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journal homepage: [www.elsevier.com/locate/envsci](http://www.elsevier.com/locate/envsci)The role of nature-based solutions and senses of place in enabling just city transitions<sup>☆</sup>Christopher M. Raymond<sup>a,b,c,d,\*</sup>, Richard Stedman<sup>e,f</sup>, Niki Frantzeskaki<sup>g</sup><sup>a</sup> Helsinki Institute of Sustainability Science (HELSUS), University of Helsinki, Finland<sup>b</sup> Ecosystems and Environment Research Program, Faculty of Biological and Environmental Sciences, University of Helsinki, Finland<sup>c</sup> Department of Economics and Management, Faculty of Agriculture and Forestry, University of Helsinki, Finland<sup>d</sup> Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences, Alnarp, Sweden<sup>e</sup> Department of Natural Resources and the Environment, Cornell University, United States<sup>f</sup> Center for Conservation Social Sciences, Cornell University, United States<sup>g</sup> Department of Human Geography and Spatial Planning, Faculty of Geosciences, Utrecht University, the Netherlands

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## ABSTRACT

Discussions about just transitions and nature-based solutions (NBS) often articulate an essentialist sense of place perspective that emphasises stasis through combinations of belonging, rootedness, continuity, attachment and connections among sites, scales and subjectivities. In response, we demonstrate how a progressive understanding of “senses” of place that embraces fluid place meanings accessible at different temporal and spatial scales enables a new understanding of the interface between structural and emotional transformation of place, as well as rethinking of just urban transitions. We present four transformation modalities that reconsider people-place, people-nature, and people-institutional relations pertinent to environmental justice and use case examples to demonstrate their relevance to NBS planning. We conclude by offering two overarching principles for urban policy, planning, and governance for fostering just transitions through NBS. First, NBS planning needs to purposefully activate structural and emotional transformations through experimentation to enhance procedural justice. Second, NBS co-design and implementation should consider the dynamic interplay between recognition and distribution justice to engage multiple senses of place.

## 1. Introduction

Nature-based solutions (NBS) are nature-inspired and place-based interventions that restore and strengthen ecological flows, ecosystem services and contribute to biodiversity while delivering multiple benefits across social-ecological-technological systems (European Commission, 2015, 2021; Raymond et al., 2017a; Frantzeskaki et al., 2019). Realising these benefits in ways that also address disproportionate impacts and injustices to diverse societal groups will require fundamental changes to social, climate, economic and political systems (McPhearson et al., 2021), thus pointing to the importance of better understanding the relationships between NBS and just transitions.

Building on theories of social justice and identity politics (Fraser, 1998) and environmental justice (Schlosberg, 2007), just transitions through NBS necessarily involve moving beyond issues of proximity or

local with respect to environmental harms, to a wider consideration of distributional, procedural and recognition justice (Anguelovski et al., 2020; Schlosberg, 2013; Tozer et al., 2020; Walker, 2009; Pineda Pinto et al., 2021). Distributional justice considers the fair (re-)allocation of natural resources (Kabisch and Haase, 2014), as well as acknowledging the historic inequalities embedded in ecosystem services production and consumption (Andersson et al., 2019; Langemeyer and Connolly, 2020). For example, ensuring adequate NBS and recreation amenities within walking distance of one’s domicile (Korpilo et al., 2022). Procedural justice concerns how decisions are made, which affected groups participate in design, planning, and management of public spaces, and on what terms (Low, 2013; Martin et al., 2016; Schlosberg, 2007). For example, providing multi-level governance processes where all affected people can be heard (Buijs et al., 2016; Frantzeskaki and Kabisch, 2016). Recognition acknowledges the importance of interpersonal interactions

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that understand and respect different needs, values, preferences and identities (Calderón-Argelich et al., 2021), taking account of complex relations between interest and identity, economy and culture, class and status (Fraser, 1998; Schlosberg, 2013). For example, recognition of the diverse values of nature held by groups with different knowledge systems and ethnicities (IPBES, 2022).

Rapid and radical transformations toward sustainability necessitates rethinking just transitions in ways that account for the multiple relationships between people and place in NBS planning and implementation (McPhearson et al., 2021), broadly referred to as sense of place (Raymond et al., 2017b). A diversity of theoretical perspectives on sense of place exist (Williams and Miller, 2021), but the construct is often operationalised in either or both of two ways: i) evaluative statements about the intensity of people-place relations (place attachment) and ii) descriptive statements about place (place meanings) (Stedman, 2016). Sense of place, when coupled with urban transitions, can lead to new symbolic understandings or meanings of place; new narratives of place and transformation, and new types of people-place relationships (Frantzeskaki et al., 2018). Studies demonstrate heightened experiences of care, connection and belonging that are fostered when people from diverse cultural backgrounds work together on greening projects (Barthel et al., 2010; Jennings et al., 2016; Jennings and Bamkole, 2019; Kingsley et al., 2021). Such relationships are mediated by the structural characteristics of green areas (e.g., vegetation, facilities, but also norms and regulations), as well as motivations for park use (Vierikko et al., 2020) and governance processes such as experimentation with NBS (Frantzeskaki, 2019). However, sense of place is rarely stable, and often contested (Raymond et al., 2021). NBS may prioritize the needs of developers seeking market-mediated interactions with nature, but it can also support participatory action and planning (Kotsila et al., 2020a). Anguelovski et al. (2020) introduced the concept of ‘relational greening’ as a way of examining the intersection between past and present experiences in urban green areas, and the different ways that people assign place meanings, embedded in their day-to-day interactions.

Most understandings in the NBS and the wider sense of place scholarships privilege fixity, stability and strong and chronically accessible place attachments and place meanings (Di Masso et al., 2019; Raymond et al., 2017b). In accordance with this paradigm, stability and sedentarism are viewed as the normal or preferred condition (Di Masso et al., 2019), and fixity, localism, and tradition are emphasised (Relph, 1976; Tuan, 1974; Gustafson, 2001a, 2001b; Lewicka, 2011; Low and Altman, 1992). In gentrification studies, for example, place change is frequently viewed as a “disruption” to the long-term place meanings (Anguelovski et al., 2020; Tozer et al., 2020) rather than as an opportunity for activating an assemblage of meanings that may be fixed or fluid, positive or negative. We see similar patterns in the wider environmental change literature when place change in the context of violent conflict or catastrophic disaster has been considered as a ‘shock’ to place meanings that can be slow to evolve and potentially maladaptive (Marshall et al., 2018; Masterson et al., 2017; Stedman, 2016). Such place change can contribute to a sudden loss of identity and can evoke strong emotional responses (Schlosberg et al., 2021).

We assert that accepting—even implicitly—this essentialist approach to sense of place as the only—or even primary—way to view just transitions will lead to a ‘rigidity trap’ (Stedman, 2016) whereby any structural transformation to place (e.g., changes in physical or socio-demographic qualities of a given place) will be considered as threatening to affective bonds with place, otherwise termed emotional transformations. To protect cities from processes such as rapid gentrification (Cole et al., 2020), we need to move beyond viewing place as a relatively fixed, stable ‘attitude’ towards a spatial setting (Jorgensen and Stedman, 2001). Building on a progressive-relational approach emphasising fluidity in people-place bonds (Raymond et al., 2021), we propose to accommodate possibilities for conceptualising dynamic or unfolding meanings and attachments in response to structural dynamics (Bugden and Stedman, 2019; Di Masso et al., 2019; Raymond et al., 2017b; West

et al., 2020), resulting in the potential for multiple and changing senses of place (Raymond et al., 2021). In essence, we propose a pluralistic and dynamic (over time) conceptualization of senses of place in relation to urban settings and urban nature specifically.

In this paper, we present two interpretive lenses and four modalities for understanding the potential for *just transitions through NBS that are grounded in a progressive-relational approach of senses of place*. We argue that our progressive-relational approach will elucidate how NBS affect and are affected by interventions that elucidate the fluidity of senses of place, and that this approach better opens the door to engaging with issues around justice. We offer a conceptual lens to examine the interface between senses of place and environmental justice with respect to NBS enabling just cities transitions. After introducing this progressive perspective on place, we highlight how just transitions through NBS need to be reimagined as a dialectic between different modalities of structural, emotional and institutional transformations, each linked to different aspects or associations between justice elements. We offer case examples to exemplify each modality and suggest how urban environmental policies and planning can respond to each modality to promote just transitions.

## 2. Introducing a progressive approach to understanding senses of place

When drawing on a more traditional, essentialist view on place, people-place bonds form slowly, through the steady accretion of experience and associated sentiments. This reinforces the notion that the stable is preferred to the changing. In contradistinction to this, a progressive place approach explores how material and embodied practices interact and physically transform places within a wider socio-political context (Raymond et al., 2021, 2017b). This opens up space for multiple layers of place contestation, as well as different patterns of place meaning creation — both positive and negative meanings unfolding across time with respect to different types of place changes— in short, “changing senses of place”. A mobilities-informed senses of place emphasizes the possibility of strong attachment to visited places (Williams and McIntyre, 2012), multiple places (rather than a fixation on home, Cresswell, 1996; Gustafson, 2009; Manzo, 2005; Stedman, 2006), and a dynamic senses of place throughout the life course (Bailey, 2021). Di Masso et al. (2019) articulate the relational nature of the “fixity and flow” elements of sense of place, noting that these relations vary across contexts and social actors.

Raymond et al. (2017c) draw upon Gibson’s (1979) affordance theory to describe how sense of place may develop quite quickly. An affordance refers to the “possibility for action” provided to an individual by an environment—by the substances, surfaces, objects, and other living creatures that surround the social actor, and form through direct perception and action. As a corollary, place meanings based on immediate perception of contextual information form as a joint product of environmental attributes and characteristics of the individual perceiver, thus bypassing the need for deep, slow, reflective abstraction in the creation of meanings and attachments (Raymond et al., 2017b).

Closely linked to above, sense of place is not necessarily strongly held, and chronically accessible, but may be ‘weaker’—not particularly well developed, open to interpretation and framing, and thus “malleable”. Bugden and Stedman (2019) note that traditional views of place often describe sense of place as a “top of the mind” representation that has a more or less inevitable and robust effect on behaviour. In response, they argue that place meanings may be thought of as temporarily, rather than chronically accessible, and embedded in contexts and situations. Because these contexts or situations are fluid and variable, researchers ought to consider place meanings and attachments accordingly.

### 3. How does a progressive understanding of senses of place relate to just transitions?

In this section, we highlight the relevance and contribution of a more progressive understanding of “senses” of place to just transitions through NBS. We focus on issues of distributional, procedural, and recognition justice related to both structural and emotional transformations (Table 1).

#### 3.1. Structural transformations

Here we define structural transformation as the physical and social changes to a location that influence how settings function, and the services they provide. These changes in turn shape how settings are perceived. For example, settings may provide affordable, spacious facilities for an informal music and art scene, or structures for supporting interactions between different property owners (Olsson et al., 2020). Changes in tax regulation or incentive schemes could support the

development of NBS (Hérivaux and Le Coent, 2021). Similarly, place meanings can change in response to rapid place-environment changes, such as coral bleaching on the Great Barrier Reef (Marshall et al., 2019), or rapid housing densification in high amenity areas (Stedman, 2003). Technological transformations like new citizen engagement platforms provide innovative ways to engage audiences directly and indirectly affected by place changes, including residents and visitors; however, they also bear the risk of heightening pre-existing social inequalities: for example, in the form of digital divides (Olafsson et al., 2021). By extension, distributional justice associated with structural transformations necessitates considering the proximity and magnitude of benefits and harms of these changes (Gulsrud et al., 2018). Procedural justice issues move beyond engaging actors affected by one place change to considering those affected by multiple place changes, as well as whether particular groups have input into the place changes (i.e., structural changes that are imposed without consent, as many are, carry serious justice implications). Procedural and recognition justice are broadened to consider a wider range of vulnerabilities (e.g., people who

**Table 1**

Summary of the four modalities concerning people-place relations, NBS, and just transitions. By way of example, we focus on the perspective of residents who interact with land-use planners and/or developers.

	Modality 1 Embracing continuity	Modality 2: History of broken promises	Modality 3 Build it and they will come	Modality 4: Embracing new senses in changing places
<b>People-Place Relations</b>				
<b>Structural Transformation</b>	<b>Resisting Change</b> The capacities and potential for structural transformation are low. Residents strongly resist change to support continued connection to a historic ideation of place.	<b>Dismissing Change</b> No support by planners for structural transformations to engage residents’ new senses of places or those aspired to by them.	<b>Co-opting Change</b> Developers ‘manufacture’ new senses of places, which are different to those held by residents.	<b>Negotiating Change</b> Structural changes made by developers are tailored to the different forms and changing senses of place of residents across space and time.
<b>Emotional Transformation</b>	Local communities of residents promote place continuity and defend static and enduring meanings through place-protective behaviours.	Residents have opportunities to share their fixed, fluid, accessible and inaccessible place meanings.	Developers remodel or manufacture spaces to align with dominant logics without engaging local residents’ senses of place.	Residents think anew about dynamic and unfolding connections and ways of being emplaced.
<b>Senses of Place</b>	Rootedness, emphasis among residents on place continuity. Places have a ‘multi-layered history’.	Residents have chronic or temporary accessibility of strong and weak, fixed and fleeting, positive and negative place bonds over different temporal and spatial scales.	The ‘creative destruction of senses of place’ - local senses of places are overlooked by land-use planners and developers in favour of senses aligned with capitalist logics and social diagnosis of what a given culture ‘should be’.	Residents’ senses of place are not only heard by land-use planners and developers, but new forms of negotiation processes are established to identify whether and how these senses can be embedded in urban planning.
<b>NBS</b>	NBS are designed by land-use planners and developers without open engagement with local residents. Residents see NBS as an ‘unfit’ solution to what the community is recognising as ‘fit’.	Residents recognize that they are dealt with or confronted with tokenistic engagements about NBS planning and design by land-use planners. Symbolic gestures are not supported with meaningful engagement nor participation.	NBS are co-designed by land-use planners and developers with specific interests and capitalist logics in front of mind. Residents see NBS as ‘capturing’ or ‘capitalising’ public spaces with limited social value or benefits.	NBS as grounds of active urban experimentation. Residents are actively and openly engaged in urban arenas of experimentation by land-use planners, developers and other actors (in situ and digitally) that provide space for understanding the interactions among local communities, urban environments and technologies. Residents feel heard and empowered.
<b>Implications for environmental justice</b>	Residents that engage in place protective behaviour have input into place changes. However, not all voices, senses of place or desired place changes are recognised by land-use planners in the development process. Issues of recognition justice are likely to be pronounced in this modality.	Multiple resident groups are engaged by land-use planners in the proposed changes to place, contributing to a sense of high distribution, procedural and recognition justice. However, the multiple senses of place that are elicited in the NBS design phase by land-use planners are ignored in the NBS implementation phase by developers, undermining trust in community engagement and planning projects, thereby impacting procedural and recognition justice.	The structural elements of place are remodelled by developers to attract new senses of place that do not align with residents’ actual or aspired relationships. There is consideration of the emotional aspects of place transformation held by residents, thereby magnifying issues of distributional and procedural justice.	Issues of environmental justice communicated by residents are actively listened to by land-use planners and developers during all elements of the design, planning and implementation of NBS. While not all needs are met, most residents view the process as just and equitable.

are ‘on the move’, including those who are vulnerable by being uprooted through forced relocation, poverty, etc).

The senses of place framing calls into question the permanence of the consequences (and the nature of these consequences) of place change with associated impacts for just transitions thinking. Our relational approach to senses of place recognises the possibilities of both fixed and fluid people-place relationships, and different moments of association on a spectrum between these two extremes (building on Di Masso et al., 2019). Such a spectrum has consequences for just transitions through NBS. If place meanings can be malleable or temporary (Bugden and Stedman, 2019), distributional impacts are less likely to be permanent. It may also be possible to shift place meanings through deliberative processes involving diverse stakeholder groups or designing inclusive governance settings (Frantzeskaki et al., 2018). We do not wish to overstate this: other place meanings may be more permanent and chronically accessible resulting in resistance and/or the potential for multiple layers of place contestation. Hence, new frameworks are needed to understand the interface between different forms of senses of place in relation to the structural elements of the existing place and the intended or actualised transformation of that place through NBS.

**Emotional transformations** engage the emotional responses individuals and groups have when their senses of place are challenged through place changes like NBS. When a place changes, or if people lose access to a place, it creates an emotional response. These emotional responses can be both positive and negative (Manzo, 2005), fixed or fleeting (Bugden and Stedman, 2019; Di Masso et al., 2019), or deeply held. That sense of place is not necessarily deeply held presents a note of caution: it invites manipulation of place sentiments by powerful actors who seek to enable transformations of place that may or may not align with community expectations. Those who are most vulnerable may be most susceptible to such manipulations (e.g., presenting place meanings that emphasize the need for jobs may undercut attempts at sustainability transitions (e.g., Bell and York, 2010)). From this perspective, any place change through NBS could lead to both positive and negative perceptions of distributional impacts. Procedures also need to engage with multiple layers of place contestation between different actors who have different notions of how a place could or should be (Ingalls et al., 2019; Di Masso et al., 2021). Recognition involves engaging the diversity (and multi-directionality) of place meanings within and across race, class, and ethnicity, rather than comparing the meanings of one sub-group against another and defending those that are consistent with notions of tradition.

In reality, structural transformations rarely, if ever occur in isolation from emotional transformations. We therefore need to improve our understanding of the interplay between structural and emotional changes. Issues of recognition within a place can be affected by virtual and imaginary representations created outside the place; for example, the way in which groups co-create place through social media platforms like Flickr, Wikipedia or OpenStreetMap (Calcagni et al., 2019), as well as how social media companies, or other advertisers, represent place and influence social discourses through their global platforms (Gulsrud et al., 2018). The mobilities paradigm posits that place meanings can be virtual, imagined, or realized by different insider and outsider groups (Di Masso et al., 2019). Therefore distributional justice impacts may be experienced not only by those directly affected by an NBS intervention, but also those exposed to an NBS through virtual or imaginative travel. In this case, emerging justice issues emerge are tied to the capacity of different groups to engage in these activities. Divergent place realities may stem from these engagements, calling into question which actors are affected by NBS, and in what manner. Multi-level governance processes thus need to rethink who is affected by a given issue and how processes can be redesigned to cater for different place imaginaries with respect to current or future desired states.

#### 4. Modalities for considering senses of place in just city transitions

Here we outline some of the planning consequences associated with neglecting structural and emotional transformations linked to the design and implementation of NBS. For understanding the place-related and place-based transformations that NBS trigger/set in motion, we conceptualise NBS as *place disruptions that have the potential to trigger or reroute on-going transformations towards just transitions*. We offer four modalities of the nexus of relations between people, place and nature in response to NBS-based place transformations (Fig. 1). We conceptualise the modalities as archetypical descriptions or scenarios that are tied to institutional responses that enable just transitions through NBS, grounded in a progressive understanding of place.

##### 4.1. Modality 1: “Embracing continuity”

The first modality represents a context where a desire for structural transformation and emotional transformation is low (Box 1). Many individuals and groups may be deeply rooted to place as it currently exists. New developments are perceived to disrupt pre-existing place meanings. Residents seek place continuity, leading to place protective behaviours (Devine-Wright, 2009). As Stedman (2002) notes: “we are willing to fight for places that are central to our identities (...), this is especially true when important symbolic meanings are threatened by prospective change” (p. 577).

A progressive understanding of senses of place challenges this dynamic. NBS may challenge established rituals, and identities may feel threatened. Others may have highly fluid and/or fleeting connections to place and little desire to engage in planning for future transformations of the place. This can lead towards an ‘ambivalence towards place’ and reticence to engage emotionally to structural transformation. Further, institutional structures are not in place nor are tailored in ways to enable validation of community concerns. When relating/interacting in planning processes, more entrenched actors put forward meanings of place and identity to deflect and delegitimise anything new, magnifying points of difference and infringing to highly rooted place meanings and attachments. Consequently, the distributional, procedural and recognition justice concerns of politically well-organized groups close to an area of proposed change may be projected loudly and may lead to the under-representation of the justice concerns of equally affected yet less heard in NIMBY disputes, including minority ethnic groups and new migrants. It is also possible that some of these groups may be relating to place in different ways, and have less stable or multi-centred connections to place as a result of different cultural backgrounds and life histories. While public opposition to NBS is an unresearched topic, it is possible that listening to the views of under-recognised groups may contribute new senses of place to NBS planning and implementation, challenging existing norms and values.

##### 4.2. Modality 2: history of broken promises

The second modality is characterized by an unmet desire from communities to be part of change in their place (Box 2). New spaces for knowledge co-creation and public participation are supported by NBS planners, leading to a sense of storing distribution, procedural and recognition justice. However, this early engagement is not followed through by institutional actors (city or state government or others). Promises concerning structural changes, including the physical implementation of new NBS, which may have held promise for creating new senses of place, are broken and plans for change are forgotten and never realised. Trust in the co-creation process declines, ultimately leading to disengagement and disempowerment of diverse actors. Frustration about inaction can lead to the creation of active citizen groups who challenge current social and physical conditions of place. In contrast to modality 1, the door is opened to more fluid, diverse place meanings and

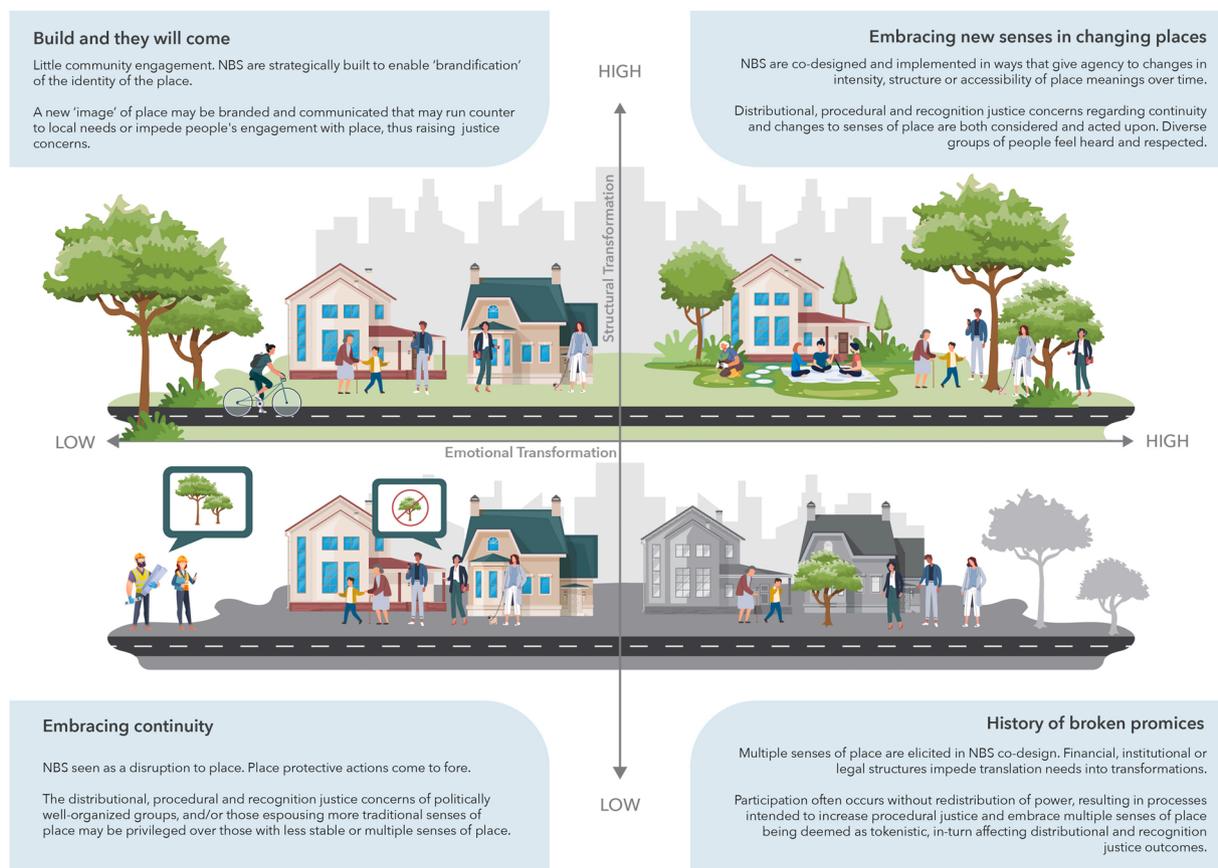


Fig. 1. Overview of some of the planning consequences associated with spotlighting or neglecting structural and emotional transformations linked to the design and implementation of NBS.

**Box 1**

New York City (United States) Million Trees Program.

New York City's Department of Parks and Recreation, in conjunction with the non-profit New York Restoration Foundation launched a large-scale street tree planning initiative – the globally highlighted metropolitan initiative of MillionTreesNYC to green the city (Campbell 2014). Prior to this, street trees had been planted at the request of neighbouring property owners, and the MillionTreesNYC shifted the focus to trees being planted without adequate local involvement. Although the program experienced many successes, it has been criticized as “green spectacle” (Lavine 2012) promoting the neoliberal interests of the city (Campbell 2014), rather than being genuinely based on the interests and needs of local residents. In the early phases of the program, many residents especially in the Bronx–mistreated the trees – removing them or constraining their space– as an act of disagreement with the tree plantation program. Community officers faced with this situation started a consultation to find out that residents felt ignored and had their voices and perceptions not represented (issues of procedural justice) and in return objected to the structural change that tree plantations introduced. To add to this, Rae (2010) emphasizes the sidewalk areas where the trees were planted as unclear in ownership/responsibility: technically the city owns the property, but local residents have strong territoriality and attachment. She notes “some welcome their arrival with open arms and excitement, while others see their planting as an intrusion into their private space or territory”. In her analysis of public comments received in response to the program, Rae describes objections based on tree location (literally Not in my FRONT yard), concerns about the process and lack of consultation with local people (procedural justice issues), concerns about maintenance responsibilities, and potential property damage/litter/public safety. In areas like Brooklyn, MillionTreesNYC tree planting was initially unsuccessful, with citizens unrooting and vandalising trees. The Not in My Front Yard reaction was fuelled by the feeling of ‘invasion of space’ by the city to what residents were perceiving as ‘their public space’ often used for parking, socialising seeing trees as obstacles to these uses. In early 2014 specifically, local community centres and citizen groups were brought together by the Department of Parks and Recreation for consultation on changing the perception and image of citizens towards trees and the greening initiative overall. That required a number of sessions, door-to-door campaigns as well as planned citizen engagement. Intermediate solutions like ‘medium-height fences’ around new trees have been proposed and installed in all street trees in Brooklyn neighbourhoods as well as in Bronx and other areas that first trees were vandalised. MillionTreesNYC may have been problematic from the recognition justice standpoint, as vulnerable and/or non-coalesced groups (e. g., new migrants) were likely not recognized and hence under-represented in these consultations.

attachment, as the prospects of change are linked to potential structural changes. Participatory processes are intended to increase procedural justice outcomes; however, processes are often not associated with the

redistribution of power, including clear and actionable pathways for turning aspirations into desired realities. Further, the meanings that are represented often are not those of local inhabitants – those from outside

**Box 2**

Case study of Södertälje, Sweden.

Ronna, in the municipality of Södertälje, Sweden, was built as part of the Swedish Million Programme (1 million new homes) in the 1960 s. Ronna is perceived as a “hardscape where no garden would grow, no vines would curl around a pergola, and no playground would hear the laughter of children” (Mack, 2021, p. 2). Far-right populist narratives emphasize the high proportion of people in these cities that are foreign born, and are commonly linked to social problems like drug sales, rioting, arson, and even murder (Backvall, 2019). Multiple engagements with Ronna residents have been conducted over time to improve the green spaces in the area. Residents have described emotional attachments to lush and bucolic spaces, places of freedom, and of raising children, growing up, and growing old (Mack, 2021). They also describe how their meanings have changed over time with respect to changing management of NBS. However, participation has commonly occurred without redistribution of power (Mack, 2017). This is often because the funding is not there to support their ambitions, or their desires are viewed by outsiders to cause more problems (e.g., increased potential for crime), leading to further inaction. Consequently, while participatory processes are intended to increase procedural justice, they are often deemed to be ‘tokenistic’, and in turn lead to distributional and recognitional outcomes not being met. While contemporary Swedish architects seek to impose new paradigms on old spaces, their designs often lead to neat, standardized spaces and negate the emerging place meanings of a changing socio-demographic such as Syriac and Christian communities (Mack, 2017). Municipalities are under political pressure from national governments to rapidly transform the structural aspects of place to overcome perceived issues of anti-social behaviour. For example, in 2012 the Delegation for Sustainable Cities set the vision to transform Ronna into an urban area that is environmentally, economically and socially sustainable, is innovative for small scale businesses and supports diverse types of housing and activities and people with different experiences, competences, income levels and backgrounds. While community engagements occur, there are few ongoing processes for residents’ emotional connections to place to be heard and to be embedded into the structural transformation.

the area, including the desires of planners, architects and businesses which have a view on what a place ‘should be’ are considered, often under the guise of ‘expert’ or ‘technical’ knowledge, undermining recognitional justice concerns including the views of different classes, ethnicities and gender identities. However, the “broken promises” can sometimes lead to new sets of meanings and attachments that are linked to these changes and are set into motion even if the structural changes themselves do not unfold, or meanings and attachments that are associated with these broken promises—i.e., new capacity “well, even if these actors did not deliver, we the people will engage this ourselves.”

#### 4.3. Modality 3: build it and they will come (or will they?)

The third modality represents contexts with high structural transformation and low emotional transformation in which emphasis is more on the place change than the senses which underpin human relations and new beginnings (Hough, 1990) (Box 3). This modality is commonly associated with urban gentrification and associated with the ‘build and they will come’ mentality. Urban structure is transformed leading in some cases to new forms of place contestation. Developers often seek to ‘manufacture’ or commodify new place meanings to align with new senses of place that reflect corporate and material interests (Di Masso et al., 2015, 2021). Procedures are not established to listen to the diverse needs of residents, and in some cases (e.g. gentrification plans in Copenhagen), new state legislation, policies and community benchmarks are introduced that represent non-local interests, bypass local

community concerns and to create a new place identity through structural transformation of residential housing areas (see Gulrud et al., 2021). This ties to the points raised earlier by Bugden and Stedman (2019) that emphasize the potential malleability of place meanings. This malleability links forward to the idea that vested interests seek to actively shape emotional meanings and attachments through changes to the physical and/or social structure of the setting (Frantzeskaki et al., 2016). Modality 3 considers instances where these attempts do *not* result in strong emotional transformation. This failure can mischaracterize structural transformation’s effects, or active resistance to the change. In either case, this may result from a lack of engagement with key social actors, and in such instances, established meanings and attachments may overcome attempts to change them. This modality is prevalent in planning that operates with the push of an economic agenda and promotes the commodification of public urban space. In this modality, there is a hidden paradox: the growth agenda pushes for optimal or efficient use of all space devoted to development as a way of producing revenue, and it is often the case that green strategies such as NBS may not be seen favourably (i.e., adding unnecessary cost to the project). However, planning rules and schemes may necessitate or oblige developers to integrate green solutions into the development plans. The structural elements of place are remodelled and branded in a way to attract new senses of place, with little to no consideration of the emotional aspects of place transformation, thereby magnifying issues of procedural and recognition injustice. Community leaders may see greening solutions as a means to obscure more fundamental issues, including the overall loss

**Box 3**

Fishermans Bend, Melbourne, Australia.

Fishermans Bend is an inner Melbourne city area that is under transition. The 258-hectare area sees the relocation of previous industrial activities and the redevelopment as a new high-density area of four precincts. Despite visionary proposals for regenerating and redeveloping the brownfield with nature-based solutions approaches such as water-sensitive urban design principles (State of Victoria, 2022) as well as open co-design proposals, the area is currently transforming with private interests of developers and an economic growth agenda dominating/driving mainly due to the fact the land is privately owned. The ‘green aspects’ so far include majorly manicured green spaces and green stripes in boulevards and public spaces with a distinct feature of economic utility rather than multifunctionality or renaturing of the area. As the site is still under development, with the limited consultation and openness to take on historical place meanings, we see how developers manufacture new place meanings and new imaginaries that, in a sense, force a new sense of place through the planned nature. This case depicts the ‘build it and they will come’ modality in its urban design conception, showing that consultation with neighbouring communities/residents comes as secondary, with recognition and representation justice concerns being overlooked.

of green space for densification projects, thereby leading to distributional justice concerns.

#### 4.4. Modality 4: embracing new senses in changing places

The fourth modality represents contexts with high structural and emotional transformations (Box 4). In these contexts, people's multiple senses of place and identities are recognized and considered during the designing, planning, and implementing of NBS as critical determinants of the planning process. Environmental justice issues are actively engaged during all elements of the design, planning, and implementation of NBS. The community can identify, resolve or navigate high levels of place contestation, e.g., being receptive to fixed and fluid dynamics of business meaning shared by people from different classes, ethnicities, orientations, etc. Individuals and communities recognise that their place is undergoing change and that some place meanings are associated with grief and oppression, whereas others are associated with adaptation and new beginnings (attention given to both strong and weak place meanings). Despite the tensions between fixity and fluidity in senses of place, distributional, procedural and recognition justice concerns regarding continuity and change are both considered and acted upon. Diverse groups of people feel heard and respected. While not all needs are met at every stage (recognizing that there are always winners and losers when engaging with both structural and emotional transformations of place), most inhabitants view the process as just and equitable. Modality 4 speaks to instances when careful, proactive, deliberative design and planning results in structural changes that both reflect (respond to) and re-create a plurality of meanings and attachments that emancipate latent meanings, giving rise to a fuller panoply of meanings/attachments, both through the structural changes themselves and through the increased sense of capacity that affected people, who have participated in the creation and implementation of NBS.

### 5. Implications for NBS and just transitions

The previous section showed how NBS have been designed and implemented in contexts with different engagements with structural and emotional transformations, each having different possible consequences for just transitions. The implementation of NBS requires a concerted institutional approach that is inclusive and aims to advance equity and justice throughout the planning cycle. Such an approach needs to be

polycentric and geographically embedded (Loorbach et al., 2020). Tzoulas et al., (2021, p. 339) argue that “the need to integrate cooperative, competing and conflicting interests in the implementation of NBS necessitates polycentric governance”; meaning a diversity of arrangements “that allow multiple, overlapping, semi-autonomous decision-makers to cooperate, compete and resolve conflicts between each other” (p.338). We build on this argument, considering two principles that strive for modality 4 as desirable for designing and planning just city transitions, geared towards embracing new senses in changing places, and accepting place-based emotional and structural transformation. The first principle elaborates on experimentation as a means of inclusive governance to activate structural and emotional transformations, as well as procedural justice outcomes. The second principle elaborates on how to strive for plurality and diversity of institutional approaches to allow for fluidity and adaptiveness of place and meaning transformations so as to anticipate for just transitions.

#### 5.1. Principle 1: NBS design and planning must purposively activate structural and emotional transformations through experimentation to support procedural justice outcomes

Research on experimentation and sustainability transitions points to the potential for experimentation to foster new place-related narratives of change, novel practices, and collaborations to promote procedurally just transitions. Experimentation can adopt new forms of participatory action research (e.g., arts-based dialogues), which build trust between different types of affected groups and decision-makers (von Wirth and Frantzeskaki, 2021). Policies and programs need not always focus on the solution or outcome. They can seek to foster social and policy learning and, as such, aim to ‘listen to and understand’ diverse voices and their journey towards forming new or solidifying existing people-place relations. However, to engage with the interplay between structural and emotional transformations, planners need to deal with issues of non-belonging, detachment, fast and slow connections, and positive and negative meanings associated with place change. This brave space can be achieved through complementary engagement processes for planning focusing on aspects of relational identity instead of focusing solely on interests, positions, or outcomes (Shapiro, 2017; Turnhout et al., 2020). Urban experimentation through NBS can enable the priming (purposeful change) in more malleable place meanings (Frantzeskaki, 2019) while simultaneously grappling with meanings that are chronically accessible

#### Box 4

Metropolitan Park, Pavlos Melas City, Greece.

In Pavlos Melas city in the region of Thessaloniki in Greece, a large vacant land of around 332 square meters in the city's west includes 63 buildings that once were barracks, military offices and prison was dedicated for regeneration to transform into a multifunctional metropolitan park with a cultural community centre. The old buildings were vacated in 2006, and the city has left the land and the vacant buildings to be used by active, creative economy communities, including artists, community engagement groups, and youth. The main reason was protracted planning processes, political interests blocking any alignment and strategic planning for the use and regeneration of the place, as well as the budget cuts due to the financial crisis in 2010 and a period of economic austerity that still pertains in Greece. That allowed for different communities of interest and cultural communities – given that the area is bordered by many multicultural neighbourhoods and ethnically ‘demarcated’ boroughs to establish and root multiple narratives of ownership of the place. Against this background, in 2017–2018, during the preparations of the regeneration plan for the metropolitan park, the city organized consultations as well as open participation sessions inviting all representatives of the communities, actors who had previously used and appreciated the place and land was confronted with resistance and with very ‘emotionally charged’ narratives of ‘resistance.’ The consultation and public participation sessions revealed the strong connections with the vacant land and the confluent and co-existing pluralities of meanings of a place for the different urban communities. These pluralities of meanings were supported by a sense of representation (recognition justice issues were early on addressed) and a relationship of trust between communities and between communities and local government (procedural justice issues addressed). The curated consultation sessions and openness in the engagement of the city planners allowed over time and through phase 1 of the regeneration process (2018–2019) to positively change place meanings of the urban communities (multicultural communities) and embrace new uses, and a new vision for restoration of green spaces and the ‘re-imagining’ of the building stock encountering cultural and social uses for present and future services. This case illustrates that when multiple meanings co-exist, an open and well-organised participatory planning process that allows the co-design of NBS can facilitate a positive change of senses of place (Hölscher et al., 2021).

and resistant to change. However, planners need to be open to senses of place not changing (i.e., not being activated) because of NBS design or implementation (Bugden and Stedman, 2019).

## 5.2. Principle 2: NBS co-design and implementation need to consider the dynamic interplay between recognition and distributional justice to recognize and adapt to multiple senses of place

Modality 4 calls into question the interplay between recognition and distribution justice. Clashing temporalities can exist between the use and distribution of benefits to NBS across groups based on issues of gender, class, ethnicity, and sexual orientation. These can be addressed by spatially planning for democratic access to a diversity of place meanings, and thus emotional transformations, but also require dealing with structural elements of recognition, including high volunteering demands, minimal state support, an overemphasis on valuing quantifiable aspects, and the under-recognition of the time needed for personal and social benefits to developing (Kotsila et al., 2020b). Dealing with the interplay between distribution and recognition also means rethinking our understanding of change. As we have described, change is often viewed negatively from an essentialist view, but the more progressive view presented in this paper highlights the possibilities for planners to come to terms with more fluid meanings and attachments grounded in, e.g., temporary uses of spaces including farmer markets, “pop up” food offerings, trade fairs, cultural exhibitions, and arts-based science, as well as how to place narratives unfold over time (both positively and negatively) to affect community attitudes towards both the NBS and the just city transition.

## 6. Conclusions

We have offered a novel conceptualization of the relationships between place and people and interrelated just transformations through NBS that are foundationally relational and dynamic. Our concept comprises of four modalities for enabling just city transitions through NBS by connecting the view of structural and emotional transformations with senses of place and just transitions. The four modalities offered a rubric to understand the likely consequences of engaging (or not engaging) with a plurality of senses of place when designing NBS. Just transitions are most likely to occur when planners pay attention to the interplay between a place’s emotional and structural transformation, including the multiple fixed, fluid, temporary, and permanently accessible place meanings. From this perspective, issues of procedure, recognition, and distributional justice are subject to change over time based on the symbolic and affective meanings individuals and groups assign to different aspects of the structural transformation and the relationships formed (or impeded) through the co-creation process. Planners, therefore, need to consider just transitions through NBS as an iterative process of relationship building open to multiple place subjectivities and perceptions of transformation over time.

## CRedit authorship contribution statement

**Christopher Raymond:** Conceptualization, Writing – all drafts, Case preparation. **Richard Stedman:** Conceptualization, Writing – all drafts, Case preparation. **Niki Frantzeskaki:** Conceptualization, Writing – all drafts, Case preparation.

## Declaration of Competing Interest

The authors 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

No data was used for the research described in the article.

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## References

- Andersson, E., Langemeyer, J., Borgström, S., McPhearson, T., Haase, D., Kronenberg, J., Barton, D.N., Davis, M., Naumann, S., Röschel, L., Baró, F., 2019. Enabling green and blue infrastructure to improve contributions to human well-being and equity in urban systems. *Bioscience*. <https://doi.org/10.1093/biosci/biz058>.
- Anguelovski, I., Brand, A.L., Connolly, J.J.T., Corbera, E., Kotsila, P., Steil, J., Garcia-Lamarca, M., Triguero-Mas, M., Cole, H., Baró, F., Langemeyer, J., del Pulgar, C.P., Shokry, G., Sekulova, F., Argüelles Ramos, L., 2020. Expanding the Boundaries of Justice in Urban Greening Scholarship: Toward an Emancipatory, Antisubordination, Intersectional, and Relational Approach. *Ann. Am. Assoc. Geogr.* 110, 1743–1769. <https://doi.org/10.1080/24694452.2020.1740579>.
- Backvall, K., 2019. Constructing the suburb: Swedish discourses of spatial stigmatisation (PhD Dissertation). Uppsala University.
- Bailey, E., 2021. A life course approach to the pluralisation of sense of place: Understanding the social acceptance of low-carbon energy developments. In: Raymond, C., Manzo, L., Williams, D., Di Masso, A., Von Wirth, T. (Eds.), *Changing Senses of Place: Navigating Global Challenges*. Cambridge, Cambridge University Press. <https://doi.org/10.1017/9781108769471.003>.
- Barthel, S., Folke, C., Colding, J., 2010. Social-ecological memory in urban gardens—Retaining the capacity for management of ecosystem services. *Glob. Environ. Chang.* 20, 255–265. <https://doi.org/10.1016/j.gloenvcha.2010.01.001>.
- Bell, S.E., York, R., 2010. Community economic identity: the coal industry and ideology construction in West Virginia. *Rural Socio* 75, 111–143. <https://doi.org/10.1111/j.1549-0831.2009.00004.x>.
- Bugden, D., Stedman, R., 2019. Place and behavior: The role of accessibility. *J. Environ. Psychol.* 63, 109–117. <https://doi.org/10.1016/j.jenvp.2019.04.008>.
- Buijs, A., Mattijssen, T., Van der Jagt, A., Ambrose-Oji, B., Andersson, E., Elands, B., Möller, M., 2016. Active citizenship for urban green infrastructure: fostering the diversity and dynamics of citizen contributions through mosaic governance. *I. Curr. Opin. Environ. Sustain* 22, 1–6.
- Calcagni, F., Amorim Maia, A.T., Connolly, J.J.T., Langemeyer, J., 2019. Digital co-construction of relational values: understanding the role of social media for sustainability. *Sustain. Sci.* 14, 1309–1321. <https://doi.org/10.1007/s11625-019-00672-1>.
- Calderón-Argelich, A., Benetti, S., Anguelovski, I., Connolly, J.J.T., Langemeyer, J., Baró, F., 2021. Tracing and building up environmental justice considerations in the urban ecosystem service literature: A systematic review. *Landsc. Urban Plan.* 214, 104130 <https://doi.org/10.1016/j.landurbplan.2021.104130>.
- Cole, H.V.S., Anguelovski, I., Baró, F., García-Lamarca, M., Kotsila, P., Pérez del Pulgar, C., Shokry, G., Triguero-Mas, M., 2020. The COVID-19 pandemic: power and privilege, gentrification, and urban environmental justice in the global north. *Cities Heal.* 00, 1–5. <https://doi.org/10.1080/23748834.2020.1785176>.
- Cresswell, T., 1996. *On the Move: Mobility in the Modern Western World*. Routledge.
- Devine-Wright, P., 2009. Rethinking NIMBYism: the role of place attachment and place identity in explaining place-protective action. *J. Community Appl. Soc. Psychol.* 19, 426–441. <https://doi.org/10.1002/casp.1004>.
- Di Masso, A., Dixon, J., Di Masso, A., Dixon, J., 2015. More than words: Place, discourse and the struggle over public space in Barcelona. *Qual. Res. Psychol.* 12, 45–60. <https://doi.org/10.1080/14780887.2014.958387>.
- Di Masso, A., Williams, D.R., Raymond, C.M., Buchecker, M., Degenhardt, B., Devine-Wright, P., Hertzog, A., Lewicka, M., Manzo, L., Shahrad, A., Stedman, R., Verbrugge, L., von Wirth, T., Di Masso, A., Williams, D.R., Raymond, C.M., Buchecker, M., Degenhardt, B., Devine-Wright, P., Hertzog, A., Lewicka, M., Manzo, L., Shahrad, A., Stedman, R., Verbrugge, L., von Wirth, T., 2019. Between Fixities and Flows: Navigating Place Attachments in an Increasingly Mobile World. *J. Environ. Psychol.* 61, 125–133. <https://doi.org/10.1016/j.jenvp.2019.01.006>.
- Di Masso, Andrés, Jorquera, V., Ropert, T., Vidal, T., 2021. Gentrification and the Creative Destruction of Sense of Place: A Psychosocial Exploration of Urban Transformations in Barcelona. In: Raymond, C., Manzo, L., Williams, D., Di Masso, A., von Wirth, T. (Eds.), *Changing Senses of Place: Navigating Global Challenges*. Cambridge University Press, Cambridge.
- European Commission., 2015. Towards an EU Research and Innovation Policy Agenda for Nature-Based Solutions & Re-Naturing Cities. Access online 4 May 2021. (<https://op.europa.eu/en/publication-detail/-/publication/fb117980-d5aa-46df-8edc-af367cddc202/language-en>).
- European Commission., 2021. Evaluating the Impact of Nature-based Solutions: A Handbook for Practitioners. Accessed online 30 May 2021. ([https://ec.europa.eu/info/news/evaluating-impact-nature-based-solutions-handbook-practitioners-2021-may-06\\_en](https://ec.europa.eu/info/news/evaluating-impact-nature-based-solutions-handbook-practitioners-2021-may-06_en)).

- Frantzeskaki, N., 2019. Seven lessons for planning nature-based solutions in cities. *Environ. Sci. Policy* 93, 101–111. <https://doi.org/10.1016/j.envsci.2018.12.033>.
- Frantzeskaki, N., Kabisch, N., 2016. Designing a knowledge co-production operating space for urban environmental governance—Lessons from Rotterdam, Netherlands and Berlin, Germany. *Environ. Sci. Policy* 62, 90–98. <https://doi.org/10.1016/j.envsci.2016.01.010>.
- Frantzeskaki, N., van Steenberg, F., Stedman, R.C., 2018. Sense of place and experimentation in urban sustainability transitions: the Resilience Lab in Carnisse, Rotterdam, The Netherlands. *Sustain. Sci.* 13, 1045–1059. <https://doi.org/10.1007/s11625-018-0562-5>.
- Frantzeskaki, N., McPhearson, T., Collier, M., Kendal, D., Bulkeley, H., Dumitru, A., Walsh, C., Noble, K., van Wyk, E., Pinter, L., Ordonez, C., Oke, C., Elmquist, T., 2019. Nature-based solutions for urban climate change adaptation: linking the science, policy and practice communities for evidence-based decision-making. *Bioscience* 69, 455–566. <https://doi.org/10.1093/biosci/biz042>.
- Fraser, N., 1998. *Social Justice in the Age of Identity Politics: Redistribution, Recognition, and Participation in The Tanner Lectures on Human Values 19 Salt Lake City, UT*. Redistribution. University of Utah Press.
- Gibson, J., 1979. *The Ecological Approach to Visual Perception*. Houghton Mifflin, Boston.
- Gulsrud, N.M., Raymond, C.M., Rutt, R.L., Olafsson, A.S., Plieninger, T., Sandberg, M., Beery, T.H., Jönsson, K.I., 2018. 'Rage against the machine'? The opportunities and risks concerning the automation of urban green infrastructure. *Landsc. Urban Plan.* 180, 85–92. <https://doi.org/10.1016/j.landurbplan.2018.08.012>.
- Gustafson, P., 2001a. Roots and routes: Exploring the relationship between place attachment and mobility. *Environ. Behav.* 33. <https://doi.org/10.1177/00139160121973188>.
- Gustafson, P., 2009. Mobility and territorial belonging. *Environ. Behav.* 41, 490–508. <https://doi.org/10.1177/0013916508314478>.
- Gustafson, P., 2001b. Roots and Routes. *Environ. Behav.* 33, 667–686. <https://doi.org/10.1177/00139160121973188>.
- Hérivaux, C., Le Coent, P., 2021. Introducing nature into cities or preserving existing peri-urban ecosystems? Analysis of preferences in a rapidly urbanizing catchment. *Sustainability* 13, 587. <https://doi.org/10.3390/su13020587>.
- Hölscher, K., Lodder, M., Allaert, K., Sillen, D., Frantzeskaki, N., Dumitru, A., Connop, S., Vandergert, P., Collier, M., McQuaid, S., Quartier, van de Sijpe, K., Vos, P., Dick, G., Kelly, S., Mowat, L., Sermpazi, R., Dziubala, A., Madajczyk, N., Osipiuk, A., (2021), *Connecting Nature, The Connecting Nature Framework: facilitating and connecting innovations for the large-scale implementation of nature-based solutions*, ISBN Number: 978-1-9161451-3-9.
- Ingalls, M.L., Kohout, A., Stedman, R.C., 2019. When places collide: power, conflict and meaning at Malheur. *Sustain. Sci.* <https://doi.org/10.1007/s11625-019-00689-6>.
- IPBES, 2022. In: Pascual, U., Balvanera, P., Christie, M., Baptiste, B., González-Jiménez, D., Anderson, C.B., Athayde, S., Barton, D.N., Chaplin-Kramer, R., Jacobs, S., Kelemen, E., Kumar, R., Láz, E., Martin, A., Mwampamba, T.H., Nakangu, B., O'Farrell, P., Raymond, C.M., Subramanian, S.M., Terman, M., Van Noordwijk, M., Vatn, A. (Eds.), *Summary for Policymakers of the Methodological Assessment Report on the Diverse Values and Valuation of Nature of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES secretariat, Bonn, Germany. <https://doi.org/10.5281/zenodo.6522392>.
- Jennings, V., Bamkole, O., 2019. The relationship between social cohesion and urban green space: An avenue for health promotion. *Int. J. Environ. Res. Public Health* 16. <https://doi.org/10.3390/ijerph16030452>.
- Jennings, V., Larson, L., Yun, J., 2016. Advancing sustainability through urban green space: Cultural ecosystem services, equity, and social determinants of health 13. <https://doi.org/10.3390/ijerph13020196>.
- Jorgensen, B.S., Stedman, R.C., 2001. Sense of Place as an attitude: Lakeshore owners attitudes toward their properties. *J. Environ. Psychol.* 21, 233–248. <https://doi.org/10.1006/jevp.2001.0226>.
- Kabisch, N., Haase, D., 2014. Green justice or just green? Provision of urban green spaces in Berlin, Germany. *Landsc. Urban Plan.* 122, 129–139. <https://doi.org/10.1016/j.landurbplan.2013.11.016>.
- Kingsley, J., Egerer, M., Nuttman, S., Keniger, L., Pettitt, P., Frantzeskaki, N., Gray, T., Ossola, A., Lin, B., Bailey, A., Tracey, D., Barron, S., Marsh, P., 2021. Urban agriculture as a nature-based solution to address socio-ecological challenges in Australian cities. *Urban For. Urban Green.* 60, 127059. <https://doi.org/10.1016/j.ufug.2021.127059>.
- Korpilo, S., Kaaronen, R.O., Olafsson, A.S., Raymond, C.M., 2022. Public participation GIS can help assess multiple dimensions of environmental justice in urban green and blue space planning. *Appl. Geogr.* 148, 102794. <https://doi.org/10.1016/j.apgeog.2022.102794>.
- Kotsila, P., Hörschelmann, K., Anguelovski, I., Sekulova, F., Lazova, Y., 2020b. Clashing temporalities of care and support as key determinants of transformatory and justice potentials in urban gardens. *Cities* 106, 102865. <https://doi.org/10.1016/j.cities.2020.102865>.
- Kotsila, P., Anguelovski, I., Baró, F., Langemeyer, J., Sekulova, F., Connolly, J.J.T., 2020a. Nature-based solutions as discursive tools and contested practices in urban nature's neoliberalisation processes. *Environ. Plan. E Nat. Sp.* <https://doi.org/10.1177/2514848620901437>.
- Langemeyer, J., Connolly, J.J.T., 2020. Weaving notions of justice into urban ecosystem services research and practice. *Environ. Sci. Policy.* <https://doi.org/10.1016/j.envsci.2020.03.021>.
- Lewicka, M., 2011. Place attachment: How far have we come in the last 40 years? *J. Environ. Psychol.* <https://doi.org/10.1016/j.jenvp.2010.10.001>.
- Loorbach, D., Wittmayer, J., Avelino, F., von Wirth, T., Frantzeskaki, N., 2020. Transformative innovation and translocal diffusion. *Environ. Innov. Soc. Transit.* 35, 251–260. <https://doi.org/10.1016/j.eist.2020.01.009>.
- Low, S., 2013. *Public Space and Diversity: Distributive, Procedural and Interactional Justice for Parks*, in: Young, G., Stevenson, D. (Eds.), *The Ashgate Research Companion to Planning and Culture*. Ashgate, Surrey, UK.
- Low, S.M., Altman, I., 1992. *Place attachment: A conceptual inquiry*. In: Low, I.A. & S.W. (Ed.), *Place Attachment*. Plenum, New York, pp. 1–12.
- Mack, J., 2017. *The construction of equality: Syriac immigration and the Swedish city*. U of Minnesota Press.
- Mack, J., 2021. Impossible nostalgia: green affect in the landscapes of the Swedish Million Programme. *Landsc. Res* 1–16. <https://doi.org/10.1080/01426397.2020.1858248>.
- Manzo, L.C., 2005. For better or worse: Exploring multiple dimensions of place meaning. *J. Environ. Psychol.* 25, 67–86. <https://doi.org/10.1016/j.jenvp.2005.01.002>.
- Marshall, N., Adger, W.N., Benham, C., Brown, K., I Curnock, M., Gurney, G.G., Marshall, P., L Pert, P., Thiault, L., 2019. Reef Grief: investigating the relationship between place meanings and place change on the Great Barrier Reef, Australia. *Sustain. Sci.* 14, 579–587.
- Marshall, N., Barnes, M.L., Birtles, A., Brown, K., Cinner, J., Curnock, M., Eakin, H., Goldberg, J., Gooch, M., Kittinger, J., Marshall, P., Manuel-Navarrete, D., Pelling, M., Pert, P.L., Smit, B., Tobin, R., 2018. Measuring what matters in the Great Barrier Reef. *Front. Ecol. Environ.* 16, 271–277.
- Martin, A., Coolsaet, B., Corbera, E., Dawson, N.M., Fraser, J.A., Lehman, I., Rodriguez, I., 2016. Justice and conservation: The need to incorporate recognition. *Biol. Conserv.* <https://doi.org/10.1016/j.biocon.2016.03.021>.
- Masterson, V.A., Stedman, R.C., Enqvist, J., Tengö, M., Giusti, M., Wahl, D., Svedin, U., 2017. The contribution of sense of place to social-ecological systems research: A review and research agenda. *Ecol. Soc.* 22, 49–63. <https://doi.org/10.5751/ES-08872-220149>.
- McPhearson, T., M. Raymond, C., Gulsrud, N., Albert, C., Coles, N., Fagerholm, N., Nagatsu, M., Olafsson, A.S., Soiminen, N., Vierikko, K., 2021. Radical changes are needed for transformations to a good Anthropocene. *Npj Urban Sustain.* 1 (1), 1–13. <https://doi.org/10.1038/s42949-021-00017-x>.
- Olafsson, A., Möller, M., Mattijssen, T., Gulsrud, N., Bas, B., Buijs, A., 2021. *Social Media and Experiences of Nature: Towards a Plurality of Senses of Place*. In: Raymond, C., Manzo, L., Williams, D., Di Masso, A., von Wirth, T. (Eds.), *Changing Senses of Place: Navigating Global Challenges*. Cambridge University Press, Cambridge, UK.
- Olsson, J.A., Brunner, J., Nordin, A., Hanson, H.I., 2020. A just urban ecosystem service governance at the neighbourhood level- perspectives from Sofielund, Malmö, Sweden. *Environ. Sci. Policy* 112, 305–313. <https://doi.org/10.1016/j.envsci.2020.06.025>.
- Pineda Pinto, M., Frantzeskaki, N., Nygaard, C.A., 2021. The potential of nature-based solutions to deliver ecologically just cities: Lessons for research and urban planning from a systematic literature review. *Ambio* 16. <https://doi.org/10.1007/s13280-021-01553-7>.
- Raymond, C.M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Nita, M.R., Geneletti, D., Calfapietra, C., 2017a. A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. *Environ. Sci. Policy* 77. <https://doi.org/10.1016/j.envsci.2017.07.008>.
- Raymond, C.M., Kytä, M., Stedman, R., 2017b. Sense of place, fast and slow: The potential contributions of affordance theory to sense of place. *Front. Psychol.* 8. <https://doi.org/10.3389/fpsyg.2017.01674>.
- Raymond, C.M., Giusti, M., Barthel, S., 2017c. An embodied perspective on the co-production of cultural ecosystem services: Toward embodied ecosystems. *J. Environ. Plan. Manag.* <https://doi.org/10.1080/09640568.2017.1312300>.
- Raymond, C.M., Williams, D., Di Masso, A., Manzo, L., von Wirth, T., 2021. *Introduction: Senses of Place in the Face of Global Challenges*. In: Raymond, C., Manzo, L., Williams, D., Di Masso, A., von Wirth, T. (Eds.), *Changing Senses of Place: Navigating Global Challenges*. Cambridge University Press, Cambridge, UK.
- Relf, E., 1976. *Place and Placelessness*. Pion, London, United Kingdom.
- Schlossberg, D., 2007. *Defining Environmental Justice: Theories, Movements, and Nature*. Oxford University Press.
- Schlossberg, D., 2013. Theorising environmental justice: the expanding sphere of a discourse. *Env. Polit.* 22, 37–55. <https://doi.org/10.1080/09644016.2013.755387>.
- Shapiro, D., 2017. *Negotiating the nonnegotiable: How to resolve your most emotionally charged conflicts*. Penguin.
- State of Victoria, 2022. *Fishermans Bend Water Sensitive City Strategy*. State of Victoria, Melbourne. (<https://www.fishermansbend.vic.gov.au/media/fishermans-bend-water-sensitive-city-strategy>).
- Stedman, R.C., 2003. Is it really just a social construction?: The contribution of the physical environment to sense of place. *Soc. Nat. Resour.* 16, 671.
- Stedman, R.C., 2006. *Places of escape: Second-home meanings in Northern Wisconsin, USA*. Multiple Dwelling and Tourism: Negotiating Place, Home and Identity. CABI Cambridge, MA, pp. 129–144.
- Stedman, R.C., 2016. Subjectivity and social-ecological systems: a rigidity trap (and sense of place as a way out). *Sustain. Sci.* 11, 891–901. <https://doi.org/10.1007/s11625-016-0388-y>.
- Tozer, L., Hörschelmann, K., Anguelovski, I., Bulkeley, H., Lazova, Y., 2020. Whose city? Whose nature? Towards inclusive nature-based solution governance. *Cities* 107, 102892. <https://doi.org/10.1016/j.cities.2020.102892>.
- Tuan, Y.-F., 1974. *Space and Place: Humanistic Perspective*. Prog. Geogr. 6, 211–252.
- Turnhout, E., Metzke, T., Wyborn, C., Klenk, N., Louder, E., 2020. The politics of co-production: participation, power, and transformation. *Curr. Opin. Environ. Sustain.* <https://doi.org/10.1016/j.cosust.2019.11.009>.

- Tzoulas, K., Galan, J., Venn, S., Dennis, M., Pedrolì, B., Mishra, H., Haase, D., Pauleit, S., Niemelä, J., James, P., 2021. A conceptual model of the social–ecological system of nature-based solutions in urban environments. *Ambio* 50, 335–345. <https://doi.org/10.1007/s13280-020-01380-2>.
- Vierikko, K., Gonçalves, P., Haase, D., Elands, B., Ioja, C., Jaatsi, M., Pieniniemi, M., Lindgren, J., Grilo, F., Santos-Reis, M., Niemelä, J., Yli-Pelkonen, V., 2020. Biocultural diversity (BCD) in European cities – Interactions between motivations, experiences and environment in public parks. *Urban . Urban Green*. 48, 126501 <https://doi.org/10.1016/j.ufug.2019.126501>.
- von Wirth, T., Frantzeskaki, N., 2021. Urban Experimentation and the Role of Senses of Place: An Illustrative Case from Rotterdam, the Netherlands. In: Raymond, C., Manzo, L., Williams, D., Di Masso, A., von Wirth, T. (Eds.), *Changing Senses of Place: Navigating Global Challenges*. Cambridge University Press, Cambridge.
- Walker, G., 2009. Beyond Distribution and Proximity: Exploring the Multiple Spatialities of Environmental Justice. *Antipode* 41, 614–636. <https://doi.org/10.1111/j.1467-8330.2009.00691.x>.
- West, S., Haider, L.J., Stålhammar, S., Woroniecki, S., 2020. A relational turn for sustainability science? Relational thinking, leverage points and transformations. *Ecosyst. People* 16, 304–325. <https://doi.org/10.1080/26395916.2020.1814417>.
- Williams, D., McIntyre, N., 2012. Place Affinities, Lifestyle Mobilities, and Quality-of-Life. In: Uysal, M., Perdue, R., Sirgy, M. (Eds.), *Handbook of Tourism and Quality-of-Life Research*. International Handbooks of Quality-of-Life. Springer, Dordrecht.
- Williams, D.R., Miller, B.A., 2021. Metatheoretical moments in place attachment research. In: Manzo, L.C., Devine-Wright, P. (Eds.), *Place Attachment: Advances in Theory, Methods and Applications*, 2nd edn., Routledge, London, pp. 13–28.