

# A Theoretical Walk through the Political Economy of Urban Water Resource Management

Gareth Walker<sup>1,2\*</sup>

<sup>1</sup>*School of Geography and Environment, University of Oxford*

<sup>2</sup>*Keble College*

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## Abstract

The political economy of urban water management demands the interrogation of a highly socialised and engineered space. Many approaches are available to the researcher, yet they are often based on their own claims concerning the nature of society and space, which are contradictory and incommensurate with the next. This makes a synthesis of theory problematic, suggesting an ‘either/or’ decision to the researcher. This paper provides a critical genealogy of theoretical approaches to the political economy of urban water management and a framework through which their synthesis may be discussed. It employs a critical realist philosophy, mapping each approach to its respective ontological and epistemic grounding. A metaphorical ‘walk’ is then taken across the resulting map in order to provide a coherent and logical survey of theory. Finally, critical realism is employed to argue that struggles to synthesise theory are rooted in their competing ontological claims. Critical realism and in particular Bob Jessop’s Strategic Relational Approach are assessed as means of reconciling tensions uncovered during the walk.

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## Introduction

In 1844, a young Karl Marx wrote a letter outlining the role of critical philosophy in sociological analysis and emancipation, stating:

The reform of consciousness consists only in making the world aware of its own consciousness, in awakening it out of its dream about itself, in explaining to it the meaning of its own actions.

Marx 1978, 15

Waking from this dream about ourselves begins by acknowledging that humans are reflexive in the way they organise themselves and their beliefs; the theories and models they use to interpret social reality are selected from among many and reinforced to the point where they “gradually acquire the moral and ontological status of taken-for-granted facts which, in turn, shape future interactions and negotiations” (Barley and Tolbert 1997, 99). Understanding this insidious process is central to critical realism’s (CR) exploration of the relationship between an objective reality that exists independent of the observer (ontology) and our socially produced, transient knowledge of that reality (epistemology) (Bhaskar 1986).

Like all variants of realism, CR submits that there are objects, forces, and rules which exist independently of our knowledge and that our knowledge of them is necessarily incomplete and socialised. It is the proposed relationship between the two which distinguishes CR. Our epistemologies are necessarily limited by the fact that the underlying causal laws which generate physical and social change and structure are multiple, countervailing, and/or complementary, giving rise to only *temporary* sequences and patterns which condition (and are conditioned by) human knowledge and practice. Patterns are therefore observed after the mechanisms that gave rise to them may have reconfigured, limiting the social researcher’s ability

to use conjunction in observation to generate knowledge. This results in theories which are able to effectively describe and explain the structural properties of a collection of events but which commit the 'epistemic fallacy' of assuming direct knowledge of their generative mechanisms.

Using the CR approach, this paper offers a critical genealogy of the key ontologies, epistemologies, and disciplines (Table 1) which engage with questions of social change, water resource management, and water utilities.

The discussion is structured around a walk across a conceptual map of theoretical 'lenses' (Figure 1). Like any map, it is as omissive as it is inclusive. It fails to capture the messy collection of theories which actually exist in practice; it is a synthesis and a simplification. The examples used rarely possess the one-to-one relationship with the epistemologies I situate them within. Through this walk, however, I show how tensions between theories and difficulties in synthesising their knowledge are rooted in problems of social ontology and epistemology. Finally, I discuss the potential of CR and Jessop's Strategic Relational Approach (SRA) in addressing these conflicts.

### *A Walk Across Theoretical Lenses*

#### STEP 1: CRITICAL POLITICAL ECOLOGY

Political ecology samples across spatial and institutional scales to link patterns of natural resource management and use, exposure to environmental hazards and degradation, and the changing structural features and power relations of society (Blaikie 1985, 1999). *Critical* political ecology builds upon a rejection of early positivist positions which held it was possible to fully observe human–environment interactions and abstract on their nature through rational enquiry. Positivism underwrote early responses by embryonic theorists such as Adam Smith, John Stuart Mill, and Karl Marx to the observation that the economic imperative to manage and control water tended to promote the concentration of bureaucratic power and capital (Foster and Holleman 2012). Marx's work on the Asiatic mode of production and its centralised despotic ruling elite prompted concerted efforts to trace social power relations to labour's metabolism of water into value. Weber's conception of the hydraulic bureaucratic state followed by his student Wittfogel's (1957) 'hydraulic civilisations' built upon early political economy and geographical determinism (Semple 1911) to explore how difficult hydrological environments foster highly centralised management structures and equally concentrated centres of power and surplus value.

While appropriated for studies of contemporary environmental history (Reisner 1993; Worster 1992), the hydraulic civilisation's implicit material and geographic determinism have led critical theorists to counter that human and environmental systems are coconstitutive

**Table 1. The critical realist approach to social knowledge.**

Theoretical level	Description
Ontology	<i>Questions of being:</i> What is the social world composed of and what rules govern its change?
Epistemology	<i>Questions of knowing:</i> What does it mean to have knowledge of the social?
Discipline	<i>Questions of doing:</i> How does a researcher collect and analyse data in order to develop their epistemic position?

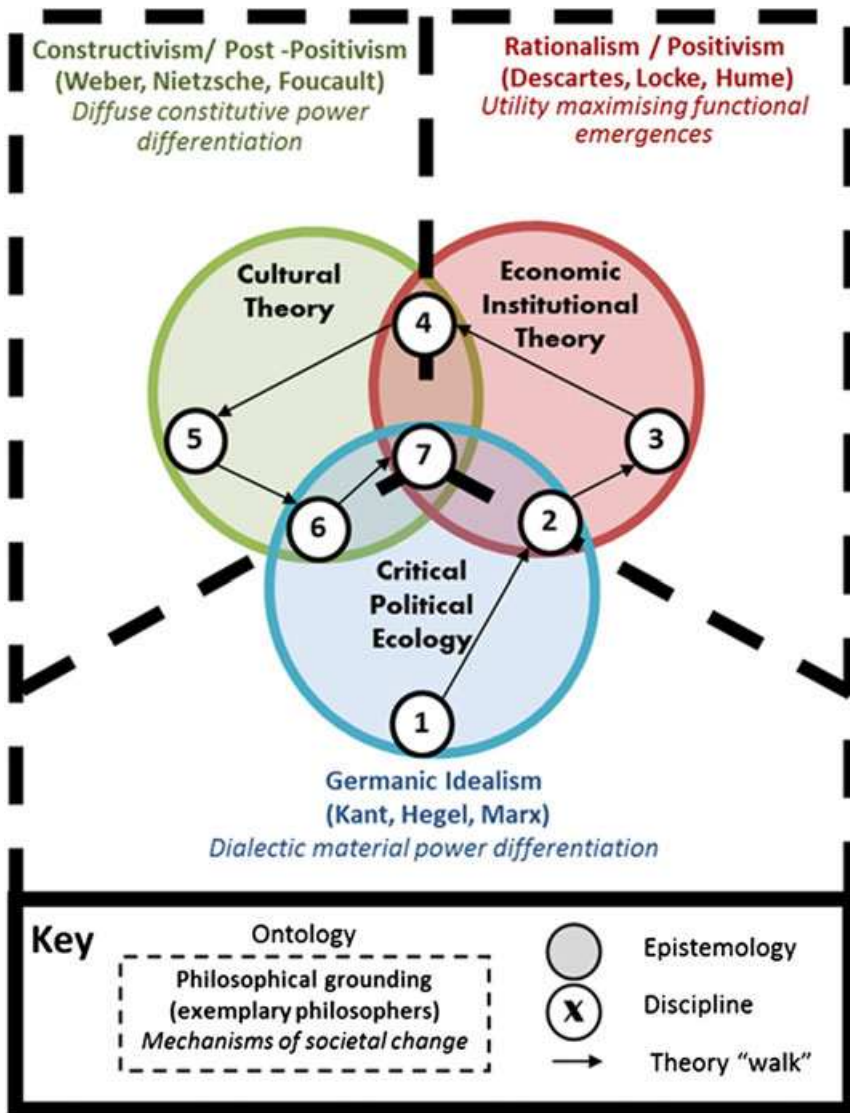


Fig. 1. Theoretical lenses applied to contemporary water management.

(Ekers and Loftus 2008; Swyngedouw et al. 2002). Hydraulic landscapes are defined as socio-natural, composed of biophysical processes implicated by water, the institutional and discursive structures which enable collective action upon water, and the practices of water production and consumption which operate through them. Their 'critical' aspect comes from an understanding of a hydraulic landscape as not only expressed, generated, and resolved but also *partially and imperfectly revealed* to the researcher through its constant maintenance and reconfiguration over time, in which neither the natural nor the social takes ontological precedence (Swyngedouw 2006). Some studies have taken a macrohistorical view, examining how hydraulic landscapes of late 19th and early 20th century coevolved as a more or less coherent whole alongside projects of state building and modernisation (McCulloch 2009; Swyngedouw 1997, 1999). Similar studies of contemporary landscapes

have turned to processes of neoliberalism and the commoditisation of nature from a spatiotemporal perspective (Bakker 2003a; Castree 2010). Gandy has explored how the development of urban water and sanitation systems is situated within the demands of private capital (Gandy 1997), the modernisation of living standards and the 'sanitary city', and the rise of modern environmentalism (Gandy 2004a). Graham and Marvin (2001) sought to relate the uneven spatial distribution of urban water services to the uneven allocations of power and capital in urban water finance.

Resource geographers also emphasise the material dimensions of natural resources which actively resist or frustrate human projects, providing a further destabilising force which must be socially negotiated (Kaup 2008). In particular, Bakker (2003a) adapts the regulation school interpretation of institutions and norms as regulating forces which temporarily stabilise crisis-prone regimes of accumulation (Bénassy et al. 1979; Lipietz 1986) to show how state-sponsored regulation of water utility management serves as a basis for further power differentiation via the production of new socio-natures, offering a powerful model for the political ecology of drought (Bakker 2000), social equity disputes (Bakker 2001), or the development of market-oriented policy (Bakker 2003a).

## STEP 2: SOCIO-ECOLOGICAL SYSTEMS

Approaching the positivist lens, theories share political ecology's focus on human–environment interactions and their differential impacts within a society but employ concepts of resilience and adaptive capacity to describe a system-based model of social vulnerability. Adger (2006) identifies antecedents in this lens to include hazards research, human ecology, and entitlements theory, all of which focus on the nature and determinants of social vulnerability to the environment and assume a pragmatic focus on technocratic knowledge and policy prescription (Mustafa 2005). Early models analysed vulnerability as a pre-existing condition which determined the impact of a hazard and tended to leave "people or communities characterized as 'victims', passive actors that are subordinate to the hazard" (Haque and Burton 2005, 334), leading contemporary approaches to treat vulnerability as process-based capacity of a unified socio-ecological system (SES) to respond and navigate through endogenous and exogenous perturbations at different scales (Cutter 1996; Folke 2006). Thus, vulnerability at one scale is determined by the multi-level effects of institutional structures, policy, and material dimensions of a whole SES (Adger et al. 2004; Bohle et al. 1994; Burton and Sousson 2003; Haque and Burton 2005).

Owing to their pragmatic focus, such models make policy prescriptions towards reducing vulnerability through an increase in adaptive capacity, defined as "adjustments in a system's behaviour and characteristics that enhance its ability to cope with external stresses" (Smit et al. 2000, 225). Pelling and High (2005) posit that such capacity is linked to a social learning process which balances order and chaos and formal and informal and in which structures are rigid enough to maintain a necessary level of social order yet sufficiently loose to allow for experimentation and dialogue. It is these frameworks that much of Integrated Water Resources Management (IWRM) policy paradigm has emphasised in its simultaneous adaptive management of critical social and ecological systems at a river basin scale.

Within urban water resource planning, irreversible investments made over decadal planning horizons are highly vulnerable to the irreducible uncertainties of future conditions. The importance of flexibility and adaptive capacity has led to literature emphasising the value of 'low or no regrets' strategies, which may be altered or reversed frequently in response to changing conditions (Fankhauser et al. 1999; Hallegatte 2009; Reilly and Schimmelpfennig 2000). Strategies such as demand management are embraced as robust responses to water

scarcity, which ensure security of supply without committing to the environmental risks and loss of flexibility of supply-driven approaches (Geldof 1995; Pahl-Wostl et al. 2007).

### STEP 3: ECONOMIC INSTITUTIONAL THEORY

Moving to neoclassical economic perspectives, positivism is combined with a new definition of rationality. Collective action is no longer a result of *instrumental* rationalists devising means to objective or shared ends but is emergent from the interactions of *strategic* rationalists operating in a social context constituted by other rational agents (Dryzek 1996). Social structure is analysed with reference to the initial distribution of information and resources across pre-constituted rational agents and their utility-maximising imperatives (Jessop 2001). Urban water management is typically analysed through two principle observations: firstly, that water is a common pool resource (CPR), a non-exclusive, rivalrous good with the capacity to generate a social dilemma of over-consumption (Hardin 1968); and secondly, that the economies of scale and barriers to market entry and exit implicit in utility infrastructure make direct competition between service providers difficult and encourage monopoly conditions (Littlechild 1988).

At a collective choice level, early theories understood the role of the state to be either the direct deliverer of water as a public good or the source of *necessary* regulation of private undertakers to incentivise efficiency under limited competition and significant externalities (Cowan 1993; Littlechild 1988). Later, public-choice and private-choice theorists rejected the interpretation of regulation as a concerted effort to correct for the market failures, instead observing that the social costs of public regulation of monopolies may in fact be higher than privately maintained monopolies themselves (Posner 1974; Stigler and Friedland 1962). Regulation, no matter what its stated intention or logic, is subject to capture by private interests and short-term political imperatives, rendering it counterproductive (Stigler 1971). As a result, such theories view the state's role as ideally minimising regulatory intervention (Robinson 2004), limiting its jurisdiction to the arbitration of concession contracts or 'competition for the market' (Demsetz 1968) and securing a regime of private property rights (Coase 1960).

Later developments argued institutions (North 1990), particularly those relating to utilities (Williamson 1975, 1976, 1999), are not exclusively generated by market failures or private appropriation, but from the uncertainties and costs of doing business (transaction costs). Agents remain rational, but it is a 'bounded rationality' defined by conditions of time constraints, incomplete and asymmetric distributions of information, and uncertainty regarding the strategic actions of other agents. These conditions are particularly endemic in utilities, in which long-term investments must be made with incomplete information regarding future conditions (Williamson 1976, 1999). Privatisation or long-term public-private concession contracts in utilities are further marred by the fact that they give "informational autonomy to a party who is not under direct public sector control" (Shapiro and Willig 1996, 99), generating a social dilemma referred to as the principle agent problem (Baron 1989; Crocker and Masten 1996). The vertical integration of the water utility as a firm (Williamson 1975), and/or the presence of regulatory institutions (Levy and Spiller 1994), provides a stable and predictable long-term operating environment to mitigate these costs. At an operational level, economics and engineering in utility resource planning have been steadily converging since the 19th century. The result is a hydro-economic framework which rationalises optimal resource planning in terms of satisfying consumer surplus anticipated from projected demand curves (Harou et al. 2009; Lund 1987). Water is treated as an economic good and its management and allocation subject to the criteria of maximising



social utility (Rogers et al. 2002). Initial models tended to focus on the optimal timing and scale of investment in supply augmentation (Luss 1982; Perera and Codner 1988). As the policy agenda moved towards adaptive management and demand-side solutions, models attempted to incorporate the value of flexibility to uncertain future conditions (Dixit et al. 1994; Erlenkotter et al. 1989). Such models have evaluated the use of domestic retrofit programmes (Groves 2006; Lund 1987; Rosenberg et al. 2008; Rubinstein and Ortolano 1984), dynamic pricing mechanisms (Hughes et al. 2008), and licence trading mechanisms (Adler 2008) as a means of postponing or avoiding the costs of supply augmentation while increasing flexibility in resource planning.

#### STEP 4I: RESOURCE GOVERNANCE AND ECOLOGICAL MODERNISATION

Institutional economics has been criticised for overlooking the role of culture in altering the identities, priorities, and behaviours of agents (Jessop 2001), leading to theories which propose a socially embedded concept of human agency (Granovetter 1985). A rationalist view of the agent is retained; however, the agent operates through institutions which are both the formal 'rules of the game' and the tacitly agreed informal conventions and norms of culture (North 1990). Of great significance to resource economics has been Ostrom's (Ostrom 1991, 2005, 2010; Ostrom et al. 1994) study of socially negotiated solutions to CPR management problems. Ostrom's model of networked governance transcends the conventional binary of hierarchy versus market models of collective action, and with it many models of the role of the state. In fact, Ostrom's work built upon earlier studies of irrigation management (Maass and Anderson 1978) which emphasised the role of technological and institutional development outside of state apparatus that directly negated Witfogell's necessary relationship between irrigation and centralised authority. Instead, Ostrom emphasises the role of communication, learning, and trust in establishing informal institutions of trust and reciprocity and suggests that the objectives and strategic imperatives of agents are incrementally altered, making room for culture in the economic theory of resource governance (Dryzek 1996).

While Ostrom's observations were primarily at the local and/or community scale, her theoretical framing of networked governance as a novel response to CPR management has gained traction in ecological modernisation (EM) models of water utility resource planning. Building upon optimistic theories of capitalist economic growth (Kuznets 1955; Lipset 1959), EM states that as disposable income increases with economic development, so too will demand for high-elasticity goods such as environmental health and social justice. Concurrently, the environmental limits and externalities of economic growth are internalised into an economy through a reflexive process of institutional and technological innovation. This renders the environmental crisis a question of technical reform, allowing 'sustainable development' to be adopted as a depoliticised, normative policy objective (Blaikie 1999; Gandy 1999).

Models of EM in water point to when a river basin reaches a point of 'peak water' (Gleick and Palaniappan 2010), 'river basin closure' (Molle et al. 2010), or 'water deficit' (Ohlsson and Turton 1999) and posit an optimal response of increased efficiency in water productivity followed by increased efficiency in water allocation (Ohlsson and Turton 1999), and in some cases a further period of economic restructuring (Brooks et al. 2009). 'Governance' has provided a conceptual delivery vehicle for the technical and intuitional innovation deemed necessary by EM (Allan 2005; Pahl-Wostl 2002; Spaargaren and Van Vliet 2000). It has also provided a means of capturing the observed retreat of centralised bureaucratic power in many modern states and the proliferation of public-private partnerships, independent bodies, and

regulatory structures (Jessop 1998). Literature employing the trope of governance reform tends to present itself as an emancipatory project; traditional paradigms of technocratic planning, centralised authority, and the subjugation of nature are eschewed in favour of cultural and institutional reform towards increased economic productivity, greater social equity and inclusion, and effective environmental protection (Brooks et al. 2009; Turton and Meissner 2002). This paradigm has become particularly prominent in contemporary multilateral water policy, in which the current water crisis is repeatedly referred to as ‘a crisis of governance’ (European Parliament 2000; UN Water 2006).

#### STEP 4II: CULTURAL ECONOMIC THEORY

Moving further into post-positivist cultural theory, we enter fields of sociological analysis which understand culture as constituting modes of economic exchange (Polanyi 1944; Weber et al. 2002). Institutions are not selected on the basis of a strategic rationality (even a ‘bounded’ one), but instead because they resonate with culturally constructed standards of legitimacy, fairness, and identities which are shared by other agents who employ and maintain those institutions (DiMaggio 1994).

Cultural accounts of institutional development in urban water resource management have examined the administrative traditions in which they are situated. Some have noted the cultural rise of the ‘regulatory state’ (Levi-Faur and Gilad 2004; Majone 1994) and risk societies in the UK (Giddens 1998) and independent regulatory agencies in Europe (Thatcher 2002). Historical analysis of water rights regimes traces the riparian and prior appropriation regimes to traditions of Roman common law (Getzler 2004; Taggart 2002) and social justice disputes on the American frontier (Schorr 2012), respectively. Barraqué (2003) offers a typology of water governance and regulatory mechanisms across Europe based on the Germanic and Roman origins of their respective legal systems. At a narrower scale, studies of the regulatory culture of water resource management in England and Wales identify specific constructions of social equity (Bakker 2001), acceptable risk (Johnson and Handmer 2002), economic efficiency (Shaoul 1997), management identities (Ogden 1995), and the water user (Sharp 2006).

#### STEP 5: CULTURAL THEORY

At the extreme end of cultural theory are positions with an ontology rooted in a deep-seated scepticism concerning the existence of methodologically independent facts. Their epistemology is acutely aware of the situated nature of research and the researcher. Their methods are therefore highly reflexive in terms of claims to knowledge, asserting that it is impossible to step ‘outside’ of social realities and survey them independently. Culture is no longer considered a ‘lens’ through which the world is observed by otherwise similar and knowable agents; culture defines the agent; it permits and restricts personal meaning and logic and dictates what can be thought, the identity of the thinker and how they are heard and understood by others. Research tends to resist causal narratives of societal change and focusses instead on what Foucault refers to as ‘genealogies’ (Foucault 1972) which offer archaeologies of difference and similarity in culture and practice; the truth, legitimacy, and logic of which are defined by geometries of power.

Water utilities are often examined via their direct role in the regulation of public health and hence the mobilising water as BioPower, a means of controlling people through the subjugation of their bodies, mortality, and reproductive capacity (Foucault 2008). Bakker frames this in terms of ‘Biopolitics’, noting water “simultaneously connects individual bodies

to the collective body politic” (Bakker 2010, 190). Identifying, relating, and contrasting the logics of practice found in water production and consumption allow research to trace how social power resides in the ‘everyday’ meaning of water. Studies of transitions in the logic of water consumption and sanitation include Strang’s (2004) ‘The meaning of water’, Wright’s (2000) ‘Clean and decent’, or Goubert’s (1989) ‘The conquest of water’. From the perspective of production, Clark (1992) proposes a framework of ‘real regulation’ which views the regulation of utilities as a collection of administrative practices mediated through institutional state structures.

Some studies of water utilities have sought to relate practices of consumption and production as an integral whole. Gandy (2004a, 2004b) has examined how the changing relationship between the human body and water in urban environments reflects the broader ‘hydrological order’ of the period in question. Similar studies have examined the logics of water-consuming practices co-evolve with those of infrastructure development (Hand et al. 2005; Sofoulis 2005; Strang 2004), providing a strong critique of projects of EM. Sofoulis (2005) and Shove and Walker (2010) both contrast water managers’ attempts at employing economic incentives and conservation messaging with the daily routines and meanings of everyday water, questioning the implication of mainstream policy that consumers are somewhat hypocritical or dissonant in their decision-making. For some, there remains an emancipatory element, particularly during periods of crisis where the everyday breaks down. Taylor et al. (2009) note that drought tends to reveal “fundamental tensions” (Taylor et al. 2009, 591) surrounding consumption and may serve as a catalyst for behavioural change. Periods of crisis are points at which water consumers may become aware of the fetishized and objectified nature of their consumption (Kaika 2004) and may also negotiate new and novel assemblages of water production and consumption (Teh 2011).

#### STEP 6: CRITICAL DISCOURSE THEORY

Returning to the periphery of critical political ecology the more staunch post-positivist positioning on social facts is relaxed in favour of a focus on how language and meaning relate to social structure. An appropriate starting point is Gramsci’s development of Marx’s model of a material base generating a social superstructure. Gramsci’s work on cultural hegemony emphasised that class dominance and power were achieved through ideological as well as material means, suggesting a reciprocal relationship between culture and materiality. The values, perceptions, and opinions which rationalised and legitimised material class relations were said to be translated into common sense and taken-for-granted facts through a wide array of institutions (Gramsci 1995). Thus, he shared Foucault’s belief that power does not reside within the structure of the state but operates across all social interactions. However, he retained a claim to positivism in his appeal to be able to know the structural and material basis of society. This becomes important when critical research claims objective knowledge of the intention of a text and speaks to its strategic use in legitimising power and manufacturing consent (Herman and Chomsky 1988).

Directly referencing Gramsci’s definition of hegemony as power by means other than coercion or law, Zeitoun and Warner (2006) have developed a model of ‘hydro-hegemony’ in which struggles for hegemony in water management serve to explain the lack of direct violent conflict. Other studies have examined how water resource planning is rationalised and endowed with legitimacy through established ‘sanctioned discourses’ which define hydrosocial contracts and prescribe resource planning strategies (Ohlsson and Turton 1999; Turton and Meissner 2002).



This approach is also applied to discourses of human–nature interactions as “contested representations under conditions of unequal power” (Blaikie 1999, 133). Theories of materially ‘produced’ natural landscapes already reviewed are often accompanied by a simultaneous emphasis on their partial social construction (Castree 1995). Thus, a hydraulic landscape also encompasses a cultural landscape, sitting within an uneasy synthesis of ‘socio-natures’ (Mustafa 2005). When related to power, studies have examined how constructions of scarcity serve to legitimise politically or financially motivated projects (Bakker 2003b; Kaika 2004; Mehta 2001, 2003; Taylor et al. 2009).

#### STEP 7: SYNTHETIC CRITIQUES IN SOCIOLOGY

Geography places itself at the epicentre of debates concerning nature versus society, subjectivity versus objectivity, and the discursive versus the material (Whatmore 2002). It is therefore host to a multitude of efforts at synthesis through concepts such as hybridity (Whatmore 2002), quasi-objects (Latour 1993), or assemblages (Bennett 2010). In water, the hydraulic landscape model has rested upon a post-Marxist understanding of ‘things’ as simultaneously “subjects and objects, material and discursive, natural and social” (Swyngedouw 1996, 70), embodying processes which are theoretically distinct but dialectically unified. Reflecting concepts of the socio-natural (Castree 1995; Castree and Braun 2001), hydraulic landscapes are understood as both materially produced and socially constructed (Linton 2010; Swyngedouw 1996).

Synthesis is ultimately frustrated by incommensurate ontologies and epistemologies which reflect deeper tensions in sociological theory concerning nature versus society (Harvey 1996; Latour 1993), agency versus structure (Giddens 1984; Jessop 2008), and positivism versus post-positivism (Bourdieu 1992; Patomäki and Wight 2002). Latour asks “[c]an anyone imagine a study that would treat the ozone hole as simultaneously naturalized, sociologized and deconstructed?” (Latour 1993, 6). Castree concedes that socio-natures face a similar quandary in that it “...appears paradoxical: how can one be ontologically realist about produced “nature” and yet epistemologically sceptical?” (Castree 1995, 15). Bakker and Bridge (2006) note there is struggle “...to account for the socio-economic production and discursive construction of nature, while simultaneously acknowledging the productive capacities of the non-human world” (Bakker and Bridge 2006, 11).

Given its explicit concern with exploring the distinctions and transitions between the transitive and intransitive and the objective and the socialised, the CR approach has been identified by some political ecologists as providing a possible means of reconciling these tensions (Castree 1995; Gandy 1996). In particular, Castree (1995) notes that CR offers a potential basis for Marxist geography’s application of dialectic materialism to problems of hybrid ontologies. CR’s insistence on ontological realism, epistemic relativism, and judgmental objectivity allows the researcher to be clear about what kind of knowledge is being generated by dialectic-relational efforts to describe “socio-natures.” However, Castree (1995) highlights two import obstacles to the application of CR in political ecology.

Firstly, CR is accused of failing to address how intransitive dimensions may be taken as ‘given’ when the researcher may be unable to distinguish between these and their own situated knowledge (Castree 1995). However, CR accepts that direct knowledge of generative mechanisms is unobtainable and emphasises the abductive process of postulating feasible common generative processes. In this sense, CR is in agreement with David Harvey’s observation that the dialect method is “not a reductionism to ‘things’ but to an understanding of common generative processes and relations” (Harvey 1996, 58). A second concern is the lack of detail CR provides on how its research agenda is sufficiently reflexive to its own

positioning and cultural embeddedness (Castree 1995). To address this concern, models of political economy must integrate CR's understanding of human agents as highly reflexive (Jessop 1996). Building upon CR, Jessop's SRA proposes a non-functionalist, evolutionary account of social organisation and change in capitalist societies which goes some way in making these reflexive processes explicit (Jessop 2005, 2008). The SRA seeks to show how social structures select and reinforce specific discourses and actions while resisting others and, simultaneously, how variations in discourse enable and constrain the construction of new temporarily stable material relationships (Jessop 2004). In particular, Jessop has explored how the extent to which the state may be defined is contingent upon the degree to which agents are able to collectively construct and deploy 'economic imaginaries' to interpret the material outcomes of economic practice, rationalise decision-making, and define legitimate visions and strategies of future economic practice (Jessop 2012). Functionalism and the unproblematic assumption of direct knowledge relating to intransitive dimensions of social reality are therefore avoided through CR's emphasis on this disjuncture between the economic imaginaries and their partial and imperfect realisations in the wider economy, retaining stability for limited periods of time only (Jessop 2003).

The SRA could also address an identified need (Ekers and Loftus 2008; Nash 2013) in water governance analysis for an approach which simultaneously describes the state as a site of struggle, rather than a monolithic hegemon, while also accommodating for dimensions of state governmentality in everyday practice. Ioris (2011) applies the SR approach to water governance in this respect, explaining how government policy and institutional structures serve to mediate and generate the strategic political tensions within water management. Thiel (2010) employs SRA to reintroduce the state into questions of water governance and critique its self-appointed status as the neutral third term in relation to state or market-oriented policy. Walker (2012) has employed an SR approach to analyse the interaction between water demand forecasts, their ontological assumptions, and the discursive-institutional frameworks through which they are channelled.

The SRA has yet to be fully adapted to the demands of geography or to answer the broader criticisms of CR. Both Ioris (2011) and Thiel (2010) note that few SRA implementations have sufficiently incorporated socio-spatial dimensions into their approach. At a fundamental level, there are those who echo Castree (1995), claiming that the SRA ultimately "offers no concept of the real" (Bonefield 1993, 41), only a circular referencing between social agency and structure in which neither takes precedent. Similarly, Bakker and Bridge (2006) describe CR's approach to materiality in geography as that of 'construction-as-refutation', in which received wisdoms concerning nature are at once refuted as social constructions, but only through appealing to bedrock materiality to which, apparently, only the researcher has access. CR and SRA's attempt to keep structure and agency, and the transitive and intransitive, as theoretically distinct but practically inseparable may therefore only be attractive to those favouring a dialectic method, and even then only after careful development.

### *Short Biography*

Gareth Walker's research focusses on the marketisation and liberalisation of water resource planning in the private water sector of England and Wales. His theoretical approach is based on developments of regulation school interpretations of the state, the production of hydrosocial landscapes, and the neoliberalisation of nature. He has published papers on the role of demand models and meta-governance in resource planning in England and Wales.

He has also worked on broader topics of water security, migration, and conflict. Gareth is currently a Doctoral Candidate at the School of Geography and Environment (SoGE) at the University of Oxford. Gareth holds a BSc in Physics with Philosophy of Science from Kings College London and an MSc In Water Science, Policy, and Management from the University of Oxford.

## Notes

\* Correspondence address: Gareth Walker, School of Geography and Environment, University of Oxford, South Parks Road, Oxford OX1 3QY, UK. E-mail: garethwalker@gmail.com

## References

- Adger, W. N. (2006). Vulnerability. *Global Environmental Change* 16 (3), pp. 268–281.
- Adger, W. N., Arnell, N. W. and Tompkins, E. L. (2004). Successful adaptation to climate change across scales. *Global Environmental Change* 15, pp. 77–86.
- Adler, J. H. (2008). Water marketing as an adaptive response to the threat of climate change. *Hamline Law Review* 31, pp. 729.
- Allan, J. A. (2005). Water in the environment/socio-economic development discourse: sustainability, changing management paradigms and policy responses in a global system. *Government and Opposition* 40 (2), pp. 181–199.
- Bakker, K. J. (2000). Privatizing water, producing scarcity: the Yorkshire drought of 1995. *Economic Geography* 76 (1), pp. 4–27.
- Bakker, K. J. (2001). Paying for water: water pricing and equity in England and Wales. *Transactions of the Institute of British Geographers* 26 (2), pp. 143–164.
- Bakker, K. J. (2003a). *An uncooperative commodity: privatizing water in England and Wales*. 1st ed. New York: Oxford University Press.
- Bakker, K. J. (2003b). From public to private to... mutual? Restructuring water supply governance in England and Wales. *Geoforum* 34 (3), pp. 359–374.
- Bakker, K. J. (2010). *Privatizing water: governance failure and the world's urban water crisis*. Ithaca, N.Y.: Cornell University Press.
- Bakker, K. J. and Bridge, G. (2006). Material worlds? Resource geographies and the matter of nature. *Progress in Human Geography* 30 (1), pp. 5–27.
- Barley, S. R. and Tolbert, P. S. (1997). Institutionalization and structuration: studying the links between action and institution. *Organization Studies* 18 (1), pp. 93–177.
- Baron, D. P. (1989). Design of regulatory mechanisms and institutions. *Handbook of Industrial Organization* 2, pp. 1347–1447.
- Barraqué, B. (2003). Past and future sustainability of water policies in Europe. *Natural Resources Forum Wiley Online Library*, 27 (3), pp. 200.
- Bénassy, J. P., Boyer, R. and Gelpi, R. M. (1979). Régulation des économies capitalistes et inflation. *Revue économique* 30 (3), pp. 397–441.
- Bennett, J. (2010). *Vibrant matter: a political ecology of things*. Durham, NC: Duke University Press Books.
- Bhaskar, R. (1986). *Scientific realism and human emancipation*. 1st ed. London: Verso.
- Blaikie, P. M. (1985). *The political economy of soil erosion in developing countries*. London: Longman.
- Blaikie, P. (1999). A review of political ecology. *Zeitschrift für Wirtschaftsgeographie* 43, pp. 131–147.
- Bohle, H. G., Downing, T. E. and Watts, M. J. (1994). Climate change and social vulnerability. Toward a sociology and geography of food insecurity. *Global Environmental Change* 4 (1), pp. 37–48.
- Bonefield, W. (1993). Crisis of theory: Bob Jessop's theory of capitalist reproduction. *Capital and Class* 17 (2), pp. 25–47.
- Bourdieu, P. (1992). *The logic of practice*. Stanford, California: Stanford University Press.
- Brooks, D. B., Brandes, O. M. and Gurman, S. (2009). *Making the most of the water we have: the soft path approach to water management*. London: Earthscan/James & James.
- Burton, I. and Sousson, J. (2003). *Livelihoods and climate change. combining disaster risk reduction, natural resource management and climate change adaptation in a new approach to the reduction of vulnerability and poverty*. Winnipeg: IISD: (International Institute for Sustainable Development).
- Castree, N. (1995). The nature of produced nature: materiality and knowledge construction in Marxism. *Antipode* 27 (1), pp. 12–48.
- Castree, N. (2010). Neoliberalism and the biophysical environment 2: theorising the neoliberalisation of nature. *Geography Compass* 4 (12), pp. 1734–1746.
- Castree, N. and Braun, B. (2001). *Social nature: theory, practice, and politics*. Malden, MA: Blackwell.
- Clark, G. L. (1992). 'Real' regulation: the administrative state. *Environment and Planning A* 24 (5), pp. 615–627.

- Coase, R. H. (1960). The problem of social cost. *Journal of Law and Economics* 3 (1), pp. 1–44.
- Cowan, S. (1993). Regulation of several market failures: the water industry in England and Wales. *Oxford Review of Economic Policy* 9 (4), pp. 14–23.
- Crocker, K. J. and Masten, S. E. (1996). Regulation and administered contracts revisited: lessons from transaction-cost economics for public utility regulation. *Journal of Regulatory Economics* 9 (1), pp. 5–39.
- Cutter, S. L. (1996). Vulnerability to environmental hazards. *Progress in Human Geography* 20 (4), pp. 529–539.
- Demsetz, H. (1968). Why regulate utilities. *Journal of Law and Economics* 11 (1), pp. 55–66.
- DiMaggio, P. (1994). Culture and economy. In: Smelser, N. J., and Swedberg, R. (eds) *The handbook of economic sociology*. Princeton: Princeton University Press.
- Dixit, A. K., Pindyck, R. S. and Davis, G. A. (1994). *Investment under uncertainty*. Princeton, NJ: Princeton University Press.
- Dryzek, J. S. (1996). Foundations for environmental political economy: the search for homo ecologicus? *New Political Economy* 1 (1), pp. 27–40.
- Ekers, M. and Loftus, A. (2008). The power of water: developing dialogues between Foucault and Gramsci. *Environment and Planning D: Society and Space* 26 (4), pp. 698.
- Erlenkotter, D., Sethi, S. and Okada, N. (1989). Planning for surprise: water resources development under demand and supply uncertainty I. The general model. *Management Science* 35 (2), pp. 149–163.
- European Parliament. (2000). *Water framework directive*. Brussels: EU.
- Fankhauser, S., Smith, J. B. and Tol, R. S. J. (1999). Weathering climate change: some simple rules to guide adaptation decisions. *Ecological Economics* 30 (1), pp. 67–78.
- Folke, C. (2006). Resilience: the emergence of a perspective for social–ecological systems analyses. *Global Environmental Change* 16 (3), pp. 253–267.
- Foster, J. B. and Holleman, H. (2012). Weber and the environment: classical foundations for a postexemptionalist sociology. *American Journal of Sociology* 117 (6), pp. 1625–1673.
- Foucault, M. (1972). *The archaeology of knowledge*. London: Tavistock.
- Foucault, M. (2008). *The birth of biopolitics: lectures at the College De France, 1978–1979 (Lectures at the College De France)*. New York: Palgrave.
- Gandy, M. (1996). Crumbling land: the postmodernity debate and the analysis of environmental problems. *Progress in Human Geography* 20 (1), pp. 23–40.
- Gandy, M. (1997). The making of a regulatory crisis: restructuring New York City's water supply. *Transactions of the Institute of British Geographers* 22 (3), pp. 338–358.
- Gandy, M. (1999). Rethinking the ecological leviathan: environmental regulation in an age of risk. *Global Environmental Change* 9 (1), pp. 59–69.
- Gandy, M. (2004a). Water, modernity and emancipatory urbanism. In: Lees, L. (ed.) *The emancipatory city*. London: Sage, pp. 178–191.
- Gandy, M. (2004b). Rethinking urban metabolism: water, space and the modern city. *City* 8 (3), pp. 363–379.
- Geldof, G. D. (1995). Adaptive water management: integrated water management on the edge of chaos. *Water Science and Technology* 32 (1), pp. 7–13.
- Getzler, J. (2004). *A history of water rights at common law*. Oxford: Oxford University Press.
- Giddens, A. (1984). *The constitution of society: outline of the theory of structuration*. Cambridge: Univ of California Press.
- Giddens, A. (1998). Risk society: the context of British politics. In: Jane, Franklin (ed.) *The politics of risk society*. Cambridge: Polity Press, pp. 23–34.
- Gleick, P. H. and Palaniappan, M. (2010). Peak water limits to freshwater withdrawal and use. *Proceedings of the National Academy of Sciences* 107 (25), pp. 11155–11162.
- Goubert, J. (1989). *The conquest of water: the advent of health in the industrial age*. Cambridge: Polity Press.
- Graham, S. and Marvin, S. (2001). *Splintering urbanism, networked infrastructures, technological mobilities and the urban condition*. London: Routledge.
- Gramsci, A. (1995). *Further selections from the prison notebooks*. Minneapolis: University of Minnesota Press.
- Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *American Journal of Sociology* 91 (3), pp. 481–510.
- Groves, D. (2006). *New methods for identifying robust long-term water resources management strategies for California*. California: RAND Corp.
- Hallegatte, S. (2009). Strategies to adapt to an uncertain climate change. *Global Environmental Change* 19 (2), pp. 240–247.
- Hand, M., Shove, E. and Southerton, D. (2005). Explaining showering: a discussion of the material, conventional, and temporal dimensions of practice. *Sociological Research Online* 10 (2).
- Haque, C. E. and Burton, I. (2005). Adaptation options strategies for hazards and vulnerability mitigation: an international perspective. *Mitigation and Adaptation Strategies for Global Change* 10 (3), pp. 335–353.
- Hardin, G. (1968). The tragedy of the commons. *Science* 162 (3859), pp. 1243–1248.

- Harou, J. J., Pulido-Velazquez, M., Rosenberg, D. E., Medellín-Azuara, J., Lund, J. R. and Howitt, R. E. (2009). Hydro-economic models: concepts, design, applications, and future prospects. *Journal of Hydrology* 375 (3–4), pp. 627–643.
- Harvey, D. (1996). *Justice, nature and the geography of difference*. Oxford: Blackwell.
- Herman, E. S. and Chomsky, N. (1988). *Manufacturing consent: the political economy of the mass media*. New York: Pantheon.
- Hughes, N., Hafi, A., Goesch, T. and Brownlowe, N. (2008). Urban water management: optimal price and investment policy under uncertainty. *52nd AARES Conference*, Australian Bureau of Agricultural and Resource Economics, pp. 5–8.
- Ioris, A. A. (2011). Applying the Strategic-Relational Approach to urban political ecology: the water management problems of the Baixada Fluminense, Rio de Janeiro, Brazil. *Antipode* 44 (1), pp. 122–150.
- Jessop, B. (1996). Interpretive sociology and the dialectic of structure and agency. *Theory, Culture & Society* 13 (1), pp. 119–128.
- Jessop, B. (1998). The rise of governance and the risks of failure: the case of economic development. *International Social Science Journal* 50 (155), pp. 29–45.
- Jessop, B. (2001). Institutional re(turns) and the Strategic-Relational Approach. *Environment and Planning A* 33 (7), pp. 1213–1235.
- Jessop, B. (2003). Governance and meta-governance: on reflexivity, requisite variety and requisite irony. In: Henrik, B. (ed.) *Governance, as social and political communication*. Manchester: Manchester University Press, pp. 101–116.
- Jessop, B. (2004). Critical semiotic analysis and cultural political economy. *Critical Discourse Studies* 1 (2), pp. 159–174.
- Jessop, B. (2005). Critical realism and the Strategic-Relational Approach. *New Formations* 56, pp. 40–53.
- Jessop, B. (2008). *State power*. Cambridge: Polity.
- Jessop, B. (2012). Economic and ecological crises: green new deals and no-growth economies. *Development* 55 (1), pp. 17–24.
- Johnson, C. and Handmer, J. (2002). Water supply in England and Wales: whose responsibility is it when things go wrong? *Water Policy* 4 (4), pp. 345–366.
- Kaika, M. (2004). Constructing scarcity and sensationalising water politics: 170 days that shook Athens. *Antipode* 35 (5), pp. 919–954.
- Kaup, B. Z. (2008). Negotiating through nature: the resistant materiality and materiality of resistance in Bolivia's natural gas sector. *Geoforum* 39 (5), pp. 1734–1742.
- Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review* 45 (1), pp. 1–28.
- Latour, B. (1993). *We have never been modern*. London: Harvester Wheatsheaf.
- Levi-Faur, D. and Gilad, S. (2004). The rise of the British regulatory state: transcending the privatization debate. *Comparative Politics* 37 (1), pp. 105–124.
- Levy, B. and Spiller, P. T. (1994). The institutional foundations of regulatory commitment: a comparative analysis of telecommunications regulation. *Journal of Law, Economics, and Organization* 10 (2), pp. 201–246.
- Linton, J. (2010). *What is water? The history of a modern abstraction*. Vancouver: University of British Columbia Press.
- Lipietz, A. (1986). Behind the crisis: the exhaustion of a regime of accumulation. A “regulation school” perspective on some French empirical works. *Review of Radical Political Economics* 18 (1–2), pp. 13.
- Lipset, S. M. (1959). Some social requisites of democracy: economic development and political legitimacy. *The American Political Science Review* 53 (1), pp. 69–105.
- Littlechild, S. (1988). Economic regulation of privatised water authorities and some further reflections. *Oxford Review of Economic Policy* 4 (2), pp. 40–68.
- Lund, J. R. (1987). Evaluation and scheduling of water conservation. *Journal of Water Resources Planning and Management* 113 (5), pp. 696–708.
- Luss, H. (1982). Operations research and capacity expansion problems: a survey. *Operations Research* 30 (5), pp. 907–947.
- Maass, A. and Anderson, R. L. (1978). ... *And the desert shall rejoice: conflict, growth, and justice in arid environments*. Cambridge, Mass: MIT Press.
- Majone, G. (1994). The rise of the regulatory state in Europe. *West European Politics* 17 (3), pp. 77–101.
- Marx, K. (1978). For a ruthless criticism of everything existing. In: Tucker, R. (ed.) *The Marx–Engels reader*. New York: Norton, pp. 12–15.
- McCulloch, C. S. (2009). The water resources board: England and Wales' venture into National Water Resources Planning, 1964–1973. *Water Alternatives* 2 (3), pp. 461–475.
- Mehta, L. (2001) The manufacture of popular perceptions of scarcity: dams and water-related narratives in Gujarat, India. *World Development* 29 (12), pp. 2025–2041.
- Mehta, L. (2003). Contexts and constructions of water scarcity. *Economic and Political Weekly* 38 (48), pp. 5066–5072.
- Molle, F., Wester, P. and Hirsch, P. (2010). River basin closure: processes, implications and responses. *Agricultural Water Management* 97 (4), pp. 569–577.
- Mustafa, D. (2005). The production of an urban hazardscape in Pakistan: modernity, vulnerability, and the range of choice. *Annals of the Association of American Geographers* 95 (3), pp. 566–586.
- Nash, F. (2013). Participation and passive revolution: the reproduction of neoliberal water governance mechanisms in Durban, South Africa. *Antipode* 45 (1), pp. 101–120.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. 9th ed. Cambridge: Cambridge University Press.



- Ogden, S. G. (1995). Transforming frameworks of accountability: the case of water privatization. *Accounting, Organizations and Society* 20 (2), pp. 193–218.
- Ohlsson, L. and Turton, A. R. (1999). The turning of a screw: social resource scarcity as a bottleneck in adaptation to water scarcity. *Occasional Paper Series, School of Oriental and African Studies Water Study Group, University of London*.
- Ostrom, E. (1991). *Governing the commons: the evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Ostrom, E. (2005). *Understanding institutional diversity*. Princeton, NJ: Princeton University Press.
- Ostrom, E. (2010). Beyond markets and states: polycentric governance of complex economic systems. *American Economic Review* 100 (3), pp. 641–672.
- Ostrom, E., Gardner, R. and Walker, J. (1994). *Rules, games, and common-pool resources*. 4th ed. Michigan, USA: University of Michigan Press.
- Pahl-Wostl, C. (2002). Towards sustainability in the water sector—the importance of human actors and processes of social learning. *Aquatic Sciences—Research Across Boundaries* 64 (4), pp. 394–411.
- Pahl-Wostl, C., Craps, M., Dewulf, A., Mostert, E., Tabara, D. and Taillieu, T. (2007). Social learning and water resources management. *Ecology and Society* 12 (2), pp. 5.
- Patomäki, H. and Wight, C. (2002). After postpositivism? The promises of critical realism. *International Studies Quarterly* 44 (2), pp. 213–237.
- Pelling, M. and High, C. (2005). *Social learning and adaptation to climate change*. Benfield Hazard Research Centre, Disaster Studies Working Paper 11, pp. 1–19.
- Perera, B. J. C. and Codner, G. P. (1988). A combined stochastic dynamic programming–statistical disaggregation approach applied to multiple reservoir systems. *Water Resources Management* 2 (3), pp. 153–171.
- Polyani, K. (1944). *The great transformation*. New York: Rinehart.
- Posner, R. A. (1974). The social costs of monopoly and regulation. *The Journal of Political Economy* 83 (4), pp. 807–828.
- Reilly, J. and Schimmelpfennig, D. (2000). Irreversibility, uncertainty, and learning: portraits of adaptation to long-term climate change. *Climatic Change* 45 (1), pp. 253–278.
- Reisner, M. (1993). *Cadillac desert: the American West and its disappearing water*. Harmondsworth: Penguin.
- Robinson, C. (2004). Water privatisation: too much regulation? *Economic Affairs* 24 (3), pp. 24–31.
- Rogers, P., De Silva, R. and Bhatia, R. (2002). Water is an economic good: how to use prices to promote equity, efficiency, and sustainability. *Water Policy* 4 (1), pp. 1–17.
- Rosenberg, D. E., Howitt, R. E. and Lund, J. R. (2008). Water management with water conservation, infrastructure expansions, and source variability in Jordan. *Water Resources Research* 44 (11), pp. 1–11.
- Rubinstein, J. and Ortolano, L. (1984). Water conservation and capacity expansion. *Journal of Water Resources Planning and Management* 110 (2), pp. 220–237.
- Schorr, D. (2012). *The Colorado doctrine: water rights, corporations, and distributive justice on the American frontier*. London: Yale University Press.
- Semple, E. C. (1911). *Influences of geographic environment, on the basis of Ratzel's system of anthropo-geography*. New York: H. Holt and Company.
- Shaoul, J. (1997). The power of accounting: reflecting on water privatization? *Accounting Auditing & Accountability Journal* 10 (3), pp. 382–405.
- Shapiro, C. and Willig, R. (1996). Economic rationales for the scope of privatization. In: Jasiński, P. and Yarrow, G. K. (eds) *Privatization: critical perspectives on the world economy*. London: Routledge, pp. 89–119.
- Sharp, L. (2006). Water demand management in England and Wales: constructions of the domestic water user. *Journal of Environmental Planning and Management* 49 (6), pp. 869–889.
- Shove, E. and Walker, G. (2010). Governing transitions in the sustainability of everyday life. *Research Policy* 39 (4), pp. 471–476.
- Smit, B., Burton, I., Klein, R. J. T. and Wandel, J. (2000). An anatomy of adaptation to climate change and variability. *Climatic Change* 45 (1), pp. 223–251.
- Sofoulis, Z. (2005). Big water, everyday water: a sociotechnical perspective. *Continuum: Journal of Media & Cultural Studies* 19 (4), pp. 445–463.
- Spaargaren, G. and Van Vliet, B. (2000). Lifestyles, consumption and the environment: the ecological modernization of domestic consumption. *Environmental Politics* 9 (1), pp. 50–76.
- Stigler, G. J. (1971). The theory of economic regulation. *The Bell Journal of Economics and Management Science* 2 (1), pp. 3–21.
- Stigler, G. J. and Friedland, C. (1962). What can regulators regulate—the case of electricity. *Journal of Law and Economics* 5 (1), pp. 1–16.
- Strang, V. (2004). *The meaning of water*. Oxford: Berg Publishers.
- Swyngedouw, E. (1996). The city as a hybrid: on nature, society and cyborg urbanization. *Capitalism Nature Socialism* 7 (2), pp. 65–80.
- Swyngedouw, E. (1997). Power, nature, and the city. The conquest of water and the political ecology of urbanization in Guayaquil, Ecuador: 1880–1990. *Environment and Planning A* 29, pp. 311–332.

- Swyngedouw, E. (1999). Modernity and hybridity: nature, regeneracionismo, and the production of the Spanish waterscape, 1890–1930. *Annals of the Association of American Geographers* 89 (3), pp. 443–465.
- Swyngedouw, E. (2006). Circulations and metabolisms: (hybrid) natures and (cyborg) cities. *Science as Culture* 15 (2), pp. 105–121.
- Swyngedouw, E., Kaika, M. and Castro, E. (2002). Urban water: a political-ecology perspective. *Built Environment* (1978-) 28(2), pp. 124–137.
- Taggart, M. (2002). *Private property and abuse of rights in Victorian England: the story of Edward Pickles and the Bradford water supply*. Oxford: Oxford University Press.
- Taylor, V., Chappells, H., Medd, W. and Trentmann, F. (2009). Drought is normal: the socio-technical evolution of drought and water demand in England and Wales, 1893–2006. *Journal of Historical Geography* 35 (3), pp. 568–591.
- Teh, T. (2011). Doctoral thesis: hydro-urbanism: reconfiguring the urban water-cycle in the Lower Lea River Basin, London. University College London.
- Thatcher, M. (2002). Regulation after delegation: independent regulatory agencies in Europe. *Journal of European Public Policy* 9 (6), pp. 954–972.
- Thiel, A. (2010). Constructing a strategic, national resource: European policies and the up-scaling of water services in the Algarve, Portugal. *Environmental Management* 46 (1), pp. 44–59.
- Turton, A. and Meissner, R. (2002). The hydrosocial contract and its manifestation in society: a South African case study. In: Turton, A. and Henwood, R. (eds) *Hydropolitics in the developing world: a Southern African perspective*. Pretoria: University of Pretoria, pp. 37–60.
- UN Water. (2006). Water: a shared responsibility: UN World Water Development Report 2. UNESCO.
- Walker, G. (2012). A critical examination of models and projections of demand in water utility resource planning in England and Wales. *International Journal of Water Resources Development* 29 (3), pp. 352–372.
- Weber, M., Baehr, P. R. and Wells, G. C. (2002). *The Protestant ethic and the “spirit” of capitalism and other writings*. New York: Penguin Classics.
- Whatmore, S. (2002). *Hybrid geographies: natures cultures spaces*. London: SAGE Publications Limited.
- Williamson, O. E. (1975). *Markets and hierarchies, analysis and antitrust implications*. New York: Free Press.
- Williamson, O. E. (1976). Franchise bidding for natural monopolies—in general and with respect to CATV. *The Bell Journal of Economics* 7 (1), pp. 73–104.
- Williamson, O. E. (1999). Public and private bureaucracies: a transaction cost economics perspectives. *Journal of Law, Economics, and Organization* 15 (1), pp. 306.
- Wittfogel, K. (1957). *Oriental despotism: a comparative study of total power*. New Haven: Yale University Press.
- Worster, D. (1992). *Rivers of empire: water, aridity, and the growth of the American West*. New York: Oxford University Press.
- Wright, L. (2000). *Clean and decent: the fascinating history of the bathroom & the water closet and of sundry habits, fashions & accessories of the toilet, principally in Britain, France & America*. London: Penguin.
- Zeitoun, M. and Warner, J. (2006). Hydro-hegemony—a framework for analysis of trans-boundary water conflicts. *Water Policy* 8 (5), pp. 435–460.