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Green Infrastructure

a line of trees or a philosophy?

A study of a contested concept at the County Administrative Board of Skåne

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Abstract

Landscape fragmentation and decreasing habitat areas poses a threat to biodiversity worldwide. Green infrastructure has developed as a conservation approach promoting habitat connectivity on a landscape scale. However, green infrastructure is much more than a network of natural structures and elements enabling species movement. It represents a new mode in environmental protection policy, addressing the contradictions between economic development and nature conservation. All county administrative boards of Sweden are currently developing regional green infrastructure action plans, which are supposed to be submitted to the ministry of the environment and energy on October 1st 2018.

Departing from the theoretical framework of political ecology this study is an exploration of how the participants in the green infrastructure project in Skåne understand the concept of green infrastructure. The empirical findings are analyzed after the model of contested concept. According to the model can a concepts' meaning be divided into two levels; the first level is united by a set collective *core ideas* characteristic to the concept. The contest of contestable concepts occurs in the second level of meaning where the interpretations of what a concept means in practice and how it should be operationalized are formed. The findings show that there is a general consensus among the practitioners regarding a set of core ideas. The main purpose of green infrastructure is to strengthen and protect biodiversity through applying a strategic landscape approach to environmental protection and by involving actors from outside the county administrative board. The conceptual challenges and contradictions arise when discussing how green infrastructure is supposed to develop from policy, into an operationalizable tool in conservation practice. The main conflict is the contradiction between green infrastructure's function as a communicative tool for promoting environmental policy, and its inability to adequately conceptualize ecological relationships. The main differences between the respondents in the study is whether they understand green infrastructure as a noun, i.e. green infrastructure planning, or as an adjective, i.e. green infrastructure thinking. All participants express criticism towards adopting the terminology green infrastructure. The respondents experience that the words green and infrastructure do not properly reflect the concepts comprehensive meaning. The intuitive and potentially misleading understanding of the concept prevent practitioners to seek more information about its meaning leading to possible ecological dangers associated with the operationalization of the concept. There is a belief that because the words have strong intuitive connotations, the terminology itself is preventing a clear definition and purpose of the present project.

This study shows that it is necessary to confront and discuss the comprehensive meaning of green infrastructure in order to reach a successful implementation of green infrastructure. As it is understood by the participants in this study green infrastructure aims at conceptualizing landscape relations, rather than single elements. As an adjective promoting a strategic approach to conservation green infrastructure is perceived as an advantageous concept. As a noun, green infrastructure is experienced as ecologically inadequate.

Translations

County administrative board	*Länsstyrelsen*
Environmental objective	*Miljömål*
Environmental objectives	*Miljömålen*
Funding target agreements	*Regleringsbrev*
National Board of Housing, Building and Planning	*Boverket*
Planning and building act	*Plan och bygglagen*
Regional green infrastructure action plan	*Regional handlingsplan för grön infrastruktur*
Spreading link	*Spridningslänk*
Spreading zone	*Spridningszon*
Swedish Agency for Marine and Water management	*Hav- och vattenmyndigheten*
Swedish Board of Agriculture	*Jordbruksverket*
Swedish Environmental Code	*Miljöbalken*
Swedish Environmental Protection Agency	*Naturvårdsverket*
Swedish Forest Agency	*Skogsstyrelsen*
Swedish species information center	*Artdatabanken*
Swedish Transport Administration	*Trafikverket*
Value core	*Värdekärna*
Value elements	*Värdeelement*
Value network	*Värdenätverk*
Value territory	*Värdetrakt*

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1. Introduction

The increase of land development has fragmented green spaces and habitats throughout the landscapes. Areas that support ecological functions and biodiversity have become small and scattered. Isolation makes ecosystems fragile and less adaptable to change and the growing instability of the environment increases the need of sustainable ways of managing local landscapes. Green infrastructure has gained popularity in environmental policy as a planning tool providing space for environmental protection without compromising economic growth in a stressed landscape.

Mandated by the Swedish government, guided by the Swedish Environmental Protection Agency (SEPA), all county administrative boards are presently developing regional green infrastructure action plans. Targeting a strategic conservation of biodiversity, strengthening ecosystem resilience and ecosystem services. The finished plans are to be presented to the ministry of the environment and energy on October 1st 2018. Based on interviews this thesis examines the conceptual understandings and difficulties of green infrastructure experienced by practitioners at the county administrative board of Skåne. Furthermore, it explores how the introduction of green infrastructure into Swedish environmental policy can be understood as a part of the ongoing process of ecological modernization.

Locating a gap, a contribution and a conflict

The project to develop regional action plans for green infrastructure is the first green infrastructure project coordinated at a national level in Sweden. Introducing green infrastructure into Swedish environmental policy is a step towards institutionalizing the concept and creates the need for research exploring both its meaning and policy impact. A first step to engage with green infrastructure in Swedish planning is to collect empirical information exploring what green infrastructure means in the present context. We are only observing the early stages of the implementation of green infrastructure in Swedish environmental policy, challenging its logics and identifying challenges are important for developing a successful and valuable concept. In this study, I attempt to follow the call of Setten, Stenseke & Moen (2012),

> In order to find strategies for preventing further biodiversity losses, research on how to solve the problems as they are defined and framed in existing paradigms has to be performed together with research that examines prevailing institutional orders, power relations, biases in how problems are framed and defined, and the usefulness and effectiveness of frameworks and concepts. (Setten, Stenseke, & Moen, 2012, p. 310)

Green infrastructure is a developing concept, and its meaning often depends on the context in which is it deployed and on who is employing it (Lennon & Scott, 2014). The diversity in interpretations of green infrastructure allows actors to adopt a definition appropriate to their interests, reflecting and reproducing relations in the landscape. From an ecological perspective, what is needed are large areas of high quality habitats, not narrow linkages connecting fragmented pieces of nature. However, the dynamics of modern landscape with a high demand on land, emphasis is given to the network aspects of green infrastructure since it makes space for both environmental protection, and development.

The theoretical framework of political ecology recognizes the conflict between the objective to protect biodiversity and the logics of modern landscapes. Coming from a critical tradition it is difficult believing that green infrastructure will function as the magic lubricant between development and conservation. Now when the Swedish government has called for a nationwide adoption of the concept, it is important to explore its conceptual meaning and possible conflicts.

Research aim and questions

The aim of this study is to engage with the concept of green infrastructure through exploring the interpretations and conceptual understandings among practitioners involved in the project to develop a regional action plan for green infrastructure at the county administrative board of Skåne. In a broader perspective, the purpose of the study is to examine how the governmental mandate to develop regional green infrastructure action plans can be understood in the context of ecological modernization.

To meet the aim of the study the following research questions are addressed,

I. How do the interpretations of green infrastructure vary among the involved practitioners?

II. What are the potential conceptual conflicts among the involved practitioners?

III. What is the advantages and disadvantages of green infrastructure according to the practitioners working with the concept?

Delimiting the study

To enable in-depth research the study is delimited to the project to develop a green infrastructure action plan at the county administrative board of Skåne. Including more than one county administrative board in the study would have entailed a less detailed focus, contrary to the purpose of exploring the conceptual understandings and interpretations. The research is delimited to exploring the understandings of green infrastructure articulated by the respondents. Investigating how green infrastructure is presently implemented at the county administrative board would make the purpose too large for the extent of the study.

The development of green infrastructure policy is closely related to policy regarding ecosystem services. However, due to the limited extent of this study the conceptual meaning and political development of ecosystem services in policy are not explored. Because SEPA has the main responsibility in the project of developing regional green infrastructure action plans, ae the governmental mandates and published reports on green infrastructure referred to in this study are limited to the ones concerning SEPA directly. Furthermore, due to the limited extent of this study publications on green infrastructure from other authorities are not included.

2. Regional Green Infrastructure Action Plans

As a background, the following chapter reviews the political developments leading to the governmental mandate to develop regional green infrastructure action plans, and introduces the definitions and terminology applied. It is worth noting that the county administrative board is the English translation of the Swedish word *Länsstyrelsen*, which is the government's regional representative, whose primary task is to ensure that governmental objectives are achieved while considering regional conditions. The Swedish county administrative boards thus differ from both the British and North American definition of a county.

Terminology from the Swedish Environmental Protection Agency

The official definition of green infrastructure is developed by SEPA and applies to all county administrative boards is:

> An ecologically functional network of habitats and structures, natural areas and landscape elements that are designed, used and managed in a way that preserves biodiversity and provides important ecosystem services for society throughout the landscape.[1i] (Naturvårdsverket, 2015, p. 9)

Green infrastructure is not to the same as the concept green structure, commonly used in municipal planning. Green structure is different from SEPA's understanding of green infrastructure because it includes social aspects of accessibility and recreation together with other outdoor activities (Naturvårdsverket, 2011). While green infrastructure is a primarily ecological concept.

SEPA emphasizes the importance of public participation when working with green infrastructure, 2016 they published "Message, sub-message and vocabulary for green infrastructure"[ii] (Naturvårdsverket, 2016) to assist the county administrative board when communicating the public, local politicians and planning- and environmental administrators. The main definition of green infrastructure is complemented by six sub definitions, translated and listed below,

a. Green infrastructure provides a new perspective and approach: The importance of seeing the entirety of the landscape.
b. The work on green infrastructure shall be based on a survey of landscape qualities.
c. Working with green infrastructure means working with a landscape perspective where forests, gardens, parks, green areas, wetlands, lakes, streams, coastal and sea areas are combined to functional habitats.
d. Together we can accomplish more in the work to create functional habitats for plants and animals and human wellbeing.
e. With an identified network of nature, we can prioritize and plan more efficiently.
f. The work with green infrastructure contributes to reaching the national environmental objectives and international commitments.

[1] All following translations is made by the author. The original quotes and name of the reports in Swedish can be found in appendix IV.

Resulting from a dialogue between concerned authorities and the county administrative boards, SEPA published "Important concepts when working with green infrastructure"[iii] (Naturvårdsverket, 2017) which defines six important concepts when mapping green infrastructure (see appendix I).

Green infrastructure promoted by the European Union

The work with green infrastructure in Sweden is intimately connected to international commitments by the government. Activities within both the European Biodiversity strategy, the EU habitat- and birds directive and the European Landscape Convention matches the work with developing green infrastructure.

At the center of the habitat directive, formally known as Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, and the birds directive, formally known as Council Directive 2009/147/EC on the conservation of wild birds, is the network of protected areas called the Natura 2000. Natura 2000 has a fundamental green infrastructural approach to conservation aiming at protecting a connected network of habitats throughout the EU (European Commission, 1992).

The European Landscape Convention was adopted in 2000, it aims at promoting protection, management and planning of landscapes and facilitating European cooperation in issues concerning the landscape. The convention includes not only the terrestrial and aquatic landscapes of high quality, but also the everyday landscape and even decaying landscapes. According to SEPA, a lot of the work connected to the landscape convention and the work on green infrastructure can be coordinated (Naturvårdsverket, 2011). Like SEPA's definition of green infrastructure, the convention also promotes a broad participation in the design of landscapes. By ratifying the Convention, Sweden has undertaken the task to engage in a broad participation in decision-making and processes relating to the landscape, locally and regionally.

In 2011, the European Commission presented the EU Biodiversity Strategy 2011 – 2020. The strategy contains six inter-dependent targets, which address the main drivers of biodiversity (European Commission, 2011). The second target of the strategy is, "Better protection and restoration of ecosystems and the services they provide, and greater use of green infrastructure" (European Commission, 2011). According to the strategy, the development of a green infrastructure is essential to overcome challenges related to an increasing loss of biodiversity. The objective is to maintain and restore degraded ecosystems by integrating a green infrastructure approach in physical planning.

In the communication "Green infrastructure - Enhancing Europe's natural Capital" (European Commission, 2013) from the European Commission to the European Parliament, the council, the European economic and social committee and the committee of the regions, it is stated that green infrastructure is a successful tool for achieving positive ecological, economic and social impacts. The importance of green infrastructure for reducing and adapting to climate change is emphasized as well as the capacity to improve resilience to natural disasters (European Commission, 2013). The communication stresses the need of including green infrastructure into physical planning activity. However, it should not compromise the possibilities for economic development (Silva et al., 2010).

Background to the government mandate

To assist the reader figure 1 on page 8 chronologically lists the mandates and reports referred to in the following section. The first official reference to green infrastructure in a governmental publication found in the material examined for this study is in the government bill "A united energy and climate policy (prop. 2008/09:162)"[iv] from 2008. The Swedish government states that it is necessary to develop a green infrastructure in order to protect biodiversity and to secure the continued ability of ecosystems to maintain and supply ecosystem services in a changed climate (Regeringen, 2008a, p. 122). Green infrastructure is also mentioned in the bill "Sustainable protection of natural areas (prop. 2008/09:214)"[v] which was also published in 2008. The government asserts the need of evaluating how the Swedish nature conservation's efforts to maintain biodiversity correspond to the requirements of developing a green infrastructure and ecological networks (Regeringen, 2008b, p. 89). Without efforts to develop a green infrastructure, the government that there is a risk of isolation and decimation of species populations. The isolation of populations in the landscape increases the risk of local species extinction, reduced genetic exchange between populations and obstruct the ability for species to move in the landscape. These threats to biodiversity could gradually reduce the ability of ecosystems to deliver services and hinder a necessary adaption to climate change (Regeringen, 2008b).

In august 2010, the government commissioned SEPA to conduct a preliminary study on green infrastructure in Sweden. In May 2011 SEPA published the report "Proposed plan for creating and maintaining green infrastructure"[vi] (Naturvårdsverket, 2011). In the report, green infrastructure is defined as "structures in the landscape where the use of those structures ensures a long-term survival of habitats and species, by ensuring species' ability to spread, the ability of ecosystems to deliver important services is maintained"[vii] (Naturvårdsverket, 2011, p. 5). Because that different species requires different habitats and structures to survive a landscape with a functioning green infrastructure will look different depending location (Naturvårdsverket, 2011). In the report, it is emphasized that the building and maintaining of green infrastructure is not separate from other ongoing work in protecting biodiversity. Instead a green infrastructure perspective should be integrated in the ongoing work (Naturvårdsverket, 2011).

In the report from 2011 SEPA listed twelve proposals on how to continue the work with green infrastructure. In 2012 the government commissioned SEPA to develop two of these proposals, the implementation of regional landscape analyses and an analysis of relevant policy instruments available for developing green infrastructure (Regeringen, 2012). The results were published in December 2012, in the report "Green Infrastructure, presentation of government mandate"[viii] (Naturvårdsverket, 2012). The definition of green infrastructure is unchanged from previous publications, but green infrastructure is more emphasized as an interdisciplinary concept. Because green infrastructure is crossing boundaries of traditional sectors in society the report stresses the need of coordination between authorities to make it a successful project (Naturvårdsverket, 2012).

In April 2013, the government commissioned SEPA and the Swedish Agency for Marine and Water Management to present a proposal for regional green infrastructure action plans in terrestrial and aquatic biotopes. In the commission, the government writes that the purpose of green infrastructure is to contribute to a long-term conservation of biodiversity and ecosystem services, and to ensure the resilience of ecosystems, especially in a changing climate (Regeringen, 2013). The government mandate declares that the action plans should be designed to enable a high degree of participation from municipalities and other concerned authorities, representatives of land users and landowners, environmental organizations, researchers and local population (Regeringen, 2013). The action plan is supposed to be "a dynamic document"[ix] (Regeringen, 2013, p. 3) which will contribute to make the planning of conservation measures directed towards biodiversity cost-effective.

SEPA published the report "Proposal to how regional action plans for green infrastructure can be developed"[x] (Naturvårdsverket, 2013) in September 2013. SEPA states that green infrastructure can provide a framework to assemble conservation measures in a geographical context with a spatial landscape approach. A landscape approach in the continued work with preservation of biodiversity should aim at increasing connectivity in the landscape to maintain its multi-functionality. According to the report there is no generally accepted definition of green infrastructure in Sweden. In the report, green infrastructure is discussed as a tool for reaching positive ecologic, economic and social results through what SEPA calls natural or semi-natural solutions. However, the report's main focus is green infrastructure's potential to strengthen ecological values. Economic and social values are not explored further. In the forthcoming implementation of the regional action plans, SEPA wants there to occur "major synergies to include the importance of green infrastructure in promoting these values as well"[xi] (Naturvårdsverket, 2013, p. 9).

Green infrastructure should be integrated into ongoing conservation work to avoid it becoming a parallel course in conservation work, (Naturvårdsverket, 2013). SEPA asserts that a prerequisite for green infrastructure work to become successful is clear directions to authorities on both national and regional levels. Otherwise, the work risks low priority and might not be performed (Naturvårdsverket, 2013). The report from 2013 finishes by stating that a higher level of ambition with green infrastructure work entail initially high costs for the state. In a longer perspective, a high level of ambition to create a functioning green infrastructure will generate profits in terms of more efficient nature conservation, and societal benefits such as the security of resilient ecosystems and the continued provision of ecosystem services. A lower level of ambition with less national supervising would slow down the work, leading to additional costs for the state. (Naturvårdsverket, 2013).

In the government bill "A Swedish strategy for biodiversity and ecosystem services (prop. 2013/14:141)"[xii] from march 2014, the development of regional green infrastructure action plans is stated as an important measure to reach the environmental objectives (Regeringen, 2014a, p. 100). In chapter 11.2.2 "Green Infrastructure"[xiii] it says that regional green infrastructure action plans should be developed in cooperation with relevant landscape actors such as landowners, land users, government authorities, nonprofit organizations and other relevant actors at local and regional level (Regeringen, 2014a, p. 98).

> An action plan for green infrastructure at regional level can provide a framework for collecting conservation measures in a geographical context (landscape perspective) to preserve biodiversity and multifunctionality in the landscape. Nature conservation measures should build on existing instruments, information and voluntary efforts. The work must consider property rights.[xiv] (Regeringen, 2014a, p. 101)

The interdependency between a functional green infrastructure and the continued ability of ecosystems to provide services is emphasized throughout the whole bill. To promote recognition of important ecosystem services in physical planning and to guarantee ecological links in the landscape, the government intend to mandate relevant authorities to develop regional green infrastructure action plans. The work should be initiated during 2014 and established in most parts of the country in 2017 (Regeringen, 2014a, p. 106).

In September 2014, the government mandated the SEPA together with the Swedish Agency for Marine and Water management, the Swedish Board of Agriculture, the National Board of Housing, Building and Planning, the Swedish Transport Administration and the Swedish Forest Agency to develop guidelines supporting the county administrative boards in their work to develop regional green infrastructure actions plans (Regeringen, 2014b). In commission 64 in the funding target arrangements for the fiscal year 2015, the government mandated the county administrative boards to develop regional green infrastructure action plans (Regeringen, 2015a). The

plans should improve the possibilities of reaching concerned environmental quality objectives and enable adaptations to a changing climate. The plans should be presented 1 October 2017.

In February 2015, the government commissioned SEPA to coordinate the work with developing a functional green infrastructure (Regeringen, 2015b). In September 2015 SEPA published the results from the commission given the previous year, "Guidelines for regional green infrastructure action plans"[xv] (Naturvårdsverket, 2015). The guidelines recognize that there are several definitions of green infrastructure. The purpose of working with green infrastructure is "to contribute to the conservation of biodiversity, promote ecosystem status and resilience and thereby strengthen ecosystem services that are important to society"[xvi] (Naturvårdsverket, 2015, p. 10).

According to the guidelines the work to develop regional green infrastructure action plans should center around three essential elements, participation, landscape perspective and making use of already ongoing work. Work on green infrastructure must be organized in cross-sectoral forms to avoid reinforcing a fragmentation of the landscape between different authorities and land uses. The guidelines state that the contribution from a green infrastructure approach is the increased consideration for a landscape context. Furthermore, the guidelines contain detailed descriptions of what to include in the regional green infrastructure action plans, and to some extent how to do some of the proposed analyses. The green infrastructure action plans are supposed to function as both planning material, and for prioritizing actions strengthening green infrastructure. For the action plans to be useful in physical planning, it is important that they are uniform throughout the country and cover the entire county. (Naturvårdsverket, 2015).

In commission 31 in the funding target arrangements for the fiscal year 2016 the government mandate to the county administrative boards to develop regional green infrastructure action plans are the same as in the previous year, with the objective to submit the finished action plans on October 1st 2017 (Regeringen, 2016). In commission 23 in the funding target arrangements for the fiscal year 2017 the date for presenting the regional green infrastructure action plans have been forwarded to October 1st 2018 (Regeringen, 2017).

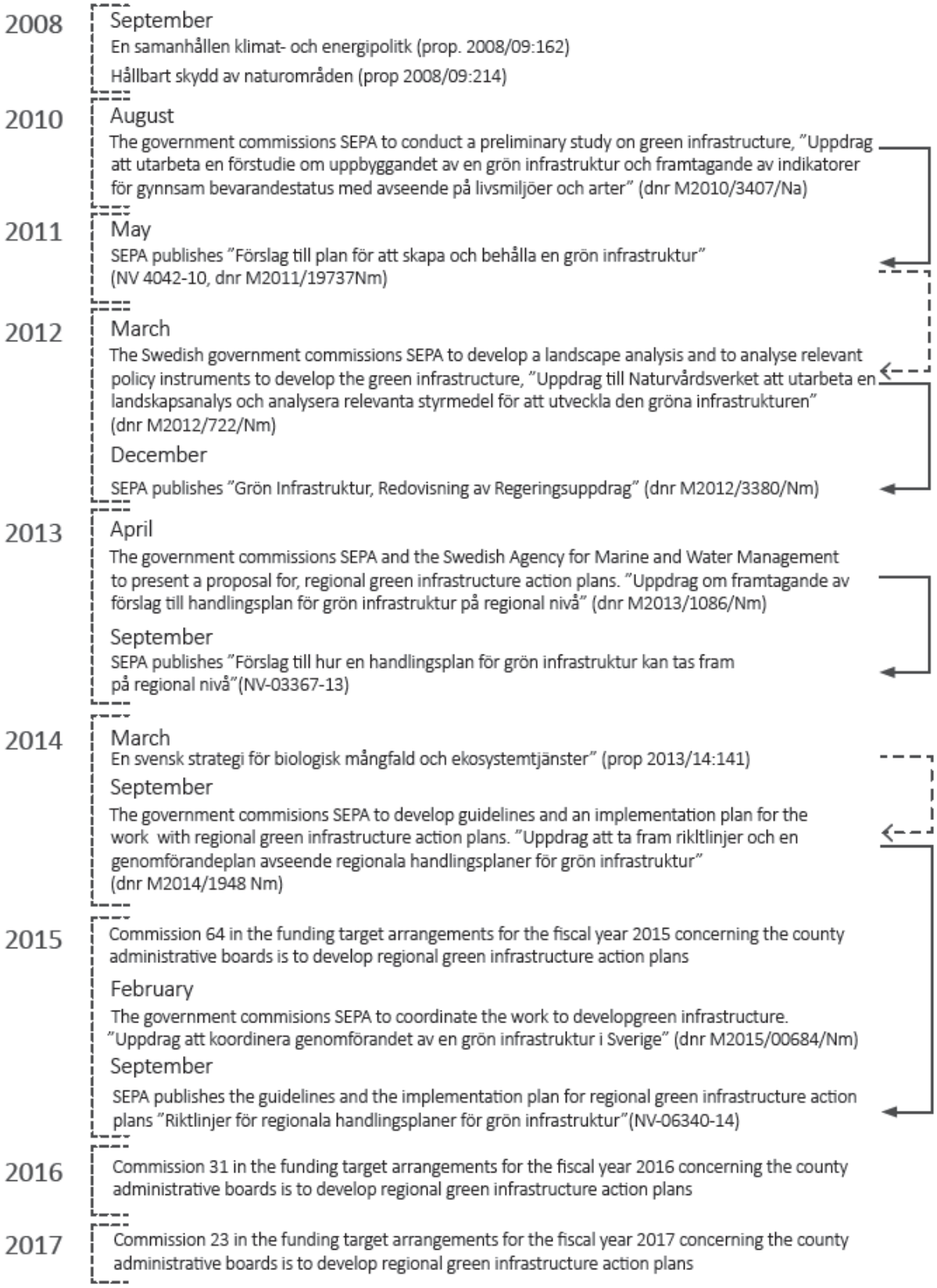

FIGURE 1 THE GOVERNMENTAL MANDATES AND PUBLICATIONS BY THE SWEDISH ENVIRONMENTAL PROTECTION AGENCY LEADING UP TO THE MANDATE FOR THE COUNTY ADMINISTRATIVE BOARDS TO DEVELOP REGIONAL GREEN INFRASTRUCTURE ACTION PLANS. THE ARROWS ILLUSTRATE WHICH MANDATE RESULTED IN WHICH REPORT. THE DASHED ARROWS ILLUSTRATE THAT THE PREVIOUS PUBLICATION WAS FUNDAMENTAL FOR THE PHRASING OF THE FOLLOWING MANDATE. LAYOUT, WÖSEL THORESEN 2017.

3. Political ecology

In this chapter the theoretical foundation of the study is presented. Political ecology together with theories of environmental governance and ecological modernization is the guiding theoretical approach in this study. The objective of the following chapter is to present a framework for understanding the origin of green infrastructure as a concept. An analysis of the conceptual understanding of green infrastructure cannot be limited by the traditional boundaries between social and natural sciences. It is necessary to move beyond this disciplinary division between social and natural phenomena to enable a conducive analysis of how green infrastructure is understood by the practitioners at the county administrative board of Skåne. Thus, the research field of political ecology is appropriate to apply. Fundamental to the approach is as Robbins (2012) writes "politics is inevitably ecological and ecology is inherently political" (Robbins, 2012, p. 3). Mels (2002) express another fundamental notion in political ecology, "the natural must always be understood as mediated by the social" (Mels, 2002, p. 135) and Benton (1999) says that social phenomena cannot be understood as independent of complex natural relations. Central to political ecology is the analysis of different power relations illuminating interconnection between human actions and the environmental conditions (Jönsson & Andersson, 2017). Because green infrastructure is a conceptualization of human-nature relations in the landscape, political ecology offers a theoretical framework for understanding and analyzing those relations. Working within political ecology is to acknowledge that social processes have environmental aspects and ecological implications and that changes to the environment are not neutral or apolitical. All changes are embedded in social power structures.

Political ecology emerged in the 1970's from the interweaving of political economy with ecological theories. Since then the approach has according to Escobar (2010) developed through three generations. The first generation, Escobar (2010) calls preconstructivist. It developed from a dissatisfaction with the lack of attention to power structures and undeveloped conceptualization of nature within human and cultural ecology. The second generation of political ecology was influenced by the theoretical frameworks marked as *post*- since the 1980's. This generation is distinguished through the engagement with epistemological issues of how nature and environments are represented and constructed. Thus Escobar (2010) calls the second generation of political ecology constructivist. In the third and present generation of political ecology, the postconstructivist, Escobar (2010) identifies a move away from the focus on construction of meaning to a focus on how different realities are constructed. The third generation in addition to an epistemological interest also examine the ontological issues of human-nature relations.

The strength of political ecology is the ability to facilitate both the critical examinations of existing scientific theories, and the progress of the theories criticized (Jönsson & Andersson, 2017; Robbins, 2012, 2015). Robbins (2015) described political ecology as a *trickster science*, because the theories engaged with are often transformed when utilized within political ecology. He argues that the field is defined by its relational position to other fields of research. Conceptualizations and theories from adjacent fields are both applied and criticized, sometimes simultaneously (Robbins, 2015). In their examination of the development of political ecology Jönsson and Andersson (2017) recognize that because of its relational position the field has to some extent come to be defined by its opponent. Political ecology developed as response and resistance to more reactionary and apolitical explanations to environmental problems (Jönsson & Andersson, 2017). The main focus of political ecology has traditionally been on issues concerning the use of land and resources in the global south. In recent years the efforts to "bring it home" has increased (Widgren, 2015).

Ecological modernization

> The only possible way *out* of the ecological crisis is by going further *into* the process of modernization (Mol, 1995, p. 42)

Ecological modernization as a concept was launched in the early 1980's by Jänicke and Hubert attempting to link ecology and economy, advocating the belief that institutions of modern society can be transformed to avoid further ecological crisis (see Gibbs, 2000; Jänicke, 2008; Lundqvist, 2000; Mol, 2010; York, Rosa, & Dietz, 2010). Led by Mol and Spaargaren ecological modernization theory gained territory during the 1990's criticizing the Marxian and political ecologist traditions in environmental sociology (York et al., 2010). In contrast to the conceptualization of environmental problems as capitalist market failures, the perspective of ecological modernization promotes a standpoint that sustainability can be achieved through incremental reform, rather than radical social transformations (Gibbs, 2000).

> The basic idea of ecological modernization is that, at the end of the second millennium, modern societies witness centripetal movement of ecological interests, ideas and considerations in their institutional design. This development crystallizes in a constant ecological restructuring of modernity. (Mol, 2010, p. 66)

Fundamental to ecological modernization is the argument that when modern society matures, the continued development will be characterized by an ecological rationale (Mol, 1995). Equal to how the early stages of modernization were governed by economic rationality, ecological concerns will increase and eventually be equivalent to economic ones (York et al., 2010). According to Mol (2010) the ecological rationality grew independent from political and socio-ideological rationalities during the 1970's and 1980's. And in the 1990's ecological rationality started to break free from the economic rationalities. This he argues has led to "that economic processes of production and consumption are increasingly analyzed and judged, as well as designed and organized from both an economic and an ecological point of view" (Mol, 2010, p. 67). In this process the ecological values are assumed to be integrated into economic choices, and simultaneously, economic valuation is supposed to be applied to ecological features (York et al., 2010).

> The task is therefor to change the direction of technological progress and to put the compulsion for innovation at the service of the environment. The emphasis of this approach lies on the possibility of ecological-economic "win-win" solutions that can be achieved, above all, through cost reduction and competition for innovation. (Jänicke, 2008, p.558).

The term ecological modernization indicates the possibility of overcoming environmental crisis, without compromising the modernization process (Mol & Spaargaren, 1993) similar to how the term sustainable development offer the possibility for further development without threatening sustainability (Gibbs, 2000). Hajer (1997) and Harvey (1996) argue that sustainable development is the central concept of the ecological modernization policy discourse. Sustainable development projects within ecological modernization are kept together by their, according to Hajer (1997), vague story-lines. The ambiguity of the concept makes it possible for political actors and practitioners from different backgrounds to interact without having to agree on a clear definition of what sustainable development means or how it is achieved (Jacobs, 1999). According to Lennon (2015) the sustainable development discourse facilitates a conceptualization of nature adapted to market logics.

By restructuring market economy to integrate environmental problems into its logic ecological modernization, economic development is reconciled with environmental protection (Lennon, 2015). This approach has received, and is still subject to, criticism from different angles. Gibbs (2000), Robbins (2012) and Watts (2015) criticize the ignorance of political and economic power in the ecological modernization discourse when it comes to

implementation of policy and its frequent failures to take social processes into account. According to Watts (2015) the dynamics of power relations are obscured within resilience theory. Instead attention is given to identify required conditions for system to fulfill in order to adapt to a set of changes. The fundamental causes for changes are not examined or challenged. Harvey (1996) criticizes the assumed possibility of an ecological switch in capitalist economy and notes a risk for the ecological modernization discourse to become "corrupted into yet another discursive representation of dominant forms of economic power" (Harvey, 1996, p. 82).

Criticizing ecological modernization, scale should be taken into consideration. It is the general outcome and the overall effects of modernization that are central to the debate between the theory's advocates and critics (York et al., 2010). Criticism towards ecological modernization has not focused on single observations that contradict the theory, but focused the general patterns of modernization's environmental consequences (York et al., 2010). While ecological modernization theory acts as a counterpoint to macro approaches with a focus on the variance in behavior of industries and governments. However, this small-scale focus is limited because organizations and industries exist in larger contexts and must hence be critically examined in a larger scale (Swyngedouw & Heynen, 2003; York et al., 2010). The conflict of scale can be illustrated by comparing the reasoning of Mol (2010) and York et al. (2010). Mol (2010) argues that material flows are decoupled from economic flows in what he defines as the most ecologically advanced nations from the mid-1980's and onward. This because environmental reforms have resulted in a decline in the use of natural resources, regardless of economic growth. However, York et al. (2010) bring attention to what has been called the "Netherlands fallacy", by shifting their environmental impacts beyond their nation borders through the import of resources, a nation with high population densities and high levels of consumption can keep a clean environmental record. The same problem applies to business and industries, where a business may expand resource consumption and waste production in other sectors of the economy (York et al., 2010). York et al. (2010) criticize the strong emphasis in ecological modernization theory on institutional change, and the presumption that the development of new institutions together with incremental changes for protecting the environment is both effective and appropriate to achieve sustainability. They argue that it is important to critically examine the outcome of such institutional changes, and their efficiency in addressing the intended environmental problems. If not York et al., (2010) believe there is a risk of the reforms to reach sustainability only become symbolic changes.

Adapting market-based solutions to environmental problems entails a commodification of nature and nature's services, which contributes to a problematic simplification of ecological relations (Robertson, 2004). By itemizing[2] nature into ecosystem services, ecological functions are transformed into single services suited for monetary valuation and exchange (Gómez-Baggethun, de Groot, Lomas, & Montes, 2010; Kosoy & Corbera, 2010). Setten et al. (2012) notes that the lack of convergence between assumptions in economic theory and the complexity of ecosystems will more often than not lead to market failures. Commercialization separates singular ecosystem services from the species and processes building up the ecosystem (Kosoy & Corbera, 2010; Robertson, 2004; Setten et al., 2012). This process is criticized for obscuring the complexity of ecosystems, neglecting the relational aspect of ecosystems acknowledging that ecosystem functions are interdependent (Kosoy & Corbera, 2010; Robertson, 2004, 2006) and prevents efficient allocation of resources to conservation (Setten et al., 2012). York et al. (2010) argue that modernization and economic growth lead to environmental degradation and that overcoming the modern ecological crisis without acknowledging the fundamental conflict between economic

[2] Itemization is a process of individuation and abstraction where both legal and material boundaries are put around a phenomenon so it can be bought and sold (Kosoy & Corbera, 2010).

growth and ecological sustainability is unlikely. In an article from 2008 Jänicke, one of the founding fathers of ecological modernization, underlines the shortcomings of the concept,

> the concept encounters inherent limits where (potentially marketable) technological solutions are not available. The "persistent problems" of environmental policy – namely urban sprawl, soil erosion, the loss of biodiversity, the final storage of nuclear waste, or global climate change – all exemplify these limits. Also, the modernization approach is in general not a viable option when risk is acute and immediate defensive action is needed. (Jänicke, 2008, p. 562)

He still claims that the potential of ecological modernization to reduce the environmental consequences of industrial expansion is without alternative. However, he acknowledges that structural solutions are needed and that, "structural solutions cannot rely on a strategy of ecological modernization, since the existing problems cannot be solved through marketable technological innovations" (Jänicke, 2008, p. 563). The article finishes with the recognition that "In sum, ecological modernization is – despite its impressive potential – not sufficient to ensure a long-term stabilization of the environment." (Jänicke, 2008, p. 563).

As noted by Bryant and Bailey (1997), from a political ecology perspective environmental change and conditions are products of power relations between unequal actors. Robbins (2012) argues that historically the assertion that economic markets can optimize production and thus lead to environmental benefits is questionable. Mol (2010) responds to criticism towards ecological modernization for being inadequate and incorrect by writing, "It is not so much that these objections are completely incorrect. From their starting points and the basic premises of these schools of thought, the points raised against ecological modernization are internally logical, consistent and coherent." (Mol, 2010, p. 71). Taking a stand in relation to the process of ecological modernization is thus taking a stand for an ideological position.

Environmental governance

Ecological modernization has influenced both the production of environmental information and nature conservation practices through adaptation to the logics of economy (see Bakker, 2005; Lave, 2012; Lave, Mirowski, & Randalls, 2010; Robertson, 2004, 2006, 2010; Swyngedouw & Heynen, 2003). The changing state-market relations in ecological modernization is sometimes described as environmental governance. Central to environmental governance is the adaption of environmental reforms to economic and market dynamics, and the belief that the market should be the organizing agent in society. The function of the governing state is not to ensure public welfare, but to enable market creation and protection (Lave et al., 2010). The traditional position of the nation-state in environmental reforms is shifting, leading to new governance arrangements and new political spaces. The shift towards environmental governance has entailed a move away from the traditionally formal representative "hard" government, towards the more informal and "soft" governance (Thomas & Littlewood, 2010). Environmental objectives have traditionally belonged in the hard spaces of government, while the soft spaces are primarily driven by economic development goals (Thomas & Littlewood, 2010). In environmental governance, new soft spaces of governance are gaining in influence at the expense of the traditional hard spaces (Thomas & Littlewood, 2010). Top-down hierarchical governing systems are abandoned for more decentralized and flexible styles of national governance (Mol, 2010). The traditional role of the sovereign state and national arrangements is to some extent replaced by global environmental institutions and supranational governance arrangements for environmental policy and politics (Mol, 2010). There is an increasing involvement of non-state actors taking over conventional tasks of the state in environmental governance, through e.g. privatization and public-private partnerships (Mol, 2010).

Thomas and Little wood (2010) argue that due to the changing geographies of governance, policy priorities have shifted, “Economic development goals tend to dominate the policy agendas of these new governance arrangements and the dominant paradigm that these policies tend to address is that of a global market place in which localities and regions must compete” (Thomas & Littlewood, 2010, p. 205). In this context, environmental protection is turned into a positive-sum game, promoted through ideas of green growth (Hajer, 1997). Environmental protection is promoted as an opportunity for business through creating new markets, products and services and thus increase competitiveness in world markets (Gibbs, 2000). Thomas and Littlewood (2010) argues that it is necessary that old government mechanisms based on welfare-driven public sector must be complemented or even replaced by the new style of governance for the achievements of this paradigm. Environmental governance has developed as an approach to environmental protection and conservation emphasizing the importance of private property and protection of individual rights (Swyngedouw, 2005). Efficient management of natural resources is achieved through the assignation of property rights, and promotion of monetary pricing of nature’s services and the expansion of commodity markets into the realm of nature’s services (Kosoy & Corbera, 2010). In the ideology of environmental governance market-led capitalism can solve environmental problems through trading of resources and rights. Market logics will assign high prices to scarce resources and thus encourage a sustainable management. The impact of power asymmetries concerning who can claim ownership and thus trade ecosystem services, and defining a fair price for such services is neglected in this approach (Kosoy & Corbera, 2010). It is furthermore important to recognize that ecosystem services and environmental conditions are valued differently at different scales by stakeholders in multiple geographies, and this variation in values is not captured by market price.

4. Literature review

The following chapter provides a review of a small segment of the extensive literature published on green infrastructure. Writings on green infrastructure can be grouped in two main categories, one addresses the ecological issues, with research on species migration patterns and the ecological function of landscape connectivity. The other category concerns issues around the planning of green infrastructure. Research in landscape ecology, biology and other disciplines studying the eco- and biological features of green infrastructure of course have a major impact on the development of the green infrastructure approach. Due to the limited extent of this study, and to meet its purpose, only literature associated with the planning of green infrastructure are in focus. Starting off from the theoretical framework in this study the readings have focused on research concerned critically examining the concept green infrastructure and placing it in relation to theories of ecological modernization and environmental governance.

Green infrastructure literature is primarily Anglo-Saxon or North American. Lennon (2015) assumes that similar processes is happening in other locations, using a different terminology. The development of green infrastructure in Europe and primarily the UK has a slightly different starting point than the development in North America. In Europe, green infrastructure developed from the need to efficiently manage green spaces within highly populated landscapes (Benedict & McMahon, 2006). Through different greening agendas, social and economic benefits were included in the concept from the beginning (Beatley, 2000). In North America, primarily ecological benefits led the development of the concept (Benedict & McMahon, 2006). Lennon (2015) interprets the recent work undertaken on green infrastructure in the USA as not giving priority to ecological preservation above other objectives. Rather, it seeks to advance modes of combining social, economic and ecological benefits. Mell (2010) identified the same patterns as Lennon (2015) and argues that the north American perspective is changing to resemble the broader European approach to green infrastructure. Despite the extensive research on green infrastructure there is according to Lennon (2015) little academic literature that critically engage with green infrastructure, and the implications of its institutionalization within planning practice.

Definitions and general characteristics of green infrastructure

Benedict and McMahon (2006) defines green infrastructure on the first page in their textbook, *Green Infrastructure, linking Landscapes and Communities* as,

> An interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife, […] green infrastructure is the ecological framework for environmental, social and economic health – in short, our natural life-support system. (Benedict & McMahon, 2006, p. 1)

The definition includes the common characteristics of green infrastructure, it emphasizes the multifunctionality of spaces included in a green infrastructure network. It includes economic and social aspects beside the environmental objectives and it places humans in the center, green infrastructure is *our* natural life-support system. The definition expresses the two-folded aspect of green infrastructure. The first half is a definition of green infrastructure as a noun, referring to an interconnected network of green spaces. The second half defines green infrastructure as an adjective describing an approach to nature conservation. Kambites and Owen (2006) differentiate between these two understandings of green infrastructure in the article “Renewed Prospects for Green Infrastructure Planning in the UK”, they outline the differences between green infrastructure thinking and green infrastructure planning. The main characteristics of the noun green infrastructure is the priority of

connectivity and multi-functionality resulting in benefits for both nature and human. Whilst at the center of the adjective green infrastructure is public participation, smart conservation and having a holistic landscape perspective. In their article "Green Infrastructure: Smart Conservation for the 21st Century" Benedict and McMahon proclaim that green infrastructure is "the ecological framework needed for environmental, social and economic sustainability" (Benedict & McMahon, 2002, p.12).

In the thesis "Green infrastructure: concepts, perceptions and its use in spatial planning" Mell writes that "There are currently as many definitions of green infrastructure as there are authors working on the concept" (Mell, 2010, p. 33). He argues that the definitions of green infrastructure applied by different actors directly relate to their different purposes. Examining definitions of green infrastructure from different research projects and reports, Mell (2010) identifies the following common features emphasized, multi-functionality, natural and human benefits, biodiversity, sustainability and connectivity. Mell (2010) also identify the need of integrating larger areas with external supporting networks of green structures as a central idea to green infrastructure. From studying different definitions Mell (2010) phrases his own definition of green infrastructure,

> Green infrastructure is the resilient landscapes that support ecological, economic and human interests by maintaining the integrity of, and promoting landscape connectivity, whilst enhancing the quality of life, place and the environment across different landscape boundaries. (Mell, 2010, p. 37)

At the center of green infrastructure approach is according to Benedict and McMahon (2006) the notion that open and green spaces connected through a network provides ecological benefits and must be protected and managed. In planning theory, green spaces have previously been defined as having recreational values and something that is pleasant to have in the urban landscape (Benedict & McMahon, 2006). By introducing the concept of green infrastructure, these spaces are promoted as spaces not only nice to have, but necessary to society (Ahern, 2007; Benedict & McMahon, 2006; Lennon, 2015). While green spaces in natural conservation traditionally is perceived as self-sustaining spaces, the application of the term green infrastructure often implies that it is both possible and necessary to actively protect and manage green spaces to guarantee the continued ability to deliver desired benefits (Benedict & McMahon, 2006; Lennon, 2015).

When studying the implementation of green infrastructure in Ireland, Lennon, Scott, Collier, and Foley (2017) identified three fundamental components to the concept, collaboration, multi-functionality and connectivity. The collaborative component of a green infrastructure approach is realized in the ambition to involve local community groups in the development of planning and policy documents (Lennon et al., 2017). The collaborative approach is moreover supposed to facilitate and monitor the effectiveness of policy implantation and recognize the local knowledge situated in communities and NGO's (Lennon et al., 2017). Studying green infrastructure projects in Canada, Amati and Taylor (2010) conclude that to make a successful green infrastructure policy regarding both implementation and sustainability, it must be supported by the public by reflecting public interests and values.

Spaces of green infrastructure are anticipated to be multi-functional, holding functions for protecting and enhancing biodiversity, as well as provide accessible areas for recreation and provide ecosystem services such as sustainable water management and the potential to adapt to consequences of climate change (Lennon et al., 2017). The multi-functionality approach also includes to policy implementations. Mell (2010) says that the variation in definitions of green infrastructure promotes a view that it is an all-encompassing approach to planning that can be used by a diverse range of practitioners. A planner interviewed by Lennon et al. (2017, p.

157) said that what they were doing when planning for green infrastructure was to provide a framework that can be practiced by different actors.

Green infrastructure consists of two words with strong connotations, where the green is associated with the environment (Mell, 2010) and infrastructure implies the work to have a technical rationale (Lennon, 2015). Benedict and McMahon (2006) conceptualize the green as being the ecological functions in a landscape, and the infrastructure is the physical elements enabling those ecological functions. Instead of associating nature conservation policies to traditionally soft values, Lennon (2015) argues that the term infrastructure creates associations to the perceived rationality and objectivity of grey infrastructure planning. Using infrastructure also communicate that habitat conservation is something useful and even necessary for society (Lennon, 2015). According to Benedict and McMahon (2006) the term infrastructure implies that ecological elements in the landscape need to be planned with the same priority as traditional infrastructure, e.g. road networks and communications. According to Lennon (2015) the adoption of the term infrastructure in nature conservation practices implies that habitats and ecological elements can be created by men, and we can create new, potentially better infrastructure in respect to providing benefits for society.

Infrastructure highlights the importance of connectivity in the landscape, connecting important areas assisting ecological functions (Benedict & McMahon, 2006). The connective feature of green infrastructure can be discussed in two ways relating to the differentiation between green infrastructure thinking and planning by Kambites and Owen (2006). In green infrastructure planning, connectivity refers to the practical method of physically connecting landscape elements. In green infrastructure thinking, the connective role of green infrastructure is to provide a space for multi-organizational planning (Kambites & Owen, 2006). According to Mell (2010) infrastructure also applies to more metaphorical connective features, such as the importance of developing suitable policies and agendas and to connect people and landscapes.

The lack of consensus and ambiguity of green infrastructure is argued by some to be a conceptual weakness and risk (see Ahern, 2007; Kambites & Owen, 2006; Lennon, 2015), while Wright (2011) argues that it is a strength. The diversity and scope of the concept is argued to allow a wider range of practitioners to engage with the concept (Wright, 2011). A fixed definition would stifle the adoption to varied requirements of different spatial and temporal situations and the concepts' future progression (Wright, 2011). Wright (2011) opposes limiting the meaning of the concept, and argues for the need of helping practitioners to understand the policy context around it. Even if green infrastructure is a new term, it does not represent a new set of ideas, thus is the need for a unified definition neither desired nor beneficial (Wright, 2011). Ahern (2007) believes that the familiarity of the term and its intuitive lead to an acceptance and a use of the concept. Mell (2010) discusses the problems associated with the diversity of definitions and believe that it potentially could discourage different actors from employing the concept. Instead Mell (2010) argues that a more focused outline of what constitutes green infrastructure may in a longer perspective increase the acceptance and thus its use as an adaptive landscape management process.

Green Infrastructure and ecological modernization

Green infrastructure planning and thinking is part of the ecological modernization process facilitating the belief that no choices must be made between economic growth and nature conservation (Lennon, 2015; Wright, 2011). In the UK, green infrastructure has its origin in Ebenezer Howard's ideas of Garden Cities in the nineteenth-century (Benedict & McMahon, 2006; Mell, 2010). Modeled after the garden cities arose the concept of green belts (Amati & Taylor, 2010; Benedict & McMahon, 2006; Hall, 2004). The green belt approach followed modernist planning ideals, and was introduced through ambitious regional plans created by a small number of experts pursuing to rationally organize rapidly growing urban areas (Amati & Taylor, 2010). In later years the green belt approach has been heavily criticized for its limiting effects on land supply and its inadequacy to tackle problems arising with the continued growth of urban areas (Amati & Taylor, 2010). In the present sustainability discourse Amati and Taylor (2010) observe a change in the meaning of green belts as planners are forced to view green spaces in a more nuanced way. The change is embedded in a larger shift within planning practice in the UK and internationally (Amati & Taylor, 2010). In recent years, the previous top-down and state led planning, dominating in the post-war period, made room for looser engagements between local authorities and other stakeholders (Amati & Taylor, 2010; Thomas & Littlewood, 2010). According to Lennon (2015) is the ongoing institutionalisation of green infrastructure part of a shifting focus from environmental protection, towards environmental governance. Lennon et al. (2017) describe green infrastructure as a new mode of collaborative planning tool for multifunctional landscapes. The previous concept of ecological network focused primarily on ecological connectivity, and failed to reflect social dynamics in the landscape (Lennon et al., 2017). Adopting a green infrastructure approach the county councils in Ireland sought to "advance a more functionally integrated network of key sites that meet several social objectives while concurrently maintaining ecosystems integrity" (Lennon et al., 2017,). Lennon et al. (2017) found that the county councils which have deployed a green infrastructure approach for enhancing resilience have attempted to reduce tensions between growth management and environmental protection. The context of an ecological modernism is a prerequisite for the development of green infrastructure (Amati & Taylor, 2010; Lennon, 2015). See Lundqvist (2000) for a review of how environmental policy has shifted in Sweden in order to fit the characteristics of ecological modernization.

Green infrastructure is closely related to the concept of ecosystem services. Ecosystem services was introduced in the early 1980's as an educational tool to raise public awareness of the services ecosystems provide to humans (Setten et al., 2012). Setten et al. (2012) argues that economists and ecologists joined forces when establishing ecosystem services as a way of framing conservation imperatives to convince society of nature's value and need of protection. They further argue that the use of market metaphors in conservation policy and planning is necessary to gain public interest because the public is embedded in a global economy and distant from natural processes (Setten et al., 2012). The introduction of green infrastructure to planning policy has a similar ambition, with its emphasis on benefits for humans and society. Like the critical perspective of Lennon (2015) on the lack of understanding possible implications of institutionalizing green infrastructure, Setten et al. (2012) says that the implications of embracing ecosystem services within environmental decision-making are little understood.

A general critique from ecologists against the concept of ecosystem services is the reductionist approach to nature. The fixation with end products, i.e. the services, contributes to a neglect of the species and processes producing the desired services (Setten et al., 2012). This critique is similar to what Lennon (2015) perceive as problematic with green infrastructure's strong emphasize on human benefits, nature is only ascribed a value if it produces something that benefits humans. Drawing on the critique towards ecosystem services by Setten et al. (2012) and green infrastructure by Lennon (2015) the purpose of conservation within the ecological

modernization paradigm is not to protect nature in its own right. But instead to protect the services nature produce that are fundamental for the survival of humankind. Only green spaces turned active producing a calculable service to humans are worth protection.

The priority towards monetarization of ecological processes and an anthropocentric emphasize on social benefits within green infrastructure (Benedict & McMahon, 2002; Lennon et al., 2017) is coherent with the broader international discourse that advances financial justifications for environmental conservation (Kosoy & Corbera, 2010; Lennon, 2015; Setten et al., 2012). This is reflected in the growing literature on ecosystem services and the development of market-based instruments for conservation. In a European context, The Economics of Ecosystem and Biodiversity is a palpable example, "The Economics of Ecosystems and Biodiversity" is a global initiative focused on "making nature's values visible" (TEEB, 2017). Green infrastructure approach is part of what is referred to in policy as smart conservation, where the main characteristic of green infrastructure is as the enabler of combining environmental protection and economic development in the same space (Amati & Taylor, 2010). The European Environment Agency writes that smart conservation is one of the key principles of green infrastructure (European Environment Agency, 2011). The current development of methods to evaluate ecosystem services locate conservation policies at the core of neoclassical economic thought according to Engel, Pagiola and Wunder (2008). Payments for ecosystem services, is according to Kosoy and Corbera (2010) the consequence of commodification of nature in the context of market based environmental governance.

5. Research Methodology

In the following chapter, research methodology and the material used in the study are presented and discussed following the rationale behind a multi-method approach. Applying a multi-method approach the researcher uses different qualitative methods and data sources to build an understanding of the selected subject. Because the aim of this study is to explore the participants' understanding of the concept green infrastructure, it is adequate to use qualitative methods with an exploratory approach. The study focuses on the interpretation of texts, narratives and experiences, building a description of common meanings and experiences of the concept green infrastructure for different practitioners. Through triangulation of interviews, observations and political documents and reports, the research achieves intertextuality.

All the opinions expressed by the respondents in this study are their own personal beliefs. This is heavily emphasized by the respondents, since some of the opinions are somewhat controversial and are not to be interpreted as official statements from the county administrative board of Skåne. All 17 respondents approved to participate with their full name in the study.

Interviewing, transcribing and coding

The primary method for data collection in this study is semi-structured concept interviews. A semi-structured interview allows the respondents to raise themes the researcher may not have anticipated (Kvale, Brinkmann, & Torhell, 2009). A concept interview is an interview seeking to interpret a concept and reveal any discursive assumptions fundamental to the opinions of the respondents (Kvale et al., 2009). Semi-structured interviews do not rely on a rigid set of questions written in advance, instead each interview is a social encounter dependent on the unique interaction between the interviewer and the respondent (Valentine, 2005). The interview schedule used in the interviews is presented appendix II. Depending on the respondents' level of engagement in the project the duration of the 17 interviews varied between 15 to 70 minutes. In appendix III is a list of all the respondents participating in the study together with the length and location of the interview. Depending on the interests and level of engagement in the interview by the respondents, different issues and themes came into focus. To fulfill the purpose of this study, it is of equal interest what issues the respondents themselves define as important in relation to green infrastructure as well as answering the questions in the interview schedule.

All respondents approved to recording the interviews. The 15 interviews performed in person were recorded by using an application on a cellphone. The two interviews made by phone was recorded using an application specific for recording phone calls. Instead of having to stick to an interview guide recording an interview give the interviewer more freedom to follow the path of the respondent, and the conversation can grow more dynamically (Valentine, 2005). A tape gives an accurate record of the interview, including capturing the nuances of the conversation (Valentine, 2005). Valentine (2005) recommend to keep a research diary since having notes of how you felt after interviewing and inspirations for upcoming interviews can be beneficial both when doing your interviews and when analyzing the material. After completed the interview I took notes capturing the immediate reflections on both the content of the interview and the context around it.

All 17 interviews were fully transcribed, resulting in over 100 pages of interview material. The transcribing process gives the researcher an opportunity to re-familiarize with the material (Crang, 2005). Depending on the purpose and methodological approach of a study the styles of transcript vary. Since this study aims to explore how the participants make sense of the concept green infrastructure, it is appropriate with detailed transcripts

rendering the exact words of the respondent including additional comments on hesitations and tone of voice. For transcribing I used the free software *InqScribe*, where the written text is directly linked to the audio file.

Out of the 17 respondents, eight wanted to read and approve the transcript before the material was analyzed. After sharing the transcript with the respondents, they had two weeks to return comments or changes to the material. Three respondents only wanted to approve the publications of direct quotes in the study. They were also allowed a time limit of two weeks to return any comments on the chosen quotes. Only minor changes in spelling and names had to be changed after reviewing.

Starting to process the material I began by formalizing the interview material into categories and codes. Crang (2005) explain codes as "the abbreviations or acronyms put on similar segments" (Crang, 2005, p. 223). I used both analogue and digital methods when coding the material. First I used colored pens for analogue coding of printed interviews. Then I continued by using *Dedoose*, a software for analyzing qualitative data. In the Dedoose I re-coded the analogously coded interviews. Two or more codes could apply to the same segment of text. The second coding gave me the possibility to reevaluate and discover findings from the first round of coding. The codes have emerged from the materials through analytic induction (Crang, 2005). In this process, the codes evolve organically with the analytical work of the researcher. Codes and categories are redefined until the final categories are coherent and supporting the research purpose (Crang, 2005). Codes can be divided into emic and etic codes, emic codes are generally those used by the respondents themselves, while etic codes are assigned by the researcher (Crang, 200). I developed codes from emic, to etic codes. Starting off with many codes and during the analytical process consolidate them to a few codes appropriate to the research purpose. All interviews and transcriptions was done in Swedish. Any direct quotes in the study has been translated by the author.

Analyzing the material as a contested concept

It is important to be aware that coding the material is not the same as interpreting it. In their study of ecosystem services Setten et al. (2012) distinguish between terms used in policy rhetoric, and researchable conceptualizations. They argue that ecosystem services are not designed as a tool for scientific structuring, the weaknesses of its framework should be recognized when addressed within scientific research. Because green infrastructure is a concept closely related to ecosystem services, both in practice and in theory it is important to be aware of its origin. Taking the warning from Setten et al. (2012) seriously I have applied the model of contested concepts developed by Jacobs (1999) when analyzing the interview material.

In his analyze of the concept sustainable development Jacobs (1999) developed an analytical model called *contested concepts*. His argument is that the search for a precise meaning of what sustainable development is relies on a misguided understanding of the function of political concepts. The complex and normative meanings of contestable concepts have two levels of meaning. The first level is unitary but vague, and can often be expressed in a short sentence. There exist multiple variations of the first level definition and they are united by a set of *core ideas*. This collective of ideas are characteristic for the concept to which they belong. People holding different interpretations of them can agree on the identification of situations where the core ideas are *not* present. The contest of contestable concepts occurs in the second level of meaning. In this level the interpretations of what a concept means in practice and how it should be operationalized are formed, raising questions of alternative conceptions of a concept. Jacobs (1999) illustrates this by using the example of democracy, most people can agree on when a situation or political context is not democratic, even if they cannot agree on how democracy is achieved.

> For common political concepts, the battle is neither over the first level of meaning nor indeed whether one accepts normative goal. Almost everyone is in favour of democracy, liberty and social justice; the debate is over alternative conceptions of what they mean, at the second level. (Jacobs, 1999, p. 26)

Because some interpretations have more discursive influence, the first level of meaning give the appearance of a common understanding, disguising the conflict of different objectives. Adopting the contested concept model for analyzing the material make it possible to identify conflicting interests.

Wright (2011) applied the contested concept model when studying the development of green infrastructure in England. Both her and Jacob's position is that the ambiguity of the concepts green infrastructure and sustainable development is unavoidable. Furthermore, that the pursuit of a single precise meaning of such concepts is problematic because it hinders the development to bridge environmental theory and economic policy. Since this study take its starting point in the tradition of political ecology with a critical perspective on the outcomes integrating economic rationalities to ecological problems, the results of applying the model of contested concept is different from both Jacobs (1999) and Wright (2011).

Respondents

To meet the aim of the study participants are the practitioners at the county administrative board of Skåne involved in the present green infrastructure project. The respondents belong to different levels in the organizational structure of the project, shown in table 1, in appendix II there is a detailed list of all respondents. In addition to the people officially involved in the project three external experts whom have been consulted in the project were also interviewed. Ola Olsson and Pål Axel Olsson from the department of biology at Lund University have spoken at both internal meetings within the county administrative board and external meetings with municipalities and other interested parties. Both at meetings I observed and in interviews, it was clear that the lectures had impacted the practitioners' understanding and design of the project. Gabrielle Rosqvist is a conservation administrator at the county administrative board of Skåne and the manager for the Sand Life project, an initiative to reconstruct biotopes on sandy soils in southern Sweden. Because one of the prioritized areas in the intended action plan is sandy grasslands in eastern Skåne Gabrielle is brought in to the project as an expert.

The task of the work group is to manage the project. Johan Niss is the project coordinator and together with Gudrun Berlin and Linda Gustafsson they are have most assigned working hours to put into the project. The purpose of the project group is to represent the interests from other units at the county administrative board, and to give input to the work group. The level of working hours the employees in the project group are assigned in the project range from none to partly fulltime. The steering committee hold the official responsibility for the project and decisions concerning its continued development. Because the project is assigned to the department of environmental affairs it was also appropriate to interview the head of department.

In the beginning of the study I was invited to participate in a meeting with the work- and project groups by the project coordinator and likewise my supervisor at the county administrative board, Johan Niss. At the meeting, I presented the study and myself and informed everyone that during the spring I would contact them to schedule a time for an interview. Johan Niss functioned in this study as what is generally known as a "gatekeeper", an individual in an organization that can give access to people important to the research (Valentine, 2005).

One employee at the county administrative board declined to participate in the study since she felt she had not been enough involved in the project to have any information to share. I assured her that her opinions and thoughts around green infrastructure alone would be more than enough for participating in an interview. However, she still declined to participate. One scheduled interview had to be cancelled because the respondent got ill. After she did not have the time to schedule a new time for an interview due to heavy workload.

TABLE 1, THE 17 RESPONDENTS IN THE STUDY AND THE ORGANIZATIONAL STRUCTURE IN THE PROJECT TO DEVELOP A REGIONAL GREEN INFRASTRUCTURE ACTION PLAN AT THE COUNTY ADMINISTRATIVE BOARD OF SKÅNE.

Head of the Department of Environmental Affairs	
Annelie Johansson	

Steering Commitee	
Elisabet Weber	Department of Community Affairs
Paul Eric Jönsson	Nature Conservation Unit
Per-Magnus Åhrén	Nature Protection Unit

Project Group	
Britta Roos	Cultural Heritage Unit
Jan Lanner	Swedish Forest Agency
Johanna Ragnarsson	Environmental and Water Strategy Unit
Malin Andersson	Nature Conservation Unit
Marie Eriksson	Water Management Unit
Pär Persson	Spatial Planning Unit
Thorbjörn Nilsson	Spatial Planning Unit

Work Group	
Gudrun Berlin	Nature Protection Unit
Johan Niss	Nature Protection Unit
Linda Gustafsson	Nature Examination Unit

External Experts	
Gabrielle Rosqvist	Nature Protection Unit
Ola Olsson	Lund University
Pål Axel Olsson	Lund University

Observations

To get insight to how the participants discuss green infrastructure the interviews are complemented with observations of five meetings. As the word suggests it is the act of noting a phenomenon and recording it for scientific purposes (Creswell, 2013). Participating as an observer in meetings gave me the opportunity to gain knowledge about how the practitioners expressed themselves when discussing issues concerning green infrastructure and the project.

Observational studies can take many forms, what I did can be categorized as what Creswell (2013, p. 167) describes as a nonparticipant observation. The researcher is then an outsider of the group, observing and taking field notes from a distance. The data collection is done without direct involvement with study subject (Creswell, 2013). As mentioned before, introduced Johan Niss me to the participants at the first meeting I attended, in the following meetings I did not take an active role, but observed passively. Table 2 is a list of the meetings where I participated as an observer. There should have been one more project group meeting on June 1st, but because there was no new information to share Johan Niss postponed the meeting until later the coming autumn.

TABLE 2, LIST OF OBSERVED MEETINGS WITHIN THE PROJECT TO DEVELOP A REGIONAL GREEN INFRASTRUCTURE ACTION PLAN AT THE COUNTY ADMINISTRATIVE BOARD OF SKÅNE.

Date	Time	Group	Topic
2017-01-24	9.00-15.30	Southern Counties	Biodiversity connected to grasslands
2017-01-31	13.00-14.30	Project Group	The continued work with the action plan
2017-03-17	9.00-10.30	Work Group	Sandy grasslands, discussing methods for proceeding the analysis in the project
2017-03-20	9.30-15.00	Work Group	The continued work with the action plan
2017-04-21	9:30-11:00	Steering Commitee	The continued work with the action plan

Documents

The study also rests on empirical information from political documents and published reports from Swedish authorities. The selection is limited to mandates from the Swedish government concerning SEPA. Reading the documents, focus has been on how green infrastructure is conceptualized and defined by SEPA.

Methodological considerations

All choices made when designing a research have impact on the outcomes of the study. Choosing a quantitative approach to answer the research questions could possibly have expanded the empirical findings by including more participants, and allowed a more comparative study. However, the present approach gives an in-depth understanding of the key actors in the current project. As a researcher, it is my choice to engage with this particular topic. All choices made in designing the research, and how to analyze and understand the empirical findings are biased on me and my understanding of the material. A study like this is in that sense a creative project, because the understanding of the material is unique to researcher, relying on the researcher making sense of the material using the knowledge gained from preliminary research.

Looking back instead of conducting 17 individual interviews, I would also have performed group interviews. Because when the practitioners engage with green infrastructure professionally it is generally as part of a group, and their common understanding will impact how green infrastructure is conceptualized in policy. Observing facilitated discussions would have given more information about the conflicting interests and understandings at an organizational level, instead of between individual practitioners.

6. Results

The following chapter presents the empirical findings from the performed interviews. Despite the clear purpose to protect and strengthen biodiversity, the participants in the project experience an ambiguity regarding the green infrastructure's comprehensive meaning, especially regarding its operationalization. The previous knowledge and familiarity with the concept of green infrastructure vary among the respondents. Some of them have encountered it in previous employments and projects. For others, the current project is the first time they work with green infrastructure. Most of the respondents with an education in biology or ecology recognizes features in green infrastructure from similar preceding concepts.

Before presenting the empirical material, I believe it is important to mention the impact O. Olsson, associate professor in conservation biology and P. A. Olsson, professor in plant ecology, from Lund University have had on the respondents' understandings of green infrastructure. When starting the green infrastructure project at the county administrative board of Skåne O. Olsson and P.A. Olsson held lectures where they emphasized that from an ecological perspective it is more important to develop large habitats of high quality, than developing landscape connectivity. Creating spreading corridors and linkages in the landscape should not be the primary objective of green infrastructure in order to meet the purpose of the project; to protect and strengthen biodiversity. Emphasis should instead be to increase the quality and size of areas with high ecological values. Several of the respondents mention these lectures as essential to their present understanding of green infrastructure. Had they not participated in the lectures they believe their interpretation of the concept would be considerably different.

What is green infrastructure?

> There are two parts of this project, the first is to collect information and create a basis for planning, so we get something useful for planners. The other part is that we can't afford to protect all the nature necessary to reach the environmental objectives. So, we must work differently than before, and this new way is green infrastructure, where we include landowners and other stakeholders in the landscape to ensure the protection of biodiversity.
> (Lanner, forest consultant at the Swedish Forest Agency)

The above quote from Jan Lanner at the Swedish Forest Agency outlines the main features of green infrastructure as it is applied in the current project at the county administrative board of Skåne. Green infrastructure is both a planning mechanism and a new way of working with environmental protection. The main difference between the respondents is regarding which of green infrastructure's two-folded meaning they discuss. Some respondents only discuss green infrastructure as a noun, referring to a way of connecting biotopes and habitats through green linkages and structures, while other discuss it in terms of an adjective referring to it as a strategic landscape approach. The differences in understandings of green infrastructure can to some extent depend on whether the respondents belong to the project- or the work group. The respondents in the work group have had more time to engage with the concept and build a broader understanding.

> I think we who are working with green infrastructure has different pictures of what it is, and we have not really talked about it in detail yet. I'm sure Gudrun and Johan have a clear picture what it is. (Andersson, outdoorlife coordinator)

Conservation administrator Linda Gustafsson, one of the three practitioners in the workgroup, says that her understanding of green infrastructure has changed since the project started in October 2016. She believes that SEPA's definition of green infrastructure as ecological functional networks characterized the work in the

beginning leads to a too narrow focus on connecting habitats. Gustafsson says, “it's easy to think about trails on the ground, and maybe that isn’t what it's supposed to be, I think that it's more landscape ecology, to think about the whole landscape”. Gudrun Berlin, also a conservation administrator and part of the work group, describes green infrastructure as “a functional landscape for ecosystem services and biodiversity”. To Berlin the network approach is a way of understanding that everything in the landscape is interconnected. Johan Niss, the project coordinator and the third member of the work group, summarizes green infrastructure as “the nature we have, then each species has their own requirements for how nature, or green infrastructure, has to look in order to survive”.

Ragnarsson, environmental strategist, discusses green infrastructure as an adjective and believes that green infrastructure can be misguiding, giving too strong associations to green linkages and corridors in the landscape. She is concerned that SEPA has been overly enthusiastic, trying to fit to many things into the concept. From her understanding she believes that green infrastructure is a conceptual framework of how the SEPA wants the county administrative boards to work with environmental protection. Outdoor life coordinator Andersson, suggests green infrastructure as a way of bringing attention to soft values in landscape management. What those soft values are she believes is difficult to define, and says “it is a little to fuzzy topic to understand how we are supposed to work with it” (Andersson).

Johansson is the head of the department of environmental affairs and she describes green infrastructure as “the green fingers in the landscape” with the purpose to preserve biodiversity. Her approach is supported by Lanner who defines green infrastructure as a way of ensuring the presence of decent habitats to preserve biodiversity. Also, Rosqvist, conservation administrator, associates green infrastructure to the county’s responsibility to ensure the survival of endangered species in the landscape. She further emphasizes that the work with green infrastructure must be dynamic, “green infrastructure must be a living concept to secure species protection, it shouldn’t become a dead hand in the landscape” (Rosqvist). Åhrén, director of the nature protection unit, combines the noun and the adjective green infrastructure in his explanation of the concept. He says that it is a way of connecting areas with of high ecological value to enable species movement in the landscape. However, he argues that this can only be done if landowners are engaged because the county cannot buy and protect all land important to biodiversity.

Most respondents working as conservation administrators at the county administrative board experience difficulties communicating ecological values in the landscape to people outside their own profession. There is a general belief among the respondents that green infrastructure has developed as a concept attempting to repackage environmental protection work to give it a higher status and to gain interest from a wider public. According to several of the respondents the anthropocentric approach in green infrastructure is necessary to give environmental protection higher status on the planning agenda at both regional, national and international level, “It’s about packaging and presenting conservation in a way that more people become engaged” (Ragnarsson). Because green infrastructure place humans in the center of environmental protection Johansson believes it is an advantageous concept, “humankind is the most egocentric mammal on earth, and we don’t do anything unless it benefits us as a species” (Johansson). The inclusion of a human perspective is what distinguishes green infrastructure from other environmental protection according to the director of the nature conservation unit, P. E. Jönsson. Ragnarsson believes that green infrastructure can be a way to reach other actors than the ones traditionally engaged in environmental protection. Green infrastructure provides a common framework for communicating environmental protection work,

> I think green infrastructure is as much an important process in society as it is a process for the green side in the governmental world to get an explanatory concept, a standard explaining and describing the ecological values that exist. If that knowledge stays in the corridors at the county administrative board, in a house in Malmö, it does not serve any purpose. Then it will result in one nature reserve here, and one nature reserve there, but green infrastructure is about how we ensure the protection of areas between these protected sights. Nature conservation needs to go out among people, not into the bushes looking for species, there we have been for several years, but out to the people!
> (Johansson, head of department of environmental affairs)

All respondents were asked whether they believe green infrastructure is something already existing in the landscape, or if it something man-made. The interpretations of the question differed between the respondents, but most agreed that it is something existing, yet it must be recreated or strengthened due to the fragmentation and continuous exploitation of the landscape. P. A. Olsson said that "green infrastructure exists in the landscape, it is created by organisms' thinking", Eriksson, conservation administrator, answered that "it already exists in the landscape, all we do is to point out where it is". Niss noted that the term green infrastructure is something that man has created, "it is an attempt to define something existing making it comprehensible to us". But since humans have such a major impact on the landscape, he asserts that one can say that it is man-made. None of the respondents could give a clear answer to what distinguishes their green infrastructure project from the commonly used concept green structures in municipalities.

Strategic landscape approach to conservation

> It's about engaging actors, working cross municipality borders, working with both value cores, value territories and the landscape in-between, not only manage singular objects, but to understand how they are connected at a landscape level.
> (Ragnarsson, environmental strategist)

In all the interviews the most frequent description of green infrastructure is that it is a landscape approach to environmental protection. The landscape approach is also what most respondents mention as green infrastructure's main contribution in environmental protection. The purpose of the landscape approach is according to the respondents to strategically direct measures and actions to places where they have the most environmental, and as some mentioned economic benefit. Green infrastructure can be used as way to distribute and prioritize environmental subsidies strategically in the landscape to make it more efficient. The respondents believe that it is a strength that the project is run by the county administrative board who can adopt a regional perspective. Several of the respondents mention that one of the purposes of the project is to create a plan supporting the prioritization of efforts undertaken by both the county administrative board, municipalities and landowners. O. Olsson hopes that green infrastructure can become a way to distribute the Swedish Board of Agriculture's rural development measures more strategically from a conservation perspective, "after all, if we expect agricultural support as nature conservation measures, we get a staggering budget compared to all other conservation measures" (O. Olsson).

> It is also an economic issue, we don't want to waste resources, especially when we don't have that much to begin with. […] Today everyone has the right to financial support, but in the future areas important to green infrastructure might be entitled a larger share
> (Gustafsson, conservation administrator)

Other characteristics of green infrastructure, such as the idea of connectivity and functionality most respondents do not consider as new features in environmental protection. It is also generally recognized among the respondents that the project's purpose is not to produce new information, but rather to integrate ongoing efforts at the county.

> It should help prioritizing what efforts should be made where in the landscape. We need to become more efficient with our measures in the landscape, whether it is about voluntary initiatives, or governmental money. (Niss, project coordinator)

Another aspect of the holistic landscape perspective promoted in green infrastructure is the attempt to include the trivial landscape[3] in conservation policy. Rather than focusing only on value cores, single species or already protected areas, the aim is to find ways to include the landscape in-between areas of high ecological value in policy. According to the respondents, the legislation is not adapted to include the trivial landscape, the county administrative board cannot legally protect land that does not qualify ecologically. The interviewed conservation administrators hope that green infrastructure can be away to acknowledge the landscape in-between value cores and value territories as important for supporting and protecting biodiversity. Apart from not having the juridical possibility to protect all land necessary to protect biodiversity the respondents also remark that it is impossible from an economical perspective. Green infrastructure must thus facilitate other ways of managing ecologically important land. The trivial landscape is important, both because it is the habitat of many presently common species which are at the risk of becoming endangered in the future if their habitats are not more carefully managed. And it is important because the trivial landscape support value cores and give them the potential to expand spatially.

> You cannot work with small individual reserves and think that you'll reach the environmental objectives. One must see how different parts are connected, both reserves and the landscape in between them to cope with biodiversity. And I think the landscape in between has a lot to give.
> (Andersson, outdoorlife coordinator)

Gustafsson believes that a green infrastructure approach is a natural step in the development of Swedish conservation policy.

> In the beginning of the 20th century, fascinating objects called natural memories were protected, it could be a huge oak or stone. Then the understanding that we need areas to protect species and habitats developed, and focus shifted towards national parks and nature reserves. But they are also isolated objects, it is a core of something very valuable that you protect and manage. Green infrastructure is a way to see these objects in their ecological context and how they are connected, and where links are missing.
> (Gustafsson, conservation administrator)

Green infrastructure is perceived to accommodate the whole landscape in environmental protection policy. If green infrastructure can successfully contribute to increase the understanding that different areas are connected, and cease the perception of ecologically rich areas as separate entities, the respondents believe green infrastructure to be an advantageous approach for conservationists.

Multiple actors and public participation

As a part of the new landscape perspective promoted in the project, several respondents mention that all actors in the landscape must be engaged an encouraged to contribute to a functional green infrastructure for preserving biodiversity. Because the mandate states that one purpose is to involve the trivial landscape in conservation practice, landowners become central stakeholders. All respondents emphasize the level of engagement from land owners as vital to the project's success. Since it is not possible for the county administrative board to legally protect all land necessary to create a functional landscape for biodiversity, the respondents want to engage landowners in ecological sustainable land management. Reading the guidelines from SEPA the project

[3] Translated from the Swedish term" vardagslandskapet".

coordinator Niss considers the collaboration and communication with private landowners, NGO's and municipalities as much the purpose of the mandate as delivering data about green infrastructure.

> The guidelines [from SEPA] emphasize cooperation, green infrastructure is supposed to be discussed with landowners and municipalities, it's not just the county that decides what green infrastructure is, and that's how we're going to do it, instead it should be developed in close cooperation with stakeholders. (Niss, project coordinator)

Several of the respondents mentioned forestry as an example where a green infrastructure approach can improve the work. Forest owners in Sweden are supposed to voluntarily set aside a percentage of their cultivation forest important to biodiversity, cultural heritage or outdoor life. In Skåne there are many small-scale owners and a landscape approach through green infrastructure could be a method to strategically place these voluntary reserves adjacent and thus create larger continuous areas.

Green infrastructure is furthermore argued to be a way of making landowners collaborate cross property boundaries and recognize that they are a part of a bigger landscape. Respondents believe that if the project manage to involve landowners it will create a more sustainable landscape management lasting over time and hence get a greater impact. It is believed that if landowners can participate in the design of the action plan and the measures recommended, their willingness to implement it will be greater than if the county administrative board from a top-down perspective would order the landowners to take measures.

County antiquarian Roos thinks green infrastructure is a communicative concept because it aims at conceptualizing landscape relationships rather than discrete objects. When people are out experience nature, they do not face nature conservation or cultural heritage objects, but a complex reality. To appeal to the public interest, she believes that all the complex components and relationships of nature's reality must be included in the conceptualization.

Engaging public participation is both difficult and time consuming. Originally the plan was supposed to be finished in October 2017, in the beginning of 2017 the project was extended by an additional year. Andersson thinks it is important that the county administrative board does not rush the development of the action plans. She and other respondents think the limited time given to the project can pose a problem towards building successful public interest. Many of the respondents believe that the original timeframe has had a negative impact on the ambitions to involve the public in the project. Had the county administrative board known from the beginning that they would have two years to spend, the project had probably been designed differently.

When asked who the recipients of the green infrastructure action plan are, all respondents answered the county administrative board, municipalities and landowners. Landowners and municipalities are emphasized as the most important actor when operationalizing the action plan.

> The municipalities are important because of the plan monopoly, if they can take more consideration of green infrastructure in their planning it would mean a lot. They can really destroy nature of they want to exploit land, and then it is gone forever.
> (Gustafsson, conservation administrator)

Even though the respondents mentioned the same actors as important, they did not share the same belief in whether the actors will be able to make use of the action plan. As the guidelines from SEPA are presently phrased some respondent do not believe the finished plan will be implemented by municipal planners. Practitioners working with conservation and environmental issues will perhaps use the plan, but they do not believe it will

influence the comprehensive planning process. Instead they argue that physical planners need a different material, with a clearer legal status and defined boundaries.

The uncertainty regarding green infrastructure's legal status concern several of the respondents. Whether green infrastructure get the status of national interest or regional recommendation Berlin believes it will affect the level of engagement from both the landowners and practitioners at the county. P. E Jönsson thinks it would be appropriate to incorporate green infrastructure in the general legislation (i.e. biotope- and shoreland protection). The respondents believe that if the green infrastructure is going to have any affect in the landscape, the legal status need to be clarified.

Because green infrastructure as a term is new in Sweden the county architect Weber believes it is difficult to incorporate it in the existing legislation. She agrees with P.E Jönsson and other respondents that it would be beneficial to include green infrastructure in Planning and Building Act (PBL). Green infrastructure has developed outside Swedish jurisdiction, and she misses an explanation of how green infrastructure can be included in the present juridical terminology.

> When we got the mandate I immediately saw the problems related to the municipalities and physical planning. At a number of occasions, I have said to SEPA that if we want a fast change in the landscape, we have to look at the legislation. […] I think legislation is required, and it might be necessary to make changes in PBL to make sure that this become a part of the municipal planning. That it's not only about buildings and grey infrastructure, but also include the green. (P.E. Jönsson, director of nature conservation unit)

Focus on biodiversity

According to the mandate from SEPA an equal focus should be put on biodiversity and ecosystem services in the project. Based the observations and interviews it is evident that the main focus in Skåne is protecting and strengthening biodiversity. According to most respondents, this is because the information about how to define, map and value ecosystem services is scarce, while biodiversity is an established practice at the county administrative board. The county has a lot of material supporting a project focused on biodiversity. A focus on ecosystem services would require new material, and be too resource intensive for the extent of this project.

Some of the respondents hesitate to comment on the ecosystem service objective because they are uncertain of what ecosystem services *really* are. For those respondents who are comfortable talking about ecosystem services, most do not see the prioritization of biodiversity as a neglect of ecosystem services. For them the preservation of biodiversity is fundamental to create and strengthen the green infrastructure, which then create conditions for functional ecosystem services. "Green infrastructure is fundamental to produce ecosystem services. Good ecosystem services require green infrastructure" (Ragnarsson).

Johansson consider the regional green infrastructure action plan as a continuation of the conservation strategy for Skåne from 2015. In the strategy hotspots and value cores with high biodiversity were identified. Not surprisingly these are located in rural, more unexploited parts of the county. Several of the people working with the conservation strategy now have a leading role in the green infrastructure project. The project thus has a stronger focus on green infrastructure in rural landscape than on the urban understanding of green infrastructure. Gustafsson believes the rural focus in the project also has its explanation in the division of responsibility between municipalities and the county. She says that the county traditionally has a more active role in the management of rural landscapes, while the municipalities are more responsible for urban areas.

P.E Jönsson believes the chosen focus on rural areas is strategic since it reduces the potential risk of conflicting interests with municipalities. Johansson interpret the rural focus as a way to establish a new concept. The action plan cannot cover all land and water in Skåne, and to avoid conflict and create positive public interest she believes the chosen focus is strategic. Locating the project mainly in rural areas with acknowledged high ecological values and fewer competing land use interests than in urban areas increases the possibilities for a successful implementation. However, Johansson do not think that the rural focus is green infrastructure's original objective. After the interview, she says that she must discuss further with the project group and try to encourage a wider perspective, because as she says "the major challenge, and the most urgent is the green infrastructure in urban landscapes" (Johansson).

Niss and Lanner believes that the focus of the project is depending on the people involved. Lanner who is also engaged in other counties green infrastructure project thinks it is interesting how differently the counties has interpreted the mandate.

> It's nothing conspiratorial, those who get the assignment have been working with environmental protection and conservation for a long time. Adding that you've just finished the work with the conservation strategy which you consider successful, of course you continue working in the same direction. (Lanner, forest consultant)

Green *and* infrastructure

> It's not certain that neither green nor infrastructure are the words that I would use to accomplish what I believe we want to accomplish in this project.
> (Weber, county architect)

Most respondents believe that the combination of green and infrastructure give associations that not fully recognizes the concept's comprehensive meaning. GIS-engineer Nilsson says, "you link green to green things, and infrastructure you connect with road networks and so on, but if the concept is explained and you reflect on it, it is a constructive concept". He directs attention towards two of the main difficulties associated to using the words green and infrastructure. Firstly, the words green and infrastructure create intuitive associations to most people. Secondly these associations might not reflect the concept's meaning. Roos considers it an advantage of the concept that it has an intuitive understanding, it makes it easy to grasp and therefore to discuss. However, she believes that it is important that the associated image is a correct representation of the concept's meaning. She says that if the concept creates a misguided image, it will be difficult to communicate the comprehensive meaning of the concept. To understand the comprehensive meaning of green infrastructure the concepts must, as Nilsson said, be explained and reflected on.

Water strategist Persson thinks that green and infrastructure represents two contradictions. Infrastructure he believes is associated with exploitation, and green to ecological values. He says that people working with green questions are traditionally against the development of infrastructure, commonly understood as road networks. The purpose of introducing the concept he believes derives from a will to make planners working with traditional grey infrastructure involve more green and soft values in the planning process. Lanner believes that the traditional associations to grey infrastructure s positive since "people understand, in part, what it's about". However, he continues, "but it may not be all about what you think it's about, and then it's not that good". Furthermore, he believes that infrastructure is a too technical term, "it's too much plumbing and construction work over the whole thing" (Lanner). Eriksson has a similar opinion, "I feel that it is something that man has created, infrastructure is asphalt and iron, it has nothing to do with nature".

Johansson, Weber and Andersson think infrastructure is a useful term when discussing environmental issues with planners, the public and other practitioners who do not have knowledge about the ecological relations between habitats and species. Green infrastructure is then a beneficial and pedagogical tool for communicating that nature also need an infrastructure, equal to the grey infrastructure central in physical planning. Andersson and other respondents believe that the associations to road network also is beneficial from a landowner perspective. Even if you as a landowner only own a small segment of a road, your segment is important for the functionality of the entire network. Equally the green infrastructure can bring awareness that the environmental measures taken on your land contributes to building a functional landscape for preserving biodiversity at a larger scale.

> You can put it on a map and show that here, we need a road for species, and here we need a road for cars, here we have our neighborhoods, and here we have concentrations of biodiversity, and we need to develop connection between them. And that perhaps it becomes clearer to landowners and municipalities in their plans that we need to plan connections to benefit biodiversity, not building barriers.
> (Rosqvist, conservation administrator)

Even if infrastructure is a pedagogical and communicative word all respondents express some critique towards the adoption of it. They believe it gives a one-sided view that green infrastructure is only about building green linkages and the opportunities for species to spread in the landscape.

> Infrastructure, then you think that it's about connectivity, and that it should be a road network. But maybe it's not the network, but areas we're talking about, but focus becomes that we are going to connect this and connect that, what is important is to create a functional landscape, not just a network. (Berlin, conservation administrator)

According to O. Olsson green infrastructure developed from the metapopulation concept in ecology and epidemiology. He believes the concept green infrastructure ignores that the fundamental requirement for species development is spacious habitats. Gustafsson believes it would be better to not have a word that is as associated to an existing phenomenon as infrastructure. She believes it is hard for people who have not read the guidelines from SEPA to understand the wider meaning of green infrastructure.

> Infrastructure directs the thought too much towards connectivity, which is needed in some cases but not in all. Instead it's about having enough large areas, that don't need to be physically connected. It's a bit tricky to communicate since green infrastructure keep directing the mind towards the physical connectivity. The purpose is to preserve biodiversity, and then it is significantly more important to get enough large areas and create good habitats than linking them together, and it is difficult to communicate this using green infrastructure. (Niss, 2017)

Most respondents believe that green in the concept is commonly associated to nature and that which is perceived as *natural*. Lanner mentions the potential risk of associating green to green enterprises and green infrastructure to ecologically sustainable transportation systems. He is concerned that green infrastructure is a corruptible concept and may be appropriated to greenwash activities from both public and private actors.

> I think green is a wide concept, I think of nature. In nature, you capture several aspects, both biodiversity, water, recreation and outdoor life. Social values, public interests and cultural heritage are also included in the green. That's what I'm thinking of when I hear the word green, that it's the whole landscape.
> (Andersson, outdoorlife coordinator)

The main critique towards the term green in green infrastructure is the ignorance of hydrology and water elements. Even if blue structures are included in the project, the general impression is that the terminology in green infrastructure gives priority to terrestrial features. In other projects at the county administrative board water elements are sometimes referred to as blue infrastructure. In the present project, hydrological features

are included in the green and this bothers the respondents working with water related issues at the county administrative board,

> I don't like the term green infrastructure, because then you think it's just about terrestrial values and people don't understand that it's also about water, and since I work with water I get angry when you only talk about the green infrastructure.
> (Eriksson, conservation administrator)

Weber believe there is a risk using the word green, without the appropriate understanding of ecology is a lawn is perceived as green, even though it might be poor in species and does not contribute to the development of biodiversity.

Conceptual challenges

The most common conceptual critique from the respondents directed towards green infrastructure is the inherent simplification of environmental relationships. At the meeting about biodiversity on grasslands (2017-01-24) practitioners from other county administrative boards in southern Sweden participated and expressed concerns towards the simplification of ecology within green infrastructure. It was argued that infrastructure focuses too much on corridors and roadsides, missing the fundamental aspect of biodiversity, the habitat area. Most species are limited by their lack of space, not their ability to spread, "you must have someplace that species migrate from, and someplace they migrate to" (Rosqvist). There is a difference between the image conveyed by the concept green infrastructure, and what the practitioners believe as actually needed in conservation policy. The respondents believe that green infrastructure promotes something other than ecosystem functionality. Several of the practitioners with an education in biology, ecology or similar subjects expressed concerns about the problems that arise when complex ecological relations are simplified to fit a policy concept. Roos summarized this problem well when she said, "I may be ignorant enough to think it is a good concept". Because she is not a conservation manager, she does not perceive the ecological problems of simplification in the concept. Eriksson expresses a strong skepticism towards what she calls artificial concepts. To her there is a danger in embracing such concepts and apply them in conservation practice, it will impact how we perceive and value nature in a negative way.

Persson believes that concepts like green infrastructure and ecosystem services has developed in the intersection between natural and social sciences. In the concepts, complex ecological relations are simplified in favor of communicating. The simplifications are contra productive according to Persson, because they lead to an undefined terminology which can be interpreted in different ways. Instead of facilitating communication and interdisciplinary collaboration, simplification creates more of the communication problems they aimed at bridging in the first place.

Ragnarsson together with other respondents believe it to be a problem that the definition of green infrastructure has not been more discussed at the county administrative board. Through working with the project, she has shaped her own understandings and interpretations of the concept. Niss believes it has been hard to communicate both the purpose and the definition of the project within the organization because the discussions stay at connectivity. Niss also experiences difficulties communicating what green infrastructure is to the public in meetings with landowners and municipalities. He believes that the comprehensive meaning of green infrastructure is slipping because "we all have different starting points" (Niss).

The intuitive understanding of green infrastructure is experienced as both advantageous and problematic by the respondents. Advantageous because the concept allows a discussion around green infrastructure and its issues

without demanding a clear definition. The concept creates a “superficial consensus”, as expressed by Roos. It is problematic since if you get a general understanding of a concept, Roos reckon there is a tendency among both practitioner and public to not seek further knowledge about its comprehensive meaning. As the project coordinator Niss considers the superficial consensus and general understanding as a potential strength in the initial stages of the project because it facilitates progress in discussions. However, in later stages he is concerned that it will become an impediment when turning abstract ideas into operationalizable actions in the landscape. This problem realized in a meeting about sandy grasslands (2017-03-17). The purpose of the meeting was to discuss which GIS analyses to perform in the chosen focus areas for the action plan. In the discussions between Niss, Berlin and Rosqvist a confusion arose. They needed to make a list of species linked to different habitat types as classified by Swedish Species Information Center. In the discussions, it appeared that they had not thought of the same habitat types. Niss thought they wanted to select species linked to sandy grasslands, but according to the Swedish Species Information Center’s classification system, you have to choose either dry grasslands or sandy soils. Apart from the land classification issue, the selection of species connected to grasslands leads to several other difficulties in the proposed GIS analyses. Berlin and Rosqvist have previously worked together when developing a conservation strategy for Skåne, and there experienced the problems connected to selecting species based on habitat types. Niss had not understood the existence of such difficulties, and was bewildered that it had taken him such a long time to understand the difficulties of including grasslands in the analyses “we have been sitting in twenty meetings, and I have said grasslands, and you [Berlin] have said sandy soils” (Niss).

O. Olsson believes that green infrastructure is a pedagogical concept to communicate conservation policy. However, he does not believe that it is a functional for conceptualize ecological relationships. This critique that green infrastructure is a singular concept that creates the notion that one infrastructure can be constructed to preserve biodiversity is repeated by the respondents. Several of the conservation managers highlight that different organisms linked to different habitats and landscapes need different types of infrastructure, “I worry that this is an attempt to find a one size fits all solution, and I don’t think such solution exists” (O. Olsson). The risk of invasive species is also mentioned by several of the practitioners with education in biology and ecology.

O. Olsson believes the major risk for conservation practice when engaging with green infrastructure is that the movements of species in the landscape become the primary focus. According to him, current research show that the size and quality of habitats is significantly more important to biodiversity than migration opportunities. If environmental protection work embraces the promoted focus on connectivity by green infrastructure he sees great risks that the work will be contra productive to its original purpose. Both Gustafsson and O. Olsson remark that the guidelines from SEPA about green infrastructure with the emphasize on a landscape approach are adequate from an ecological perspective.

Green infrastructure is perceived by several of the respondents as a policy buzzword difficult to interpret. O. Olsson thinks that green infrastructure has similarities with concepts as sustainable development, they are strong policy concepts which you can assign different meanings depending on your purpose. Both Persson and Eriksson believe that it is problematic with the continual introduction of new words conceptualizing more or less the same issues (i.e. green infrastructure, ecosystem services, nature based solutions, ecological network, green structures etc.) since a lot of work is spent on rephrasing and repackaging the same material to fit the new concept. It takes valuable time and resources away from the work to further develop and deepen the knowledge about the concerned issues.

Persson believes it is a risk that green infrastructure is a two-dimensional concept. Green infrastructure is perceived as linear objects on map connecting areas with high ecological values. He regards the three-dimensional thinking to be especially important when working with water issues.

> If you want to have this green infrastructure then you must think more three-dimensional, than two-dimensional lines on a map, think about which are the organisms and biotopes we want to benefit and improve the conditions for? What values do we want to preserve in the landscape? (Persson, water strategist)

Institutional challenges

Before the respondents where asked any questions concerning institutional challenges in the project, most of them brought up the issue themselves. Several of the respondents experienced a frustration of being restrained by the inflexible organization structure at the county administrative board.

Niss believes that one of the major challenges in the project is to create a common understanding of green infrastructure, both among practitioners at the county administrative board and with external actors. Another difficulty according to Niss is designing an action plan useful for municipalities, landowners and the county administrative board. He says that it is hard to grasp the operationalizing and implementation of the plan. Accordingly, it becomes difficult to communicate the purpose and meaning of green infrastructure to both internal and external collaborators. Niss believes the problems of different understanding derive from the concept itself. Instead of thoroughly thinking through green infrastructure's meaning, the discussion is kept at a general level where no clear definitions are needed.

At the work group meeting 2017-03-20 Berlin, Gustafsson and Niss conclude that it is difficult to conceptually distinguish between green infrastructure and other conservation measures undertaken by the county administrative board. To make it clearer for themselves and the rest of the project group they need to formulate regional objectives for the action plan. When the work is moving into deciding which actions to take in the project, Niss says that it has become evident that different actors and practitioners have carried different images of what the work is about. "You have different ways of describing reality if you are a conservation manager or administrate agricultural issues" (Niss). Andersson believes that you must think different on green infrastructure if it is applied to forests, open land or water. And depending on what you work with you have different ideas of what green infrastructure is and thus it is difficult to understand each other until you have more tangible examples. Most of the respondents in the project group lack examples illustrating the project's purpose.

It is not only the project in Skåne that experiences difficulties defining the purpose and meaning of green infrastructure. To aid the county administrative boards SEPA published a document explaining and defining the terms used when working with green infrastructure (Naturvårdsverket, 2017). While the guidelines from 2015 (Naturvårdsverket, 2015) are too unspecified and difficult to interpret, Niss believes that the recent document instead trivializes the project. He is missing something in-between the guidelines and the simplified explanations. Then he concludes that this maybe is where the action plan fit. Because green infrastructure is a new concept in Swedish conservation policy several respondents bring up the notion that the action plan itself is an attempt to define what green infrastructure means in a Swedish context.

Berlin believes that there are some organizational difficulties for implementing green infrastructure at the county administrative board. The practitioners working with water has no assigned, or too little assigned time to put into the project. Partly because their workload is to heavy already, but also because it is not a prioritized project

from the management. Gustafsson and Berlin both think it is problematic that department managers give priority to case management[4] over green infrastructure. Berlin believes this is because case management is calculable, while working with green infrastructure is more abstract and long term project. Weber also believes that practitioners working at the county administrative board are restricted by the organization built around case management. Roos suggests that the organizational and legal structure at the county administrative board pose a challenge to implement the transdisciplinary objective of green infrastructure. She says that even if the different administrators are aware of the need and advantages of working over department boundaries, the structure of the organization is not adapted to it.

Due to lack of time has the representative from the department of rural affairs not been very active in the project. Several of the respondents experience this as a major challenge for a successful implementation of green infrastructure. Niss says that it has been easier to engage the Swedish Forest Agency than the rural department in the project. He believes this is because the project started within the department of environmental affairs. The problems where framed from a conservationist perspective, and the objectives of the project developed from those problems. Niss says that they tried to have an active discussion with the other departments, but since the project money is assigned to conservation it became their project. The rural department has projects of their own with a clearer connection to agricultural development. Further has there not been any official requirement from the Swedish Agricultural Agency to the rural departments to contribute to the green infrastructure project. He believes that if the planning unit and the rural department had someone working at least half time in the project the project would probably have a different focus.

Gustafsson experiences a skepticism towards the concept green infrastructure within the county administrative board. She believes it is difficult for practitioners to establish a new strategic landscape approach in their everyday work. The conservation administrators already have a lot to consider in their work, including another aspect in the decision-making can be arduous, “then it is easy to keep going in old tracks, you take the easy option and do as you always have” (Gustafsson). Despite the difficulties to establish a green infrastructure approach cross the department boundaries, Berlin and Gustafsson highlight that a lot of the ongoing work at the county administrative board can already be characterized as green infrastructure. Berlin and Gustafsson have similar experiences of encountering projects that clearly passes as green infrastructure projects, but the practitioners involved have not considered the possibility. Hence Gustafsson believes it is the project group’s responsibility to inform other practitioners about green infrastructure and its possibilities. P.E. Jönsson believe that the main organizational challenge for the project is,

> That we do a landscape planning that we don’t have the authority to do. In Swedish law the physical planning is regulated in PBL and the municipalities have monopoly on planning, thus it can become tricky regarding both municipalities and individual landowners if the county board draws green lines on a map. This is the difficulty, to explain that it doesn’t mean anything in practice, but it is rather a vision of how we want habitats to connect in the landscape. (P.E Jönsson, head of nature conservation unit)

Weber has express a similar concern as P.E Jönsson, during the meetings with the steering committee she has experienced that green infrastructure discussion has two different dimensions, one planning and one administrative dimension. Depending on which dimension they discuss different legislation applies. Weber believes there is a confusion around in which dimension to place the current project, and says “if you talk about the two different dimensions at the same time, no one understands what you’re really mean”. Weber thinks

[4] Translated from Swedish, ärendehantering

there is a pressing need to discuss and clarify in which of the two dimensions the projects has its purpose. She also questions whether it is appropriate to call it *green infrastructure action plan* if the purpose is to support municipal planning processes. She believes the name might be intimidating to municipal planners who already have plenty of directions, laws and guidelines to consider in their work.

The level of communication with the other counties regarding the project varies among the respondents. Some have had no contact with their colleagues in other counties, while others experience this project as the one with most communication with other counties as they have participated in. The communication with other counties is experienced both as time consuming and a hindrance of fast progress, and beneficial because one can take advantage of competences and resources from other counties.

Will it last?

All respondents were asked if they believe the term green infrastructure will last in Swedish environmental policy. Some respondents believe that because the concept is used internationally and in the European Union it will last, regardless if it is successful or not. Most respondents believe however that because the name green infrastructure has many associated difficulties it will change as the concept develops. Because green infrastructure is a current buzzword in environmental policy the respondents believe that different actors want to use it, thus the concept will be infused with contradictory meanings.

Berlin believes that even if the green infrastructure is replaced with other words, the landscape perspective will remain and that is what she regards as important. Niss hopes that green infrastructure will be replaced by a more useful and less obscure term. Because green infrastructure has the possibility to host contradictory perspectives in one concept Rosqvist (2017) believes there is a probability that the word will be replaced. The present focus on biodiversity will probably be challenged by other meanings and perspectives and the respondents believe the conflicting interests will create the need of a new concept adequately capturing the work to protect biodiversity.

If green infrastructure is going to get a foothold in physical planning Johansson stresses the need of clarifying its legal status. She believes green infrastructure must become an incorporated part of the municipalities' comprehensive planning. Otherwise she sees the risk of it disappearing, "it may become colorful plans and maps hidden away on a dusty bookshelf somewhere" (Johansson).

7. Analysis

By analyzing the empirical findings based on the theoretical and methodological framework this chapter investigates the research questions, the first section addresses question 1 – 3, exploring the advantages and disadvantages of working with green infrastructure and potential conceptual conflicts. The second section targets the study's general objective and attempts to outline how green infrastructure, as it is applied by the county administrative board of Skåne and SEPA can be understood as a part of a modernization process of Swedish environmental protection policy.

Green infrastructure – a contested concept

The main finding from the interviews with the project participants is the confusion whether green infrastructure should be understood as a noun, referring to a network of habitats in the landscape, or as an adjective, describing a strategic approach to environmental protection. The respondents have not distinguished between green infrastructure's different applications, not when discussing with me, or between each other. The confusion makes it difficult to communicate clearly about its conceptual meaning, leading to a frustration towards the project. If there is no clear definition the respondents believe there is a risk that actors will assign green infrastructure different meanings appropriate to their individual purposes. This they fear will create communication difficulties and hinder efficient protection of biodiversity.

The conceptual disorientation is not as apparent among practitioners in the work group, probably because they are the most active in the development of the action plan. However, when the work group discusses with both the project group and the steering committee there is a continuous movement between the two different understandings of green infrastructure. At one point, green infrastructure is discussed in terms of a physical landscape object which can be planned and managed to preserve and support ecological functions. In the next sentence, green infrastructure is discussed as a way of applying a strategic landscape approach to environmental protection work. The continuously changing meaning of green infrastructure, and thus the purpose of the mandate itself makes it difficult for other participants to understand how they can contribute with their knowledge to the projects further development.

The advantages and disadvantages of working with green infrastructure expressed by the respondents are determined by whether the respondent understand the concept as mainly a noun or adjective. The main experienced disadvantage is the simplification of complex ecological relations and processes in the landscape. Simultaneously is the simplified understanding of ecology perceived as a pedagogical and communicative strength to reach people outside traditional environmental sectors. The threshold to discuss complex and urgent issues necessary protect and strengthen biodiversity is lowered.

Although the respondents experience green infrastructure as a complicated and ambiguous concept they have a similar first level understanding of green infrastructure. From the interviews the following set of core ideas are identified as essential to green infrastructure;

- The purpose of green infrastructure is to protect and strengthen biodiversity.
- Working with green infrastructure entails a strategic landscape perspective to the planning of conservation measures, demanding the inclusion of the trivial landscape into environmental and conservation policy.

- It is necessary to involve actors from outside the county administrative board, especially private landowners and land use organizations when working with green infrastructure.
- Working with green infrastructure require interdisciplinary cooperation across department- and sector boundaries at the county administrative board and elsewhere.

The core ideas resemble the three aspects SEPA emphasis as significant to green infrastructure work in the report from 2013. Firstly, is the holistic landscape perspective, secondly is the prerequisite to work across traditional department- and sector boundaries, and finally is the need to strengthen the collaboration with public actors (Naturvårdsverket, 2013). The central idea of the need to include the trivial landscape for supporting ecologically valuable areas is coherent with Mell's (2010) findings when studying different international definitions of green infrastructure.

As Jacobs (1999) writes can all practitioners agree to the core ideas characterizing a concept's first level of meaning. The contestation and conceptual conflicts occurs in the second level of meaning. In the project in Skåne it is not so much of a conflict as it is a confusion regarding green infrastructure's second level of meaning. Most contestations derive from the confusion whether green infrastructure is a noun or adjective. It seems as if the participants have kept the discussion at the first level, creating a superficial consensus, as Roos expressed it. They have not reviewed its meaning in depth and have not identified or confronted their differences. The lack of discussion regarding green infrastructure's ability to function as both noun and adjective creates confusion and divergence among the participants as to how the project's purpose is supposed to be achieved. There is a conflict regarding for whom the plan is designed, and how the recipients are supposed to operationalize it. The experience of the plan's purpose as unclear, together with the absence of a common understanding as to what green infrastructure means in practice, there is no consensus to how it is going to be put into operation. The respondents agree on the need of engaging municipalities, land owners, NGO's and other practitioners at the county administrative board. However, there are differences whether they believe the intended recipients will be able to turn the plans to practice. There is an internal critique that the practitioners designing the plan at the county administrative board does not have sufficient insight in physical planning. Hence, the plan will not correspond to the requirements necessary to make it applicable for physical planners.

When designing the plan, there is a conflict in balancing simplification of ecology and the concept's function as a tool for communication. What the respondents consider as most important of the two is determined by their understanding of the project's main purpose. The respondents who believe that the main purpose of green infrastructure is to bring awareness and engage other actors than traditional environmentalists in conservation, are more tolerant towards the need to simplify, and give priority to the concept's communicative purpose. Is habitat connectivity instead considered the main purpose, simplification of ecology become a larger concern. The conflict between green infrastructure's function as a communicative or ecological concept is realized when deciding which areas to focus on in the action plan. If the respondents consider green infrastructure as mainly a noun, they want to prioritize areas of high ecological value with large concentrations of endangered species. While the respondents who consider green infrastructure as mainly an adjective, want to locate the project to areas with conditions for successful cooperation with landowners and land use organizations. The later of course also consider the ecological values important, but maintain that green infrastructure apart from traditional conservation practice is a strongly collaborative approach.

Green infrastructure in this project is different from international implementations of green infrastructure. In an international context, green infrastructure developed to appropriately reflect social dynamics in relation to

natural conditions (Lennon et al., 2017). While at the county administrative board of Skåne this is debatable. The practitioners have diverging understandings, some discuss green infrastructure from a strictly ecological perspective, while others believe recreation and outdoor life is as central to the concept as protecting biodiversity. The conflict in the second level of meaning whether social aspects and recreation is part of green infrastructure or not influences the decisions where to focus the plan, and which measures are considered appropriate.

The conflicting interest between communication and the complexity of ecology is also present in the respondents understanding of the word infrastructure. Most respondents mention the difficulties of adopting a commonly used word as infrastructure before the question was raised in the interviews. Respondents who believe green infrastructure should primarily function as an ecological concept perceive infrastructure as a problematic term, because it simplifies the complexity of species movement and ecology. Infrastructure is experienced as an advantageous term by the respondents who believe green infrastructure is primarily a strategic approach with emphasis on communication to conservation. They believe the connective role of infrastructure can provide space for multi-actor planning, and connecting people and land users to their landscape.

Another contestation in the second level of meaning is the one between voluntary involvement and the need for legislation. The mandate promotes a collaboration with public actors and presently relies on engaging landowners to participate voluntarily. Even though this is regarded as positive and contributing to a longer sustainable management of the landscapes, most respondents believe it is necessary to make green infrastructure a legal term for successful implementation. Figure 2 on page 40 illustrates the first and second level of meaning based on the empirical findings in this study.

The findings in this study correspond with both Jacobs (1999) analysis of sustainable development and the study of green infrastructure by Lennon et al. (2017). Equal to how sustainable development facilitates interaction between different practitioners without demanding a clear definition to how it is achieved, the project at the county administrative board of Skåne is kept together by green infrastructure's vague story-lines. It is the concepts' ambiguity that makes it possible for practitioners to interact without having to confront a clear definition of the concept. However, as Lennon et al. (2017) found the story-lines start to branch when specified.

Opposite to Ahern (2007) who believes that the familiarity of the words green and infrastructure together with the intuitive understanding of the concept would lead to an acceptance of the concept, the respondents in this study believe that these features will contribute to the abandonment of the concept. Instead they agree with Mell (2010) who argues that the diversity of definitions and the concept's ambiguity discourage actors from employing the concept. As governmental employees, they must follow the mandate, but most respondent would argue for the need of a different and clearer terminology.

Wright (2011) argued that a fixed definition would restrain the development of the concept, and instead argued for the need of encourage practitioners to understand its comprehensive meaning. Based on the interviews and observation I believe that the intuitive understanding of the concept and the artificial consensus surrounding it prevent practitioners from seeking further information about its conceptual meaning. This contributes to practitioners applying the concept without being conceptually challenged or confronted it, and thus the development stagnates.

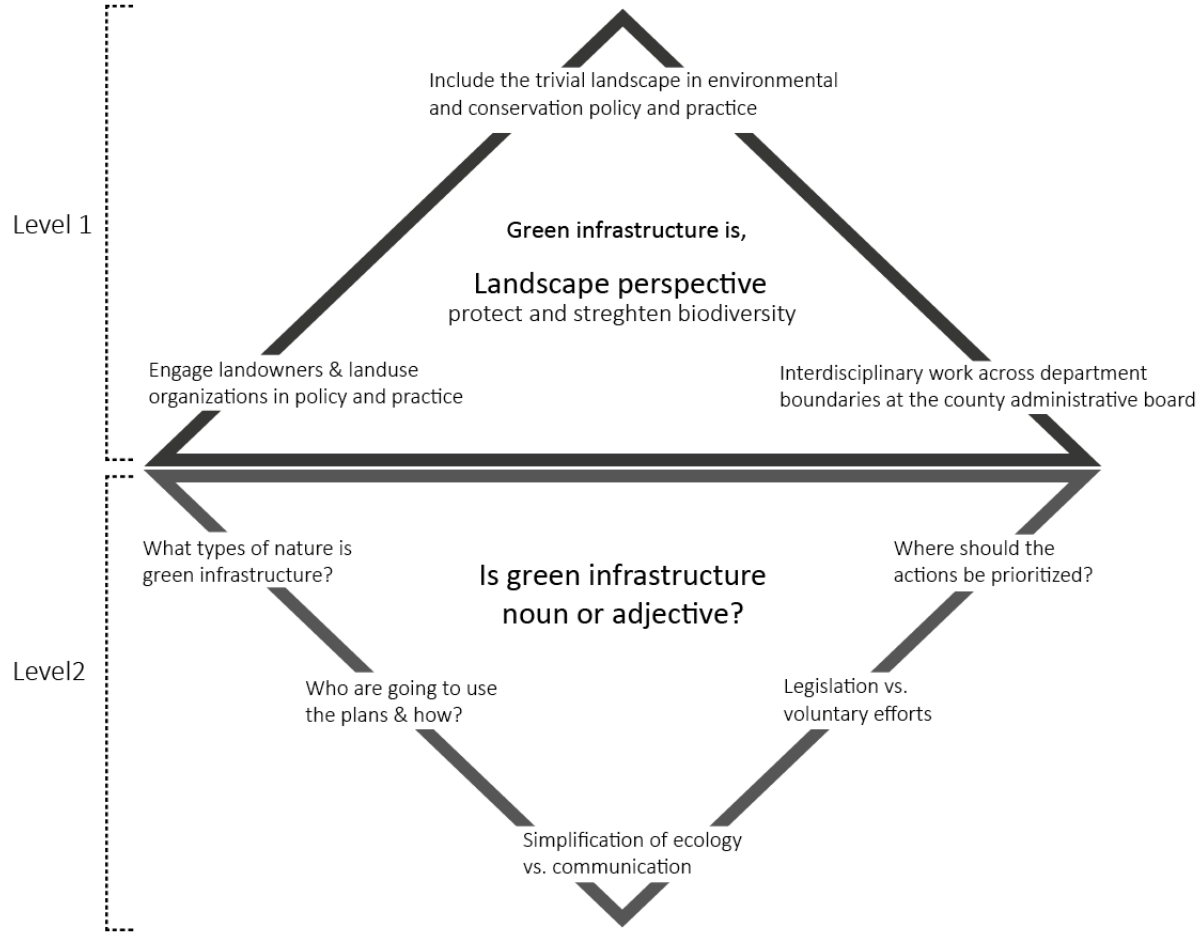

FIGURE 2 AN ILLUSTRATION SHOWING GREEN INFRASTRUCTURE'S FIRST AND SECOND LEVEL OF MEANING BASED ON THE INTERVIEWS. THE FIRST LEVEL ARE THE CORE IDEAS ALL RESPONDENTS AGREE ON. THE SECOND LEVEL IS THE CONCEPTUAL CONTESTATIONS ARISING WHEN THE CONCEPT IS SPECIFIED. LAYOUT, WÖSEL THORESEN 2017.

Mell (2010) identified multi-functionality, natural and human benefits, biodiversity, sustainability and connectivity as the main characteristics of green infrastructure. It is interesting that none of the respondents in this study brought up multifunctionality as an objective of green infrastructure. Because SEPA is supervising the work to develop regional action plans it is expected that the department of environmental affairs at the county administrative boards take responsibility for designing the plans. That SEPA is responsible for the work with green infrastructure has most likely shaped its conceptual meaning. If instead the National Board of Housing, Building and Planning would have administrated the work to develop regional action plans the focus would probably been different and the practitioners involved in the projects would have other perspectives on its purpose. Why none of the respondents brought up multifunctionality or resilience as features of green infrastructure is probably because the project has such strong focus on protecting biodiversity in rural areas. Had instead the focus been ecosystem services or more urban landscapes, both resilience and multifunctionality would most likely been frequently mentioned by the respondents.

Regarding the institutional problems of implementing green infrastructure at the county administrative board, it is not the understandings among the practitioners that hinders a successful operationalization. Rather it is the institutional and structural conditions for performing interdisciplinary work. The institutional difficulties associated with the organizational inflexibility at the county administrative board is not exclusively negative. I believe there is a purpose of the county administrative board being a tardy organization, so political policy is not

becoming too sensitive to trends. The time it will take time for green infrastructure to gain ground within the organization will also be time for it to develop into a useful and advantageous concept.

The work with green infrastructure is still in its early days at the county administrative board. As the work with green infrastructure develops from an idea to actions in the landscape a great number of second level conflicts will appear. In this study, I barely scratched the surface of the conflicts relating to the execution of green infrastructure. A final, practical example of such conflict is the decision of what types of land green infrastructure includes. Some respondents believe that it is only ecologically functional green spaces that are included in green infrastructure. While others maintain that i.e. a park with low ecological values, but which is important for recreation should be considered green infrastructure. This, together with many more conflicts will accompany the continued development of green infrastructure.

Ecological Modernization

SEPA's definition of green infrastructure contains both the anthropocentrism and technical rationale characteristic to ecological modernization. Following SEPA's definition of green infrastructure landscapes can be designed and managed in order to maintain the production of ecosystem services beneficial for society. The definition states that a *functional* network of habitats is needed to preserve biodiversity and ecosystem services. The focus on function and managing give the implementation of green infrastructure technical connotations to environmental protection work. As most of the respondent mentioned do the words green and infrastructure give technical associations, creating an image of environmental engineering for preserving biodiversity. Lennon (2015) argues that giving technical solutions to environmental problems is to de-politicise the problems. Green infrastructure function according to the governmental mandate and the many reports preceding it as a tool to reach positive ecologic, economic and social results. It is promoted as a way of performing environmental protection without restricting development. Green infrastructure is in policy a conservation practice compatible with modernization.

Within ecological modernization there is a belief that incremental change can solve environmental problems. Green infrastructure can be thought of as an incremental change in traditional conservation practice, a move from governing to governance. All reports from SEPA emphasize green infrastructure as a collaborative approach to involve public and private actors in conservation work. Engaging non-state actors in the conventional tasks of the state is a main feature in environmental governance. Green infrastructure can be understood as a part of what Thomas and Littlewood (2010) define as the new soft spaces of environmental governance, characterized by a collaborative approach. In the interviews, several respondents mentioned the need of engaging non-state actors, because it is impossible for the state to protect all land of ecological importance. This notion has its origin in the ideas of ecological modernization. Instead of the state legally protecting ecologically important land and prohibiting environmentally harmful activities, ecological modernization promotes the idea that actors should have to pay for environmentally harmful activities. With time, it will become more economically rational for actors to design their activities in an environmentally sustainable way. Similar the green infrastructure project in Sweden relies on the commitment of individual landowners. Following the logic that landowners with their exploitation of land contribute to landscape fragmentation threatening biodiversity they are the ones who should take responsibility of securing the green infrastructure, counseled by the state. The changing space of environmental protection from the hard spaces of government, to soft spaces of governance also have an economic rationale. Instead of the state legally protecting areas of land, and thus removing these from future development, green infrastructure promotes a reconciliation of environmental problems and economic

development. Green infrastructure as promoted by SEPA fits into the notion of incremental change as it meant to rationalize conservation practices, and make conservation work more cost efficient.

The simplification of ecology inherent to green infrastructure can be understood as a part of ecological modernization's reductionist approach to nature. Green infrastructure as it is promoted by the SEPA is focused on creating the conditions for ecosystems and landscapes to produce services beneficial for society. The focus on services can be understood as a part of the process of itemizing natural processes, separating them from a complex ecological system and reducing them to single services. This actualizes the arguments by Kosoy and Corbera (2010) and (Setten et al., 2012) that itemization of natural processes through the focus on the production of services are main drivers in ecological modernization policy.

The respondents express a concern that in a longer perspective there is a danger of integrating anthropocentric concepts as green infrastructure and ecosystem services into environmental protection work. When ecological modernization places human benefit at the center of environmental protection policy the purpose of conservation is no longer to protect nature in its own right. Only green spaces with observable human benefits and services become worth protection. This is perceived as problematic because it affects our relation to nature and perception of its value. It is also problematic because present knowledge about environmental relations is not complete. The respondents' understandings of a landscape are the space where nature and society interact. I believe the landscape perspective promoted in the present project in Skåne offers a way to counter the reductionist approach to nature in ecological modernization. The landscape perspective as t is expressed by the respondents in this study is relational with emphasize on interdependency. Placing the conditions for ecosystems to keep producing their services in center, instead of focusing on single services unpredicted consequences and tradeoffs can possibly be avoided.

Even if green infrastructure as a policy concept fits into the modernization process of environmental protection, while conducting the interviews I had a similar experience as Robertson (2010). He found that governmental employees became skilled at adapting the terminology of the governing ideology, while working for results potentially counter to the ideology's objective. It is my understanding that even though the concept aims at being the lubrication between conservation practices and economic development by promoting voluntary actions and arguing for the importance of species migration over habitat area, leaving land free for development. The practitioners implementing it at the county administrative board has a clear objective in protecting and strengthening biodiversity. While using the terminology of ecological modernization through concepts like green infrastructure, ecosystem services and resilient landscapes they keep doing what they always have done, protecting our common nature.

8. Conclusion

The formulation of the problem to which green infrastructure is promoted as a solution is to its nature ecological modernistic. From the perspective of ecological modernization habitat fragmentation can be solved through a conservation practice emphasizing connectivity. But habitat fragmentation depends on a vast amount of complex societal and political processes, and from both an ecological and political perspective is connectivity alone not a satisfying solution.

In this study the understandings of green infrastructure among practitioners at the county administrative board of Skåne has been mapped out. The findings show that there is a general consensus among the practitioners regarding a set of core ideas. The main purpose of green infrastructure is to strengthen and protect biodiversity through applying a strategic landscape approach to environmental protection and by involving actors from outside the county administrative board. However, all participants in this study express criticism towards adopting the terminology green infrastructure. The respondents experience that the words green and infrastructure do not properly reflect the concepts comprehensive meaning. The intuitive and potentially misleading understanding of the concept prevent practitioners to seek more information about its meaning leading to possible ecological dangers associated with the operationalization of the concept. There is a belief that because the words have strong intuitive connotations, the terminology itself is preventing a clear definition and purpose of the present project.

The conceptual challenges and contradictions arise when discussing how green infrastructure is supposed to develop from policy, into an operationalizable tool in conservation practice. The main differences between the respondents in the study is whether they understand green infrastructure as a noun (i.e. green infrastructure planning) or as an adjective (i.e. green infrastructure thinking). The contestations arising from the different understandings concern how the plans are supposed to be turned into practice, and by whom. Depending on the respondents understanding of green infrastructure they consider the simplification of ecology in the concept as a communicative strength (in green infrastructure thinking) or a weakness (in green infrastructure planning).

The perceived ambiguity of how to operationalize green infrastructure make the respondents reluctant towards further reflection on green infrastructure's comprehensive meaning. Instead they leave the interpretations to people at a higher level of governance, creating a discrepancy between green infrastructure thinking and green infrastructure planning. SEPA stated in their report from 2013 that explicit directions to authorities, both national and regional are a must for successful implementation of the action plans, if not the work is risking low priority and might not be performed. However, because the respondents experience SEPA's directions as unclear together with the uncertainty regarding green infrastructure's legal status the anticipated risk can turn into reality.

The emphasis on voluntary efforts from landowners and users, together with green infrastructure's technical connotations for conservation practices the mandate to develop regional green infrastructure action plans is a part of the ongoing process of ecological modernization of conservation policy. The green infrastructure approach has developed in an international context of combing economic development goals with conservation objectives.

The purpose of this study is not to argue for the abandonment of the concept green infrastructure, but rather to encourage a discussion about its comprehensive meaning. The ambiguity of green infrastructure in a Swedish context is not exclusively negative. Because the project to develop regional action plans is a way of introducing

the concept into Swedish national environmental policy it cannot have a rigid definition already from the beginning. As some of the respondents mentioned it is important that green infrastructure is a living and developing concept. Because of its conceptual difficulties, the development of the concept must be critically challenged, so it does not end up being an empty policy buzzword without ecological support. An obstacle to the continued development of green infrastructure is the hesitancy held by practitioners with no education in ecology or biology to comment the concept. As green infrastructure is attempting an interdisciplinary approach towards conservation it is problematic that involved practitioners do not believe that it is their concept to criticize, and thus contribute to its progression.

It is my aspiration that this study will contribute to extend the discussions surrounding green infrastructure to include the conceptual challenges associated with its operationalization. Furthermore, I hope it will lead to a critical examination of how artificial concepts influence our understanding of nature and what we perceive as available options for real change.

Suggestions for further research

Green infrastructure is a new and developing concept in Swedish policy and this study is an attempt to critically engage with the subject. Research topics related to this developing concept is numerous, following I suggest four possible topics related to the aim of this study.

This study presents empirical information on the interpretations and understandings of green infrastructure in a group of practitioners at the county administrative board of Skåne. After mapping the understandings of green infrastructure, a second step could be to investigate how green infrastructure is operationalized and implemented by practitioners. An extending research including how green infrastructure is understood by landowners and land users involved in the projects would also be of interest, since they are the main drivers of land use change by operationalizing policies in the landscape.

In their mandate SEPA emphasize the need of collaboration over department boundaries and coordination between authorities to make it successful. A study evaluating whether green infrastructure facilitates interdisciplinary collaboration in realty and not only in policy would be beneficial for the concept's further development. This study focuses on the understandings of green infrastructure at one of the 21 county administrative boards of Sweden. A comparative study investigating differences regarding both understanding and implementation between the different county administrative boards would be essential to understand how green infrastructure is developing at a national level. Because green infrastructure is a concept promoted by the European Union a study exploring how the Swedish implementation of the concept differs from the international approach would also illuminate the current green infrastructure debate.

9. Final comment

The empirical data in this study show that green infrastructure provides a common terminology and space, giving the impression of a shared landscape where equal actors engage. A landscape can be described as the summarized whole of singular elements, equal to how an ecosystem is the integrated system of individual species, natural elements and processes. It is however not possible to create a conceptual image of everything; the landscape perspective is a selected view. What is visible in the landscape is determined by what we believe is possible to see. What we believe is possible to see is in turn determined by power relations behind the decisions where to look, and what to see. When green infrastructure leaves the county administrative board's corridors, and step out into the landscape involving landowners and municipalities it is not going to be a discussion between equal actors. Different interests and understandings of green infrastructure's second level of meaning will collide, then one of the main tasks for the county administrative board will be to facilitate a discussion where not only those with power in the landscape get their voices heard.

Belonging to the tradition of geography, the lack of a discussion regarding green infrastructure and scale concern me. In the literature, green infrastructure is promoted as a planning tool applicable in the range from a local small to pan-regional and even international scale. In the interviews the scale on which green infrastructure is discussed varied from a narrow perspective on the presence of single species, to including all nature at a national scale.

Reaching successful discussions, and finally implementation of green infrastructure I believe it is important to remember that green infrastructure is not an objective in itself. Instead it is a means to create conditions for protecting and strengthening the threatened biodiversity. If this notion is lost, and green infrastructure itself becomes the primary target of conservation practice, I believe it will fail its original intention. However, I hope the county administrative boards take the chance to develop the landscape approach necessary to facilitate good regional planning for biodiversity. But first they must untangle the different scales of green infrastructure planning, green infrastructure thinking and green infrastructure administration, and always remember why and for who they plan the green infrastructure.

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Respondents

Andersson, M. (2017) *Outdoor life co-ordinator, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Berlin, G. (2017) *Conservation administrator, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Eriksson, M. (2017) *Conservation administrator, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Gustafsson, L. (2017) *Conservation administrator, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Johansson, A. (2017) *Head of the Department of Environmental Affairs, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Jönsson, P. E. (2017) *Director of Nature Conservation Unit, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Lanner, J. (2017) *Forest consultant, Swedish Forest Agency /Interviewer: W. Thoresen*.

Nilsson, T. (2017) *GIS-engineer, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Niss, J. (2017) *Conservation administrator, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Olsson, O. (2017) *Associate professor in conservation biology, Lund University/Interviewer: W. Thoresen*.

Olsson, P. A. (2017) *Professor in plant ecology, Lund University/Interviewer: W. Thoresen*.

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Ragnarsson, J. (2017) *Environmental strategist, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Rosqvist, G. (2017) *Conservation administrator, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Roos, B. (2017) *County antiquarian, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Weber, E. (2017) *County architect, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Åhrén, P.-M. (2017) *Director og Nature Protection Unit, The County Administrative Board of Skåne/Interviewer: W. Thoresen*.

Appendix I, List of important concepts

Translation of the table with definitions of six important concepts for green infrastructure in "Viktiga begrepp i arbetet med grön infrastruktur" (Naturvårdsverket, 2017, p. 5). The Swedish name of the concept is included in italic.

Concept	Meaning
Value elements *Värdeelement*	Elements of positive importance for biodiversity describing ecological qualities that are prerequisites for functioning ecosystems e.g. species, composition of species, species complexes, habitats and functions.
Value core *Värdekärna*	Continuous areas with high natural values in present conditions. A value core usually has significant occurrence of value elements that create the conditions for high natural values and rich biodiversity. The size of a value core may vary.
Value territory *Värdetrakt*	A landscape section with particularly high ecological values. A value territory has a significantly higher density of value cores (or value elements) for animal and plant life including important biological structures, functions and processes than the surrounding landscape.
Spreading zone *Spridningszon*	The area around a value core within which one or more species can migrate. The size of the zone varies between species and ecosystems, but a guideline for the work with green infrastructure could be in the range of 0 – 2 km.
Spreading link *Spridningslänk*	An area functioning as a link between value cores, based on the migration capacity of species. The distances are often short enough to fit within the spreading zone.
Value network *Värdenätverk*	A network of value cores with functional habitats for particular species or group of organisms that form ecological links through overlapping spreading zones. The value network has value elements and the biological spreading connections are stronger within than outside the network.

Appendix II, Interview guide (translated from Swedish)

Before

- Is it ok to record the interview?
- Can I use your name in the study?
- Is it ok to cite you in the study?
- Do you want to read the transcribed interview before I use it in the study?

Information about the respondent

- Name and age?
- Where do you work, and what is your main work tasks?
- How long have you been in the profession?
- What is your level of education?

Green Infrastructure

- How are you involved in the project to develop the regional green infrastructure action plan?
- How would you define green infrastructure?
- How would you describe green infrastructure to someone who do not know anything about it?
- What is the main purpose of green infrastructure?
- When was the first time you heard of green infrastructure?
- What is the purpose of the action plan?
- For whom are you developing the action plan?
- Who are the most important actors to realize green infrastructure in the landscape?
- How is the work with green infrastructure different from other conservation related work you do?
- What are the "new" green infrastructure brings to the table regarding environmental protection work?
- What pros' and cons' have you experienced working with the green infrastructure, both internally at the county administrative board and towards external parties?
- If and how do you collaborate/communicate with the other counties working on developing their action plans?
- Have you experienced any differences between in how the counties develop their action plans?
- What do you think about the combination of the words green and infrastructure?
- How do you believe the work with the action plan can be evaluated?
- Generally, do you stand positive or skeptical towards the project and the concept?

Finishing

- Anything else you would like to bring up that you have thought of concerning green infrastructure?
- Anything you would like to clarify before finishing?

Appendix III, List of respondents

Name	Institution	Unit	Title	Date for interview	Place for interview	Interview Length
Andersson, Malin	County administrative board of Skåne	Nature Conservation Unit	Outdoor life co-ordinator	2017-03-22	County administrative board of Skåne	00:52
Berlin, Gudrun	County administrative board of Skåne	Nature Protection Unit	Conservation administrator	2017-03-22	County administrative board of Skåne	00:37
Eriksson, Marie	County administrative board of Skåne	Water Management Unit	Conservation administrator	2017-04-06	County administrative board of Skåne	00:25
Gustafsson, Linda	County administrative board of Skåne	Nature Examination Unit	Conservation administrator	2017-03-17	County administrative board of Skåne	01:10
Johansson, Annelie	County administrative board of Skåne	Department of Environmental Affairs	Head of the Department of Environmental Affairs	2017-04-10	County administrative board of Skåne	00:47
Jönsson, Paul Eric	County administrative board of Skåne	Nature Conservation Unit	Director	2017-04-04	County administrative board of Skåne	00:23
Lanner, Jan	Swedish Forest Agency	Swedish Forest Agency	Forest consultant	2017-04-04	Phone interview	00:34
Nilsson, Thorbjörn	County administrative board of Skåne	Spatial Planning Unit	GIS-engineer	2017-03-21	County administrative board of Skåne	00:22
Niss, Johan	County administrative board of Skåne	Nature Protection Unit	Conservation administrator	2017-03-24	Phone interview	01:05
Olsson, Ola	Lund University	Department of Biology	Associate professor in conservation biology	2017-03-21	Ecology building, Lund University	00:30
Olsson, Pål Axel	Lund University	Department of Biology	Professor in plant ecology	2017-03-21	Ecology building, Lund University	00:17
Persson, Pär	County administrative board of Skåne	Spatial Planning Unit	Water strategist	2017-05-04	County administrative board of Skåne	00:31
Ragnarsson, Johanna	County administrative board of Skåne	Environmental and Water Strategy Unit	Environmental strategist	2017-04-03	County administrative board of Skåne	00:27
Roos, Britta	County administrative board of Skåne	Cultural Heritage Unit	County antiquarian	2017-04-05	County administrative board of Skåne	00:28
Rosqvist, Gabrielle	County administrative board of Skåne	Nature Protection Unit	Conservation administrator	2017-03-27	County administrative board of Skåne	00:33
Weber, Elisabet	County administrative board of Skåne	Department of Community Affairs	County architect	2017-04-10	County administrative board of Skåne	00:53
Åhren, Per-Magnus	County administrative board of Skåne	Nature Protection Unit	Director	2017-04-27	County administrative board of Skåne	00:45
Arneng, Emma	County administrative board of Skåne	Inspection Unit, Department of Rural Affairs		cancelled		
Hedlund, Marit	County administrative board of Skåne	Nature Conservation Unit		declined		

Appendix IV, Translations of reports and quotes

[i] Translated from Swedish, Ett ekologiskt funktionellt nätverk av livsmiljöer och strukturer, naturområden samt anlagda element som utformas, brukas och förvaltas på ett sätt så att biologisk mångfald bevaras och för samhället viktiga ekosystemtjänster främjas i hela landskapet. (Naturvårdsverket, 2015, p. 9)

[ii] Translated from Swedish, Budskap, underbudskap och vokabulär för grön infrastruktur (Naturvårdsverket, 2016)

[iii] Translated from Swedish, Viktiga begrepp i arbetet med grön infrastruktur (Naturvårdsverket, 2017)

[iv] Translated from Swedish, En sammanhållen klimat- och energipolitik (prop. 2008/09:162)

[v] Translated from Swedish, Hållbart skydd av naturområden (prop. 2008/09:214)

[vi] Translated from Swedish, Förslag till plan för att skapa och behålla en grön infrastruktur (Naturvårdsverket, 2011).

[vii] Translated from Swedish, strukturer i landskapet och brukande av desamma som säkerställer en långsiktig överlevnad av livsmiljöer och arter, genom att spridningsmöjligheter säkerställs och på så sätt vidmakthålls ekosystemens förmåga att leverera viktiga ekosystemtjänster. (Naturvårdsverket, 2011, p. 5)

[viii] Translated from Swedish, Grön infrastruktur, Redovisning av Regeringsuppdrag (Naturvårdsverket, 2012)

[ix] Translated from Swedish, Ett levande dokument (Regeringen, 2013, p. 3)

[x] Translated from Swedish, Förslag till hur en handlingsplan för grön infrastruktur kan tas fram på regional nivå (Naturvårdsverket, 2013)

[xi] Translated from Swedish, bör det finnas stora synnergieffekter att inkluderea grön infrastrukturs betydelse för att främja även dessa värden. (Naturvårdsverket, 2013, p. 9)

[xii] Translated from Swedish, En svensk strategi för biologisk mångfald och ekosystemtjänster (prop. 2013/14:141)

[xiii] Translated from Swedish, Grön Infrastruktur

[xiv] Translated from Swedish, En handlingsplan för arbetet med grön infrastruktur på regional nivå kan utgöra ett ramverk för att tydligare samla naturvårdsåtgärder i ett geografiskt sammanhang (landskapsperspektiv) för att bevara biologisk mångfald och mångfunktionalitet i landskapet. Naturvårdsåtgärderna bör bygga på befintliga instrument, information och frivilliga insatser. I arbetet måste hänsyn tas till äganderätten. (Regeringen, 2014a, p. 101)

[xv] Translated from Swedish, Riktlinjer för regionala handlingsplaner för grön infrastruktur (Naturvårdsverket, 2015)

[xvi] Translated from Swedish, Syftet med grön infrastruktur är att bidra till bevarande av biologisk mångfald, främja ekosystemens status och resiliens och därmed stärka ekosystemtjänster som är viktiga för samhället i stort. (Naturvårdsverket, 2015, p. 10)