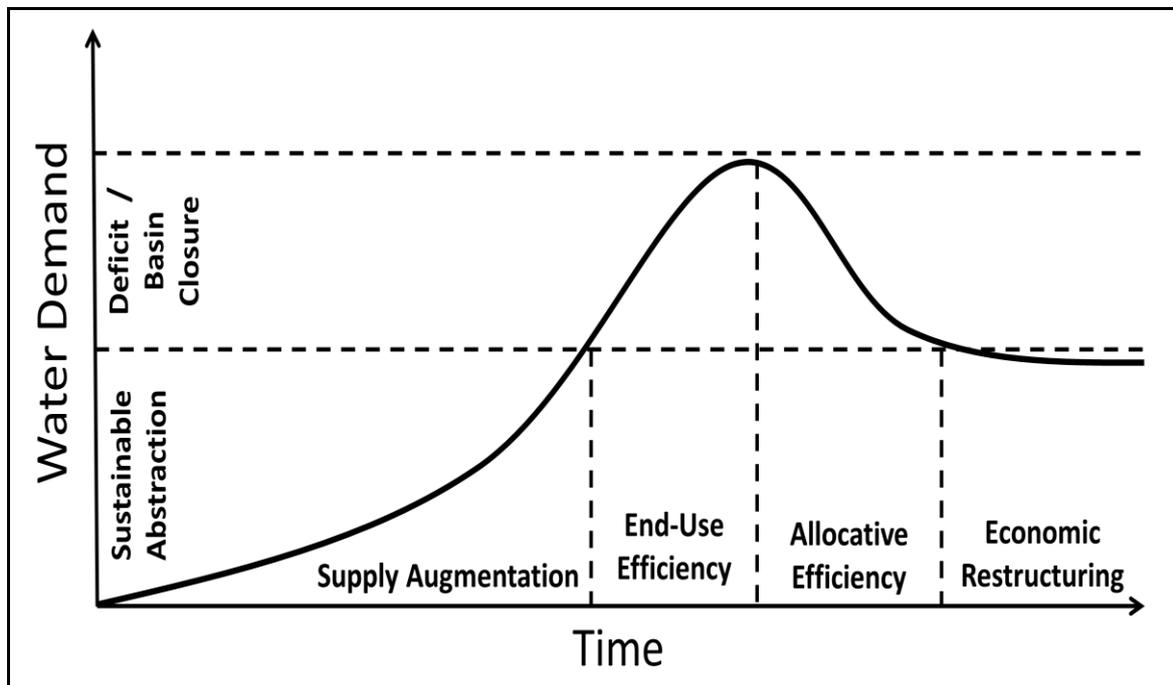
Molle et al. (2009) note post-World War II reconstruction initiatives to have often included a supply-driven water resources planning strategy. Often aligned with state strategies towards economic and social power, water resources projects were delivered through bureaucracies underpinned by an ideology of technocratic elitism, man's dominion over nature, the casting of water as a public merit good, and a consensus that the state was the only viable means of coordinating national water resources projects. Institutionally, these bureaucracies were often imbued with direct state subsidies and hierarchical authority, allowing them to operate under principles of professional consensus over democratic processes. While the English and Welsh water sector has always operated in various hybrid forms of public and private ownership and control (water resources planning prior to privatisation in 1989 was to some extent polycentric across several resources planning agencies), researchers examining post-war water resources planning in England and Wales note the presence of many of the characteristics Molle et al. (2009) describe, in particular, the ability of state-sponsored planning organisations to initiate large supply-driven projects in response to local water resources scarcity (Guy and Marvin, 1995; Hassan, 1998; Bakker, 2003; McCulloch, 2009). Thus in 1973, with abstraction at its

peak and projected to grow exponentially, planners insisted that "[t]here is no intrinsic shortage of water in England and Wales. In total, rainfall is ample [sic] to meet all demands for the foreseeable future" (WRB, 1973: 1). Such research suggests that states, which have undergone periods of national supply-oriented water resources planning, shared common institutional and cultural features that favour technocratic thinking, closed network decision-making, and state-sponsored cross subsidies.

With hindsight, the seeds of the decline of supply-oriented planning can be identified from the 1970s onwards. Increasing affluence had begun to transform the local environment into a source of leisure and quality of life, while the environmental and social externalities of economic growth were highlighted in prominent research and international reports (Ehrlich, 1968; UN, 1972; Meadows et al., 1972; Brundtland, 1987; ICWE, 1992; WCD, 2000). Simultaneously, many advanced European economies began to de-industrialise, weakening the correlation between increased water abstraction and economic development and undermining the case for state sponsorship (Juuti and Katko, 2005). While deep green theorists called for the radical restructuring of economic and political orders (Bahro, 1984), it was a model of ecological modernity which began to replace the supply-driven approaches of the post-war era. Rather than rejecting current modes of economic growth on the grounds of social and environmental impacts, ecological modernity appeals to a model of development which argues that as economies mature towards high-end or service-sector employment, so too does disposable income and demand for high elasticity goods and services such as environmental integrity, social security, and transparent governance (Kuznets, 1955; Lipset, 1959; Huber, 1982, quoted in Spaargaren and Mol, 1992). The internalisation of social and environmental externalities into capitalist modes of exchange is presented as a reflexive process, achieved via institutional and technological innovation. Multilateral agreements now promote the designation of an economic value to water (ICWE, 1992) and endorse its economically efficient allocation and consumption in light of competing economic uses (European Parliament, 2000). Water's economic status is increasingly recast from a public to a private good, its scarcity articulated as naturalised and absolute, and its management prescribed in terms of economic efficiency (Rogers et al., 2002; Savenije and van der Zaag, 2002). When a river basin reaches a point of 'peak water' (Gleick and Palaniappan, 2010), 'river basin closure' (Molle et al., 2010) or 'water deficit' (Turton and Ohlsson, 1999) policy models project an optimal socioeconomic response of increased efficiency in water productivity followed by increased efficiency in water allocation (ibid), and in some cases a further period of economic restructuring (Brooks et al., 2009) (see Figure 1).

In examining the social and technological innovation necessary to achieve ecological modernity, models of 'social learning' (Pahl-Wostl et al., 2007), 'adaptive capacity' (Turton and Ohlsson, 1999) or 'social capital' (Adger, 2003) have sought to proceed beyond absolute water scarcity metrics to capture the social dimensions of scarcity's nature and impact. Explicit or implicit in these models is the observation that the state, as coordinator of collective action and as an intermediary between the public and private spheres, has significantly changed in nature. This is described as the shift from *government* to *governance* (ibid). While no agreed definition of governance prevails (see Tortajada, 2010 for a discussion) the following provides common ground between governance definitions: firstly, it involves negotiation between, and coordination of, a diverse array of state, private sector, civil society, and third sector actors. Secondly, it emphasises mechanisms of collective action which are distinct from the traditional state versus market dichotomies. In particular, the reflexive self-organisation of agents towards shared goals is understood to be governed by relationships of reciprocity, mutual benefits, and negotiated institutional structures (Ostrom, 2010). Finally, agents may engage in polycentric and nested governance structures which operate across spatial and temporal scales, making analysis of the reach and effects of governance difficult to delineate and analyse. It has now become something of an adage that the water crisis is a crisis of governance, rather than of availability per se (UN, 2006).

Figure 1. Stylised synthesis of optimal adaptation trajectory to water scarcity under models of ecological modernity.



GOVERNANCE AND META-GOVERNANCE FAILURE

To analyse water scarcity in many post-industrial European states is therefore to ask why there has been a failure to implement ecological modernity and to appeal to governance failure as an explanatory framework. The criteria for governance failure are as numerous as those of governance. This paper adopts a non-normative definition of governance failure as a failure amongst a group of agents to renegotiate shared objectives and negotiate collective action towards them (Jessop, 2000). Jessop's (2008) Strategic Relational Approach (SRA) is adapted to examine governance failure in relation to ecological modernity and scarcity in England and Wales. The SRA is a non-functionalist, evolutionary account of social organisation and change in capitalist societies and seeks to describe: (1) the dynamics of capitalist modes of production; (2) the nature of the state and politics in societies dominated by capitalist relations of production; and (3) the structural coupling and path dependence of economic and political orders and the limits to their coordinated change (Jessop, 2008: 21). From these three foci, three corresponding sources of governance failure are proposed.

Considering (1), governance may fail due to the inherently contradictory and unstable nature of capitalist exchange. Spaargaren and Mol (1992) identify early criticisms of ecological modernity based on Marxist theory which maintain that the environmental crisis is a product of a continuing industrial crisis and view ecological modernity as the state's attempt to regulate and mitigate the antagonistic relationship between development and the environment (Keil, 2007; Castree, 2008). Economic development is analysed as a spatiotemporal process driven by the social metabolism of nature into value and the transformation of space into a social relation and a force of production (Swyngedouw, 1992). Economic expansion in pursuit of further capital drives this process into new social and environmental arenas, reproducing the inequalities, tensions, and contradictions which constitute its operation. Analysis describes how inequalities, tensions, and contradictions are expressed across landscapes in terms of exposure to hazards, access to services, and economic gain (Blaikie, 1985; Harvey, 1996). In terms of water, much of the analysis rests on the observation that to dominate water

is to dominate people (Wittfogel, 1956; Worster, 1992; Reisner, 1993). As an economy's demands on water change, labour and capital must be mobilised to overcome its biophysical and geographical dimensions which resist human intention (Bakker, 2005). Such mobilising becomes a vehicle for social differentiation and capital accumulation; water resources projects are composed of physical, institutional and discursive infrastructures which introduce selective biases in the allocation of wealth, authority, access to services, definitions of legitimate consumption, and exposure to produced scarcities. The tensions in state hydraulic missions (Swyngedouw, 1999) and subsequent projects of ecological modernity in water (Bakker, 2003, 2005) are expressed, resolved, and generated through a hydraulic landscape which must be constantly reconfigured and maintained.

Considering (2), the state is understood to play a central role in enabling the discourses, practices, and institutions which reproduce a hydraulic landscape. Critical research on ecological modernity has pointed to a tendency to present reform and innovation as a depoliticised, technical truism (Allan, 1999, 2005; Graham, 2006). In a similar manner, Jessop notes how the state evokes various economic imaginaries such as the Knowledge Based Economy (Jessop, 2005) or the Green Deal (Jessop, 2012) to rationalise and mitigate tensions and contradictions faced in economic development. It is here where Jessop's understanding of the state as an ensemble of strategic-relational objects is important; internal and external state relations and institutions limit the degree to which an imaginary can be consolidated and mapped onto semiotic and extra-semiotic objects in the actual world. Hence, Jessop claims that "whether, how and to what extent one can talk in definite terms about the state actually depends on the contingent and provisional outcome of struggles to realise more or less specific 'state projects'" (Jessop, 1990a: 9). Analysed as an economic imaginary and state project, ecological modernity may fail because it is often economically and politically costly (Mollinga, 2008). The state may reject reform once the costs of institutional reform become apparent, preferring instead "economically invisible and politically silent" (Allan, 2005: 182) options such as food trade and desalination. At best, reform towards ecological modernisation is a case of introducing a structural selectivity in the form of material and symbolic support which privileges the emergence of specific governance outcomes. It is this which Jessop coins 'meta-governance' (Jessop, 2003a). The state may flank or support the emergence of specific governance structures through its role in shaping 'sanctioned discourse' (Allan, 1999) and 'hydrosocial contracts' (Turton and Ohlsson, 1999). It plays a constitutional role in governance, providing legal and regulatory frameworks, acting as the primary organiser and mediator between organisations, and defining the basis through which governance structures are negotiated (Jessop, 2003a). However, these will always be monitored and influenced by partisan and political interests, introducing the risk of a governance structure being undermined by short-term political interests or conflicting priorities within the state.

Finally, considering (3), governance may fail due to its nature as a reflexive self-organising process. As discussed, state meta-governance is necessarily partial and contested; its aim is to be selected, retained, and reinforced by a wider array of semiotic (orders of discourse) and extra-semiotic (institutional and material) structures. In Jessop's analysis, institutions are not the collectively negotiated outcomes of pre-constituted rational agents operating under utility-maximising imperatives; they act differentially upon various actors and have reciprocal relationships with their identities, beliefs, and modes of calculation. Specific institutional arrangements, discursive orders, and power asymmetries have co-evolved over time and become structurally coupled with political orders, serving to legitimise and rationalise economic conduct and power. Choreographing the uptake of new modes of governance requires the rescripting of these structures that, in turn, requires negotiation between a wide array of actors with disparate modes of belief, practice, and economic incentives. The institutional change which ecological modernity makes reference to in its vision of adaptation becomes a contentious process that requires a high degree of interpersonal and inter-organisational coordination. As a consequence, a practical criticism of ecological modernity has been that the rate at which reform can proceed may not outpace the growth of socio-environmental externalities (York and Rosa, 2003).

The risks, costs and benefits of resources management are necessarily shared unevenly between the agents involved in generating problems of coordination. Where agents view reform as a strategic or ideological concession, they will resist such change while actively maintaining the current structures they rely upon. In addition, there is often a deficit of knowledge concerning the causal structures of the objects of governance leading to uncertainty, and risk of unintended consequences. Jessop argues this is particularly problematic where the object of governance is a complex and unstructured system, which may be beyond intentional control.

WATER SCARCITY AS (META)GOVERNANCE FAILURE IN ENGLAND AND WALES

The changing hydraulic landscape and water scarcity

The following section explores how economic restructuring from the 1970s to the present (2013) has affected the collapse of supply-side resources planning and enabled the emergence of a radically distinct form of water scarcity, incommensurate in metrics, composition, and distribution to its predecessor. Supply-driven resources planning was brought to an end – not by increasing scarcity, but by a sudden collapse in water demand in the late 1970s which took resources planners by surprise and undermined their legitimacy. Subsequent economic restructuring generated a new set of demand drivers and criteria for scarcity. As northern and midland industrial centres declined, economic development came to be driven by financial and service sectors of southern England. Water demand shifted from industrial consumption towards public supply, rendering the water utility sector the primary abstractor of water. When combined with new constructions of the environment which promoted metrics of scarcity based on basin-scale assessments of environmental integrity, the South and South East regions of England became the focus of distinctly new forms of scarcity. The relative rise of public demand and the privatisation of water utilities in 1989 rendered the water utility sector the chief site of negotiation for new models of ecological modernity in response to scarcity.

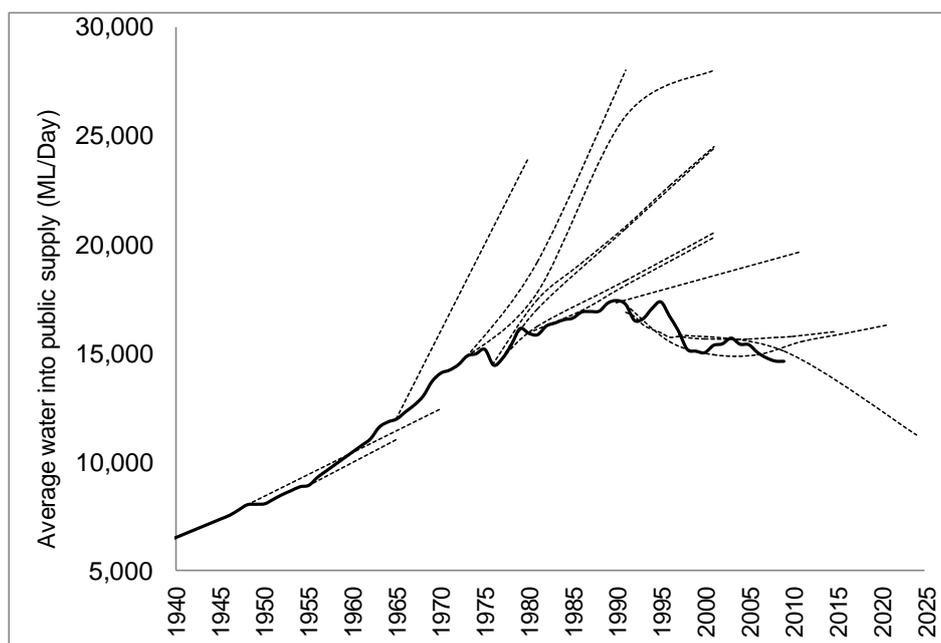
Table 1. Changes in the economic production and social construction of water scarcity from supply-driven planning to ecological modernity.

		Supply-driven planning (1900-1989)	Ecological modernisation (1989-present)
Water demand characteristics	Principal abstractor	Industry and energy generation	Domestic and commercial
	Geographical focus of economic growth	North and Midlands	South, South East, and London
	Primary drivers of water demand	Industrial output and modernisation of living standards	Domestic consumerism, financial and service industries, environmental allowances
Scarcity metrics	Water resources sufficiency criteria	Sufficient security of supply	Sustainable development
	Spatial units employed in analysis	National	River basin

In the mid-1970s, net abstraction had reached levels not seen since in England and Wales (Figure 3). A steady growth in demand over the 19th and 20th centuries had been sustained by a public health revolution, growth in water-intensive industrial production and energy generation, and the post-World War II project of socioeconomic recovery (Guy and Marvin, 1995; Hassan, 1998; Bakker, 2003;

McCulloch, 2009). With no reason to believe these trends would cease, planners projected demand to grow exponentially (Figure 2). A consolidated and state-coordinated water resources planning system moved to deliver consecutive resources development projects in anticipation of the demands of industrial growth and modernised living standards. However, sharp economic decline in the late 1970s rendered the water demand projections upon which major infrastructure developments were founded meaningless. Kielder reservoir, approved in 1973 prior to the shift in demand behaviour, became an increasingly obvious example of the vulnerability of large irreversible capital investments to inaccuracies in demand projections. By the time of its completion in 1982 at a cost of £150 million, it was evident that most of the water would not be required and was earmarked for transfer schemes (NRA, 1995). In 1976, only three years after the approval of the Kielder Water Scheme, plans drawn up by the Southern Water Authority to flood 700 acres of farmland at Broad Oak were rejected on the basis of their use of linear projections in demand forecasting, as well as a lack of emphasis on water conservation in the form of leakage control (*ibid*). A similar enquiry into raising the levels of Ennerdale reservoir would later be rejected in 1980 entirely on the basis of failing to take control of leakage into consideration (*ibid*). Even today, 'conventional' engineering solutions to securing supply are perceived as a political and environmental risk. Of the three companies taken to public enquiry over their resources plans in 2010, two were proposing major reservoir developments which attracted regulatory scrutiny (DEFRA, 2010a,b).

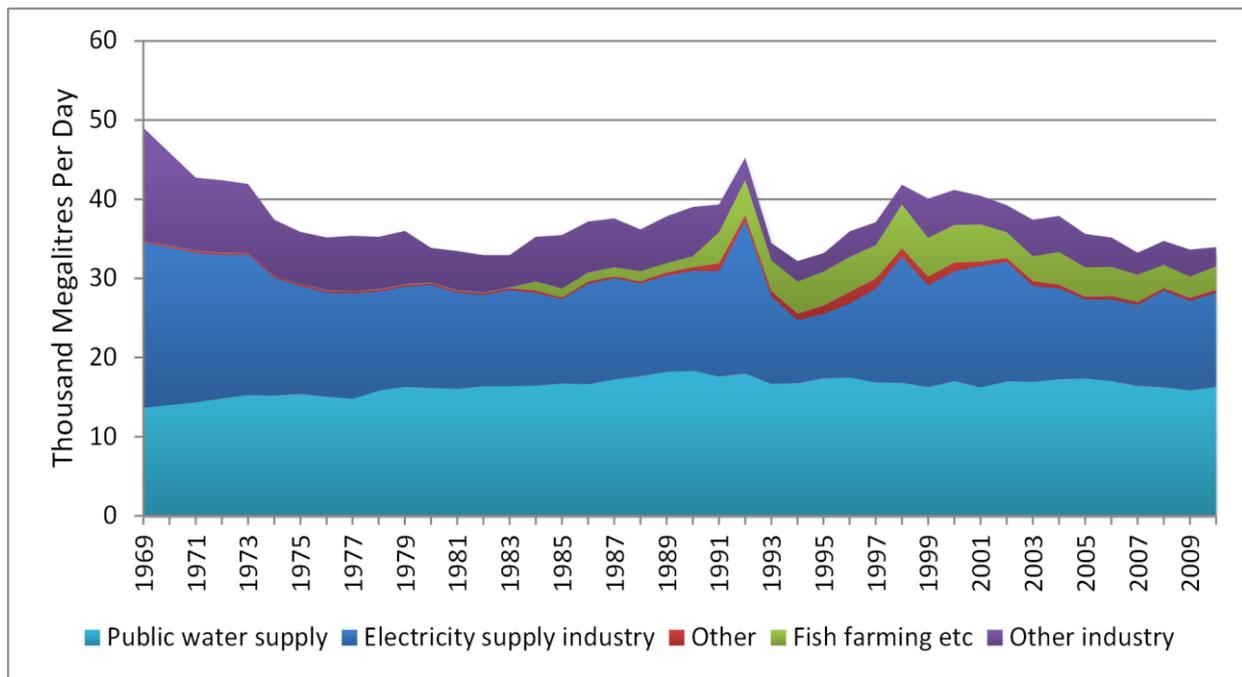
Figure 2. Projected (dashed line) and actual (solid line) water placed into public supply in England and Wales (Original graph in Walker, 2012).



In the midst of economic turmoil came the election of the Conservative government of 1979. Perceived state failures in the 1970s led to a crisis in legitimacy of centralised planning and state-led projects (Jessop, 2000). International Monetary Fund (IMF) bailouts were accompanied by conditions of limited public spending and borrowing, severely limiting the state contributions to water resources management. While the neo-liberal philosophy of the Conservative government and its programme of water utility privatisation in 1989 were far from unified or hegemonic (Maloney and Richardson, 1995; Haughton, 2002), some core characteristics can be abstracted. The first was a critique of the state acting with self-interest according to short-term political goals or personal utilities and therefore unable

to plan according to maximal social welfare. Secondly, a retreat of state provision of services was advocated. An appeal was made for market mechanisms, and privatised provision¹ in lieu of state services was made. Scarcity was accordingly rescripted; supply-driven planning's interpretation of water as a public merit good to be developed and subsidised, was replaced with that of water as a scarce private resource, to be allocated under criteria of economic efficiency (Bakker, 2005). The use of market mechanisms as a means to increase water productivity and efficiency in allocation were explicitly laid out and implicitly demanded the commoditisation of water. These transformations together formed a 'Market Environmentalist' blueprint for water management (ibid).

Figure 3. Total licensed inland surface and groundwater abstraction in England and Wales.



Note: Data collected before 1991 are not strictly comparable with those of later years; licensed vs. actual abstraction may vary; abstraction does not indicate consumptive use.

Data source: DEFRA, 2009.

The unexpected decline in water demand in the years prior to, and soon after, privatisation reduced pressure on security of supply and allowed the market-based models of water resources planning to remain untested and intact for much of the early 1990s. The environmental regulator, the Office of Water Services (OFWAT), noted in its early assessments of resources planning that some improved connectivity between companies combined with gradual leakage reduction would be sufficient to "avoid the need for major resources development such as large reservoirs and their concomitant large investment" (OFWAT, 1994: 1). Much of privatisation's early delivery of environmental objectives was focused on the shift in policy focus from water *quantity* to water *quality*. While demand for water slowed, new European Union (EU) standards on effluent and drinking water quality meant the majority of early private capital investment was spent on water quality projects. It was only in later years that new contradictions and spatial inequalities of the economic regime would surface. This new water scarcity began to emerge primarily in the South and South East of England, partially produced by the

¹ For a detailed attempt to list the defining features of the neo-liberal project, see Castree (2010).

demands of a new economic regime, partially by the hydrological features of the region, and partially by new standards of environmental integrity taking hold in water policy. Industrial decline in the north of England had been mirrored by a growing emphasis on financial services and knowledge-based economies in southern England, with Greater London serving as its focal point. The South East region of England emerged from the economic recession of the 1980s as UK's strongest regional economy. While these regions enjoyed a steady rise in wages and disproportionately higher government support and resources, the industrial economies of the north continued to decline, reinforcing the north-south divide of wealth and political power (Jessop, 1990a; Peck and Tickell, 1995). The Conservative government vigorously pursued economic development in the southern region as it transpired to be the centrepiece of the 'Thatcher Miracle' (ibid). New Labour subsequently continued the promotion of the South, South East and Greater London as the engines of the new British 'Knowledge-based Economy' serving globalised markets such as financial services, technological research, and media (Jessop, 2003b).

The South and South East regions remain sites of substantial capital accumulation and bastions of economic growth in government policy. Water scarcity has become another instance of the tension faced by regional planners in this area, attempting to "maintain its economic success and its position as one of Europe's most prosperous regions, while at the same time enhancing its environment and improving the well-being and quality of life of all its citizens" (Foley, 2004: 1). Population growth in southern regions consistently outpaces national averages. From 1991 to 2003, the South East Region of England experienced the fastest population growth in the country, with an increase of 5.9%² and was projected to increase 14.0% from 2003 to 2028³ (ONS, 2003). To this day, the region remains in a constant housing crisis, rendering increased housing development in the region politically vital for successive governments. An average of approximately 25,000 new homes a year were built between the early 1990s and 2004 (SERA, 2004) and the promotion of housing in the region is a political imperative. In 2003, Labour's Regional Development Agency proposed to increase home building to 29,000 per year (ibid). This intensified development continues in the meteorologically driest regions of the county. Rainfall follows a decreasing gradient from >3000 mm/year on the west coasts of Scotland and Wales to <600 mm/year in the South East of England and London (Met Office, 2013). Climate models employed by the government and regulators project that this pattern will be amplified in future; precipitation is expected to follow a trend of wetter winters and dryer summers, accompanied by an increase in variability at both monthly and inter-annual scales (Christensen et al., 2007). A North-South (weak to strong) gradient in the severity of warming trends and heightened winter-summer precipitation margins indicates that the South East will be the most exposed in the UK (Hulme et al., 2002). Finally, resources availability has been further diminished by a change in scarcity metrics within policy. Whereas early evaluations assumed the option of inter-basin transfers, contemporary scarcity is assessed at a catchment level and against criteria of environmental sustainability. Directives enacted into UK legislation in 1994⁴ require the identification and protection of Sites of Special Scientific Interest and Biodiversity Conservation Areas while environmental groups increasingly highlighted the consequences of over-abstraction to rivers and wetlands (RSNC, 1992; RSPB, 1995; BAG, 1996; English Nature, 1996). In early 1994, the NRA assessed England and Wales to be over-abstracted by 300 Mega Litres (ML) /day (NRA, 1994) and by 2001 the EA was calling for a further 700 ML/day in reductions⁵ (EA, 2001a).

² National average: 4.1% (ONS, 2003).

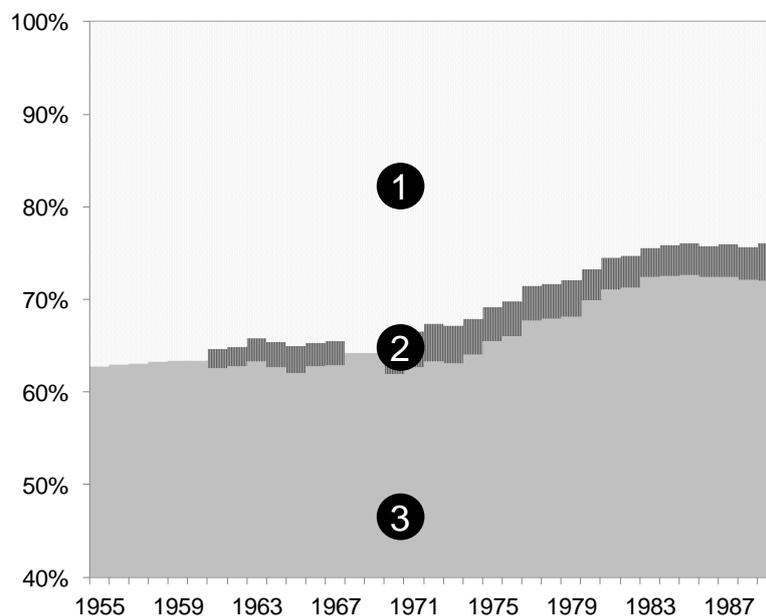
³ National average: 11.1% (ONS, 2003).

⁴ 1992 EU Directive on Conservation of Natural Habitats, enacted under the 1994 Conservation of Natural Habitats Regulations.

⁵ By 2001, Total water placed into public supply for England and Wales was approximately 15,000 ML/day, while total volume of licensed abstraction for all industries was approximately 40,000 ML/day.

Drastic changes in the composition of water demand have placed private water utilities at the centre of water resources policy. While demand in other sectors stagnated or declined, that of water placed into public supply steadily grew, rendering water utilities increasingly dominant drivers of abstraction. Initial declines in industrial water demand due to restructuring were compounded by energy production and metered commercial undertakings responding to regulatory and economic pressures. The energy sector began to favour coastal sites and circulating methods for cooling in new stations (Turnpenny, 2003), while metered commercial customers using public water supplies also reduced their demand (see Figure 4). The UK continued to be Europe's leading importer of embedded water through its food trade networks, which when combined with predominantly rain-fed agricultural production, ensured agricultural abstraction played a relatively small role on a national scale.⁶ The only sector to not follow the trend of decline was that of domestic consumption. The 1950s onwards saw a dramatic increase in household real income and the development of post-Fordist modes of water consumption in the home which transformed domestic water consumption from a practice driven principally by public health to one driven by modern consumerist principles (Chappells, 2003). In contrast to almost all other sectors, per capita domestic demand grew to accommodate shifting standards of comfort, cleanliness and convenience (Shove, 2003). The uptake of water using domestic appliances, high-powered showers and outdoor water systems, and the trend towards reduced occupancy rates in households, all contributed to an increase in per capita consumption at a national scale. In an unfortunate though perhaps not entirely unrelated pattern, per capita consumption also followed an increasing gradient from northern to southern Britain, ranging from an average of 140 litres in areas of Wales to 170 litres in the South East of England (see Figure 5).

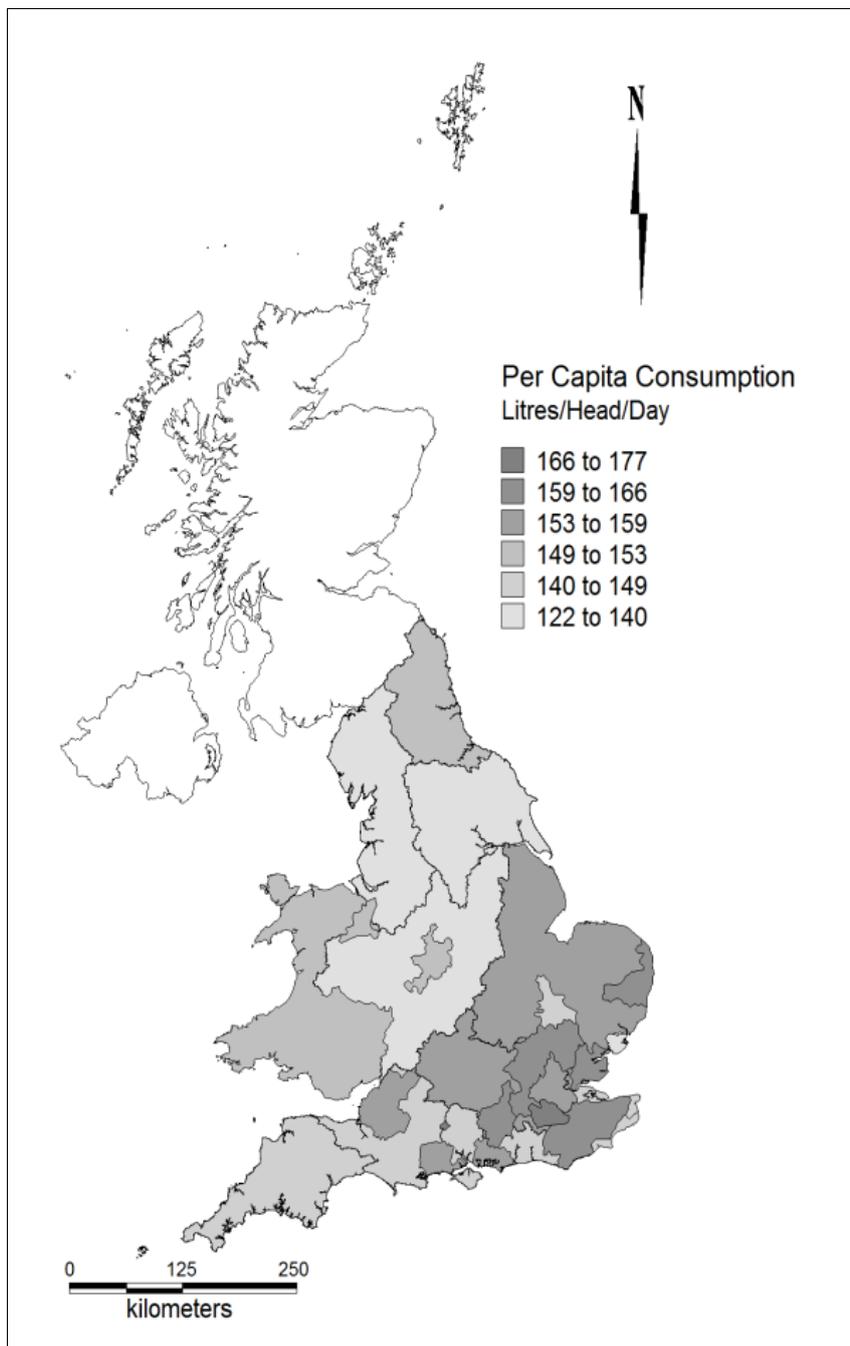
Figure 4. Relative proportion of water into supply for industrial (1) non-potable, (2) and non-industrial (3) use.



Data sources: Central Advisory Committee for Water (1959); Water Resources Board (1973); Central Water Planning Unit (1977); Water Services Association (1990-1997).

⁶ This is not the case at a regional scale, the most prominent example being the East Anglia region.

Figure 5. Reported domestic per capita consumption estimates for year of 2009.

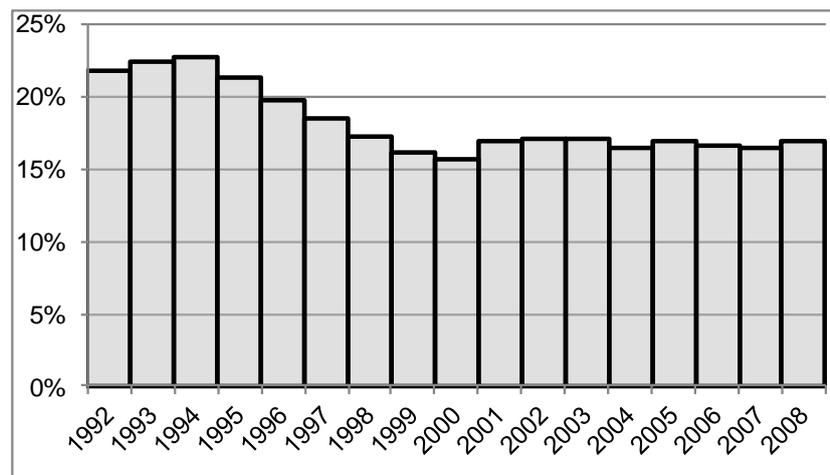


Data source: Calculated from Water company draft Water Resources Management Plans submitted to OFWAT in 2009.

This reconfiguration of demand has increasingly tested the privatised utility sector's market-based interpretation of ecological modernity and made it the primary site of negotiating scarcity. By many of the model's own standards, it has so far failed to deliver. National average percentage leakage rates for England and Wales reduced from 1995 to 2000, but are now projected to remain stagnant. Per capita consumption has gradually risen and stagnated and is projected to miss government aspirations for reduction (Walker, 2012). In 2013, domestic metering levels have reached 30% penetration. The trade

of abstraction licences (EA and OFWAT, 2011), as well as bulk water between companies (OFWAT, 2010), have remained stagnant since privatisation. Catchments continue to be classified as highly water-stressed, particularly in the South, South East, and Anglia regions of England. Thames Water's service region contains the most water-stressed catchments, highest rates of leakage, highest per capita consumption, lowest domestic meter penetration, and has recently built England's first desalination plant. While these statistics indicate an underlying struggle to commoditise water into a tradable private economic good (Bakker, 2005), the social forms and responses to that struggle have been varied. To explain this variation, analysis now turns to the role of the state.

Figure 6. Leakage rates for water utilities of England and Wales as percentage of water placed into public supply.



Data source: Calculated from Water company draft Water Resources Management Plans submitted to OFWAT in 2009.

State positioning and sponsorship of modes of governance

Successive governments have attempted to re-articulate the ecological modernity narrative in an attempt to rationalise and reconcile the tensions between economic growth and water scarcity outlined above. Each government operates under its own political principles and imperatives and destabilises its predecessor through shifting diagnostics of governance failure and prescribing new responses to that failure (see Table 2). The transition from state to private in 1989, and the associated promotion of 'laissez faire' market environmentalism (Bakker, 2003), was only the first step in this succession. The New Labour government of 1997 promoted a substantially different approach to governance based on 'Third Way' governance mechanisms which *simulated* market outcomes rather than assume their emergence. The Coalition government of 2011 has emphasised institutional investment to *enable* markets themselves and has emphasised a liberal economic philosophy.

The role and influence of the state during the initial transition of public to private models of water resources governance have been extensively documented (Maloney and Richardson, 1995; Bakker, 2003). Supply-driven resources planning reflected broader political principles of state building and citizenship (ibid). This state-centric model operated through a governance system of a closed network of technocrats and political elites who provided the coordination and consensus necessary to promote and deliver the extensive resources development projects of the era (McCulloch, 2009). This system

Table 2. Successive governments, political logics, and effects on water governance.

Time period	1974-1979	1979-1997	1997-2010	2010-present (2013)
Primary political party	Labour	Conservative	New Labour	Conservative - Liberal Democrat coalition
Meta-governance Principles	Keynesian state coordination	Neo-liberalism	Third Way	Libertarian paternalism
Water meta-governance principles	Closed-network technocratic planning	'Laissez faire' market environmentalism	Market- <i>simulating</i> re-regulation	Market- <i>enabling</i> re-regulation
Governance failure diagnosis	Technical failure	State failure	Market failure	Institutional failure

relied upon acts of Parliament⁷ and government policy which consolidated the industry and centralised planning processes, as well as extensive cross subsidies to finance capital projects and promote social equity. The transition to a privatised model of resources planning did not imply a retreat in state involvement; in fact, research in utility liberalisation notes that increased state involvement through re-regulation is often the case (Majone, 1994; Vogel, 1996). In England and Wales, research has revealed that the government went to considerable lengths in ensuring the successful floatation of the water industry on the stock exchange, as well as its deliberate promotion of a specific laissez-faire approach to resources planning and governance. Prior to public offering, industry debt was written off, allowable returns were enshrined in agreed future price rises, and an initial 'green dowry' of £1.6 billion was issued to the industry (Maloney and Richardson, 1994). The initial governance structure encouraged by the Conservative government was a 'light touch' approach whereby market forces would autonomously drive economic efficiency and environmental integrity (Bakker, 2003). State-sponsored revisions to management structures and financial principles of water companies were also extensive; companies were transformed into corporatised, ring-fenced, self-financed companies, and were subject to the scrutiny of shareholders and the discipline of the market (Taylor, 1999; Bakker, 2003). Water charging principles were reformed away from spatial cross subsidies and towards user pays or cost recovery models. The floating of these companies on the stock market was accompanied by the establishment of three independent regulators: OFWAT, the NRA⁸ and the Drinking Water Inspectorate (DWI), tasked with monitoring and enforcing, respectively, the economic, environmental, and drinking water standards of the industry. This new economic model of equity and resources efficiency, delivered through a laissez faire approach and 'light touch' regulation, substituted state coordination for market incentives.

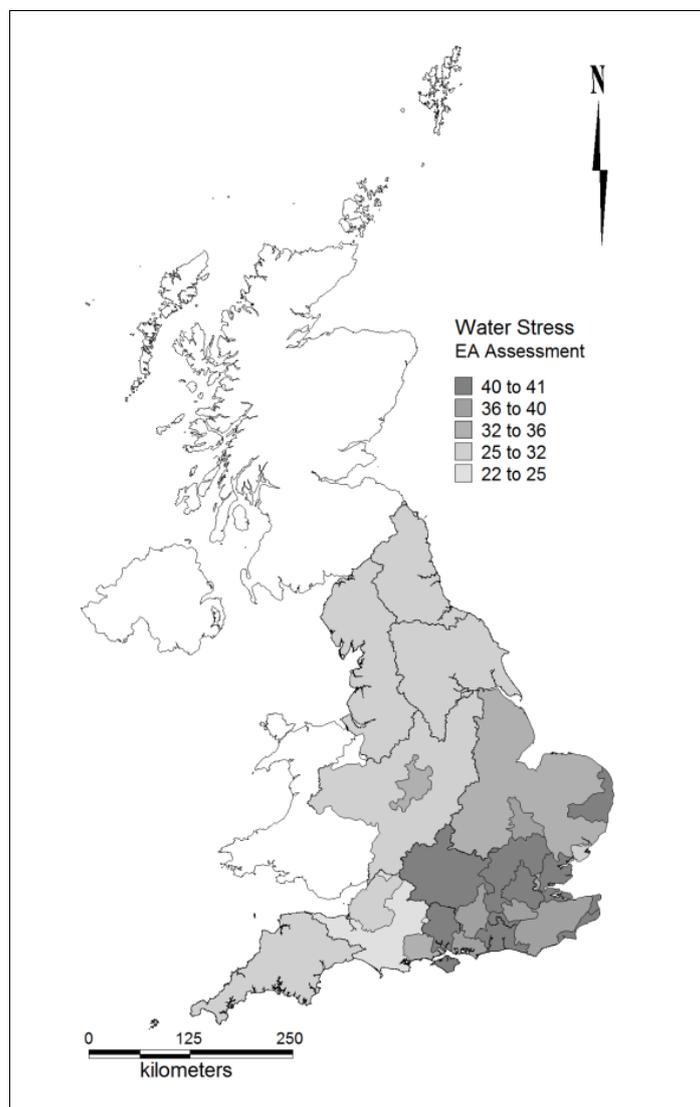
New Labour entered government in 1997 on a mandate to respond to the perceived market failures of the preceding Conservative laissez faire model. Labour's new economic logic, which solicited a 'Third Way' between free markets and centralised planning, was mobilised to resurrect ecological modernisation. Economically, Labour positioned itself as the 'enabling state', creating a stable environment for free market innovation, competition and efficiency (Newman, 2001). Socially, it was the facilitator of change, ensuring the "balancing of social interests and creating the possibilities and limits of social actors and systems to organise themselves" (Kooiman and Van Vliet, 1993: 64).

⁷ 1963 Water Resources Act (HM Government, 1963), 1973 Water Act (HM Government, 1973).

⁸ Later subsumed by the establishment of the Environment Agency (EA) in 1996.

Supporting these objectives were principles of meta-governance based on distinctly new patterns in state, market, and society interrelationships. State power was reconfigured such that it was the steward of a growing number of public-private partnerships, Quasi Autonomous Non-Governmental Organisations (QUANGOs), Arms-Length Management Organisations (ALMOs), independent regulators and multilevel planning and governance structures. Regional Assemblies and Regional Development Agencies (RDAs) were established as a mix of civil, state and private stakeholders, and were assigned the task of coordinating, planning and development through Regional Spatial Strategies and Regional Economic Strategies, respectively. The role of these regional bodies grew since their inception representing a "dispersion of authoritative decision making across multiple territorial levels" (Hooghe and Marks, 2001: xi).

Figure 7. Water stress classification of water utilities



Data source: EA, 2007a.

The private water sector was to be a pertinent example of this new state logic. Droughts in 1995 and a subsequent Water Summit in 1997 heralded the beginning of Labour's market failure diagnosis and its

largely sceptical view of market mechanisms in governance. Aspirations for universal metering were abandoned and attention was refocused on leakage levels which had been significantly underestimated. By 2000, the economic models of marginal costs used to determine target leakage levels began to yield negative results for further repairs. The continued growth of per capita domestic demand indicated that the statutory duty placed on companies to promote water efficiency in 1996 had proven ineffective. Having moved away from the politically salient option of volumetric domestic charging, the New Labour government attempted to promote efficiency through wider governance of domestic technologies and consumption behaviours. While research has documented the growth of direct regulatory 'sticks and carrots' since 1997, what has received far less attention are the 'post-regulatory' governance structures which sought to operate around and in concert with economic regulatory reform (Scott, 2004). The 2003 Water Act placed duty on government as well as industry to promote water efficiency, introducing the state as partially accountable for its delivery (HM Government, 2003). The original limited requirements for water efficiency enshrined in earlier legislation⁹ were developed into new standards of building design and assessment; a Code for Sustainable Homes introduced voluntary water efficiency targets for new builds (CLG, 2006), later made mandatory for all publicly funded housing, and later also compulsory in updated building codes (HM Government, 2010). Behavioural change was adopted as a project of government, with Department for Energy, Food, and Rural Affairs (DEFRA) announcing a Framework for Pro Environmental Behaviours (DEFRA, 2008). As the number of actors involved in the governance of per capita consumption increased so too did the need for an institutional structure capable of governing their coordination. In 2005, an independent body, Waterwise, was established with a remit to promote water efficiency within the industry. This was accompanied by the Water Saving Group, an association of water companies, developers, local government, regulators and consumer representatives, tasked with the ultimate aim of "reducing per capita consumption in households" (DEFRA, 2005). By 2008, the government had introduced an 'aspirational' target of reducing per capita consumption to 130 litres per head per day, or less, by 2030 (DEFRA, 2011b). Many of the governance structures established for domestic energy demand management were put to task on water. The independent Market Transformation Programme established in 1997 to deliver on EU energy efficiency requirements for domestic products developed a secondary remit for water, as did the Energy Saving Trust.

Collaborative modelling between the EA, RDAs, and the water industry began to argue that the impacts of development could be mitigated by increases in domestic efficiency and water network integration (EA, 2001b; WRSE, 2006). The EA claimed that development in the Thames Gateway could feasibly be 'water neutral' through increased efficiency in existing housing stock (EA, 2007b). By 2003, the EA had been granted a legal mandate to lead the Third Way governance approach to water resources planning in support of its duty to conserve, augment, redistribute and secure the proper use of water resources (HM Government, 2003). An EA-sponsored governance network called the Water Resources in the South East (WRSE) group¹⁰ was established to negotiate and cement transfer agreements and shared resources planning between water companies in the South East. Water companies were required to publish 25 year resources plans to which the EA, neighbouring water companies, and end water users, were granted a consultative role. Failure to gain EA approval through adherence to its Resource Planning Guidelines would entail ministerial intervention, essentially granting the EA a partial veto on water company resources plans. In addition, regulators were granted powers to force bulk water trade agreements between companies which were deemed to be economically efficient. The EA used this leverage to promote 'Water Neutrality', the aspirational 130 PCC target and

⁹ Water regulations act of 1999.

¹⁰ Membership consists of the EA, OFWAT, CCWater, Thames Water, South East Water, Southern Water, Portsmouth Water, Sutton and East Surrey Water, and Affinity Water.

the integration of water company resources plans and regional government Regional Spatial Strategies (RSS).

A similar approach was taken to abstraction reform. While the Conservative government had assumed pro-competition laws would ensure an active abstraction licence market, Labour purposefully rejected market mechanisms as too risky and uncertain opting instead for a governance-based approach (DEFRA, 2001). The EA's Restoring Sustainable Abstraction and Catchment Abstraction Management initiatives aimed to negotiate reductions and redistribution of abstraction licences, again supported by legislation which granted the EA powers to redefine the terms of abstraction licences and forcibly retract them where they were deemed environmentally damaging.

The election of the Conservative-Liberal Democrat Coalition government in May 2010 occurred during conditions strikingly similar to those at the start of the previous Conservative administration. An economic recession resulted in renewed hostility to government spending and the size of the state which the coalition government pledged to drive down. The government's vision was one of re-centralising policy while applying a federal principle of the lowest level of decision-making possible. Affecting collective action was now principally one of the variants of liberal paternalism, an approach to social engineering which promotes minimal institutional intervention to alter the behaviour of individuals while maintaining the individual's ability to 'opt out'. This philosophy eventually found its way into government rhetoric under what Jessop (2003) would describe as its 'economic imaginary' of the Big Society and its accompanying doctrine of 'nudge' economics. The coalition government set about dismantling the regulation and governance structures of New Labour. Bodies such as DEFRA and the EA were instructed to "cease all lobbying and policy-making activities" (DEFRA, 2010c: 1). Regional Development Agencies which had been responsible for Labour's South East Plan were dissolved. Communities and Local Government (CLG), which had been responsible for much of delivery and enforcement of the new building standards, were heavily cut back as part of the coalition's 'Bonfire of the QUANGOS' (Guardian, 2012). Leaked documents outlining the government's plans for the bonfire also allocated the future of OFWAT, the Consumer Council for Water (CCWATER), and the EA as "still to be decided" (BBC, 2010: 1).

Distinct from earlier laissez-faire policies, or New Labour's re-regulation in substitution of markets, the Coalition's meta-governance of ecological modernity promotes regulation *for* the market. A specific variant of neo-liberalism (Castree, 2010), this approach is prominent in utility sectors where liberalisation implies significant institutional investment (Vogel, 1996; Jordana and Levi-Faur, 2004). Under this model, the state, including the broad array of regulatory and legislative structures which compose it, is actively engaged in the project of market reform and is therefore accountable for its success or failure. This also shifts the diagnosis of water scarcity from one of market failure to one of institutional failure. Policy now discusses how to remove institutions which act as barriers to market development while fostering those that enable it. Efforts to promote markets in abstraction licences, bulk water trade, the possible vertical separation of water companies, and the increased use of domestic metering were all framed in terms of institutional reforms which would promote markets and reveal the 'true value of water'.

Even prior to the Coalition Government's election, mounting frustration with a lack of competition and growing regulatory complexity had led the House of Lords (2007), regulators (OFWAT, 2007; EA and OFWAT, 2011), Water Companies (Severn Trent Water, 2010; Anglian et al., 2011), and Conservative think tanks (Policy Exchange, 2011) to support increased competition and market mechanisms in resources planning. The coalition's message that "[o]ver recent decades Government has tended to rely primarily on prescriptive regulation to achieve public policy outcomes" (DEFRA, 2011a: 1) and its emphasis on the potential for "market-based approaches and voluntary approaches" (ibid) held strong currency within the sector. A government commissioned review of OFWAT criticised its "regulatory burden" (Gray, 2011) while its White Paper on Water sought to "introduce deregulatory legislative changes. [In order to] increase competition in the market for water and sewerage customers and

expand opportunities for innovative new entrants to enter the market" (HM Government, 2011: 70). A DEFRA/OFWAT 'Red Tape Challenge' aimed to promote further deregulation (DEFRA, 2011a). OFWAT began to outline its plans for 'light touch' regulation.

A consequence of implicating the state in the design and promotion of markets has been the exposure of the political nature of such reforms. A case in point has been the struggle to promote the Scottish government's introduction of competition for commercial water customers as an exemplar for reform in England and Wales. The truth is that Scotland's implementation of competition was a political compromise by its left-leaning government, designed to meet EU and UK pro-market policy without relinquishing its public water infrastructure to private ownership (Ioris, 2008). The political will and relative institutional simplicity of publicly owned bulk supplier contrast greatly with the realities of the English and Welsh sector. Restrictions on government spending have meant that while the possible savings of moving away from New Labour structures have been emphasised, the political and economic costs of establishing new institutional frameworks to promote markets were overlooked. To understand this final source of governance failure, analysis must address the path-dependent and path-shaping effects of existing discursive, institutional and material assemblages and the problematic nature of coordinating their change.

Structural coupling of institutions and political orders

Governance projects do not work with blank slates, but must be inserted into an array of discursive, institutional and material structures which are in turn the product of previous economic and political orders. For example, resisting all attempts to reform water resources planning has been the legacy of an abstraction licensing regime established during a period of industrial expansion and predicated on "the perception of water as a free and plentiful resource" (Sowter and Howsam, 2008: 1). During the exponential growth of industrial water abstraction, the 1963 Water Act served to protect the 'Licence of Right' of existing abstractors while allocating further licences on a first come, first-served basis. By 1999, government had come to the conclusion that the inherited regime was "put in place in the 1960s and public attitudes have changed considerably" (DETR, 1999: 1) and did not reflect government policy regarding the economically efficient allocation of goods. As government observed: "the present allocation of resources is therefore not necessarily a full reflection of the real need or past commercial acumens, and even the provision of bulk supplies is not necessarily an adequate long-term corrective" (DETR, 1999: 36).

By 2007, only 46% of licensed abstraction volume was estimated to be actually used by its owners. While government viewed these licences as dormant or misaligned, owners viewed them either as a means of rent seeking or as insurance against future threats to water security. The costs of compensation eventually led government to conclude in 2011 that abstraction reform would not be completed until 2027 (HM Government, 2011).

The dominance of water utilities has also had a marked effect on the nature of this structure and their effect on governance. Studies of water utility resources planning strategies have revealed they tend to adopt low or no risk strategies, preferring to remain socially and politically 'invisible' rather than optimising their strategy on calculated risks (Rayner et al., 2005). Resources planning operates over decadal planning horizons to deliver highly centralised, risk-averse, and resilient engineering and financial projects. In response to EU directives concerning effluent and drinking water quality standards, the industry invested £3.9 billion which included 120 pesticide treatment plants, 30 nitrate removal plants and the renovation of 25,000 km of distribution pipes and a further £7.3 billion in effluent treatment plants (Byatt, 1996). To secure these investments, the regulatory regime guaranteed the value of all water company assets to capital markets (Helm, 2009), a move which is now recognised to have inadvertently introduced a bias towards end of pipe solutions in resources planning (OFWAT, 2011). Efforts at pro-market reform have also threatened to increase perceived financial uncertainty in

the sector and hence the cost of borrowing. This is a central concern for the most recent government whose emphasis on infrastructural projects and access to capital at low interest rates has formed a central component of its model for economic growth. When the government finally announced it would not be proceeding to full competition in the water industry, it directly referenced the possible impacts on the industry's ability to borrow (HM Government, 2011).

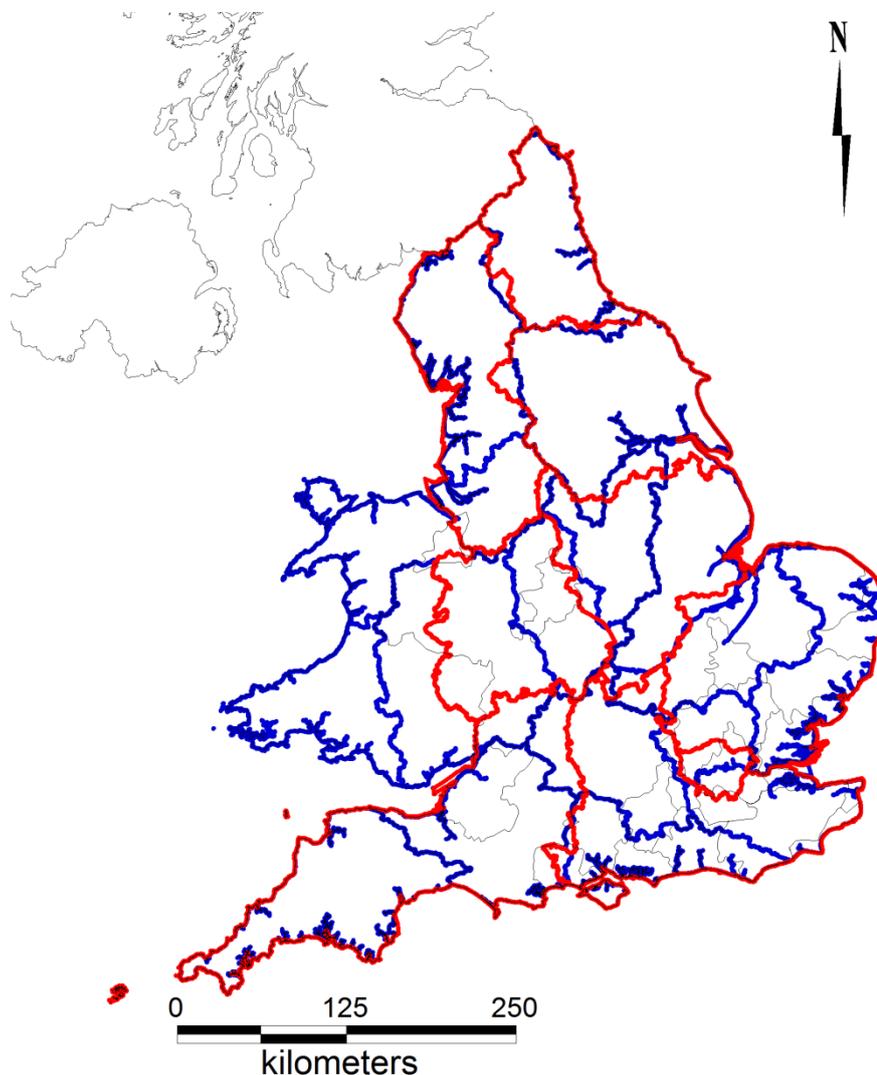
In addition to the path dependencies of previous orders of governance, governance may also fail due to the complexity of new forms of self-organisation. Regulation was originally designed with a governance structure that involved only the triad of regulators, government, and the private sector working together to deliver basic water and sanitation services (Medd and Marvin, 2008; Moss et al., 2009). As the remit of the sector has broadened, so too has the demand for an institutional structure capable of governing a complex social coordination (Cashman and Lewis, 2007). OFWAT has been obliged to introduce a series of measures to incentivise demand management programmes, including a Revenue Correction Mechanism which compensates water companies for the lost revenue implied in promoting demand management in metered households (OFWAT, 2009). Water companies also cite the uncertainty surrounding social coordination as a core reason for not engaging in bulk water trade with neighbours, domestic demand management programmes, or the trade of abstraction licences (Walker, 2012). Understanding of domestic demand dynamics is in its infancy; industry demand models continue to struggle to explain and predict patterns of consumption, let alone successfully predict the yield and cost of demand management initiatives (ibid). The governance of increased efficiency in water consumption also requires a level of cooperation between water companies, consumers, and intermediary bodies such as property developers and appliance producers which the industry has struggled to support (Medd and Marvin, 2008). The result is an approach to demand management which has been described as "unfocussed, fractured among many organisations (many with little public recognition or awareness) and ad hoc" (RSPB; quoted in House of Lords, 2006: 74).

Institutional complexity also takes on a spatial dimension, particularly in the south of England. Considering Figure 8, it is clear that the administrative, environmental, and water company boundaries are heavily misaligned in these regions. John et al. (2005: 736) describe the South East Region as "the most institutionally weak and geographically divided" in England while the WRSE group has acknowledged that the South and South East of England present unique spatial institutional complexities, making water supply particularly "fragmented" (WRSE, 2010: 10). One possible route to increased trade would be the mergers of companies within a catchment, or the establishment of trade agreements, but these have been blocked by regulatory and antimonopoly interventions (Bakker, 2005). The WRSE group, while providing models of potentially efficient allocations of water within the South and South East, was ultimately ignored by companies in their final resources plans.

CONCLUSIONS

Supranational economic forces played a significant role in determining the water resources strategy pursued by a nation state in England and Wales. In particular, this paper has demonstrated the potential of macroeconomic change to destabilise regimes of water governance and enable their successors. The rise of 'light touch' regulation in 1989, and equally the more recent move for deregulation and market mechanisms by the Coalition Government, were both shaped by an economic recession which permitted government to cast doubt on public spending and emphasise free enterprise responses. The UK's water resources planning structures are increasingly exposed to supranational economic forces as it has positioned itself to be highly integrated into globalised markets. Global food trade has ensured that the UK remains an exception to the global rule where agricultural abstraction is normally dominant. The intensified development of the South and South East are similarly being driven by a need to cater to the globalised markets of financial services and technology. Even within resources management itself, the influence of international debt and equity markets on the extent and pace of

Figure 8. Institutional boundaries of resources management; Water Utility Fresh Water Supply (Grey), River Basin Management Units (Blue), Political Regions (Red).



institutional reform towards increased marketisation has been marked. This brings forwards a whole host of questions regarding the appropriate scale and metrics of analysis when looking at what determines a society's response to scarcity. Scarcity itself will be measured at a catchment scale, but a society's response will necessarily be shaped by its position in a global economy and the effects these have on national governance projects. However, while appeal to changing economic conditions serves as a powerful point of departure in explaining governance change, it does not explain the specific forms of governance which have emerged from those conditions over time. The neo-liberal laissez-faire doctrine, Third Way projects of regional and multilevel governance, and the current libertarian market-building initiative all activated and mitigated different underlying tensions between development and water management, but are themselves symptoms of shifting state 'imaginaries'. As each government initiates reform, it also becomes an arbitrator of the uneven costs and benefits of reform, rendering it an inherently political process.

Finally, the dominance of water utilities and their domestic demand base means their specific regulatory and social structures have had a significant impact on water governance reform. Researchers have noted that the English and Welsh regulatory system struggles to accommodate a nuanced or risk-

based assessment of the trade-offs between security of supply and cost-effectiveness (Willis et al., 2002; Hall et al., 2012). Water utilities have co-evolved with the everyday routines of domestic water use which are enshrined in moralised constructions of legitimate or 'normal' consumption (van Vliet et al., 2005; Chappells and Medd, 2008). Attempts to affect these patterns or indeed any resources strategy which places them at risk have been successively portrayed as a threat to public health, a compromise in the modernisation of living standards and economic growth, and more recently as an infringement on consumer sovereignty (Howarth, 1999, 2004; Taylor et al., 2009; Walker, 2012). Water companies are legally defined as 'suppliers of last resort' and therefore bear most of the political risk for breaches in security of supply, and security of supply forms a component of regulatory performance metrics (Johnson and Handmer, 2002). Some companies now include the uninterrupted and unmitigated supply of water in their customer charters (Howarth, 1999).

Policy which emphasises demand management, and more generally integrated catchment management, implies the opening up of the so-called 'black boxes' of socioecological systems (Pahl-Wostl, 2002). While the infrastructure of supply consists of centralised assets under the ownership and control of a single private water utility, the infrastructure of consumption and allocation constitutes a wide array of socio-technical systems traditionally outside the jurisdiction of water companies. Where demand management extends 'beyond the meter' economic regulation must manage the contradictory outcome of asking private companies to encourage reduced consumption of their product, as well as the diversity of often unexpected incentives placed on households by demand management projects (Wirl, 1995; Renwick and Archibald, 1998; Molle and Turrall, 2004). Water scarcity is therefore always subject to its socio-political and economic context, which limits the ability of abstract models to predict social responses to scarcity or compare levels of scarcity across those contexts.

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