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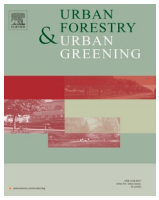

Original article

Green space management for biodiversity: Swedish Managers' experience of implementation and influence

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ABSTRACT

The global biodiversity crisis requires multifaceted approaches across several contexts to reduce the speed of the decline and potentially enhance biodiversity. Management of green spaces, including municipal parks, housing areas and cemeteries, can strengthen these efforts. This paper reports the results of a workshop with 33 green space managers from tactical and operational levels, with eight facilitating researchers, on central aspects influencing management for biodiversity. Workshop participants shared their contextual experiences and ranked 16 predefined aspects that affect green space management for biodiversity. Prioritisation of biodiversity in politics and governance, its priority internally in the organisation and nature's overall priority in society emerged as important factors. Access to economic resources, laws and regulations, and communication both within organisations and with the public were much discussed. Meadow establishment and maintenance, deadwood handling and plant selection were concrete examples of the work where knowledge about biodiversity could also play a role. Green space management holds promising yet untapped potentials for enhancing biodiversity. This article serves as a starting point for further research in this field.

1. Introduction

The last decades have seen a dramatic decrease in biodiversity globally, exemplified by a 69 % decrease in relative wildlife abundance since 1970 (WWF, 2024). This alarming trend is largely caused by anthropogenic activities, with land-use change acting as the main direct driver (Jaureguiberry et al., 2022). Heavy urbanization (McKinney, 2008; Wenzel et al., 2020) with its associated forms of land alterations is estimated to account for at least 25 % of cases where a net habitat loss of 10 % or more occurs for certain species (Simkin et al., 2022). Additional major drivers are linked to the intensification of agriculture (Sánchez-Bayo & Wyckhuys, 2019; Watson et al., 2021; Outhwaite et al., 2022), forestry management involving large scale ecosystem disturbances (Latterini et al. 2023), and infrastructure development (Benítez-López et al. 2010), all of which have signficantly harmed species and their habitats (WWF, 2024). Furthermore, climate change is increasingly exerting a heavy impact on biodiversity loss, emerging as its most rapildy developing threat (Jaureguiberry et al. 2022).

Biodiversity concerns "…all forms, levels and combinations of natural variation, at all levels of biological organisation" (Gaston, 2010:27). It includes: "variation in genetic, phenotypic, phylogenetic, and functional attributes, as well as changes in abundance and distribution over time and space within and among species, biological communities and ecosystems" (Dıaz et al., 2015:12). There are still shortfalls and knowledge gaps regarding the full values and functions of biodiversity (Hortal et al. 2015), and there are several reasons to be concerned about its loss and to engage in its protection (WWF, 2024). Consequently, there is legislation, such as the EU's Nature Restoration Law (EU, 2024), which addresses biodiversity loss by providing incentives for its preservation and enhancement.

Effective landscape management strategies are critical to preserve and enhance overall biodiversity (Maxwell et al. 2020). Urbanised areas may in Sweden include just 3 % of the total land area (Statistics Sweden, 2023) but are integral to ecosystem functioning and support of cognitive understanding of the importance of biodiversity (Aronson et al., 2017; Campbell-Arvai, 2019). Urban landscapes can be species rich (Niemelä 1999) and often surpass other heavily impacted landscape types such as agricultural land when it comes to biodiversity (Goode, 2020) and have

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the potential to provide opportunities for urban citizens to experience a sense of nature and potential appreciation of a diversity of plants and animals.

The definition of "urban" lacks academic consensus, varying across authors and disciplines (Dijkstra et al., 2019; McIntyre, 2020). This article adopts a management-centred perspective, where the "urban areas" refer to spaces shaped by public or private green space management.

The management of green spaces in urban settings includes the work with parks, housing areas, cemeteries, urban forests and other green infrastructure within various organisations. The green space management sector in Sweden, like in many parts of the world, is much based on local governments, while also including cemeteries and both privately and publicly owned housing organisations as main landowners and employers of green space managers (Persson et al. 2020). The sector includes a large number of organisations, many of them small, and many with green space management as a small part of their responsibilities. There is also a growing complexity in the work, with influence from stakeholders like citizens, non-government organisations and entrepreneur companies (Persson et al. 2020).

Green space management concerns both maintenance and upkeep on an everyday basis, and also long-term development, involving organisational aspects. This has been described as strategic management (Jansson et al. 2019). The management organisation in, e.g., a local government is often divided into three levels or phases: operational management, including green space maintenance and upkeep, tactical management elaborating overall plans and strategies, and the policy level working with long term visions on the political level, often informed by plans from the tactical level (Jansson & Randrup, 2020).

Effective and strategic communication is essential for biodiversity-focused work (Seymour et al. 2020). However, uncoordinated stakeholders and limited communication act as barriers to the implementation of urban green initiatives (Buffam et al. 2022). Furthermore, strategic management supporting biodiversity requires a broad approach, including diverse professional affiliations and stakeholder interests (Maxwell et al. 2020; Seymour et al. 2020). Green space managers, as well as their management organisations, may have different priorities and views on biodiversity in their work, as described in the development of three ideal types by Christoffersen & Randrup (2024). That might affect concrete activities as well as the involvement of multiple stakeholders in a broader approach, i.e. governance, to balance human and ecological perspectives (Aronson et al. 2017; Deparis et al. 2023).

The combination of green space management and governance can be understood through a combined model (Jansson et al., 2019), based in the park-organisation-user model (Randrup & Persson (2009) and the tetrahedron policy arrangement approach (PAA) (Arts, Leroy, & van Tatenhove, 2006). Altogether, the combined model shows how the management organisation, with its policy, tactical and operational levels, is working in a larger context, including relations to different actors, mainly the public, as well as to the physical landscapes being managed. The governance aspects from the PAA include these relations directly, and also how they are affected by power and resources, rules of the game, and discourses (Arts, Leroy, & van Tatenhove, 2006).

The possibilities within green space management strongly depend on strategic management and governance with focus on prioritisation on different organisational levels and among different actors, vertically as well as horizontally (Sunding, 2025). Horizontal alignment is the connection between sectors, and vertical alignment is between policy, tactical and operational levels, both important to allow efficiency and flow in the management work.

There are several needs for further research to adequately direct green space management to biodiversity preservation and enhancement (Lepczyk et al. 2017). This includes gaining insights into the aspects affecting management for biodiversity, as experienced by managers. Engaging practitioners is essential for successful outcomes in green spaces and their qualities (Eggermont et al. 2015). However, scientific findings often fail to reach practitioners engaged in concrete management for biodiversity (Aronson et al. 2017). Much research focuses on aspects of governance, planning and management of green spaces generally, addressing aspects such as financing, organisation, power distribution, and relations to various stakeholders (Jansson & Randrup, 2020; Knudsen et al. 2019; Hanson and Olsson, 2023; Singleton, 2023; Chowdhury et al. 2023), or urban ecology or biodiversity (e.g. McIntyre, 2020; Kowarik, 2018; Müller et al. 2018). To the best of our knowledge, no study has specifically investigated green space managers' experiences and perspectives regarding their work with management of green spaces for biodiversity.

In this study we focus on the experiences of green space managers from southern Sweden, using qualitative methods to understand their specific, practical working conditions as related to the promotion of biodiversity. While the generalizability of the findings is limited, our aim is to contribute to an informed discussion about the preservation and enhancement of biodiversity through green space management.

Two research questions are central to this study: 1. What types of experiences exist regarding the preservation and enhancement of biodiversity through green space management? 2. What aspects influence the possibilities to work for biodiversity in green space management?

2. Material and methods

2.1. The workshop

This study builds on a workshop directed at green space managers. It was part of a full day seminar focusing on research and practice orientated towards management for biodiversity initiated by a group of researchers in landscape governance and management at the southern part of the Swedish University of Agricultural Sciences, in Alnarp. The seminar day, including the workshop, was advertised through various channels: (1) in two of Sweden's most prominent professional journals related to green space management (2) at the official webpage of the Swedish University of Agricultural Sciences (SLU), and (3) through social media (mainly LinkedIn). This outreach strategy was designed by the researchers to attract participants across parts, roles and levels of the Swedish green space management sector. Attendance was free of charge for all participants and brought together a total of 33 professionals from the green space management sector, from municipalities, cemetery organisations, housing companies, plant nurseries and landscaping companies. They represented managers at the tactical level (N = 22) and the operational level (N = 11). The managers thus occupy different positions within the organisations, yet all the managers are imbued with some authority to make management decisions and interact with users in their sites, which ultimately contribute to the institutionalization of new practices and policies. Additionally, eight researchers specializing in landscape management, governance and vegetation participated as well as facilitated the workshop. A large variety of roles was thus represented in the room. For the workshop, the 33 participants formed six mixed groups of 6–8 individuals in each, encouraged to mix in terms of workplace and management responsibilities.

The three-hour long workshop consisted of two parts. First, each group was asked to internally freely share and discuss their experiences of working with green space management for biodiversity, including related challenges and possibilities. Secondly, each group ranked 16 aspects according to how much they influence management for biodiversity, inspired by the Q-methodology (Brown et al. 1999). Both were documented through notetaking.

2.2. Ranking inspired by Q-methodology

The Q-methodology is an approach that can help explain the perspectives of various stakeholders, including decision-makers, managers,

and citizens, across different spheres of society (Brown et al. 1999), e.g. by letting them discuss and rank different aspects of a subject. Previously, it has been applied to biodiversity conservation studies, capturing stakeholders' perceived experiences of the impediments or facilitations in related management, policymaking, and governance (Zabala et al. 2018), and for assessment of ecosystem services across green space management organisations globally (Buffam et al., 2022).

For this workshop, inspired by Q-methodology, 16 aspects were prepared as shown in Fig. 1. This was done through a process spanning about one month, involving a group of seven researchers specialised in subjects like landscape management and governance and with much experience from collaboration with practice. The group drafted and discussed how to select and formulate 16 probable aspects expected to cover what can influence management for biodiversity. This was done mainly through e-mails but also during a couple of meetings. The content was based on the researchers both pointing at relevant aspects in previous research literature, and their general experiences of research and practice.

The workshop groups were given the predefined 16 aspects printed on cards and were instructed to rank their importance as a result of their discussions, by first reading them all together and then ranking them according to four levels. On the first level, workshop participants were allowed to place one aspect, which they considered the most influential for working with management for biodiversity. Level two allowed three aspects, level three five aspects and level four seven aspects (Fig. 2). Additionally, the distribution of two blank cards to each group allowed them to write one or two new aspects of their own choice. The condition for doing so was a removal of an equal number of aspects from the predefined cards. High engagement and lively discussions in all groups characterized this part of the workshop. Each group compiled the results and a discussion in plenum followed. Similar to the ideas of Q-methodology, the researchers in the workshop allowed for spontaneity and flexibility, serving as support and facilitators of the group discussions while taking notes.

2.3. Analysis

The notes taken by researchers during the group discussions were collected and compiled qualitatively and inductively, through thematic analysis, with coding and clustering into themes. Two separate qualitative analyses were made for the two parts of the workshop. The results of the ranking made by each group were also compiled separately, and quantitatively. Each factor placed on level 1 got 4 points, on level 2: 3 points, on level 3: 2 points and on level 4: 1 point each. These three parts

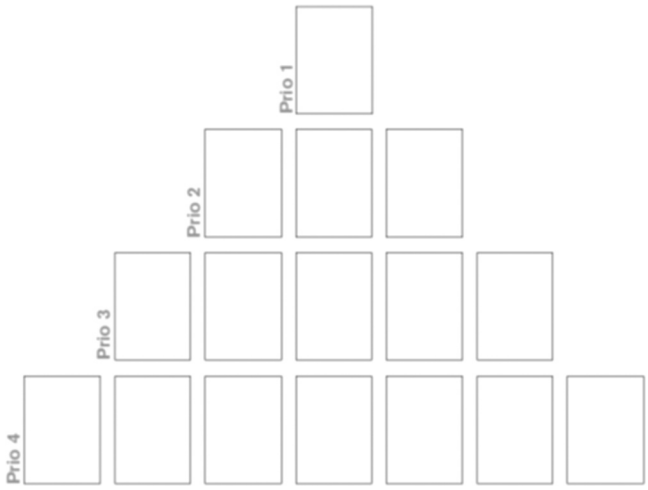

Fig. 2. The model used to rank the 16 aspects.

of the analysis also formed three parts of the results from the workshop: Group discussion on experiences, Rank of the influencing aspects, and Discussion during ranking.

3. Results

3.1. Group discussion on experiences

Through the thematic analysis of the first part of the workshop, on experiences, two overall themes were formed: *communication* and *landscape elements*. Fig. 3 displays how the experiences of the participating green space managers, although not very rich, revolved around these two major topics, each associated with subthemes.

3.2. Communication

Communication with different actors emerged as a pivotal aspect of management for biodiversity among the workshop participants, particularly emphasized as the importance of communicating with the public as well as within the manager's own organisations (Fig. 3).

The subtheme *the public* centred on communication between management staff and the public, highlighting how opinions and views among citizens were influential in relation to managers' efforts to preserve and enhance biodiversity. A central opinion among the workshop

1. Urban densification
2. Climate change
3. Access to particular land areas
4. Possibilities for connecting areas, e.g. via green corridors
5. How biodiversity is prioritised in society
6. How nature in general is prioritised in society
7. How biodiversity is prioritised internally in the administration/organisation
8. How biodiversity is prioritised in politics/governance
9. Knowledge of how biodiversity can be assessed, measured and monitored
10. Laws and regulation
11. Access to economic resources
12. Access to technical solutions
13. Agreement about the most valuable initiatives
14. Resources and competences for collaboration (e.g. with land owners, condominium associations, private foundations, voluntary associations)
15. Dialogue with the public
16. Dialogue with entrepreneurs/operators

Fig. 1. The 16 predefined aspects given the groups to rank in order of their influence on management for biodiversity.

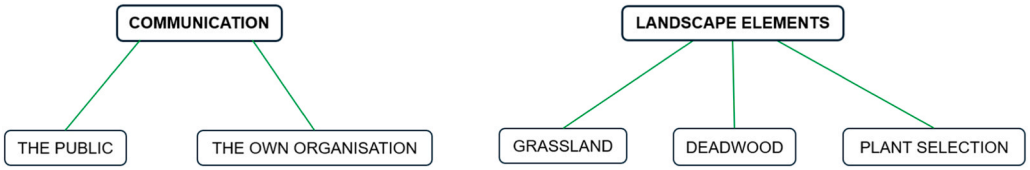

Fig. 3. Thematic structure formed though thematic analysis of the group discussion on experiences from management for biodiversity, during the first part of the workshop.

groups was that the acceptance among the public plays a vital role in the management for biodiversity and therefore, their perspectives should be actively integrated into the related decision-making and planning. The description of public involvement was of various types, and examples included everything from how some citizens had called for more frequent grass-cutting due to fear of ticks, to alleging that leaves in their drainpipes originated from adjacent cemeteries.

Some commented on the need to appease the public through a diplomatic approach, with suggestions that one cannot assume they hold the best knowledge. One participant remarked *"In order to avoid negative attitudes among the public, we sow annuals in the periphery and keep perennials in the center"* highlighting a strategy possibly aimed more at managing public perception than at supporting biodiversity. This ties into the participants noticing different views of aesthetics among the public. These views also varied with the type of settings, as different aesthetics may be accepted in urban parks than in more natural areas, allowing different types of actions for biodiversity in the management.

The *organisation* subtheme focused on how communication within the participants' own organisational structures impacts management for biodiversity. They noted that larger organisations tend to create contextual disunity both at the overall organisational level and within individual units, which hinders efforts to manage for biodiversity. This may relate to hierarchical structures with lengthy and cumbersome administrative procedures, requiring specifically approved orders to the operational level before allowing actions. Insights from group discussions suggested that a lack of direct communication between tactical and operational levels can limit the possibilities to take measures for biodiversity. Participants requested a more holistic approach to management for biodiversity within the organisations, allowing for more decision-making in the operational work on site.

A recurring issue regarding organisational communication challenges was conflicts between clients and contractors. These conflicts stem from non-functional procurements and a *"lack of expertise among contractors"*. This was manifested on specific instances, such as when contractors *"sow meadow seeds in the wrong location,"* as well as on more systemic levels, illustrated by the following quote*: "There are problems with procurement processes that must be adhered to in every detail. In cases where regular lawns do not function due to site-specific circumstances, and a meadow-like planting would be more suitable, the contractor tears it up and repeatedly establishes standard turf grass instead."*

3.3. Landscape elements

Different types of implementations of biodiversity were brought up during the first part of the group discussions. This especially concerned conversion of traditional lawns into meadows, but also other approaches and ecosystems.

The *grassland* subtheme concerned managers' experiences of converting lawns into meadows as a measure to preserve and enhance biodiversity in different areas. The participants themselves noted this as a trend and expressed concern about it becoming a phenomenon that overshadows other management actions for biodiversity.

Considerable attention to public opinion surrounded the implementation of meadows, as also connected to the previously described subtheme of communication with the public. This showed in quotes hinting at historical and cultural associations such as *"They have issues with the meadow we developed in the old cemetery"* and *"Way back in time that land was intended for the church bell ringer's goats"*. Managers are concerned about reactions from the public when they allow vegetation to grow freely. One participant remarked *"Maybe we should not be so afraid of that"*, indicating a view that managers *could* take a more active role in promoting biodiversity within their work on meadows. However, diverse public perceptions of aesthetics raise concerns, which can become a challenge for long-term meadow management. While meadows are often found appealing during their initial establishment, some participants had observed this to diminish over time. However, others highlighted that the public gradually become more accustomed to longer grass, leading to increased acceptance in line with the progressive development of meadows.

In several of the groups, the issue of cut meadow material was brought up. Meadow management is dependent on the harvest and removal of cut biomass, and its disposal can be problematic and even become a legal matter with no clear solution. Certain municipalities have been classifying cut meadow material as waste to be handled by organisations licensed to work with that. Consequently, participants called for a comprehensive summary or analysis of management of meadow material across Sweden.

The *plant selection* subtheme included a focus on site quality, emphasizing the importance of placing the right plant in the right location. This involved observing existing vegetation patterns to better understand maintenance needs and terrain-specific possibilities. Other parts of the discussion centered on invasive exotic species and expansive native species like sea-buckthorn (*Hippophae rhamnoides*), both types viewed as threats to biodiversity that outcompete other species and thus require significant management efforts.

Discussions in the groups also concerned *deadwood* and management routines for that, where the participants highlighted organisational discrepancies concerning the handling of deadwood. Some participants opt to store the material visibly in designated depot sites, while others chose to dispose it in less visible areas, such as under shrubs, to avoid reactions.

The need to incorporate deadwood in management for biodiversity was also to some extent highlighted: *"We have calculated how many cubic meters of dead wood we need to have per forest stand"*. The use of dead hedges was also described to facilitate the integration of deadwood into management practices to promote biodiversity, an approach occasionally challenged by public opinion, which deemed the aesthetics unsuitable for park settings. Consequently, routines for deadwood management developed along with approaches to address and inform the public about the benefits of such practices.

3.4. Rank of the influencing aspects

All groups ranked the aspects influencing management for biodiversity according to the instructions, except for one group that placed two aspects in top. While three of the groups used the predefined aspects only, three groups also formed own aspects on blank cards, one each. These self-formulated aspects naturally received low points in the subsequent aggregated ranking. However, since all three of them included aspects of knowledge, they may point at an aspect that was lacking in the predefined ones and can be clustered.

Accumulating the points (Fig. 4), the most highly ranked aspects

	Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	Gr 6	Total	Average
How biodiversity is prioritised in politics/governance	3	4	3	2	4	3	19	3,2
Access to economic resources	2	3	2	2	3	2	14	2,3
How biodiversity is prioritised internally within the administration/organisation	1	3	4	2	1	2	13	2,2
How nature in general is prioritised in society	4	1	2	4	1	1	13	2,2
Laws and regulation	2	3	0	2	3	3	13	2,2
Dialogue with the public	3	2	3	3	1	1	13	2,2
Climate change	2	1	1	1	3	4	12	2,0
Knowledge about how biodiversity can be assessed, measured and monitored	2	2	1	3	2	2	12	2,0
Resources and competencies for collaboration*	3	2	2	1	2	2	12	2,0
How biodiversity is prioritised in society	4	2	1	3	1	1	12	2,0
Access to particilar land ares	1	1	1	1	2	3	9	1,5
Access to technical solutions	2	1	2	1	1	1	8	1,3
Dialogue with entrepreneurs/operators	1	2	1	1	2	1	8	1,3
Urban densification	1	0	2	1	1	2	7	1,2
Possibilities for connecting areas, e.g. via green corridors	1	1	1	1	2	1	7	1,2
Agreement about most valuable initiatives	1	1	1	2	1	1	7	1,2
Knowledge of the operational staff/contractors			3				3	
Knowledge of the manager		1					1	
Knowledge about biodiversity	1						1	
*e.g. with land-owners, housing cooperatives, private associations, non-profit organisations								

Fig. 4. Grading of 16 aspects affecting management for biodiversity, as assessed by the groups.

affecting the management for biodiversity were *How biodiversity is prioritised in politics/governance*, placed on level 1 or 2 by five of the six groups. *Access to economic resources* followed. Other factors highly ranked by the managers included *How biodiversity is prioritised internally within the administration/organisation; How nature in general is prioritised in society; Laws and regulation* and *Dialogue with the public*.

Overall, the highly ranked aspects reflect the importance of biodiversity being prioritised among various actors in different contexts, mainly politically, through governance and organisationally, but also societal priority of biodiversity and nature at large (see Fig. 4). Participants described the lack of priority for biodiversity in these contexts being of such paramount importance, even decisive, that they are *"a barrier or bottleneck that has prevented us from gaining experience with the other aspects"*.

3.5. Discussion during ranking

Six themes emerged from the qualitative analysis of the discussion during the second part of the workshop, while ranking the 16 aspects: *Organisation, Citizens, Knowledge, Economy, Legislation*, and *Climate change*.

3.6. Organisation

The prioritisation of biodiversity within the own division or organisation was ranked as the third most important aspect among the groups (see Fig. 4). The 'undervaluation' of biodiversity, when not prioritised in organisations, was also in focus in the group discussions. Furthermore, organisational dynamics suggest a need for managers to receive support from higher levels within organisational hierarchies. Consequently, managers' abilities to align their actions in management for biodiversity closely link up to their position or role within the organisation. Addressing the slow speed of decision-making processes, one respondent used the phrase *'to meet oneself to death'* about the inefficiencies in large organisations, where bureaucracy and excessive meetings can hinder effective management work.

3.7. The public

Participants have generally had positive feedback from the public when implementing initiatives for biodiversity in the management of public spaces. However, they noted that perceptions of nature can vary among citizens based on demographics such as age, background (e.g., rural versus urban upbringing), place of birth (e.g., Sweden vs. abroad), and traditional or cultural heritage. This was expected to be reflected in different views of aesthetics and preference for different public settings, such as parks in contrast to more natural areas, and, in turn, in the types of management actions that are accepted.

3.8. Knowledge

All uses of the three blank cards expressed the aspect of knowledge, and knowledge also appeared in the group discussions among several groups. On the one hand, it revealed signs of resignation, illustrated by expressions such as, *'…we already work with that [referring to biodiversity] without knowing what we are doing*' followed by, *'…we can never measure or confirm what we ultimately achieve"*. One specific need for more knowledge discussed concerned how to monitor and measure biodiversity. Participants also pointed to the need for different types of knowledge.

On the other hand, some participants argued that there is no general shortage of knowledge, but a variation depending on professionals' backgrounds and education. Participants emphasized that maintaining knowledge about biodiversity is a personal responsibility that encourages greater awareness and understanding among superiors, thus making its prioritisation more likely.

Knowledge also appears as linked to holistic approaches, where informed stakeholders in different roles are essential for understanding how different aspects of biodiversity are interconnected and for translating this understanding into operational maintenance. Notably, one group identified general knowledge, particularly among maintenance contractors, as important in making management for biodiversity possible. This was included on one of the blank cards, and was highly ranked, on level two (see Fig. 4).

3.9. Economy

Economic resources was considered the second most important aspect according to the ranking (Fig. 4), discussed as a driving force for gaining momentum in management for biodiversity. However, participants also expressed that investing in biodiversity through management leads to long-term cost savings compared to other management strategies, claiming that *"in the long run, it becomes cheaper"*.

3.10. Legislation

Laws and regulation ranked as the fourth most influential aspect among the groups (see Fig. 4). Some participants argued that effective laws are crucial to preserve and enhance biodiversity, emphasizing their importance: *"Nature knows no borders; therefore, laws and regulations are essential. Without them, the actions of a single municipality are inconsequential if neighbouring municipalities do not follow suit."* In contrast, other participants regarded legislation as subordinate and chose not to discuss it further, believing it to be of limited importance to their work.

3.11. Climate change

Climate change ranked as the sixth most influential aspect concerning management for biodiversity (see Fig. 4). Overall, it was little discussed. One perspective was that it had limited influence on the possibilities to manage for biodiversity, e.g., by saying *"climate is important but you can adapt to it"*. Another participant referred to the prioritisation as a bottleneck, stating that they still do not have any experiences of the influence of climate change on management for biodiversity being the hindering aspect.

4. Discussion

This study aimed to increase the understanding of how green space managers in Sweden experience their work for biodiversity, as basis for knowledge on how biodiversity can be preserved and enhanced. The results show that there are experiences of this work, although they can be seen as rather limited. They also show a complexity of aspects affecting the work, where some appear to influence and limit the possibilities to work for biodiversity more than others. Much focus was placed on aspects related to communication and collaboration, both within the own organisation, and with the public. The prioritisation of biodiversity by decision makers and other superiors, along with economic resources, were clearly lifted, as was the prioritisation of nature in society at large.

4.1. Experiences from working with management for biodiversity

The participants in this study provide a picture of their experiences of management for biodiversity being rather limited. Much of it has been focusing on meadows and other types of grasslands, and the work has been challenged in several ways.

The quite clear focus on grasslands and conversion of turf grass into meadows and similar vegetation systems may be connected to the many existing lawns today (Ignatieva et al., 2017), where meadows may be an easy way of enhancing their biodiversity. Also, meadow types of grasslands that are continuously harvested may be valuable choices since they are among the most species rich vegetation systems globally (Wilson et al., 2012). There has also been an international trend during the last years focusing on meadow development through both international and national campaigns.

The workshop also revealed experiences to some extent encompassing a broader scope of management for biodiversity than meadows. The fact that green space managers implement and discuss also e.g. plant selection and deadwood showcases a recognition of the multifaceted nature of management for biodiversity, although the work is still limited. This is in accordance with Wilson et al. (2009), who argue for a broad analysis where many aspects are accounted for when prioritizing and planning for biodiversity. However, with work on separate landscape elements, such as grasslands, deadwood and plant selection, there is a risk of not getting into holistic natural processes dynamics and ecosystems. Management for biodiversity may require new thinking and strategy. This includes the potential of natural succession for biodiversity conservation (Seymour et al. 2020; Bonthoux et al., 2014; Kowarik, 2018).

4.2. Aspects influencing management for biodiversity

Both when describing experiences from work with management for biodiversity in general, and when rating aspects influencing the possibilities to do so, communication, collaboration and organisational aspects with various actors were brought up as important. This emphasises various connections between actors about the development of the physical landscape and its qualities. The study also revealed a broader pallet of aspects affecting the work in green space management for biodiversity, including the views of the public at societal as well as on local level, and aspects connected to knowledge, economy, legislation and climate change.

While green space management includes large possibilities to preserve and enhance biodiversity (Castelli et al. 2021), this potential can be limited by challenges related to governance, including the involvement of multiple stakeholders and the need to balance human perspectives with ecological considerations (Aronson et al. 2017; Deparis et al. 2023). The results of this study show how the work is affected by several different aspects that can be seen through the combined model (Jansson et al. 2019), where governance aspects like legislation (rules of the game), economy and knowledge (resources), climate change (discourses) and also by the public, the own organisation and contractors (actors) found in the PAA model (Arts, Leroy, & van Tatenhove, 2006) appeared more limiting than the existing green spaces. This shows how the possibilities for green space managers to support biodiversity are much affected by a larger organisation and governance context.

The results specifically indicate that green space managers need support from policy and the own organisation in forming strategies for biodiversity. This is in line with the importance of prioritisation on different organisational levels and among different actors in a strategic management and governance context, vertically as well as horizontally (Sunding, 2025). Horizontal alignment between sectors, and vertical alignment between policy, tactical and operational levels, appeared of crucial importance in green space management for biodiversity. For managers on tactical level, but even more for those on operational level, this alignment is needed to enable internal organisational flow. Both bottom-up and top-down hierarchical barriers have previously been identified as detrimental to management for biodiversity, both nationally (Seymour et al. 2020) and internationally (Thoyer et al., 2002), and as was found here, at the operational level, including when maintenance is outsourced. The results therefore show the importance of both vertical and horizontal alignment (Sunding, 2025) within the organisation managing for biodiversity, but also with actors that the organisation collaborates with.

The implementation of biodiversity appears to be hindered by a lack of targeted and effective prioritizing, which according to Wilson et al. (2009) is increasing the risk of failure in biodiversity conservation projects. Prioritisation requires contextual policies and related strategies that are flexible and adaptable to local circumstances (Wilson et al. 2009). Without a manifest strategy, biodiversity promoting efforts tend to become ad hoc activities, depending on the initiative and leadership of single managers. The workshop revealed a situation where approaches for biodiversity in green space management are still rather limited, with insufficient organisational support.

The managers' personal views, knowledge, and engagement appear, at least in many cases, to be drivers of change, where individual incentives must compensate for the collective shortcomings in the organisational support. They must thus manoeuvre several challenges, many of which are related to actors, both within the own organisation, its various organisational levels and outsourcing activities, as well as in the public (Jansson et al., 2019). Involving the public and other interested parties, albeit time consuming, may be of great importance. It supports the idea that new, collaborative governance structures are needed to solve the (wicked) environmental problems that humanity face today (Head, 2023), such as the decline of biodiversity.

Like in previous research (Seymour et al. 2020; Buffam et al. 2022),

communication with different actors emerged as a key component for successful management approaches. Much of the problems in the communication with decision makers, and particularly the public at local level appeared connected to opinions about aesthetics. The managers' personal views on biodiversity may affect their individual ways forward (Christoffersen & Randrup, 2024), but they may also be hesitant to promote biodiversity if users potentially perceive that negatively, hindering their work (Hoyle et al. 2017), something also indicated by the results of this study. However, sometimes managers' expectations of negative reactions are put to shame (Hoyle et al., 2017). The fact that the participating managers generally had positive feedback from the public regarding efforts for biodiversity may indicate an emerging consciousness in the population, as has also been experienced elsewhere (e.g. Manfredo et al., 2021). Ignatieva et al. (2017) found appreciation of both traditional lawns and of alternatives, and Southon et al. (2017) found that citizens generally prefer and accept meadows over traditional lawns. Therefore, transitioning lawns to meadows may enhance biodiversity while also gaining public support. However, a long-term approach and prioritisation is needed to develop and sustain high biodiversity in meadows, also as meadows change over time (Fekete et al., 2024).

Knowledge was lifted in different ways among the participants, as sufficient and not, and as a need for different types of knowledge in management for biodiversity. Authors like Seymour et al. (2020) argue that science alone will not suffice to tackle the current biodiversity crisis; additional social, political, economic, and educational measures will be necessary. This can mean several types of knowledge and skills among a broad range of actors, including, e.g., contractors and the public. The embracement of them may even be decisive for halting the crisis of biodiversity loss, to diversify solutions (Pereira and Bina, 2020). Also, the importance of how to evaluate biodiversity promoting activities was discussed. While there is quite a lot of efforts to solve this issue (e.g. Strandberg et al. xxx), the question remains as to how such documentation can be a driver for biodiversity promotion, and not a hindrance.

4.3. Methods discussion

Like other studies examining management of urban open space and biodiversity contexts (Seymour et al. 2020; Buffam et al. 2022), this study included a diverse range of participants from various professional affiliations. This diversity offered a broad understanding of the current situation for management practices for biodiversity. However, the included participants cannot be expected to represent the views of green space managers in general. First, they were limited to practitioners from southern Sweden, following the geographical placement of the workshop. Second, they had all actively signed up for the seminar day on management for biodiversity, showing particular interest in the subject.

The data collection during the workshop includes some limitations, as it depended much upon each facilitator to take notes in their own way. Furthermore, using pre-defined aspects in the workshop affected the results. With more time, a full Q methodology approach could have included also a forming of aspects from the participants, possibly ending up in other aspects. However, it is not evident that it would be possible to engage the managers for an even longer workshop session, which would then be required.

Knowledge identified as an important aspect of management for biodiversity, acknowledged by several participants in this study. However, its significance may have been downplayed because it was not part of the predefined aspects.

Furthermore, the study did not include much data from each participant other than work affiliation and management level, as a way of limiting the collection of personal data to the most relevant. However, more personal data such as age, gender, and educational background could have been of interest to the study.

4.4. Concluding remarks

We can ascertain that management for biodiversity is a topic considered relevant and on the agenda among green space managers in Sweden today, evident by the attendance of very motivated green space managers with varying positions and organisational affiliations, and their active participation in the workshop. While the experiences from working with management for biodiversity are still rather limited, often restricted to meadows and other grasslands, there are knowledge and ideas also about other interventions, mainly deadwood and plant material. In our second research question we asked about aspects that influence the work for biodiversity and found several that determine possibilities to act and thereby also the likelihood of successful results. Prioritisation, politically, within the own organisation and in society at large, was considered the most important of all. A stronger mandate to implement effective action among green space managers, on both tactical and operational levels, requires stronger support from higher levels to facilitate targeted policies. Such support would also provide a stronger platform for dialogues with the public, an overarching task and concern in everyday green space management.

Author statement

I, Lisbet Christoffersen, have been responsible for ensuring that the descriptions are accurate and agreed to by all authors.

The contribution of each author appears in the authors list on the submission page.

CRediT authorship contribution statement

Märit Jansson: Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Conceptualization. **Johanna Deak Sjöman:** Writing – review & editing, Writing – original draft, Investigation. **Tobias Emilsson:** Writing – review & editing, Investigation. **Randrup Thomas Barfoed:** Writing – original draft, Methodology, Investigation, Conceptualization. **Lisbet Christoffersen:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Mikael Brocki:** Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: All authors reports article publishing charges was provided by Swedish University of Agricultural Sciences. All authors reports a relationship with Swedish University of Agricultural Sciences that includes: employment. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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