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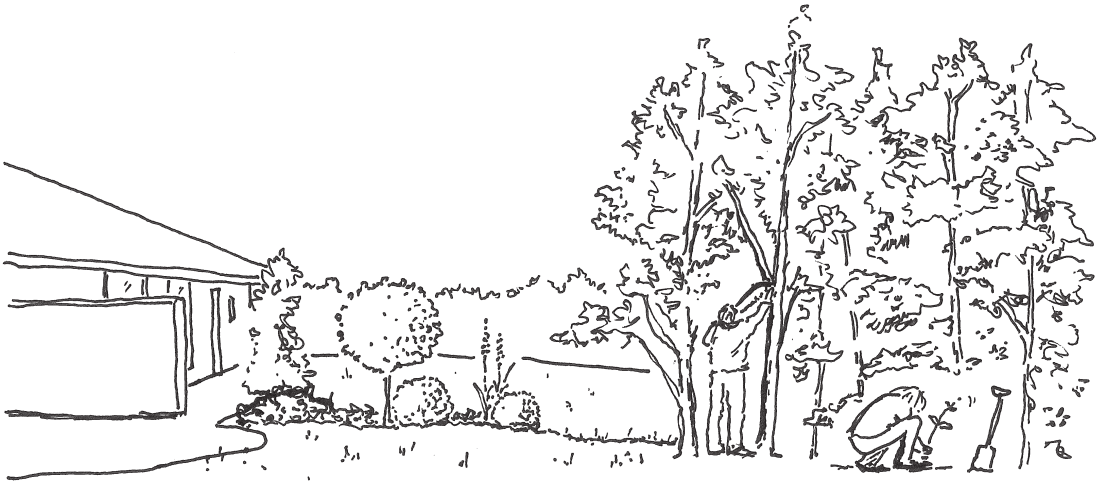
User Participation in Public Urban Woodland Management

Drivers and Impact on Green Space Quality

Hanna Fors



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Cover: The co-management zone
(illustration: Hanna Fors)

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User Participation in Public Urban Woodland Management. Drivers and Impact on Green Space Quality

Abstract

There is widespread agreement on the many benefits citizens gain from recreational use of local green spaces such as urban woodlands, and the importance of involving users in the development of their everyday landscapes. Despite this, the impact of user participation on the quality of public green spaces has not been thoroughly studied. In this PhD thesis, resident participation in public urban woodland management including drivers for participating, impact on the quality of the woodland, and ways in which local authorities can facilitate it in a long-term perspective was explored. The topic was studied through a literature review and a seven-year longitudinal, mixed-method case study of the residential area Sletten in Holstebro, Denmark. The literature review identified a general lack of empirical support for the many assumed positive outcomes of user participation in the different phases of green space development. A particularly large disparity was found between assumed and empirically substantiated knowledge on how participation may directly benefit physical urban green spaces.

The purpose of the case study was to investigate the topic with focus on resident participation in management of public urban woodlands. In Sletten, residents participate in the maintenance and management of the public woodland edge zone bordering their private gardens, called the co-management zone. It was found that clear guidelines and continuous local authority–resident communication, including municipal guidance, inspiration and control, were crucial for a functional co-management zone. The study of residents' drivers of participation pointed at combinations of both personal and environmental drivers, the relative importance of which changed over time from gardening interest, stand height and residents inspiring their neighbours in 2010, to forest edge type and length of residence in 2015. Local authorities aiming to facilitate co-management should be aware of this temporal dimension and encourage participation by identifying people interested in gardening who inspire others, combined with strategic woodland vegetation design and management increasing visual and physical accessibility. In Sletten, it was found that social, experiential, functional, and ecological dimensions were all included in residents' perceptions of 'urban woodland quality'. Maintenance, accessibility, nature and facilities are aspects that occur repeatedly in quality assessment schemes for other types of urban green space. These were also central to urban woodland quality, apart from facilities. In addition, the study revealed the importance of structural and species diversity between and within woodland stands – a quality aspect that distinguishes woodland from other types of urban green space. It was also found that participation had additional benefits for participants. This research has contributed new insights, useful to green space managers in their work when involving users in management, and has provided new approaches to the scientific discussion on green space quality.

Keywords: user participation, public involvement, green space governance, urban woodland management, place-keeping, urban forestry, green space quality assessment, urban woodland quality, drivers, co-management zones

Brukarmedverkan i skötsel av offentliga urbana skogar. Drivkrafter och påverkan på grönområdeskvalitet

Sammanfattning

Det råder bred enighet om hur mycket stadsbor får ut av att använda lokala grönområden rekreativt, och om betydelsen av att involvera brukare i utvecklingen av sina vardagslandskap. Trots detta vet man idag inte hur brukarmedverkan påverkar kvaliteten på offentliga grönområden. I denna avhandling undersöktes brukarmedverkan i förvaltning av offentliga, urbana skogar, med fokus på drivkrafter för deltagande, dess inverkan på skogens kvalitet och sätt på vilka lokala myndigheter kan underlätta långsiktigt deltagande. Ämnet studerades genom en litteraturstudie och en sjuårig longitudinell fallstudie av bostadsområdet Sletten i Holstebro, Danmark. Litteraturöversynen visade på att empiriskt stöd saknas för många av de positiva resultat brukarmedverkan i grönområden antas ha, särskilt i fråga om hur det fysiska grönområdet antas gynnas av brukarmedverkan.

Syftet med fallstudien var att undersöka ämnet med fokus på boendes deltagande i förvaltning av offentliga, urbana skogar. I Sletten deltar de boende i skötsel och förvaltning av brynzonen av den skog som gränsar till deras privata trädgårdar, den så kallade 'samförvaltningszonen'. Studien visade att tydliga riktlinjer och kontinuerlig kommunikation mellan kommun och boende, där kommunen ger vägledning, inspiration och kontrollerar att riktlinjerna efterlevs, var avgörande för en funktionell samförvaltningszon. 2010 drevs de boendes deltagande i skogsförvaltningen av trädgårdsintresse, tillräcklig beståndshöjd och att boende inspirerade sina grannar att delta, för att 2015 istället drivas av skogsbrynstyp och hur lång tid de boende bott i Sletten. Kommuner som vill underlätta samförvaltning bör vara medvetna om denna förändring av drivkrafter över tid och kan uppmuntra deltagande genom att identifiera personer som är trädgårdsintresserade som kan inspirera andra, kombinerat med strategisk design och förvaltning av skogen inriktad på att öka visuell och fysisk tillgänglighet. De boende betraktade kvalitet av urbana skogar som uppbyggd av sociala, upplevelse-, funktionella och ekologiska dimensioner. Skötsel, tillgänglighet, natur och faciliteter (t.ex. gångvägar och lekplatser) är aspekter som ingår i många kvalitetsbedömningssystem för andra typer av urbana grönområden. Förutom faciliteter var dessa aspekter också centrala för kvalitet av urbana skogar. Dessutom visade studien på vikten av strukturell och artdiversitet mellan och inom skogsbestånd - en kvalitetsaspekt som särskiljer skogar från andra typer av urbana grönområden. Forskningen som presenteras i denna avhandling har bidragit med nya användbara insikter för grönyteförvaltare som arbetar med brukarmedverkan och med nya tillvägagångssätt för den vetenskapliga diskussionen om grönområdeskvalitet.

Nyckelord: brukarmedverkan, förvaltning av urbana skogar, bedömning av grönområdeskvalitet, kvalitet av urbana skogar, drivkrafter, samförvaltningszon

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Prologue

All of a sudden he's there, drives up and parks the car on his driveway. Kindly enough, he has agreed to squeeze in my interview after running a long trail race and before having friends over for dinner on a Saturday evening in October. This positive and energetic 43-year-old man has lived in Sletten with his family from the establishment of the neighbourhood. What he really likes about Sletten is that it feels like living in the city, while having nature on the doorstep, and it doesn't feel too crowded. He especially likes the green space in the middle of the forest village, since it creates a feeling of community and it is used for joint activities. But the woodland beyond the garden, he adds, is at least as good: "It's really nice that it's right next to your garden, instead of having a neighbour there". He's active in his leisure time, running, trail running and road biking. A quick glance at his garden tells you that he has an interest in gardening as well.

He has participated very actively in the co-management zone, more than most other residents in Sletten. Well, to be frank, his management activities extend far beyond the stipulated four-metre wide zone. In fact, he considers that delimitation redundant. It's rather hard, he says, to create something sensible within those few metres, guessing that few Sletten residents stay within the limit. He even believes the four-metre limit has made some residents refrain from participating, being afraid that the local authorities would think that they participated too much. He considers other guidelines much more important, for example, the ones saying how large a percentage of the originally planted trees that can be removed, considering it important to preserve the woodland and make sure that it doesn't become too open. He says that guidelines should include what the local authorities do not want, such as open areas in the woodland, but apart from that, the guidelines should be as unrestricting as possible, to allow the residents to decide.

He started participating in management of the zone when the woodland was two-three years old. By then, he had finished establishing his own garden and became interested in the woodland, partly because he realised how close to the

garden it actually was. Initially, when the woodland trees were still small, the area was very open and windy. Therefore, his primary focus then was to create a sheltered environment from the harsh wind. He did this by putting straw around the trees that were most exposed to the northerly winds, which made them grow quicker, affording shelter. Then he made a path system of his own and planted different trees and shrubs. The small original woodland trees were planted in rows, so he removed some of them to create a more natural path, and planted some new, more interesting tree species in between the woodland trees. His ideas on how to develop the woodland grew after having started to work on it. Now that it has become a "real little forest or a small park", he doesn't really add new plants or features, but maintains the environment, and not least, uses and enjoys it. "Often when I get home from work, instead of going inside I go for a walk [in the woodland], just to release some stress and see if anything has changed there." He likes the experience of walking around in the woodland, looking at the trees and remembering when he planted this tree or that tree.

Last summer three boys, about 12-14 years old living in the same forest village, decided to make a mountain bike path around the entire forest village. He thinks they were inspired by other residents' activities in the zone. The path turned out to be "very narrow, but really nice", he says. He has connected his path system to theirs, as he thought they showed initiative. Since the path is so narrow, it is mostly used by adults for running, but he says it doesn't matter whether the boys maintain it or if it becomes overgrown.

Not all the residents in Sletten know that they can participate in something called the co-management zone. He remembers receiving a letter from the local authorities with written guidelines for the zone in 2010. When he and his family moved to Sletten, he found it difficult to find information on what you were allowed to do in the woodland, so he appreciated the letter. The role of the local authorities is to set limits that guide participation, he says. They planted a varied base planting, and left it up to the residents to put their mark on the woodland. Personally, he has never contacted the local authorities regarding the woodland. He thinks that it really makes sense to involve residents in the woodland management: "It's really up to each individual how much they want to do. If you just want to leave it as it is, you can. Or, you can do a lot /…/ because now it has become a forest it doesn't matter if there are many or few paths". He thinks residents should participate individually. It's difficult to do it together, since people have so many different interests and ideas regarding the zone, while some are not interested in participating at all.

When asked to describe what high quality of the Sletten woodland means to him he mentions the varied woodland and the possibility of harvesting food: "I actually think it's really the variation you can create through replacing some

trees. To plant some apple trees or a nut bush. In fact, we just went and harvested a bowl full of hazelnuts!" He says that resident participation in the co-management zone has generated social values, for example, when he and his children organised a trail run last summer for all the children in the forest village; two laps around the path the boys had created, with prizes as well. He added: "such activities gives us something to gather around." His children have also played and biked a lot in the woodland, which has only been possible thanks to the paths. Participation in the zone has also increased the functionality of the woodland, both because of the paths and the trees and shrubs people have planted that provide fruit, berries and nuts. He also thinks that the zone has provided experiential values, especially when you have planted a new plant and can follow its growth. One of his children sowed a spruce when still in kindergarten: "It grows in the forest today and that's nice to see. We cherish it because it has a symbolic value for us." He also thinks that participation in the zone provides ecological values. They often see pheasants, hares and roe deer in the woodland, probably because he has planted a lot of fruit trees, which the animals like. He also sees ecological value in conversations between him and his children about the need to wash apples from the supermarket before eating them as they have been treated, while those from the zone can be eaten straight from the tree. This makes his children more conscious about these things.

He enjoys other residents' participation: "I think it's fun passing by where someone has done something with the forest and replaced some trees with others or planted something new, making it even more exciting to pass by". The participation of other residents also means that he can discuss things with his neighbours, and they can exchange ideas regarding the zone. He is allowed to use their part of the zone: "If someone plants an apple tree, you can eat the apples if you want to. That's how it works. As long as people plant enough trees, it won't be a problem!"

He thinks tree height is one of the drivers for participation. When the trees are too small, people don't want to participate; residents need privacy, peace and quiet in the zone to become interested in participation. That's why people on the other side of his forest village, where the trees are smaller, have participated less than the residents on his side. The reason he started to participate was that he thought it was an "obvious opportunity". He also thinks that it simply suits his family to participate; he spent his childhood helping out in his father's 10-acre forest, and always found it intriguing to see the change in character between different parts of the forest. He concludes by saying: "I really think that it's a good, stress-releasing way to get outside and do something. And it's so close to our home; it's wonderful to have [the woodland] in the backyard. So I enjoy being there, even today."

Images on the next spread: The garden and co-management zone of the resident interviewed above, showing how his participation has developed over the years. The green area on the plan shows the stipulated four-metre wide zone, but his participation goes far beyond that.


2010

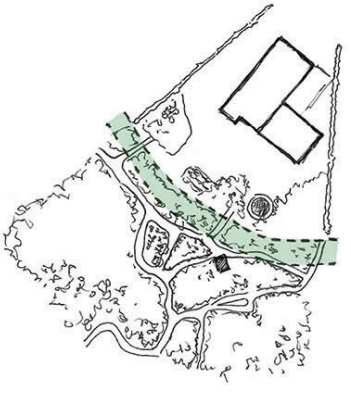

2010


2010


2015


2015


2015




2017


2017


2017


2017


TØN-
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2017


2017

To Erik, Ester and Astrid

Contents

List of publications

This thesis is based on the studies described in the following papers, which will be referred to by their Roman numerals in the text:

I Fors, H., Molin, J.F., Murphy, M.A. & Konijnendijk van den Bosch, C. (2015). User participation in urban green spaces – For the people or the parks? *Urban Forestry and Urban Greening*, 14(3), pp. 722-734.

II Fors, H., Nielsen, A.B., van den Bosch, C.C.K. & Jansson, M. (2018). From borders to ecotones – Private-public co-management of urban woodland edges bordering private housing. *Urban Forestry and Urban Greening*, 30, pp. 46-55.

III Fors, H., Wiström, B., Nielsen, A.B. Personal and environmental drivers of resident participation in urban public woodland management – A longitudinal study. Under 2nd review at *Landscape and Urban Planning*.

IV Fors, H., Jansson, M. & Nielsen, A.B. (2018). The Impact of Resident Participation on Urban Woodland Quality – A Case Study of Sletten, Denmark. *Forests*, 9(670).

The contributions of Hanna Fors to the papers included in this thesis was as follows:

I Made a substantial contribution to the formulation of research aims, methodology employed, data analysis and writing of the paper.

II Planned the study together with my supervisors. Collected the data together with Nielsen. Wrote the paper jointly with supervisors.

III Planned large parts of the study and collected the majority of the data, partly alone, partly together with Nielsen. Analysed the qualitative data and contributed to the analysis of quantitative data. Wrote the paper with feedback and co-writing from the co-authors.

IV Planned the study. Collected and analysed the data. Wrote the paper with support from Jansson and Nielsen.

1 Introduction

In the Danish residential area of Sletten in Holstebro, residents participate in the management of the local urban woodland through a so-called co-management zone. The Sletten resident described in the prologue touches upon many of the central themes of this thesis, for example, What is important to consider when residents are involved in urban woodland management? How do users define 'green space quality', or more specifically, 'urban woodland quality'? How is that quality affected when residents are involved in woodland management? What kind of environments are created through resident participation in management? and Why do some residents choose to participate while others do not?

Today, user participation is promoted across multiple phases of green space planning and management. International policy initiatives such as the Local Agenda 21 Action Plan (UNCED, 1992), the European Landscape Convention (Council of Europe, 2000) and the EU's Aarhus Convention (Stec et al., 2000) have contributed to this trend. All of these initiatives aim to involve citizens more closely in decisions regarding the local spaces and services they use, with the underlying premise that this will create better, more inclusive and sustainable local environments. Moreover, the underlying idea of user participation is that green spaces can only be planned and managed in a satisfactory way if the end-users, i.e. the citizens, are directly involved in order to integrate their needs, perspectives and capabilities (Van Herzele et al., 2005).

In the past, user participation in green space management has been much less common than the more established practice of participatory planning (Konijnendijk, 2011). However, there is now an emerging trend towards increased user involvement in green space management (Mattijssen et al., 2017). While user participation in the planning of green spaces has been studied to some extent (see e.g. Janse & Konijnendijk, 2007; Sipilä & Tyrväinen, 2005; Ståhle, 2006), research on user participation in the management phase of green spaces is still limited, with a few notable exceptions, for example, in Scandinavia (e.g.

Delshammar, 2005; Molin, 2014). The increased interest in this practice, from both practitioners and the research community, highlights the importance of organising participation in a way that utilizes the resources of users and the local authorities, as well as the physical green space, in a fruitful and conscious way.

However, many green space managers lack the knowledge required to involve users in a beneficial way, making them hesitant about participation. A survey sent to all Swedish green space managers in 2016, showed that only 12.3% of them involved volunteers in maintenance of public green spaces and/or trees. Furthermore, the vast majority of Swedish green space managers (93.2%) did not plan to transfer any green space maintenance to local users or NGOs in the near future, which is in contrast to the trend among green space managers in the UK (Randrup et al., 2017). A Danish study found that green space managers receive no specific training in involving the public, forcing them to work ad hoc with user participation in each case, with no overall plan, and being selective in which users and groups they choose to involve in green space maintenance (Molin & Konijnendijk van den Bosch, 2014). This insecurity regarding user participation in green space management could stem from a lack of knowledge on the potential results or, more precisely, how it can benefit or disfavour local authorities, participating and non-participating users, and the physical green space itself.

Users have been found to benefit from participation in green space management through an increased sense of satisfaction with their neighbourhood (Nannini et al., 1998), greater recreational and social use of green spaces (Glover et al., 2005; Jones, 2002), and an increased sense of attachment to the green space (Van Herzele et al., 2005). However, the benefits of user participation are often taken for granted in the literature. This is especially the case regarding benefits to the physical green space, which stresses the need for more empirical studies on how green space quality is affected by participation.

User participation may also have some drawbacks. If a specific user group has too much influence over a green space, for example, there is a risk that the multifunctionality of the green space will be reduced, thereby excluding non-participating users from their space. Non-participating users may also feel excluded from the green space and that they are viewed as intruders, as they feel that participating users have made the space their own. The appearance of public green spaces could also develop in an undesirable direction due to user participation. Burton et al. (2014) have found that green spaces managed by voluntary users may look very different from the perceptions of municipal green space managers and other users have of what a public green space should look like, and might force the local authorities to relinquish of some of their control over the end-result in the green space. Valid questions are whether it is suitable

to have participating users in the management of all green spaces, and how participation should be guided in a conscious way so as to enhance green space quality rather than impairing it, while retaining interest in participation.

A crucial question regarding user participation in green space management is how local authorities can facilitate long-term user involvement. Long-term initiatives often rely on individual "champions", and if they leave a project, succession can often be a problem, and others may also stop participating leading to deterioration of the green space (Mattijssen et al., 2017; Delshammar, 2005). There are also examples where the authorities are the limiting factor over the long term, e.g. ever-changing administrations making it difficult for citizens to create long-term relationships with authorities. The citizens' activities may also be hindered by ambiguous communication structures and bureaucratic procedures. Furthermore, the set-up of formal arrangements and official policies that influence a green space can have substantial effects on whether it is possible to secure long-term involvement in its management (Mattijssen et al., 2017). The role of green space managers in these governance arrangements was therefore considered an important aspect to include in this thesis.

Based on their retrospective study, Mattijssen et al. (2017) found three factors that support long-term user involvement in public green space management, namely, increased formalisation, participating users having a strong adaptive capacity helping them to cope with continual contextual changes, and the supporting role of authorities, where the absence of support could become a threat to long-term involvement. Today, local authorities retain a key role in green space governance arrangements as landowners and policy makers, making citizens dependent on their cooperation to be able to pursue activities, but in a way in which authorities mainly play a facilitating and enabling role in the background (Mattijssen et al., 2017). Sustaining participation in green space management over time is a recognised challenge. Despite this, only a few longitudinal studies have been carried out. The present case study therefore provides a valuable addition.

If communities are to be allowed to make more decisions through devolved governance, it is crucial to understand their motivation and interests (Mathers et al., 2015). The question of why users choose to participate in green space management has been studied in the context of a natural environment, e.g. concerning volunteering in natural resource management that focuses on ecological green space values (Measham and Barnett, 2008; Bruyere and Rappe, 2007), and in studies focusing solely on community gardens (Guitart et al., 2012; Draper and Freedman, 2010; Armstrong, 2000), or with urban trees in mind (Austin, 2002; Still and Gerhold, 1997). However, there is a lack of studies on drivers of management participation in urban public woodlands, designated for

everyday use by local residents. While many of the studies mentioned above were conducted in North America, there has been less research carried out in a European, and more specifically, a Scandinavian context. Just as interesting as drivers of participation are the drivers of *non-participation* in different phases of green spaces, something that has only been studied to a small extent, with the exception of the study by Clausen (2016) on non-participation in Danish landscape planning.

1.1 Aims and research questions

The overarching aims of the work presented in this thesis were to explore the impact of resident participation in public urban woodland management on the quality of the physical woodland, and to provide empirically supported knowledge on how residents can participate in a way that fruitfully and consciously employs the resources of the residents, the local authorities and the physical woodland. The research was conducted from the perspective of the landscape architect. Findings should be of interest to professional green space managers and planners, potentially making them better prepared to manage user participation processes. The work was guided by the following overall research questions.

1 What drives users to engage (or not) in resident participation in woodland management of urban private–public transition zones in residential areas?
2 How is the quality of public urban woodlands affected by resident participation in woodland management of urban private–public transition zones?
3 How can local authorities facilitate long-term resident participation in public urban woodland management?

To meet these aims and answer the research questions, the research was divided into two parts. First, a literature study was conducted, with the somewhat broader focus of user participation (rather than only resident participation) in all phases of green space development (i.e. not only management) of public urban green spaces (i.e. not only woodlands). The findings are presented in a review article (Paper I) and addressed, with its broader focus, research question 2. The knowledge gaps identified in Paper I strengthened the motivation for the already initiated longitudinal case study of the residential area Sletten in Holstebro, Denmark, which comprised the second part of the research. Based on the results from this case study, Paper II addressed research question 3, Paper III mainly addressed research question 1, and Paper IV predominantly addressed research question 2.

In the light of its central role in this thesis, the case study area Sletten is presented in the following section.

1.2 The case area, Sletten

In 1995, 160 ha arable land on the eastern fringe of Holstebro, Denmark (Figure 1) was earmarked for residential development. The new district was named Sletten (The Plain), and is delineated by a regional road to the north and a large elongated lake (Vandkraftssøen) to the south. The landscape plan for Sletten was developed in 1995-1998, reflecting landscape urbanism principles (Waldheim, 2006). It included commercial areas (20 ha) and 400 housing units arranged in eight forest villages, six fort villages and a retirement home (21 ha). The housing is set in a matrix of new woodland plantings (32 ha) and pastures (30 ha), intersected by the road infrastructure (27 ha), existing shelterbelts, wetlands and natural brooks (30 ha) that flow into the lake (Figure 2). The case study focused on the forest villages, with 201 housing units bordering the woodland. The residents in the forest villages are a rather homogeneous, middle-class societal group.

Figure 1. Location of the city of Holstebro in Denmark. (Figure made by Hanna Fors)

The planning, design and novel approach of co-management of the woodland in Sletten was led by the head green space manager at the local authority's green

space department. Collaboration was initiated with a Swedish university professor who contributed through experiences and ideas from two landscape laboratories in southern Sweden, one situated in Snogeholm and one at the Swedish University of Agricultural Sciences (SLU) campus in Alnarp (Tyrväinen et al., 2006). Landscape laboratories are conceptualised as experimental woodland areas in a local landscape context where innovative design and management concepts for urban forests are demonstrated and studied in full scale (Tyrväinen et al., 2006). The woodlands in Sletten were established as a third 'landscape laboratory' in three phases parallel with residential development in 1999-2004. While the woodland planting types partly overlap those in the Alnarp and Snogeholm landscape laboratories, integration in a residential area gives a unique profile to this landscape laboratory. Considering the considerable and swift changes in land use in urban settings, there is insufficient time to wait for the woodland to mature, and there is an urgency to make the young woodland usable and functional from as early as possible. Accordingly, innovative afforestation methods focused on developing experiential qualities already in the juvenile phase were developed. Three widely differing afforestation models were used for woodland design: the seed source model, the density gradient model and the habitat model (Nielsen and Jensen, 2007). Together, these comprised 52 vegetation types and 85 tree and shrub species, resulting in differing appearances (e.g. tree height, planting distance and species composition) between different parts of Sletten (Figure 2).

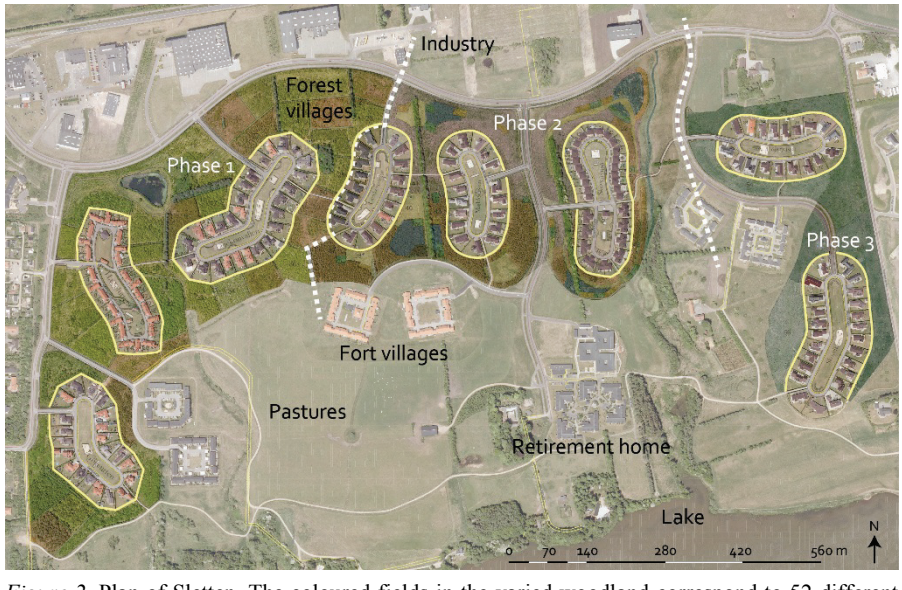

Figure 2. Plan of Sletten. The coloured fields in the varied woodland correspond to 52 different vegetation types. (Figure made by Hanna Fors, based on orthophoto, ®GST)

Recognising that newly planted woodlands need more than trees to provide ecological and experiential values, traditional mechanical weed control was replaced by sowing a mixture of flowering cover crops after only 1.5 years. The 30 ha of 'woodland' was turned into a sea of flowers that created experiential values for the residents, nectar for insects and habitats for birds and small mammals. In addition, the cover crop reduced the cost of weeding and initiated positive communication with the residents (Figure 3).

Figure 3. The cover crops used as an alternative to mechanical weed control in the newly planted woodland. (Photo: Carl Aage Sørensen)

Early on, some residents in the forest villages voluntarily started to weed around the planted seedlings or to grow flowers and vegetables at the woodland edge. As the tree canopy started to close, residents engaged in pruning and thinning among the trees, planting their own plants, providing nesting and feeding boxes for birds, setting up hammocks, putting out garden furniture, creating paths, or building huts as part of children's play, for example. These activities were tolerated and even encouraged by the local authorities and the head green space manager at the time, as they created a gradual transition from the plant communities, maintenance levels and activities in private gardens to those of the woodland. This was regarded as being positive for the successful integration of residential housing and woodland, as well as for the residents' attitudes to having woodland as a neighbour, in particular as the trees grow taller and shade the gardens. Over the years, these resident activities became formalised into

collaboration in a so-called 'co-management zone', which is now controlled by the present head green space manager. The Swedish university professor and the former and present head green space managers at the local authorities in Holstebro played/play key roles in the development of Sletten, and were therefore interviewed as part of the case study (Paper II).

During the first few years, some of the residents engaged in their everyday landscape in ways other than through the co-management zone. Residents formed grazing guilds and jointly owned and took care of most of the grazing animals in the pastures outside the woodlands.

When the former head green space manager retired in 2005, a local authority–resident communication "vacuum" ensued, until the new manager (appointed in 2008) formalized the co-management zone in 2010, and developed the following guidelines based on the former manager's informal guidelines for the zone, on input from the residents during dialogue meetings, and from researchers at SLU in Sweden.

- The co-management zone extends 4 m into the woodland (three planting rows) and must be accessible to the public.
- Each household may choose whether, and to what extent, it wants to participate in the section of woodland edge that borders its property (i.e. the width of its garden).
- A minimum of 30% of the originally planted trees and shrubs (planted with a spacing of 1.5 m x 1.5 m) must be retained.
- Up to 40% of the trees may be replaced with other trees or shrubs.
- Up to 30% of the trees may be replaced with herbaceous plants, etc.
- Weeding, pruning of trees and shrubs, removal of field layer vegetation and other maintenance activities should respect and maintain a forest character.
- Establishment of permanent structures such as sheds and greenhouses is not permitted, nor is keeping storage space for firewood, tools, garden compost, etc.

The guideline document also provided inspiration in the form of a list of suitable woody plants, summer flowers, vegetables and woodland herbs. Procedures for guideline enforcement were not described; rather, residents were encouraged to contact the local authorities when in doubt about whether a specific action is allowed. Paper copies of the guidelines were distributed to all residents in 2010. Since then, manager presence in the neighbourhood and enforcement of the co-management zone guidelines have been limited, and information about the co-management zone has not been distributed to newcomers.

2 Central concepts and theoretical framework

2.1 Governance

A broad definition of governance is the ways in which public and private actors from state, market and/or civil society govern public issues at multiple scales, either separately, i.e. governing *by* the state vs. governing *without* the state, or through collaboration, i.e. governing *with* the state (Arts & Visseren-Hamakers, 2012). In this thesis, a more strict interpretation is used, where governance is seen in contrast to traditional, hierarchical governmental steering, and refers to new ways of governing and organising political processes in post-modern societies, where traditional top-down government is thought of as outdated (Arts & Visseren-Hamakers, 2012; Sehested, 2004). A multi-centred political system, where public and private actors collaborate without any clear hierarchy between the actors, is characteristic for strict governance. An important underlying idea is that nobody has all the knowledge and answers required to solve a collective problem, and thus the actors are interdependent (Sehested, 2004). Governance can, for example, include policy networks, public participation and public–private partnerships (Arts & Visseren-Hamakers, 2012). This means that user participation in the management of the Sletten woodland is an example of governance.

2.2 User participation

The concept of participation in a green space context may be described in many terms, but the important signifier here is the user – implying that the target group is relatively local to the green space. Users are a specific part of the public, namely the individuals or groups who regularly or potentially inhabit and

interact with a space. When these users participate in the management of, and decision-making concerning, a publicly accessible space, the term 'public participation' is also relevant. 'Public participation' and 'public involvement' are often used interchangeably, but have somewhat different meanings (Väntänen and Marttunen, 2005). The term public involvement includes the public in decision-making without necessarily guaranteeing that they actually have any impact on the end result (World Bank, 1993). In contrast, Arnstein (1969) stresses that participation should give access to the process, as well as a certain degree of power to affect outcomes. The use of these terms as synonyms shows that participation notions can range from consultation without any influence on the final decision, to integrated cooperation (World Bank, 1993) – a span that raises questions regarding which ideals of participation processes and outcomes should be sought.

2.3 Civic/physical participation in place-making/place-keeping

Green space development can be divided into different phases: either the making phase and the keeping phase (Dempsey and Burton, 2012), or the corresponding planning, design, construction and management phases. In the making phase, green spaces are planned, designed and constructed; green spaces (hopefully of high quality) are *made*. The keeping phase is the ongoing work of management and further development of existing green spaces, including physical maintenance operations and systemic park policy work to *keep* the high quality of the green space. Users can participate in all phases of green space development, with varying levels of influence on the end result, and more or less direct influence on the green space. Physical participation, such as engaging in vegetation maintenance, can directly affect a green space, while civic participation, e.g. when users offer their thoughts and opinions on a green space plan, requires additional implementation steps before the user input becomes visible in the physical green space. While civic participation is primarily a process involving the local authorities and the users, physical participation involves also the physical green space. In this thesis the main focus is on physical participation in the keeping phase of a green space.

2.4 Theory for drivers

To structure the study on residents' drivers of participation (Paper III), Kurt Lewin's (1936) equation on human behaviour was applied to the data as a theoretical lens. It reads B=f(P,E), and says that human behaviour (B), such as

participation in the co-management of urban green space, is the result of a combination of person (P) and environment (E), where environment comprises properties of the physical and social environment.

2.5 The park–organisation–user model

For the purpose of the research presented in this thesis, the park–organisation–user model (Randrup and Persson, 2009) was adapted into an analytical framework to map out how user participation processes in all phases of green space development affected public urban green space, users and administrators according to the literature (Paper I). The original park–organisation–user model has the three dimensions 'users', 'managers' and 'urban green environment' (Figure 4).

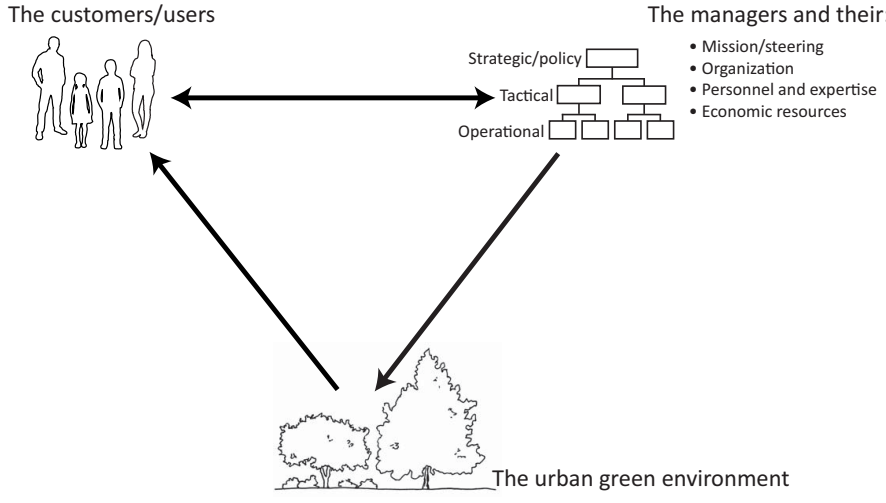

Figure 4. The park–organisation–user model, after Randrup and Persson (2009). (Fig.: Hanna Fors)

The adaptation for the literature review included re-defining the three dimensions as 'users', 'administration' and 'public urban green space' (Figure 5). In this way, the type of green space was specified and the management actors were broadened to administrators to encompass a wider group of potential participation initiators. Administrators or administrative actors refers to actors potentially receiving input from participation processes, ranging from regional administration actors to local park maintenance workers – most often meaning municipal entities with responsibility for green space development, i.e. the making and keeping of green spaces. The original model has a one-way arrow

from green space to (i.e. benefiting) users, demonstrating a representative democracy stance to green space management, where the administration alone provides high-quality green spaces for users (Molin, 2014). During the adaptation for the research presented in this thesis, and the literature review in particular, an arrow was added in the opposite direction indicating that users can also directly affect green spaces through physical participation. In this way, the model was updated to include new modes of governance, such as place-based approaches, that are present in contemporary urban green space development (Molin, 2014). This framework allows connections to be drawn between participation and green space quality by comparing and assessing how participation affects the different dimensions, and how this in turn directly or indirectly affects the quality of the physical green space. This analysis emphasises how administrators, users and green spaces each have roles affecting green space quality, potentially benefiting from participation.

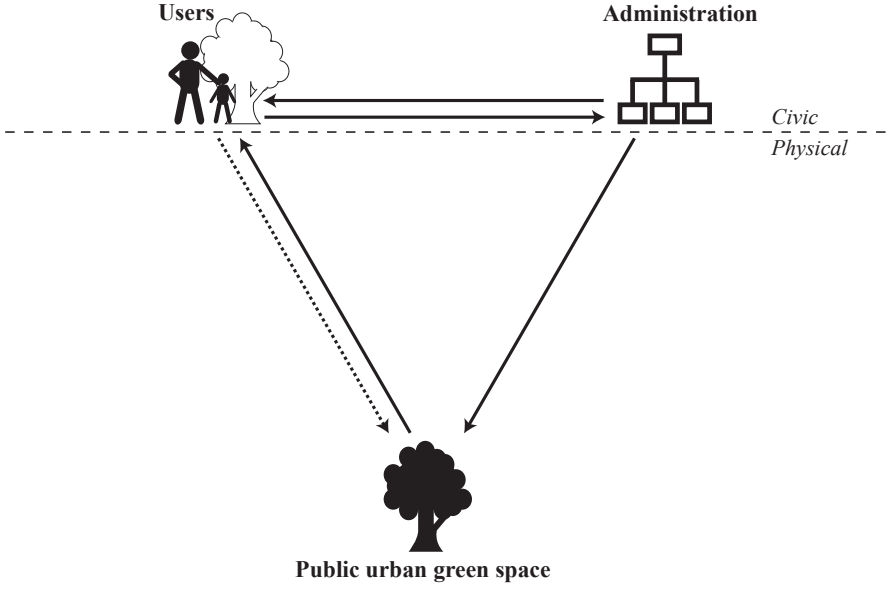

Figure 5. The park–organisation–user model (Randrup and Persson, 2009) adapted into an analytical framework for the present research. (Figure made by Julie Frøik Molin)

2.6 The policy arrangement approach

For the research on Sletten, and the work presented in Paper II in particular, the policy arrangement approach (Arts et al., 2006) was used as a theoretical framework (Figure 6). A *policy domain*, also called 'sector' or 'policy area', is

a component of the political system organised around, and dealing with, issues that share the same characteristics, e.g. the energy, health or environmental policy domains (Burstein, 1991). A *policy arrangement* is defined as "the temporary stabilisation of the content and organisation of a policy domain" (Arts et al., 2006, p. 96). The policy arrangement approach can only show the temporary stabilisation, since the formation and structuring of a policy arrangement are in continual flux, a process described as *institutionalisation of policy arrangements*. The approach aims to analyse that ongoing process (Arts et al., 2006).

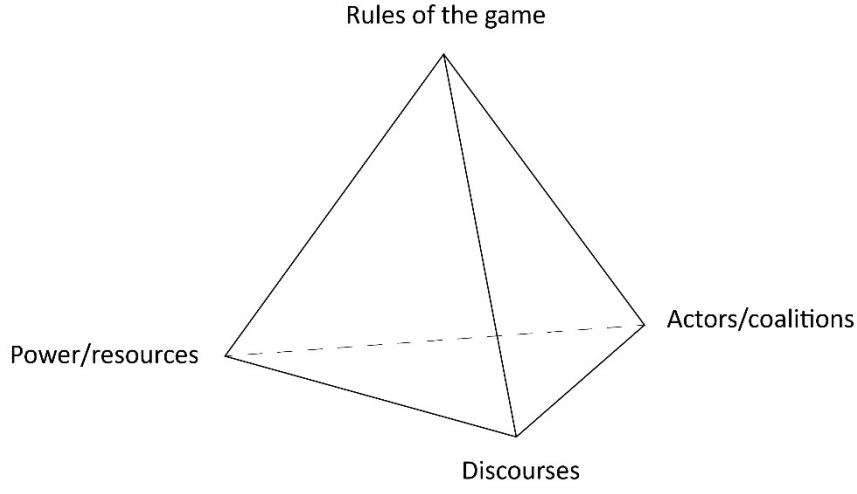

Figure 6. The policy arrangement approach, after Arts et al. (2006). (Fig.: Hanna Fors)

Sletten's public–private co-management zone can be considered as representing a situation of co-governance, with the local authorities and local residents both influencing decisions and actions (Molin and Van den Bosch, 2014). Governance is seen as not being restricted to the strategic level of decision-making, but also taking place at the operational management level where 'place-based governance' shows the importance of local connections between people and their living area (Molin and Van den Bosch, 2014). From a governance perspective, the public–private co-management zones in Sletten can be considered an example of an (environmental) governance arrangement. The policy arrangement approach is intended for analysis of 'policy arrangements', but the term used here is rather 'governance arrangements' (Arnouts et al., 2012; Buizer et al., 2015). This distinction is made for several reasons: since the co-management zone concept has not yet translated or stabilised into a formal policy

(Buizer et al., 2015), since main focus here is on the organisational part of the arrangement (Arnouts et al., 2012), and since the broader context of decision-making that governance refers to, as described in section 2.1, is more applicable to the Sletten case study. Governance arrangements can nonetheless be analysed using the four dimensions of the policy arrangement approach. As a part of the case study (Paper II), the Sletten co-management zone was analysed along the four interdependent dimensions of the policy arrangement approach: 1) actors and coalitions (who is involved? e.g. individual users, local authorities), 2) power and resources (how can actors influence decision-making? which resources are available to them, e.g. in terms of knowledge, time and funding?), 3) discourses (which main 'storylines' provide the context and background for decision-making?) and 4) the rules of the game (which rules and procedures guide interaction and decision-making?). Different power relationships and outcomes will result, depending on how different actors harness and use power, resources, discourses and rules. Since policy and governance arrangements are in continual flux, as described above, the analysis focused on a certain point in time, representing a temporary stabilisation of the Sletten governance arrangement (Arts et al., 2006). However, the framework also proved useful for the visualisation and discussion of potential future development in Sletten. Adding the residential community associations as an actor, would have implications on the other dimensions of the Sletten governance arrangement, since these are interdependent (Arts et al., 2006). This potential future temporary stabilisation of the governance arrangement was also demonstrated, using the policy arrangement approach.

2.7 Defining 'urban woodland quality'

These studies were initiated with a slight preconception that users are either involved in green space management for the sake of participation, where the process might just as well result in good as in poor outcomes for people and parks, driven by the support for participation in international policies, – or – not involved at all, due to the fear of green space managers of complicated, time-consuming participation processes that do not fit in with the regular planning and management process at the local authority. Participation seemed to have clear benefits, but if users are not involved in a conscious way these benefits will not be, or at least not fully, realised. Having users participating in all public green spaces is probably not desirable, but how do we know where and when to involve them? Participating users are likely to affect a green space in a way that increases its quality for them – so far so good. However, at the same time, their participation may result in reduced quality for non-participants who also use the

same area. Here, an intrinsic value can be identified in the holistic approach of the professional planner/manager/landscape architect, negotiating the needs of different user groups and aiming to create a green space with high quality for all. But are users able to create environments of high quality for non-participants as well? In order to be able to discuss the impact of participation on green space quality, the concept of green space quality in relation to participation processes must first be defined. Green space quality proved to be a term that is often used lightly, without specifying the type of quality concerned. Possible reasons for this, as well as an attempt to define green space quality, are discussed below.

2.7.1 The four roots of all quality definitions

'Quality' is a contested concept. For this reason, practically all definitions and models of quality of a specific green space are subject to discussion and include some values and world views of particular actors and interests, while excluding others (Lindholst et al., 2015). There is no such thing as a global or universal definition of quality; rather, the appropriate definition depends on the specific situation and context (Reeves and Bednar, 1994). There are four roots of all quality definitions: 'excellence', 'value', 'conformance to specification' and 'meeting/exceeding expectations'. These four roots represent the historical development of the concept of quality, but most contemporary quality schemes are a combination of several of these roots. Each root has its advantages and disadvantages, i.e. you always loose something and gain something else by choosing one of the roots instead of another (Reeves and Bednar, 1994).

An advantage of the quality root 'excellence' is that it is easy to get people on board, as everyone wants to work towards something excellent. A disadvantage is that whether something is excellent or not can only be assessed subjectively, making it difficult for a company to strive for this, since the employees and their customers/users may not necessarily share the same view. Quality is seen as excellence within areas such as music and painting, where quality is a matter of taste. Hence, it is a less useful root for assessing public green spaces.

Defining quality instead as 'value' gives a better indication of how the customer perceives the product or service. Furthermore, it enables comparisons of completely different products or experiences, e.g. a meal at a 5-star restaurant and at a fast-food restaurant. A disadvantage is that is difficult to tell whether customers base their quality assessment mainly on the price or on what they get out of the product. Most people do not know how much of their taxes are used to finance green space management, and therefore probably do not think about green space quality in terms of value.

Technical quality is an example of quality in terms of 'conformance to specification', where green space management can be directed by a description or a standard for maintenance. In this case, defining quality is rather straightforward. However, as a customer or a user, one rarely thinks in terms of comparing a maintenance description (which is probably not publicly available) with the performance of the actual green space. Rather, the individual user's experience determines whether it is a green space of high quality or not. On the other hand, if quality is to be defined by professional green space managers, this is the most commonly used quality root (at least in the Scandinavian countries). Despite appearing to be an easily defined type of quality at first sight, the complexity unfolds when it is operationalised by professionals. There are different types of maintenance descriptions, where 'performance descriptions' state, for example, how many times the grass should be mowed during a specific period, 'condition descriptions' may state how high the grass is allowed to grow, and 'function descriptions' state, for example, that it should be possible to play ball games on the grass (Randrup et al., forthcoming). Each type of description is associated with different difficulties when conformance to specification is to be measured and monitored. Thus, the way in which quality is measured affects the quality itself.

An advantage of the quality root 'meeting/exceeding expectations' is that the focus lies on the user's/customer's experience, which is reasonable considering that they are the people using the product/service. With this definition, the subjective perceptions of the product are reported, which are important in order for professionals to be able to understand what the user regards as high quality. A disadvantage is that this makes it the most complex quality definition, and therefore the most difficult to measure/assess. For example, it is difficult to compile many users' individual and differing quality assessments into an overall quality assessment.

In conclusion, definitions of quality as 'conformance to specification' or 'meeting/exceeding expectations' are the two roots that are deemed most relevant for the definition of green space quality within the scope of this thesis.

2.7.2 Existing quality definitions for green spaces

The quality roots presented above relate to the quality concept in general. However, more specific quality definitions exist within the realm of green spaces. With an ecological focus and interest in plant primary productivity, urban green space quality has been defined as the level of vegetation cover and tree cover (Davies et al., 2008), a definition that perhaps could be grouped under quality in terms of 'conformance to specification'. However, the scope of this

quality definition is too narrow in the present context, as the aim of participation is not only to benefit green spaces, but also the (participating) users.

Many quality schemes, instruments and assessment tools for measuring green space quality can be found in the scientific literature. A brief review of the literature on the quality of 'green spaces', 'open spaces', 'urban woodlands', 'parks' and 'the built environment', conducted in the online database Scopus in August 2018, showed that most of these deal specifically with how green space quality is associated with physical activity, as has also been noted in earlier reviews (see summaries in Gidlow et al., 2012; Rigolon and Németh, 2016). The search results were manually reviewed: 1) to only include articles dealing with quality assessments on local green space scale (rather than regional or national scale), and 2) to exclude articles focusing only on a specific aspect of quality (e.g. soundscape; species richness, relationship between physical activity and park access). After these two steps, five articles stood out, all of them first reviewing other green space quality assessment schemes, and then presenting schemes of their own, focused on quality assessment on local green space scale in relation to green space use (Table 1).

Lindholst et al. (2016) reviewed quality schemes from the perspective of municipal green space planners and managers aiming to provide high-quality green spaces for citizens. As a result of a joint project including, among other things, their review, the Nordic Green Space Award scheme was developed as a tool for green space quality assessment for use by Scandinavian local authorities in enhancing the quality of their public green spaces. The tool consists of three key themes divided into ten main criteria.

In Van Herzele and Wiedemann's (2003) monitoring tool for green space provision, accessibility is considered to be a precondition for the use of green spaces, and green space quality is defined as attractiveness, seen from the user's perspective. This green space quality tool consists of five parameters, and is based on the dominant qualities found by reviewing human-environment studies on people's preferred environments. Quality assessment is performed by combining a GIS model with field observations.

Dempsey's (2008) review of the concept of high-quality built environment identifies ten inter-related and inter-dependent key features of the built environment within which quality on the neighbourhood scale can be understood. Public green spaces constitute an essential part of such environments, motivating the inclusion of the review here, despite its somewhat broader focus.

Quality assessment scheme	Nordic Green Space Award (NGSA)		Urban, high-quality built environment at neighbourhood scale	Monitoring tool for provision of accessible and attractive urban green spaces		Neighbourhood Green Space Tool (NGST)	A QUality INdex of Parks for Youth (QUINPY)
Perspective/ focus	Public green spaces, green space manager perspectives, expert and layperson assessment		Built environment, neighbourhood scale	Urban green spaces, user perspectives		Neighbourhood urban green space in relation to use, user-informed tool development	Urban green spaces, use by young people
Reference	Lindholst et al., 2016		Dempsey, 2008	Van Herzele & Wiedemann, 2003		Gidlow et al., 2012	Rigolon and Németh, 2018
Green space quality aspects	Structure and general aspects	Size, character and location	High residential density	Attractiveness	Space	Access	Structured play diversity
		Accessibility	Mixed land uses		Nature	Recreation facilities	Nature
	Functionality and experience	Recreational and social aspects	Accessibility		Culture and history	Amenities	Park size
		Culture and history	Connectedness and permeability		Quietness	Natural features	Maintenance
		Nature and biodiversity	Legibility		Facilities	Incivilities	Safety
		Landscape and aesthetics	Attractiveness	Accessibility (precondition for use)			
		Environment and climate	Inclusiveness				
	Management and organisation	Management	Maintenance				
		Maintenance	Safety				
		Communication and information	Character				

Coloured fields in the table correspond to the four central quality aspects below. (Some of the schemes also assess other green space quality aspects.)

Maintenance	Level of maintenance of facilities, e.g., amount of litter, vandalism
Accessibility	Accessibility to and within the green space, e.g., entrances
Nature	Biodiversity, old trees, extent of greenery, vegetation, number of trees, naturalness, sounds of nature
Facilities	Benches, paths, toilets, sport fields, play equipment, lighting

Table 1. Overview of existing assessment schemes for green space quality focusing on urban green space use

Gidlow et al. (2012) reviewed existing quality assessment schemes and then developed a less time-consuming neighbourhood urban green space quality tool to facilitate inter-site comparison. Their tool consists of five domains to assess combined with three additional items to characterize the space.

Rigolon and Németh (2018) reviewed existing green space quality schemes and found a lack of tools addressing quality for young people and a one-sided focus on the association with physical activity only. The authors therefore developed a quality index of parks for youth consisting of five categories, broadening the focus from physical activity to include both passive and active recreational use. This is the only tool of the five reviewed here that does not involve field studies, but is based on publicly available geospatial data.

As can be seen from Table 1, many aspects of quality reoccur in the different green space quality tools. 'Maintenance', 'accessibility', 'nature' and 'facilities' are included in all the reviewed schemes.

The literature search did not reveal any schemes specifically designated for the assessment of urban woodland quality in relation to use. Acknowledging the importance of employing a situation- and context-specific quality definition (Reeves and Bednar, 1994), a new framework was needed to be able to explore the impact of participation on urban woodland quality, as part of the case study (Paper IV). Therefore, the four dimensions defined by Bell et al. (2005) that all must be considered for the well-balanced design of the urban forest (i.e. street trees, parks and woodlands) were transformed into an assessment scheme for 'urban woodland quality' (Table 2). The four interrelated dimensions are: 'the social', 'the experiential', 'the functional' and 'the ecological' (Bell et al., 2005). During the individual interviews with green space professionals in 2016 and residents in 2017, the interviewees were asked how they viewed the impact of resident participation on the urban woodland quality in terms of these four dimensions. (This is discussed in more detail in Papers II and IV.) In the context of this thesis, urban woodland quality is thus defined as consisting of social, experiential, functional and ecological values. The quality definition used in Paper I, with its broader focus, differed from that in the case study of Sletten, since the latter specifically concerns 'urban woodland quality'.

Table 2. *Assessment scheme for urban woodland quality, based on the four dimensions presented by Bell et al. (2005)*

Dimension	Aspects of Dimension	Indicators for Urban Woodland Quality
Social	Escape	Is the possibility to escape the urban scene provided? Impression of naturalness/ wildness? Are cultural references incorporated to help people identify with their community?
	Social activities	Are there possibilities for social activities (e.g., walking, sitting, socializing with friends, children's play)? Is there a mix of larger and smaller spaces for different activities?
	Safety and security	Is there greater visibility along paths and beneath trees? Are there more obvious signs of management presence? Is there clear signposting?
Experiential	Aesthetics	Are multi-sensory experiences available? Is seasonal change perceivable?
	Design style	What degree of control or active presence of people is shown in the design of paths, planting patterns and open spaces? Do they affect the user experience?
	The role of the urban forest in urban life	Does the woodland provide a non-urban experience? Is there a sense of timelessness and continuity? Does the urban woodland act as a stepping stone between built city and nature?
Functional	Accessibility	Is the woodland accessible to all societal groups?
	Carrying capacity	Is the woodland designed to satisfy both physical and visual carrying capacity? Are there winding paths among trees or straight paths in the open?
	Climate	Do woodland trees provide the site-specific desired climate-regulative functions (e.g., shade, shelter from the wind and moderation of extreme temperatures)? Is year-round use possible?
Ecological	Urban ecology	Does the urban woodland help improve or revitalize the natural capital of an urban area (e.g., increase of ground water infiltration, soil amelioration, or erosion control)? Are new habitats developed?
	Landscape ecology principles	Were landscape ecology principles employed as a key part of the design process (e.g., linking corridors to connect scattered habitat fragments, and allowing wildlife species to move in between)? Do woodland design and management promote habitat diversity (not necessarily only natural habitats)? Is it possible for people to get close to nature in their everyday lives?

2.7.3 Quality for whom, according to whom, assessed by whom?

Several studies have shown that user participation in green space development may result in increased usage after the participation process, often in correlation with increased satisfaction (Kaplan, 1980; Jones, 2002; Glover et al., 2005; Huang, 2010). In such cases, participation benefited the process or the participating users, but this is not necessarily linked to improved physical green space quality. The participants, who are more satisfied with the green space and use it more after participation, experience a perceived quality improvement, making participation worthwhile for them. However, this does not mean that non-participating users consider the quality improved. In fact, the physical quality may decrease, since increased use may result in greater maintenance needs for the green space. Furthermore, the increased satisfaction among participants may stem from simply being involved in the process, and not necessarily based on actual improvements of the green space.

From their case study of user participation in urban green space redesign and management, Aalbers and Sehested (2018) concluded that the green space quality that is developed through participation is above all a result of the 'critical knowledge' and 'situated knowledge' of the actors involved, and that green space quality thus lies in the eyes of the beholder, which has been claimed previously by Aalbers (2002) and Jones et al. (2016). They acknowledge that participating users develop other types of urban green spaces than the rather uniform ones regarding shape and use created by local authorities, which can be viewed as a quality. However, the authors call for further studies on when and where it is suitable to transfer green space management to users, since the desired green space qualities can differ considerably between different actors (Aalbers and Sehested, 2018).

2.7.4 Measuring green space quality

There is a general lack of empirical studies on the effect of user participation on green space quality. This is, to some extent, understandable, considering the issues involved in quality measurements discussed above. Just as no single definition of green space quality exists, there is no universal model or tool for the assessment of green space quality. It is necessary to define the kind of quality that is relevant to measure, who should define it and whether measurements should be carried out by green space professionals, participating users, non-participating users, or interest organisations/NGOs. Although it is possible to obtain, for example, rather precise estimates of tree canopy cover using quantitative field measurement techniques, it is more difficult to assess more subjective notions, such as participation leading to 'better appearance' and

'higher quality'. The urban scale at which quality is assessed will also influence the assessment scheme, since different features and elements will be appropriate to select in the quality assessment of, for example, an individual garden and an entire neighbourhood (Dempsey, 2008).

The implementation of quality schemes as part of green space management will not necessarily have positive effects, leading to improvements in the process and green space quality. One has to be aware that using any particular quality scheme will affect the actual quality. This is because for each quality scheme it is inherently decided which stakeholders that are to conduct the quality assessment and what kind of quality that is assessed and promoted. A quality assessment conducted by a professional green space manager is never totally objective or free from bias as it is affected by the professional's education and training and their evolved personal view regarding green space quality (Lindholst et al., 2015).

2.7.5 Does the quality depend on the type and scale of the green space?

In the literature, large-scale planning studies of regions or country comparisons have been found to lack specific connections between participation outputs and green space quality. The spatial scale of a study affects both the amount of detail in empirical studies and the type of green space quality that can be assessed. A study must be conducted on city or site level to take user needs and functionality into account. Quality assessments of green spaces on a regional or national scale, on the other hand, become synoptic by nature, expressing green space quality in terms of, for example, tree canopy cover. The type of participation in a green space that can be studied is also affected by scale. Studies on physical user participation in green spaces are more likely on the site-specific scale, as participating physically implies that users are present in a specific space.

2.8 The development of user participation in green spaces

Historically, authorities have been responsible for public green spaces including their management. User participation dates back to the 1960s, when local authorities, for example, in the United States and the UK, started involving users in urban and regional planning, in response to emerging criticism of professionally based rational comprehensive planning (Smith et al., 2014). An early description of involvement levels can be found in Arnstein's (1969) ladder of citizen participation. Arnstein's article was a response to how citizen

participation was treated in North America in the 1960s, often with no redistribution of power from authorities to citizens. This created an 'empty' participation process for the citizens involved, while authorities could still claim that they had encouraged citizen participation. Today, user participation is promoted across multiple phases of green space development, not only in planning and design, but there is now an emerging trend towards increased user involvement also in green space management (Mattijssen et al., 2017).

Several societal trends are currently affecting the continuously increasing number of participatory governance practices for urban green spaces in Europe. These are: 1) user participation being linked to socio-cultural objectives, 2) e-governance becoming more common, 3) cuts in budgets forcing authorities to increase outsourcing of green space maintenance to private actors, as well as fostering of public–private partnerships, since authorities strive to maintain public green space quality, and 4) local authorities promoting and engaging in community-supported urban agriculture and local food production, as urban residents are showing an increasing interest in urban gardening (Van der Jagt et al., 2016).

2.8.1 The development of research on user participation in green spaces

The literature search, which was conducted in 2013, provided an insight into the history of research on user participation in green spaces (Paper I). The search was limited to include peer-reviewed scientific articles in the English language, empirical articles based on original research, and articles referring to user participation in the making or keeping of public urban green spaces. Bearing these limitations in mind, as well as the possibility of relevant articles being excluded, it was found that there was a gap between the first two articles, in the early 1980s, and the others following after the latter half of the 1990s. This highlighted the growing popularity of the subject, up until 2013 when the search was carried out. Interest in the subject has increased even more since then, as evident from the many articles published after 2013 (see, for example, Molin and Van den Bosch, 2014; Mathers et al., 2015; Mattijssen et al., 2017; Aalbers and Sehested, 2018).

Furthermore, the literature search showed that the popularity of the research topic of user participation in green spaces began in North America in the early 1980s, followed by a period after the latter half of the 1990s when publications predominantly originated from North America and Western Europe. From 2010 and onwards, the topic became increasingly popular in publications in the English language from the Asian countries of Taiwan, Nepal and China

(including Hong Kong). Despite differences in local context, the articles from these four countries all argued for increased citizen participation, rather than reviewing participation processes that had actually taken place. Together with one article from Russia (Nilsson et al., 2007), these studies emphasised the ability of participation processes to legitimise government (Huang, 2010; Gurung et al., 2012; Lo and Jim, 2012; Shan, 2012), potentially signalling a growing interest in, and support for, participation, while the focus in Western European studies has moved towards critique of ongoing processes.

2.8.2 Involved – but to what degree?

The involvement of users is generally seen as something good and desirable, but to what degree are they really involved in practice? How much power is actually transferred from local authorities to participating users? Table 3 presents different ways of describing the level of user participation. Apart from the 'Spectrum of Public Participation in Forest and Woodland Planning', none of the ladders or spectra described below has been specifically developed for participation in green space management, but they may, nonetheless, be applied to the field. Arnstein (1969) developed a ladder of citizen participation to show that there are different degrees of citizen participation with varying degrees of power. Her ladder had eight rungs, corresponding to different degrees of citizen participation in decision-making and planning in terms of: 1) manipulation; 2) therapy; 3) informing; 4) consultation; 5) placation; 6) partnership; 7) delegated power; and 8) citizen control. The two lowest rungs describe non-participation, the following three tokenism, while only the three highest rungs indicate citizen power (Arnstein, 1969).

It is important to not only consider to what degree people are involved, but also which societal groups that are involved. It is particularly important to involve children and youths. They provide a different, and valuable, perspective compared to adults, and children are often interested in becoming involved. Participation can also be a way to foster their democratic learning and gain knowledge on citizens' rights and duties, and how decisions are made in a democracy. Despite this, adults often fail to involve children or even consider doing so (Lansdown, 2001).

Children's participation in the development of urban green spaces has often focused on planning and design. However, children might also be interested in participating within management, also on the operational management level with the possibility of physically manipulating the environment (Jansson, 2015).

Hart (1992) recognised this and provided a much needed adaptation of Arnstein's ladder to include children's participation. The purpose of this was to

stimulate dialogue on children's participation, rather than to provide a comprehensive tool for assessment of projects in which children participate (Hart, 2008). The most important issue when children are involved is not that they operate on the highest possible rungs of the ladder, but rather to give each child the opportunity to choose to participate at the highest level of his or her ability (Hart, 1992). Hart (2008) states that the ladder of children's participation only deals with a rather narrow range of ways in which children can participate, i.e. formal programmes and projects, rather than children's everyday informal participation in their communities, seeing a need for integration of knowledge on children's formal participation on the one hand, and their informal participation and building of culture through play, on the other.

There are also more recent descriptions of user participation levels. The Spectrum of Public Participation, developed by the International Association for Public Participation, has been adapted by Ambrose-Oji et al. (2011) to specifically describe public participation in forest and woodland planning and management. One difference between this spectrum and the ladder of citizen participation is that the former does not take into account non-participation, and the presentation of the level of participation as a spectrum, rather than a ladder, is an attempt to move away from the normative association that reaching the higher rungs of the Arnstein ladder is always better in any participation process. According to Van der Jagt et al. (2016), the novelty of the spectrum also lies in the way in which the various roles of non-governmental actors along different parts of the spectrum have been clarified (see Table 3). 'Involve' is included in this spectrum as a level between the rungs corresponding to placation and partnership on the ladder (Table 3), and is defined as "working directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered". 'Partnership' concerns "partnering with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution". 'Empower' is to "place final decision-making in the hands of the public" (Ambrose-Oji et al., 2011, p. 3).

Table 3. *Systems used for the description of the degree of user participation by different scholars*

Ladder of Citizen Participation (Arnstein, 1969)

Manipulation	Therapy		Informing	Consultation	Placation		Partnership	Delegated power	Citizen control
Non-participation			*Tokenism*				*Citizen power*		

Ladder of Children's Participation (Hart, 1992)

Manipulation	Decoration	Tokenism	Assigned but informed	Consulted and informed		Adult-initiated, shared decisions with children	Child-initiated and directed	Child-initiated, shared decisions with adults	
Non-participation			*Degrees of participation*						

Spectrum of Public Participation in Forest and Woodland Planning (Ambrose-Oji et al., 2011)

Form of participation	Inform	Consult		Involve			Partnership (or Collaborate)		Empower (or Control)	
Non-governmental actor role	Provide information and views about plans for decision-making processes			In care and maintenance	In planning decisions	In management	Collaborative management		Lease of public land	Purchase of public land

the hierarchical, closed and open co- and self-governance continuum (Arnouts et al., 2012)

Hierarchical governance		Closed co-governance	Open co-governance		Self-governance	

The level of participation that is achieved may be affected by whether participation was initiated top-down by authorities or bottom-up by users. A participation process could be placed along the spectrum and ladders of level of participation described above, but could also be described according to its governance mode. Governance modes constitute the organisational component of a policy arrangement, or governance arrangement, and range from hierarchical to open co- to closed co- to self-governance (Arnouts et al., 2012) (Table 3).

2.8.3 Power is not the only thing that matters

The message derived from the spectra and ladders described above is that local authorities should aim for genuine and real participation of users, given its benefits. Users may lose interest in participation processes and become disappointed if their efforts and input are disregarded by authorities who were only looking for more consultative types of participation. At the same time, users shouldn't be involved unconsciously; not at the lowest, symbolic level only for local authorities to be able to tick off the participation box, nor automatically at the highest, empowering level when participants do not demand it. As Burton and Mathers (2014) emphasised, participants' capacity and interests concerning scale and type of participation need to be matched with corresponding management activities. If, for example, an activity demands insurance, or if participants lack the skills necessary to carry it out, it is better to offer participants other tasks. This is related to the issue that many stakeholders in European cities continue to regard open space management as the responsibility of the local authority, which can make them reluctant to participate in initiatives, or become very selective in the way in which they choose to become involved. Participants who feel that they are "taking jobs" from professional maintenance staff may choose to be involved in arranging events, rather than in operational maintenance. Sometimes, participants find the initial phase of place-making more exciting than the place-keeping of an open space, and lose interest over time (Burton and Mathers, 2014).

Tritter and McCallum (2006) criticized Arnstein's ladder of participation for being hierarchical, and linear, and therefore an unrealistic model of user involvement that only emphasises the transfer of power. Although their focus was on user participation in healthcare policy and practice, their remarks are valid in other contexts. Gaining power through a public participation process is not the goal of all users, and in many cases some do not even wish to become involved. Transferring power from local authorities to users does not automatically result in high-quality participation processes or outcomes. Rather,

the authors call for a model that shows the full potential of participation, which is evolving with time and involves a diversity of valuable knowledge and experience of both professionals and users involved. Instead of a ladder, they propose a mosaic model to better describe the participation process (Tritter and McCallum, 2006).

The same analogy is used by Buijs et al. (2016), who propose so-called mosaic governance as a way to maximise the environmental outcomes of user participation in green spaces, specifically. Mosaic governance is about employing an enabling and stimulating governance style in order to exploit the full potential of user participation, while avoiding undesirable outcomes. The cultural diversity of both citizens and their green space use, the institutional diversity in how they self-organise, as well as the diversity of physical urban green spaces demand context-sensitive rather than generic governance approaches from the authorities. In practice, this means embracing a wide range of partnerships with citizens, from bottom-up initiatives to cross-sector partnerships, and creating different kinds of arrangements depending on the type of green space and the character of the citizens involved, and to develop the arrangements over time as social and ecological circumstances change (Buijs et al., 2016). Mosaic governance explicitly focuses on grassroots and bottom-up processes in the urban context, and the socio-cultural diversity of residents and communities (Buijs et al., 2018).

2.8.4 Mosaic governance in practice

While it is important to be aware of the problems associated with the different types of non-participation as described in Table 3, the higher levels of participation are more interesting when discussing participation at different levels in practice. The choice of method depends on the type of green space where participation takes place and the type of participation process. For example, involving residents in the local landscape close to their homes, as in the Sletten case, calls for a different approach from one involving people in a community garden situated further away. Combining the conclusions presented by Tritter and McCallum (2006) and Buijs et al. (2016), indicates that the following aspects should be considered when describing mosaic governance in urban open spaces in practice.

- Acknowledgement that participants may seek different methods of involvement in relation to different issues and at different times in the planning and implementation process
- The use of a variety of methods for participation makes participation relevant for different types of user groups. Context-sensitive methods must thus be

provided for different kinds of participation (i.e. participation processes ranging from one-off events to continuous participation; from hierarchical to self-governance; from bottom-up to cross-sector partnerships; from individual to collective organization; concerning a diversity of green spaces type and scale, (i.e. individual street trees, small street gardens, community gardens, nature conservation areas, etc.) to target a diversity of users (i.e. individuals, groups or organisations, as well as diversity in culture, age, green space use, knowledge, experience, resources etc.), and to ensure that green spaces meet local requirements.

- The use of a dynamic structure and participation process, negotiated by the users themselves, to account for changing social and ecological circumstances.

According to Tritter and McCallum (2006), the complete mosaic shows complex and dynamic relationships between individual tiles and groups of tiles, where tiles of different colours and shapes are essential parts of the complete picture, but only when being systematically integrated. If their reasoning is transferred to the context of urban green spaces, the tiles would represent different governance arrangements associated with different spatial locations, varying in size, green space type, community and participant type, and integration within different institutional and organisational arrangements that might be top-down or bottom-up initiated, long-term or short-term, and so forth. The complete mosaic can be regarded as an overview of the entire urban green infrastructure governance for a given city, enabling user participation to be mapped and monitored.

3 Research design

3.1 The research from a critical realism perspective

The case study of Sletten was conducted in a way that is in line with the philosophy of science 'critical realism'. Critical realism was introduced in the 1970s by Bhaskar as an alternative to positivism and constructivism (Fletcher, 2017). Bhaskar (1998 in Fletcher, 2017) stated that human knowledge based on scientific experiments only captures a small part of reality, and he therefore criticised positivism for reducing ontology to epistemology. The constructionism view, that reality is mentally constructed, can similarly be criticised for reducing reality to human knowledge (Fletcher, 2017). Critical realist ontology divides reality into three levels: the empirical level (events as we experience them, which can be observed and interpreted at this level), the actual level (where events occur whether we experience/interpret them or not, different from what is observed at the empirical level) and the real level (the inherent properties of an object or structure acting as causal mechanisms producing the events at the empirical level). Critical realists strive to explain social events through analysing how the causal mechanisms affect the other layers of reality. This means that the causal mechanisms at the real level cannot be identified independently of the events at the empirical level; the three levels are part of the same inseparable reality. The focus of critical realism on causal analysis rather than thick empirical description makes it useful in explaining social events and suggesting practical policy recommendations to address social problems (Fletcher, 2017). This suggests that critical realism is suitable for studies within public green space management in general, since this is a research field close to practice, often seeking to have direct practical implications.

The key steps of critical realism include the identification of demi-regularities, abduction and retroduction. Quantitative, extensive data (e.g.

statistical data) as well as qualitative, intensive data (e.g. from interviews) can be used to identify demi-regularities at the empirical level of reality (Fletcher, 2017).

Because of critical realism ontology and epistemology stating that there is a 'real' world and that it is theory-laden, not theory-determined, all explanations of reality are treated as potentially fallible (Bhaskar, 1979 in Fletcher, 2017). This means that the researcher's scientific interpretation is not always seen as the best explanation to a phenomenon, but that the participants' experiences sometimes provide the best explanation of reality. Therefore, critical realism allows informants' understandings to challenge existing scientific theories (Redman-MacLaren & Mills, 2015 in Fletcher, 2017). The process starts with a deductive coding process, where the list of codes is drawn from theory and the literature. The most dominant codes are then used as a starting point for the identification of demi-regularities. This is followed by abduction, i.e. redescription of empirical data using theoretical concepts (Fletcher, 2017). The aim of the final stage of critical realist analysis, retroduction, is to identify the contextual conditions that are required for a particular causal mechanism to result in the empirical trends observed, since varying conditions affect how causal mechanisms manifest at the empirical level of reality. At this stage, conclusions about a phenomenon are drawn by moving back and forth between empirical and deeper levels of reality (Fletcher, 2017).

3.2 Case study approach

As mentioned previously, two different approaches were adopted in this research: a literature review and a case study. In the case study of Sletten, spanning over seven years, a combination of qualitative and quantitative methods was employed, in a mixed-method approach, acknowledging that the use of qualitative and quantitative methods in tandem results in a stronger study than a qualitative or quantitative approach alone (Creswell and Plano Clark, 2007). A single case study approach was chosen for the research design since the studied co-management zone is unique and only occurs in one place, which precludes a randomised field trial or other types of experiment. The research questions addressed are explanatory "how" and "why" questions; and a contemporary phenomenon is studied in depth and within its real-life context without the possibility of controlling the studied event. Together, these aspects make a case study the preferred approach (Yin, 2009). The case study in this thesis has a single-case (holistic) design with the co-management zone as the single unit of analysis and the neighbourhood Sletten as the context of the case (Yin, 2009). The assumption that the co-management zone is unique, in

combination with the focus on how different aspects of resident participation in urban woodland management changes over time, made a single-case design the most appropriate choice.

3.2.1 Case selection

The case was identified through information-oriented selection and can be considered an extreme or potentially paradigmatic case (Flyvbjerg, 2006). An extreme case is an unusual case that is particularly problematic or good (Flyvbjerg, 2006). The municipal green space management department and the challenges it faces in the city of Holstebro are similar to those in other parts of Denmark and other Nordic countries; for example, green space maintenance is outsourced, the budget for management has been cut during recent decades, and green space maintenance is administratively a sub-unit of a larger technical department (Randrup and Persson, 2009). The extreme component of the case – compared to conventionally managed areas in Holstebro municipality, as well as other Nordic municipalities – is the formalised, but open, resident participation in the operational woodland management.

A paradigmatic case is difficult to identify since there is no standard for it, "because it sets the standard", and it is therefore instead selected based on intuitive procedures, that should nonetheless be accounted for (Flyvbjerg, 2006). The case should be of prototypical value in order to be paradigmatic, but it is seldom possible to decide this in advance, since the strategic choice of case, the way in which the case study is performed including its validity, and how it is received by the research community and the public are aspects that influence whether it can be regarded as paradigmatic or not (Flyvbjerg, 2006). It will be revealed in the course of time whether Sletten is a paradigmatic case, for example, whether other local authorities choose to implement co-management zones and regard it as an innovative method for user participation in urban woodland management. The perspectives and conclusions obtained from a case depend on the type of case it is regarded as, which means that it could be valuable to regard the case of Sletten as a simultaneously extreme and paradigmatic case, thereby gaining more information about it (Flyvbjerg, 2006).

3.3 Papers II, III and IV: Data collection methods

3.3.1 Field surveys of participation (2010 and 2015)

In June and July 2010, the co-management zone bordering the garden of each home (n = 201) was surveyed by me and two other researchers for physical signs of participation in woodland management. The type of boundary between the garden and the co-management zone was also noted, and the character of the garden was assessed. This field survey was guided by a template developed in dialogue with the green space managers responsible for the management of the woodland in Sletten, ensuring that their knowledge and experiences were integrated. Field notes were supported by photographic documentation of a selection of residents' management inputs and garden characteristics. The 2010 field survey was conducted before the co-management zone was formalised and guidelines distributed to all residents. In 2015, a post-formalisation field survey was conducted by me alone, using the same methodology as in 2010 (Figure 7).

3.3.2 Focus group interviews with residents (2010)

The local authorities sent the newly developed guidelines for the co-management zone to all Sletten's forest village residents in early September 2010, with an invitation to one of three dialogue meetings, about the co-management zone, held during three consecutive evenings. Five focus group interviews were scheduled either before or after each dialogue meeting and conducted by me and another researcher. Three to nine participants showed up for each interview, resulting in a total of 34 participants from 29 households (i.e. 14.4% of the households in the forest villages). The interviews were semi-structured (Kvale, 1996), following an interview guide with open-ended questions (Wibeck, 2010), and supported by an aerial photograph of Sletten (the basis for Figure 2). The interviews focused on: residents' attitudes to the neighbouring woodland and the co-management zone; residents' use of, and participation in, the co-management zone; and residents' current assessment of, and preferences for, communication and information exchange between them and the local authorities. The interviews lasted 40-80 min, were audio-recorded and transcribed verbatim. The data were used in Paper II.

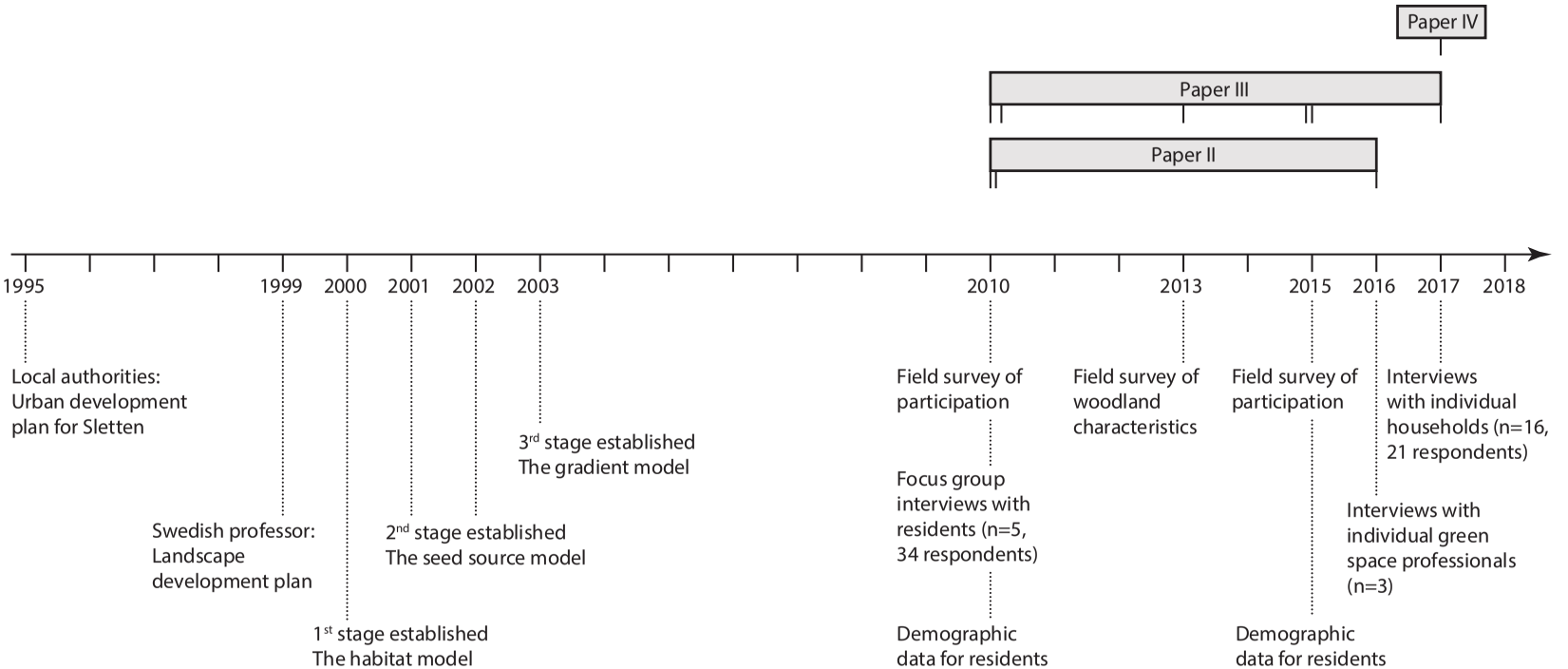

Figure 7. Overview of the urban development of Sletten, the timeline for the data collected for the case study, and the time period and data covered in each paper. (Figure made by Hanna Fors)

3.3.3 Field survey of woodland characteristics (2013)

A field survey of woodland vegetation characteristics was carried out by Wiström (co-author, Paper III) in 2013, i.e. between the field studies in 2010 and 2015. It included measurement of stand height for all woodland stands and classification of forest edge type towards private gardens. The data were used in statistical analysis of drivers (Paper III). Tree and shrub growth in young stages is approximately linear, which was confirmed by field observations and photographs. Thus, the vegetation data provided an indication of the characteristics and stand height for 2010 and 2015. Forest edge types were considered to be more or less stable over the time span studied, based on previous studies on forest edges in the same ecoregion (Wiström & Nielsen, 2014). This was verified by observations of vegetation made during the field survey of resident participation in 2015.

3.3.4 Demographic data (2010 and 2015)

As a supplement to the field survey data, demographic data were obtained from local authority records on the age and gender of the residents in households with a garden bordering the co-management zone for the years 2010 and 2015. The data were used in statistical analysis of drivers (Paper III).

3.3.5 Individual interviews with green space professionals (2016)

Semi-structured (Kvale, 1996) individual interviews were conducted during April and May 2016 with the three green space professionals who had led the planning, design, establishment and management of the woodland and the implementation of co-management, namely the former manager (head of green space management in the local authorities of Holstebro, who retired in 2005), the university professor who designed the woodland plantings and supported the process from the start, and the present manager. These three key informants provided information on the initial and current thoughts behind the co-management zone, as well as their perspectives on successes and challenges. The interviews were semi-structured and focused on the development of Sletten; how user participation influenced woodland management; and the co-management zone as an approach to user participation in the management of edge zones of public urban woodland. The three interviews were audio-recorded and transcribed verbatim.

3.3.6 Individual interviews with residents (2017)

Non-participants are often difficult to identify and reach. However, their recreational experiences as users of the green space are likely to be affected by participation, making their views on participation interesting. The intention during the selection of residents was to interview eight non-participating residents and eight participating residents. Information on participants and non-participants was retrieved from the field survey of participation conducted in Sletten in 2015. An employee at Holstebro municipality assisted by phoning Sletten residents to book interviews with them in their homes on four consecutive days in October 2017. Only two non-participants agreed to be interviewed, so 14 interviews were conducted with participants. Another aim in the selection of residents was to interview two residents from each of the eight forest villages to obtain an even spatial distribution over the whole neighbourhood to identify potential local differences due, for example, to differences in woodland appearance. Eventually, residents from one to three households from each forest village were interviewed. The number of family members at home during the interviews varied between one and two. Because of this, some of the interviews were conducted with two family members in the household, resulting in 21 interviewees in all. The interviewed residents were between 31 and 79 years old with a mean age of 55.1 years. These values can be compared with the mean age of all Sletten residents, which was 42.1 years (SE = 1.459 years) in 2010 and 46.8 years (SE = 1.491 years) in 2015. The interviews were semi-structured and focused on residents' definitions of urban woodland quality; descriptions of their own participation and how it has changed over time; their views on the impact of resident participation on urban woodland quality; and drivers of resident participation. They lasted 27-77 min, were audio-recorded and transcribed verbatim. To study the drivers of participation, the quantitative data obtained from the field surveys and the demographic data were complemented with qualitative data, i.e. the 16 individual resident interviews, to provide a more complete picture of residents' drivers. Furthermore, this increased the construct validity of the study (Yin, 2009), since residents as key informants were asked about their opinions on the importance of the drivers identified based on quantitative data, thereby reviewing the conclusions from the statistical analysis.

3.4 Papers I-IV: Methods of analysis

The literature review (Paper I), was guided by certain selection criteria for an article to be included in the review, the most important being that only peer-reviewed, scientific, empirical articles were included. The in-depth reviews of

the 31 articles included began with careful reading and note-taking. A Microsoft Excel spreadsheet was compiled and used to guide the note-taking and organise information that could potentially be compared later. The spreadsheet was designed to systematically log each article's basic publication information, aim(s), methodology, main arguments and findings. Using a grounded theory approach, steps for further analysis were determined by trends apparent in the material itself (Denzin and Lincoln, 2011), so columns were added to the spreadsheet to better categorise the material logged. An adapted version of the park−organisation−user model (Randrup and Persson, 2009) served as analytical framework to structure the literature review around dimensions of green space development.

All interview transcripts in Papers II-IV were qualitatively analysed by coding, followed by categorization of codes (Creswell, 2013), while the theoretical framework used, varied between the papers. Findings were structured according to the four dimensions of the policy arrangement approach (Arts et al., 2006) for the analysis of the co-management zone in terms of a governance arrangement in Paper II. In Paper IV, findings were structured according to the quality assessment scheme for urban woodland quality, adapted from Bell et al. (2005).

Paper III built on a mixed-method study. Here, the field surveys of physical signs of participation conducted in 2010 and 2015 were combined with the field survey of woodland vegetation characteristics and demographic data on residents. Mixed generalised linear modelling was performed to identify the dominant personal, physical environmental and social environmental variables explaining level of resident participation. In relation to this, the analysis of individual interviews was focused on interviewees' views on the relevance of the drivers for participation identified through statistical analysis.

4 Papers I-IV - Summary of the results

In the following sections the three research questions addressed in this thesis are answered by intertwining the results obtained from the four studies presented in Papers I-IV.

4.1 What drives users to engage (or not) in resident participation in woodland management of urban private–public transition zones in residential areas?

Initial conclusions regarding what drives the residents of Sletten to participate are presented in Paper II. It was noted that the residents' seemingly strong place-attachment to their neighbourhood had probably made them more inclined to participate in managing the young woodland plantations directly bordering their gardens. Furthermore, participation had led to increased resident use of the co-management zone part of the woodland, implying that this goes both ways; i.e., resident participation also contributed to creating a stronger attachment to the local environment.

The drivers of Sletten residents' participation in the co-management zone were studied in more detail through the mixed-method study presented in Paper III. Important contributions of Paper III are the longitudinal comparisons and interpretations of how the development of driver composition has determined and changed the type and extent of participation between 2010 and 2015, made possible through the repeated field surveys. Such longitudinal observational studies of drivers of participation in green space management are rare; the few existing longitudinal studies being retrospective.

Overall resident participation increased from 41% of all households in 2010 to 65% in 2015. This suggests a general appreciation of the possibility to participate. A particularly large increase in participation was found in the newest, eastern part of the neighbourhood with the youngest woodland

vegetation. Drivers related to the physical environment, the social environment and the personal characteristics of residents were all found to be part of the explanation of participation, as related to Lewin's (1936) equation for human behaviour.

The five identified main variables were 'garden character – horticultural richness' (a personal variable), 'neighbour effect', 'new/same owner 2015' (both related to social environment), 'stand height' and 'forest edge type' (both related to physical environment).

Residents were asked about their views on the importance of the five main drivers identified based on the analysis of quantitative data, as well as whether they thought interest from researchers and the local authorities could drive participation. The results of the interviews largely confirmed the importance of the drivers identified through statistical analysis. All except one interviewee thought that an interest in gardening could lead to participation in woodland management (i.e. garden character 'horticultural richness'). A majority of the interviewees (14 out of 16) believed that residents could inspire each other to participate and share ideas through their own participation (i.e. 'neighbour effect'), and four of them reported having inspired other residents. Eleven interviewees thought that 'tree height' drove participation, but did not simply state "the taller the trees the better". Rather, they were of the opinion that there was a lower threshold for tree height before it became interesting to participate, and that the woodland had to be perceived as a "real forest" before being driven to participate. Ten interviewees thought that shrub 'forest edges' favoured less participation than one-step forest edges. The results from interviews regarding length of residence were more ambiguous (i.e. 'new/same owner 2015'). Some interviewees confirmed the findings of the statistical analysis, believing that newer residents did not participate due to a lack of information from the municipality, and that long-term residents participated more than newer ones, as they had followed the growth of the trees over the years. Regarding the interest that the municipality had shown in Sletten, 10 out of 16 were of the opinion that providing residents with information and inspiration regarding the co-management zone could affect participation. Two interviewees who had not experienced any interest on the part of the municipality consequently did not consider this a driver. Interviewed non-participants found it somewhat difficult to answer the question regarding drivers. In addition to the drivers identified through statistical analysis, interviewees mentioned personality, interest in nature, and period in life and, related to this, the amount of energy, time and physical strength required for participation, as possible additional drivers.

Resident participation in 2010 was explained by three variables, two of which increased the probability of resident participation. These were households with

gardens dominated by 'garden character – horticultural richness', i.e. a personal variable, and increasing 'stand height', being a physical environment variable. 'Visually enclosed garden', on the other hand, was associated with a lower probability of participation, i.e. a physical environment variable. Having a next-door neighbour who participated in woodland management increased plant maintenance and misuse, i.e. 'neighbour effect'. In other words, this demonstrates that the 41% of the households that participated in 2010 became first movers, being mainly driven by their personal interest in gardening, participating in places where the woodland had grown sufficiently high. However, these residents were not only the first to participate, but their participation was also sustained over time. The fact that gardens dominated by a 'horticultural richness' character were positively associated with all positive participation types in both 2010 and 2015 indicates that this group of residents not only participated in preserving maintenance, but also in management, developing the woodland by adding plants and functions such as nesting and feeding boxed for birds, etc. at their own expense. Moreover, this, combined with the significant 'neighbour effect' for participation through plant maintenance in 2010, indicates that these residents' co-management actions inspired next-door neighbours to participate. This interpretation was supported by statements from the interviewees.

'Stand height' and garden character 'horticultural richness', which explained overall participation in 2010, were still important variables in 2015. In addition, the physical environmental variable 'forest edge type' mattered, with one-step edges and/or semi-open edges in relation to shrub forest edges being positively associated with overall participation. The changes in resident participation between 2010 and 2015 were mainly explained by 'forest edge type', with a lower probability for participation in shrub forest edges than in one step and/or semi-open edges, and 'new/same owner', where being a newcomer in 2015 led to a lower probability of resident participation.

The finding that interviewees believed a woodland with taller trees to be more useful than lower woodland and wanting a "real forest" before participating, suggests that the relationship between stand height and participation is not linear. Rather, it seems that trees need to reach a minimum height to afford participation, but once that threshold has been passed, other variables drive the change in participation between 2010 and 2015. Regarding the development of drivers over time, the increase in overall participation, from 41 to 65% between 2010 and 2015, and noted changes in all participation types were mainly explained by the forest edge type, where one-step and semi-open forest edges provided visual and physical access. That shrub edges hindered participation was confirmed by the results of the interviews. One explanation of the importance of

tree height and edge type as drivers of participation could be that the affordance of the woodland edge zone for co-management "grew" in parallel with tree and shrub growth, or, more precisely, with increasing visual and physical accessibility associated with increasing tree height. Expressed simply, participation seems to have been encouraged where residents could *see* the suitability of the zone for co-management and could *enter* the zone physically. Aesthetic merits and perceived safety could be additional explanations of the increased levels of participation prompted by open stand and edge types. The forest edges are more often semi-open in the newest, most eastern part of the neighbourhood, which makes forest edge type a valid explanation for the noted participation increase in this part of Sletten.

Residents who enclosed their gardens visually, for example, by planting a high hedge, participated less than other residents in 2010, and were also responsible for a degree of the increase in misuse between 2010 and 2015. Visually enclosed gardens obstruct residents' views of the co-management zone, disconnecting them visually from the woodland, thereby making them less likely to participate in its maintenance. This can be seen as an affirmation of the affordance of visual and physical accessibility to the co-management zone as a driver of participation. In relation to this, the association between one-step forest edges and increasing misuse of the co-management zone suggests that the visual and physical accessibility afforded by this specific edge type increased not only positive participation, but also undesirable misuse. This suggests that the misuse observed at Sletten is not unique or provoked by the permissive attitude of the local authorities.

Changes in participation between 2010 and 2015 were partly explained by new owners at certain addresses in 2015 compared with 2010. The formalisation of the co-management zone and associated distribution of guidelines to all residents provide another plausible explanation of the increase in participation between 2010 and 2015. Interviewees said that guidelines were not distributed to newcomers after 2010, and that long-term residents who had followed the growth of the woodland over the years participated more than newer ones, which may be two reasons why newer residents were less engaged in the co-management zone than those who lived in Sletten also in 2010.

Households with a lower mean age misused the woodland to a higher degree than households with a higher mean age. Lower 'mean age per household' also partly explained the increased resident participation in plant maintenance in 2015. However, the mean age per household did not influence overall participation levels, suggesting that other variables were more influential for participation.

4.2 How is the quality of public urban woodlands affected by resident participation in woodland management of urban private–public transition zones?

Participation is generally regarded as something positive; enhanced green space quality being one of the many benefits that have been ascribed to participation. However, such arguments are accepted without questioning whether there is empirical support behind them. Paper I presents the results of a literature review that sought to answer how participation affects the physical quality of green spaces. What if participation affects green space quality negatively, implying less benefits of green space use for citizens in general? While the case study described in Papers II-IV was focused on user participation in the management of urban woodlands in Sletten specifically, the study presented in Paper I had a wider focus, encompassing user participation in all phases of green space development (planning, design, construction and management), and in all types of urban public green spaces. The study addresses the types of participation in focus in the literature (i.e. civic/physical), arguments used to support user participation in green spaces, and whether there is empirical evidence supporting these arguments.

Most studies in the reviewed articles were found to be concerned with participation processes themselves. Civic participation was the type most studied, and far more studies had been conducted on the making phase than the keeping phase of the green space.

Bearing in mind the impact of participation on physical green spaces, green space quality was defined in Paper I as including objectively testable, physical aspects of ecological and user functionality, including the range of ecosystem services that users may appreciate, i.e., how the green space performs environmentally and meets local needs for use. However, the articles reviewed included various vague or subjective notions of the term ‘quality’.

Many arguments for participation, i.e. support and potential benefits attributed to participation, were found in the reviewed articles. These can be viewed as aspects of green space quality affected by participation, and ranged from social aspects, such as consensus and community building, to ecological aspects, such as an increased number of trees. The mentioned arguments directly serving the physical green space included ‘increased green area’, ‘increased number of trees’, ‘improved functionality’ and ‘healthier trees’, all of which are testable, physical aspects that could contribute to our understanding of green space quality. The arguments ‘better appearance’ and ‘higher quality’ are more vague, and require clear operationalisation to be empirically tested. Arguments related to users and green space administrators were, however, also of interest, since these actors may affect green space quality indirectly, through arguments

such as ‘better decisions’, ‘creative solutions’, ‘user satisfaction’ and ‘ownership’.

However, when looking for proof for described benefits of participation, it was found that despite the fact that many arguments for participation were discussed in the literature, few of them had been empirically tested. The general lack of thorough testing (verses rhetoric), implied that many benefits of participation are taken for granted. In particular, the arguments most directly linked to the physical green spaces and their quality were least tested in regards to the number discussed – only the notion of healthier trees was tested, and that only in one article. Rather than assessing the physical outputs of participation, i.e. how the green space performs environmentally and meets local needs for use, most of the empirical studies tested the benefits of the process to users and administrators, aligning with a traditional human-centric and government-down approach to green space administration.

It was concluded in Paper I that the identified knowledge gap called for more case-level studies, rather than large-scale studies (city, state, national), to be able to empirically evaluate place-specific green space quality outcomes of user participation. Such research could contribute knowledge on how participation processes can be made most meaningful, providing administrators with information on what to realistically expect from participation in green space development. Without empirical evidence linking participation to green space quality, professionals’ scepticism to involving users could continue without response. Due to the discovery of the predominance of process-driven studies, it remains unclear whether participation actually improves green spaces, or if it is exercised simply for the benefit of the people involved.

The case study of Sletten (Papers II-IV) is one of the case-level empirical studies called for in Paper I. The first conclusions regarding how resident participation affects urban woodland quality in Sletten are presented in Paper II. The results of this study showed that participation in the co-management zone, as implemented in Sletten, had first and foremost provided benefits for the residents involved as individuals. Small-scale, nuanced contributions by individuals to the co-management zone enhanced the recreational experience for those participants. A large proportion of the residents had managed to participate without misusing the co-management zone, succeeding in maintaining the woodland character and public access. However, these qualities were generally not perceived by others, largely because no public path system provided public access to the co-management zone. Few social benefits or aspects of participation were found. This may be a result of the fact that residents are welcome, but not obliged, to collaborate with their neighbours. More participating residents, combined with local authorities encouraging

collaboration between residents, could potentially increase social benefits in the future, as could including the residential community associations as an actor.

The three green space professionals interviewed in the study described in Paper II regarded the co-management zone approach as financially preferable to conventional public green space management. This finding is in contrast to previous reports from professional planners who considered participatory planning processes to be more resource- and time-consuming than conventional planning. User participation in management may therefore be more favourably regarded. However, when discussing the benefits of participation for green space managers, they rather focused on values other than monetary ones, such as the benefits in health and recreation residents gain from participation and the creation of interesting environments, i.e. benefits to the physical urban woodland and its users.

It was also noted in Paper II that residents changed the physical landscape and created other qualities in the urban woodland. Some residents had expanded their gardens and were mowing the grass, thereby creating garden-like lawns under the trees in the co-management zone, transferring garden characteristics to the woodland. At the same time, prominent discussions occurred among the residents concerning the importance of safeguarding the "forest feeling" in the co-management zone, so that the woodland would continue to provide a liberating alternative to gardens where the vegetation does not have to look perfect, appreciating the "wildness" of the woodland. While a diversity of interesting transition zones has emerged in Sletten, it is also clear that the effect on the physical landscape has been largely one-directional; garden characters and functions have enriched the woodland edge (i.e. the co-management zone), while no residents have chosen to bring woodland characteristics and species into their own garden. This could be explained by people's general desire for a gradient of well-kept vegetation in their immediate housing environment, and more nature-like areas further away, but still close to home.

The green space professionals interviewed in the study considered several resident initiatives to be valuable contributions to the public woodland environment, adding small-scale, frequent and nuanced physical qualities that cannot be planned or maintained within the public budgets for green space management (Paper II). Not all resident-created environments in the co-management zone met professional standards, but due to a prevailing co-creation discourse within the local authorities, the resident participation process was considered an end in itself. Moreover, this raises questions about how to balance between guidelines that are clear enough to guide participation and prevent misuse, and at the same time encourage and stimulate creativity. Interestingly, residents seemed more worried than the green space professionals that the

woodland would become garden-like and privatised. When environments co-created by local residents are not judged by the same standards as other public green spaces, the effect of user participation on green space quality is a valid concern – who safeguards green space quality if green space managers do not?

In Paper I it is stated that a prerequisite for empirical testing of how user participation affects green space quality is: "a clear definition of green space quality, adjustable to suit each individual place, to determine what features of the green space that should be assessed, as well as whether subjective and/or objective assessments should be carried out". Three years after Paper I was published, while working on Paper IV, this was rephrased somewhat: A definition of green space quality *is* needed for such testing, but it will become too broad to make sense if it should be adjustable to suit each place. Rather, quality must be defined in a new way in each context, for example, in relation to user participation, or a new type of green space such as urban woodlands. This is a likely reason for the existence of many systems for green space quality assessment, although they seem to include more or less the same aspects of quality. For Paper IV, a brief review of scientific literature was conducted, as described in section 2.7.2, identifying four recurring overall quality aspects in existing general green space quality schemes: maintenance, accessibility, nature and facilities. No assessment schemes specifically designed for urban woodland quality in relation to use were found in the literature. Acknowledging the importance of employing a situation- and context-specific quality definition, a new framework was deemed necessary to allow for exploring the impact of participation on urban woodland quality in Sletten. The four dimensions defined by Bell et al. (2005), namely 'the social', 'the experiential', 'the functional' and 'the ecological', that all needs to be considered for a well-balanced design of the urban forest (i.e. street trees, parks, woodlands) were transformed into a quality assessment scheme for 'urban woodland quality'. This definition of urban woodland quality was compared with how Sletten residents themselves described high urban woodland quality.

4.2.1 Residents' definition of urban woodland quality

The residents interviewed for the study presented in Paper IV generally shared the image of high-quality woodland in Sletten. To them, high quality was (1) having a natural woodland making nature experiences possible; (2) related to the structural and species diversity of woodland stands, including diversity and density, and species characteristics; (3) accessibility to the woodland, both physical (available on the doorstep and from the paths) and mental (the fact that residents were allowed to use it); and (4) for a few, something for which better

management or maintenance would be needed. Sletten residents confirmed the significance of most of the key aspects identified in existing green space quality assessment schemes in the literature (maintenance, accessibility, nature), but not facilities, except for paths. Structural and species diversity of woodland stands are aspects unique to urban woodland quality studies, both in the literature and in Sletten, as opposed to studies of green space quality in general. Within this category, residents mentioned woodland density, diversity in species, variety in experiences, and the species characteristic age of trees, and plants with edible berries, fruits, and nuts.

4.2.2 Impact of physical participation on urban woodland quality in general

The study described in Paper IV not only explored residents' perceptions of urban woodland quality in general, but also the impact of resident participation. It was found that the urban woodland quality obtained from public management partly differs from that obtained from also resident participation. Outcomes of participation in Sletten affected both the users, i.e. the residents, and the physical environment (Table 4). The effects on the physical landscape corresponded much to the functional and ecological quality dimensions of the urban woodland quality scheme. The effects on users corresponded predominantly with quality aspects within the social and experiential dimensions for a publically managed urban woodland.

While the so far mentioned effects of participation potentially also could be a result of public woodland management, benefitting woodland users, it is not given that they do. It depends on the public maintenance and management intensity of the woodland and whether this is performed with the intent to meet user needs or rather aimed at nature conservation. For the resident-reported outcomes from participation, their passive and active use is practically always in focus, also when it comes to physical qualities serving nature conservation. As an example, residents feeding wild animals or planting different trees and shrubs with the aim of increased biodiversity do also benefit users, rendering enjoyable experiences during walks and better woodland appearance.

A conclusion from the study presented in Paper IV was that participation led to social qualities for both participants and residents in general in Sletten, despite the guidelines for the co-management zone not demanding participating neighbors to collaborate with each other. In other words, individual participation

Table 4. *Outcomes of participation in Sletten compared against the assessment scheme for "urban woodland quality", based on Bell et al. (2005). "Management and maintenance style" and "structural and species diversity" were added to make the scheme better reflect user perceptions. In the table, resident-described outcomes of their own participation, as well as outcomes seen (or believed to result) from participation by other residents, are presented. Examples of codes: 2 (I) means that two residents mentioned this participation outcome and that it benefits the individual; 4 (A) means that four residents mentioned this participation outcome and that it benefits all/many of the residents in the neighborhood.*

Dimension	Aspects of Dimension	Participation Outcome Affecting the Physical Environment	Participation Outcome Affecting Residents	Participation Outcome Affecting Participating Residents
Social	Escape		Nature experience 4 (I)	Sense of community 4 (I) Empowerment 4 (I) Increased participation from inspiration 2 (I) Bird boxes as pest control
	Social activities	Better usability 4 (I), 1 (A)	Social interaction 2 (I), 1 (A) Increased use of urban woodland 6 (I)	
	Safety and security		Improved safety 1 (I)	
Experiential	Aesthetics	Experiencing domesticated animals 1 (I), 1 (A)		Happiness and pleasure 4 (I) Relaxation 4 (I) Participation as personal hobby 1 (I) Enhancement of private garden 7 (I) Memories stored in resident-planted trees 2 (I) Enhanced view of woodland from inside 3 (I) Recreational experiences for participants 1 (I)
	Design, management and maintenance style	Better appearance 5 (I), 4 (A)	Enjoyable experiences during walks 3 (A)	
	The role of the urban forest in urban life		Nature experience	
	Structural and species diversity	Better appearance 2 (I), 1 (A)	Enjoyable experiences during walks 4 (A)	

Dimension	Aspects of Dimension	Participation Outcome Affecting the Physical Environment	Participation Outcome Affecting Residents	Participation Outcome Affecting Participating Residents
Functional	Accessibility		Better accessibility to woodland 1 (I), 1 (A)	Food 7 (I), 2 (A) Firewood 1 (I) Storing firewood in woodland 2 (I)
	Carrying capacity	Paths 2 (I), 10 (A)		
	Climate	Wind-sheltered environment 1 (I) Better usability 1 (I)		
Ecological	Urban ecology	Fertilizing the woodland/creating mold 7 (A) Increased biodiversity 15 (A) Better tree development 5 (A) Bird boxes as pest control 1 (A)	Clean air 1 (A)	Environmental awareness 2 (I)
	Landscape ecology principles	Increased biodiversity	Nature experience	
Sum of participation outcomes and whom it benefited		Individual participants: 16 All residents: 45	Individual participants: 14 All residents: 10	Individual participants: 44 All residents: 2

can also bring social values. The reason that less social outcomes of participation were identified in the study presented in Paper II could be that social values takes time to develop, but could also be due to the methods employed in the different studies. The topic was more directly addressed during individual interviews with residents and the social dimension was clearer and wider defined through the assessment scheme for urban woodland quality used in Paper IV.

Participation in urban woodland management had additional benefits for participants, showing a difference between the urban woodland quality for participants vs. all residents, as well as between participation and woodland use alone (Table 4). The only exception was *food*, which, to some extent, benefited the resident group as a whole. This type of benefit included, above all, experiential qualities, e.g., residents obtaining happiness and pleasure from the act of participating, sense of community between participants, and an enhanced view of the woodland from inside.

Sometimes, both participating and non-participating residents missed out on physical qualities and benefits that would have been possible outcomes of participation if it was not for participation of other residents or hindering physical environment characteristics, e.g., low accessibility from paths to the woodland or residents living next to a dense, thicket-like part of the woodland. This means that participation does not only affect urban woodland quality positively. Furthermore, this implies that urban woodland quality that can be obtained from participation is affected by the original urban woodland quality as affected by design (e.g., species selection), and public management (e.g., long-term local authority strategies). The latter has the possibility to respond to new user needs that arise, such as improvement of path systems. Furthermore, urban woodland quality in Sletten is affected by the qualities of the neighborhood at large. Features of a high-quality built environment at a neighborhood scale identified by Dempsey (2008), such as connectedness and permeability or legibility, are intrinsic qualities in the Sletten landscape plan benefiting all residents, qualities not affected by resident participation.

4.2.3 Impact of physical participation on physical urban woodland quality specifically

Rather than looking specifically at nature conservation as e.g. Mattijssen et al. (2018), this study looked at all types of physical qualities created from participation, i.e. physical qualities supporting both use and the environment, visible in the physical landscape.

Aalbers and Sehested (2018) state that when users are involved in green space management, they create green spaces of a different kind, with other qualities.

So, do the physical qualities created through participation differ from those created through public woodland management? The fact that there are corresponding quality aspects in the scheme based on Bell et al. (2005) for all physical qualities created from participation suggests that no differences exist.

However, a close look at the outcomes shows a number of differences. While managers and residents can both create paths, it is more likely that residents place their path exactly where they are needed to support woodland use. Managers could adapt the woodland for social activities, e.g., create a glade for children's play or prune trees making them ready for someone to install a hammock; however, they are unlikely to identify such needs without asking residents. To put straw around exposed trees to create a more wind-sheltered environment is a small-scale way of influencing the woodland. Public management does not have the resources to perform such frequent, small-scale management and maintenance contributions. Participation mainly occurs within the limited area of the co-management zone, and, for the creation of some physical qualities, this is not an advantage. Rational, large-scale thinning among the trees, performed by public managers, leads to better tree development for the entire remaining woodland, while a few residents' small-scale thinning only supports a small number of trees.

Residents sometimes refrained from ornamental gardening in favour of a more natural woodland character or removed too garden-like plants, thereby creating 'invisible' physical qualities. Such resident-created qualities cannot be measured or put in a scheme. In the same way as the risk of privatisation increases due to the proximity between the garden and the area where the residents participate, the likelihood of residents caring for and protecting their environment is also increasing, simply because they participate in their local landscape. This was reflected in that interviewed residents generally seemed to have a sound and conscious nature view and opinion about what plants that are suitable in a woodland and how to maintain it, regardless of – but sometimes helped by – gardening interest or occupation within relevant fields. Guidelines are still needed to prevent misuse and residents sometimes disliking other residents' actions in the zone supports the idea of limiting participation and keeping it within a co-management zone. That said, many residents seem to intuitively know how to take care of the woodland, thereby preserving urban woodland quality.

The question was asked in Paper I of whether participation in green spaces really improves parks, or if it is exercised for the benefit of the people involved, making the participation process an end in itself. Based on the case study of Sletten, it can be argued that the two cannot be easily separated. Participation in Sletten has resulted in physical qualities being created, but just as experiential

qualities benefit users, so do the physical qualities. Defining the impact of participation on the quality of an urban woodland in terms of enhanced nature conservation only, and labeling benefits to users as co-benefits, is not reasonable for a woodland integrated with a neighborhood, widely used by residents.

User participation in urban green space management has been found to affect urban biodiversity values positively (Dennis & James, 2016). When it comes to urban woodlands and Sletten, it remains to be studied whether residents create more positive, ecological qualities in the limited co-management zone than would be possible to create through active, systematic, public management of the entire woodland.

4.3 How can local authorities facilitate long-term resident participation in public urban woodland management?

A crucial question for user participation in green space management is how local authorities can facilitate long-term user involvement. In the study presented in Paper II, the Sletten co-management zone is brought forward as one possible way for this to be done, or more specifically how residents can be involved in urban woodland management through participation in the transition zone between private properties and public woodland. Paper II builds on the perspectives of ecotone thinking and governance arrangements. It conceptualises and evaluates the co-management zone as an approach to user participation in management of residential urban woodland edges, metaphorically treating and considering the transition zone from private garden to public woodland as an 'ecotone-like' space rather than a strict border. As such, the co-management zone approach applies the ecotone perspective to the administrative level of public green space maintenance regimes over the divide of public-private ownership. It can be seen as a zone where residents' and local authorities' overlapping interest has been used to, in most cases, create richness and meetings rather than boundaries. Residents in Sletten generally evaluated their involvement in the co-management zone positively, as did the responsible green space managers, indicating that the method has potential for transforming woodland edges bordering private gardens into zones of shared use and appreciation between residents and public woodland managers. In this way, recreationally valuable and varied meetings between private gardens and urban woodlands are created, rather than the development of the all too common 'no man's land', that neither residents nor green space managers care too much about.

By its very nature, the ecotone represents a zone of conflict and competition between neighbouring habitats, where the tension between the two is regarded a

positive quality creating a zone of species richness (Kahn, 2016). In Sletten, there is tension too, which has led to some privatisation of the public woodland. This underlines that the co-management zone needs rules of the game that hinder residential encroachment; rules that natural ecotones can do without. To transform tension into positive impacts, there is a need for clear guidelines and continuous local authority–resident communication, including municipal guidance, inspiration and control.

The fact that the Sletten co-management zone borders directly on homes facilitates expansion of private premises out into the woodland, while this would occur less easily with longer distances. The fear of being excluded was expressed in some residents' concerns about privatisation of the woodland, despite guidelines stating that the zone should be publicly accessible. In order to counteract potentially negative recreational and environmental effects of participation while encouraging residents to participate it is crucial to find the appropriate level of municipal control in each place-specific context. Some interviewed residents believed that professionals should be involved in woodland management beyond the co-management zone and the professor regarded the zone as a way to rehearse participation. This together supports earlier findings regarding the importance of matching participants' capacity with corresponding management activities.

Participation processes increase the need for communication. This in turn means that user participation changes the conventional, professional role of the green space manager from focusing on green space maintenance to communication. Even though intensified local authority–resident communication demands new skills, the core competence of the green space manager is still needed, calling for an adapted rather than transformed role. A discourse on co-creation and support for the development of this role within the local authority appeared to affect the managers' work and the outcome of the co-management zone in Sletten. While an earlier study concluded that the transformation of Danish green space managers' role from hierarchical governance to increased co-governance can be perceived as challenging, the interviewed green space managers simply dealt with changed circumstances. This implies that the changed role takes different forms. Dealing with participation in a limited zone close to participants' homes might be perceived as less challenging for managers but, as mentioned by the professionals themselves, can cause conflicts among residents and between residents and the local authorities if the co-management zone is misused.

Local authorities should consider at what level they choose to involve users, as this influences the outcomes that can be obtained. The degree of participation of Sletten residents can be placed in available spectra and ladders of participation

(Table 5). Resident participation in Sletten occurs predominantly as 'Informing' and 'Citizen Control'. However, in the Sletten case rung 3 cannot be regarded as only tokenism, but rather as a prerequisite for rung 8 (Arnstein, 1969). Children participate in the Sletten co-management zone at the three highest rungs of the ladder of children's participation. This could e.g. include parents or neighbours initiating construction of play equipment or a BMX-track in the woodland or children themselves deciding to prune trees to make a long mountain-bike path, making own or joint decisions with adults. The nature of their participation is therefore close to what Hart (2008) define as children's everyday informal participation. The spectrum parts 'Inform', 'Involve' and 'Empower' (Ambrose-Oji et al., 2011) all apply to Sletten residents. Many but not all of them have been informed about the guidelines and the participation possibility, and have in a few occasions been involved in maintenance activities directed by the local authorities, e.g. making a path through the woodland together or felled trees after them being marked by local authorities. While they have not purchased or leased the woodland, their empowerment lies in that they can act autonomously in the co-management zone. Some of them have participated without knowing it was allowed. The Sletten case is an open co-governance arrangement, considering its governance mode, which is flexible and accessible to all residents, where involved governmental and non-governmental actors are only loosely bound to one another, working in small coalitions or individually, leading to diffused power shared by various participants and an open and rather unorganised decision-making process (Arnouts et al., 2012).

Table 5. *Systems used for the description of the degree of user participation by different scholars. Sletten residents' level of power is marked in green in the different systems.*

Ladder of Citizen Participation (Arnstein, 1969)

Manipulation	Therapy		Informing	Consultation	Placation		Partnership	Delegated power	Citizen control
Non-participation			*Tokenism*				*Citizen power*		

Ladder of Children's Participation (Hart, 1992)

Manipulation	Decoration	Tokenism	Assigned but informed	Consulted and informed		Adult-initiated, shared decisions with children	Child-initiated and directed	Child-initiated, shared decisions with adults	
Non-participation			*Degrees of participation*						

Spectrum of Public Participation in Forest and Woodland Planning (Ambrose-Oji et al., 2011)

Form of participation	Inform	Consult		Involve			Partnership (or Collaborate)		Empower (or Control)	
Non-governmental actor role	Provide information and views about plans for decision-making processes			In care and maintenance	In planning decisions	In management	Collaborative management		Lease of public land	Purchase of public land

the hierarchical, closed and open co- and self-governance continuum (Arnouts et al., 2012)

Hierarchical governance		Closed co-governance	Open co-governance		Self-governance

An important question is *where* local authorities should encourage resident participation in management. While interviewed residents considered participation as positive for the ecological dimensions of urban woodland quality, it is still possible that the types of domestic gardening activities practised in the co-management zone had negative effects on nature. In order to have a margin of safety, similar co-management zones should be implemented in young urban woodland plantations or shelterbelt plantations between residential areas and infrastructure/commercial districts with low conservation value. Conservation values would be at risk if the approach were to be uncritically transferred to residential areas bordering on remnant forest patches, riparian corridors, etc., that have been absorbed by urban sprawl. The interviewed present manager did also consider woodland to be the ideal type of green space for implementation of a co-management zone, as open areas would run a greater risk of residents "fencing in" the public land, since residents also want privacy and a space of their own. He considered both young and mature woodlands to be appropriate places, but believed that the thinning guidelines should be more restrictive for the latter. Both the present manager and the professor stressed ensuring a co-management zone with multi-story vegetation in the mature woodland, considering a small-scale, natural transition from garden to woodland important for sustained participation and for green space quality.

5 Discussion

5.1 Drivers of resident participation in urban woodland management

It is essential to understand the drivers of co-management and how they may change over time to facilitate and sustain participation (Measham & Barnett, 2008). Earlier studies have shown that participation levels are affected by physical environmental properties such as access, secure perimeter fencing and the size and location of the area (Dennis & James, 2016), and that physical environment characteristics play a role in sustaining participation, since participants are motivated by how the physical outcomes of their efforts are perceived (Speller & Ravenscroft, 2005; Young, 2011).

Regarding social environment drivers, participation levels are influenced by the local authority's approach to participation in terms of, for example, communication, support and policies (Jones, 2002; Mathers et al., 2015; Mattijssen et al., 2017; Young, 2011). Participants also influence the participation of others, where meeting new people is a driver for participation (Mathers et al., 2015), and signs of individual and collective care in the landscape contribute to communal place identity (Jorgensen et al., 2007).

Physical participation is also influenced by individual preferences, interests and demographic variables. People generally have a desire for orderly, well-kept landscapes in their immediate residential environment, but also for more nature-like areas nearby (Jorgensen et al., 2007), and are driven to participate by a desire to improve the local outdoor environment (Mathers et al., 2015; Still & Gerhold, 1997). Regarding the age of participants in urban and community forestry, i.e. a demographic variable, patterns are inconsistent (Still & Gerhold, 1997; Straka et al., 2005; Wall et al., 2006).

The case study of Sletten has deepened current knowledge on drivers of residents' participation in urban woodland management. It was found that both personal and environmental drivers explained participation in the co-management zone, where environment comprises both the physical and social environment. An important finding was the temporal dimension of participation drivers, where the composition of drivers changed over time, from gardening interest, stand height and residents inspiring their neighbours in 2010, to forest edge type and length of residence in 2015. The results of the resident interviews largely confirmed the importance of the drivers identified through statistical analysis.

Non-participating green space users are also affected by participation, but they are often difficult to reach, and therefore much less studied than participants. Reasons for the non-participation of users in green spaces in general (i.e. not only in their management) include lack of trust in existing political decision-making structures, fearing not having any real political influence, gossip, pressure and direct exclusion from the physical or social landscape (Clausen, 2016), and lack of awareness among users of the possibility to participate (Straka et al., 2005). Related reasons for, not non-participation, but unsuccessful participation, include professional scepticism, poor communication, varying personal interest in vegetation, lack of commitment (both users' and authorities'), too little support from authorities/tokenism, lack of trust in authorities, uneven levels of activity, lack of funding, conflicting interests and lacking implementation (Fors et al., 2015, i.e. Paper I). Non-participating residents also proved to be difficult to reach in the case study of Sletten, but participating residents, and the few non-participants interviewed, could nonetheless provide some information. Drivers of non-participation in Sletten included a lack of information about the possibility to participate, a lack of interest in gardening, a lack of time, not being at a stage in life when participation was possible, and not being the kind of person that participates. The fact that Sletten residents mostly participated independently from green space managers could be one reason why they mentioned more personal drivers for non-participation than the many drivers related to the relationship to local authorities mentioned in the literature.

The above findings are likely to be valid for resident participation in adjacent urban woodland in other places and countries where the vegetation and culture are similar. While some variables may drive participation in general, others are presumably more important for user participation in, for example, a community garden further away from home, where the green space is not part of participants' everyday life in the same way.

5.2 Does resident participation increase urban woodland quality?

As a result of the literature survey (Paper I), it was concluded that we do not actually know whether user participation in green spaces increases green space quality. This question was partly answered by the longitudinal case study of Sletten, in which the narrower focus on the green space type 'urban woodlands' and participation in management specifically (not in design or planning) was adopted.

'Quality' is a contested concept (Lindholst et al., 2015) and claims that quality lies in the eyes of the beholder (Aalbers and Sehested, 2018) and that it is context-dependent (Reeves and Bednar, 1994) indicate that the concept is very subjective and practically impossible to measure. Many green space quality assessment schemes do nonetheless exist in the scientific literature. Searching the literature, this thesis identified four key aspects of green space quality that reoccur in all the found assessment schemes, i.e. 'maintenance', 'accessibility', 'nature' and 'facilities'. Acknowledging the importance of employing a situation and context-specific quality definition (Reeves and Bednar, 1994), dimensions of woodland design (Bell et al., 2005) were then used in this thesis to devise a scheme for assessing the impact of participation on the quality of urban woodlands specifically, defining urban woodland quality as built up by 'the social', 'the experiential', 'the functional' and 'the ecological' quality dimensions. The urban woodland quality assessment scheme was further developed to better reflect resident-perceived quality. Together, the effects of participation in Sletten on users and the physical environment covered all dimension aspects of the adapted urban woodland quality assessment scheme, suggesting that these dimensions and aspects could work well for the purpose of future urban woodland quality assessments. Residents confirmed the significance of most key aspects identified in existing green space quality assessment schemes in the literature (maintenance, accessibility, nature), but not facilities, except for paths. The structural and species diversity between and within woodland stands as important quality aspects for residents' use were new quality aspects, unique to urban woodland quality studies.

Through the co-management zone, a rich diversity of transition zones between gardens and woodland has developed. The so often strict border between private and public properties has in Sletten been turned into a meeting, rich in experiences and visual impressions. Obtained urban woodland quality is also affected by the participant's drivers of participation. A resident planting trees and shrubs driven by the ambition to create a space with as high biodiversity as possible create other qualities and another type of physical environment than residents striving to enhance their private garden appearance.

The lack of empirical evidence for benefits of participation identified in the review article (Paper I) leads to the question of whether participation is performed for the parks, i.e. increased green space quality, or for the people, i.e. the process being more important than outcomes. Participation in Sletten mainly benefited the people, in particular participating residents; however, those benefits partly build on physical qualities being created, suggesting that benefits to users and physical qualities cannot always be easily separated.

Another question is whether participating users are able to create high quality green spaces for non-participating users as well. A possible answer is that there are situations where this is less important and where participation is motivated by the benefits that the individual participant gain from it. Sletten is an example of this, since there is no public access to some parts of the woodland, which means that regardless of the appearance of the environment being created through resident participation in those areas, few non-participating residents and even fewer users from the city centre, get their recreational experience altered. That said, the case study showed that non-participating residents did get less benefits from participation than participants.

If user participation in management occurs in deprived and degraded green spaces, the physical green space quality will at least not get worse from participation. Under those circumstances, positive outcomes of the participation process for users and local authorities could even be a valuable end in itself, regardless of green space quality impact.

5.3 Making long-term resident participation work

A crucial question for user participation in green space management is how local authorities can facilitate long-term user involvement. Several studies stress the importance of support from local authorities for this, since people may loose interest and motivation over time and also individual 'champions' may leave and the green space degrade (Jones, 2002; Young, 2011; Mattijssen et al., 2017; Delshammar, 2005; Burton and Mathers, 2014). Reversely, local authorities are sometimes the limiting factor over the long-term, through ever-changing administrations, ambiguous communication structures, bureaucratic procedures and too short-term management contracts (Mattijssen et al., 2017).

The longitudinal case study of resident participation in Sletten, forming the main base of this thesis, both confirms and contradicts the importance of local authorities to sustain resident engagement in the long run. One way to look at it is through the three factors identified by Mattijssen et al. (2017) as supporting long-term user involvement in public green space management. The *formalisation* that has occurred in Sletten when guidelines for the co-

management zone were written down and sent to all residents has increased participation levels. The intent of the present manager to involve the residential community associations in the future was seen as a further formalisation of resident participation that could sustain participation over time. Sletten residents' participation was likely not largely affected by societal changes such as political, socio-economic or cultural development. However, they still need a strong *adaptive capacity*, but for other reasons, namely the continuously changing circumstances for their participation caused by e.g. the growing woodland. Residents with a strong adaptive capacity have changed the expression of their participation from e.g. initially growing vegetables to putting up a hammock below the shading trees when tree canopies started to close. There has been political development in the increased focus on ´co-creation´ in the local authorities of Holstebro, but rather than being something for residents to adapt to, this has strengthened the *supporting role of local authorities*. Sletten residents have appreciated local authorities' support when given professional guidance, inspiration and control, clear guidelines for the co-management zone and continuous communication between residents and local authorities. Periods with communication "vacuum" and unclear guidelines have made some residents refrain from participation, while others have been satisfied with independent participation knowing that they are allowed to participate and having seen the guidelines.

The approach of local authorities for involving users must be adapted to suit the green space type where participation should take place and desired level and type of participation, and users' wishes and needs, thereby creating different governance arrangements. The co-management zone concept builds up one of these governance arrangements and one of the tiles in the mosaic representing the urban green infrastructure governance for a given city, where all tiles together are examples of mosaic governance using the full potential of user participation while avoiding undesired outcomes (Tritter and McCallum, 2006; Buijs et al., 2016).

5.3.1 The adapted role of the green space manager

The need for well-functioning communication between residents and local authorities means that user participation transforms the conventional, professional role of the green space manager from focusing on green space maintenance to communication. Even though intensified local authority–resident communication demands new skills, the core competence of the green space manager is still needed, calling for an adapted rather than transformed role.

While some Danish green space managers have found the transformation of their role from hierarchical governance to increased co-governance challenging (Molin and Konijnendijk van den Bosch, 2014), the green space managers interviewed within the Sletten case study experienced it differently and simply dealt with the changed circumstances. This implies that the changed role takes different forms.

Local authorities' facilitating and enabling role in the background as described by Mattijssen et al. (2017) is important for long-term participation in Sletten as well. Too strong control, too strict guidelines too early in the participation process does on the contrary discourage participation. Residents appreciate their freedom to participate individually without always having to ask local authorities for permission before they act or to discuss and collaborate with neighbours.

Dealing with participation in a limited zone close to participants' homes might be perceived as less challenging for managers but, as mentioned by the professionals themselves, can cause conflicts among residents and between residents and the local authorities if the co-management zone is misused. Interviewed residents themselves mention few conflicts, suggesting that this is a minor problem.

Users sometimes choose to engage in civic participation over physical participation, feeling that they are "taking jobs" from the professional maintenance staff (Burton and Mathers, 2014). However, the activities conducted by Sletten residents are additions to the public woodland management, i.e. they are not taking jobs from the professionals.

The importance of both personal and environmental drivers identified confirms that co-management of urban woodlands requires green space managers to focus on both communication and collaboration with users and woodland management. They can encourage and sustain participation by identifying people interested in gardening who inspire others, combined with strategic woodland vegetation design aimed at increasing visual and physical accessibility. In practice, this means establishing one-step and semi-open forest edges alongside gardens and sufficient tree height since the results showed that these are distinctive woodland properties that stimulate co-management. The choice of woodland edge type can also be used in the opposite way to hinder participation; dense shrub-dominated edges could be planted in places where housing borders woodland of high conservation value in order to limit residential encroachment in a way that simultaneously supports important ecosystem services for residents. Furthermore, employed strategic management models need to incorporate dynamics over time for both vegetation and participants.

Some residents have a higher threshold for initiating participation than others, and some types of environments are more difficult for people to engage in.

Despite that few Swedish green space managers involve users right now or intend in the near future (Randrup et al., 2017), there are neglected green spaces and under-prioritised areas can be found further away from city centres in residential areas where participation in management could increase green space quality, as long as clear guidelines are provided and green space managers are sufficiently engaged, present and follow up on participation.

5.4 Methodological discussion

5.4.1 A single case study, is that all? You can't generalise from that…

Researchers conducting qualitative case studies often get critique from quantitative researchers stating that it is impossible and undesirable to generalise from a single case. Arguments against generalisation based on qualitative empirical data material include e.g. stressing the particularity of findings and how rich qualitative studies render sophisticated understandings, or mentioning the complexities of patterns in qualitative studies and the difficulties in representing these (Halkier, 2011). Quantitative studies lend themselves for *statistical generalisation*, i.e. to infer the results from a sample and apply it to a population, saying that what was true for the sample is also true for the entire population, something which is only possible if the sample is randomly selected and representative of the population (Schwandt, 2007). The results of a case study are not well-suited for this. The desired and appropriate way to generalise is instead to expand and generalise theories through so called *analytical generalisation*, i.e. to do a "generalising" and not "particularising" analysis (Yin, 2009).

Another quite common critique towards qualitative research is that ´anything goes´, a critique that can be met by rigorously applying qualitative theory and methods, i.e. using a systematic method, suitable for the study, and being clear and explicit about what you have done (Braun and Clarke, 2006). That qualitative approaches cannot – and should not – be judged against the same criteria as quantitative research does not mean that there are no rules or systems within qualitative methodology, but rather that there are other assessment criteria and other methods for data collection and analysis which should be applied just as rigorously as those within quantitative studies (Braun and Clarke, 2006). An example of such criteria is to aim for *transferability* of a case, rather than to talk about generalisability (Guba and Lincoln, 1989). The researcher's main task is

then to describe the case study thoroughly, so that the reader can decide whether the conclusions are transferable to another context.

Some of the conclusions from Sletten can only be generalised to green spaces in a similar context. Sletten is first and foremost used recreationally by the local residents of the neighbourhood. In another green space that is more heavily used by the general public, conflicting interests would be a greater risk.

5.4.2 Methodological reflections for Papers I-IV

An adaption of Randrup and Persson's (2009) park−organisation−user model served as analytical framework to structure the literature review around dimensions of green space development (Paper I). In the literature, only two arguments for participation were found that supported part of the model's adaptation – namely the vector added to directly link users to public urban green spaces. Articles focusing on physical participation linked the users to green spaces in action, but the potential benefits of participation along that vector remain little explored. Otherwise, the framework allowed for a holistic perspective of green space provision and could methodologically serve further research. It was particularly useful in the illustration of gaps considering the different dimensions and their potential direct and indirect interactions.

The literature study, the intention of which was to obtain an overview of this field of research, benefited from the search being initially unrestricted in terms of participation types and spatial scale of study. However, the open process led to broad ranges in results which could be problematic for more specific research questions. In terms of a review and the field of research, the body of excluded research remains substantial and is open to future review studies with different green spaces in focus - national parks or community gardens for example. The urban focus of the literature review disregarded studies about user participation in the fields of natural resource management, nature conservation, non-urban forest planning which could likewise be branches for further study and cross-comparison. Studies from these broader fields are likely to demonstrate even more approaches to, applications and goals of participation. The review's focus on articles written in English may have affected the geographic distribution of found participation cases with a predominance of studies performed in North America.

To fully evaluate the potential of co-management zones, further research is needed to assess the impact on community level recreation as well as biophysical and ecological impacts. Being a landscape laboratory where innovative design and management concepts for urban forests - in particular co-management zones - are tested in full scale, Sletten is a unique case. Further studies of co-

management zones should preferably cover other contexts – socially as well as ecologically.

Longitudinal observation studies of drivers of participation in green space management are rare. Rather, existing longitudinal studies are retrospective (e.g. Mattijssen et al., 2017). Therefore, the repeated field surveys conducted for Paper III provided a rare opportunity for longitudinal comparisons and interpretations of how the development of driver composition has determined and changed the type and extent of participation from 2010 to 2015. The study was confined to a specific landscape context and a restricted number of people, as is typical for place-based research (Flyvbjerg, 2006). Thus, in many ways the identified drivers and proposed explanations are only as important as the avenues for future research prompted by them.

It was clear during the individual interviews with residents that a richer data material was created from the semi-structured interviews than would have been possible, for example, from a survey sent to the residents by post. At a face-to-face interview, unclear questions can be repeated and rephrased slightly so the interviewee understands. It is also easier to detect whether the interviewee answers a question without really having a clear opinion about it, making it possible to disregard the answer for sounder conclusions. To ask residents about the drivers for participation concluded from Paper III was a good way to strengthen those results, and to gain a richer picture of the implications and reasons behind those drivers being important.

It would have been interesting to interview more non-participants to gain deeper knowledge on how they are affected by participation processes. That said, it was also positive that many interviewees participated in the co-management zone (14 out of 16), since it seemed to be easier for them than for non-participants to reflect over the resident participation in the area and, for example, have opinions about likely drivers for participation, together contributing to a richer material.

'Before and after' studies could be interesting for measurements of not only green space quality, but also the impact of user participation on it. However, such studies are often difficult to conduct, since participation may already have been initiated when the area is discovered by researchers, making it impossible to carry out the 'before' study.

6 Conclusions

The results of the literature review showed that many positive outcomes of participation are discussed in the literature, but few of them have been explored empirically to support the claims. This means that many benefits of participation are taken for granted. In particular, outcomes directly affecting the physical environment were least tested. Rather than assessing the physical outputs of participation, the majority of the reviewed articles studied the participation process itself, making it unclear whether participation actually improves green space quality.

The Sletten co-management zone proved to be a participation method with the potential to transform woodland edges bordering private gardens into zones of shared use and appreciation between residents and public woodland managers. Clear guidelines and continuous local authority–resident communication, including municipal guidance, inspiration and control, is crucial for a well-functioning co-management zone. In order to counteract potentially negative recreational and environmental effects of participation, while encouraging residents to participate, it is crucial to adopt the appropriate level of municipal control in each place-specific context.

Participation processes increase the need for communication. This in turn means that user participation transforms the conventional, professional role of the green space manager from focusing on green space maintenance to communication. Although intensified local authority–resident communication demands new skills, the core competence of the green space manager is still needed, calling for adaptation rather than transformation of their role.

Residents' participation in urban woodland management was found to be driven by a high level of gardening interest; being inspired by having a neighbour that also participated; sufficient tree height in the woodland; one-step and semi-open forest edge types that provide visual and physical accessibility; length of residence, where newer residents were not as involved as residents who had lived there longer; and local authorities, and sometimes researchers,

showing an interest in resident participation. The identified importance of both personal and environmental drivers suggests that co-management of urban woodlands requires green space managers to focus on both well-functioning communication with users and conscious woodland design and management. The strategic management models employed should incorporate changes over time in both vegetation and participants, since drivers of participation change over time.

Green space professionals viewed the co-management zone approach as financially preferable to conventional public green space management. This contradicts previous reports that professional planners consider participatory planning processes to be more resource- and time-consuming than conventional planning, indicating a possible difference in resource requirements between user participation in green space planning and management.

Four overall quality aspects were identified in existing general green space quality schemes described in the literature: maintenance, accessibility, nature and facilities. Residents' definition of urban woodland quality confirmed the significance of all these aspects, except for facilities. In addition, residents mentioned the structural and species diversity between and within woodland stands as central for the perceived woodland quality – a quality aspect that distinguishes woodland from other types of urban green space.

From the development and testing of an urban woodland quality assessment scheme, it was concluded that the scheme, defining urban woodland quality as consisting of social, experiential, functional and ecological dimensions could work well for the purpose of urban woodland quality assessments.

Participation in urban woodland management provides additional benefits to participants that woodland use alone does not, predominantly experiential qualities. It was also found that residents sometimes missed out on benefits due to hindering physical environment characteristics or the participation of other residents. This means that participation does not only affect urban woodland quality positively. Furthermore, this implies that urban woodland quality that can be obtained from participation is affected by the original urban woodland quality as affected by design (e.g., species selection), and public management (e.g., long-term local authority strategies).

Residents can create physical qualities better adapted to local user needs, with regard to both actual needs and the placement of the physical quality. This leads to better urban woodland quality for woodland use, especially for participating residents, while some ecological qualities, such as better tree development, are more efficiently created when performed by public managers.

7 Outlook

The Sletten case study has provided detailed knowledge on different aspects of resident participation in public urban woodland management. The uniqueness of the case means that it would be interesting to conduct future studies of co-management of edge zones of other young woodlands but in other countries than Denmark, in other types of urban green spaces with different governance set-ups and sociodemographic groups, as well as investigate the adaptations of the concept needed for it to work well also in mature woodlands.

The marked increase in participation in the Sletten co-management zone between 2010 and 2015, and the fact that the composition of the drivers of participation changed over time, suggest that the temporal dimension merits much more attention. There is a need for stronger focus on longitudinal studies in the future.

More, broader empirical studies of drivers of user participation are needed that on equal terms provide results and conclusions regarding all three interrelated dimensions of participation (i.e. a type of human behaviour), namely the personal characteristics of participants, and the characteristics of the social environment and the physical environment.

Due to only two non-participating residents agreeing to be interviewed, the study of the effect of resident participation on urban woodland quality could not add much knowledge on how the recreational experience of non-participants is affected by other residents' participation, apart from the finding that participation had fewer benefits for them than for participants. How non-participants are affected by user participation, therefore, remains an interesting topic for future studies.

References

Aalbers, C.B.E.M., Sehested, K. (2018). Critical upscaling. How citizens' initiatives can contribute to a transition in governance and quality of urban greenspace, *Urban Forestry and Urban Greening* 29**:**261-275.

Aalbers, C.B.E.M. (2002). Contacts through contracts. In: Aalbers, T., Ekamper, S., Tjallingii, I.M. (Eds.), *The Utrecht-Houten Case Study. Alterra, Wageningen Work package 4 Communicating Urban Growth and Green*. 102p.

Ambrose-Oji, B., Tabbush, P., Frost, B., Carter, C., Fielding, K. (2011). Public Engagement in Forestry: A toolbox for public engagement in forest and woodland planning. Edinburgh, Forestry Commission GB. Available at: http://www.forestry.gov.uk/toolbox

Armstrong, D. (2000). A survey of community gardens in upstate New York: Implications for health promotion and community development. *Health and Place*, 6, 319-327.

Arnouts, R., van der Zouwen, M., Arts, B. (2012). Analysing governance modes and shifts - Governance arrangements in Dutch nature policy, *Forest Policy and Economics* 16:43-50.

Arnstein, S.R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners* 35 (4): 216–244

Arts, B., Leroy, P., van Tatenhove, J. (2006). Political Modernisation and Policy Arrangements: A Framework for Understanding Environmental Policy Change. *Public Organiz Review* 6: 93-106.

Arts, B. and Visseren-Hamakers, I.J. (2012). Forest governance: mainstream and critical views. In: Broekhoven, G., Savenije, H., von Scheliha, S (Eds.) Moving Forward With Forest Governance, *ETFRN News* (53), pp 3-10.

Austin, M.E. (2002). Partnership opportunities in neighborhood tree planting initiatives: Building from local knowledge. *Journal of Arboriculture*, 28, 178-186.

Bell, S., Blom, D., Rautamäki, M., Castel-Branco, C., Simson, A., Olsen, I. A. (2005). Design of urban forests, in: *Urban Forests and Trees: A Reference Book*, pp. 149-186.

Braun, V., Clarke, V. (2006). Using thematic analysis in psychology, Qualitative Research in Psychology 3(2):77-101.

Bruyere, B. & Rappe, S. (2007). Identifying the motivations of environmental volunteers. *Journal of Environmental Planning and Management*, 50, 503-516.

Buijs, A.E., Mattijssen, T.J., Van der Jagt, A.P., Ambrose-Oji, B., Andersson, E., Elands, B.H., Steen Møller, M. (2016). Active citizenship for urban green infrastructure: fostering the

diversity and dynamics of citizen contributions through mosaic governance. *Current Opinion in Environmental Sustainability* 22, 1-6.

Buijs, A., Hansen, R., Van der Jagt, S., Ambrose-Oji, B., Elands, B., Lorance Rall, E., Mattijssen, T., Pauleit, S., Runhaar, H., Stahl Olafsson, A. & Steen Møller, M. (2018). Mosaic governance for urban green infrastructure: Upscaling active citizenship from a local government perspective. *Urban Forestry and Urban Greening*.

Buizer, I.M., Elands, B.H., Mattijssen, T.J.M., Jagt, A.P.N., Ambrose, B., Geroházi, E., & Santos, E. (2015). *The governance of urban green spaces in selected EU-cities: Policies, Practices, Actors, Topics* (No. D6.1 EU FP7). EU.

Burton, M., Dempsey, N., Mathers, A. (2014). Connecting making and keeping: design and management in place-keeping, in: Dempsey, N., Smith, H., & Burton, M. (Eds.) *Place-Keeping: Open Space Management in Practice*. Routledge, pp. 125-140.

Burton, M., Mathers, A. (2014). Collective responsibility for place-keeping: are partnerships the solution for open space management? In: Dempsey, N., Smith, H., Burton, M. (Eds.) *Place-Keeping: Open Space Management in Practice*. Routledge, pp. 76–99.

Burstein, P. (1991). Policy Domains: Organization, Culture, and Policy Outcomes, *Annual Review of Sociology* 17:327-350.

Clausen, L.T. (2016). No interest in landscape? The art of non-participation in Danish landscape planning, *Landscape Research*:1-12.

Council of Europe (2000). European Landscape Convention. Florence: Strasbourg: Council of Europe.

Creswell, J. and Plano Clark, V. (2007). *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage.

Creswell, J.W. (2013). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. SAGE Publications Thousand Oaks.

Davies, R. G., Barbosa, O., Fuller, R. A., Tratalos, J., Burke, N., Lewis, D., Warren, P.H. & Gaston, K. J. (2008) City-wide relationships between green spaces, urban land use and topography. *Urban Ecosystems*, 11(3), 269-287.

Delshammar, T. (2005). *Kommunal parkverksamhet med brukarmedverkan*. [Public park management with user participation] Diss. Alnarp: Swedish University of Agricultural Sciences.

Dempsey, N., Burton, M. (2012). Defining place-keeping: The long-term management of public spaces, *Urban Forestry & Urban Greening* 11(1):11-20.

Dempsey, N. (2008). Quality of the Built Environment in Urban Neighbourhoods, *Planning Practice & Research* 23(2):249-264.

Dennis, M., James, P. (2016). User participation in urban green commons: Exploring the links between access, voluntarism, biodiversity and well being. *Urban Forestry and Urban Greening* 15, 22-31.

Denzin, N.K., Lincoln, Y.S. (2011). The SAGE Handbook of Qualitative Research. Sage, London.

Draper, C. & Freedman, D. (2010). Review and analysis of the benefits, purposes, and motivations associated with community gardening in the United States. *Journal of Community Practice*, 18, 458-492.

Fletcher, A.J. (2017). Applying critical realism in qualitative research: methodology meets method, *International Journal of Social Research Methodology*, 20:2, 181-194

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry* 12(2), 219-245.

Gidlow, C.J., Ellis, N.J. & Bostock, S. (2012). Development of the neighbourhood green space tool (NGST). *Landscape and Urban planning*, 106(4), pp. 347-358.

Glover, T.D., Shinew, K.J., Parry, D.C. (2005). Association, sociability, and civic culture: The democratic effect of community gardening. *Leisure Sciences* 27, 75-92.

Guba, Egon G. and Lincoln, Yvonna S. (1989). *Fourth Generation Evaluation*. Thousand Oaks, CA: Sage.

Guitart, D., Pickering, C. & Byrne, J. (2012). Past results and future directions in urban community gardens research. *Urban Forestry & Urban Greening*, 11, 364-373.

Gurung, A., Karki, R., Bista, R., Oh, S.E. (2012). Peoples' perception towards urban forestry and institutional involvement in metropolitan cities: a survey of Lalitpur City in Nepal. *Small-scale Forestry* 11 (2), 193–205.

Halkier, B. (2011). Methodological practicalities in analytical generalization, Qualitative Inquiry 17(9):787-797.

Hart R.A. (2008). Stepping Back from 'The Ladder': Reflections on a Model of Participatory Work with Children. In: Reid A., Jensen B.B., Nikel J., Simovska V. (eds) Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability, pp. 19-31. Springer, Dordrecht

Hart, R.A. (1992). Children's Participation: From tokenism to citizenship, Innocenti Essay no. 4, International Child Development Centre, Florence

Huang, S.-C.L. (2010). The Impact of Public Participation on the Effectiveness of, and Users' Attachment to, Urban Neighbourhood Parks. *Landscape Research* 35, 551-562.

Janse, G. and Konijnendijk, C.C. (2007). Communication between science, policy and citizens in public participation in urban forestry - Experiences from the NeighbourWoods project. *Urban Forestry & Urban Greening* 6(1): 23-40

Jansson, M., (2015). Children's perspectives on playground use as basis for children's participation in local play space management. *Local Environment* 20(2), 165-179.

Jones, N.A., Shaw, S., Ross, H., Witt, K. & Pinner, B. (2016). The study of human values in understanding and managing social-ecological systems. *Ecology and Society*, 21(1).

Jones, R. (2002) Enticement: the role of community involvement in the management of urban parks. *Managing Leisure* 7, 18-32.

Jorgensen, A., Hitchmough, J., Dunnett, N. (2007). Woodland as a setting for housing-appreciation and fear and the contribution to residential satisfaction and place identity in Warrington New Town, UK. *Landscape and Urban Planning* 79, 273-287.

Kahn, A., (2016). Ecotone thinking – exploring the promise of landscape and design for the urbanising world. *'Scape Magazine* 2016, 15.

Kaplan, R. (1980). Citizen participation in the design and evaluation of a park. *Environment and Behavior* 12, 494–507.

Konijnendijk, C.C. (2011). Innovations in urban forest governance in Europe. *Trees, People and the Built Environment Conference 2011 Proceedings*. Birmingham.

Kvale, S. (1996). *Interviews: An Introduction to Qualitative Research Interviewing*. SAGE, Thousand Oaks.

Lansdown, G., (2001). *Promoting children's participation in democratic decision-making*. Florence, Italy: Unicef, United Nations Childrens's Fund, Innocenti Research Centre Available: http://www.unicef-irc.org/publications/pdf/insight6.pdf

Lewin, K. (1936). *Principles of Topological Psychology*. New York: McGraw-Hill.

Lindholst, A. C., Sullivan, S. G., van den Bosch, C. C. K., Fors, H. (2015). The Inherent Politics of Managing the Quality of Urban Green Spaces, *Planning Practice and Research 30(4):376-392*.

Lindholst, A.C., Konijnendijk van den Bosch, C.C., Kjøller, C.P., Sullivan, S., Kristoffersson, A., Fors, H. & Nilsson, K. (2016). Urban green space qualities reframed toward a public value management paradigm: The case of the Nordic Green Space Award. *Urban Forestry and Urban Greening*, 17, pp. 166-176.

Lo, A.Y.H. & Jim, C.Y. (2012). Citizen attitude and expectation towards greenspace provision in compact urban milieu. *Land Use Policy*, 29(3), pp. 577-586.

Mathers, A., Dempsey, N., Frøik Molin, J. (2015). Place-keeping in action: Evaluating the capacity of green space partnerships in England. *Landscape and Urban Planning*, 139, pp. 126-136.

Mattijssen, T., Buijs, A. & Elands, B. (2018). The benefits of self-governance for nature conservation: A study on active citizenship in the Netherlands. *Journal for Nature Conservation*, 43, pp. 19-26.

Mattijssen, T.J.M., van der Jagt, A.P.N., Buijs, A.E., Elands, B.H.M., Erlwein, S., Lafortezza, R. (2017). The long-term prospects of citizens managing urban green space: from place making to place-keeping? *Urban Forestry and Urban Greening* 26, pp. 78-84. http://dx.doi.org/10.1016/j.ufug.2017.05.015

Measham, T.G., Barnett, G.B. (2008). Environmental volunteering: motivations, modes and outcomes. *Australian Geographer* 39(4), 537-552.

Molin, J.F. (2014). *Parks, People and Places - place-based governance in urban green space maintenance*. Diss. Copenhagen: University of Copenhagen.

Molin, J.F. & Konijnendijk van den Bosch, C.C. (2014). Between Big Ideas and Daily Realities – The roles and perspectives of Danish municipal green space managers on public involvement in green space maintenance. *Urban Forestry & Urban Greening* 13(3), pp. 553-561.

Nannini, D.K., Sommer, R., Meyers, L.S. (1998). Resident involvement in inspecting trees for Dutch elm disease. *Journal of Arboriculture* 24, 42-46.

Nielsen, A.B. & Jensen, R.B. (2007). Some visual aspects of planting design and silviculture across contemporary forest management paradigms - Perspectives for urban afforestation. *Urban Forestry and Urban Greening*, 6(3), pp. 143-158.

Nilsson, K., Åkerlund, U., Konijnendijk, C.C., Alekseev, A., Caspersen, O.H., Guldager, S., Kuznetsov, E., Mezenko, A., Selikhovkin, A. (2007). Implementing urban greening aid projects – the case of St. Petersburg, Russia. *Urban Forestry and Urban Greening* 6, 93–101.

Randrup, T.B., Kristoffersson, A., Lindholst, C., Dempsey, N. & Persson, B. (forthcoming). Management of Maintenance. In Jansson, M. & Randrup, T. (eds.): *Urban Open Space Governance and Management – a textbook*. Routledge.

Randrup, T. B., Östberg, J., Wiström, B. (2017). Swedish green space management – The managers perspective, *Urban Forestry and Urban Greening* 28:103-109.

Randrup, T.B., Persson, B., (2009). Public green spaces in the Nordic countries: Development of a new strategic management regime. *Urban Forestry and Urban Greening* 8, 31-40.

Reeves, C.A., & Bednar, D.A. (1994). Defining quality: Alternatives and implications, *The Academy of Management Review*, 19(3), pp. 419–445.

Rigolon, A. & Németh, J. (2018). A QUality INdex of Parks for Youth (QUINPY): Evaluating urban parks through geographic information systems. *Environment and Planning B: Urban Analytics and City Science*, 45(2), pp. 275-294.

Schwandt, T.A. (2007). *The sage dictionary of qualitative inquiry*, 3rd edn, SAGE Publications, Inc., Thousand Oaks, CA, [Accessed 7 September 2018], doi: 10.4135/9781412986281.

Sehested, K. (2004). Democratic consequences of urban governance – What has become of representative democracy? In: P. Bogason, Kensen, S., Miller, H., (eds.), *Tampering with tradition: The unrealised authority of democratic agency*, Lexington Books, Lenham, pp. 63-85.

Shan, X.-Z. (2012). Attitude and willingness toward participation in decision-making of urban green spaces in China. *Urban Forestry & Urban Greening*, 11(2), pp. 211-217.

Sipilä, M. and Tyrväinen, L. (2005). Evaluation of collaborative urban forest planning in Helsinki, Finland. *Urban Forestry & Urban Greening* 4, 1–12.

Smith, H., Pereira, M., Hull, A., van den Bosch, C.K. (2014). The governance of open space: Decision-making around place-keeping. In: Dempsey, N., Smith, H., Burton, M. (Eds.) *Place-Keeping: Open Space Management in Practice*. Routledge, pp. 52-75.

Speller, G., Ravenscroft, N. (2005). Facilitating and evaluating public participation in urban parks management. *Local Environment* 10, 41-56.

Stec, S., Casey-Lefkowitz, S., Jendrośka, J. (2000). The Aarhus Convention: an implementation guide. United Nations Pubns.

Still, D.T., Gerhold, H.D. (1997). Motivations and task preferences of urban forestry volunteers. *Journal of Arboriculture* 23, 116-129.

Straka, T.J., Marsinko, A.P., & Childers, C.J. (2005). Individual characteristics affecting participation in urban and community forestry programs in South Carolina. *Journal of Arboriculture* 31, 129-135.

Ståhle, A. (2006). Sociotope mapping – exploring public open space and its multiple use values in urban and landscape planning practice, *Nordic journal of architectural research*, 19(4), pp. 59-71.

Tritter, J.Q., McCallum, A. (2006). The snakes and ladders of user involvement: Moving beyond Arnstein, *Health Policy* 76(2):156-168.

Tyrväinen, L., Gustavsson, R., Konijnendijk, C., Ode, A. (2006). Visualization and landscape laboratories in planning, design and management of urban woodlands, *Forest Policy and Economics* 8(8):811-823.

UNCED (1992). The Earth Summit: The United Nations Conference on Environment and Development. Graham & Trotman London.

Van der Jagt, A.P.N., Elands, B.H.M., Ambrose-Oji, B., Gerőházi, E., Steen Møller, M. (2016). Participatory governance of urban green space: trends and practices in the EU. *Nordic Journal of Architectural Research* 28.

Van Herzele, A. & Wiedemann, T. (2003). A monitoring tool for the provision of accessible and attractive urban green spaces. *Landscape and Urban planning*, 63(2), pp. 109-126.

Van Herzele, A., Collins, K. & Tyrväinen, L. (2005). Involving people in urban forestry – A discussion of participatory practices throughout Europe. In: C.C. Konijnendijk, K. Nilsson, T.B. Randrup, & J. Schipperijn (Eds.), *Urban forests and trees – a reference book* (pp. 207-228). Berlin: Springer.

Väntänen, A., Marttunen, M. (2005). Public involvement in multi-objective water level regulation development projects - Evaluating the applicability of public involvement methods. *Environmental Impact Assessment Review* 25, 281-304.

Wall, B.W., Straka, T.J., Miller, S.E. (2006). An econometric study of the factor influencing participation in urban and community forestry programs in the United States. *Arboriculture and Urban Forestry* 32, 221-228.

Wibeck, V. (2010). Fokusgrupper: om fokuserade gruppintervjuer som undersökningsmetod, [Focus Groups: About Focused Group Interviews as Method of Inquiry], 2 ed. Studentlitteratur, Lund.

Wiström, B. & Nielsen, A.B. (2014). Effects of planting design on planted seedlings and spontaneous vegetation 16 years after establishment of forest edges. *New Forests*, 45(1), pp. 97-117.

World Bank (1993). Public involvement in environmental assessment: requirements, opportunities and issues, Environmental Assessment Sourcebook Update, vol. 5. World Bank, Washington DC. Retrieved February 22nd, 2018 from http://siteresources.worldbank.org/INTSAFEPOL/1142947-1118039086869/20526290/Update5PublicInvolvementInEARequirementsOpportunitiesAndIssuesOctober1993.pdf

Yin, R.K. (2009). *Case study research : design and methods*. 4. ed. London: SAGE.

Young, R.F. (2011). Planting the living city: Best practices in planning green infrastructure - Results from major U.S. cities. *Journal of the American Planning Association* 77, 368-381.

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In this thesis, resident participation in public urban woodland management including drivers for participating, impact on the quality of the woodland, and ways in which local authorities can facilitate it in a long-term perspective was explored. The topic was studied through a literature review, and a seven-year longitudinal, mixed-method case study of the so-called co-management zone in the residential area Sletten in Holstebro, Denmark.

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