Routledge
Taylor & Francis Group

Journal of Environmental Planning and Management

ISSN: 0964-0568 (Print) 1360-0559 (Online) Journal homepage: www.tandfonline.com/journals/cjep20

Contested representations of benefits of urban nature in a densifying marginalised neighbourhood

Sanna Stålhammar & Christopher M. Raymond

To cite this article: Sanna Stålhammar & Christopher M. Raymond (2025) Contested representations of benefits of urban nature in a densifying marginalised neighbourhood, Journal of Environmental Planning and Management, 68:9, 2217-2241, DOI: 10.1080/09640568.2024.2311822

To link to this article: https://doi.org/10.1080/09640568.2024.2311822

Published online: 16 Feb 2024.

Journal of Environmental Planning and Management, 2024
Vol. 68, No. 9, 2217–2241, https://doi.org/10.1080/09640568.2024.2311822

Contested representations of benefits of urban nature in a densifying marginalised neighbourhood

Sanna Stålhammar[a]* and Christopher M. Raymond[b,c,d]

[a]*Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences, Alnarp, Sweden;* [b]*Helsinki Institute of Sutsainability Science, University of Helsinki, Helsinki, Finland;* [c]*Ecosystems and Environment Research Program, Faculty of Biological and Environmental Sciences, University of Helsinki, Helsinki, Finland;* [d]*Department of Economics and Management, Faculty of Agriculture and Forestry, University of Helsinki, Helsinki, Finland*

(*Received 2 February 2023; final version received 25 January 2024*)

The aim of this study is to uncover contested representations of benefits of urban nature, and how these are formally considered and operationalised in planning in the context of densification in a contested space. Such examination is necessary to understand to what extent the implementation of various representations allows for diverse framings of plural values of nature in governance, especially in vulnerable areas and contested spaces, and to consider the implications of these different knowledge holders. Through a case study of an ongoing densification process in Bellevuegården and Lorensborg in Malmö, this study explores how benefits of urban nature are (i) represented in planning and policy, and expressed by (ii) opposing residents within the planning process. The study draws on interviews and document analysis and contributes to an in-depth and localised understanding of the construction of benefits of urban nature in planning, including confrontations between planning, developers, residents, and urban nature. We uncover how multiple representations exist simultaneously at different levels of planning, policy and in the lived experiences of residents. The lack of formal guidelines for how to represent these benefits in planning and decision-making, in terms of concepts, tools and assessment approaches, creates an interpretive flexibility that is not systematically inclusive of a spectrum of diverse social and ecological representations and their underlying values. Rather, this flexibility allowed for representations aligned with the city's strategic goals for densification to be privileged, which in this case resulted in the decision to remove green space.

Keywords: green infrastructure; urban nature; urban ecosystem services; urban trees; densification; diverse values; marginalised neighbourhood; epistemic justice

1. Introduction

Urban nature is known to provide vital well-being benefits for citizens (IPBES 2019), and offer substantial promise in supporting rapid and radical transformations towards sustainability (McPhearson *et al*. 2021). Sweden has been a world-leader in

*Corresponding author. Email: sanna.stalhammar@slu.se

establishing an ecosystem services approach to monitoring and promoting urban nature in spatial planning (Khoshkar *et al*. 2020). Multiple municipalities across the country have undertaken detailed mapping of the ecosystem services provided by urban green areas (Schubert *et al*. 2017), and diverse actions have been implemented for advancing ecosystem service assessments in planning and practice, including capacity building, participatory processes and development of thematic plans and operational documents (Khoshkar *et al*. 2020). While substantial research has been devoted to the opportunities and challenges of scaling urban green (Anderson *et al*. 2023; Mumaw and Raymond 2021), little research has explored whether, and how, the ways of representing the benefits of nature in urban planning and policy affect outcomes for preserving or scaling urban green in specific cases, and whose and what knowledge are included in those representations.

Governance of urban nature relies on particular representations of nature in planning and policy, which can leverage power and set directions for decision-making. A range of conceptual framings are being used to represent benefits of urban nature in order to counteract exploitation or to recreate green areas in urban environments. These include planning approaches and concepts such as green infrastructure (GI), nature-based solutions (NBS), ecosystem services (ES), and multifunctionality (Potschin *et al*. 2016). These relatively new planning approaches and concepts draw attention to the importance of urban nature to yield sustainable outcomes in planning and policy (McPhearson *et al*. 2021). However, multiple framings of urban green benefits are often applied simultaneously in European cities, which can prevent effective implementation and be a source of confusion (Hansen *et al*. 2021; Leone *et al*. 2023). GI and ES are prioritized approaches in Swedish spatial planning, but strategies are lacking to move from vision to action, and the format for operationalization and terminology varies (Nordh and Stahl Olafsson 2021).

Sustainable and inclusive planning of urban nature relies not only on effectively mainstreaming approaches such as GI, but also on accounting for citizens' diversity of values and ways of knowing nature (Anguelovski *et al*. 2020; Fors *et al*. 2021; Zuniga-Teran *et al*. 2021). This requires making explicit how GI, NBS and other framings are underpinned by specific conceptualisations of human-nature relations and values of nature (Randrup *et al*. 2020; Tozer *et al*. 2022). Moreover, contemporary representations of benefits of urban nature such as GI risks being mainstreamed as an approach that does not question the status quo, with a heavy reliance on rational planning and prioritisation of instrumental values of urban nature (Randrup *et al*. 2020). ES has, on the one hand, been advocated as a concept that could transform natural resource management and planning towards sustainability (MEA 2005), but its implementation in planning does not necessarily refer to transformative processes, and instead modifies procedures within the existing planning frameworks (Beery *et al*. 2016; Hansen *et al*. 2021). The discursive and conceptual construction of ES in terms of utilitarian benefits in planning has also been documented to mask social, political and justice issues (Ernstson and Sörlin 2013). Furthermore, NBS has been shown to be discursively mobilised to privilege neoliberal values within urban nature's governance, with a focus on e.g. quantifiable benefits, profit, quick economic returns and growth (Kotsila *et al*. 2021).

Uncovering how benefits of urban nature are represented and operationalised in planning in relation to loss of green is critical to support pluralism of urban nature and nature's values (Pascual *et al*. 2023). Such pluralism includes the goal of improving

the lives of especially vulnerable groups of citizens, and to contribute to a more nuanced insight on the development of urban green planning in Scandinavian cities. An examination of the representations of benefits of urban nature in the Swedish context is thus necessary to understand to what extent the implementation of various framings in governance allow for diverse plural values of nature (Pascual *et al*. 2023), especially in vulnerable areas and contested spaces, and to consider the implications of this for epistemic justice for different knowledge holders. How representations of nature inform the contestations between green space and densification in planning, and how the removal of urban green is justified in specific cases in planning in a Swedish context are largely unexplored (cf. Zalar and Pries 2022). In Sweden, densification is increasingly targeted at marginalised neighbourhoods, especially the public housing "Million Program" areas, which were part of a housing reform where one million new dwellings were built between 1965 and 1974 (Hall and Vidén 2005). These are typically large residential estates with an abundance of green space, located on peripheral municipally owned land, that struggle with stigmatisation and segregation (Grundström and Molina 2016).

The aim of this study is to uncover contested representations of benefits of urban nature, and how these are formally considered and operationalised in planning in the context of densification in a contested space. Through a case study of an ongoing densification process in Bellevuegården and Lorensborg in Malmö, this study explores how benefits of urban nature are i) represented in planning and policy, and ii) expressed by the opposing residents. The study draws on interviews, document analysis and participant observation to provide an in-depth and localized understanding of the construction of urban nature in planning, including confrontations between planning, developers, residents, and urban nature. It contributes to the growing scholarship on the relevance of epistemic representations of nature to urban nature governance (Randrup *et al*. 2020; Woroniecki *et al*. 2020; Hansen *et al*. 2021; Leone *et al*. 2023) and uncovers how representations can mobilise interests in contested spaces, who this affects, and for whom the city is planned (Anguelovski *et al*. 2020; Tozer *et al*. 2022; Zalar and Pries 2022).

2. Densification and loss of urban green

Cities often seek to be green, resilient and smart at the same time as they are situated within growth imperatives. In Sweden, on average, 37% of green spaces in urban areas are private residential gardens, while 40% is publicly accessible (SCB 2019). While 94% of the urban population has access to at least one green area within 200 metres of their home, the size of available greenspace is considerably smaller for the largest settlements (SCB 2019). While Sweden is a forerunner with considerable progress on urban sustainability and nature planning (Khoshkar *et al*. 2020), discourses of urban sustainability often do not question the necessity of densification (Isenhour *et al*. 2015; Lisberg Jensen, Alkan Olsson, and Malmqvist 2023). Densification is part of the foundation of the "compact city" approach, which is emerging as a central paradigm in sustainable urbanism and urban planning in the Global North (Bibri, Krogstie, and Kärrholm 2020). Densification is used to counteract sprawl, and is equated with various social, economic, and environmental benefits, including reduced greenhouse gas emissions (Bueno-Suárez and Coq-Huelva 2020). Although densification is referred to as a strategy for sustainability in Swedish comprehensive plans, which is supposed to

solve multiple spatial problems at once (Lisberg Jensen, Alkan Olsson, and Malmqvist 2023), it has also been identified as a particular challenge in contemporary Nordic urban planning amongst management officials (Randrup *et al*. 2021). The decline of urban green is often a result of incremental changes from a number of planning and development decisions, likened by Colding, Gren, and Barthel (2020) to a tyranny of small decisions (Kahn 1966), which are individually justified based on socio-economic reasons, but that taken together can result in an undesirable outcome. Small scale "green fixes" also conceal factors of scale and create short-sightedness in city planning (Holgersen and Malm 2015). Densification approaches and policies often lack specific strategies for how to secure urban green space given that short- and long-term planning can imply goal conflicts, and the provision of green in a compact city approach is, thus, a major challenge (Haaland and van den Bosch 2015). According to Sweden's Environmental Objectives, there should be green areas near residential buildings with good quality and accessibility, although these are not quantitatively specified (SEO 2023). Moreover, according to the national board of housing, ecosystem services should be assessed and integrated into planning, construction, and governance of the built environment by 2025 (Boverket 2016). Lisberg Jensen, Alkan Olsson, and Malmqvist (2023) show that comprehensive plans in the city of Malmö in Sweden frame densification as the nearest-at-hand solution to long-term sustainability in urban planning, discarding inherent goal-conflicts in terms of preserving and restoring ecosystem services. In the broader Nordic context, Hautamäki (2019) reveal that green structure is conceptualised and modified to fit in with the compact city policies and to fulfil the priority of densification, with resulting priorities of development over the preservation of green in Helsinki.

Densification is also known to negatively affect the most vulnerable groups in cities, through displacement and eviction due to increases in rent. In Sweden, displacement is resulting in new social organisation and mobilisation for housing justice (Listerborn *et al*. 2020). How densification and removal of green space affects vulnerable groups and is justified in specific cases in planning is still underexplored (cf. Zalar and Pries 2022).

3. Representations of benefits of urban nature

This paper draws on scholarship in Sustainability Science, Human Geography, and Science and Technology Studies that focuses on the representations of nature in governance, and how these representations can mobilise or silence different knowledges (Star and Griesemer 1989; Fricker 2007; Ernstson and Sörlin 2013; Woroniecki *et al*. 2020; Stålhammar and Brink 2021; Tozer *et al*. 2022). We analyse epistemic dimensions in terms of representations of benefits of urban nature articulated in planning, and as expressed by residents. This approach includes analysing the role of representations and framings, understood as linguistic expressions of written and spoken language that individuals use to create meaning and that structures experience and action in social life (Jørgensen and Phillips 2002).

Given that multiple and sometimes misaligned concepts are used in Swedish green planning to refer to nature's benefits, we start from the broad idea of benefits of urban nature as an analytical concept in order to cast a wide net over the various representations that may exist in our case. Benefits of urban nature (here used interchangeably with green areas) are often framed in terms of concepts and tools such as GI, NBS, and ES (Hansen *et al*. 2021; Matsler *et al*. 2021; Leone *et al*. 2023). These concepts have important merits and provide

green planners with a more comprehensive and integrated planning regime, often based on networks or multifunctionality of green and biodiversity and include multiple definitions and operationalisations. While these concepts are used for different purposes, they broadly share the theoretical backbone of representing human-nature relations in anthropocentric terms; and pose ecological networks and functions in relation to human benefit (Potschin-Young *et al*. 2017; Randrup *et al*. 2020). The interpretation and implementation GI-planning and related concepts of benefits of urban nature varies widely within the European context (Leone *et al*. 2023). The common anthropocentric and instrumental foundations of these approaches have been criticised for creating a planning regime that excludes diverse values, such as relational and intrinsic values of nature (Randrup *et al*. 2020). In order to create sustainable urban governance, urban green planning approaches require consideration of a pluralism of values (Pascual *et al*. 2023; Tozer *et al*. 2022). The way that diverse values of nature become represented in planning is particularly important in contested urban spaces, where marginalised groups often struggle to be heard (Fors *et al*. 2021).

Representations of nature's benefits are, in this study, understood as having the potential to act as performative technologies, which can be understood to set boundaries for attention and action, and which can open up new arenas of power (Latour 1987; Robertson 2006). Representations allow for particular knowledge and resources in planning to be mobilised, rationalised, and justified in particular ways, while others can become silenced (Ernstson and Sörlin 2013; Tozer *et al*. 2022). Moreover, we here take the representation of urban nature's benefits, and emerging concepts such as ES, GI and NBS, to be understood as boundary objects (Star and Griesemer 1989; Abson *et al*. 2014), or "fuzzy" boundary concepts (Hansen *et al*. 2021). These ideas, concepts or tools should be able to maintain a common identity across disciplinary boundaries, but be adaptable and flexible, which in general can be useful for transdisciplinary collaboration in order to adapt application to local contexts, and allows discourses to evolve (Star and Griesemer 1989). However, flexibility can also create ambiguity in terms of power aspects. These concepts and constructions of nature can be mobilised by actors in planning to justify various goals, and while they are often portrayed as neutral assessment tools, they have a way of rendering critical social and political questions as merely "technical" questions (Ernstson and Sörlin 2013).

The perceived neutrality of dominant administrative rationalism (Dryzek 2013) and rational planning often does not question the value system of government or public agencies, or the status quo; moreover, it does not take into account pluralism in understanding nature's values (Pacchi 2018; Pascual *et al*. 2023). This study starts from a pluralist perspective, implying that there are diverse and legitimate place-based ways of knowing urban nature beyond expert or scientific knowledge and concepts, of which planning and governance for sustainability should ultimately strive to be inclusive. In following Anguelovski *et al*. (2020), we draw on the theory of epistemic injustice (Fricker 2007), i.e. when someone is wronged in their capacity as a knower, to shed light on the often invisible lived experiences of urban nature, and the gaps in interpretive resources between these and representations in formal planning.

4. Methods and materials

This is an in-depth exploration of a contested case of densification in a marginalised neighbourhood, which combines qualitative methods of interviews, document analysis, and participant observation.

4.1. The case of densification in Bellevuegården and Lorensborg, Malmö

The neighbourhoods of Bellevuegården and Lorensborg in the city of Malmö were purposefully selected as critical cases (Flyvbjerg 2011) to represent a typical marginalised Million Program Area in Sweden, a former public housing program meant for low-income groups (Hall and Vidén 2005), which is undergoing a densification process with resulting removal of green space.

Malmö is the fastest growing city in Sweden, expected to have 500,000 residents by 2031, and with political goals to build 26,750 new apartments by 2035. In the city, the demands and political goals for housing, sustainable mobility and reduced sprawl, along with goals to preserve the surrounding fertile agricultural lands, has resulted in the development of a strategic planning policy for inward expansion only. The city has historically been referred to as the "the city of parks," but has among the least area of green spaces in all of Swedish urban areas (Barboza *et al*. 2021). According to the World Health Organisation and the Swedish National Board of Housing, Building and Planning, all citizens should have access to a green area (at least 0.5 hectares) within 300 meters. Today 74% of the population in Malmö live in areas that do not meet this requirement (Barboza *et al*. 2021). The city has a number of innovative sustainability flagship residential projects and interventions, but these are not typical of current and planned housing.

The ongoing densification in the Million Program Area of Bellevuegården and Lorensborg will partly remove green areas and trees from courtyards, alleys, and streets (Malmö stad 2021b). The new plans will result in about 650 additional residents that will share the remaining green spaces, which also means additional pressures on adjacent green areas. There has been a large resistance to the densification amongst the residents. In 2020, residents organised protest lists with 700 initial signatories, and in 2021 they appealed the detailed plan in Bellevuegården to the Supreme Land and Environmental Court with 121 signatories from the area. The appeal was mainly directed at how the public consultation of the plan had been prevented by the pandemic, and that communication and information around this had not been sufficient. Besides these procedural issues, the residents were, in general, attempting to appeal the contents of the plan, which included the removal of open green spaces in courtyards, the removal of 269 trees, and removal of parking lots. The appeal was declined in November 2021; and this study includes data collected both before and after the decision (Figure 1).

Lorensborg and Bellevuegården are neighbouring districts located in the western part of Malmö, Sweden's third largest city. Lorensborg was built at the end of the 1950s and Bellevuegården in the 1970s. Today, there are about 9,500 residents in the area, which is dominated by rental apartments, with up to 16 floors. Green courtyards form a large part of the green structure of the area, and there are several parks nearby. Employment rates in Lorensborg and Bellevuegården are 20% below the average in Sweden (Malmö stad 2021a). There are major issues regarding safety, and Bellevuegården is classified as a "risk area" because of high crime rates and social exclusion. Densification here forms part of political arguments to increase safety and to solve segregation issues, by e.g. building to increase surveillance with entrances facing both sides of the buildings (Malmö Stad 2021d). The new plans include a mix of housing such as townhouses and multi-storey, and rental and ownership housing, which seeks to attract diverse socio-economic segments of residents (Malmö Stad 2022a). The idea of using densification to solve crime is part of a long-standing

Figure 1. Bellevuegården (foreground) and parts of Lorensborg (upper left) (Photo: Anders Paulsson).

discourse of how planning can solve social issues, for which there is little and conflicting evidence in the Scandinavian context (Ceccato 2020).

Million program areas are common in and outside large Swedish cities and were built as part of a housing reform by the Swedish Social Democratic Party between 1965 and 1974 to ensure affordable, high-quality housing for all (Hall and Vidén 2005). These neighbourhoods struggle with stigmatisation, segregation, and crime, and are perceived as socially problematic areas (Grundström and Molina 2016). As part of the political planning ideal of "Folkhemmet," of providing citizens with a high quality of life, these neighbourhoods have abundant green spaces (Grundström and Molina 2016). However, these are today typically not well managed, and are increasingly seen as peripheral target areas for densification (Zalar and Pries 2022). We here draw on a previous study using public participation GIS in Bellevuegården and Lorensborg (Raymond *et al*. 2021) which shows residents' ($n = 80$) preferences and appreciation for surrounding green areas spatially (see Figure 2). The GIS data provides a starting point for this present study, and indicates that the planned densification will affect many places that are important for the residents in their daily lives.

4.2. Data construction and analysis

The material was designed to capture and provide detailed descriptions of how the benefits of nature are represented through the social (interviews) and material (planning and policy documents) realms in this case, and how this is considered in practice,

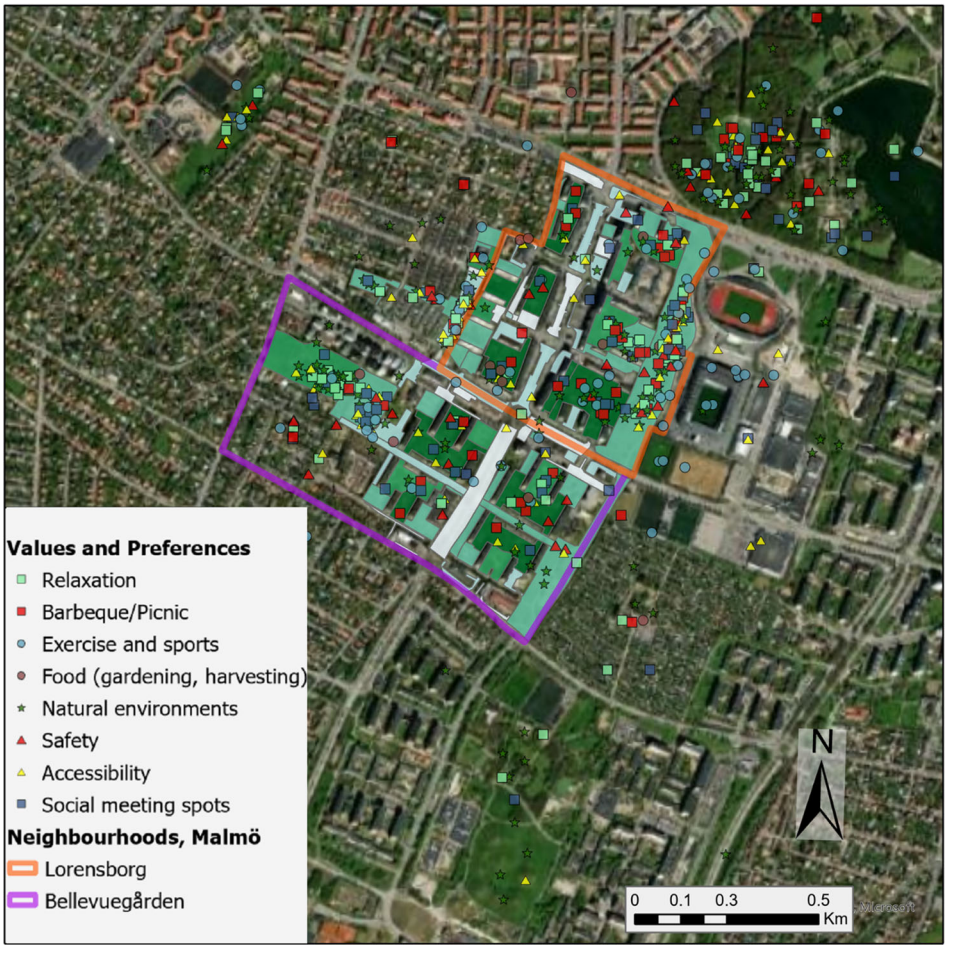

Figure 2. Results of PPGIS survey showing values and preferences of locations that are appreciated by residents ($n = 80$) in Lorensborg and Bellevuegården for different reasons such as relaxation, barbeque, nature appreciation, and gardening. Many of these are located within the courtyards and will disappear due to densification with the new planning program.

as expressed in official documents, by practitioners, as well as by residents. The informants and material from the two groups, i.e. (1) policy and planning and (2) residents, were purposefully chosen to uncover contestations of representations of benefits of urban nature between the formal and informal realms of knowledge. The multi-method approach comprised of: (a) in-depth semi-structured interviews, (b) participant observation, (c) content analysis of official planning documents, and (d) summary of outcomes of legal cases concerning green space development (Table 1).

In-depth semi-structured interviews were applied in order to uncover rich descriptions and to search for meanings, main points, contrasts in transcripts and texts, which were organized in key themes. Informants were selected based on the criteria of being able to provide in-depth and diverse insight into the case, with a focus on the urban green spaces. It includes representatives from planning within the city government, residents involved in the appeal and resistance movement, housing companies, and civil society organisations. The analytical approach included both a priori and inductive

Table 1. Overview of data collection.

Data collection	
In-depth interviews	*Informants (position/sector)*
2	City planning office, City of Malmö
1	Environmental department, City of Malmö
1	Development engineer, City of Malmö
1	Housing company project developer
2	Residents Bellevugården (main appellant and main petitioner)
2	Civil society organisation
Participant observation	
2 Public consultation meetings for the planning program (online and in person) in 2021	
1 Stakeholder consultation workshop for the planning program in 2021	
Content analysis of official planning documents	
Comprehensive Plan (Malmö Stad 2018)	
Planning program 6050 (Malmö Stad 2022a)	
Consultation report for planning program 6050 (Malmö Stad 2022b)	
Detailed plan 5513 (Malmö Stad 2020b)	
Consultation report for detail plan 5513. (Malmö Stad 2020a)	
PM Public Environment: Annex to Pp6050 (Malmö Stad 2021c)	
PM Investigation of environmental impact: Appendix to Pp 6050 (Malmö Stad 2021d)	
Environmental Program for the City of Malmö 2021-2030 (Malmö Stad 2021e)	
Summary of outcomes from legal cases concerning green space development	
Appeal, Växjö district court P1127-21 Aktbil 1 (2021)	
Appeal, Svea land and environment court of appeal P5906 21 Aktbil 3 Överklagan Dp 5513. (2021)	
Protocol for decision. Svea land and environment court of appeal. 2022. Aktbilaga 35 Mål nr P5906-21 (2021)	

coding (Bryman 2016), allowing for themes to emerge that uncover the representations of benefits of urban green, including how these benefits have been taken into account in the planning practices, and decisions around densification. In this study, nine interviews with informants were conducted between 2021 and 2022 (Table 1). The qualitative and in-depth interview method enabled deep exploration of participants' views, and allowed them to describe processes and procedures freely and in their own terms. The approach starts from the perspective that the interview material gives an indication of the dominant epistemic representation of benefits of urban nature in terms of the concepts, framings, discourses, assessment tools, and processes within informant's professional organization from planners, developers and policy makers, and in the everyday lives of residents. The interview guide included central a priori themes but were adapted to the different informants, given that they provide insight into different aspects of the case study. It included questions of: (i) the views, perceived justifications and challenges on densification and the planning program in Bellevuegården and Lorensborg; (ii) how benefits of green spaces have been articulated and considered in the plan, how these benefits have been assessed, and how the removal of green space is justified; (iii) the role of green spaces for residents' everyday lives; (iv) opportunities and strategies for residents and practitioners to influence how benefits of green spaces are included in plans and development. Interviews lasted between 40 and 90 min, and were tape recorded and transcribed. Participant observation with the role of observer-as-participant (Allen 2017) was carried out at public consultation meetings online and in-person, as well as at a public consultation meeting and workshop for invited stakeholders and organizations. Interview findings were triangulated with

observations and document analysis of official planning documents and reports that, in different ways, establish and communicate goals, plans and strategies related to urban greening, such as the detailed and comprehensive plans including supporting and technical documents (Malmö Stad 2018, 2020a, Malmö Stad 2021b, Malmö Stad 2021c, Malmö Stad 2021d, 2021e, Malmö Stad 2022a, 2022b), as well as legal documents from the appeal (Svea Hovrätt 2021,Tozer *et al*. 2022; Växjö district court 2021). For these documents, qualitative content analysis (Bryman 2016) was applied based on the interview guide to discern how concepts, framings and assessments of benefits of urban green were articulated in policies and plans, as well as how these translate into detail planning and implementation with resulting removal or conservation of green spaces.

5. Findings

The findings are presented according to the two research questions of how benefits of urban nature are (i) represented in planning and policy (Section 5.1), and expressed by (ii) the opposing residents within the planning process of Bellevuegården and Lorensborg (Section 5.2).

5.1. How are benefits of urban nature represented in policy and planning?

In this case, the importance of green areas, and the various benefits associated with these are formally represented and evaluated in a multitude of ways. This section reports on these multiple representations of urban nature based on analysis of strategic and supporting planning documents, and from interviews with planners and practitioners working with various aspects. The planning program area is characterised by a high proportion of green, including parks, large green courtyards, various avenues of trees, and other green structures with, in total, 21 different biotopes (see Haaland *et al*. 2021). The benefits associated with these areas, including various ES such as water regulation, air purification, cultural ES, health benefits, and supporting habitat for biodiversity were articulated and in some forms represented in some of the planning assessments of the area, but were not fully considered in the planning processes. This was due to various aspects, which we identified as themes below: Mismatches between representations of nature in strategic planning targets and practice, and lack of mandatory guidelines; Vague definitions in the determination of environmental impact; Trees represented and assessed as ES not protected; Urban nature as a technical and functional necessity, with intangible aspects of urban nature underrepresented. The recognition of various benefits of urban nature was also, in part, sidelined by other political priorities, such as to build more housing and improve public transportation.

5.1.1. Mismatch between representations of nature in strategic planning targets and practice, and lack of mandatory guidelines

Overall, this study shows a mismatch between targets and implementation for policy and planning of urban green, and a lack of rigidity in rules and guidelines for preserving existing urban green. There are various strategic targets and guidelines for the preservation, maintenance and expansion of green spaces in the city at multiple planning and policy levels. According to Malmö's master plan (Malmö Stad 2018), green

areas must be considered on the basis of both ecological and social values. The master plan sets out strategies for how Malmö's park, natural and water environments "must be protected, expanded and that their recreational and biological qualities must be improved" (Malmö Stad 2018, 35). It states that great restrictiveness must be applied when using green and blue environments for other purposes, that the proportion of paved areas should be reduced, that especially mature trees must be protected, and that the number of trees and large coverage of treetops should increase sharply, especially on the city's streets and squares, and should be prioritised over other functions in the streets. The master plan also states that the balancing principle, a compensation tool for green space, must be applied in all planning and exploitation of land in Malmö (Malmö Stad 2018, 35). The master plan is not legally binding, but is a strategically guiding document for planning, which gives a vision for the politically accepted and viable future scenarios and ideals. Malmö's Environmental Program also outlines various goals for improving and accounting for the quality and quantity of green, such as: "The value of biodiversity must be integrated into the planning and development of the city" and "The City of Malmö must develop its work involving a coherent green infrastructure" (Malmö Stad 2021e). However, the interviews and document analysis show that there is often a lack of consideration of both ecological and social benefits of green at the detailed plan level.

In the case of Bellevuegården and Lorensborg, the local level "planning program" (Malmö Stad 2022a) does not fully follow the master plan strategies outlined above. A planning program is a planning document that is not mandatory and functions as an intermediate between a detailed plan and a comprehensive plan. Most of the 269 large old trees within the planning program area will be affected or felled, and parts of the green courtyards in Bellevuegården are planned to be replaced with new housing complexes. Overall, the green structures in the area will be greatly affected by the plans (Haaland *et al*. 2021; Malmö Stad 2022a), but the exact percentage of green that will be lost or affected is not determined, since the specifics of development will be decided in later stages of detailed planning. Interviews with informants showed that there is a lack of support for formal recognition of the social and ecological benefits of green spaces at the detailed plan level, in this case and more broadly. When asked about the formal requirements for taking into account the benefits of urban green and ES at the detailed plan level, one planner explained this as: "No, but it's probably an area where there is not very clear control, I would say. So that it may be a bit up to the individuals who work in the project, to prioritize and control, as best they can." Similarly, another interviewee stated that: "Um, we've probably varied a bit in describing them [ecosystem services] in detailed plans. But sometimes we do it quite carefully." This lack of regulations or specific guidelines for urban green thus results in the representation of benefits being determined by the priorities of the individual planner.

5.1.2. Vague definitions in the determination of environmental impact

The determination of outcomes that cause "significant environmental impact" [betydande miljöpåverkan] is a critical assessment that can be used to justify the preservation of green from a legal point of view, for example if the Swedish environmental quality standards are transgressed. Even though there are guidelines to determine most of these significant impacts, what should be deemed a significant impact in relation to

ecological values and ES is not straightforward. One interviewee explained that: "For some questions it is more of a – not exactly intuitive – but it becomes much more of a question of judgment, because there are no set restrictions." It is thus unclear to what extent impacts on ES within the planning area could have been deemed as significant, if interpreted by another planner. For example, one city official from the environmental department stated that they had tried to argue for the need for an in-depth ecological assessment of the planning area in Bellevuegården and Lorensborg, and that if this had been carried out earlier, the ecological values and i.e. large old trees could have been "setting the tone" for strategically planning the area instead of being removed. The lack of regulation around green spaces was often mentioned by interviewees as a foundational problem that leads to an arbitrariness of consideration of green space at the detailed plan level, and especially a lack of tools to restore or create new green in the city.

In the initial investigation into the environmental impact of the planning program, it was recognized that biodiversity and several ES can be affected by the removal of trees, such as air purification, air humidification, rainwater retention, shading and cooling. However, it was concluded that there is no "significant" impact on ecological values or air quality (Malmö Stad 2021d). The environmental impact inventory did call for an in-depth ecological inventory [naturvärdesinventering] to assess whether the trees along Lorensborgsgatan provide bird and bat nesting and habitat. A more in-depth ecological assessment will likely be handled in conjunction with the detailed planning of the new bus lane running through the area. The investigation of environmental impact concluded that even though there will be an impact on several ES, the overall environmental impact was deemed as not significant, and an official environmental impact assessment was not needed (Malmö Stad 2021d). Moreover, it was stated that even though the land itself can be regarded as a non-renewable natural resource, the plan does not imply significant depletion of this non-renewable natural resource. This was justified by referring to the aim of the plan proposal, which is to achieve land use so that the city of Malmö can increase the number of inhabitants without exploiting surrounding agricultural land (Malmö Stad 2021e). Thus, the need to increase housing and the number of inhabitants was here prioritised over the preservation of land with green areas and trees, even though this can be regarded as a non-renewable resource.

Several informants expressed that the removal of green space in the area is ultimately a political decision, and that what becomes prioritised is often a result of trade-offs between different interest and political goals in planning, such as in this case with the expansion of the express bus lane and new housing. To the question of how and what tools planners and practitioners have to work towards realising the strategic goals for green areas outlined in the master plan, several interviewees stated the importance of mandatory legislation, and emphasized the responsibility of the regional government as a supervisory authority, for which exemptions to legal requirements can be given. Moreover, informants expressed that since the political decision to densify the neighbourhood is largely based on long-term regional planning (Trafikverket 2022), residents have marginal opportunities to influence the planning outcomes. Interviewees also frequently mentioned how many or most planning decisions are determined by economic incentives, to fit economic calculations and cost-benefit analysis.

5.1.3. *Trees represented and assessed as ES not protected*

Because of lacking guidelines for how to take benefits of urban green into account in decision-making, including as ES or other framings, how urban nature was considered in planning was, in this case, a question of a somewhat arbitrary conceptualization of different benefits (such as climate adaptation), relying on the particular assessments deemed relevant by the planning board. This was expressed in interviews and demonstrated by a close reading of the assessment and valuation of trees within the planning area (Malmö Stad 2021c, 2021d).

The large number of old trees that will be affected by the development of the area was of particular concern for the ecological inventory but, despite detailed assessment of ES, was not deemed important enough to protect, due to other planning priorities. During the consultation phase of a plan, concerned stakeholders (including other city departments) are able to submit their comments, to which the urban planning board are required to respond. The analysis of these comments (Malmö Stad 2021b, 2022b) shows that various arguments for the importance of green are upheld. For example, the ecologist department [kommunekolog] requested a tree inventory for the detailed planning area, and stated benefits of green spaces for recreation and human health, as well as the importance of protecting old and large trees as habitat for biodiversity and ES such as temperature stabilization, shade, and water regulation. The ecologist department also emphasized the strategies of the master plan, which states that existing trees must be protected, and that the total number of trees should increase sharply (Malmö Stad, 2018). Furthermore, the ecologist department pointed out that the current master plan states that the four steps of the balancing principle must be applied in all planning and development, including to avoid, minimize, and compensate or substitute natural values within the area. As a response, the urban planning board stated that there is no legally binding requirement in the Planning and Building Act to compensate or replant felled trees, and thus disregards the balancing principle that is set out in the master plan. However, the urban planning board decided to carry out a tree inventory, and then a more detailed assessment of ES provided by trees, described below (Figure 3).

A tree inventory of 184 trees within the planning program area was carried out in 2020. The inventory showed that at least 30 trees that should be protected by the Swedish biotope protection areas regulation [Biostopskydd kap 11 § Miljöbalken] could become affected by the densification. The inventory stated that felled trees will be replaced with new trees, not because of the city's compensation policy, but because of the housing agency's own replanting tree policy (Malmö Stad 2020b). The tree inventory included walking tours of the area and aimed to provide an overview of the value of the street trees (Malmö Stad 2021c). Based on the inventory, it was concluded that many of the trees were in relatively poor condition, and that even though some "large and extra beautiful specimens" were mentioned, the aesthetic value of the trees as street trees was deemed not sufficient for reconsidering the plan to remove them (Malmö Stad 2021c, 9). Aspects that were weighed into this statement were e.g. efficient land-use, and the possibility of protecting trees during construction. It was then deemed necessary to carry out an in-depth tree assessment and valuation of the ES provided by trees. The tree assessment and valuation were carried out by a consultant who quantified ES provided by trees along Lorensborgsgatan, as well as calculating the replacement cost of ES using the software i-Tree Eco and the Alnarps model 2.2 method. 269 trees were included in the tree valuation, and the leaf surface was estimated to 12.30 hectares. The results showed total storage of carbon (134 tonnes of

Figure 3. Lorensborgsgatan and a few of the trees that are planned to be felled in the densification project (Photo: Sanna Stålhammar).

carbon, corresponding to 491.78 tonnes of CO_2), reduction of storm water in the area (375.24 cubic meters), and reduction in air pollution (29.30 kilogram Nitrous Oxide, 10.37 kilogram particles with diameter less than 2.5 µm). The monetary values for these services were also calculated,[1] with the replacement cost for the 269 trees estimated at SEK 61,532,464 (excluding VAT) (Malmö Stad 2021c). The report from the assessments concludes that: "The tree assessment makes it clear that the existing trees in the area contribute to many important ecosystem services. Therefore, it is also important to replace the ecosystem services of the felled trees locally within the planning program area" (Malmö Stad 2021c, 11). It also stated that the large old trees contribute to more ES than newly planted trees, and that newly planted trees should achieve at least the same crown coverage as the existing trees. Despite these detailed assessments of how trees provide multiple ES, the plans to remove trees were not reconsidered, and the extent of tree removal will be specified in later stages of planning.

One practitioner explained that they had attempted to argue for moving and replanting the trees, based on the results of the tree valuation, to the city planning board. They stated that: "I argued that the replacement cost of these trees is much higher than what the cost would probably be to move them. So, I argued that they could be moved. It is unclear how that was received." According to the interviewee, the city planning board did not move forward with this suggestion. Moving the trees could be a potential compensation approach, but several practitioners emphasized in interviews that the balancing principle and compensation for the loss of green space is often not applied due to the lack of mandatory legislation.

The value of trees for residents was also mentioned by planning officials, although the potential of future development is prioritized over current benefits: "You understand when you talk to the residents that these trees are worth a lot because this is a green street. And then I have to explain that like, yes, but compared to what we could do. And then we have to spend quite a few years of growth time [for new trees]."

5.1.4. Urban nature as a technical and functional necessity, with intangible aspects of urban nature underrepresented

Preservation of green spaces and urban nature was explained in interviews as often reliant on technical tools and arguments. For example, one informant from the environmental department stated that: "We can get the green areas [preserved] if we can connect them to a very technical need, such as delaying water, etc. This is often the way we do it, to say something like: "to prevent problems with storm water, we need at least this [green] area." Technical and functional framings of nature's benefits are thus often necessary justifications. The quality and varied functions of different types of urban green were expressed as important to consider, such as one interviewee questioning the value of preserving a particular green space in the neighbourhood since there is a garage underneath, which prevents water infiltration and through this aspects makes the green area less valuable. In general, benefits of green were emphasized in terms of climate adaptation and water regulation, rather than social or cultural aspects and benefits.

Another informant explained that if the technical tools available show that it is efficient and feasible to exploit green space, then it is difficult to justify not to, based on other types of tools or "softer" values related to green space. When asked what aspects are taken into account in terms of benefits of green spaces, they stated that: "(…) there are some [buildings] that end up on surfaces, which unfortunately we have had to draw building rights on the inner courtyard. And I have not been able to justify that it is not possible. Because the technical tools I have shown that it is possible [to build on courtyards]." In sum, interviewees expressed that there is a lack of guidelines for social and cultural aspects of benefits of urban nature, such as for recreational purposes; and also that these values are difficult to take into account because of the technical tools, quantifiable benefits, and economic calculations being dominant in the planning process. This results in a lack of consideration of social aspects and of how current residents' wellbeing and sense of place connected to urban nature is directly affected by the new plans.

5.2. How are benefits of urban nature expressed by the opposing residents in this case?

Various benefits of urban nature were articulated by residents in their formal appeals, as well as expressed in interviews. We categorised these into subthemes of: social cohesion and sense of community, sense of place, and urban green as public common space.

The residents' appeal to the Supreme Land and Environmental Court [Svea hovrättmark och miljö-överdomstolen] regarding detailed plan 5513 included several points and arguments about the importance and benefits of green areas and courtyards. However, the main point of appeal concerned the procedure for the public consultation on the detailed plan. The public consultation was prevented by the COVID-19 pandemic, and the appeal states that the information around online public consultation was insufficient, and that it switched to online meetings last minute, which prevented participation, especially by the elderly and immigrants. The appeal was rejected in 2021, and the appellants were not given a trial permit. The appeal was considered based on the procedural issues with participation, and not with the content of the plan and removal of green spaces.

5.2.1. *Social cohesion and sense of community*

In interviews, residents pointed out the importance of green, inward-facing and open courtyards for social cohesion and for meeting spaces, for both children and adults. One interviewee stated that: "Our neighbourhood is based on the fact that we know that the children have the whole yard to play. They can run, they can cycle, they can move. In the winter we have these small hills, where the little ones go sledding. Things happen all the time in the yard." In the appeal (Växjö district court 2021), the residents reject the idea that additional buildings in the courtyards will create more social cohesion, and state that since the entrances face outwards, this will likely lead to less social cohesion and increased segregation. The appeal objects to the fact that children and adults will lose the direct contact with courtyards, including the opportunity to meet directly with neighbours. The appeal also mentioned the importance of the courtyards for activities for children and as open public spaces. During interviews, one resident explained the importance of this, especially during vacations when residents do not have resources to travel and many spend family holidays at home, as exemplified by this statement: "and with this densification, if we look at the greenery on the courtyards. With an average of 11,000, you cannot afford to travel. Your children, you stay home when they have summer vacation. It is not the Alps or the Maldives, it is Bellevuegården." One interviewee stated that "And when they [meeting places] disappear, the social contact between a great many people disappears." These statements align with the results of our previous PPGIS survey (Haaland *et al*. 2021) which also showed how residents use and perceive the importance of their courtyards, for purposes such as recreation and meeting places, barbeques, picnics.

5.2.2. *Sense of place*

Another way that the benefits of urban nature were expressed was through how they contribute to residents' sense of place, and sense of attachment to the neighbourhood. One of the residents who was part of organizing the mobilization against the densification described in an interview that during the collection of the signatures (about 700), they talked a lot to other residents, and learned that many of them were surprised and sad about the courtyards being rebuilt, since they feel strongly about these places. The interviewee stated that: "And then, we started organizing the resistance to this, I was one of those who started the resistance. And then I talked to a lot of people, people who then grew up there as children, and who now say "but are they removing our hills?" For them it's not just a hill of grass, for them it's like [gasps] "It's our hills, it's where we played, it's where we went sledding when you were little." They have love for this. Just as one might have to a tree that has stood in one's childhood garden."

5.2.3. *Urban green as public common space*

Interviews showed that the way that benefits of urban nature in this neighbourhood contribute to residents' wellbeing is important for understanding urban green as public common space. The main opposing residents driving the appeal sought advice in writing the appeal for the detailed plan from a civil society organisation, who provided support. The organisation is a social union with roots in the autonomous left movement, active in political questions around housing and the right to the city in Sweden's

larger cities. During interviews with members from the organisation who assisted in the process, interviewees expressed the importance of seeing urban green areas in terms of common and public spaces and resources. One expressed that: "if you have a neighbourhood like Bellevuegården, where people are living very densely, there is a need for a lot of space outside of the residence, so that it can function like a second living room." This need and function were explained as not restricted to green spaces particularly, but that a green space can also act as a temporary second living room. They went on to state that: "If you remove this possibility, then it becomes a restriction on one's own home." The need to consider the values of green areas for marginalised neighbourhoods in relation to residents' well-being, was expressed by residents and the civil organisation members. Because of the various benefits that green spaces provide for residents, the value of green spaces was argued to be relatively higher for marginalised neighbourhoods, than for neighbourhoods with wealthier socio-economic profiles, with more capabilities, and that this is an aspect that arguably should be taken into consideration in planning.

6. Discussion and concluding remarks

This study starts from the perspective that different epistemic representations of nature's benefits in planning represent different values of nature (Pascual *et al*. 2023), and that the choice of representations come with political and ethical implications in the governance of urban nature. By close examination of these representations in a marginalised densifying neighbourhood in Sweden, we uncover how multiple representations of benefits of urban nature exist simultaneously at different levels of planning, policy and in the lived experiences of residents. This demonstrates how the lack of guidelines for how these benefits should be represented in planning and decision-making, in terms of concepts, tools and assessment approaches, creates an interpretive flexibility that is not systematically inclusive of a spectrum of diverse representations and their underlying values. Rather, certain representations aligned with a city's strategic goals are privileged. The material shows how the lack of applying rigid and diverse framings and representations of benefits favours instrumental values and technocratic representations, which in this case allowed for mobilisation of interests that resulted in the decision to remove green space.

We found a mismatch between targets and implementation for policy and planning of the benefits of urban nature. Ambitious and vague targets can be beneficial since they leave room for interpretation and context-specific implementation. Given that city development involves compromises between social goals it cannot be expected that all targets in a master plan will be met by every detailed plan. However, for green space planning targets to be met, additional targets, guidelines and processes for urban green risks are required at the intermediate level between the master plan and detailed plan that synchronize these two. Similarly, Garcia-Garcia *et al*. (2020) report on how green structures defined in master plans are not respected in detailed planning in Madrid, which leads to urban green spaces being especially sensitive to the non-compliance of master plans. The gap between master and detailed planning and the lack of mandatory guidelines can be seen to contribute to the tyranny of small decisions (Colding, Gren, and Barthel 2020), where the decline of urban green is a result of incremental changes from a number of smaller planning and development decisions. When these types of incremental strategies for urban green dominate, they

will not likely result in transformative system changes, and significant extra efforts are need for radical system change (Hansen *et al*. 2022). Moreover, the lack of legislation or specific guidelines for the benefits of urban nature results in their consideration to be determined case-by-case and by the priorities of the individual planner. Other studies have documented how the success of environmental and green space planning in Sweden is often related to individual enthusiasts within the municipal organization (Beery *et al*. 2016).

Although the benefits of urban nature as an analytical unit is rather broadly construed, the idea of seeing these as a boundary object (Star and Griesemer 1989) was helpful as an analytical concept in this study. It allowed for an analysis of how representations of the benefits of urban nature maintain common identity between the multiple social worlds of planning, development, and the residents, and to what extent it facilitated communication between these. We found that benefits of urban nature did not maintain common identity, and instead was a loosely defined idea in the interface of planning, policy and residents. The benefits of urban nature could, here, be rendered into e.g. a technical functional perspective as an NBS by practitioners and planners when it suited planning needs. The multifunctionality of urban nature benefits makes their representation challenging to conceive of in terms of a boundary object, and thus the benefits of urban nature can be seen to lack common identity. Instead, the findings are aligned with Hansen *et al*. (2021), who refer to urban nature as a "fuzzy boundary object." The fuzziness, or interpretive flexibility, also prevented efficient communication of the multiple and diverse benefits of urban nature between residents and planning and decision-making.

The broad, flexible and vague conceptions of benefits of urban nature also implies that the preservation of green space risks being determined by individual planners, including decisions such as how to determine what is a 'significant' level of impact on ES or trees. The flexibility leads to the uneven application of different framings, assessments and arguments. The same patch of green, or a specific tree, can on the one hand be argued to be important as a nature-based solution that provides climate adaptation benefits, but on the other hand be argued to be a problem because of the future threat of pests and a need for more varied tree species in a future climate. This study demonstrates how this interpretive flexibility, when unregulated, resulted in the removal of urban nature, as well as masked social and justice issues. The lack of specificity on how the benefits of urban nature should be represented leaves room for crowding out diverse values and knowledge. From an epistemic justice perspective (Fricker 2007), the interpretive space of the benefits of urban nature can be seen as imperialised by dominant representations and interests, such as those aligning with the status quo of densification. The lack of interpretive resources by lesser-heard knowledges, such as from the residents and other values of benefits of urban green, results in an epistemic oppression, when not being heard in city planning and development. In order to ensure epistemic justice, the benefits of urban nature need to be more systematically conceptualised based on a wider range of knowledge and values, which then results in more diverse framings and representations (Raymond *et al*. 2023). Planners need additional tools, which include a more diverse and precise set of ecological, and "intangible" social values of urban green spaces (cf. Muhar *et al*. 2018). The analytical lens of an "empty signifier" (Davidson 2010) can also be relevant for future studies to understand the various consequences of how the interpretive flexibility of benefits of urban nature upholds ideology and hegemony in urban governance.

The findings add to the documentation of the contradictions between green space and densification in planning in the Scandinavian context (Hautamäki 2019; Zalar and Pries 2022; Lisberg Jensen, Alkan Olsson, and Malmqvist 2023). We echo Hautamäki (2019), who investigated the construction of urban green in a compact city discourse in Helsinki, and revealed that the green structure is conceptualised and modified to fit in with the compact city policies and fulfil the priority of densification. Moreover, our findings show how the interpretive flexibility of representations of the benefits of urban nature allows for internal contradictions between goals of densification and greening to be maintained, while goals for preservation of green becomes overrun by other priorities, such as the need to increase housing. The fluid framing allows for the densification imperative to remain unquestioned, as long as development can replace existing ecological functions with technological solutions. The inherent goal-conflicts between densification and preservation or urban green in Malmö (Lisberg Jensen, Alkan Olsson, and Malmqvist 2023) are thus maintained. In order to fully account for these goal-conflicts, and the implications of removing urban green in the long term, the benefits of urban nature need to be more systematically conceptualised and prioritised in policy, regulation and practice. Similar studies at the city level show the lack of strategies and tools to overcome conflicting goals for the preservation of green and densification at multiple planning levels (Uggla 2012; Lisberg Jensen, Alkan Olsson, and Malmqvist 2023). Our findings align with Zalar and Pries (2022) who investigated another marginalised residential area in Malmö (Rosengård) and found that the compact city approach "unmaps" existing green areas and redefines them as problematic, producing blind-spots and undermining the right to green space. When green spaces in Million Program areas are targeted for densification, this downplays the high relative value of green spaces for the wellbeing of residents, who have limited resources, capabilities and access to green. The residents expressed that surrounding green is important for their sense of place and wellbeing in similar ways to Mack (2021), who documented an "impossible nostalgia" and green affect for Million Program residents. Importantly, even when green areas are developed or restored within underprivileged neighbourhoods, these spaces have been documented to be negatively "disruptive," create feelings of detachment, and to undermine the therapeutic landscape aspects of natural outdoor areas (Triguero-Mas *et al*. 2021). This study thus adds to the evidence of the importance of social and cultural aspects of green space in socially deprived areas (Ward Thompson *et al*. 2012, 2016), specifically in terms of social cohesion and for senses of place. Unfortunately, unequal distribution and access to green is only the tip of the iceberg of injustice related to urban green spaces, and to address distribution issues, cities need to tackle deep-seated issues of procedural justice and unequal investment in inclusivity (Zuniga-Teran *et al*. 2021).

This study also shows that representations of benefits are prioritised based on their technical and functional benefits, which were described as prioritised both over social as well as ecological values of urban nature. Construing urban nature in terms of its technical functions sanctions an increased technocratic discourse of nature in planning and governance (Dryzek 2013), where optimising (and replacing) functions of green becomes the focus rather than preserving existing green areas. Moreover, informants in this study expressed that the outcomes for urban green are, to some extent, governed by technical tools. If their tools and calculations show that removal of green is "possible" (i.e. efficient), then it is difficult to justify the contrary based on other arguments. Individual planners are, thus, not deciding the outcomes of urban green autonomously, but are acting in a network of other "actants" (Latour 1987), of technical

assessments, trapped in the current paradigms of quantification and cost-benefit analysis of environmental planning (Wegner and Pascual 2011). However, the monetary assessments of ES from trees in this study showed that these tools are unsystematically applied, with varied outcomes. Despite detailed calculations of the replacement cost for trees to 62 million SEK, and conclusions showing how the trees currently provide important ES to the neighborhood and city, this did not lead to the preservation of trees. This finding adds to the documentation of how assessments of ES affect decision-making and the preservation of nature (Guerry *et al*. 2015). More site-specific studies are needed that explore how these technical tools function in networks of urban governance (cf. Robertson 2006), including tensions between efficiency and deliberation in planning (Calderon *et al*. 2022).

There is a pressing need to further analyse the representations of benefits of urban nature, and how these interplay with exploitation of urban nature in a Scandinavian context, especially in marginalized areas. The themes outlined in Section 5.1 and 5.2 can be used in future studies to investigate similar issues in other cases. While additional case studies are needed, future studies could also benefit from comparisons between representations and implications for knowledge involved in exploiting or preserving urban nature at multiple sites, within or across cities, as well as evaluating the outcomes for different knowledge holders.

Acknowledgments

We would like to thank the interview participants in Malmö for their generous sharing of time and insights, and the participants in the VIVA-PLAN project. This study was conducted within the VIVA-PLAN project funded by the Swedish Research Council for Sustainable Development, Formas (grant number: 2018-00175).

Disclosure statement

No potential conflict of interest was reported by the author(s).

Note

1. The value of the reduction of NO_2 was estimated at SEK 3,539 per year, and reduction in PM2.5 was estimated at SEK 105,719 per year. The value of the delay of water ranged from approximately SEK 375,000 to SEK 7,500,000, depending on what technical solution would be chosen (Malmö Stad 2021c).

Funding

This study was conducted within the VIVA-PLAN project funded by the Swedish Research Council for Sustainable Development, Formas. This work was supported by Svenska Forskningsrådet Formas.

ORCID

Sanna Stålhammar http://orcid.org/0000-0002-3398-2640
Christopher M. Raymond http://orcid.org/0000-0002-7165-885X

References

Abson, D. J., H. von Wehrden, Stefan Baumgärtner, J. Fischer, J. Hanspach, W. Härdtle, H. Heinrichs, *et al.* 2014. "Ecosystem Services as a Boundary Object for Sustainability." *Ecological Economics* 103 (C): 29–37. doi:10.1016/j.ecolecon.2014.04.012.

Allen. 2017. *The SAGE Encyclopedia of Communication Research Methods*. Thousand Oaks, CA: Sage.

Anderson, E., D. Haase, J. Kronenberg, M. Wolff, J. Langemeyer, and A. Mascarenhas. 2023. "Holistic Solutions Based on Nature: Unlocking the Potential of Green and Blue Infrastructure." *Special Feature in Progress*. Ecology & Society. https://ecologyandsociety.org/feature/144/.

Anguelovski, Isabelle, Anna Livia Brand, James J. T. Connolly, Esteve Corbera, Panagiota Kotsila, Justin Steil, Melissa Garcia-Lamarca, *et al.* 2020. "Expanding the Boundaries of Justice in Urban Greening Scholarship: Toward an Emancipatory, Antisubordination, Intersectional, and Relational Approach." *Annals of the American Association of Geographers* 110 (6): 1743–1769. doi:10.1080/24694452.2020.1740579.

Barboza, Evelise Pereira, Marta Cirach, Sasha Khomenko, Tamara Iungman, Natalie Mueller, Jose Barrera-Gómez, David Rojas-Rueda, Michelle Kondo, and Mark Nieuwenhuijsen. 2021. "Green Space and Mortality in European Cities: A Health Impact Assessment Study." *The Lancet Planetary Health* 5 (10): e718–30–e730. doi:10.1016/S2542-5196(21)00229-1.

Beery, Thomas, Sanna Stålhammar, K. Ingemar Jönsson, Christine Wamsler, Torleif Bramryd, Ebba Brink, Nils Ekelund, Michael Johansson, Thomas Palo and Per Schubert. 2016. "Perceptions of the Ecosystem Services Concept: Opportunities and Challenges in the Swedish Municipal Context." *Ecosystem Services* 17 (February): 123–130. doi:10.1016/j.ecoser.2015.12.002.

Bibri, Simon Elias, John Krogstie, and Mattias Kärrholm. 2020. "Compact City Planning and Development: Emerging Practices and Strategies for Achieving the Goals of Sustainability." *Developments in the Built Environment* 4 (November): 100021. doi:10.1016/j.dibe.2020.100021.

Boverket. 2016. Ekosystemtjänster. National Board of Housing. https://www.boverket.se/sv/PBL-kunskapsbanken/teman/ekosystemtjanster/

Bryman, Alan. 2016. *Social Research Methods*. 5th ed. Oxford: Oxford University Press.

Bueno-Suárez, Carlos, and Daniel Coq-Huelva. 2020. "Sustaining What is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe." *Sustainability* 12 (11): 4445. doi:10.3390/su12114445.

Calderon, Camilo, Amelia Mutter, Martin Westin, and Andrew Butler. 2022. "Navigating Swift and Slow Planning: Planners' Balancing Act in the Design of Participatory Processes." *European Planning Studies* 32 (2): 390–409. doi:10.1080/09654313.2022.2156271.

Ceccato, Vania. 2020. "Safety in the Making: An Assessment of Urban Planners' Practices in Municipalities in Sweden." In *Crime and Fear in Public Places towards Safe, Inclusive and Sustainable Cities*, edited by Ceccato, V. and Nalla, M. K. Abingdon: Routledge Publishing.

Colding, J., Å. Gren, and S. Barthel. 2020. "The Incremental Demise of Urban Green Spaces." *Land* 9 (5): 162. doi:10.3390/land9050162.

Davidson, M. 2010. "Sustainability as Ideological Praxis: The Acting out of Planning's Master-Signifier." *City* 14 (4): 390–405. doi:10.3390/land9050162.

Dryzek, John S. 2013. " *The Politics of the Earth: Environmental Discourses*. New York: Oxford University Press.

Ernstson, Henrik, and Sverker Sörlin. 2013. "Ecosystem Services as Technology of Globalization: On Articulating Values in Urban Nature." *Ecological Economics* 86 (Suppl C): 274–284. doi:10.1016/j.ecolecon.2012.09.012.

Flyvbjerg, Bent. 2011. " Case Study". SSRN Scholarly Paper. Rochester, NY. https://papers.ssrn.com/abstract=2278194.

Fors, Hanna, Frederik Aagaard Hagemann, Åsa Ode Sang, and Thomas B. Randrup. 2021. "Striving for Inclusion—A Systematic Review of Long-Term Participation in Strategic Management of Urban Green Spaces." *Frontiers in Sustainable Cities* 3: Article 572423. doi:10.3389/frsc.2021.572423.

Fricker, Miranda. 2007. *Epistemic Injustice: Power and the Ethics of Knowing*. New York: Oxford University Press.

Garcia-Garcia, Maria Jesus, Lucille Christien, Enrique García-Escalona, and Concepción González-García. 2020. "Sensitivity of Green Spaces to the Process of Urban Planning. Three Case Studies of Madrid (Spain)." *Cities* 100 (maj): 102655. doi:10.1016/j.cities.2020.102655.

Grundström, Karin, and Irene Molina. 2016. "From Folkhem to Lifestyle Housing in Sweden: Segregation and Urban Form, 1930s–2010s." *International Journal of Housing Policy* 16 (3): 316–336. doi:10.1080/14616718.2015.1122695.

Guerry, Anne D., Stephen Polasky, Jane Lubchenco, Rebecca Chaplin-Kramer, Gretchen C. Daily, Robert Griffin, Mary Ruckelshaus, *et al.* 2015. "Natural Capital and Ecosystem Services Informing Decisions: From Promise to Practice." *Proceedings of the National Academy of Sciences of the United States of America* 112 (24): 7348–7355. doi:10.1073/pnas.1503751112.

Haaland, Christine, and Cecil Konijnendijk van den Bosch. 2015. "Challenges and Strategies for Urban Green-Space Planning in Cities Undergoing Densification: A Review." *Urban Forestry & Urban Greening* 14 (4): 760–771. doi:10.1016/j.ufug.2015.07.009.

Haaland, Christine, Kari Lehtilä, Sanna Stålhammar, and Christopher Raymond. 2021. "Bedömning av sociala och ekologiska värden i Lorensborg och Belleveugården, Malmö och Ronna, Södertalje", juli. doi:10.5281/zenodo.5136809.

Hall, Thomas, and Sonja Vidén. 2005. "The Million Homes Programme: A Review of the Great Swedish Planning Project." *Planning Perspectives* 20 (3): 301–328. doi:10.1080/02665430500130233.

Hansen, Rieke, Marleen Buizer, Arjen Buijs, Stephan Pauleit, Thomas Mattijssen, Hanna Fors, Alexander van der Jagt, *et al.* 2022. "Transformative or Piecemeal? Changes in Green Space Planning and Governance in Eleven European Cities." *European Planning Studies* 31 (12): 2401–2424. doi:10.1080/09654313.2022.2139594.

Hansen, Rieke, Martina van Lierop, Werner Rolf, Damjana Gantar, Ina Šuklje Erjavec, Emily Lorance Rall, and Stephan Pauleit. 2021. "Using Green Infrastructure to Stimulate Discourse with and for Planning Practice: Experiences with Fuzzy Concepts from a Pan-European, a National and a Local Perspective." *Socio-Ecological Practice Research* 3 (3): 257–280. doi:10.1007/s42532-021-00087-2.

Hautamäki, Ranja. 2019. "Contested and Constructed Greenery in the Compact City: A Case Study of Helsinki City Plan 2016." *Journal of Landscape Architecture* 14 (1): 20–29. doi:10.1080/18626033.2019.1623543.

Holgersen, Ståle, and Andreas Malm. 2015. "Green Fix" as Crisis Management. or, in Which World is Malmö the World's Greenest City?" *Geografiska Annaler: Series B, Human Geography* 97 (4): 275–290. doi:10.1111/geob.12081.

IPBES. 2019. " Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services*"* Zenodo. doi:10.5281/zenodo.3553579.

Isenhour, Cindy, Gary McDonogh, and Checker Melissa. 2015. *Sustainability in the Global City: Myth and Practice*. 1st ed. New York: Cambridge University Press.

Jørgensen, Marianne, and Louise Phillips. 2002. *Discourse Analysis as Theory and Method*." London: SAGE.

Kahn, Alfred E. 1966. "The Tyranny of Small Decisions: Market Failures, Imperfections, and the Limits of Economics*." *Kyklos* 19 (1): 23–47. doi:10.1111/j.1467-6435.1966.tb02491.x.

Khoshkar, Sara, Monica Hammer, Sara Borgström, Patrik Dinnétz, and Berit Balfors. 2020. "Moving from Vision to Action- Integrating Ecosystem Services in the Swedish Local Planning Context." *Land Use Policy* 97 (september): 104791. doi:10.1016/j.landusepol.2020.104791.

Kotsila, Panagiota, Isabelle Anguelovski, Francesc Baró, Johannes Langemeyer, Filka Sekulova, and James Jt Connolly. 2021. "Nature-Based Solutions as Discursive Tools and Contested Practices in Urban Nature's Neoliberalisation Processes." *Environment and Planning E: Nature and Space* 4 (2): 252–274. doi:10.1177/2514848620901437.

Latour, Bruno. 1987. *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard University Press.

Leone, Michael, Ieva Misiune, Luís Valença Pinto, Julia Palliwoda, Raïsa Carmen, Sander Jacobs, and Jörg A. Priess. 2023. "Lost in Implementation? A Field Study of the Uptake of the 'Green Infrastructure' Term and Concept in Urban Policies." *Ecosystems and People* 19 (1): 2220831. doi:10.1080/26395916.2023.2220831.

Lisberg Jensen, Ebba, Johanna Alkan Olsson, and Ebba Malmqvist. 2023. "Growing Inwards: Densification and Ecosystem Services in Comprehensive Plans from Three Municipalities in Southern Sweden." *Sustainability* 15 (13): 9928. doi:10.3390/su15139928.

Listerborn, Carina, Irene Molina, and Åse Richard. 2020. "Claiming the Right to Dignity : New Organizations for Housing Justice in Neoliberal Sweden." *Radical Housing Journal* 2 (1): 119–137. doi:10.54825/DBXL1532.

Mack, Jennifer. 2021. "Impossible Nostalgia: Green Affect in the Landscapes of the Swedish Million Programme." *Landscape Research* 46 (4): 558–573. doi:10.1080/01426397.2020.1858248.

Malmö Stad. 2018. Comprehensive plan for Malmö summary in English. Adopted by Malmö City Council in May 2018. https://malmo.se/download/18.4f363e7d1766a784af162c8/1610100360559/OP_english_summary_lores.webb.pdf

Malmö Stad. 2020a. Granskningshandling: Samrådsredogörelse. Detaljplan för kvarteren Stensjön och Delsjön m.fl. (Bellevuegården) i Hyllie i Malmö. Malmö stad Stadsbyggnadskontoret. SBN-2016-481.

Malmö Stad. 2020b. Planbeskrivning: Detaljplan för kvarteren Stensjön och Delsjön m.fl. (Bellevuegården) i Hyllie i Malmö. Dp 5513. Malmö Stad Stadsbyggnadskontoret. SBN-2016-481

Malmö stad. 2021a. "Statistik för Malmös områden." Available at: https://malmo.se/Fakta-och-statistik/Statistik-for-Malmos-omraden.html.

Malmö stad. 2021b. Malmö stad Lorensborg och Bellevuegården Planprogram 6050 Samrådshandling. Malmö Stad Stadsbyggnadskontoret.

Malmö Stad. 2021c. PM Offentlig Miljö: Bilaga till Pp6050, Planprogram för Lorensborg och Bellevuegården. Malmö Stads Stadsbyggndskontoret

Malmö Stad. 2021d. PM Undersökning av miljöpåverkan. Bilaga till Pp 6050, Planprogram för Lorensborg och Bellevuegården. Malmö Stads Stadsbyggnadskontoret

Malmö Stad. 2021e. Miljöprogram för Malmö stad 2021-2030. https://malmo.se/Miljoprogram-for-Malmo-stad-2021-2030.html

Malmö Stad. 2022a. Planprogram 6050, Planprogram godkänt av SBN mars 2022. Malmö Stad Stadsbyggnadskontoret.

Malmö Stad. 2022b. Granskningshandling: Samrådsredogörelse. Planprogram för Lorensborg och Bellevuegården. Malmö stad Stadsbyggnadskontoret. SBN-2018-769

Matsler, A. Marissa, Zbigniew J. Grabowski, and Alison D. Elder. 2021. "The Multifaceted Geographies of Green Infrastructure Policy and Planning: Socio-Environmental Dreams, Nightmares, and Amnesia." *Journal of Environmental Policy & Planning* 23 (5): 559–564. doi:10.1080/1523908X.2021.1976565.

McPhearson, Timon, Christopher M. Raymond, Natalie Gulsrud, Christian Albert, Neil Coles, Nora Fagerholm, Michiru Nagatsu, Anton Stahl Olafsson, Niko Soininen, and Kati Vierikko. 2021. "Radical Changes Are Needed for Transformations to a Good Anthropocene." *Npj Urban Sustainability* 1 (1): 1–13. doi:10.1038/s42949-021-00017-x.

MEA. 2005. *A Report of the Millennium Ecosystem Assessment. Ecosystems and Human Well-Being*. Washington, DC: Island Press.

Muhar, Andreas, Christopher M. Raymond, Riyan J. G. van den Born, Nicole Bauer, Kerstin Böck, Michael Braito, Arjen Buijs, *et al.* 2018. "A Model Integrating Social-Cultural Concepts of Nature into Frameworks of Interaction between Social and Natural Systems." *Journal of Environmental Planning and Management* 61 (5-6): 756–777. doi:10.1080/09640568.2017.1327424.

Mumaw, Laura Moch, and Christopher M. Raymond. 2021. "A Framework for Catalysing the Rapid Scaling of Urban Biodiversity Stewardship Programs." *Journal of Environmental Management* 292 (Augusti): 112745. doi:10.1016/j.jenvman.2021.112745.

Nordh, Helena, and Anton Stahl Olafsson. 2021. "Plans for Urban Green Infrastructure in Scandinavia." *Journal of Environmental Planning and Management* 64 (5): 883–904. doi:10.1080/09640568.2020.1787960.

Pacchi, Carolina. 2018. "Epistemological Critiques to the Technocratic Planning Model: The Role of Jane Jacobs, Paul Davidoff, Reyner Banham and Giancarlo De Carlo in the 1960s." *City, Territory and Architecture* 5 (1): 17. doi:10.1186/s40410-018-0095-3.

Pascual, Unai, Patricia Balvanera, Christopher B. Anderson, Rebecca Chaplin-Kramer, Michael Christie, David González-Jiménez, Adrian Martin, *et al.* 2023. "Diverse Values of Nature for Sustainability." *Nature* 620 (7975): 813–823. doi:10.1038/s41586-023-06406-9.

Potschin, M., C. Kretsch, R. Haines-Young, E. Furman, P. Berry, and F. Baró. 2016. "Nature-Based Solutions." In *OpenNESS Ecosystem Services Reference Book.* EC FP7 Grant Agreement no. 308428, edited by Potschin, M. and K. Jax, No. 308428. www.openness-project.eu/library/reference-book.

Potschin-Young, M., R. Haines-Young, C. Görg, U. Heink, K. Jax, and C. Schleyer. 2017. "Understanding the Role of Conceptual Frameworks: Reading the Ecosystem Service Cascade." *Ecosystem Services* 29 (Pt C): 428–440. och juni. doi:10.1016/j.ecoser.2017.05.015.

Randrup, T. B., J. Svännel, A. Sunding, M. Jansson, and Å. O. Sang. 2021. "Urban Open Space Management in the Nordic Countries. Identification of Current Challenges Based on Managers' Perceptions." *Cities* 115 (Augusti): 103225. doi:10.1016/j.cities.2021.103225.

Randrup, Thomas B., Arjen Buijs, Cecil C. Konijnendijk, and Tom Wild. 2020. "Moving beyond the Nature-Based Solutions Discourse: Introducing Nature-Based Thinking." *Urban Ecosystems* 23 (4): 919–926. doi:10.1007/s11252-020-00964-w.

Raymond, C. M., A. Buijs, R. Rodela, N. Gulsrud, S. Stålhammar, K. Lehtilä, C. Haaland, T. McLachlan, and A. Diduck. 2021. "Mosaic Governance: A Multi-Method Approach for Engaging Diverse Groups in the Planning of Green Spaces and Meeting Spots". "Zenodo." doi:10.5281/zenodo.5520132.

Raymond, Christopher M., Christopher B. Anderson, Simone Athayde, Arild Vatn, Ariane M. Amin, Paola Arias-Arévalo, Michael Christie, *et al.* 2023. "An Inclusive Typology of Values for Navigating Transformations towards a Just and Sustainable Future." *Current Opinion in Environmental Sustainability* 64 (oktober): 101301. m.fl. doi:10.1016/j.cosust.2023.101301.

Robertson, Morgan M. 2006. "The Nature That Capital Can See: Science, State, and Market in the Commodification of Ecosystem Services." *Environment and Planning D: Society and Space* 24 (3): 367–387. doi:10.1068/d3304.

SCB. 2019. Statistics Sweden, Green space and Green Areas in Urban Areas 2015. https://www.scb.se/en/finding-statistics/statistics-by-subject-area/environment/land-use/green-areas-within-and-in-the-vicinity-of-urban-settlements/pong/statistical-news/green-areas-within-and-around-urban-areas-2015-/

Schubert, Per., Nils G. A. Ekelund, Thomas H. Beery, Christine Wamsler, K. Ingemar Jönsson, Andreas Roth, Sanna Stålhammar, Torleif Bramryd, Michael Johansson, and Thomas Palo. 2017. "Implementation of the Ecosystem Services Approach in Swedish Municipal Planning." *Journal of Environmental Policy & Planning* 20november, (3): 298–312. och doi:10.1080/1523908X.2017.1396206.

SEO. 2023. Swedish Environmental Objectives. Swedish Environmental Protection Agency. https://www.naturvardsverket.se/en/om-miljoarbetet/swedish-environmental-objectives/

Stålhammar, Sanna, and Ebba Brink. 2021. "Urban Biocultural Diversity' as a Framework for Human–Nature Interactions: Reflections from a Brazilian Favela." *Urban Ecosystems* 24 (3): 601–619. doi:10.1007/s11252-020-01058-3.

Star, Susan Leigh, and James R. Griesemer. 1989. "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39." *Social Studies of Science* 19 (3): 387–420. doi:10.1177/030631289019003001.

Svea hovrätt. 2021. Svea HR P 5906 21 Aktbil 3 Överklagan Dp 5513

Svea hovrätt. 2022. Protokoll. Aktbilaga 35 Mål nr P5906-21. Svea hovrätt Mark- och miljööverdomstolen 060201

Tozer, Laura, Harriet Bulkeley, Bernadett Kiss, Andrés Luque-Ayala, Yuliya Voytenko Palgan, Kes McCormick, and Christine Wamsler. 2022. "Nature for Resilience? The Politics of Governing Urban Nature." *Annals of the American Association of Geographers* 113 (3): 599–615. doi:10.1080/24694452.2022.2130867.

Trafikverket. 2022. " Malmö – Ramavtal 8". https://bransch.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/finansiering/storstadsavtalen/malmo–-ramavtal-8/

Triguero-Mas, Margarita, Isabelle Anguelovski, Melissa García-Lamarca, Lucía Argüelles, Carmen Perez-del-Pulgar, Galia Shokry, James J. T. Connolly, and Helen V. S. Cole. 2021.

"Natural Outdoor Environments' Health Effects in Gentrifying Neighborhoods: Disruptive Green Landscapes for Underprivileged Neighborhood Residents." *Social Science & Medicine (1982)* 279 (juni): 113964. doi:10.1016/j.socscimed.2021.113964.

Uggla, Ylva. 2012. "Construction of 'nature' in Urban Planning: A Case Study of Stockholm." *Town Planning Review* 83 (1): 69–85. doi:10.3828/tpr.2012.4.

Växjö district court. 2021. Appeal P1127-21. Aktbil 1

Ward Thompson, Catharine, Jenny Roe, Peter Aspinall, Richard Mitchell, Angela Clow, and David Miller. 2012. "More Green Space is Linked to Less Stress in Deprived Communities: Evidence from Salivary Cortisol Patterns." *Landscape and Urban Planning* 105 (3): 221–229. doi:10.1016/j.landurbplan.2011.12.015.

Ward Thompson, Catharine, Peter Aspinall, Jenny Roe, Lynette Robertson, and David Miller. 2016. "Mitigating Stress and Supporting Health in Deprived Urban Communities: The Importance of Green Space and the Social Environment." *International Journal of Environmental Research and Public Health* 13 (4): 440. doi:10.3390/ijerph13040440.

Wegner, Giulia, and Unai Pascual. 2011. "Cost-Benefit Analysis in the Context of Ecosystem Services for Human Well-Being: A Multidisciplinary Critique." *Global Environmental Change, Special Issue on the Politics and Policy of Carbon Capture and Storage* 21 (2): 492–504. doi:10.1016/j.gloenvcha.2010.12.008.

Woroniecki, Stephen, Hausner Wendo, Ebba Brink, Mine Islar, Torsten Krause, Ana-Maria Vargas, and Yahia Mahmoud. 2020. "Nature Unsettled: How Knowledge and Power Shape 'Nature-Based' Approaches to Societal Challenges." *Global Environmental Change* 65 (vember): 102132. doi:10.1016/j.gloenvcha.2020.102132.

Zalar, Alva, and Johan Pries. 2022. "Unmapping Green Space." *City* 26 (1): 51–73. doi:10.1080/13604813.2021.2018860.

Zuniga-Teran, Adriana A., Andrea K. Gerlak, Alison D. Elder, and Alexander Tam. 2021. "The Unjust Distribution of Urban Green Infrastructure is Just the Tip of the Iceberg: A Systematic Review of Place-Based Studies." *Environmental Science & Policy* 126 (December): 234–245. doi:10.1016/j.envsci.2021.10.001.