

URBAN POLITICAL ECOLOGY: imaginaries, governance, and the non-human

Nate Gabriel

A later version of this article was published in 2014 in the online journal *Geography Compass*.

Abstract

Urban political ecology (UPE) has established a firm foothold as urban environments have become increasingly relevant for both academics and for the broader environmental movement. Over the last decade, UPE has established a position that took as its starting point the tightly interwoven status of “socio-nature”, coupling a critical stance on urban environments through a theorization of society in which the “urban” is a distinct historical expression of capitalism. More recently, some (Grove 2009, Holifield 2009, Gandy 2012) in UPE have voiced concern that this approach places too heavy an emphasis on structural capitalist forces, and have begun to reexamine and push further UPE's engagement with post-structuralism and post-humanism. This paper explores three such moves: the first is a resurgence in interest in environmental imaginaries; the second is a closer engagement with the extensive literature on urban governance; the last is a new form of engagement with post-humanism, specifically the theoretical implications of including non-human agency into accounts of urban political ecologies.

Introduction

There has been a recognition of the importance of an urban focus in political ecology since at least the late 1990s (Swyngedouw 1997, Bryant 1998). In a general sense, those working in urban political ecology (UPE) have sought to carry to the urban realm Blaikie and Brookfield's (1987) desire to forge a field of research that “combines the interests of ecology [and] a broadly-defined political economy”. Early forays into this area of research include William Cronon's now-classic *Nature's Metropolis* (1991), which explored the inextricable relationship between Chicago's economic development in the 19th century and the reworking of non-human nature; Mark Pelling's work (1999) on urban hazards, which demonstrated that the themes addressed by political ecology have as much traction in the examination of urban hazards as they do in the rural “Third World”; and Erik Swyngedouw's groundbreaking work (1997) on the Ecuadoran waterscape, which clearly demonstrated the simultaneously economic and ecological

character of the process of urbanization. As urban environments became increasingly relevant for both academics and for the broader environmental movement, this work met the need for a critical field of inquiry that combined the interests of political ecology and urban studies (Braun 2005, Keil 2003, Feng et al 2005). For further discussion of early movements in UPE, see Keil 2003, 2005).

In 2006, Heynen, Swyngedouw, and Kaika's edited volume *In the Nature of Cities*, sought to unify this otherwise disparate set of interests, by laying out an explicit theoretical agenda that examined the spatiality of nature produced through capitalist relations at the urban scale (2006). This work established a strong neo-Marxist foundation for the field, carrying forward Henri Lefebvre's theorization of urban society as increasingly dominated by processes of capitalist economic production (2003; c.f. Brenner 2009), as well as that of David Harvey, who has described the city as the site of convergence of labor, capital, and class struggle (1982, 1997). Thus, for contributors to the volume, privileging the urban in political ecology began from the view that the urban is the "significant scale at which to explore the production of nature" (Braun 2005, paraphrasing Keil and Desfor 2004). This perspective continues to be refined and expanded, most notably in Neil Brenner's recent efforts to theorize the implications of a globalizing world in which the "geographies of urbanization" have expanded beyond the traditional confines of the city and transcended the outmoded division between the urban and the rural (2013). UPE has firmly established a position that takes as its starting point the tightly interwoven status of "socio-nature", from a critical stance on urban environments in which the 'urban' is the defining expression of capitalism in the present era.

Yet, even as urban political ecology on the whole has emphasized "metabolic" capitalist processes in its investigations of uneven distribution of and access to urban environments (Heynen 2003, Heynen et al 2006, Swyngedouw and Heynen 2003), it has combined this agenda with insights that emerged from post-structural and post-humanist theory. For example, it emphasized the problematic binary of the human and the non-human, drawing in particular on work on hybridity by Bruno Latour (1993) and Donna Haraway (1991, 1997), enabling a profound re-orientation of the ways in which humans and nature are theorized in relation to each other. This placed questions about the consequences of emerging socio-natural assemblages at the center of UPE, a strategy that has proved effective for making visible a host of social problems associated with capitalist practices in cities, including certain forms of oppression, exploitation, and the in-

justices of uneven economic development. (For more recent reviews on the concept of urban metabolism in UPE, see Kennedy et al 2011, Castán Broto et al 2013, Pincetl 2012, Wachsmuth 2012).

At the same time, some commentators have voiced concern that this approach places too heavy an emphasis on capitalist metabolism and a “structuralist” theorization of power, to the extent that it becomes difficult to imagine an urban sphere outside of capitalism, so that the state, the public sphere, and even aesthetics are seen as either emerging entirely from capitalist relations or as a form of resistance to them (Gibson-Graham 1996, Thrift 2006, Grove 2009, Gandy 2012). Kevin Grove (2009), for example, has criticized UPE for not embracing the range of theoretical approaches that have characterized political ecology more generally (in particular, those associated with post-structuralism), which in his view has prevented a close engagement with a set of concerns related to discourse, subjectivity, and environmental imaginary in the constitution of urban spaces.

In the rest of this paper, I focus on three general ways in which the question of power in UPE has been developed, each emerging out of UPE’s early articulations and in some cases moving beyond them, having to do with the notion of power in the production of urban environments. The first is a brief review of recent treatments of urban environmental imaginaries, which are understood here as conceptual framings and systems of meaning related to urban environments, including assumptions about the nature of the city and the nature of nature. Work investigating environmental imaginaries is closely linked with theorizations of subjectivity and governance. Thus, in the second section, I segue into a discussion of the increasing attention to urban governance, specifically as it relates to urban infrastructures, and call for greater engagement with theorizations of self-governance that have been featured more prominently in urban governance studies outside of UPE. Finally, I engage in a brief discussion of the role of the nonhuman, including critics of UPE’s early engagement with post-humanism, and their suggestions for ways of moving beyond “capitalocentric” theorizations of human/non-human relations.

Urban Imaginaries

A focus on urban imaginaries has long been present in UPE, highlighting the role that environmental discourses can have on the collective imagining and material conditions of urban

spaces through the construction of particular types of landscapes, subjects, and practices. A decade ago, Cowell and Thomas' (2002) focused on the chilling effect of hegemonic regional discourse formations to silence otherwise progressive political activity. More recently, Kaika and Swyngedouw have set their sights on grander targets, arguing that, despite a general consensus among academics regarding the fluidity of the concept "nature", there is simultaneously a growing global agreement among policy-makers that nature is "radically out-of-sync, singular, under threat and in need of saving" (Kaika and Swyngedouw 2012, p 25). They argue that this emerging global environmental imaginary, which urges technical fixes to solve an imminent global catastrophe, effectively neuters environmental justice as a radical political project by producing a "post-political" moment in which the only rational goal is to maintain the status quo (Swyngedouw 2009).

While that literature focuses on the dominance of hegemonic environmental imaginaries, other work focuses more intently on the micropolitics of urban environmental discourse, and the possibilities for new political activity that can arise. Grove (2009) has argued, following Escobar (1999), for an "anti-essentialist" UPE that is "concerned with struggles over meanings and practices of nature and the city that shape identities that make some forms of urban metabolisms possible while foreclosing others" (p209). Gandy's early work on the "urban pastoral" offered a detailed historical analysis of the formation of new discourses of "nature" in New York City through the establishment of Central Park (2002). His later work examines a range of other sites, including the effects of discourses of hygiene and health (2006) and the relationship between sexuality and public space as sites of emergent subjectivity (2012). In the latter, he is especially interested in the insights into the diverse forces that produce urban environments that emerge by coupling queer theory with UPE. Brownlow's (2005, 2006) work is similarly interested in questions of gender, examining urban environments as spaces of fear in which human bodies become viewed as potential victims of violence. He shows how violence comes to be seen as endemic to particular forms of neglected urban nature, leading policy-makers as well as scientists to approach ecological change as a matter of social control rather than as an environmental concern (Brownlow 2006). In related work, Millington (2012) demonstrates how representations of "blight" reinforce the discursive division between the urban and the natural, while Kaika (2005) explores the role of the technological networks associated with water as "wish images" that resulted from and drove forward "modernity's Promethean project" in the 19th and 20th centuries.

Alkon (2008) explores farmers markets as sites of discursive performance, by which consumption of food sold there becomes a conduit through which environmental concerns, like the value placed on “pristine” wilderness, are carried into the urban home. Finally, my own work (2011) focuses on the role of “the urban” as a keystone of the discursive architecture that helps to reproduce the city as a capitalist space. Together, this subset of UPE research reveals the multiplicity of forces that collude in producing “the urban”. It seeks to understand the ways in which the urban environmental imagination makes visible or invisible any number of potential modes of interaction between the human and the non-human, and enables the creation of one kind of urban environment instead of another. For Cadieux, these insights make possible a more transparent, more just, and more democratic form of political negotiation in which the assumptions of environmental management are laid bare (2011).

Governing Urban Space and Urban Subjects

A second long-standing, but related, concern in UPE is the way in which the urban is produced as a governable space. This has led to a focus on a range of infrastructural components of urban processes, including water (Swyngedouw 1997, 1999; Gandy 2002, Kaika 2005, Meehan 2010), electricity (Bennett 2010), and urban parks and green space (Gandy 2002, Gabriel 2011, 2013). MacFarlane and Rutherford (2008) have argued that the focus on infrastructure in UPE has to some degree been an attempt to rectify the tendency to relegate infrastructure to an inert and apolitical backdrop in cities, and to retheorize it as an active participant in the constitution and manipulation of urban society. This is accomplished in a variety of ways, by examining infrastructure as a site of social and political struggle (Gandy 2002, Swyngedouw 2009, Otero et al 2009, Loftus 2009, Birkenholtz 2010, Castán Broto and Bulkeley 2013); as an instrument of governance (Swyngedouw 1997, Gandy 2002, Bakker 2013); or as constitutive of governable urban spaces (Kaika 2005, Gandy 2006, Kooy and Bakker 2008, MacFarlane 2008). For Loftus, the focus on urban infrastructure as coconstitutive with power-laden social relationships makes possible a “radically democratic politics” (2009, p327) which can undermine the forms of power that have been produced in and through their development, but Eckers and Loftus (2008) point out (sympathetically) that the examination of infrastructure in UPE has sometimes failed to sufficiently develop its theorization of power, treating power as both a field that structures behavior, but also as a quantity that can be held and

deployed. Likewise, governance itself is too often theorized as a dominating force that inculcates an unwitting and ultimately powerless underclass into the service of purely elite interests. For these (among other) reasons, Monstadt has argued that UPE hasn't yet fully dealt with the specific effects of infrastructure - the unique role of infrastructures and networks in producing urban space, people, and resources - and its relationship to governance (2009). In order for UPE to fulfill its promise as a useful analytical framework for studying urban infrastructure, he argues, it must be capable of grappling with the "inherently ambivalent and long-lasting" nature of complex sociotechnical systems. (ibid, p1934).

In light of this critique, despite the presence of many high-quality investigations into the relationship between urban infrastructure and governance, the following two subsections explore key questions related to urban subjectivity that have featured prominently in the urban governance literature more generally have been neglected in UPE: the role of self-governance, and the micropolitics of everyday subject formation.

Self-governance and Subjectivity

The literature focusing on the relationship between urban governance and the production of urban subjects could provide further direction for expanding such investigations. For example, in tracing the development of urbanism through urban planning, Paul Rabinow urges an analytical strategy in which 'disciplinary components' of urban space become seen as 'part of a shifting field of power and knowledge in which we can see the gradual self-formation of a class, a nation or a civilization' (2003; see also Heathcott 2003). Similarly, Osborne and Rose argue that "the contemporary city [is] a governed and ethically saturated space", tracing the effects of a range of political and governmental techniques in producing an urban space for the regulation and modulation of individual behavior (Osborne and Rose 1999, p 737; see also Osborne and Rose 2004; Crampton and Elden 2006; Huxley 2006). In doing so, they develop an understanding of the city as a space of governance, a "way of diagramming human existence, human conduct, [and] human subjectivity...in the name of government" (Osborne and Rose 1999: 737). Focusing on the question of governance and the production of urban subjects, Huxley demonstrates the importance of forms of rationality that she calls "operative rationales", which "mobiliz[e] certain 'truths' of causal relations in and between spaces, environmental bodies, and compartments" in the process of subjectification (2006, p 772). Here, operative rationales are understood as modes

of thought that shape governmental practices of spatial arrangement, activating "truths" such as those related to essentialized understandings of urban spaces, societies, and people.

While none of this work explicitly addresses the production of economic or environmental knowledge of the city, its emphasis on the forms of governance that are associated with the production of urban subjects could provide further guidance for thinking through a micropolitics of urban environmental production. Through such an approach, the establishment of urban environments could be situated within a field of power relations that constitutes distinctly urban and non-urban actors and spaces, in which the meaning of those spaces can be read through an ethical system that is intertwined with the proper functioning of a capitalist economy. In tracing the formation and operation of this field of power, the techniques of government associated with urban governance become not simply a form of violence committed against an unwilling urban populace, but productive of urban subjects, who in turn reproduce urban nature through the establishment of particular forms of knowledge about cities, nature, and people (Foucault 1980, Huxley 2007). Theorizing urban governance in this way illuminates not only the knowledges that are produced through it, but also the knowledges that are unmade by it. Taking care not to exclude subjugated knowledge from the narrative frame allows an accounting not only of what is lost in the process of discourse formation, but also what possibilities exist for new forms of knowledge in the future (Foucault 1980, Gibson-Graham 2006).

Urban Governance, Subjectivity, and the Everyday

A number of others have begun to trace the formation of urban spaces through the often varied and indeterminate practices of urban subjects. Here, governance is not examined by tracing the circuits of power through which citizens are controlled, dominated, or oppressed by the state and related institutions. Nor is it treated as a force that operates unidirectionally to inculcate citizens as self-monitoring subjects of economic regimes that foist responsibility and risk onto the poor and working classes in the service of the interests of the elite (Thrift 2005; Gandy 2006, 2012; Meehan 2010; c.f. Ellis 2012, Uitermark 2005, MacKinnon 2000, Roy 2009). Rather, this work focuses on the momentary and the commonplace, highlighting the ambiguity, ambivalence, indecision, and opportunity in which new realms of being emerge through the formation of new associations among governing subjects and the world around them. Subject formation is not framed as the negative effect of power wielded by the state or other institutions,

but as a productive dimension of the practices that produce power/knowledge, while governance is understood as the exertion of control not through laws but through what Foucault called "the right disposition of things" (Dowling 2010, p 202). That is, governance is done through the arrangement and management of people and objects, producing the material conditions that make particular ways of being comprehensible and possible.

A prime example is Paul Robbins' *Lawn People* (2007), which demonstrates the ways that the American lawn, or rather the assemblage of actors and acts that constitute it, assist in the formation of "lawn people", whose interactions with land resources in cities and suburbs are shaped by a moral framework in which particular kinds of subjects are called into being by the "needs" of the lawn. As this assemblage of actors converges, Robbins writes, "the subject comes to recognize herself as a subject and responds accordingly...the subject must be 'hailed', named, recognized... interpellated" (p15-16). The notion of self-governance expressed here is central to Foucault's understanding of the creation of subjects through "technologies of the self" (1991), such that the formation of subjects comes about because a unique set of practices that continually reproduce a discourse of lawn care. Thus, rather than treating the historical development of discourse as inevitable or "natural", Robbins recognizes that particular knowledges of and interactions with nature are made possible by a complex network of political, cultural, and historical conditions and activities. He makes clear the utility of focusing on questions of discourse and subjectivity in order to reveal how particular bodies of knowledge shape what is possible and what is not possible relative to the environment and, importantly, the effects these forms of governance can have on resource users, managers, and the resources themselves.

A number of other more recent examples have continued to develop the field further along these lines. For example, Katharine Meehan's work on informal water access and provision in Tijuana, Mexico draws on Gibson-Graham's anti-essentialist view of economy to examine the role of non-capitalist practices in the formation of urban water economies (2010). Ranganathan (2013) takes up the issue of slum dwellers' willing participation in neoliberal schemes that require payment for water pipes, arguing that their participation can be understood not evidence of buy-in to development thinking, as it is typically understood by development professionals, but as a strategy for resisting the political dominance of development thinking by strengthening future land tenure claims. Leonard focuses attention on the theorization of civil society in UPE more generally (2012), wishing to move beyond the notion of civil society as a

homogenous whole, and toward a theorization of a differentiated civic body that engages in multiple forms political activity, in which sensitivity to the diversity of concerns expressed by civil society enables "other" political ecologies to emerge. Finally, Domínguez Rubio and Fogué argue that the increasing politicization of urban infrastructure in public life, through a variety of process that includes the privatization of service provision, presents not only a target for political opposition but also an opportunity to rethink the relationship between the natural, the social, and the technological, particularly with regard to public and private spaces (2013).

In a general sense, this work expands on what some have called an "immanentist" urbanism (Karaman 2012). For Amin and Thrift, this approach is "not interested in systems, which so often imply that there is an immanent logic underlying urban life, but in the numerous systematizing networks [...] which give provisional ordering to urban life" (2002). This approach emphasizes the processes in which networks of actors arrange themselves, often in new and unpredictable ways, in the making and remaking of cities. Thus, while urban practices are at times disciplined by a few well-placed constituents of these networks, such practices always threaten to spill over from that "disciplinary envelope" (ibid pg 4). By expanding its focus on governance to include a more extensive range of governmental strategies and apparatuses wherever they operate, this work brings to the fore new possibilities for understanding of who governs effectively, and what diverse and overlapping governmental rationalities are present in cities, incorporating a broader range of practices in UPE's accounting of the formation of urban nature. Furthermore, as the range of governmental practices that fall under UPE's purview expands, so too does the roster of actors that are understood to do this work. To this roster, via a range of theoretical interventions that fall under the broad category of "posthumanism", has been added the category of the non-human.

Posthumanism

The concern with urban governance, infrastructure, and networks in UPE demands consideration of the role of nonhumans in the formation of political networks. As stated earlier, an engagement with post-humanist theory has been present since the earliest examples of UPE (Swyngedouw 1997), but Heynen et al (2006) put front and center the concerns of hybridity as well as other tenets associated with post-humanism, such as a desire to examine nature/society relations as co-constitutive assemblages of human and non-human actors. These ideas have been

carried forward perhaps most clearly in Gandy's work on cyborg urbanization, which he defines as the process by which human bodies are coconstitutive with urban space (2008). Yet, recent critiques point out that UPE has always had an uneasy relationship with post-humanism. Gandy's own (2012) exploration of the potential intersection of queer theory and UPE seeks to move beyond what he calls "first-wave" UPE, which he characterizes as "including an overly deterministic emphasis on the production and meaning of urban nature...", and toward an analysis of urban space that "challenges categories and 'mappings' in their broadest sense so that we encounter a challenge to 'neatness' in relation to human subjectivities and material landscapes alike" (p742).

Similarly, Holifield's (2009) "case against synthesis" of actor network theory (ANT) with UPE clarifies many points of conflict and complementarity between the two, arguing that, even as urban political ecologists have employed the notions of hybridity and non-human agency, UPE has by and large rejected ANT's basic epistemological and ontological underpinnings. According to Holifield, ANT's theorization of the social is incompatible with the stronger forms of Marxist analysis employed in UPE because the latter tends to understand the social as a strictly human realm. He argues that, in the work of Swyngedouw and Heynen (2003), for example, non-humans are never agents in their own right, but are merely socially mobilized (by people) to achieve certain elite ends. By contrast, ANT "rejects taking the social as a distinct domain of reality," (Holifield 2009, p 644) and is instead interested primarily in the process of assemblage of humans and non-humans, "trac[ing] the activity of giving shape to 'society' and the 'social'." (ibid). Further, he suggests that UPE has largely ignored ANT's refusal to accept the existence of capitalism except on a provisional basis, a stance that he argues flows out of these basic assumptions (Latour 2005). Holifield's position is borne out to some extent by other attempts to integrate Marxism with ANT, in which a middle ground is sought for preserving a "weak" form of ANT (Castree 2002) that rejects ANT's theoretical assumptions in exchange for those of historical materialism, but retains a focus on non-humans and assemblage in explaining various forms of injustice and inequality (Castree 2002; see also Brenner et al 2011 and Farias 2011).

Actor-Network Theory and Political Economy

Despite the rejection of some post-humanists of the core tenets of historical materialism, this work doesn't necessarily require UPE to turn its back on political economy altogether. Indeed, at its heart, ANT/post-humanism is primarily interested in a form of political economy in

which the “social” activities that humans and non-humans engage in produce the world, on an ongoing, provisional, and contingent basis. As Meehan’s (2010) work shows, destabilizing the structural relationship between humans and non-humans in contemporary Marxism requires a shift in focus toward economic practices, providing a way forward for understanding the prevalence of capitalist practices in the formation of urban nature without unnecessarily limiting UPE’s scope to the notion of the city as a wholly capitalist space (see also Gabriel 2011, 2013). In this way, urban-ness is not seen as a fixed set of relations driven by underlying (and overarching) forces, but as a series of moments in which networks of actors arrange themselves, often in new and unpredictable ways, in the making and remaking of cities. With respect to economic practices, this argument is buttressed by economists and geographers interested in the performative nature of economic practice, who argue that economies are by no means monolithic or internally consistent, but require vast collections of actors to bring them into being and to keep them going (see for example MacKenzie et al 2007). Gibson-Graham urges us to consider what must be done for urban space to be reproduced through the everyday practices of economic subjects (1996) and has endeavored, with Roelvink (Gibson-Graham and Roelvink 2010), to incorporate the more-than-human in their accounts of how cities and urban processes emerge as such (Gibson-Graham 2010, Gibson-Graham and Roelvink 2010). Likewise, Farias (2011), along with Bender (2010), as well as McFarlane (2011), have taken up this challenge in urban studies, and have begun to apply what some have termed “assemblage thinking” to urban spaces, interrogating cities’ formation as the consequence of “networked” social relations between a host of human and non-human actors, where non-human constituents of cities are more than the backdrop or landscape through which humans move, but actors that mediate urban relations and can change their trajectory.

Conclusion

In this brief review, I have not attempted to provide an exhaustive survey of recent literature in urban political ecology, but instead have tried to highlight some of the key threads that have characterized the field, and continue to drive it into new territory. Many practitioners of UPE have argued that a political ecology of the urban is necessary precisely because the urban (human) and natural (non-human) are intertwined, and that the binary that has historically defined much urban research and continues to define environmental frames beyond academia no longer holds. Consequently, they recognize that what is at stake is not only what is knowable

about urban nature, but also how we arrive at this knowledge, what effects that knowledge has on the larger world, and how non-humans engage with us to produce it.

In tracing the formation of urban space and urban economies through an examination of urban imaginaries, urban environmental governance, and an engagement with post-humanist insights about the nature of social activity and the agency of non-human actors, UPE has carried forward an interest in the political economy of urban nature, but has begun also to pay closer attention to the specific forces, discourses, practices, and actors that participate in the constitution of urban environments. By taking seriously the importance of diverse, seemingly insignificant acts in the construction and deconstruction of economic and environmental discourses, it has begun to explore the differentiating forces that produce urban nature as well as those that seem to dominate it. By drawing attention to these diverse strategies and practices, a fundamental but often overlooked connection between the practices of environment and practices of economy come to the fore, and urban space becomes visible as a series of sites in which to produce the world anew.

References

- Alkon, A. (2008). Paradise or pavement: the social constructions of the environment in two urban farmers' markets and their implications for environmental justice and sustainability. *Local Environment* 13(3), pp. 271–289.
- Amin, A. and Thrift, N. (2002). *Cities: reimagining the urban*. Malden, MA: Polity.
- Bakker, K. (2013). Constructing “public” water: the World Bank, urban water supply, and the biopolitics of development, *Environment and Planning D: Society and Space* 31(2), pp. 280–300.
- Bennett, J. (2010). *Vibrant matter: a political ecology of things*. Durham, NC: Duke University Press.
- Birkenholtz, T. (2010). “Full-cost recovery”: producing differentiated water collection practices and responses to centralized water networks in Jaipur, India, *Environment and Planning A* 42(9), pp. 2238–2253.
- Blaikie, P., & Brookfield, H. (1987). *Land degradation and society*. London: Methuen.
- Braun, B. (2005). Environmental issues: writing a more-than-human urban geography, *Progress in Human Geography* 29(5), pp. 635–650.
- Brenner, N. (2009). What is critical urban theory?, *City* 13(2-3), pp. 198–207.
- Brenner, N. (2013). Theses on Urbanization, *Public Culture* 25(1 69), pp. 85–114.
- Brenner, N., Madden, D. J., & Wachsmuth, D. (2011). Assemblage urbanism and the challenges of critical urban theory, *City* 15(2), pp. 225–240.
- Brownlow, A. (2005). A geography of men’s fear, *Geoforum* 36(5), pp. 581–592.
- Brownlow, A. (2006). An archaeology of fear and environmental change in Philadelphia, *Geoforum* 37(2), pp. 227–245.
- Bryant, R. L. (1998). Power, knowledge and political ecology in the third world: a review, *Progress in physical geography* 22(1), pp. 79–94.
- Cadieux, K. V. (2011). Competing discourses of nature in exurbia, *GeoJournal* 76(4), pp. 341–363 (Springer).
- Castán Broto, V. C., & Bulkeley, H. (2013). Maintaining Climate Change Experiments: Urban Political Ecology and the Everyday Reconfiguration of Urban Infrastructure, *International Journal of Urban and Regional Research* pp. n/a–n/a.
- Castree, N. (2002). False Antitheses? Marxism, Nature and Actor-Networks. *Antipode* 34(1), pp. 111–146.
- Cowell, R., & Thomas, H. (2002). Managing nature and narratives of dispossession: reclaiming territory in Cardiff Bay, *Urban Studies* 39(7), pp. 1241–1260.
- Crampton, J. W., & Elden, S. (2006). Space, politics, calculation: an introduction, *Social & Cultural Geography* 7(5), pp. 681–685.
- Cronon, W. J. (1992). *Nature's metropolis: Chicago and the great west*. New York: W. W. Norton & Company.
- DomÍnguez Rubio, F., & Fogué, U. (2013). Technifying Public Space and Publicizing Infrastructures: Exploring New Urban Political Ecologies through the Square of General Vara del Rey, *International Journal of Urban and Regional Research* 37(3), pp. 1035–1052.
- Dowling R. (2010). “Geographies of identity: climate change, governmentality and activism” *Progress in Human Geography* 34(4), pp. 488–495.
- Ekers, M., & Loftus, A. (2008). The power of water: developing dialogues between Foucault and Gramsci, *Environment and Planning D: Society and Space* 26(4), pp. 698–718.
- Ellis, R. (2012). “A World Class City of Your Own!”: Civic Governmentality in Chennai, India.

- Antipode 44(4), pp. 1143-1160.
- Escobar, A. (1999). After Nature: Steps to an Antiessentialist Political Ecology 1, *Current Anthropology* 40(1), pp. 1–30.
- Fariás, I. (2011). The politics of urban assemblages, *City* 15(3-4), pp. 365–374.
- Fariás, I., & Bender, T. (2012). *Urban assemblages: How actor-network theory changes urban studies*. New York: Routledge.
- Feng, H., Yu, L., & Solecki, W. (2005). *Urban dimensions of environmental change - science, exposures, policies, and technologies*. Monmouth Junction, NJ: Science Press USA Inc.
- Foucault, M. (1980). Two Lectures. In: Gordon, C., (ed.), *Power/Knowledge*. New York: Pantheon Books, pp. 78-108.
- Foucault, M. (1991). Governmentality. In: Burchell G., Gordon C., Miller P., (eds.), *The Foucault effect: studies in governmentality*. Chicago: University of Chicago Press, pp. 87-104.
- Gabriel, N. (2011). The Work That Parks Do: Toward an Urban Environmentality. *Social and Cultural Geography* 12(2), pp. 123-141.
- Gabriel, N. (2013). Mapping urban space: The production, division and reconfiguration of natures and economies, *City* 17(3), pp. 325–342.
- Gandy, M. (2002). *Concrete and clay: Reworking nature in New York City*. Cambridge, MA: MIT Press
- Gandy, M. (2006). Zones of indistinction: bio-political contestations in the urban arena, *Cultural Geographies* 13(4), pp. 497–516.
- Gandy, M. (2008). Cyborg Urbanization: Complexity and Monstrosity in the Contemporary City. *International Journal of Urban and Regional Research* 29(1), pp. 26-49.
- Gandy, M. (2012). Queer ecology: nature, sexuality, and heterotopic alliances, *Environment and Planning D: Society and Space* 30(4), pp. 727–747.
- Gibson-Graham, J. K. (1996). *The end of capitalism (As We Knew It)*. Minneapolis: University of Minnesota Press.
- Gibson-Graham, J. K. (2006). *A post-capitalist politics*. Minneapolis: University of Minnesota Press.
- Gibson-Graham, J. K. (2010). “A feminist project of belonging for the Anthropocene,” *Gender, Place and Culture - A Journal of Feminist Geography* Volume 18, Number 1, February 2011 , pp. 1-21.
- Gibson-Graham, J.K. and Roelvink, G. (2010). “An economic ethics for the Anthropocene,” *Antipode* 41(1), 320-346.
- Grove, K. (2009). “Rethinking the nature of urban environmental politics: Security, subjectivity, and the non-human,” *Geoforum* 40:207-216.
- Haraway, D. (1997). *Modest_Witness@Second_Millennium.FemaleMan©_Meets_Oncomouse™*. London: Routledge.
- Haraway, D. J. (2013). *Simians, cyborgs, and women: The reinvention of nature*. London: Routledge.
- Harvey, D. (1982). *The limits to capital*. Oxford: Basil Blackwell.
- Harvey, D. (1997). *Contested Cities: Social Process and Spatial Form*. In: Jewson, N. and MacGregor, S., (eds.), *Transforming Cities: New Spatial Divisions and Social Transformation*. New York: Routledge.
- Heathcott, J. (2005). “The Whole City Is Our Laboratory”: Harland Bartholomew and the Production of Urban Knowledge, *Journal of Planning History* 4(4), pp. 322–355.

- Heynen, N. C. (2003). The scalar production of injustice within the urban forest, *Antipode* 35(5), pp. 980–998.
- Heynen, N., Kaika, M., and Swyngedouw, E. (2006). Urban political ecology: Politicizing the production of urban natures. In: Heynen, N., Kaika, M., and Swyngedouw E., (eds), *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism*. New York: Routledge.
- Holifield, R. (2009). Actor-Network Theory as a Critical Approach to Environmental Justice: A Case against Synthesis with Urban Political Ecology, *Antipode* 41(4), pp. 637–658.
- Huxley, M. (2006). Spatial rationalities: order, environment, evolution and government, *Social & Cultural Geography* 7(5), pp. 771–787.
- Huxley, M. (2007). Geographies of Governmentality. In: Crampton, J. and Elden, S., (eds.) *Space, Knowledge, and Power*. Burlington, VT: Ashgate.
- Kaika, M. (2005). *City of flows*. New York: Routledge.
- Kaika, M. and Swyngedouw, E. (2012) *Cities, Natures and the Political Imaginary*. *Architectural Design* 82(4), pp. 22-27.
- Karaman, O. (2008). Urban Pulse - (RE)Making Space for Globalization in Istanbul, *Urban Geography* 29(6), pp. 518–525.
- Keil, R. (2003). Urban Political Ecology, *Urban Geography* 24(8), pp. 723–738.
- Keil, R. (2005). Progress Report - Urban Political Ecology. *Urban Geography* 26(7), pp. 640-651.
- Keil, R. and Desfor, G. (2004). *Nature and the city: Making environmental policy in Toronto and Los Angeles*. Tucson, University of Arizona Press.
- Kennedy, C., Pincetl, S., & Bunje, P. (2011). Environmental Pollution, *Environmental Pollution* 159(8-9), pp. 1965–1973.
- Kooy, M., & Bakker, K. (2008). Technologies of Government: Constituting Subjectivities, Spaces, and Infrastructures in Colonial and Contemporary Jakarta, *International Journal of Urban and Regional Research* 32(2), pp. 375–391.
- Latour, B. (1993). *We have never been modern*. Cambridge: Harvard University Press.
- Latour, B. (2007). *Reassembling the social - an introduction to actor-network-theory*. New York: Oxford University Press.
- Lefebvre, H. (2003). *The urban revolution*. Minneapolis: University of Minnesota Press.
- Leonard, L. (2012). Another political ecology of civil society reflexiveness against urban industrial risks for environmental justice: The case of the Bisasar landfill, Durban, South Africa, *Singapore Journal of Tropical Geography* 33(1), pp. 77–92.
- Loftus, A. (2009). Rethinking Political Ecologies of Water, *Third World Quarterly* 30(5), pp. 953–968.
- MacKenzie, D., Muniesa, F., and Siu, L. (2007). *Do economists make markets? On the performativity of economics*. Princeton: Princeton University Press.
- Mackinnon, D. (2000). Managerialism, governmentality and the state: a neo-Foucaudian approach to local economic governance. *Political Geography* 19, pp 294-314.
- McFarlane, C. (2008). Governing the Contaminated City: Infrastructure and Sanitation in Colonial and Post-Colonial Bombay, *International Journal of Urban and Regional Research* 32(2), pp. 415–435.
- McFarlane, C. (2011). Assemblage and critical urbanism, *City* 15(2), pp. 204–224.

- McFarlane, C., & Rutherford, J. (2008). Political Infrastructures: Governing and Experiencing the Fabric of the City, *International Journal of Urban and Regional Research* 32(2), pp. 363–374.
- Meehan, K., Shaw, I. G. R., & Marston, S. A. (2013). Political Geography, *Political Geography* 33(c), pp. 1–10.
- Meehan, K. (2010). Greywater and the Grid: Explaining Informal Water Use in Tijuana. Unpublished PhD dissertation, Department of Geography and Development, University of Arizona.
- Millington, N. (2012). Post-Industrial Imaginaries: Nature, Representation and Ruin in Detroit, Michigan. *International Journal of Urban and Regional Research* 37(1), pp. 279-296.
- Monstadt, J. (2009). Conceptualizing the political ecology of urban infrastructures: insights from technology and urban studies, *Environment and Planning A* 41(8), pp. 1924–1942.
- Osborne, T., & Rose, N. (1999). Governing cities: notes on the spatialisation of virtue, *Environment and Planning D: Society and Space* 17(6), pp. 737–760.
- Osborne, T., & Rose, N. (2004). Spatial phenomenotechnics: making space with Charles Booth and Patrick Geddes, *Environment and Planning D: Society and Space* 22(2), pp. 209–228.
- Otero, I., Kallis, G., Aguilar, R., & Ruiz, V. (2011). Water scarcity, social power and the production of an elite suburb: the political ecology of water in Matadepera, Catalonia. *Ecological Economics* 70(7), 1297-1308.
- Pelling, M. (1999). “The political ecology of flood hazard in urban Guyana.” *Geoforum* 30, 249-261.
- Pincetl, S. (2012). Nature, urban development and sustainability - What new elements are needed for a more comprehensive understanding?, *Cities* 29(S2), pp. S32–S37.
- Rabinow, P. (2003). *Ordonnance, Discipline, Regulation: Some Reflections on Urbanism*. In: Low, S. and Lawrence-Zuñiga, D., (eds.), *The Anthropology of Space and Place: Locating Culture*. Malden, MA: Blackwell Publishing.
- Ranganathan, M. (2013). Paying for Pipes, Claiming Citizenship: Political Agency and Water Reforms at the Urban Periphery, *International Journal of Urban and Regional Research* pp. n/a–n/a.
- Robbins, P. (2007). *Lawn people: How grasses, weeds, and chemicals make us who we are*. Philadelphia: Temple University Press.
- Roy, A. (2009). Civic Governmentality: The Politics of Inclusion in Beirut and Mumbai. *Antipode* 41(1), pp. 159-179.
- 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-The production of nature: water and modernisation in Spain, *Annals of the association of American Geographers* 89(3), pp. 443–465.
- Swyngedouw, E. (2009). The Antinomies of the Postpolitical City: In Search of a Democratic Politics of Environmental Production, *International Journal of Urban and Regional Research* 33(3), pp. 601–620.
- Swyngedouw, E., & Heynen, N. C. (2003). “Urban Political Ecology, Justice and the Politics of Scale.” *Antipode*.
- Thrift, N. (2005). *Knowing Capitalism*. Thousand Oaks, California: SAGE Publications, Inc.
- Thrift, N. (2006). David Harvey: A Rock in a Hard Place. In: Castree, N. and Gregory, D., (eds.), *David Harvey: A Critical Reader*, Malden, MA: Blackwell.

- Uitermark, J. (2005). The genesis and evolution of urban policy: a confrontation of regulationist and governmentality approaches. *Political Geography* 24, pp. 137-163.
- Wachsmuth, D. (2012). Three Ecologies: Urban Metabolism and the Society-Nature Opposition, *The Sociological Quarterly* 53(4), pp. 506–523.