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Received: 11 February 2022 | Accepted: 8 March 2023

DOI: 10.1002/pan3.10470

PEOPLE AND NATURE | BRITISH ECOLOGICAL SOCIETY

REVIEW AND SYNTHESIS

Centring justice in conceptualizing and improving access to urban nature

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Funding information
Gordon and Betty Moore Foundation; Mertz Charitable Trust; National Science Foundation; Ward Wilson Woods, Jr. Fellowship in Environmental Studies; Winslow Foundation

Handling Editor: Cecily Maller

Abstract

1. As humanity has become increasingly urban, a growing number of people have been deprived of access to nature and the benefits it provides. This is especially true for marginalized groups, who often live in neighbourhoods where nature has been so diminished and degraded that it provides fewer types, and much lower levels of benefits.
2. We review the literatures on human–nature relationships, urban sustainability and justice to create an actionable definition of 'access to nature' that people can use to advocate for and guide investments that improve access to nature in urban contexts.
3. We show how the interplay of three dimensions of justice—recognitional, procedural and distributional—determines access to nature in cities, and how these dimensions are core to increasing access to urban nature.
4. We present a design thinking framework that centres justice in creating interventions for access to nature, together with questions that can guide the process of designing and implementing new interventions.
5. Lastly, we illustrate how our framework can be operationalized by showcasing three case studies that improve access to nature to marginalized communities in the United States: Latino Outdoors, Sogorea Te' Land Trust and the Nature Imagery in Prisons Project.

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6. We conclude by re-affirming the importance of centring justice in improving access to nature, so that all people can enjoy the benefits that nature provides and lead healthy, fulfilling lives.

KEYWORDS
access to nature, design thinking, extinction of experience, human–nature interactions, justice, sustainable cities

1 | INTRODUCTION

Urban ecosystems provide enormous benefits to people (Andersson et al., 2014; Hartig et al., 2014). For instance, urban forests reduce noise, purify air and cool cities (Baró et al., 2014; Nowak et al., 2014; Smithers et al., 2018). Urban wetlands and vegetation regulate climate, increase water quality and prevent floods (Liu & Jensen, 2018; Shokry et al., 2020). Natural areas of many sorts confer mental health benefits, such as diminishing mental fatigue and stress (Li & Sullivan, 2016). Nature experience positively impacts mental health through increased cognitive function and emotional well-being, as well as reduced risk factors and burdens of mental illness (Bratman et al., 2019).

City parks, playgrounds and gardens act as places of gathering that promote social connection, learning and happiness, while also engendering connection with the natural world among city dwellers (Lin et al., 2018; Peters et al., 2010). Furthermore, green and blue spaces allow for increased physical activity (Remme et al., 2021) and can lead to more robust immune systems (Roslund et al., 2020) and reduced cardio-metabolic conditions (Kardan et al., 2015). In fact, nature is so important to human well-being that it is understood as a basic pre-condition to human rights (Boyd, 2012; Boyle, 2012; Nussbaum, 2003). If distributed equitably, urban ecosystems have the potential to support the well-being of all inhabitants (Jennings et al., 2012).

However, people who have been historically, persistently and systemically marginalized in urban settings, such as low-income populations, Indigenous Peoples and Local Communities and Black communities, have significantly less access to nature and the benefits that it provides (Clayton et al., 2016; Dai, 2011; Gerrish & Watkins, 2018). Urban natural spaces with more biodiverse assemblages tend to be in the wealthiest neighbourhoods and often require private transportation and/or entrance fees, making them inaccessible for marginalized peoples (Wolch et al., 2014). This itself is partially the legacy of unjust and discriminatory policies that block resources from neighbourhoods inhabited by marginalized racial groups and cause these communities to live with little in the way of green and blue spaces (Grove et al., 2018; Locke et al., 2021; Schell et al., 2020). Structural, economic and geographic barriers determine not only who gets to benefit from nature but also the kinds of benefits that people can derive from it (Langemeyer & Connolly, 2020).

Today there is a growing movement focused on recognizing and redressing such inequities. There is a new appetite for centring justice in the planning and development of cities so that all inhabitants can experience nature's benefits. Yet, practitioners rarely address justice explicitly in such efforts (Hoover et al., 2021). This may be, in part, because academic concepts such as dimensions of justice, nature's diverse values and human well-being are difficult to operationalize and translate into actionable policies and interventions. The conundrum stakeholders face is: how can cities be designed so that they improve the benefits people derive from urban nature, while also ensuring just outcomes so that all people benefit from natural spaces?

Here, we provide an interdisciplinary review with theoretical and practical contributions that has three aims: (i) We define 'access to nature' and show how it relates to different dimensions of (in)justice; (ii) we build on design thinking concepts to create a framework and a tool that is flexible and adaptable to centre justice into many decision contexts aimed at improving access to nature; and (iii) we illustrate with three real-world examples how justice can be centred in urban interventions.

We review the literature from a wide variety of academic fields spanning natural and social sciences, building on recent works on the intersections of people, nature and justice (Gill et al., 2019; Langemeyer & Connolly, 2020; Muradian & Pascual, 2018; Schell et al., 2020), in the hope of bridging concepts and perspectives that tend to be studied independently and with the aim of making a timely contribution to the sustainability literature.

2 | WHAT IS ACCESS TO NATURE?

In order to better understand how access to nature is disproportionate across cities, it is important to define the terms nature and access. We define access to nature as all possible means, including physical, spiritual, cultural and mental, by which a person is able to benefit from any element of the biophysical system which includes flora, fauna and geological landforms occurring across a range of scales and degrees of human presence. We expand the IPBES definition of nature (Table 1), which focuses on living things, to include non-living components that provide benefits to people (e.g. large rocks provide shade and generate a sense of awe). Our definition builds on Ribot and Peluso (2003, p. 156) who define access to natural resources as '*all possible means by which a person is able to benefit from things*'. For example, access to nature could refer to growing vegetables in an urban garden, which can lead to increased food security

TABLE 1 A glossary defining key terms used in this article.

Glossary
2SLGBTQIA+: Two-spirit, lesbian, gay, bisexual, transgender, queer, questioning, intersexual, asexual and other identities
Access to nature: All possible means, including physical, spiritual, cultural and mental, by which a person is able to benefit from any element of the biophysical system which includes flora, fauna and geological landforms occurring across a range of scales and degrees of human presence (adapted from Ribot & Peluso, 2003, p. 156)
Blue spaces: Outdoor environments—either natural or human built—that prominently feature water and are accessible to humans either proximally (being in, on or near water) distally, or virtually (being able to see, hear or otherwise sense water; Grellier et al., 2017)
Direct contact: Physical contact with aspects of nature that are at least partially independent of human control, such as going for a walk in a city park or playing in an urban forest (Kellert, 2002)
Design thinking: A process-based framework used to design solutions for problems. Circular design thinking models have four phases: definition, ideation, prototyping and evaluating (Dolak et al., 2013; Efeoglu et al., 2013; Simon, 1969)
Distributional justice: The equitable allocation of natural resources and opportunities to experience nature across spatial or temporal scales (Bennett et al., 2019; Langemeyer & Connolly, 2020)
Ecosystem services: The many benefits that people derive from and construct with ecosystems (Daily et al., 1997)
Free Prior and Informed Consent: A specific right that pertains to Indigenous Peoples and is recognized in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). It allows them to give or withhold consent to a project that may affect them or their territories ('Free, Prior and Informed Consent', Food and Agriculture Organization of the United Nations, 2022)
Indirect contact: Physical contact with aspects of nature that are largely restricted and managed by humans, such as interacting with pets at home or visiting aquaria (Kellert, 2002)
Justice: A set of conditions primarily concerned with the distribution of natural resources, political processes and the recognition to different social actors (Fraser & Honneth, 2003; Langemeyer & Connolly, 2020)
Latinx: A person of Latin American origin or descent, used as a gender-neutral alternative for 'Latino' or 'Latina'
Nature: The natural world with an emphasis on the diversity of living organisms and their interactions among themselves and with their environment. Within the context of Western science, it includes categories such as biodiversity, ecosystems, ecosystem structure and functioning, the evolutionary process, the biosphere, living natural resources, shared evolutionary heritage and biocultural diversity—which incorporates ethno-biodiversity (Díaz et al., 2015, p. 4)
Nature's diverse values: The values of nature vary greatly across knowledge systems, languages, cultural traditions and environmental contexts. Diverse values of nature refer to the way people conceive of or relate to nature in multiple and often complementary ways: living from, with, in and as nature. These different ways of relating to nature reflect people's different world views (IPBES, 2022)
Procedural justice: The inclusion of all parties who will be affected by a decision in the decision-making process (Bennett et al., 2019; Langemeyer & Connolly, 2020)
Recognitional justice: The recognition of all groups, their values and their needs (Bennett et al., 2019; Langemeyer & Connolly, 2020)
Rematriation: Restoring a living culture to its rightful place on Mother Earth. To restore a people to a spiritual way of life, in sacred relationship with their ancestral lands without external interference, with an emphasis on female leadership (Newcomb, 1995; 'Purpose and Vision', The Sogorea Te' Land Trust, 2021e). As opposed to the concept of repatriation, which refers to the return of people or objects to their home country
Rights-holders: People with explicit rights to land, nature or natural resources, whether those rights are explicitly recognized in law, international doctrine (i.e. the United Nations Declaration of the Rights of Indigenous People) or custom. Proposed as a term to use for Indigenous People and Local Communities as opposed to stakeholders in the context of land governance in order to recognize power asymmetries, move away from the weighing of interests in economic terms and recognize customary rights of these groups (Sarkki et al., 2021)
Stakeholders: Refers to anyone with an interest in certain decisions or anyone who has power over certain decisions. This term has been used in the context of deliberative democracy, collaborative management and participatory processes (Sarkki et al., 2021)
Urban areas: A human settlement with a high population density and infrastructure of built environment. Areas are described as urban based on their administrative boundaries, their functional boundaries (such as economic activity, per capita income) or morphological boundaries (based on the form or structure of land use; Seto et al., 2014)
Vicarious experience: Nature experience that goes beyond physical contact with nature, for example, interacting with nature by watching nature documentaries, videos, photographs or by listening to sounds from natural spaces (Kellert, 2002)

for the surrounding communities and reduce heat stress (Lin et al., 2018); or it could mean watching a lizard and seeing it as a cousin who descended from a deified chiefess and who teaches people to care for the soil (Kealiikanakaoleohaililani & Giardina, 2016).

Key to our definition of access to nature are five tenets. The first is that *nature must exist somewhere* for people to experience it. While vicarious nature experience (Table 1) is possible, we consider it to be a second-degree type of access that is nevertheless beneficial for people who cannot come into direct or indirect contact with nature for myriad reasons. Evidence suggests that vicarious nature experience may provide fewer benefits that direct experience (Calogiuri et al., 2018; Kahn et al., 2009). In addition, vicarious nature access cannot occur in the complete absence of nature because the creation of these experiences initially requires direct access to nature (e.g. to record video or audio of an ecosystem).

Secondly, our definition of access draws on the capabilities framework for human rights developed by Sen and Nussbaum (Nussbaum, 2000; Sen, 1979, 2005), who argue that well-being requires not only resources (i.e. nature by our definition) to achieve basic human functioning (i.e. experiencing nature) but also capabilities (i.e. what someone is actually able to do or be; here, having access to nature). Thus, we emphasize the

importance of people having the *ability to derive benefits* from their experiences in nature. This is a key point that lies at the heart of creating access: The potential for positive nature experience may exist, but if certain people are not able to realize that potential, they do not have access. Planning a greenspace in a neighbourhood so that only the residents of that neighbourhood can use it, while excluding many other residents, does not generate equitable access. Establishing national parks within urban areas to preserve nature but charging high entrance fees does not increase equitable access.

Thirdly, our definition focuses on interactions with nature that are *ultimately positive*. Many experiences with nature can be negative, from human–wildlife conflict with species (i.e. snakes, spiders) to situations (i.e. storms, dark forests) that can evoke evolutionarily hardwired emotions of fear (Dickman, 2010; Kellert, 2012; Nagy & Johnson, 2013; Soulsbury & White, 2015). We acknowledge the truth of these experiences and do not wish to craft a framework that promotes them, per se. However, Clayton et al. (2017) also argue that negative experiences, depending on the context that they are embedded in, can lead to ultimately positive outcomes—they can give people an opportunity to test themselves and grow by helping people develop a sense of self as part of the natural world.

The fourth tenet is that access to nature *goes beyond coming into physical contact* with nature. Here, we build on Kellert (2002), who theorized that human interactions with nature take three forms: direct contact, indirect contact and vicarious experience (Table 1). People who cannot physically go to the outdoors, such as incarcerated people, sick people, elderly people and people with mobility or disability issues might access nature vicariously with the help of technologies and art, like virtual reality, games or movies (Browning et al., 2020). This has proven effective in increasing health benefits to incarcerated peoples, homeless shelters and psychiatric hospitals (Nadkarni, Hasbach, et al., 2017), and indicates that we can increase access to nature by increasing all forms of contact with nature, including vicarious experience.

The fifth and final tenet is that our definition of access to nature includes access to *any element of the biophysical system*. Traditionally, research on access to nature and interventions to improve access to nature in cities have focused on whether people are able to come into contact with greenspace or urban tree cover (i.e. Astell-Burt et al., 2014; Boone et al., 2009; Dai, 2011; Dallimer et al., 2014; Kardan et al., 2015; Locke et al., 2021). Our definition expands the concept of nature to include flora, fauna, geological landforms, waterbodies, among others. Increasing access to green–blue infrastructure alone may not be enough, and our holistic conceptualization of nature captures the distinct benefits that people gain from encountering other components of nature. For example, people value neighbourhood birds (Belaire et al., 2015; Clucas et al., 2015; Cox & Gaston, 2016), and encountering birds can provide people with increased mental well-being (Hammoud et al., 2022).

3 | DISRUPTING ACCESS TO NATURE IN URBAN AREAS: SOCIAL (IN)JUSTICE AND EXTINCTION OF EXPERIENCE

If nature is indeed a pre-condition to human rights (Boyd, 2012; Boyle, 2012; Nussbaum, 2003), then disrupting access to nature is an unjust act. In urban areas in particular, it is thought that people are prone to the 'extinction of experience': as people turn to more urban lifestyles, they participate in fewer outdoor activities and visit natural areas less frequently than previous generations (Pyle, 1993; Soga & Gaston, 2016). Although a recent global meta-analysis has shown that empirical studies that address changes in nature experience over time are rare, biased towards particular geographical regions, and overall trends are inconclusive, global indicators of opportunities to experience nature suggest that nature experience is declining globally (Cazalis et al., 2023). Louv (2008) expanded on this phenomenon in his popular book, *Last Child in the Woods*, and theorized that the lack of nature interactions in childhood can lead to diminished use of the senses, attention difficulties and higher rates of physical and emotional illnesses in adulthood. Diminishing experiences of nature over a lifetime also significantly jeopardizes physical and mental health (Gaston & Soga, 2020; Roslund et al., 2020). Hence, an intentional integration of justice principles is necessary to prevent the cascading negative impacts of reduced nature experiences.

Here, we use the term 'justice' to represent a set of conditions primarily concerned with the distribution of natural resources, political processes and the recognition of different social actors (Fraser & Honneth, 2003; Langemeyer & Connolly, 2020). To implement justice principles into nature access, it is helpful to articulate three dimensions of justice: (i) 'Recognitional justice', (ii) 'Procedural justice' and (iii) 'Distributional justice' (Bennett et al., 2019, Langemeyer & Connolly, 2020; Tables 1 and 2). A just outcome for any decision is therefore understood as one that incorporates all three dimensions of justice, when the appropriate groups, resources and processes are all taken into consideration (Langemeyer & Connolly, 2020, IPBES, 2022; Table 2).

4 | CENTERING JUSTICE IN THE DESIGN OF URBAN INTERVENTIONS AIMED AT RESTORING ACCESS TO NATURE

Optimistic scenarios of increased access to nature in cities are possible thanks to good governance, participatory planning processes and financial investments that speed nature's recovery and its potential to provide benefits to city residents. However, the application of justice principles to urban nature programs is still under development.

Design thinking provides an adaptable and flexible framework where justice can be centred in the design of urban interventions that enable and improve nature access. In circular design thinking models, there is an initial phase where a problem is defined and

TABLE 2 Dimensions of justice and examples of their influence on access to nature.

Justice dimension	Definition	Factors that impact access to nature	Examples where access to urban nature has been disrupted	Examples where access to urban nature has been enabled or restored
Recognitional justice	The recognition of all groups, their values and their needs	Demographic characteristics, such as age, disability status, gender, etc. Each demographic group has different needs when it comes to accessing nature	• Children have fewer opportunities to engage with nature today than in the past (Louv, 2008; Soga & Gaston, 2016) • Seniors have particular needs in urban parks that are often not met (Loukaitou-Sideris et al., 2016) • People with mobility, visual or auditory impairments are excluded from many nature experiences (Zhang et al., 2017) • Women feel less safe in nature than men (Baran et al., 2018)	• The World Health Organization has established a global network of age-friendly cities, with a set of guidelines for cities to follow so that they can plan interventions for making their cities friendly to seniors. Ten cities in Silicon Valley have joined the network and have created opportunities for seniors to access outdoor activities, and improved trails inside and around parks to increase access (Santa Clara County, Age Friendly Santa Clara County, 2021)
Procedural justice	Inclusion of all parties who will be affected by a decision in the decision-making process	Power dynamics between stakeholders, rights-holders and governments can lead to injustices regarding on who gets to decide things, and who does not, when it comes to designing interventions that lead to access or inaccess to nature	• Creating an urban park in Los Angeles for racial minorities without consulting said groups, and creating English-only signage and hiring only white English-speaking staff (Bryne, 2012)	• Participatory planning in Kirke Park in Seattle, where three public consultation meetings were held to ask community members about their needs and refine the park's design to ensure the park met their needs (Hou & Grohmann, 2018)
Distributional justice	Fair allocation of natural resources and opportunities to experience nature across spatial or temporal scales	Historical legacies of imperialism, colonialism, slavery, white supremacy and discrimination can lead to injustices in who is benefiting from nature who is not	• Disrupting Indigenous Peoples' access to their traditional territories (Anderson, 2005) • Effects of redlining, where neighbourhoods with more African Americans have fewer green spaces (Grove et al., 2018; Locke et al., 2021; Schell et al., 2020) • Lower income neighbourhoods have fewer green spaces than higher income neighbourhoods (Astell-Burt et al., 2014)	• Urban Indigenous community gardens in Vancouver that allow Indigenous youth to plant traditional plants and learn aboriginal practices and uses of plants for food and medicine (Mundel & Chapman, 2010) • Queer Nature, a queer-run nature education and ancestral skills program serving the 2SLGBTQA+ community (Queer Nature, 2022) • Outdoor Afro, an outdoor education program enabling access to nature to Black people in 42 cities (Where Black People & Nature Meet, 2021)
		Intergenerational inequities. Present and past generations have often left fewer natural resources to future generations	• Altering ecosystems by changing climate and changing the future ability of people to interact with those ecosystems (Skillington, 2019) • Inadequate handling of waste management in cities compromises the health of future generations living nearby dumping sites (Giusti, 2009)	• Intergenerational environmental education programs connecting elementary school children and seniors in Taichung, Taiwan (Liu & Kaplan, 2016)

needs are identified, followed by an ideation phase where a prototype solution is created, a testing phase where this solution is tested, and finally an evaluation phase where the solution is assessed (Dolak et al., 2013; Efeoglu et al., 2013). This iterative cycle allows for refining solutions until adequate ones are created.

Using a cyclical design thinking framework with justice embedded in all phases can inform how to improve nature access (Figure 1). The first step is that of identifying all the stakeholders and rights-holders in the system and articulating their needs. To ensure the just participation of all people, participants from various demographic groups should be enlisted (e.g. youth, seniors, 2SLGBTQIA+ people, people with disabilities, people from low-income communities, immigrants, minorities etc.). The people in charge of the intervention design should convene an initial group of stakeholders and rights-holders. After an initial discussion, actors can refer others and add more groups until all have been identified. The step of naming and listing stakeholders and rights-holders is an act of *recognitional justice*, whereby the groups, their values and their needs are recognized.

The second step in the framework is that of all actors critically examining their positionality, or their identities and worldviews (see Positionality Statement). Whatever their roles (e.g. researchers, resource managers, local governments), everyone must be critical of their own positionalities, which shape the way interventions are designed (Chan et al., 2020). Without critically addressing positionalities, those in power are likely to uphold harmful patterns and practices leading to unjust outcomes for some groups over others (Haraway, 1988).

Multiple frameworks have been developed to improve access to nature; however, they often neglect local contexts, systems of power and knowledge structures (Gavrilidis et al., 2019; Lennon et al., 2017). Because each community is unique, the pathways to just interventions that help promote access to nature are highly contextual. Therefore, the third step in the framework entails conducting appropriate consultation with all stakeholders and rights-holders, which is an act of *procedural justice*. Depending on those involved in the decision-making process, appropriate consultation processes may be needed. For example, Free Prior and Informed Consent is necessary if decisions affect Indigenous Peoples and Local Communities (McGee, 2009; Table 1).

Once appropriate consultation occurs, the fourth step is deliberating, meaning facilitating a discussion that results in making decisions together. This deliberation can be done while ensuring that participants involved in the planning process understand how and why a decision is made. The fifth step in the framework is prototyping interventions through beta testing. This means testing a single iteration of an intervention or testing it at a smaller spatial scale. For example, if the intervention is designing new urban greenspaces, the prototyping phase could include developing greenspaces in two or three representative neighbourhoods across varying demographic and socioeconomic scales.

The sixth step is evaluating the *distributional justice* of the outcomes of the prototype. For example, one could evaluate if the name of a park is appropriate for the local contexts, if the park is accessible for different groups of people (e.g. people in wheelchairs, etc.), and who is visiting the park. This evaluation process could include focus groups or semi-structured interviews with different groups, which enable a deep understanding of the outcomes and the perceptions of the decision-making process (Bennett, 2016). It could also include quantitative data about visitation to a space, participation in an activity or usage of a resource. The appropriate type of evaluation will depend on the intervention itself and who is meant to benefit.

Finally, the seventh step is iterating and beta testing other interventions if the outcomes are not just, until interventions are deemed just by everyone identified in Step 1 (Figure 1). Throughout this process, it is key to reflect critically on questions of recognitional,

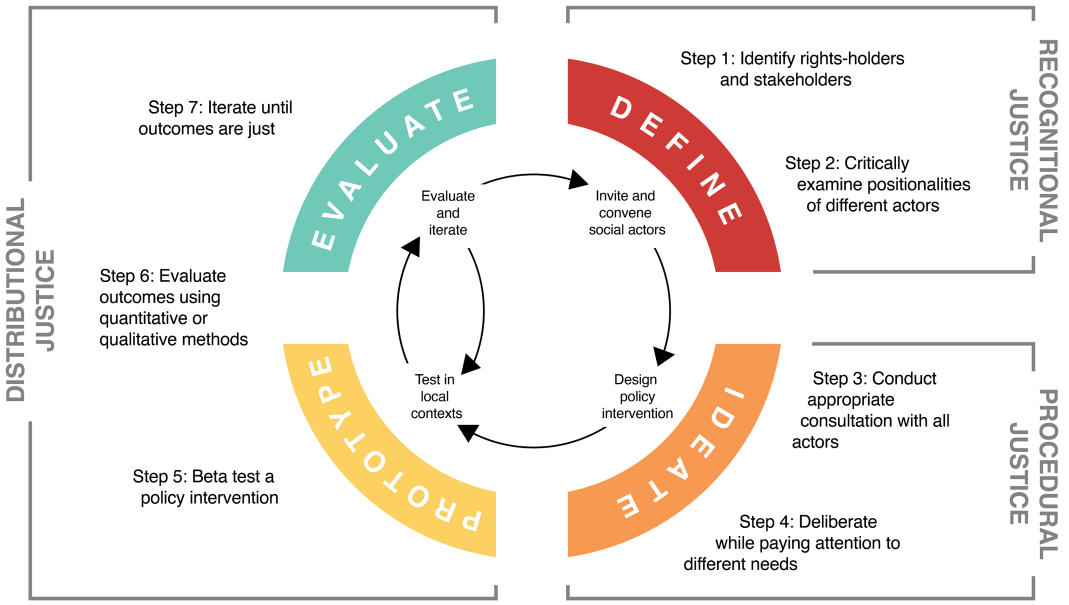

FIGURE 1 A design thinking framework for centring justice in designing policies to improve human access to nature.

FIGURE 2 Reflection questions for each step in the design-thinking process for self-assessment in achieving recognitional, distributional and procedural justice.

procedural and distributional justice to ensure that proposed policies are truly restoring access to nature in a just manner (Figure 2).

We recognize that this framework draws heavily upon processes that communities have been practicing for years. This proposed framework is intended to codify these processes in a manner that can be understood by academics and practitioners, in order to introduce them into new spheres. It also helps elucidate how justice can be centred in urban interventions and design. The next section will operationalize the framework with real-world examples.

5 | IMPLEMENTING THE PROPOSED DESIGN THINKING FRAMEWORK IN REAL-WORLD URBAN INTERVENTIONS

With three different case studies, we illustrate how justice can be centred in the design of urban interventions to increase access to nature for three marginalized communities in the United States who have been deprived of nature access to varying degrees: Latinx populations, Indigenous women and incarcerated people (Figure 3). While these communities have different struggles, these interventions share common goals of promoting human well-being, increasing access to nature and elevating environmental justice. These interventions are all actively being implemented, and we evaluate them through our framework (Figures 1 and 2) to illustrate its operationalization to design future interventions in urban contexts.

5.1 | Case study #1: Improving Latinx–nature relationships through nature excursions

Despite making up a large and growing proportion of the country's population (19% of the United States; 'QuickFacts: United States', U.S. Census Bureau, 2021), Latinx/Hispanics/Chicanx are underrepresented both in visitation to natural areas and in conservation leadership (Flores & Kuhn, 2018; 'About Us', Latino Outdoors, 2021a). This is partially caused by barriers to accessing nature, including lack of experience, transportation and equipment, as well as fear of discrimination and lack of belonging in what is perceived to be a white-dominated sphere (Bryne, 2012; Flores & Kuhn, 2018; Thomas et al., 2022).

Latinx people already interact with nature and have a long history of conservation stewardship and nature traditions both within and outside of the United States, many of which have been stripped

	Latino Outdoors	Sogorea Te' Land Trust	Nature Imagery in Prisons Project
Intervention name			
Goal	Connecting Latinx people to nature via excursions that emphasize storytelling and community	Rematriating land so that Indigenous people can practice ceremony, reclaim foodways, and enter into stewardship of their native lands	Bringing vicarious nature access to incarcerated people through nature videos
Main stakeholders & rights-holders	Latinx, Chicanx, and Hispanics in the United States	Chochenyo and Karkin Ohlone Nations, particularly women, in California, United States	Incarcerated people in the United States
Recognitional justice	Legitimize ways Latinx connect with nature	Recognize right to steward land in traditional ways	Recognize right of incarcerated to access nature
Procedural justice	Latinx leadership in the outdoors	Voice in land use decision-making	Incarcerated not represented
Distributional justice	Equal opportunity to connect with nature	Restribution of land to Indigenous people	Restore vicarious access to nature to deprived group

FIGURE 3 Case studies illustrating our framework for restoring urban access to nature in a way that centres justice. Latino Outdoors increase Latinx sense of belonging in nature through multigenerational *Vamos* excursions that emphasize storytelling, culture and family. Sogorea Te′ Land Trust rematriates land to be stewarded by urban Indigenous women in the San Francisco Bay Area. The Nature Imagery in Prisons Project gives incarcerated people in restrictive housing access to nature through vicarious experience by presenting nature videos.

away from them by supremacist laws and governance. Within the United States, Latinx communities are customarily prevented from activities that allow them to experience nature in culturally relevant ways and that bolster belonging in nature (Figure 2 Q1). All three dimensions of justice are interwoven in this issue (Figure 2 Q6). There is a lack of *recognitional justice*, as the ways that Latinx people interact with nature are not recognized, and nature experiences are designed without their preferences in mind (Cronan et al., 2008; Thomas et al., 2022). This has led to a lack of *distributional justice*, via fewer neighbourhood greenspaces, less use of public parks and less representation in leadership (Alvarez et al., 2022; Thomas et al., 2022); which has in turn led to a lack of *procedural justice*, as Latinx people therefore have less decision-making power over natural spaces.

The lack of recognition of Latinx experience in conservation settings inspired José González to found Latino Outdoors, a national volunteer-led organization that aims to lead excursions to increase access to nature (Figure 2 Q3; Flores & Kuhn, 2018). Their mission is to provide opportunities for Latinx people to interact with nature in culturally relevant ways ('About Us', Latino Outdoors, 2021a; Figure 2 Q4). The organization seeks to primarily benefit Hispanics, Chicanx and Latinx (Figure 1 Steps 1+2). Volunteers are central to the operation of the organization, ensuring that local community members' voices are heard through regular, transparent communication (Jorge Ramos pers. com. 2021; Figure 1 Step 4). Volunteer leaders incorporate local perspectives into decision-making and fit programming to local needs (Figure 1 Steps 3+4), serve on the advisory board and organize trips for their local communities ('About Us', Latino Outdoors, 2021a; 'Our People', Latino Outdoors, 2021c).

Through storytelling on blogs (called '*Yo Cuento*') and excursions (called '*Vamos*') that centre histories and cultures of Latinx people in nature, Latino Outdoors also aims to expand both participants' and outsiders' narratives of who belongs in nature (Flores & Kuhn, 2018). *Vamos* excursions are multigenerational, and they are designed to legitimize the types of interactions that Latinx people are already having with nature (Figure 1 Step 5; 'Vamos Outdoors Outings Program', Latino Outdoors, 2021d). They also provide gear, logistical support and community with peers to create inclusive opportunities for those new to nature. To increase a sense of belonging, *Vamos* excursions start with personal introductions and include opportunities for participants to learn from each other—for example, sharing plant names in different Spanish dialects (Jorge Ramos pers. com. 2021) or ethnobotanical uses of plants (Rodríguez et al., 2021). Ultimately, Latino Outdoors hopes that by increasing opportunities to access natural areas (distributional justice) in culturally relevant ways (recognitional justice), more Latinx people will become conservation leaders (procedural justice; 'Latino Outdoors Theory of Change', Latino Outdoors, 2021b).

It is clear how Latino Outdoors has fostered belonging in natural areas, and blogs shared by excursion leaders illustrate the program's impact (Figures 1 Step 6 and 2 Q18). One Latino Outdoors volunteer wrote about how important it was to her to create spaces for women and non-binary Latinx people to experience the backcountry for the first time:

> Barriers typically revolve around safety and an inequitable feeling of belonging, so I wanted to create a safe, supportive space where no one would feel embarrassed for not knowing something, or not having the "right gear", and everyone would feel safe in numbers … Access to gear, transportation, permitting systems, and the like, can be huge barriers for this type of recreation, and we were able to provide all of it. (Latino Outdoors, 2021d).

5.2 | Case study #2: Rematriating land to restore urban Indigenous cultural practices

Two urban Indigenous women, Corinna Gould and Johnella LaRose, started Sogorea Te′ Land Trust to reconnect urban Indigenous People to the land (Figure 2 Q3), specifically focusing on the *Chochenyo* and *Karkin Ohlone* on whose lands they are centred. For the Confederated Villages of Lisjan, an Ohlone tribe from *Huchuin*, otherwise known as the East Bay or Oakland, land dispossession took place in three waves. First, their ancestors were forced into enslavement in the Spanish mission system, then into ranchos by the Mexican government and finally into hiding and assimilation by genocidal campaigns when California was claimed by the United States ('Lisjan (Ohlone) history & territory', The Sogorea Te' Land Trust, 2021c).

Even today, as a non-federally recognized tribe, the Confederated Villages of Lisjan have no protected lands of their own where they can preserve their culture ('Lisjan (Ohlone) history & territory', The Sogorea Te' Land Trust, 2021c; Figure 2 Q1). The Sogorea Te′ Land Trust is an act of 'rematriation' (Table 1), which seeks to address *distributional justice* by giving land back to Indigenous People. It is also an act of *procedural justice* that involves them in decision-making around cultural sites, and *recognitional justice* of their rights to be able to live in harmony with their ancestral land (Figure 2 Q6). Sogorea Te′ centres the vision and needs of urban Ohlone women as they are the least empowered group in their community, whereas men led land management decisions for hundreds of years (Gould, 2020; Figure 2 Q7). For Sogorea Te′, access to nature does not just mean allowing physical access to land. As Corinna Gould says:

> There needed to be places for Indigenous People to reconnect. Not parks, but sovereign pieces of land where we could do our languages and our ceremonies, and we can grow food and medicine. A place where native people could just be native people. (Gould, 2020; Figure 2 Q4)

The work of the Land Trust ultimately helps everyone living in Lisjan Ohlone territory re-envision their relationship with the land (Gould, 2020; Figures 1 Step 1 and 2 Q2). However, recognizing the specific positionality they have as Indigenous Peoples dispossessed of their land, the Land Trust seeks to restore their own power through tribal land ownership and by establishing cultural easements to protect sacred places on public lands (Wires & LaRose, 2019; Figures 1 Step 2 and 2 Q2). It also enables partnerships with other groups working on Indigenous issues and farming justice ('Partnerships & alliances', The Sogorea Te' Land Trust, 2021d; Figure 1 Step 3 + 4).

Through their first rematriated site, *Lisjan*, Sogorea Te′ sought to provide a place for urban Indigenous People to practice ceremony, reclaim food ways and enter into stewardship of the land. *Lisjan* is a quarter-acre site gifted to Sogorea Te′ by their partner, Planting Justice, on San Leandro creek in the Sobrante Park neighbourhood of Oakland, the neighbourhood with the highest low-income non-White population in the city (Ramírez, 2020; Figure 1 Step 5). *Lisjan* houses an ceremonial space called an arbour, the first in their ancestral territory for 250 years; a garden space to cultivate traditional and medicinal plants and save seeds; and a *Himmetka* emergency response hub to prepare for human and climate emergencies ('Lisjan', The Sogorea Te' Land Trust, 2021b; Figure 2 Q11 + 12).

Sogorea Te′ has not formally evaluated the impacts of *Lisjan* (Figure 1 Step 6). However, it appears to have been a great success as Sogorea Te′ Land Trust continues to rematriate land to restore access to land and promote intergenerational justice (Figure 1 Step 7). The Land Trust has since begun to steward several other parcels of land, including *Rammay* and Gill Tract. They share stewardship of *Rammay* with the American Indian Child Resource Center, where they run youth planting programmes and community food distribution ('Rammay', The Sogorea Te' Land Trust, 2021f). At Gill tract, they collaborate with The University of California at Berkeley and the local community to work on food justice, urban farming and a cultural revitalization centre ('Gill Tract', The Sogorea Te' Land Trust, 2021a). Through these two sites along with the others, they have continued to build space to revive traditions and reconnect to land, as well as to connect all members of their local community to food.

5.3 | Case study #3: Bringing virtual nature to people in prisons

Incarcerated people are some of the most nature-deprived populations in the world (Nadkarni, Hasbach, et al., 2017). While prisons tend to be located in both urban and rural areas, most prisons resemble urban areas and living in cities because of their high population density and built infrastructure. At the Snake River Correctional Institute, people in restrictive housing cellblocks live in extreme isolation, confined to 9 × 12 foot cells for 23 h a day, without even access to natural light (Nadkarni, Hasbach, et al., 2017). Living in such conditions can lead to severely decreased mental health and increased violence (Nadkarni, Hasbach, et al., 2017, Nadkarni, Schnacker, et al., 2017; Figure 2 Q1), and this lack of access to nature is a justice concern (Figure 2 Q6).

In 2013, a research team started the Nature Imagery in Prisons Project to attempt to provide access to nature to incarcerated people through the vicarious experience (Table 1; Figure 2 Q3). The intervention sought to alleviate two specific injustices (Nadkarni, Schnacker, et al., 2017; Figure 2 Q6). First, they believed that access to nature and its benefits is a human right that incarcerated people were being unjustly denied (Nadkarni, Hasbach, et al., 2017) and framed their work as part of a larger movement towards prison reform (Nadkarni et al., 2021). Second, they emphasized in their work that incarcerated people are disproportionately Black and Latinx (Nadkarni & Morris, 2018), a finding that corroborates a deep literature documenting the insidious racial inequities that exist within the U.S. criminal justice system (Alexander, 2010). As bringing physical nature into prisons is difficult, the team decided to provide vicarious access to nature through videos (Nadkarni, 2021, Nadkarni, Hasbach, et al., 2017; Figure 2 Q4). The research team and correctional staff collaborated to define what access to nature meant in their intervention and select the nature media to be played (Nadkarni, Hasbach, et al., 2017).

Their intervention was conceptualized with benefits to both incarcerated people and prison staff in mind (Nadkarni, Schnacker, et al., 2017; Figure 1 Step 1), and they acknowledged uneven power dynamics among these key stakeholders. The research team also understood power dynamics between themselves and those two groups—both how their own presence could influence the behaviour of incarcerated people and staff, and the amount of control officers exerted over the lives of incarcerated people. These power dynamics were highlighted throughout the intervention; for example, officers surveilled interviews, designed the intervention for security and shepherded incarcerated people to the room where they could view videos (Nadkarni, Hasbach, et al., 2017; Figure 1 Step 2).

However, despite the research team's recognition of the importance of this intervention for incarcerated people and their relative lack of power within the prison system, incarcerated people themselves were not invited to take part in the decision-making process because of logistical constraints, as this project experienced extreme difficulty in gaining access to incarcerated people because of the protections of the Institutional Review Board and security concerns (Nadkarni et al., 2021). These logistical constraints meant that procedural justice was not fully achieved. Only upper level prison administrators, prison officers and captains and mental health professionals were invited to the 'Forward-Thinking Committee' at the Snake River Correctional Institute that worked to design the intervention with the research team (Nadkarni, 2021; Figure 1 Step 3). Instead of explicitly considering the values of the most marginalized stakeholders, the decision-making process appears to have been a balance of what researchers wanted to implement based on previous studies on vicarious nature experience and the security needs and logistical constraints of prison staff (Figures 1 Step 4 and 2 Q5 + 7).

Through this intervention, the rights of incarcerated people to access nature and the outside world were recognized, *recognitional justice*, and the ability to interact with nature was improved for a deprived population within the confines of an unjust prison system, *distributional justice*, although incarcerated people were only indirectly involved in guiding the intervention, showing there is still room to increase *procedural justice*.

The prototype intervention gave incarcerated people in a single cellblock access to nature videos in their interior exercise room, the 'Blue Room', for 45 min a day five times a week. Incarcerated people could select one of 38 nature videos to play on a projector while they exercised, or they could choose not to participate (Figure 1 Step 5). A thorough evaluation after 1 year (Figure 1 Step 6) found that the intervention was successful in reducing violence and improving people's mental health (Figure 2 Q11 + 12).

Researchers also surveyed and interviewed 27 incarcerated people and 6 staff members about their experience both before and after the programme (Figure 2 Q18). Incarcerated people felt that they benefitted from access to nature videos, with many reporting feeling calmer after watching the videos, and some even reporting physiological changes and health benefits (Nadkarni, Hasbach, et al., 2017). Incarcerated people felt that the nature videos had a positive impact on themselves, other incarcerated people and their families, and 80% of those surveyed said the nature videos made their time in restrictive housing easier (Nadkarni, Hasbach, et al., 2017). Staff members also reported that nature videos made incarcerated people calmer, made their work easier and improved relationships between them and incarcerated people. In fact, staff began using access to the room where videos were displayed as a tool to de-escalate situations.

The research team continues to use results of this evaluation to design improved iterations of the Nature Imagery in Prisons interventions (Figure 1 Step 7), and they are working to expand this project to other prisons and nature-deprived populations. In 2020, they performed a follow-up study at the Salt Lake City County Jail that focused on the physiological effects of nature imagery, as well as preferences for content and mode of delivery based on prior participants' preferences (Nadkarni et al., 2021; Figure 2 Q20). In addition, the research team shared a vision on how they hoped their work could push towards justice, despite inherent injustices in the system of mass incarceration:

> We recognize that simply providing digitally delivered nature video and sounds to the incarcerated will not solve the deep historical and long-lived injustices of our system of mass incarceration … . However, this study provides a small and implementable practice that may help fulfill the short-term goals of correctional administrators and those directly concerned with the mental and physical health of this sizeable population with little to no access to the blue and green parts of the world and their inherent health benefits. (Nadkarni et al., 2021, p. 81)

The Nature Imagery in Prisons Project illustrated that access to nature can be promoted through the vicarious experience. This project centred the most nature-deprived people in the world, incarcerated

people and improved mental health and reduced violent behaviours of participants. Vicarious nature experiences can be powerful ways of restoring access to nature when people are not able to physically reach those sites under current conditions (e.g. ableism, incarceration, illness).

6 | CONCLUSIONS

Centring justice in restoring human–nature relationships in urban areas will require deeper engagement with local communities, and expanding on the work done in both academic and applied spheres. Through this paper, we provide a theoretical contribution to this effort, where we conceptualize access to nature, along with how different dimensions of justice can disrupt or improve access. We also advance practical work by presenting a design thinking framework that can be applied to centre justice in urban interventions, which we illustrate with three case studies.

Fulfilling human–nature relationships lie at the core of humanness and the positive human experience in nature. These relationships can be multifaceted and range from those where humans have close contact with nature to our vicarious experiences with nature. We recognize the breadth and value of positive relationships that humans can have with nature and argue that promoting them can increase human quality of life in urban areas. We contend that human–nature relationships are key for promoting a conservation ethic that is essential for ensuring that existing natural resources are sustained in urban areas and beyond. More broadly, although we argue for making justice a key component of access to nature in urban areas, our framework can also be used in rural contexts where many of these issues of access disruption and environmental injustices prevail. To create a truly sustainable world with healthy humans and ecosystems, we must centre justice in our efforts to conserve, protect and restore nature.

AUTHOR CONTRIBUTIONS

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ACKNOWLEDGEMENTS

We acknowledge that many of us work at Stanford University, which sits on the ancestral and unceded land of the Muwekma Ohlone people, and we thank them for their continued stewardship of that land. We thank Dr. Jorge Ramos for sharing his experience as an advisory board member of Latino Outdoors, as well as for reviewing the case study we wrote on Latino Outdoors. We thank the Sogorea Te′ Land Trust team and Gavin Raders of Planting Justice in Oakland for sharing resources about their individual work and collaborative partnership. We thank Sogorea Te′ Land Trust for granting us permission to write about their work. We thank Prof. Nalini Nadkarni for sharing resources about the Nature Imagery in Prisons Project with us. We thank Profs. Susan Clayton and Christopher Schell for their constructive reviews.

FUNDING INFORMATION

This research was supported by the Gordon and Betty Moore Foundation. Kelley E. Langhans was supported by the National Science Foundation Graduate Research Fellowship and the Ward Wilson Woods, Jr. Fellowship in Environmental Studies.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to report.

DATA AVAILABILITY STATEMENT

This manuscript has no data associated with it.

POSITIONALITY STATEMENT

We are 15 scholars in the ecosystem services academic field who draw on anthropocentric conceptions of human–nature relationships to write this paper. We recognize that anthropocentric worldviews, in which 'people' and 'nature' can be differentiated, differ from kincentric and biocentric worldviews, in which they cannot. We recognize the long history of kincentric worldviews in Indigenous Peoples and Local Communities. We have chosen to write this piece from an anthropocentric viewpoint based on our own prevailing worldviews and the worldview of our scholarship, but recognize that the framework that we present may not be applicable to kincentric and biocentric worldviews. Our team includes female, male and non-binary coauthors from a range of ages (>25). We were born in the United States, Colombia, Germany, Netherlands, Singapore and China, but some of our families have immigrated from many places around the world. Some of us are colonial-settler descendants. None of us self-identify as Indigenous or Black, but some of us identify as people of colour. We all studied or worked in the United States at some point in our lives. We all have postgraduate academic education (Masters or PhDs underway) or are scholars holding doctoral degrees in various fields (including anthropology, hydrology, biology, climate science, geography). We write this piece from our position of privilege when it comes to our educational backgrounds.

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How to cite this article: Langhans, K. E., Echeverri, A., Daws, S. C., Moss, S. N., Anderson, C. B., Chaplin-Kramer, R., Hendershot, J. N., Liu, L., Mandle, L., Nguyen, O., Ou, S. X., Remme, R. P., Schmitt, R. J. P., Vogl, A., & Daily, G. C. (2023). Centring justice in conceptualizing and improving access to urban nature. *People and Nature*, *5*, 897–910. https://doi.org/10.1002/pan3.10470