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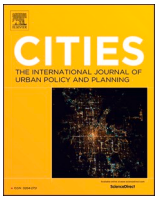

Bringing Ecological Urbanism and Urban Political Ecology to transformative visions of water sensitivity in cities

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ABSTRACT

Ecological Urbanism and Water Sensitive Urban Design have a central contribution to make in protecting and caring for people, nature and water in cities but readings of Urban Political Ecology evidence how ecological metaphors in urban design can easily translate into discriminatory urban development processes. This paper posits that for UPE to become meaningful for urban design practice, it is necessary to move beyond a critique. Instead, the insights of UPE should be pro-actively mobilized to develop a new vision of water sensitivity. The paper therefore identifies ways in which the key learnings of the critical social sciences, namely UPE, can be mobilized to support Water Sensitive Urban Design practice. How can ecological urbanists imagine new, more politically astute, forms of water sensitive living, charting design processes that not just recognize but also actively question and challenge uneven socio-ecological dynamics? In answering this question, the goal of this article is to make use of critique from UPE to influence Ecological Urbanists' goals and activate their political alignment with agendas that prioritize social equity. In imagining a new form of WSUD, we tried as much as possible not to over-instrumentalize UPE by rejecting the suggestion that some UPE 'lessons' or 'insights' could simply be inserted into ecological urbanism. On a different direction, we argue for a different emphasis in WSUD that does not deny the causes of current environmental degradation, pollution and depletion but, on the contrary, actively takes issue with and challenges the extractive and exploitative roots of contemporary urbanization processes.

1. Introduction

Water Sensitive Urban Design – WSUD is a recent approach in urban design and planning that seeks to integrate water management to promote long-term sustainability, liveability, resilience, and prosperity in cities (Ferguson et al., 2013). The main assumption of WSUD is that conventional approaches to urban water management (e.g. large centralized potable supply systems, sewage treatment plants and drainage channels) can have a negative impact on the natural water cycle. Moreover, conventional centralized urban water systems offer little flexibility for communities to cope with the possible disruptions in the face of climate change (Brown, 2012). In response, water-sensitive city designs envision a better ecological functioning of the urban landscape through the integration of storm water, water supply and sewage management by means of the implementation of a range of green infrastructure and nature-based solutions (Wong et al., 2020). Policy developments under the philosophy of WSUD have been developed and adopted across Australia since early 2000s and other countries are now considering the necessity to adopt its principles (Radcliffe, 2019).

Assumptions that WSUD techniques can improve the quality of life and use land in the best way (Ashley et al., 2013) gain a new layer of complexity when analysed against the backdrop of history and power relations of capitalist societies. In the context of the Global South where WSUD is beginning to be adopted, cities in India and Republic of South Africa for example (see Fisher-Jeffes et al., 2017; Kapur, 2023), the Australian approach is not apt to recognize the equity issues related to historical legacies such as colonialism, apartheid or caste discrimination. Urban political ecology – UPE - scholarship has explored the inherent contradictions of the design-deterministic approaches of Ecological Urbanism to restore nature in the city. Studies on ecological

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gentrification, for instance, expose how greening agendas exacerbate urban injustices, rendering vulnerable groups even more vulnerable (Anguelovski, 2016). Under the notion of bourgeois environmentalism, Baviskar (2020) traces how discourses and visions of 'improved' nature in Delhi have denied the poor their rights to the environment. Some WSUD has begun to caution against the creation of white, middleclass ghettos where only the relatively affluent can enjoy the benefits of a sustainable development (Leonard et al., 2019). However, despite the consolidation of UPE research and the recognition of its critique by ecological urbanism scholarship, there continues to be a stark divide between academic work on urban socioecological justice and designs for physical interventions. Some have identified this divide as a reason for the exacerbation of urban inequality and injustice (Shi et al., 2016).

This paper posits that for UPE to become meaningful for Ecological Urbanism, it is necessary to move beyond a critique. Instead, the insights of UPE should be pro-actively mobilized to develop a new vision of water sensitivity. The paper therefore identifies ways in which the key learnings of the critical social sciences, namely UPE, can be mobilized to support WSUD practice. How can ecological urbanists imagine new, more politically astute, forms of water sensitive living, charting design processes that not just recognize but also actively question and challenge uneven socio-ecological dynamics (cf. Kaika & Swyngedouw, 2014)? In answering this question, the goal of this article is to make use of critique from UPE to influence Ecological Urbanists' goals and activate their political alignment with agendas that prioritize social equity.

2. Recomposing theoretical and practical approaches

In this article, Ecological Urbanism is considered as a discursive and performative practice that is not fixed. As such, it is possible to provoke planners' and designers' imagination to envision what it can become (Buizer, 2016). We propose a possible reorientation of Ecological Urbanism not by simply adopting the analytical approach of critique utilized by UPE scholars but by trying to respond to the critique by way of composition (Connolly, 2018). UPE scholarship has exposed the inequitable and unjust effects of market-led projects or populist and racist discourses that make use of the design-oriented approach of Ecological Urbanism (Tzaninis et al., 2023). However, instead of debunking Ecological Urbanism altogether, we propose a different direction that seeks the political activation of its design practice to address the concerns of urban political ecologists - the urbanization of nature - and provide a transformative form of intervention to contemporary socio-environmental emergencies.

We consider the practice-oriented approach of Ecological Urbanism to have a central contribution to make in protecting and caring for people and nature in cities but we also recognize that it needs serious re-composition. Our choice of generating a debate between UPE and Ecological Urbanism flourished from our professional experiences with research and practice in the fields of landscape architecture, spatial planning and social sciences applied to water. We noticed that there are internal contradictions within Ecological Urbanism theory and inconsistencies between what its proponents propagate and what is practiced. Our readings of UPE have sensitized us to how ecological metaphors in urban design can easily translate into discriminatory urban development processes. As Gandy (2015) pointed out, even the most elaborate applications of Ecological Urbanism remain in practice essentially islands within the wider dynamics of capitalist urbanization. Therefore, we argue that a re-composition of Ecological Urbanism is needed because its projections fail to question the very processes that it relies on for its remedies. Therefore, our choice for a mode of composition between UPE and Ecological Urbanism is motivated by a wish to re-orientate the directions of the urban design agenda which is seemingly politically naive but never neutral when it comes to envisioning transformation.

The composition presented in this article evolved from a literature review that included texts from Landscape Urbanism, Ecological Urbanism, Urban Political Ecology and Water Sensitive Urban Design. Ecological Urbanism is a broad approach to urban design and planning, and too broad to analyse it exhaustively in the context of this review. Our summary of the Ecological Urbanism approach is based on a historical reading of its Anglo-American tradition and how it developed from antecedent literature on Landscape Urbanism. Our reading of Water Sensitive Urban Design is based on scholarship from Australia which, we understand, develops in parallel to Ecological Urbanism by incorporating the same ecological conceptualizations to re-imagine the urban water landscape. The UPE literature was explored to pose theoretical and conceptual questions to the practical approach of Ecological Urbanism and WSUD. Attention was also given to the role of landscape architecture expertise in interactions that make urban environments. An overview of the main protagonists of Landscape Urbanism, Ecological Urbanism, Urban Political Ecology and WSUD included in this review is contained in Table 1. The literature reviewed for this paper is not limited to the list presented in Table 1 but also included other academic work that helped us to understand each field.

Table 1
Literature review of Landscape urbanism, Ecological urbanism, Urban political ecology and Water sensitive urban design.

Literature review	Author	Year	Title
Landscape Urbanism	Waldheim	2002	Landscape urbanism: a genealogy
		2006	Landscape as Urbanism
	Corner	2006	Terra fluxus
	Weller	2006	An art of Instrumentality: thinking through landscape urbanism
	Bélanger	2009	Landscape As Infrastructure
Ecological Urbanism	Mostafavi & Doherty (Eds.)	2010	Ecological Urbanism
	Mostafavi	2010	Why ecological urbanism? Why now?
	Steiner	2011	Landscape ecological urbanism: origins and trajectories
	Spirn	2012	Ecological urbanism: A framework for the design of resilient cities
	Adams	2014	Natura Urbans, Natura Urbanata: Ecological Urbanism, Circulation, and the Immunization of Nature
	Hagan	2015	Ecological Urbanism: the nature of the city
	Reed & Lister (Eds.)	2014	Projective Ecologies
Urban Political Ecology	Kaika	2005	City of Flows: Modernity, Nature, and the City
	Swyngedouw	2006	Metabolic urbanisation: the making of Cyborg cities
	Heynen et al. (Eds.)	2006	In the Nature of Cities: urban political ecology and the politics of urban metabolism
	Gandy	2010	Rethinking urban metabolism: water, space and the modern city
	Gandy	2015	From urban ecology to ecological urbanism: an ambiguous trajectory
WSUD	Wong & Eadie	2000	Water Sensitive Urban Design—A Paradigm Shift in Urban Design
	Wong & Ashley	2006	International Working Group on Water Sensitive Urban Design
	Wong & Brown	2009	The water sensitive city: principles for practice
	Brown	2012	Transitioning to the water sensitive city: the socio-technical challenge
	Wong et al.	2020	Transforming Cities through Water-Sensitive Principles and Practices

3. Establishing ecology into urbanism

Following the classic literature of ecological advocacy in the 1970s and 1980s (e.g. *Silent Spring*[1]; *Design with Nature*[2]; and *The Granite Garden*[3]), landscape urbanism emerged at the end of the 20th century as a powerful narrative for academic discourses and professional practices (De Block et al., 2019). Urban design was traditionally guided by physical structures – e.g. roads and buildings – with green spaces relegated to left-over areas or used for ornamentation, landscape urbanism aims to integrate cultural and natural processes to design the urban form (Steiner, 2011). While remaining largely theoretical, Landscape Urbanism advances the pictorial, bucolic, and aesthetic tradition of landscape architecture. In this sense, its practices reject the pastoral images of nature as an aesthetical exception to the gridded urban fabric and recommends the use of infrastructural systems and the public landscapes they engender as ordering mechanisms of the urban (Waldheim, 2002).

It was in this context that Ecological Urbanism flourished by borrowing the conceptual agenda of Landscape Urbanism. Its most influential proponent, Mostafavi promoted Ecological Urbanism as an approach to remedy contemporary cities and organize new ones. In 2009, a conference called Ecological Urbanism was held at Harvard to bring together design practitioners and theorists, economists, engineers, environmental scientists, politicians and public health specialists, with the goal of reaching a more robust understanding of Ecological Urbanism and what it might be in the future. The conference was followed by the publication of a book with the same title in the following year which recommended that ecological urbanists should "view the fragility of the planet and its resources as an opportunity for speculative design innovations" (Mostafavi & Doherty, 2010). By not only viewing ecology and urbanism as inherent conflictual conditions but incorporating this contradiction in its practice, Ecological Urbanism aims to develop the aesthetic means – projects – to establish new relationships with the environment in cities (Mostafavi, 2010).

Ecological Urbanism incorporates multiple readings of ecology. Ecology is mobilized by urbanists as a model to represent the natural world inspired by the work of the scientific discipline of ecology that studies the relationships between different organisms and the environment (e.g. Eugene Odum). The idea that the natural world consists and is shaped by biological, physical, and chemical processes that create and sustain life and the earth is fundamental to Ecological Urbanism (Spirn, 2014). Here, the methods derived from McHarg's *Design with Nature* opened up planning thought to the idea of interconnectedness between cities and the natural world (Reed & Lister, 2014). Concomitantly, Design with Nature has (again) made nature available to management under the promise that this new form of urbanization will refine nature by allowing it to circulate (Adams, 2014). As new, presumably more sophisticated, understandings in the science of ecology emerge and challenge assumptions of predictability and control of living systems, Ecological Urbanism too begins to favour representations of dynamic systems and adaptive design approaches (Lister, 2010). It is in this sense that Ecological Urbanism gives emphasis to urban *metabolism* referring to the reconfiguration of cities in order to reduce their environmental impact and increase resilience (Hagan, 2015). This conception of metabolism is strongly rooted in systems-based approaches to urban ecology. Different from UPE's conceptualization, metabolism as it is mobilized by Ecological Urbanism naturalizes the urban process by considering it as a series of material flows that by design gives no attention to the role of politics (Gandy, 2023).

Another reading of ecology present in the intellectual framing of Ecological Urbanism is its conceptual engagement with a selective body of work by social scientists and philosophers such as Félix Guattari. Here, the realization that nature cannot be separated from culture led urbanists to incorporate an approach of ecology not only as an applied natural science but also as an ethical-political articulation to manage change (Reed & Lister, 2014). The attempt of ecological urbanists to avoid a purely technocratic perspective of ecology is mainly realized by offering a new ecological ethics and aesthetics of the urban using ecology as a metaphor to project design strategies (Mostafavi & Doherty, 2016). Sustainability, resilience, self-sufficiency and eco-efficiency, for example, are a set of existing ecological metaphors mobilized by designers to conceptualize and rearticulate complex urban patterns through potential responses (Lorrimar-Shanks & Owen, 2016). Ecological Urbanism integrates artistic expression into its theory and practice (Spirn, 2014) by using ecology as a medium of thought, a conceptual model for cultural production and developing designs' creative and imaginative agenda (Waldheim, 2006; Reed & Lister, 2014). Despite having an aesthetic dimension, the proponents of Ecological Urbanism claim that it is not a style as the works of its practitioners can be radically different in appearance even though based on the same principles (Spirn, 2014). The imagery produced by Ecological Urbanists include, for example, hyperrealist renderings that reduce the urban to a – sometimes barely visible – background and depict nature as the principal subject triumphing over the city (Adams, 2014).

Ultimately, the proposition of ecological urbanism is that urbanization becomes the provider, the precondition of nature (Adams, 2014) through a set of architectural and design interventions that aim to help cities transcend ecological circumstances such as those posed by climate change or resource constraints (Hodson & Marvin, 2010). Facing the ecological challenges of contemporary cities, landscape architects are increasingly recruited to urban development projects (as James Corner's High Line in New York) and climate resilience (as the American federal program Rebuild by Design ties hurricane recovery to coastal defence) (Fleming, 2019). Despite being seen by Ecological Urbanists as a technical endeavour to transform the way cities urbanize, the primary function of ecological urbanism often remains rhetorical (Adams, 2014); few developments ever leave the drawing board (Hodson & Marvin, 2010). For example, extensive design proposals for New York's Rebuild by Design program were never developed (Goh, 2021). Even though it is more aspirational than operational (Urban Institute, 2014), Rebuild has served as a model for design competitions elsewhere in the World such as the Water as Leverage - WaL for Resilient Cities in Asia and, more recently, the first replication of WaL for Latin America is undergoing in Cartagena. Ecological Urbanism continues to discursively shape imaginations that give form to designs and plans such as these which will potentially become interventions and, in turn, be associated with actual flows of things such as funding, people, concrete, trees and much else.

4. Decomposing ecological urbanism through the lens of political ecology

As with every new "ism", Ecological Urbanism has a focus on innovation but, as Hagan (2015) suggests, there is still a need to understand, if not solve, the field's own internal contradiction. According to Hagan, the practice of Ecological Urbanism brings forward an implicit critique of the production of contemporary material culture, and at the same time continues to operate within the political and economic status quo that gives rise to that material culture. In the neo-Marxian view of Urban Political Ecology inspired by its 'first wave' of academic production started in the 1990s with the work of the Oxford cluster led by Swyngedouw (Gandy, 2022), urbanism and ecology are inherently contradictory and even conflictual within capitalism. So far, according to political ecologists, the history of urban development has proved itself as an ecologically destructive process and many of the environmental problems of today are tied to an urban origin. The emphasis on ecological urbanism in terms of incorporating the conflictual conditions of ecology and urbanism contains a double-edged aspect: It emphasizes the possibility for new relationships with the environment in cities while it also

[1] Carson et al. (1962).
[2] McHarg (1969).
[3] Spirn (1984).

disregards the wider social and ecological impacts of capitalist urbanization.

The imaginative thinking that is characteristic of ecological urbanism remains important for cities but the flows promoted by them are not necessarily reliable in the advancement of objectives such as social justice and equity (Talen, 2013). The problem of the discipline as portrayed by UPE seems to lie primarily on the fact that it is not based on a 'deep' analysis of the causes of socioecological problems, therefore, remaining a form of modernization thinking and technological optimism. Much of the UPE critique is founded on a much deeper critique of processes of 'development' or 'industrialization', exposing these as intrinsically exploitative of people (that is, those without the means of production) and 'nature'. For example, whereas Ecological Urbanism is about an expanded presence of nature's circulations within cities connected to the field of "ecosystem services" and other utilitarian responses to the biological sciences (Gandy, 2015), Urban Political Ecology takes a different view. The idea of metabolism according to UPE is rooted in Marxist theory that places human labour at the centre as opposed to something purely material (Zimmer, 2010). In this sense, UPE understands natural flows as historical products of specific drives, desires and imaginations by humans to satisfy their needs (Swyngedouw, 2006). In this metabolic historical process, UPE recognizes that not all humans have the same influence to make changes because they are bound by existing social relations and unequal power dynamics entailing that dominant practices and discourses tend to overlay subaltern ones (Zimmer, 2010). In short, UPE offers an expanded conception of urban metabolism and the circulatory dynamics of urban space that contrasts with the organicist or systems-based formulations of ecological urbanism (Gandy, 2023). It does so by politicizing the idea of metabolism, emphasizing in power relations that constitute uneven socio-ecological production (Newell & Cousins, 2014) and questioning why flows are produced in particular ways and to whose benefits.

The implication is that processes of urbanization will always be uneven within the existing capitalist mode of urbanization as well as environmentally destructive, for that is the only way in which profits can be realized. Under these circumstances, producing nature or landscape as infrastructure generates a mechanism through which nature is commodified, financialized, and made a service provider creating future possibilities for financial accumulation (Sullivan, 2013). In this sense, the realization of Ecological Urbanism will often depend on the mobilization of investments from private funders, whose interest to come forward with funds is likely to be importantly shaped by expectations of profits - they want/need a 'business case'. It is in this sense that for the designed landscapes of ecological urbanism to be realized, even if rooted in the flows of nature, end up relying on the same capitalist/commercial processes that causes environmental degradation in the first place. This poses a dilemma for ecological urbanists who want change but have to operate with the help of planners, legislators, and investors who are not particularly known for their political engagement in issues of social justice and ecology. In fact, it can be argued that capital accumulation increasingly makes use of the open public spaces re-designed by ecological urbanists as they offer a new aesthetic that contributes to the speculation of property values. As indicated by Waldheim, a strong advocate for Landscape Urbanism, private housing will continue to be the dominant force in growing cities (Studer, 2011), therefore, chances for identifying a 'business case' seem to primarily lie in real estate. The consequence is that, in response to funders' ambitions, projects turn to be more concerned with boosting real estate values and tourism and less with creating more affordable urban environments. In the end, projects of Ecological Urbanism tend to avoid opposing this process to guarantee that the chances of high-profile corporate sponsorship are not constrained which, ultimately, becomes the goal of projects.

Green or ecological gentrification, as the process of displacement tied to ecological projects in cities is known for, becomes less of an unintended side-effect and more of an explicit objective of ecological urban planning and design. The new generation of parks that embody ideas of landscape urbanism, for instance, are often dependent on private financing and more about sustaining profit then ecology (Talen, 2013). The famous High Line in New York, for instance, aims to foster sustainable practices but is one of the city's most expensive parks to maintain and has led to an increase in housing values in the area which spurred the development of boutique hotels and million-dollar condos (Katzman, 2021). In the end, the park serves little more than an aesthetic veneer for underlying processes of neoliberal urbanization, gentrification, and lavish consumerism (Lang & Rothenberg, 2017).

Sharing facts and findings of the UPE scholarship may not be sufficient to sway designers' opinions and activate their sense of responsibility towards the achievement of social justice in cities. Perhaps UPE could yield more attention from Ecological Urbanism if it engaged more directly in helping the profession move forward with important challenges. For instance, landscape architects are often stuck in difficult negotiations that happen around projects and need guidance on how to deal with public opinion/opposition and acceptance of projects. Taking this demand as an entry point, UPE scholarship could potentially reflect along with designers that design is about taking a position and making choices within negotiations. Earlier UPE research has revealed that green spaces in cities do not exist at the mercy of nature but are politicized spaces and any attempt to intervene in them will incur in negotiations with the intricate political economic dynamics that reproduce them such as powerful landed interests (Chung et al., 2018). By proactively engaging with designers' underlying values in the choices they make, UPE has a higher potential to convince architects of the relevance of socio-political readings of contexts. A contextual reading of the social, cultural, political or economic conditions that have historically enabled or hampered physical and environmental change helps designers to choose who and based on what worldviews they want to partner with to avoid unintended design consequences. Moreover, critical researchers that have explored the agency of nonhumans argue that the idea of making nature as urban infrastructure requires a governmental project of ordering nature – including extensive labour to plan, finance, implement, maintain, monitor and more – to make it live as imagined by designers (Wakefield, 2020). This effort brings a whole new set of challenges to the sustainability of Ecological Urbanism's projects as nature behaves its own way and might not function in its new infrastructural role despite the mobilization of governance techniques.

Even after coming to an agreement with UPE scholars, however, ecological urbanists might still feel powerless to engage in such a big task towards systemic change. Carving out alternative environmental policy niches for designers concerned with social justice is challenging due to the huge disadvantage in resources when compared to the consolidated 'sustainability fix' of entrepreneurial cities focused on the current urban growth agenda (While et al., 2004). Currently, the majority of funds available for ecological urbanism projects ask designers to creatively turn ecological solutions into promising investment opportunities, thus, pushing designers to marketize their ideas as opposed to prioritize justice goals. In the next section, we attempt to advance the discussion on how to move forward in this big task of envisioning different socio-ecological configurations for cities by breaking it down into actionable steps of how to establish a political ecological urbanism.

5. Moving Ecological Urbanism into politics

Under increasing criticism, mainly from UPE, the profession of Ecological Urbanism is urged to reimagine its mission and disciplinary scope. Regarding its mission, Ecological Urbanism is asked to turn away from being an instrument of capitalist accumulation. Instead, its mission could be to become a mode of resistance, of political organizing against the structures that bind people and places in precarious social and environmental conditions (Goh, 2021). Regarding its disciplinary scope, ecological urbanism needs to adopt more than a client-driven enterprise (Fleming, 2019). Incorporating what has been learned from UPE is a significant step towards the achievement of a politically activated

Ecological Urbanism, we attempt to advance this in this section.

If Ecological Urbanism promises to reconstruct nature *as* urbanization (Adams, 2014), it should realize that, in the view of UPE, ecological science has been used to depoliticize the urban agenda which actually consists of a metabolic process deeply committed to insuring the uninterrupted expansion of capital accumulation (Swyngedouw & Kaika, 2014). When solely adopting sophisticated ecological metaphors and scientific reasoning, Ecological Urbanism too shies away from taking a political position while at the same time this seemingly neutral stance contributes to keeping things as they are. A radical disjuncture between urban space and human history is found in ecological urbanists' definitions of metabolism that reduces the urban arena to a series of intersecting flows, cycles, and material elements (Gandy, 2023). To reverse this, the discourse of Ecological Urbanism needs first to be grounded in or linked to a critique of capitalism. By embracing the notion of metabolism put forward by UPE, for example, Ecological Urbanism gains the possibility to question the ownership of and power over these processes that produce the so-called "natural world". While it is not expected for this critique to be put forward by landscape architects in the private sector, more critical voices could come from the academic circles of landscape architects. Many views about urbanization and capitalism remain ambivalent among ecological urbanists. The discourse of scholars range between viewing capitalism as ecologically destructive or a force for ecological sustainability. A common view among designers, for instance, is that the best way to "critically" engage neoliberalism is to accept its market-knows-best logic and partner with its growth machine for the achievement of ecological design objectives (Lang & Rothenberg, 2017). However, the discipline must begin to acknowledge that the mere push for sustainability in the context of neoliberal urbanization is bound to spatially manifest itself as a set of eco-enclaves within the wider urban fabric (Gandy, 2019).

Alongside a critical take on the operation of capitalism it is important that Ecological Urbanists begin to seriously engage with attempts to re-value – care for – people (labour) and nature. If the outputs of Ecological Urbanism continue to be tied to the agenda of corporate funders, it will be difficult to imagine socially just and equitable pathways for cities. Therefore, it should commit to an agenda that influences the management of urban commons from a political vantage point articulated around notions of justice and equality (Swyngedouw, 2014). According to the UPE critique, too much of mainstream urban design practice, ecological urbanism included, continues to be concerned with crafting the "look and feel" of environments for the wealthy (Waldheim, 2006) to meet the profit-making goals of urbanization and its reliance on real estate revenue. By tying its practice to a new type of growth machine (Lang & Rothenberg, 2017), ecological designs end up glossing over the inequality that comes along with private ownership of land in urban areas. Instead, urban designers should realize that they occupy a privileged position to make explicit the ways in which benefits and disbenefits of urban nature are distributed to move the justice agenda forward in cities. So far, the interdisciplinary agenda offered by ecological urbanists keeps distance from critical theory while it generates a client-oriented ecological discourse that is more revealing about the institutional context for landscape design than the environmental phenomena under investigation (Gandy, 2023).

Taking a critical position to mainstream urban environmental discourse will often mean that urban designers and their designs will become more controversial and contested – as they will necessarily challenge the powers-that-be and the status-quo – which is precisely why they will need to choose the right allies – those with experience in engaging in such struggles. Here, a politically committed ecological design practice could draw inspiration from or build strong coalitions with civil society movements in cities. This would counter the tendency for ecological paradigms to be co-opted by political agendas that reproduce, deepen old or generate new forms of inequalities. Moreover, such transdisciplinary collaborations are an opportunity for ecological designers to work collectively with grassroots organizations and learn about alternative value structures and how design affects people unequally. In this new mode of practice, the non-solutionist ecological urbanist does not know beforehand what the best intervention is - forming consensus is the work of political movements and coalitions - but takes responsibility for the implications of particular designs (Holmes, 2020).

Only if ecological urbanism grounds its discourse to a critique of capitalism, commits to an agenda of justice and takes inspiration from social movements in cities, can it potentially reverse the tendency of projects to exacerbate existing inequalities. Current discourses of ecological urbanism have the tendency to produce what Swyngedouw has termed the new socio-ecological fix that makes sure nothing really changes. Our view is that ecological urbanism should foster socio-political change and debate: activating the 'political' within Ecological Urbanism. Ecological urbanists truly committed to justice and equity have the responsibility to design the new pathways and spatial arrangements towards re-distribution, directing positive benefits at those who have been traditionally left out of urban processes, spaces and amenities (Anguelovski et al., 2020). One way to do this is to look for 'transformative potential in the cracks' of urban development, to attend to below-the-radar forms of action to explore their transformative potentials and capacities (Robin & Broto, 2020). For example, Rupprecht and Byrne (2018) found that informal green spaces in Japan and Australia exhibit fewer patterns of disadvantage than public parks and suggest this practice as an urban greening and anti-gentrification strategy.

6. Envisioning Transformative Water Sensitive Urban Design

The principles of WSUD have gained a central role in articulating the relationships between water and urban development through the socio-technical transformations of conventional approaches. Therefore, it is crucial that designers understand the implications of their decisions. Urban waters are frequently utilized to increase the value and attractiveness of development projects (Coelho, 2020) and Water Sensitive Urban Design is likely to operate in this process that may result in or deepen spatial inequalities. According to Bell, "the future form of urban relationships to water is now open for renegotiation" and we suggest that WSUD takes a transformed activist route following the lines of political activation suggested in the previous section. Furthermore, it is central that designers reflect on and recognize the causes of current environmental problems of depletion, degradation, and pollution in cities.

Given UPE's origins in the contestation of water, an effective learning of UPE by WSUD can help designers understand how the decisions they make about urban water can fit into larger processes of exclusion and potentially affect the everyday experiences of communities. The Room for the River scheme from the Netherlands, for instance, has contributed to the design of new imaginaries of resilience for many regions around the world. For densely populated delta regions, it offers the promise of opportunities to transform river overflows into parks and new property developments which can withstand controlled flooding (Smith, 2011). Such imaginaries forget or neglect the activities of displacement and relocation that the model often requires. In the Global South, this may entail mass evictions of poor families (Yarina,

2018). In a similar way, new investments for water sensitivity in the context of the Global South may worsen the fate of less privileged urban dwellers (Kapur, 2023). Water sensitive visions will result in winners and losers, and it is crucial that designers ensure that water sensitive living is not exclusive to the most privileged and vocal populations. Instead, proponents of Water Sensitive Cities must seek to create designs which address inequalities and facilitate more equitable urban development.

Applying UPE's critique can potentially reverse the tendency for WSUD projects to be simplistic or naïve about the real possibilities of transformation for urban water landscapes.[4] Considering that design is often the medium through which contested ideas about the city are visualized and justified (Goh, 2019), we call on WSUD to become more than an exercise of visualizing technical innovation. WSUD projects should not only focus on new creative forms of physical intervention but transform design processes, practices, and outcomes into explicitly public and collective exercises to challenge and reverse processes that produce marginalization. In this sense, the newness of design innovation might not always be physical or material but is present in the new ways in which design processes are organized and developed alongside political organizing to make claims on urban space and belonging (Goh, 2019; Goh et al., 2022). One concretely actionable option for planners and designers is to detach project implementation from market mechanisms that serve dominant modes of urban development and, consequently, reproduce inequalities in contemporary cities. In Manila, for instance, Feng and Hwang (2022) describe how the residents of the informal settlement of Baseco understand that the rhetoric of 'resilience' can be a precursor to evict and displace them for the waterfront to be redeveloped into a business and entertainment district. Mindful of this risk, the authors show that residents see political utility in proving that they can contribute meaningfully to reduce disaster risk and have set up a community driven mangrove project (Feng & Hwang, 2022). By supporting and promoting such kinds of initiatives, WSUD can potentially shift the public narrative towards more respect for these communities that are working hard on the ground.

Community-driven projects can potentially be more successful than the high-profile, high-budget ecological design initiatives that tend not to make it long past the opening ceremony because monitoring and evaluation yields too few political benefits (Feng & Hwang, 2022). However, given the urgency of ecological problems, societies might consider large-scale infrastructure to be of particular importance for public wellbeing and security. In terms of scale, such planning and design is challenged to be simultaneously big enough to deal with, for instance, problems at the scale of climate impacts and small enough to respond to on-the ground struggles of the disadvantaged (Shi et al., 2016). In this case, designers should take a role of inviting ordinary quotidian users of the city, particularly marginalized groups, to create imaginaries of what these structures should look like and to whom and what purposes they should serve. In parallel, it is important that designers insist on building institutional relationships capable to implement these visionary projects that prioritize historically vulnerable people and places and not the protection of centres of capital accumulation (Goh, 2022). Moreover, the achievement of long term sustainability of such projects requires design processes that promote equal partnerships between those with political and financial resources for implementation and the people who are dedicated to care for such structures.

At the level of theory, the authors engaged in WSUD claim more consideration of social science researchers in the construction of its interdisciplinarity (Bichai & Flamini, 2018) but there are still very few social scientists involved in the making of the WSUD approach. Supporters of 'water sensitivity' acknowledge that a critical element of transitioning to water sensitive cities is fostering an engaged citizenry – citizens who understand, value and actively support this transition (Dean et al., 2016). However, it is the very imbalance of social as opposed to more engineering disciplines in the construction of the Water Sensitive City vision that keeps the involvement of this supposedly "engaged" citizenry restricted. Citizen engagement, when it happens, often occurs late in the decision-making process, such the stages when implementation of proposed solutions are being discussed. For WSUD to take a social justice stance, it is necessary to look critically into the belief that equitable outcomes will be achieved as soon as people have a voice in design processes. Participatory processes can also serve to capture or co-opt the demands or achievements of civil society movements and the clear line between participation and increased justice is not direct, even when inclusion is intentional (Anguelovski et al., 2020).

The idea that 'power' resides in having a voice is a naive mistake that is often made. More important in the discussion of power, is how money flows in the processes that produce the development of cities. Social scientists have for long related urban outcomes to how and by whom plans and designs are funded and WSUD can make better use of these analyses. Here, educators too have the responsibility to change the culture of the profession by guiding students that wish to pursue a career related to WSUD to be more attentive to socio-cultural and political readings of place when designing interventions. Including the critique of UPE applied to ecological urbanism in the curriculum of landscape architects, for instance, could be an important step to take. If the socio-political role of design as a tool of mediation is recognized in education, future designers will be better equipped to situate and position themselves within this contested field.

7. Conclusion

The future of ecological urbanism holds major questions about how to ensure a better ecological functioning of the urban landscape. Centred around concerns with water scarcity, polluted waters and flooding, Water Sensitive Urban Design is one attempt to answer these questions. While this design approach holds great potential, this article argues that it can only be truly transformative if the politics of water sensitive city making is able to reverse the inequitable tendency of urban development. Ecological Urbanism overlaps with Urban Political Ecology when it addresses the "conflictual conditions between ecology and urbanism" (Mostafavi & Doherty, 2010) but the difference remains in how the different fields interpret and attribute the causes of environmental degradation. Ecological Urbanists frame cities and urbanization from an ecological point of view both metaphorically – the city is like an ecosystem – and literally – the city is (or can be) an ecosystem (Hagan, 2015). Therefore, this approach imagines a new – more 'ecological' – form for urbanization and yet it fails to see the inherent linkages between social justice and ecological degradation. The result then is that certain groups such as real estate developers are seen uncritically as stewards of city designs that favour local ecosystems when they may be in fact overexploiting them (Hagan, 2015).

UPE studies, on the other hand, have theorized urbanization as a process that manifests the capitalist logic of 'externalization' of the true costs of the (reproduction of) environment/nature and human and non-human labour – as a way of maximizing profits. Yet the conception of ecology within UPE literature remains somewhat narrow (Zimmer, 2010) with a limited degree of engagement with non-humans in urban space such as the work of Wakefield (2020) and Barua (2021) and research by Cousins and Newell (2015) on metabolic flows that

[4] For example, something as simple as the installation of rain gardens in Maryland led to disagreements concerning civic responsibility and, consequently, stimulating opposition to projects (Cholakis-Kolysko, 2021). The designer's version of paradise ended up a resident's neglected space because cultural sensitivities were not taken into consideration. If such social challenges are not considered in the design process for the sake of 'getting things done', there is a risk of neglect and/or resistance by those who do not feel sufficiently involved and represented and, in turn, persistence of problems despite the technical innovation.

combined critical theory to quantitative assessments. When compared to Ecological Urbanism that embraces the epistemological complexities of non-human nature borrowed from the science of ecology, UPE has yet to take greater account of the contribution of non-human labour to the production of value in capitalist urbanization (Gandy, 2022). This paper is an attempt to construct a dialogue between the scholarships of Urban Political Ecology and Ecological Urbanism to advance in the construction of an interdisciplinary and transformative WSUD.

In imagining a new form of WSUD, we tried as much as possible not to over-instrumentalize UPE by rejecting the suggestion that some UPE 'lessons' or 'insights' could simply be inserted into ecological urbanism. We argue for a different emphasis in WSUD that does not deny the causes of current environmental degradation, pollution and depletion but, on the contrary, actively takes issue with and challenges the extractive and exploitative roots of contemporary urbanization processes. So far, WSUD project implementation has relied on the very processes and mechanisms that cause pollution and depletion and reproduce uneven socionatural environments. This is a consequence of narrow conceptions of water as a natural phenomenon without due consideration of the socio-political processes that distribute water in its different forms (e.g. flood water, waste water, polluted water; drinkable water; etc.) across territory. We contend that WSUD needs to engage with UPE's theorization of urbanization as a political-ecological process that calls for transformation at the level of the social order to address problems of water in cities (Angelo & Wachsmuth, 2014). The 'speculative futurings' of WSUD then become more explicitly political and gains a new, potentially transformative form.

Transformative WSUD understands that a focus on the transformation of urban nature's form is not in itself sufficient to achieve water sensitivity in cities because it may lead to the exacerbation of existing inequalities or create new ones. Therefore, its agenda is tied to a commitment to the eradication of spatial inequalities, with design processes explicitly considering how the benefits and burdens of proposed interventions in the urban water system are or will be distributed. WSUD is potentially at the forefront of current practices that offer a truly transformative approach to water in cities but it will only succeed once it dares to engage with politics and imaginations that fiercely oppose processes of capitalist urbanization. To achieve this, the current WSUD approach that positions designers as technical experts who should stay away from politics is re-considered into establishing that designers are/should be mediators and activists in the struggles that unfold from competing visions of water sensitivity. Going a step further, the urban design profession could engage more seriously with UPE's critiques by developing skills and alternative modes of practice that support future designers in their commitment to social justice. One way of doing this could be through the creation of strategic alignments between ecological urbanists and civil society and social movements in cities that have historically engaged in disputes surrounding urban water.

CRediT authorship contribution statement

Raquel Hädrich Silva: Conceptualization, Writing – original draft. **Margreet Zwarteveen:** Writing – review & editing, Supervision. **Dominic Stead:** Writing – review & editing, Supervision. **Taneha Kuzniecow Bacchin:** Supervision, Project administration, Funding acquisition.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Raquel Hadrich Silva reports financial support was provided by Dutch Research Council. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

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