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GREEN PLANNING
– a guide

Cover picture: The bridge from central Kristianstad out to the wetland area known as "Kristianstad Vattenrike" and the Biosphere Reserve Visitor Centre connecting the town with nature both physically and metaphorically. The town interacts with its surroundings and needs the ecosystem services from the vegetation in order to function and to be attractive. Photograph: Per Blomberg.

GREEN PLANNING

– a guide

Kristianstad Municipality

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Kristianstad Municipality is located in southern Sweden and in terms of area is the largest municipality in Skåne County. The seat and main city, Kristianstad, is an important centre in north-east Skåne. 45,000 of the inhabitants of the municipality live in the city of Kristianstad. Kristianstad Municipality has a long tradition of working with green issues and the first biosphere reserve in Sweden was established in 2005 in the area known as vattenrike, covering most of the municipality.

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Movium Think Tank works with urban development issues and operates within SLU (the Swedish University of Agricultural Sciences). Movium develops ideas and produces, accumulates and disseminates information knowledge and opinions. We want to influence social development by running research projects, arranging courses, releasing publications and taking part in the public debate. Movium operates with no commercial interest, and is financed by state grant and membership fees.

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Kristianstad Municipality is a partner in the EU project Urban Links 2 Landscape. Six other partners from Germany, Italy, England, Poland and Latvia are also involved in project. The project has received support from Interreg Europe. The aim is to exchange knowledge about the city's green (nature) and blue (water) qualities and the interface between city and countryside. Particular focus is placed on cultivation, climate adaptation and health as important ecosystem services in urban planning.

There is an interest group attached to the project with representatives from the Swedish National Board of Housing, Building and Planning; Skåne Association of Local Authorities; Tankesmedjan Movium, SLU; Krinova, Lund and Linköping municipalities. The group contributes knowledge to the project, takes part in activities and helps to disseminate the outcomes of the project. The Swedish Environmental Protection Agency also took part in the work of the group in the creation of this guide.

In conjunction with Movium, and in dialogue with the Swedish National Board of Housing, Building and Planning, the Swedish Environmental Protection Agency and the other members of the group, Kristianstad Municipality produced this guide for green planning in order to offer municipalities and regions support in their work. The intention is for the guide to be developed further by the Swedish National Board of Housing, Building and Planning and the Swedish Environmental Protection Agency. Further information on the project may be found on the project website:
Urban Links 2 Landscape.

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Stakeholders

Foreword

The Interreg Europe project Urban Links 2 Landscape wants to strengthen ecosystem services in and around population centres in order to create more robust, sustainable and attractive cities. Kristianstad Municipality is very thankful to be able to take part in this international collaboration, contributing its own experience and gaining inspiration and knowledge from its international and regional partners in the project.

The main contribution made by the municipality is this action plan for how comprehensive physical planning might better exploit green and blue values. In recent years Kristianstad Municipality has worked actively to plan the preservation and development of green structure in environmental protection programmes, green strategy, green plans and comprehensive plans. We want to share our experience, as well as that of other Swedish municipalities and our partners, with other municipalities and regions in Europe.

This work took place in close collaboration with our regional partners, the Swedish National Board of Housing, Building and Planning; Skåne Association of Local Authorities; Tankesmedjan Movium, SLU; and the municipalities of Krinova, Lund and Linköping. Movium contributed in particular to the production of this report and we would also like to thank two public authorities, namely the Swedish National Board of Housing, Building and Planning and the Swedish Environmental Protection Agency, for their help in disseminating our findings in Sweden.

Kristianstad, June 2020

Bo Silverbern
Chairperson of Kristianstad
Municipal Council

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Photograph: Per Blomberg, 2017. Artwork: Caroline Axelblom.

Hammarby sjöstad in Stockholm is one of the city's major project on sustainable urban development during the 2000s. Ambitions to integrate green and blue structure are high in the district and, above all, to provide the opportunity to water experiences by making beaches and wetlands accessible.

1. INTRODUCTION

1.1 WHY GREEN PLANNING?

The purpose it to safeguard the greenery in the city, the municipality and the region, for our quality of life, for biological diversity and to protect land and water.

Throughout human history the development of mankind has been dependent on ecosystems, and was shaped in unison with other species in the surrounding environment. It was only after the Second World War that technological and financial developments meant that humans increasingly moved away from their dependence on ecosystems. The use of oil and coal, which are fossil products from the processes of ecosystems, made this development possible and led to a significantly higher standard of living but also a long list of environmental problems. It has also become clear that many of the functions of ecosystems are cheaper, more reliable and more flexible than the technological solutions humans have attempted to replace ecosystems with. This might apply to water purification, erosion protection, waste management, climate adaptation and many other things. At the same time it has become increasingly apparent that our green and blue environments, in the form of forests, grasslands, oceans, beaches and lakes are important for our well-being, as well as being attractive to the hospitality/tourism industry, company start-ups and housing. These green qualities need to be planned and balanced against other important social functions in order to be enjoyable and beneficial in the long term, for us and coming generations.

Why green plan?

We will be using the term green plan here. There is no precise definition of a ”green plan” which would differentiate this document from, say, a ”green structure programme” or an ”action

plan for green infrastructure". The green plan documents how the greenery is localised, how it contributes to the countryside as a living environment and where it can be developed or is threatened. The green plan is an important foundation stone in all types of construction, city transformation, densification, land management and sustainable urban development.

The first green plans in Sweden were implemented in the 1980s. At that time we began to build within existing cities, rather than, as previously, to expand cities outwards, mostly by using agricultural land. This is a good thing and contributes to a number of sustainable aspects, but we also need to keep a watchful eye on the need to maintain a sufficient amount of greenery in the city, to care for it so it is of the best quality, and to ensure that it connects well with rural areas and nature outside the city, in order to protect, strengthen and develop our living environments. Green plans should function as support for this watchful eye!

A green plan is an important part of green planning. It serves as a coordinating document for green planning. Green plans are different in different municipalities, because the conditions are different, but common to all green plans is that they are a place where information, knowledge, visions and action plans for "the green" in the city/municipality/region are accumulated and organised.

This guide for green plans shows examples that may be useful when work on green plans is carried out and there is an intention to indicate who is responsible for green areas of the city functioning as they should. Since we need to be better at coordinating our environmental initiatives, green planning must be a collaborative activity, where various municipal administrative bodies take responsibility for their part and where other stakeholders are also given the opportunity to have an input.

City planning and development departments are responsible for comprehensive planning and for ensuring that the green plan is updated and used in comprehensive plans, detailed comprehensive plans, and detailed development plans and also perhaps for leading a dialogue around how it may be used by other stakeholders. The parks department is responsible for the care and development of parkland (and may also be assigned the care of other land). The schools department is responsible for schoolyards and fields. The property management department deals with land belonging to the municipality's various properties. The sports department and the nature department have their mandates and responsibilities for specific areas of land. The green plan is initiated by "the municipality", but the municipality has many hands and feet, which must all work in unison if green planning is to be strengthened and really become a force for a better orchestrated living environment.

The process of getting all stakeholders to work together is actually the most important part of green planning and producing a green plan is a

Figure 1.1.1. Built structure, infrastructure and green- and bluestructure. How to integrate them? Artwork: Caroline Axelblom.

particular focus of energy to create a good platform for the work. This guide should be helpful in the production of green plans, but equally important is making the process function well in long-term work with green planning.

Approach

During the last 70 years the focus has been on developing the construction and traffic infrastructure, but it has become increasingly apparent that the green structure is at least as important in ensuring that society functions in a good way. Raising the status of green structure takes time, however, and requires a change in approach to town and country planning. Construction and traffic infrastructures cannot be built at the expense of green structure, but must rather be implemented with great attention to the green structure so that its quality and function post development are the same, or preferably better, in order to make up for previous damage.

Green planning plays an important role in fulfilling the international undertaking to create long-term sustainable development. Green planning is the way in which a society can work towards many of our national environmental objectives. Green planning forges a balance with other physical planning and makes it possible to develop buildings, roads, railways, airports, harbours and energy supply without depleting the qualities of the green structure. The mitigation hierarchy, the precautionary principle and the principle of balance are important approaches for successful long-term sustainable green planning and social development.

Stakeholders in urban land and urban greenery

We often mix up ”green structure” and “public space” or ”public environments”. But a large amount of urban green space is privately owned – for example private gardens. For some of the ”ecosystem services” of urban greenery, public and private greenery must work together. Some urban greenery rather operates together with impervious surfaces - such as children’s play areas. In order to derive enjoyment and benefit from all ecosystem services that urban greenery contributes to, it is important (for each individual ”service”) to agree and to make clear who is responsible for ensuring that the ecosystem services actually work!

When should the urban greenery stakeholders take action and what should they do?

In the green plan, which is a foundation stone, the greenery stakeholders are identified and localised. This does not mean that things in the city immediately begin to happen and change. In many cases it is a case of ”being alert”. Being alert, as a stakeholder, means being ready to do something.

It might be a case of improving the conditions for biological diversity (in such ways that the stakeholders in the issue are able to effect a change), or of all children playing in natural areas once a week, or of everyone who wants it, having space to grow things, or of creating sufficient space for stormwater to infiltrate or to be visible.

Depending on whether the stakeholders are park managers, planners, small building owners, teachers or tenants, the expectations, potential, power to act and desire to change are different. Everyone can take some responsibility, but we perhaps cannot demand that everyone takes responsibility. This must be decided as circumstances dictate and discussed in the green planning process. Who is it that takes responsibility, what are they are responsible for and when can we expect this to lead to action and change?

Ownership rights and communal responsibility

Who should be responsible for the land we own together? The municipal council is the body we elected to decide on communal issues, but the municipality takes responsibility in different ways. The parks department is responsible for the care and development of parkland (and may also be assigned the care of other land). The schools department is responsible for schoolyards and fields. The property management department deals with land belonging to the municipality's various properties. The sports department and the nature department have their mandates and responsibilities for special areas of land.

Private land is part of the communal structures

Greenery in the city, such as land, water and biological diversity are what "carry out" the ecosystem services we need to live a good life in the city. Many of the ecosystem services can be driven and managed by the municipal administration. But private landowners must also play their part if the system is to function well. Water and biological "transports" pay no heed to administrative boundaries. Previously, property owners have been obliged to, for example, deal with all stormwater on their property. Nowadays, when buildings are more densely arranged, it may sometimes be more expedient to find communal solutions to deal with stormwater. With regards to the great importance of trees for air quality and temperature, ownership is less relevant than function – so old trees have sometimes also been protected on private land under detailed development plans or area regulations.

How can we become better at working with progressive development?

Working on projects is an efficient way to "get things done". We have become good at it in recent decades. Working progressively with the long-term outlook is more difficult, especially when ownership of land is split and responsibility is divided between many people. Green planning and ecosystem services can, therefore, not only deal with WHAT must be done, but also with HOW we should work together – finding procedures for sharing information, monitoring, innovation and re-evaluation, not so that "the project is finished", but so that land, water and greenery maintain, and also progressively RAISE their value the whole time!

Green planning is planning for growth!

Synergetic green planning is able to initiate, drive and follow-up work on the growth of ecosystem services in the city. The work is never-ending, but it does render seasonal harvests, in the form of well-being, health, increased biological diversity and positive effect on the climate.

1.2 WHAT IS GREEN PLANNING?

The plethora of terms and concepts used in strategic documents to describe phenomena and values that we have attached to vegetation and water is quite broad, leading to a certain degree of confusion. New terms constantly appear, as do attempts at all-encompassing definitions which cause this plethora of terms and concepts to expand. As knowledge about "green and blue" values grows, the need to give a structure to the many terms and to define more clearly when it is appropriate to use different labels grows too.

Competing terms for a unifying description

In comprehensive planning, conservation (naturvården) was the unifying term and also the sector for dealing with green values. The first environmental protection legislation was adopted as far back as 1909, and was increasingly expanded through the middle of the 20th century, as more aspects were included, such as visual aspects of the landscape, green cultural environmental values and social and environmental conservation

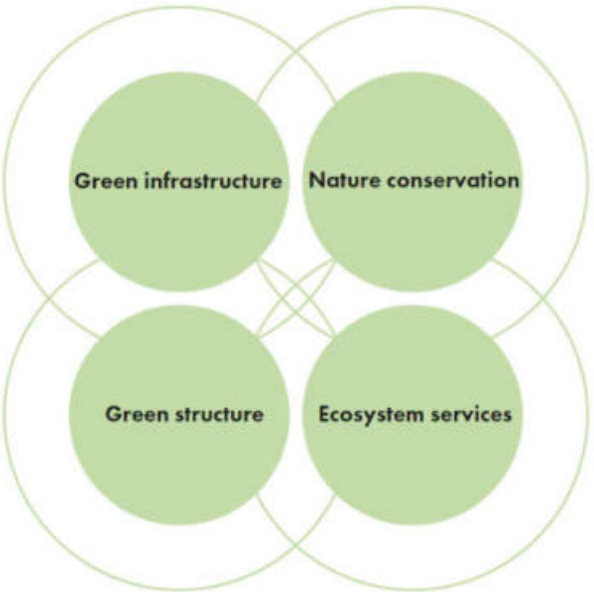

Figure 1.2.1. Competing terms and concepts which describe the overall green values.

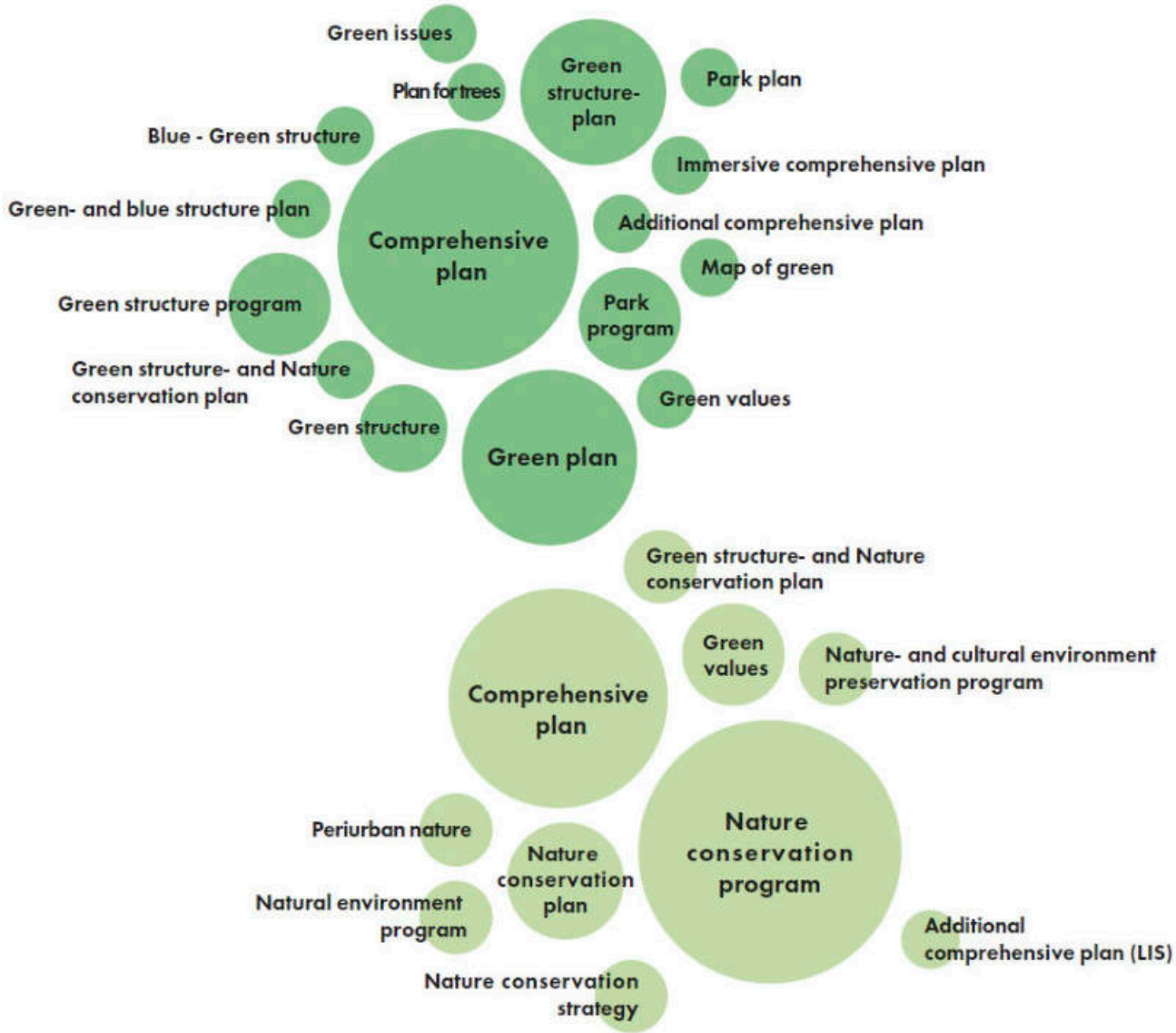

Figure 1.2.2. A large number of strategic terms and concepts are used within green planning. Boverket 2012.

Figure 1.2.3. Proposal for the structure of "the green planning family".

in the form of outdoor recreation (friluftsliv). Nature and the environment were, for a long time, thought to be external to urban areas and conservation was focused on rural environments. During the 1970s, attention became more focused on urban green areas, mostly from a perspective of recreational and aesthetic values. During the end of the 20th century the Swedish Environmental Code of 1997 (Miljöbalken) was adopted and the green structure of urban areas was addressed, primarily through the Swedish Planning and Building Act of 1987. The inclusion of the comprehensive plan in the Swedish Planning and Building Act meant that this plan gained greater significance in the planning of green and blue values. The terms green plan and green structure developed out of urban planning and then expanded to cover the whole landscape. New concepts which have been introduced in the 2000s include ecosystem services, meaning the benefits that humans derive from ecosystems, and green infrastructure which is a reference to traffic infrastructure and the green and blue structural interconnections that need to be taken into account in planning. The result has been that there are currently four overarching terms which are used for comprehensive green planning, which to a great extent overlap with each other.

Of these terms, conservation (naturvården) has been narrowed in practice to primarily refer to biological diversity. Green infrastructure has been coordinated by the Swedish Environmental Protection Agency (Naturvårdsverket) and has also had a strong focus on biological diversity. Ecosystem services have perhaps been most useful in clearly describing and organising the benefits of ecosystems. It is, however, difficult to use the term for strategic planning in the form of plans for ecosystem services, since the term then becomes very long and is not truly established in this role. The term which has come through as the strongest candidate for describing all the values and functions linked to ecosystems, vegetation and water areas is green planning or green structure planning. Sometimes the importance of water is stressed by the use of the term blue-green planning.

Proposed definitions and structure of the green planning "family"

The disparate family of terms described above, used in planning of ecosystems and their benefits can be divided into groups based on established professional groups and sectors in society.
As mentioned above, the green plan has come through as a strong candidate as an umbrella term for all the other strategic documents which may then be weighed against development structure and traffic infrastructure in comprehensive planning. A closely related term is green structure which leads our thoughts more towards structural

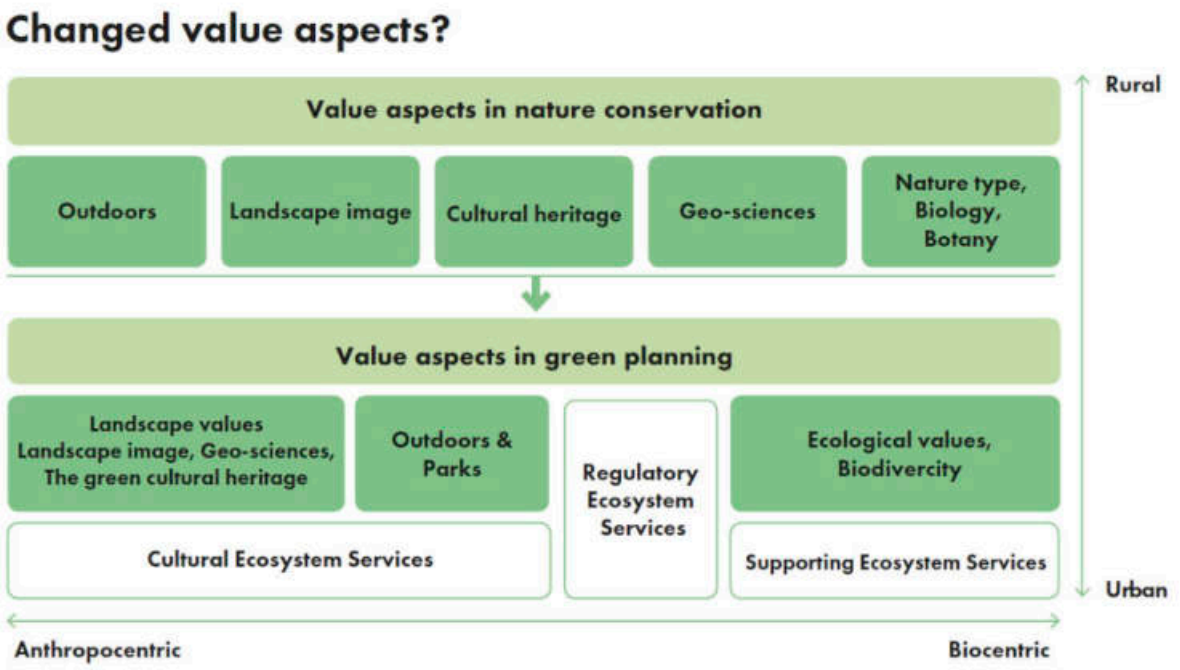

Figure 1.2.4. Proposal for the overall structure of green planning.

interrelations and does not serve to illuminate the whole picture as clearly. Green strategy may be viewed as a policy document which is more general and does not go into detail. Green strategy is often incorporated in the green plan in order to clarify the goals and strategies which underlie the work. A number of municipalities choose to produce their strategic documents in two stages, whereby the green strategy is the document were the orientation of the work is drawn up based on policy, while green plan reflects more the way in which the municipality as a whole proposes that the strategy will be implemented.

In addition seven groups of strategic documents have emerged covering recreational planning outside urban areas, in urban areas linked to administrative issues, ecological planning based on biological diversity, water planning to focus on stormwater and surface water, climate planning and landscape planning. Sustainability programmes have a much broader significance and only partially concern the ecological values in the landscape.

Green planning is used as an overall term for many different subject areas relating to ecosystem services, for example ecosystem service plans, sustainability plans, parks programmes, green plans, meeting place programmes, blue and green structure strategies, climate change plans, climate adaptation plans, conservation plans, wildlife management plans, plans for biological diversity and others. The green plan usually functions as

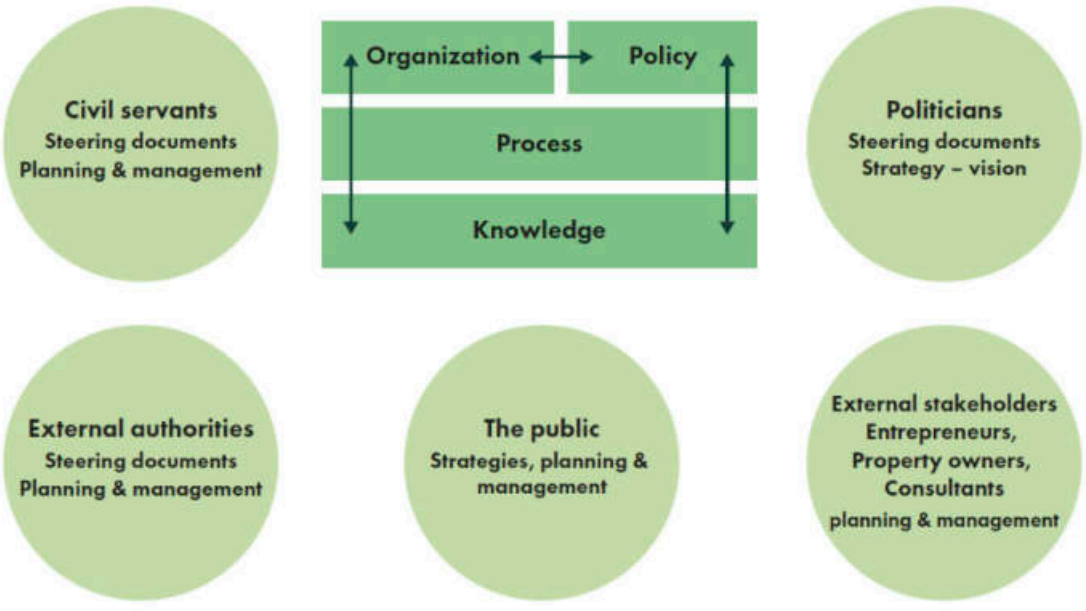

Figure 1.2.5. Objective and target groups.

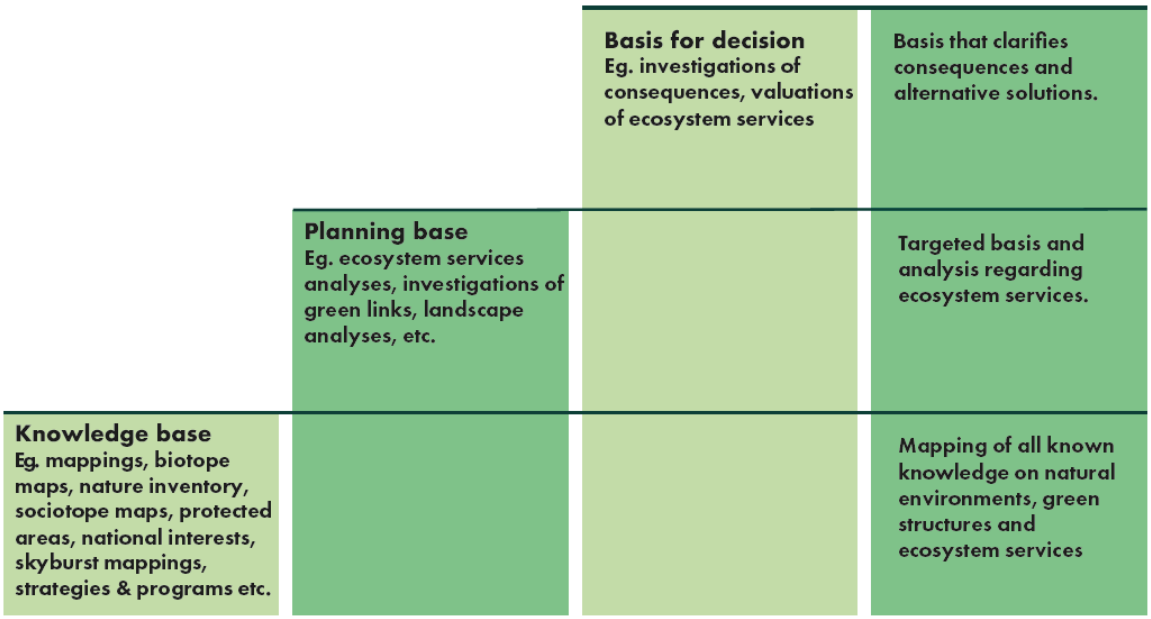

Figure 1.2.6. The support material ladder. During the planning process there is a need for different types of support material. At the beginning of the process, knowledge support material of a general nature, such as surveys and inventories, is important. As the planning process proceeds there is a need for more targeted support material such as enquiries and analyses, including those regarding ecosystem services. When the different options are being weighed up there is a need for clear decision-making support material with descriptions of the consequences of various alternatives. Support material for planning and for knowledge are part of the decision-making support material. Picture: Swedish National Board of Housing, Building and Planning (Boverket)

an umbrella plan for the other sub-strategies and plans and covers all vegetation and all water areas.

The green plan is a central tool for maintaining and developing the green structure and ecosystem services in planning, development and administration. The green plan can be both support material for physical planning and an action plan which sets out the municipality's work with green structures, greenery and ecosystem services. (The Swedish National Board of Housing, Building and Planning knowledge bank).

A green plan also functions as a knowledge base, surveying values and functions in existing green areas and natural environments. The green plan may consist of one or a number of documents. There is no legal requirement for a municipality to have green plan. The green plan is a sector-based programme which has an important function as the basis for the comprehensive plan where the interests of the green structure are weighed against the interests of the building and traffic infrastructures.

Proposal for the layout of the green plan

An attempt at simplifying the concept of green planning might be that in image 4, which brings together the green plan "family" and the concept of ecosystem services. Provisioning ecosystem services are seldom addressed in green plans, since they are dealt with at great length by the relevant sectors, but due to the land ownership of the municipalities there are a number of municipalities who deal with forestry in their green plans. Cultural ecosystem services have traditionally been primarily outdoor recreation (friluftsliv) and recreation in park environments, as well as landscape values in the form of aesthetic, cultural-historic and geo-scientific values. Ecological values and biological diversity are primarily linked to supporting ecosystem services. This leaves regulating ecosystem services which may primarily be linked to the conservation of natural resources as per the traditional concept.

Definitions

Green planning is a broad term and it is important to define at an early stage what fields and what areas of interest should come under it. Key concepts are usually ecological and recreational values, but often all the ecosystem services are covered, thus including cultural services such as green cultural heritage, aesthetic landscape values and provisioning services such as forestry and fishing. Within green planning, terms such as green structure, blue structure, green area and greenway are used to describe areas covered with vegetation and water areas regardless of whether they are located in urban parks or in areas of nature around the city. Arable land and building developments are not usually included in the concept green and blue structure.

It is also important to consider which words are used and which connotations they have in terms of values. The words nature and culture are heavily loaded in terms of values and are often set in opposition to each other. Green plan, green and blue structure plan, plan for ecosystem services, conservation plan, green infrastructure plan and sustainability plan are closely related concepts and all are used in the municipalities for similar adoption of approaches and planning. This guide attempts to clarify the meaning of the different concepts but it is the municipalities or regions who decide what terms and concepts they wish to work with.

Vegetation

Vegetation has existed on the earth for millions of years. It is the result of a unique transformation of solar energy into biomass and underpins the development of our species. Vegetation occurs in many different forms, from 100 metre tall trees to microscopic phytoplankton in the sea and fresh water habitats. It is necessary for virtually all types of animal on the earth and it forms the basis of ecosystems. Vegetation also contributes to important regulating functions such as water cycles with evaporation which contributes to rainfall, nutrient cycles which release nutrients and carbon cycles that fix carbon and release oxygen. Vegetation is present in both fresh water and salt water and means that water environments can also be called green structure. We use the label blue, although this is simply because the sky is reflected on the surface of the water to those of us above the surface. For those under the surface, green would probably be a good label.

Ecosystem services

The services and benefits that humans receive from the ecosystem are called ecosystem services. These are normally divided into four categories, namely supporting, regulating, provisioning and cultural services. These ecosystem services provide

us with food from cultivation, raw materials from forests, water purification from wetlands, climate regulation from trees, enjoyment from biological diversity, preventative health care from visits to parks and natural areas and much more.

Green structure and green infrastructure

Green structure and green infrastructure are terms used to describe the interactions and structures that exist in the countryside linked to green

In 2018 a building and construction fair was held in Vallastaden in Linköping, a district of the city which is built around a strip of parkland and a river gulley which connects the district with other green areas in the city. The district faces towards the green area and the park has become like the "living room" for the district, fulfilling a number of different functions. It is a place for social gatherings, recreation and leisure, while it drains and purifies stormwater, its vegetation binds the earth and prevents erosion and the many blossoming plants contribute to pollination and biological diversity. The new urban district became a natural part of the city's green planning. Photograph: Per Blomberg.

values. These include opportunities for animals to move in the countryside and for both animals and plants to spread and exchange genetic material with other animals and plants. They also include the opportunity for humans to move in the countryside for recreation and enjoyment. The green structure can also involve ecosystem services which are delivered in certain locations but which have an impact elsewhere, such as the purification of water and cultural interactions between places. Green infrastructure is included in EU strategies and has been implemented in Sweden by the Swedish Environmental Protection Agency. The term green structure is primarily used in green planning in municipalities and regions but has approximately the same meaning.

Conservation

The term conservation has been in use for over 100 years. It concerns protecting ecosystems and also the ethical and recreational values of the landscape from a broader perspective. Nature is a word which is loaded with values and has often been used in opposition to culture. Conservation has also often been used to describe work on ecosystems outside urban areas, which meant that green planning became a broader concept covering both conservation and work with ecosystems in urban areas.

Objective

What is the purpose of creating a green plan?

Green plans involve an organisation striving to define values and approaches that will be helpful in future work. A good green plan provides a better balance between various interests, sheds light on the significance of the green structure for the municipality and ensures that many of the sustainability goals can be achieved. Ultimately it has to do with the long-term well-being of humanity.

It is important to consider the green plan's target groups and boundaries. Is the plan primarily a basis for internal work by municipality staff, primarily for management and administration, or for physical planning, or is it a strategic policy document, or is the plan aimed at the public, with information on how the green structure can be used? If the purpose is not for it to be a general document on green issues, it may be relevant to debate whether a different term should be used.

If the green plan is primarily a strategic policy document it ought to be significantly shorter than if it is a steering document for planning and administration. Some green plans are more like handbooks for staff who are affected by green planning, while others are short strategic documents which provide a roadmap for the adoption of strategic policy approaches.

Knowledge base

Every municipality and region creates a knowledge base for green and blue structure as support material for green planning work. This material is presented in a variety of ways. Some authorities compile special reports on various themes, while others include a comprehensive knowledge base in the plan itself. It is sometimes advantageous to divide up the knowledge base, the planning support material and decision-making support material in order to make the different parts clearer. The knowledge base can then be more detailed and presented in an educational way.

Planning support material

Many green plans constitute the basis of the comprehensive planning and provide a unified picture of the green structure when later seeking to strike a balance with development structure and traffic infrastructure. Planning support material for green structure needs to give clear guidelines as to which values and functions take priority in order

to support the process of balancing it against other public and private interests. Planning support material may also contain clear recommendations on the distance to other qualities, the size of other types of area as well as experience qualities and functions within the area.

Administration support material

Administration and management aspects are important for the implementation of green planning. Parklands usually have some form of management plan were types of management and extent are described, depending on whether the administration is carried out by the municipality or is outsourced. Municipal woodland often has a forestry plan or administration plan and other types of land usually have some form of administrative guidelines.

Decision-making support material

Many green plans have some kind of action plan which shows how the municipality will develop the green and blue qualities. These are often presented as measures with a specific budget, area of responsibility and schedule. A number of municipalities allocate a specific budget for the implementation of their green plan, while others refer the financing to the annual budget negotiations.

The process

At least as important as the final document produced is the process that takes place in the municipality or region when a green plan is developed. The collective process of creating a green plan is a journey where everyone learns more about green issues and has the opportunity to ascertain what is important for the municipality. Therefore, it is very important to have a good process, both for regular staff and for elected representatives in the organisation.

The process of creating a green plan makes it possible to develop the process of planning of the built environment, where different green and blue issues will be managed. Green planning is not conducted by the communal and regional bodies alone. A range of other stakeholders are also important in the process, such as external authorities, contractors, property owners, consultants and the general public who have an interest in knowing what is planned and in being able to influence the planning.

Landschaftpark Duisburg Nord in the Rurh area in western Germany is an post-industrial landscape with old coal mines. The area has been transformed into a recreational area with the preservation of the industrial heritage as an important design strategy. The Rhine region showcases a large amount of post-industrial areas that have been retrofitted into housing areas and attractive green areas. Photograph: Per Blomberg, 2018.

1.3 THE STAKEHOLDERS IN GREEN PLANNING

Planning involves a large number of different stakeholders and inputs. Within the framework of municipal planning we find, for example, planning architects, landscape architects, land development engineers, project leaders, communication specialists, property managers, park administrators, garden engineers, municipal ecologists, environmental strategists, educators, PR officers, garden experts, city architects, city garden experts and many others.

Green planning stakeholders

All green planning involves cooperation between many different stakeholders in order to be successful and achieve results. The local municipalities need to collaborate within their organisation and with other public organisations such as neighbouring municipalities, administrative regions and national authorities. They also need to collaborate with property owners and developers, who will develop new parts of the city. In order to increase knowledge of the content, relationships and planning conditions of the green structure, it is valuable to follow the research and have contact with researchers. Ultimately, green planning takes place for the well-being of inhabitants and there is a lot of information to be gained from the population. It is also important that they feel they are a part of the planning development and of the administration of the green structure.

The municipality

Throughout the whole of Europe the majority of green planning takes place at the local level and in Sweden the municipalities also have a monopoly on planning, which strengthens their influence over the development of the green structure. The municipalities are different from one another and have different conditions depending on where they are located, how large they are in terms of area and in terms of inhabitants. In small municipalities the various colleagues and departments are close to one another, while in the large municipalities more effort is needed for cooperation in planning. Most municipalities in

Europe also own a large proportion of the green areas in city parks, sports areas, schoolyards and streets in the urban areas. The municipalities are run by representatives of the political majority who the inhabitants have elected and ultimately it is representative democracy that operates green planning. Important stakeholders in the municipalities are also the permanent staff, who work with physical planning, development, conservation and environmental protection, as well as those who administer existing parks and natural areas. However, green planning affects nearly all parts of the municipal administration and it is important that there also be cooperation with education, childcare and elderly care which are all affected by the green structure in various ways. Ultimately the municipality consists of its inhabitants and collaboration between politicians, permanent staff and the public is crucial for the success of green planning.

Regional stakeholders

Nearly every country in Europe has some kind of regional administration which plans regional development. In Sweden the municipal-regional organisations are currently being strengthened and since 2019 they have been mandated to create regional plans, where the green structure is an important part. The regions contribute to the coordination of the municipal plans and also contribute support material for physical planning. In Sweden the state also has regional representatives in the regions, in the form of county administrative boards who take care of the state's interests, weigh up inter-municipal issues and help to ensure that the national objectives are implemented as well as providing planning support material to the municipalities. At the regional level there are also local authority associations which support the work of the municipalities and represent the municipalities with regional, national and international stakeholders.

National authorities

EU collaboration has not hitherto been strongly focused on green structure, but it is rather national policies which guide the development and legislation in the different countries. A number of initiatives in the Natura 2000 area, such as the birds and habitats directives have, however, contributed to strengthening the international green structure in Europe. In Sweden, the most important stakeholders in green planning are the Swedish National Board of Housing, Building and Planning which is responsible for planning and construction while the Swedish Environmental Protection Agency which is responsible for conservation and environmental work.

Research

Several different research institutes contribute to the knowledge around green planning which is important in the local and regional work. In Sweden, the Swedish University of Agricultural Sciences and its various institutes around the country contribute important knowledge about green planning and ecosystem services. Other universities also work on these issues. Centres of excellence such as Movium and collaboration

platform such as the Council for sustainable cities (Rådet för hållbara städer) play important roles in the dissemination of knowledge.

Developers and property owners

The development of green structure takes place partly with public finance but extensively by means of private initiatives in the form of new constructions and their green areas. Here, there is often collaboration between private stakeholders and the municipalities, regions and state authorities in order to obtain good development of both the private initiatives and public interests, such as ecosystem services and biological diversity.

The general public

Most important stakeholders are all the people who live in and are active in cities, population centres, villages and in rural areas. Green planning takes place for the best interests of everybody based on the local conditions of each place. The ecosystem services contribute to our well-being and are of great economic significance for the functioning of society by means of provisioning, supporting, regulating and cultural services.

The All London Green Grid is an initiative from the city of London in Great Britain to establish an interconnected green structure throughout the urban landscape of London. The initiative aims at offering the inhabitants access to recreation and outdoor experiences. The royal castle Windsor, located southwest of London, is part of the green grid. The amount of old trees in the park is considered to be a core value for biodiversity. Photograph: Per Blomberg, 2010.

The city of Lund in southern Sweden is located in a distinctively open arable landscape, and in order to increase recreational opportunities the municipality has set up 10 to 15 m wide "public footpaths" which are strips of grass and bushes, where the general public can walk and ride between the cultivated land. The strips bind together older and natural environment such as ponds, copses and parks where resting places have been set up.

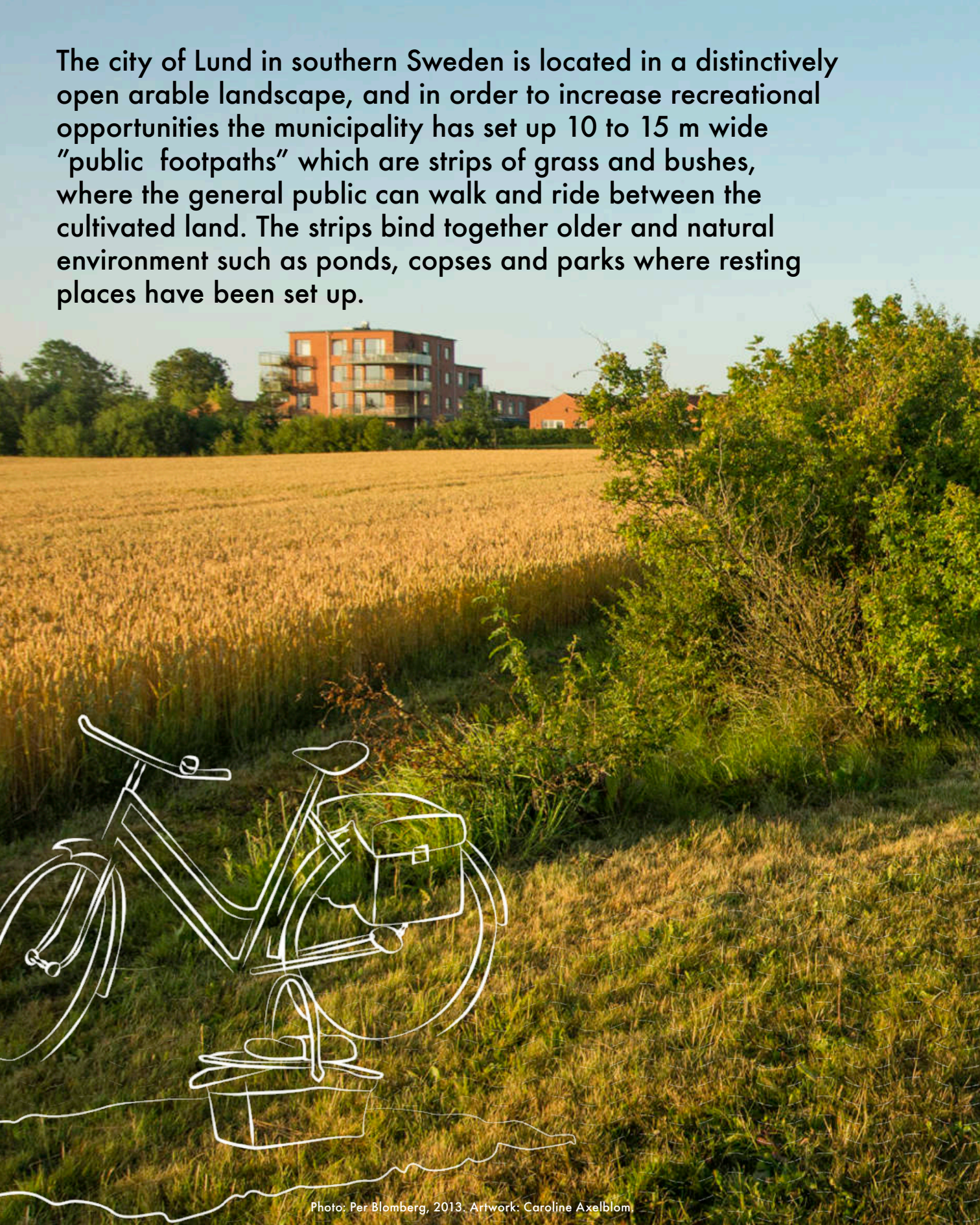

Photo: Per Blomberg, 2013. Artwork: Caroline Axelblom

2. THE CONTEXT OF GREEN PLANNING

2.1 LAWS AND STRATEGIES

The fundamental importance of nature and ecosystems for life on earth has been noted by researchers, public authority officials and voluntary organisations for centuries. In 1909 Sweden became the first country in Europe to found national parks with the purpose of preserving and protecting the natural conditions of these areas.

The decision to set up national parks was made possible by the new law on national parks which also covered the legal aspects of the preservation of natural monuments. More thorough legislation arrived in the middle of the 20th century with two conservation acts, Naturskyddslagen and subsequently in 1964 Naturvårdslagen. This continued until the Swedish Environmental Code (Miljöbalken 1998:808) came into force in 1998. The present version of this act is still in force. For a short while there was also another law called the Natural Resources Act (Naturresurslagen). The Natural Resources Act (Naturresurslagen) introduced and regulated provisions around the management of land and water resources, including the national interests, which are currently dealt with in chapters 3 and 4 of the Swedish Environmental Code. A new planning and building law was instituted in parallel with the 1997 Natural Resources Act which ran until 2010 when it was replaced by the Swedish Planning and Building Act (2010:900) (Swedish acronym PBL) which now regulates provisions for planning regarding land and water as well as building development. A brief account of the legislation is given below.

In parallel with the development of Swedish legislation concerning nature, environment, planning and building, there was an equivalent development in other countries, as well as the development of a significant number of international agreements. Sweden has currently ratified around 40 international conventions for the protection of the environment and management of natural resources. A selection of them are detailed below.

Swedish legislation

Laws and regulations for the protection, management and development of land and water areas are specific to each country. Naturally, certain common characteristics may be identified and in a number of cases there are international and European agreements which provide a common nucleus for the various legislation.

Green planning and green plans are not specifically regulated in Swedish legislation and do not have any actual legal standing. This does not mean the green planning and green plans are without value. Green plans function, for example, as an important way of accumulating knowledge, providing support material for other plans, some of which do have legal validity, and as guidance documents for measures and investment decisions. By understanding and reflecting in a strategic manner over how the "freer" green plan can slot into other legislation, it becomes possible to increase the likelihood of proposals made in green plans being implemented and safeguarded through other legally regulated measures.

In Swedish legislation, the Swedish Planning and Building Act (2010:900) and the Swedish Environmental Code (1998:808) are by far the most relevant legislation for regulations regarding land and water areas, but there are also a number of other pieces of legislation that it is important to keep track of.

The Swedish Planning and Building Act (2010:900)

The Swedish Planning and Building Act contains provisions on the planning of land and water areas, and on building. According to the introductory paragraph, the purpose of the law is, with regard to the freedom of the individual, to promote societal progress with equal and proper living conditions and a clean and sustainable habitat, for people in today's society and for future generations. The planning system consists of a regional plan, a comprehensive plan, area regulations and a detailed development plan. See also the section on green planning at other levels and

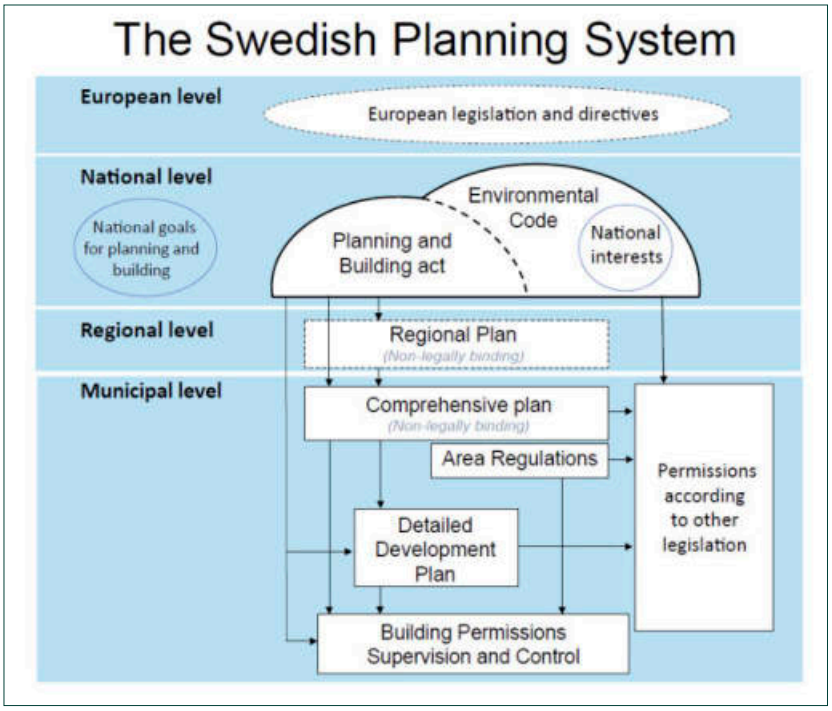

Figure 2.1.1. Structure of Swedish planning and building legislation.

Figure 2.1.2. Commonly used concepts in Swedish legislation concering greenstructure. Illustration: Caroline Dahl.

phases. Only the area regulations and the detailed development plan are legally binding documents, whereas the regional plan and the comprehensive plan may be seen as the overarching focus of the municipality over an extended time period, which leads to the production of detailed development plans and the granting of permits.

Under the Swedish Planning and Building Act different interests within society are weighed against one another and in the second chapter of the Act there is a list of public interests which should be observed along with how they should be approached. Land and water areas must be used for purposes that the areas are best suited for, with regard to their characteristics, location and needs. In the question of green structure, this means, for example, that consideration should be paid to natural and cultural values and environmental and climate aspects, and that a fit-for-purpose structure and an aesthetically appealing design should be given to buildings, green areas and communications lines. The second chapter of the Planning and Building Act also stipulates that planning must ensure that there should be parks and other green areas, as well as places suitable for play, exercise and other outdoor activities adjacent to areas with building developments.

Uses which entail good management of the areas should be given priority and consideration should also be paid to provisions about management of land and water areas in the third and fourth chapters of the Swedish Environmental Code. The Swedish Planning and Building Act stipulates that environmental quality norms which are regulated in the fifth chapter of the Swedish Environmental Code must be followed.

The Swedish Planning and Building Act not only regulates planning and building permits, but also the implementation of detailed development plans, which may be found in chapter 6. This chapter regulates the responsibility for construction of public spaces and how the costs for construction and maintenance should be allocated.

The Swedish Environmental Code (1998:808)

The Swedish Environmental Code has a number of sections, which to varying extents are relevant to green planning and green plans, not least the Right of Public Access. As described above, there is a link between the Swedish Environmental Code and the Swedish Planning and Building Act in questions of basic and specific management provisions, which appear in the third and fourth chapters respectively, and also rules regarding environmental quality norms which appear in the fifth chapter. The sixth chapter is also of

interest for green planning, as it regulates in what situations and how an environmental assessment of plans and programmes shall be carried out, including plans and programmes under the Planning and Building Act, the Roads Act and the Railways Act. In the drawing up of national marine plans, which are regulated in a special regulation on marine planning, the management rules in the Swedish Environmental Code shall also be applied, as shall the provisions for environmental assessment.

For environmental assessments the green plans may serve as a vital support documentation for assessment and proposals for compensatory measures may also be drawn from the green plans, if such became necessary. Compensation is regulated in a number of the pieces of law in the Swedish Environmental Code, but basically these have no bearing on loss of value caused by development. Instead, the Environmental Code regulates, for example, compensation when a measure means that an environmental quality norm is not followed, or encroachment into a nature reserve, an impact on Natura 2000 areas or an impact on aquatic activities and fishing. Compensation measures can also be decided on in conjunction with a permit being granted under the Environmental Code.

The Swedish Environmental Code also regulates protection of different areas, such as national city parks, nature reserves, cultural reserves, natural monuments, biotope protection areas, animal and plant protection areas, beach production areas, environment protection areas and water protection areas which are all tools relevant to green planning. The seventh chapter also contains regulations relating to the Birds Directive and Natura 2000, which are described in more detail below, and the eighth chapter is devoted completely to protection of biodiversity.

Heritage Conservation Act (1988:950)

By means of the Heritage Conservation Act our society lays down fundamental provisions for the protection of important parts of our cultural heritage. The Act contains provisions for the protection of valuable constructions, such as ancient monuments, archaeological finds, sacred monuments and certain cultural artefacts. The Heritage Conservation Act may have a certain relevance for green planning and green plans, perhaps primarily in the issue of whether green areas and natural areas may contain such objects that the law regulates and that these areas may need to be protected and taken into account in planning and management so that the overall environment can be preserved.

The Roads Act (1971:948) and the Construction of Railways Act (1995:1649)

The Roads Act and the Construction of Railways Act stipulate, exactly as the names suggests, rules and provisions for planning and construction of new transport infrastructure. The application of these laws happens in parallel with the Swedish Planning and Building Act and is integrated with the Swedish Environmental Code where the requirement for environmental assessment is regulated. The relationship of the laws to green planning and green plans is not explicit, but planning of infrastructure also needs good planning support material around green values, which green plans can provide. Proposals for new infrastructure objects need to be anchored in the municipal comprehensive plan which is regulated by the Swedish Planning and Building Act and with which the green plan often has a more active interaction.

The Forestry Act (1979:429)

The Forestry Act takes as a point of departure that the forest is a renewable resource that is to be managed sustainably yielding a good revenue.

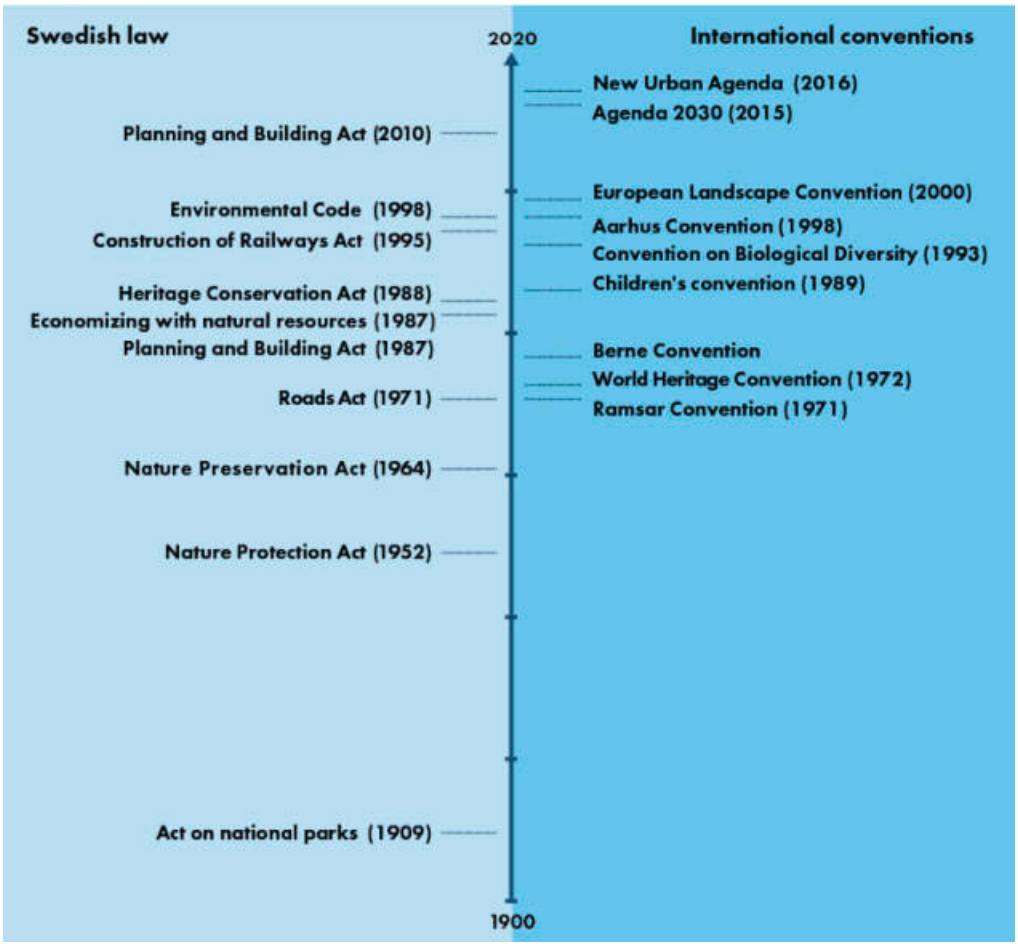

Figure 2.1.3. Timeline of Swedish legislation and international conventions.

At the same time there is an obligation to take into consideration nature, cultural heritage, reindeer husbandry and other interests, but the act clearly states that such consideration can't have an unfavorable impact on ongoing land use. The Forestry Act regulates both reforestations and clear fellings.

International agreements

A number of international agreements may support work with green planning and may also provide input into what a green plan may contain and what should be considered when developing the plan. Below is a list of a small selection of all the international agreements in existence, together with a short description of their content. In the illustration (left) there are some more conventions and international agreements which it can be worthwhile knowing about.

The 2030 Agenda & New Urban Agenda

The UN 2030 Agenda for sustainable

development contains 17 global goals which the member states have undertaken to implement by 2030. Certain of these goals stand out as more applicable to work on green planning, for example goal 11 on sustainable cities and communities, goal 13 on combatting climate change, goal 14 on oceans, seas and marine resources and goal 15 on ecosystems and biological diversity. Also, targets for equality, justice and education can have a bearing on the work with green planning and green plans.

The UN New Urban Agenda (NUA) was adopted at the Habitat III conference and later by the General Assembly and represents a vision for a more sustainable development of cities and urban areas. The agenda contains over 170 commitments which address different perspectives of sustainable urban development, though certain of them are specifically directed at the green values of cities and urban areas. For example, principal 37 commits to promoting safe, accessible green areas, which can improve health, along with social sustainability in its widest sense, while principle 38 commits to the importance of safeguarding natural and cultural heritage, through policy and planning. Principles 63–80 deal with ecological sustainability and resilient urban development and highlight the threats and difficulties attached to climate change, loss of biological diversity and pressures on ecosystems etc.

The Aarhus Convention

The Aarhus Convention is a European Convention which aims to safeguard the rights of individuals and groups in relation to environmental issues. These rights provide for access to environmental information, the right to participate in the environmental decision-making process, and the right to challenge decisions that have been made in contravention of the two aforementioned rights or any other environmental law. Essentially, the convention deals with the relationship between citizens and their governments, or state authorities, and perhaps has its strongest bearing on the processes carried out under the framework of green planning.

The Berne Convention

The Berne Convention is an international convention governing protection of flora, fauna and the environment. The convention produced lists of strictly protected plant species and strictly protected animal species, as well as protected animal species and prohibited methods of killing, capturing or in other ways exploiting them.

Convention on Biological Diversity (CBD)

The Convention on Biological Diversity, also known as the Biodiversity Convention, aims at multilateral work to preserve species, the sustainable use of resources and the fair and equitable sharing of benefits arising from genetic resources. The goals of the convention have been integrated into Sweden's environmental objectives. A review of the convention strategic plan is being carried out, with the aim of including more measurable goals and more clearly linking it to the global goals in the 2030 Agenda.

The European Landscape Convention (ELC)

The European landscape Convention states that the landscape is a common asset and a common responsibility. The convention aims to protect the different values and assets and to improve management and planning of the landscape, both urban and rural. The participation of the general public and the local community in this work is to be promoted.

The Ramsar Convention

The Ramsar Convention or the Convention on Wetlands is an international convention for the conservation and sustainable use of wetlands and

waterfowl habitat. The convention covers many different types of habitat, marshland, swamps, beach habitats, floodplains and wet grasslands as well as waterways and lakes and shallow marine areas. The convention means that specific areas, the Ramsar Sites, are highlighted based on their ecological, botanical or zoological significance, such as special water conditions or important water management functions. Most Ramsar Sites are fully or partially within the EU Natura 2000.

The World Heritage Convention

The Convention on the protection of the world's natural and cultural heritage is a global convention which aims to protect and preserve unique cultural and natural values. For a natural area to be included and highlighted, it must represent an important part of the history of the Earth, be particularly significant for the conservation of the biological diversity or be of exceptional beauty.

European strategies

The international and European agreements and conventions primarily state general targets. In addition to these, there are also strategies which give a more concrete direction to the work. Those strategies which are formulated at European level are usually implemented at a national level. The four strategies described below are of particular interest for work with green planning and green plans.

Green infrastructure strategy

The European Commission has developed a strategy for green infrastructure which aims to integrate green infrastructure in physical planning, from the perspective of protecting, restoring, recreating and strengthening. The strategy regarding green infrastructure is intended to be used when "green" solutions might provide a better, or complementary alternative to "grey" solutions.

The strategy states that there are many definitions of green infrastructure but proposes the following definition within the framework of its own work: Green infrastructure is a strategic planned network of natural and semi-natural areas with environmental values which has been designed and managed in order to take advantage of a range of different ecosystem services. Green infrastructure covers both green areas and "blue" areas, when dealing with marine ecosystems, and other land and water areas characterised by environmental values. On land, green infrastructure exists in both the countryside and urban environments. This network of green and blue areas can, according to the EU strategy, contribute to improved environmental conditions and thus to the quality-of-life of its citizens. Green infrastructure is also intended to support a green economy, create jobs and strengthen biological diversity.

The strategy evokes the need to develop, protect and strengthen the green infrastructure in order to combat the loss of biological diversity and enable ecosystems to contribute to humans and nature. The greater the scale and extent of adjacent areas and links there are in the green infrastructure network, the greater the benefits. The EU strategy for green infrastructure aims to set out how such a network may be implemented and encourage measures at all levels.

https://ec.europa.eu/environment/pubs/pdf/factsheets/green_infra/sv.pdf >>

Strategy for biological diversity

The EU previously formulated a strategy for biological diversity lasting until 2020. The strategy is now being reworked, the target being for it to be adopted in October at the UN conference on biological diversity in Kunming, China. The aim of the strategy is to protect, restore and sustainably manage natural habitats, species and ecosystems,

and to integrate biological diversity in EU policies and tools.

As a partner in the International Convention on Biological Diversity, the EU (and its member states) has adopted a series of strategies and action plans which aim to halt and reverse the loss of biological diversity. Measures taken have seen many successes, but the scale of the measures is deemed to have been too limited to reverse the negative trends. Other areas that the reworking of the strategy intends to deal with are insufficient funding and capacity and obstacles to the integration of the strategy and the convention. The ongoing assessment of the EU's strategy for biological diversity is expected to provide further insights into factors affecting success and failure which will inform the development of implementation instruments and measures in 2021.

The forthcoming strategy is expected to tackle the main reasons for the loss of biological diversity in the EU. It may include quantitative targets and measures to:
- protect nature and increase the extent of and effectiveness of protected areas by building on the Natura 2000 network,
- restore damaged ecosystems, including the carbon rich ecosystems, to a good ecological state and to improve the flow of crucial services which they provide,
- promote a sustainable use of forests, agriculture, marine environments, freshwater and urban ecosystems,
- integrate considerations of biological diversity into other EU policy areas and address the EU impact on global biological diversity,
- enable the implementation of the strategy by ensuring sufficient economic resources, improving knowledge, and engaging citizens and stakeholders in various sectors.

https://ec.europa.eu/environment/pubs/pdf/factsheets/biodiversity_2020/2020%20Biodiversity%20Factsheet_SV.pdf

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12096-EU-2030-Biodiversity-Strategy

Natura 2000

The Natura 2000 network constitutes the backbone of the green infrastructure in the EU. Natura 2000 is a network of core breeding and resting places for rare and endangered species and some rare natural habitats which are protected in their own right. It covers all 27 EU countries, on land and at sea. The aim of the network is to safeguard the long-term survival of the most valuable and endangered species and habitats in Europe, covered under both the Birds Directive and the Habitats Directive.

https://ec.europa.eu/environment/basics/natural-capital/natura2000/index_sv.htm

https://www.naturvardsverket.se/natura2000

The European Green Deal

The European Green Deal is a growth strategy for a transformation into a modern, resource-efficient and competitive economy. The roadmap with its measures was launched in December 2019 and describes what investments are needed, what financial tools there are and how a fair transformation for all may be ensured. The Commission will set out proposals for green European cities, raising biological diversity in urban areas as one of the priority targets.

https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_sv

2.2 DIFFERENT LEVELS AND PHASES

The planning takes place at different levels, with various stakeholders. The planning is also a practical activity where importance is attached to the process, not only the end product (the plan).

Green structure planning and the green plan constitute a part of many processes happening side-by-side which try to relate to other relevant processes and plans within a larger chain of planning. The planning and the plans also have different functions in different phases of the planning process. It is easy for this to become very complex, but there are also structures and systematic thought processes regarding how everything links together which can help an organisation navigate through and position its own work within green structure and green plans.

The illustration on the right takes the starting point of the process in the Swedish Planning and Building Act to describe how the comprehensive planning chain is interlinked. Green planning and the function of the green plan are different at different geographical levels and in the various different phases. At certain levels the green plan comprises support material for other plans, while at other levels it comprises an independent action plan for different measures. It is therefore important to think through in what other ways the green plan can be used and how it can best penetrate into other levels and other phases. The section below discusses some of these levels and phases.

The national planning level

With the exception of national maritime planning, and to a certain extent infrastructure planning, which are described above, no planning which has a bearing on the use of land and water areas, thus green planning, actually takes place at the

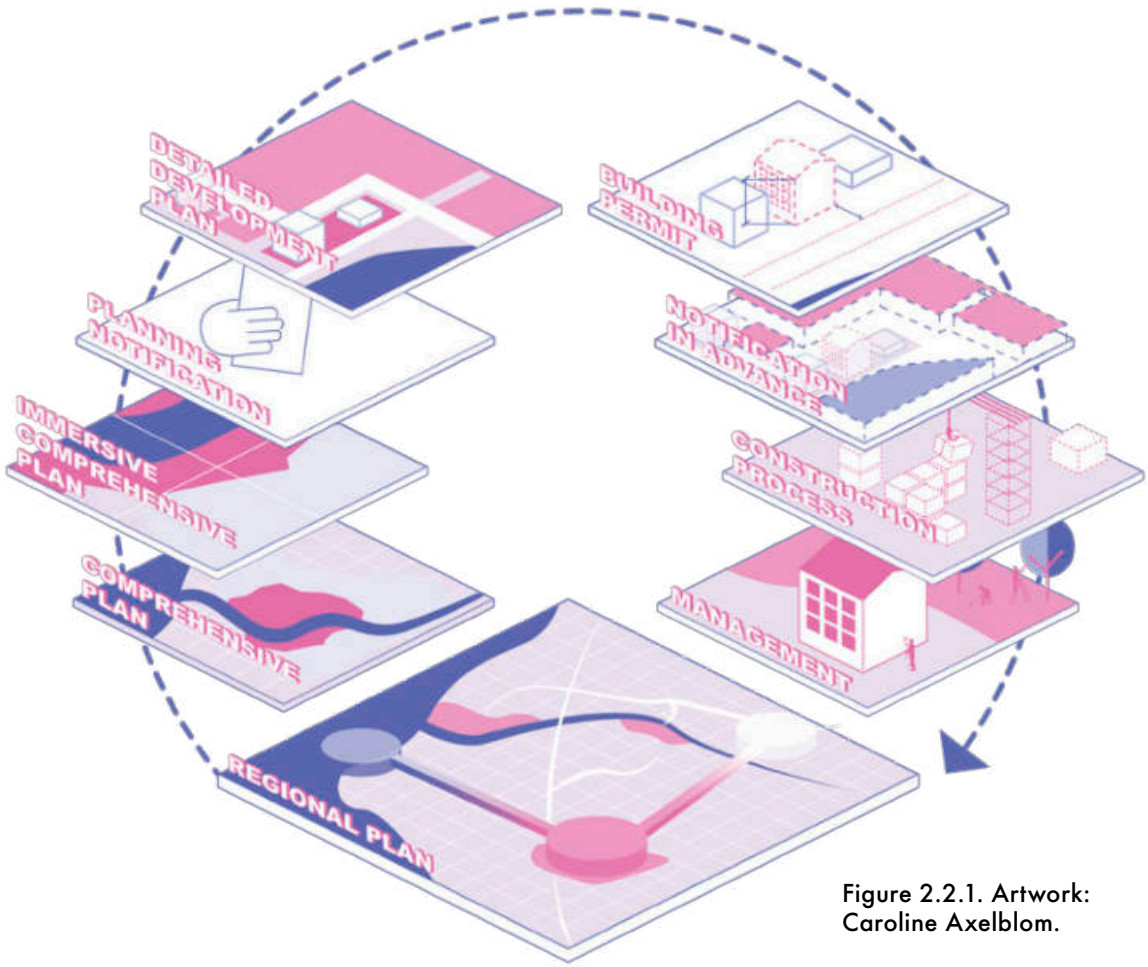

Figure 2.2.1. Artwork: Caroline Axelblom.

national level. Land use planning in Sweden is almost exclusively decentralised to the municipal level, via the set of areas of responsibility which is popularly called ”the municipal planning monopoly” which is regulated in the Swedish Planning and Building Act.

Rather, at the national level, consultation and guidelines which have an effect on planning are formulated through central bodies, such as: the Swedish National Board of Housing, Building and Planning; the Swedish Environmental Protection Agency; the Swedish Civil Contingencies Agency; the Swedish National Heritage Board; the Swedish Agency for Marine and Water Management; the Swedish Transport Administration. Support material is also developed to form the basis of other planning. A lot

of the appraisal and interpretation of the support documentation for this sector takes place during municipal comprehensive planning and via the county administrative boards inspection of the latter. "National interests" (Riksintressen) is a significant support material formulated at the national level. This is regulated in the third and fourth chapters of the Swedish Environmental Code and touches on both the values that need to be protected from development – for example conservation, cultural heritage conservation, outdoor recreation (friluftsliv), coastal zones – and those values which are protected in order to be developed. Potential goal conflicts between these are appraised in the comprehensive plan.

At the national level, decisions can be made which have an effect on the actual use of land via the institution of protection for different areas, for example nature reserves and culture reserves In practice, however, such decisions are not made without the relevant municipality being in favour.

The regional planning level

The regional planning level is relatively new in Swedish spatial planning. Until just a few years ago the Stockholm region was the only Swedish region which, according to the Swedish Planning and Building Act, had the obligation to prepare a regional plan. Since 2019, this obligation has also applied to Region Skåne. The regional plan is not legally binding, but it is an important strategic document for the region and municipalities.

The fact that so few regions are obliged to carry out regional planning does not mean that other regions do not have an input into the planning process. Regions, municipality associations, and county administrative boards are key stakeholders who contribute regional planning support material for municipal green structure planning. Larger landscape contexts and green structure issues become apparent at a regional scale which is important, not least for inter-municipality coordination.

Region Skåne is a stakeholder who, together with the 33 municipalities within the region, has worked for a long time to produce support material for municipal planning in the region. "Structure aspect" (Strukturbild) is one such task which has aimed at analysing regional planning and supporting the municipalities with their planning. In 2003 Region Skåne also put forward a strategy for green structure in the county of Skåne. This was also developed in collaboration with the 33 municipalities. It was updated in 2011. The strategy shows how the core areas and corridors in the region can be developed with the aid of new corridors and strips to create a new regional structure across municipal borders. The strategy also provides recommendations and guidelines for green structure in the municipalities.

The county administrative board is another stakeholder at the regional level, which has a number of areas of responsibility related to the planning of land and water areas and green structure planning. Within physical planning, which is regulated under the Swedish Planning and Building Act, i.e. comprehensive planning and detailed development planning, the county administrative board takes responsibility on behalf of the state for handling certain issues, for example ensuring that national interests are met. In addition to their formal duties, the county administrative boards are also responsible for providing support material regarding public interests which are regulated in the second chapter of the Swedish Planning and Building Act. This might, for example, mean natural and cultural values, environmental and climate aspects, risk and vulnerability issues etc. Thematic support material is often compiled for the county.

Figure 2.2.2. Artwork: Caroline Axelblom.

The county administrative boards in Sweden are also mandated by the government to produce action plans for green infrastructure. The aim with these action plans is, among other things, to contribute to increasing knowledge about the landscape and to increasing the focus on ecological relationships in the landscape and the need for climate adaptation. These action plans are expected to be designed so that they can be used as support documentation prior to a decision on use of land. This mandate was issued under the framework for the parliamentary bill 2013/14:141, "a Swedish strategy for biodiversity and ecosystem services". The Swedish Environmental Protection Agency has produced a roadmap for the mandate regarding which common terms, methods and guidelines for obligatory content are provided.

The municipal planning level

As previously mentioned, the Swedish municipalities have a strong influence over the use of land and water, and there are a number of processes and formal decisions which concern green planning and green plans. The planning process is usually described as, besides operating at different scale levels, also consisting of simultaneous phases: planning-building-management. These processes are related to green planning and the green plan in different ways. The issues that the green plan needs to provide answers to on the different scale levels and in the different phases vary.

Planning

Also, regulations about comprehensive planning and detailed development plans are to be found in the Swedish Planning and Building Act. Both the comprehensive plan and the detailed development plan are treated politically and consultation with relevant concerned parties and the public is required. The county administrative board expresses its opinion over the plans and also tests their legal validity after they have been adopted.

The comprehensive plan sets out the municipality's intentions regarding future land and water use, and how it is intended to care for the existing environment. The comprehensive plan is not legally binding but it is a clear vision for the

development in the municipality and serves as support documentation for the municipality and for other authorities in issues regarding decisions on land and water use. The position adopted relating to revision is that the comprehensive plan should be reissued every fourth year, with ongoing revisions as and when necessary. The comprehensive plan always applies to the whole of the municipality but a plan may be drawn up for specific topic areas or smaller geographical areas. In such cases it is called a detailed comprehensive plan. The relationship between the green plan and the comprehensive plan is primarily that the former functions as a knowledge base for the latter, but the comprehensive plan may also contain specific measures listed in the green plan and weigh these against other public interests, thus strengthening support for their implementation. More about the green plan as support material in chapter 2.3.

A detailed development plan is drawn up when a change of use or design of land and water areas is planned. The detailed development plan is, in contrast to the comprehensive plan, legally binding and an important part of its writing is regulating responsibilities and legal validity on the implementation of the detailed development plan. The relationship between the green plan and different detailed development plans may be of many different types. The green plan serves as a

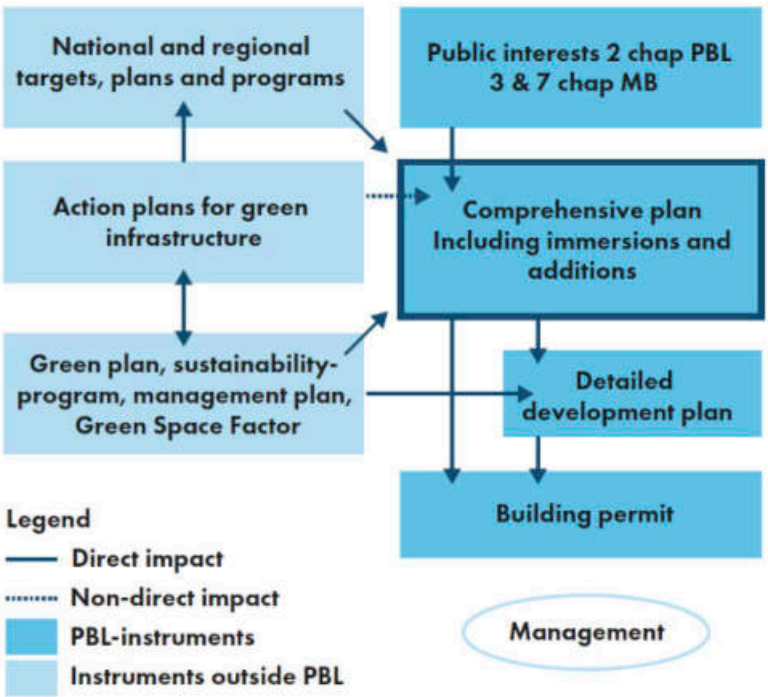

Figure 2.2.3. Planning support material.

knowledge base for the detailed development plan, just as it is for the comprehensive plan, and can then contribute to attention being paid to essential green values in the area for which plans are being made; these values are also safeguarded with preserved use by means of being regulated in the detailed development plan. The detailed development plan is also able to propose new green structures which can contribute to achieving targets regarding both the extent and the connections of the green structure, which may be set out in the green plan.

The green plan is not regulated in any specific legislation, but is rather a municipal policy document which is often treated in a political way. Green plans began to be common in the municipalities during the 1980s and were initially primarily focused on parks and playgrounds in urban areas. During the decade since that, green planning has developed to become a broader concept which applies to all areas covered with vegetation or water. Another shift is that the green plans initially dealt primarily with recreation, whereas now they also cover conservation, green cultural heritage, ecosystem services, green infrastructure and other issues linked to green structure. At present green plans or green structure plans function as a general strategy for all values linked to areas with vegetation or water. This strategy is often one of the three key structures in comprehensive planning, along with building structure and traffic infrastructure. Green plans consist of both analyses and guidelines for physical planning and they often contain a strategic map and action plan for the forthcoming period.

Conservation planning is, in contrast to the green plan, directed at protecting important areas, primarily in terms of their ecological value. Other, more detailed strategic plans are also drawn up, usually in the municipalities, regarding special

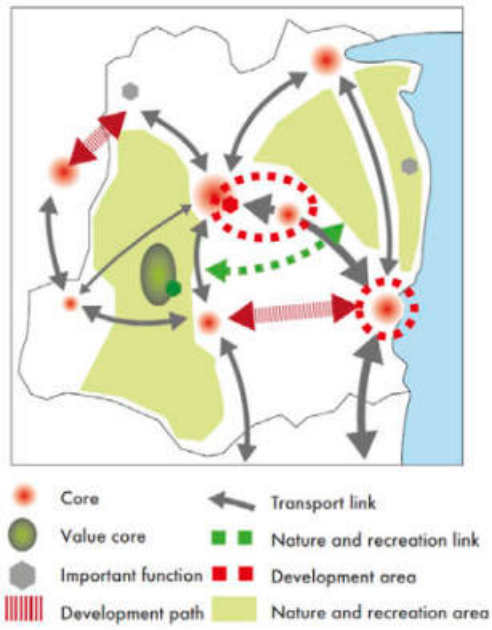

Figure 2.2.4. Development strategy in accordance with the Swedish National Board of Housing, Building and Planning model, with core value areas, natural and recreational areas and natural and recreational connections. The connections are represented by lines of thick arrows in order to stress that the district will not be developed exactly following the line. The land strip may not necessarily have to be contiguous if it is primarily ecological values that are to benefit from the strip. Many species are able to pass through environments which are not optimal for them if there are no strong barriers. If it is recreational values that are to be connected together this may happen via existing foot and cycle path networks on certain stretches which means an unbroken green structure would not be necessary.

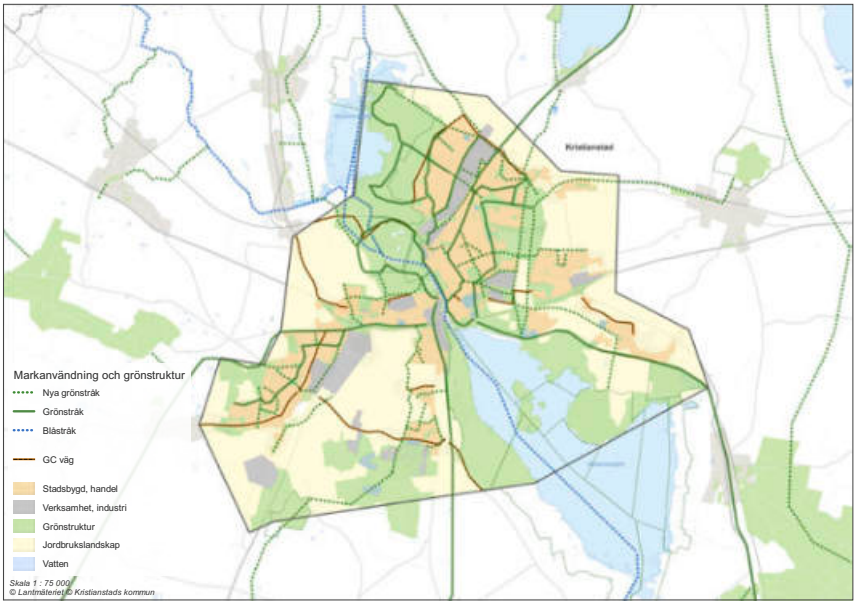

Figure 2.2.5. This figure shows land use in the comprehensive plan model, with the green structure marked in green, the traffic infrastructure in red and the building structure in yellow and orange for urban and built up areas and brown for business and commercial activities. Functioning green strips are continuous lines while development strips are shown with broken lines. For recreational connections, corridors are needed while ecological connections may function by means of a series of islands if the surrounding environment is not too hostile.

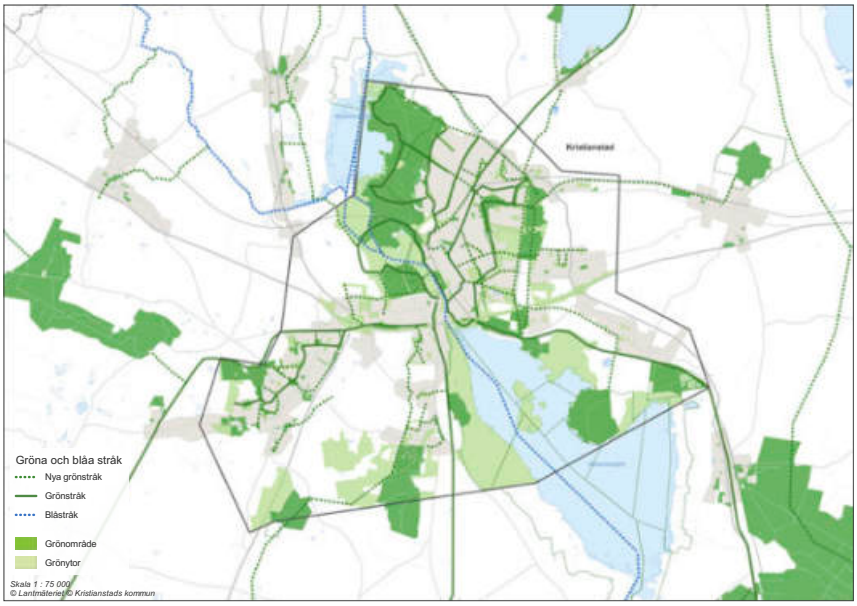

Figure 2.2.6. Here the comprehensive plan model presents a complete picture of the green structure for the comprehensive plan. It is this picture that the green plan should provide support material to. Note that the green plan is a sectoral interest which presents what is needed to develop the green structure in the best way, while the comprehensive plan is a weighing of priorities between the three structures – building structure, traffic infrastructure and green structure – wherein it is not possible to implement all of the intentions of the green plan.

topics such as outdoor recreation, water management, parks and green areas, climate adaptation, and green accounting. It is not possible to draw general conclusions or give general advice regarding the relationship between these plans and the green plan since nature-specific and organisational conditions often create specific frameworks for the work. To define how the different plans relate to each other is, however, general advice.

Construction

The implementation phase in the spatial planning process also involves a building phase, but the actual building can equally consist of construction and investment. Along with the implementation there are many contracts, permits and agreements which may have a bearing on green values, such as planning permission and building permits under the Swedish Planning and Building Act, as well as civil contracts such as land use contracts and land allocation agreements. To the extent that measures or investments are to be ensured by this means, the green plan may function as a knowledge base, or an action plan here to, if the measures are more forward-looking.

Planning support material

Green plans should function as support material for the comprehensive plan and provide support for the weighing up of priorities which needs to be carried out between different public interests. In the Swedish National Board of Housing, Building and Planning's figure the action plans for green infrastructure are marked as important regional planning support material, along with national and regional goals, plans and programmes. The comprehensive plan then acts as the support documentation for the detailed development plan and building permission, along with recommendations in the green plan. Green planning is then implemented via planning of ongoing and periodic maintenance and management.

The comprehensive plan

The comprehensive plan is the most important planning instrument in the regulation of land and water use which promotes ecosystem services and sustainable use of the green structure. The Swedish National Board of Housing, Building and Planning has presented a model for the comprehensive plan, wherein the green structure is one of three important elements. The green structure is presented in a development strategy, which is an overview of the development of construction, traffic infrastructure and green structure and in a land use map, where green structure is presented as existing or new green public areas (parkland, natural land and water) and as strips, both existing and development strips. In both the strategic parts a position adopted for the three structures regarding how they are to be prioritised in land use. Building structure needs to be integrated into the green structure in order to have attractive and healthy residential, school and working environments, while at the same time construction development should not be placed where there are currently high green values or connections. The traffic infrastructure often presents barriers to green connections and should not be placed where there are high green values, either. Good green planning means, therefore, an avoidance of areas and connections with high values, while also enabling the development of the green structure by means of allocating resources in the development budget to create new green values.

The green plan

Green plans should give an overall view of the values of the green structure and involve weighing up of priorities between different value aspects within the green planning. For example, there are areas with rich bird life, where outdoor recreational activities (friluftslivet) would be disturbing, so the choice must be made as to whether the

birdlife will be prioritised or not. Recreational activities can often be channelled to birdwatching towers were the disturbance is minimal, while the enjoyment for the birdwatchers is great. In other areas, it might be stormwater management which is prioritised over landscape values. It is often, however, a question of coordinating different values within the same green area in a multifunctional green structure. Ecosystems are, in themselves, multifunctional, providing many different ecosystem services to the benefit of humans. The content, structure and methodology of green plans is presented in more detail in chapter 4.

If the green plan looks at specific parts of the municipality, for example, population centres, these might be called detailed green plans.

Administrative planning and other aspects of green planning

In order to implement green planning, it is often necessary to have a more detailed approach, knowledge base and planning support material. For conservation planning, a conversation plan or programme is created; for outdoor recreation planning an outdoor recreation plan or programme is created; for landscape values a landscape plan or programme is created. The structure becomes clearer if these documents are linked to the green plan, which in turn is linked to the comprehensive plan. The municipalities do not always create special strategic documents for all parts, as these parts may well be treated as parts of the green plan or parts of a comprehensive plan, without a separate document.

One of the most important parts of green planning is administrative planning of land owned by the municipality itself. These may be called the park plan, the forestry plan or something else which refers to the future development and management of land. Green planning has its roots in precisely this planning and renovation of parks and green spaces in urban areas. In some municipalities the green plan is also used for this type of document, while most municipalities have raised the concept of the green plan to the level of comprehensive planning.

Land development, building permits and design

Implementation of green planning often takes place via a development project where the green plan serves as the support documentation for the development contract, land use contract and later the building permit which sets into action design and construction itself. It is important that green planning follows all the stages in order for it to be able to be implemented in a good way in the overall development planning process.

The City of Freiburg in the south of Germany is known as one of the most sustainable cities in Europe. Green structure planning is ambitious with large green areas in the vicinity of the city and access to an abundant number of parks and smaller green areas within the city. Water is present throughout the city both as natural streams and as constructed catchment gutters for rainwater in the Medieval city centre. New urban districts are established on ecological principles integrating energy savings and low waste policy for construction material with a green environment. Photograph: Per Blomberg, 2019.


Fürstenberg

2.3 TARGET GROUPS

As there is a clear link between the green plan and the comprehensive plan it is an important general strategic document which should be dealt with in the political decision-making process. Therefore, the political entities in the municipality are an important target group.

In a representative democracy the political representatives reflect the general level of knowledge in the community and the green plan needs to be presented in an informative way so that the contents and messages are clear and easily accessible for everyone. For specialists in the different aspects of green planning this is a challenge and there is often the need for help from other professionals in the fields of communication and illustration. It is also important not to present too much information, which is time-consuming to read and take in.

Those who will use the green plan most in their daily work are the permanent officials in the municipality. They are and important target group, but since they have many different specialisations, the challenge here is also to create material which is accessible and instructional. For physical planning it is important that the material is clear and provides support for different priority judgements between different interests. Such clarity often requires simplifications and prioritisation which can be very difficult to effect within and between the wide range of values which occur in the green structure.

The general public is also important target group, which needs to gain an insight into what the municipality is suggesting, deciding and doing in their management of municipal land. The general public also needs a clear and informative presentation of the contents of the green plan. Of particular interest here is information regarding where it

is possible to enjoy recreational, outdoor activities and what recreational values may be found in different places. This often results in source of travel guides or maps with information about qualities and ease of access.

Private land owners and business people who build or operate hospitality businesses or other activities which are dependent on land use also have an interest in the approach and knowledge base of the green plan. Early information on the municipality's intentions regarding catering for the public interest helps this group to assess the effects of changes to land use and to carry out a dialogue with representatives for the municipality regarding alternative measures and compensation measures. In other cases, the values in the green structure may stimulate entrepreneurs and land owners towards measures which strengthen and develop the green structure and ecosystem services.

This variety of different target groups means that it is difficult to compile a strategic document which reaches everyone and does what it is required to do well. It may be advantageous to divide the green plan into different parts, in order to better adapt to the different target groups and their needs. For example, the knowledge base and the plan itself could be placed in different documents in order to make the material more accessible Many municipalities initially adopt a green strategy with overall goals and strategies, and then a green plan with more concrete suggestions of measures and planning support material. It may also be advantageous for the action plan to be presented separately, thus making it easier to update it more often than the actual plan itself.

2.4 CONFLICTING GOALS

In local planning and prioritisation between individual and communal interests there are conflicting goals which it is important to keep in mind. Even within green planning there are conflicting goals and this is something that must be presented in the green plan.

Conflicting goals

These conflicting goals, between preservation and development, between management of agricultural land and development of green structures and urban development and between different types of recreation and friluftsliv are difficult to resolve.

Dilemmas and challenges

Private land

One important dilemma in green planning is how it relates to private land. Many green plans only cover municipal land while others have support material and analyses of all the green structure while proposals for measures and planning support material are focused on publicly owned land. In order to understand the functions and values of the green structure is important to take all land into account. Lundgren Alm (2001) defines this dilemma with using the concepts formal and actual green structure. If not all land is taken into account it is very difficult to adopt a position on biodiversity and ecosystem services. Certain green areas in development districts are viewed and used as public spaces, for example garden areas around residential blocks, and should be integrated in the green planning.

Landscape values forgotten

Green planning has primarily focused on recreational and ecological values and functions and often misses other values such as green cultural heritage, aesthetic values, educational values, and regulating ecosystem services. The fact that comprehensive planning divides up the landscape into

building structure, traffic infrastructure and green structure which are all covered by cultural heritage values is a challenge to the conservation of cultural environments. It is not efficient to prepare three different sets of planning support material for the conservation of cultural environments, but it would be desirable to select out information about green cultural heritage from the cultural environment conservation planning support material. There are tools which relate to the aesthetic and educational values of the landscape but they are often accorded low significance in municipal and regional planning, since they are, to a certain extent, subjective The issue has become topical within wind power planning and also through the European Landscape Convention.

An urban perspective

In green plans there is often a focus on urban areas, with the rural structures not being dealt with or at least not as fully. It is problematic that planning in general has an urban context and models and assessment support need to be developed in order to better take into account values and challenges of the whole landscape.

The green plan has a history within parks planning

Green plans have a history of often relating to management and administration which creates a problem since the term is also used for comprehensive planning. In this context it would probably be beneficial if the strategic document dealing with administration were to be called something other than green plan.

Plan and programme

The concepts plan and programme both create confusion in green planning as they are used for the same thing more or less equally frequently. One possible distinction is that programme tends more to contain strategies and measures for what the municipality wants to achieve while plan is more to do with planning support and guidance material. The result ought to be that a plan is a more focused document relating to physical planning while a programme would be a larger document since it often contains the concept of a plan.

No clear quality requirements

Green planning does not have any clear requirements regarding what is good quality in the legislation, something which does exist in building regulations and in traffic norms for roads and parks. The municipalities must themselves define what is good quality, good distance and sizes and assets and accessibility.

Supply and demand

There is a contradictory relationship between how supply and demand in green areas are viewed. Demand is based on people's needs such as recreation, enjoyment and health, while supply is based on preservation of green spaces in order to protect the landscape and natural values. This runs the risk of dividing the landscape into protected landscape and developable landscape, and its

based partly on the various guidelines within the Swedish Planning and Building Act.

Densification issues

The vision of densification presents a great challenge to green planning since green areas are at risk of being developed and thus more must share the existing green structure, and different types of green qualities, which are necessary for children, are at particular risk of being depleted. Size is significant in questions of enjoyment qualities and is at risk as areas are whittled away at the edges.

Inaccessible knowledge bases

Municipalities sometimes choose to involve green plans in comprehensive plans and detailed comprehensive plans, but then it is often not possible to give an account of those analyses and knowledge bases which underlie the positions adopted. One model is to release special reports on the different knowledge bases and reports which have been produced.

Land development focus on buildings and roads

It is a challenge to get development work to adopt a broader view of development and to see the opportunities for the development of green structure as an equally important aspect of the municipality's attractiveness as the development of buildings and traffic infrastructure. The development of facilities and buildings provides income but, for the overall good, green structures need to include land allocation agreements and development contracts.

The principle of balance

The principal of balance means that the qualities of public values must be balanced after a change in land use, either within the area or in the landscape as a whole. How can the principle of balance be worked into green planning and become an effective tool?

A large number of different strategic documents

How do all of the strategic municipal documents relate to one another and what hierarchy would be preferable? It is difficult for both administrative officials and political representatives to navigate their way through the many strategic documents, and to know which should be prioritised. Moreover, different strategic documents often have interests and goals which conflict with each other.

The challenge of user involvement

How is it possible to work user involvement and participation into green planning? Increased participation produces greater engagement with and concern for green values. User involvement in planning and administration strengthens social capital and democracy. It is, however, a challenge to find a way for responsibility issues, continuity and quality assurance to be implemented with user involvement in administration.

A broad range of competencies is needed

The significance of involving many different competencies and "sets of eyes" in municipal green planning. It is easy to let the planning be run by the "boffins" There is often insufficient knowledge of green values in the municipalities.

Handovers

It is often in the handover between different phases in the green planning that problems arise. There are both organisational obstacles and difficulties in clearly transferring responsibility and mandate between the phases. Difficulties arise in particular in the handover from the municipal administration and the development phase and once again back to the municipal administration post development Functioning systems for operational compensation and audits are important.

Mandates

There is often no clear mandate for the implementation of a green plan, even though it has been adopted. Access to resources for implementation and follow-up are crucial for successful implementation.

Organisational resilience

How is it possible to strengthen the memory of an organisation and transfer knowledge between different officials, elected representatives and new employees. Are there protocols for descriptions of processes, gathering of knowledge and GIS support data? Are there opportunities for knowledge transfer and training? Is the project properly staffed and are posts organised in such a way as to make the organisation less vulnerable?

Evaluation

Who lays down the values of the green structure? Is the emphasis on development, or preservation, everyday landscapes or unique environments, specialists or the general public?

Project partners in the UL2L project visiting the "health garden" in Tivoliparken in the city of Kristianstad, Sweden during a workshop in spring 2019. The health garden is a publicly accessible part of the city park where different groups of people with special needs facilitates activities and contributes to the maintenance of the garden. A "friends of garden" association supports the activities and many inhabitants of the city frequently visits the peaceful environment in the city centre. Photograph: Per Blomberg, 2019.

Comments from researchers

Green planning for the city landscape and land ownership dilemmas

One dilemma for green planning is that the municipality only has the opportunity for consultation regarding municipally owned and managed land, while many ecosystem services and ecological connections do not respect any administrative boundaries. The biodiversity of the city benefits greatly from private gardens, derelict sites and from the fact that there are spatial and historical variations for the biotopes in the city to develop in. The trees in the city play a crucial role for the city's birdlife, water circulation and air quality, but those trees which grow on privately owned land have not been factored into many green plans. Private trees often cover a large proportion of the land in the city, but they have no specified significance in the green structure of the city. While large gardens with a long continuity, (small parts of which may have been left unattended for decades) are absolutely crucial for certain species, small impervious lots can have a negative effect on water drainage. Or rather: if one garden is concreted over it makes a difference, but if one hundred owners do the same it has an effect on the ecology and water balance in the city.

It is not so easy to determine how much of the city is actually covered by the "green structure". It is partly a question of time Nature takes over everywhere where we do not clear and remove "weeds", so what may be an "impervious" surface now might be a meadow full of flowers in a few years (if the land is not put to use). What we count as green structure is to a great extent dependent on what boundaries we are in the habit of including and maintaining. A road in a park is counted as "green" even if it is long and wide. A street with the same dimensions is, however, not counted in the green structure. It might seem right, from the intention of summing the green resources of the city, but it also means that the same street will probably never be planted with trees, as it is not viewed in the context of green planning. There is, therefore, a fundamental difficulty in deciding what is green structure and what is not. This is partly because there are hidden arguments (such as the fact that the municipality does not propose changes for private land), and also because the snapshot view of the city greenery is static. It represents a certain moment in the development of the city landscape but does not reflect nature's dynamic or the continually changing relationships between humans and their environment.

It is difficult for us to avoid these dilemmas, and we must to a great extent live with them. Pointing out how they impact on (and to an extent limit) green planning does not in itself diminish the need for green planning. Green planning is necessary, both to preserve existing green values and ecosystem services and to prepare the way for more. Highlighting the dilemma and limitations may, however, hopefully serve as a reminder that even the best of green plans contains some inbuilt problems (because a map only shows a momentary picture), and is perishable, in permanent need of updating. Limitations related to land ownership perhaps do not need to be decisive in all phases of green planning. During the gathering of information and when analyses and planning support material are being created, "the green" may be mapped with a more "ecological" perspective than

is possible when measures are being proposed that will be implemented by the roads or parks departments (there are examples of green plans which establish such difference regarding the scale of the green structure at different phases). If there is knowledge about how privately owned land could also contribute to ecosystem services in the city, there is also reason for different types of cooperation between owners and managers, which could expand green planning to include all land, water and vegetation that are relevant, regardless of ownership.

What is private and what is public is not always completely clear to those moving around the city, either. Graveyards are open to the public but are owned and maintained by the Church. Swedish style "communities" are communally owned, but operated by a number of private stakeholders, while they are intermittently open to the public. A large number of hedges and other "natural curtains" have private land on one side and public land on the other. In residential blocks it is still common for yards gardens and passageways to be open to the public. The "gardens" are be attended by the parks department even if they are only used by those who live there.

So, what is not part of the green structure? Perhaps this question is not at all interesting. That all streets and squares may belong to the green structure is self-evident to everyone who has ever observed the city from above and observed that the land is not always visible under the tree crowns. In recent years it has become clear that buildings may also be part of the green structure. Green façades, such as climbing plants with roots in the earth, or continual planting at height, are used more and more in the crowded city to contribute to ecosystem services. Technology and materials for roof gardens are continually improving, providing one way of offsetting reduced green space at ground level. These green aspects are clearly important to observe in the overall understanding of greenery in the city that green planning wants to provide. The map in the documentation produced is not sufficient to show them, as they are sometimes horizontal (in the case of façades) and sometimes superimposed over another function (as with roof gardens).

Finally: as inhabitants in the city we do not experience spaces and functions, we live in an urban landscape which changes when we move, which is changed by the presence of other people and activities and which changes materially over time. What is public and what is private is sometimes clear, but often not, since the landscape we experience often contains privately owned parts. We experience the effects of green planning in different ways as increased green features in the urban landscape. These green features in the urban landscape may be small or large. They may be new (such as urban farms or stormwater measures) or consist of cultural heritage which has been made accessible. In order that the green planning analytical maps, with their separation of values, (necessary for fact-based work going forward) may be used so that they bring desirable improvements to the city as a habitable environment, it is necessary that, in all phases of green planning, they relate to the actual city landscape, as it is experienced and used by the people of the city, regardless of ownership.

Gunilla Lindholm

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3. PREPARING A GREEN PLAN

The town of Todi in Umbria, Italy is a characteristic medieval town located on top of a high hill that provided protection during hostile times. Today, the slopes surrounding the old town comprises a green belt and modern buildings are constructed in the agricultural fields below. The green slopes are an important asset for recreation and they also help to reduce the risk of erosion and landslides.

Photograph: Per Blomberg, 2018. Artwork: Caroline Axelblom.

3.1 STRUCTURE AND CONTENT

Preparing a green plan is often time-consuming work that requires a well-thought-out process and structure adapted to the conditions within the area in question. This chapter aims to provide recommendations on how the process may be designed and which aspects are important to consider in this work. We begin with suggestions for content and structure before moving on to the process.

The purpose of the green plan can be divided into four main parts: a knowledge base that compiles and expands on existing knowledge; a strategy that sets out the overall conclusions that the project organisation supports with respect to green planning and which makes the strategies clear to officials, politicians, and the public; planning support material to be used in the comprehensive planning and balancing of other structures, public and private interests; and an action plan to clarify how the organisation wishes to work with green planning in the future and which guidelines and actions they wish to work with. A number of topical programmes and plans that clarify parts of the green planning may also be tied to the green plan, for example regarding outdoor recreation, nature conservation, park development, stormwater

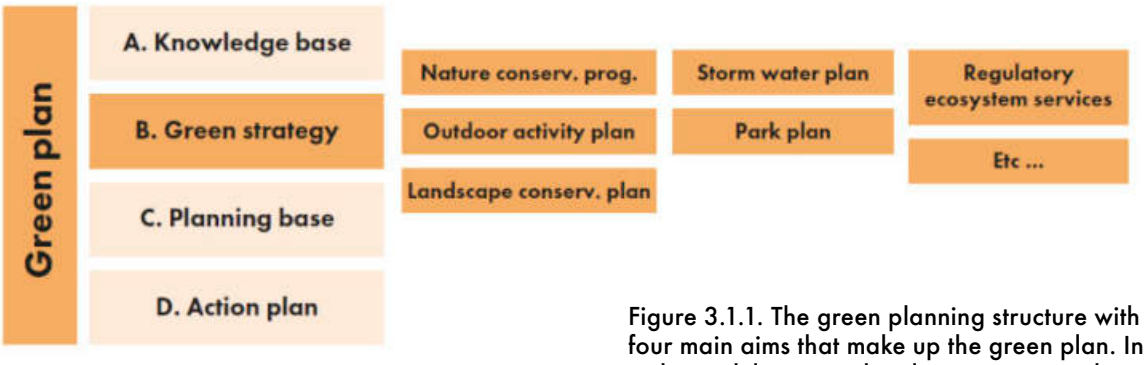

Figure 3.1.1. The green planning structure with four main aims that make up the green plan. In order to delve more deeply into certain subject areas, the organisation can prepare special programmes and plans such as park plans, conservation programmes, outdoor recreation plans, stormwater plans, and landscape conservation plans.

matters etc. It is preferable to make clear how the various strategic documents relate to one another and what gaps in knowledge there are that should subsequently be filled.

Knowledge base

A knowledge base provides the background to the state of the green and blue structure in an area and also provides information to the public, schools and others on the locations and qualities to enjoy in the area. The first time the municipality or region prepares a green plan, it is natural to spend time and resources on compiling the existing knowledge base and filling in the knowledge gaps. It will then be easier to update the knowledge base upon future revisions and to supplement when necessary.

Green strategy

A green strategy is a policy position regarding the comprehensive goals and the course of green planning. The green strategy clarifies to the organisation which considerations shall be made and saves time in ongoing spatial planning.

Planning support material

Planning support material is necessary for the comprehensive planning and also for the ongoing management of the municipality's public land and water zones. When the urban areas expand, it is important to have innovative green structure together with other green areas and greenways. The comprehensive plan establishes a balance between green structure, building structure, and traffic infrastructure, but only on a general level. The green plan's planning support material may be detailed and provide guidance for balancing detail planning, building permits, and the management of public spaces and other municipal land.

Action plan

An action plan demonstrates how the green plan shall be executed and what resources are needed for its completion. It is also preferable if the action plan clearly sets out responsibilities and a timetable

Figure 3.1.2. Eskilstuna municipality has chosen to coordinate the revisions of their nature conservation programme, outdoor recreation plan, and green structure programme in a new green plan being adopted during the spring of 2020. The Green Plan has three parts, consisting of goals and green strategies, guidelines, and policy proposals, as well as background material such as a knowledge compilation. Artwork: Ekologigruppen, preliminary version.

for the execution. Certain municipalities tie a specific budget and project organisation to the action plan, others refer to the standard budget negotiation for considerations on which measures to implement within the existing organisation structure.

Contents

The content of the green plan is mainly dependent on which target groups and which objectives are deemed most important. If the organisation chooses to prepare a general municipal strategic plan for the entire area of interest, which includes value aspects within green planning, we recommend the following:

1. Introduction

What is this document and who has participated in its preparation? What is the status of this document and how does it relate to other strategic documents and comprehensive goals? Is this document a knowledge base, planning support material, administration support material and/or decision-making support material?

2. Description of green and blue structure

In order to provide a background to the various positions taken in the green plan, it is necessary to have a summary of how the green and blue structure is designed in the area in question and which relevant analyses have been carried out to better understand values and deficiencies. This description is a knowledge summary with the important function of spreading knowledge about the green structure and educating the organisation on these values and functions.

3. Goals and strategies

What does the organisation want to achieve with the green and blue structure within the area in question? How will the organisation reach these goals? Sometimes, this part is broken off into an overall green strategy that provides the policy direction of the implementation work. These are the goals and strategies that will direct the monitoring and evaluation of future green planning. It is beneficial if the goals and strategies are tied to other important strategic positions within the organisation but also regionally, nationally, and internationally.

4. Guidelines and measures

How does the organisation want the goals and strategies to be implemented? This part can also be designed as a separate action plan for the green and blue structure or be coordinated with other strategic work such as work on environmental objectives and work with the 2030 Agenda. In order to be an effective implementation tool, guidelines and measures should have a clear division of responsibility, timetable and budget.

5. Planning support material

The purpose of the planning support material is primarily to offer support for balancing the three overarching structures in the comprehensive plan. The most important parameters tend to be core areas and connections between areas in the form of paths or strips of different types. The perspective is to both preserve qualities and develop new ones. Different areas of interest within green planning often need to be balanced against one another, but it is not recommended to balance them against other interests in the comprehensive plan. The green plan should be a clearly strategic document for which physical values are included in the green structure, setting out the way in which the organisation intends to preserve and develop these values.

6. Implementation and follow-up

In order for the green plan to be concrete and achieve results, it is necessary to prepare strategies for its implementation and to detail the follow-up.

The purpose is to demonstrate how guidelines and measures will be executed and monitored. Some form of key performance indicators or monitorable parameters are needed in this work. Implementation and follow-up require resources.

7. Appendices

These may be important references, glossaries, analyses, consultations, or other documentation that may be helpful to include in the green plan itself.

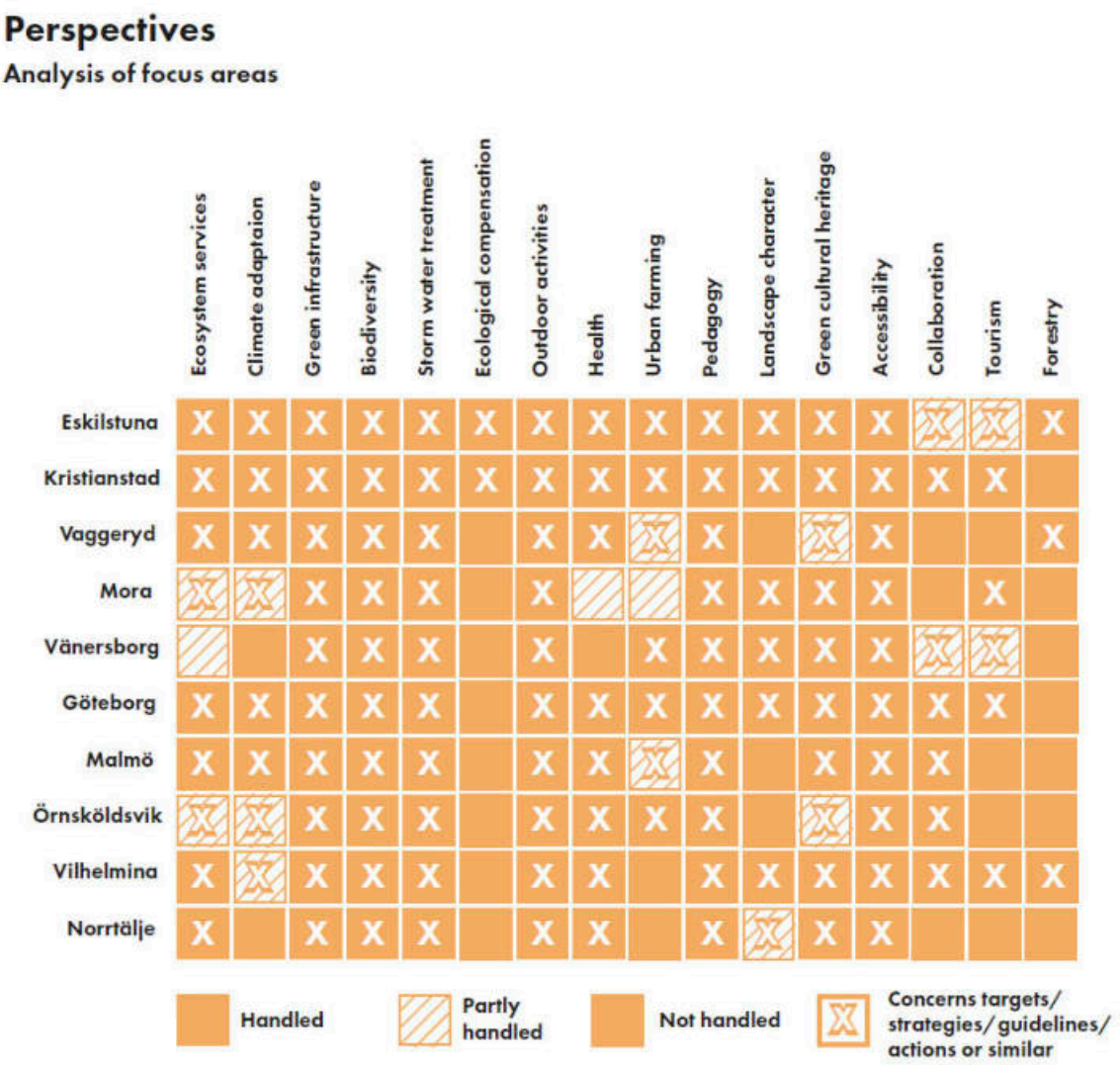

Figure 3.1.3. During winter 2019-2020, the Swedish Environmental Protection Agency conducted an analysis of ten municipal green structure plans. The analysis reveals a broad spectra of topics that are dealt with in the plans. Artwork: Caroline Axelblom.

3.2 THE PROCESS

Most public organisations are designed in a similar fashion and green planning follows similar procedures. However, variations occur and not all elements of the process description may work in your organisation. Hopefully, the majority of the recommendations may be of assistance in planning the work on the green plan.

Preparation

The initiative to prepare a green plan comes from various sources, but because a high-level political decision is almost always required, a motion, a citizen proposal, or an official letter is needed to initiate the process. It may also be that the municipality in previous strategic documents, such as the comprehensive plan, has proposed the preparation of a green plan. Without a political will and a support base in the organisation to work with green planning, it is very difficult to initiate the work on a green plan.

Figure 3.2.1. Illustration of the various steps in the process of preparing a green plan.

It is easier if the project is prepared by conducting a preparatory study prior to deciding to launch, including proposal for project schedule, organisation, and budget. At this stage, it may be valuable to think about the content and structure of the document. The conditions for the municipalities and regions vary, so naturally content and structure vary depending on organisation.

Mandates

Who commissions the preparation of a green plan? There is quite a significant difference between

whether the administration, the committee, or the municipality issues the mandate. Green planning is cross-sectoral and cross-administrative, which usually requires cooperation throughout the organisation. If there is a clear mandate from the entire municipality, it is much easier to perform the work. If the document is only to be used for internal management, an administrative order or, preferably, a committee decision, may suffice.

The mandate must make the end result and the resources and authorities allocated to the mandate clear. It is the norm for green plans be prepared by means of project work. It is useful to have a project schedule tied to the decision on performing the work, as it makes clear what is expected of the mandate, how it shall be executed and when.

Organisation

It is important to have an efficient project organisation with clear project management, steering committee, and task forces, as well as a reference group for communicating with the relevant stakeholders. Project management needs to have a mandate and be strategically located in the municipality or region to be able to coordinate the work. It is preferable to have both project managers and assistant project managers to create a resilient organisation that can handle personnel changes within project management. The task force should have representatives from the most important subject areas tied to the planning and time to actively work with the process. The steering committee is a political and/or managerial group that can make decisions on process and performance. The reference group should consist of directly impacted officials within the project organisation who are afforded the opportunity to receive information and are able to offer their opinion on the plan in various phases of the process. In smaller municipalities, the organisation naturally becomes smaller and it is usually a small task force that carries out the work on the green plan. Certain municipalities contract consultants to prepare the green plan and it is then especially important to consider the support base and dissemination of information in the process.

Time, personnel and other resources

Depending on the size and resources of the municipality or region, timetable, human and financial resources vary. Small municipalities sometimes contract consultants to coordinate the work or provide expertise, while larger municipalities often have specialised competence.
The normal time required to prepare a green plan is 2-4 years, where knowledge acquisition and initial analysis usually take one year, and then the second year is for the decision-making process, including consultation, circulation for comment, and revision before making decisions on different levels by the end of the process. Often, a committee has the mandate and will make decisions that are forwarded to the municipal executive board before reaching the municipal council. This process usually takes six months.

In order to map undocumented values and carry

out analyses that are important in preparing the green plan, funds for external services in the form of consultants or project workers are almost always needed. This is about finding a level of ambition compatible with the municipality's resources. It is also possible to apply for external funds from, for example, LONA grants or Greener Cities to finance part of the work.

The preparation of a green plan does not only require planning knowledge and expertise in various subject areas. During the process and the implementation, communication and dialogue are important. Resource requirements for GIS, illustrations and consultations should be planned at an early stage. An example comes from Kristianstad, where they hired an illustrator on a project basis for one year to contribute material for communication and consultation and for the final report. The GIS technician actively participated in the work on the green plan throughout the process and was a very important resource.

Work on the green plan

It is important to keep up the momentum in the work, through regular debriefings with the steering committee, reference group, and task force, as well as external stakeholders. It is important to have a clear project schedule with timetable to efficiently perform the work.

The external and internal dialogue is important and should be scheduled early on in the project. Many stakeholders have know-how and are interested in participating in the work and it is also important to inform the public about the work and involve those who are interested in the result. This increases the understanding of each other's roles and responsibilities, which creates favourable conditions for a good result. The public and other organisations also have valuable knowledge, such as knowledge of recreational values and biological diversity.

Geographic information systems with maps are an important part of green planning and should be integrated into the work from the beginning. It is important to allocate human resources to GIS with the possibility of monitoring the project and gradually updating maps.

It is important to take into account potential obstacles and problems that may arise during the course of the work in the project schedule. Is the timetable reasonable or is there a risk of delay due to personnel changes or policy changes following elections? Are there officials to represent the various relevant administrations? Does the mandate enjoy support from chief administrative officials? Are there sufficient resources to achieve the goal of the mandate?

Finally, many green plans neglect to report how the plan is to be executed and monitored. This is really the most important part of the entire plan and something that the project organisation needs to thoroughly consider. It is also important to

Figure 3.2.2. One important part of green planning is setting out the case for green values and what these mean to us all. Luleå Municipality has a new green plan from 2020 that provides good arguments for why green plans are necessary.

Figure 3.2.3. Illustration of possible organisation structure for work on the green plan. The political steering committee and responsible chief administrative officials may fruitfully be appointed within an existing spatial planning organisation. With two project managers, the project organisation becomes more resilient and it is possible for the two roles to have different competence levels. The reference group enables debriefings and mustering of a wider support base within the organisation for proposals. The four task forces work more concretely with knowledge bases, analyses, and proposals for each theme. Many mid-sized and large municipalities already have task forces for nature conservation, outdoor recreation, and cultural environment and so forth that could be utilised. In order to work efficiently, the groups should not have more than 3-5 participants. In small municipalities, it is possible to appoint fewer or just one task force.

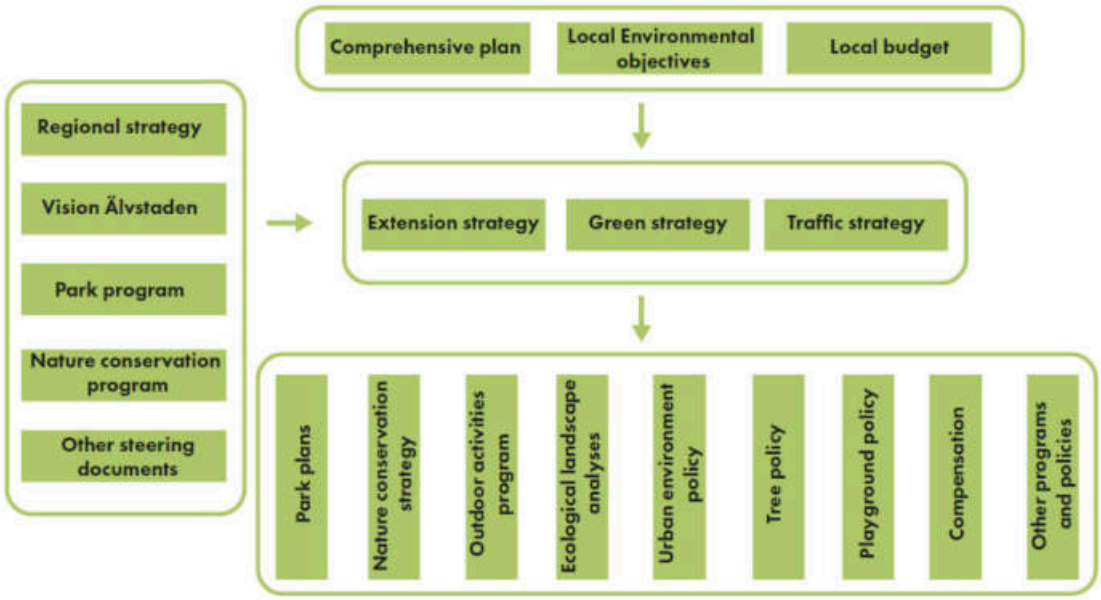

Figure 3.2.4. The 2014 green strategy for Gothenburg demonstrated how the many strategic documents interrelate in the planning. The green strategy was prepared in parallel with a strategy for expansion planning and a traffic strategy to coordinate the three structures in the comprehensive planning.

consider the communication of the green plan and the need for illustrations and instructional layout to disseminate the material. The presentation of the finished product in digital or analogue form needs to be planned from the start. Furthermore, consultation and dialogue need to be scheduled at an early stage so as to be integrated into the work.

Goals and strategies

When preparing goals for the overarching green planning, it is important to find goals that tally with other strategic goals in the municipality or the county. It is also important to review how international, national, and regional goals tally with the green planning.

The 2030 Agenda is an international agenda prepared by the UN for change towards a sustainable society. Its implementation involves a gradual change for all countries to a modern and sustainable welfare state, both at home and as part of the global system. The Agenda comprises 17 goals and 169 targets to support this work.

The National Environmental Objective System comprises a generational goal, 16 environmental quality objectives and a number of milestone targets within the fields of waste, biological diversity, dangerous substances, sustainable urban development, air pollution, and climate. The Swedish Environmental Objectives are the national implementation of the ecological dimension of the global sustainability objectives. Every region has Regional Objectives where national objectives have been broken down to a regional level and supplemented with goals for special conditions in the region in question.

Local goals and strategies may support the work and sometimes there are already good general goals in the municipality or region that may be used in green planning. Otherwise, it may be practical to relate to international, national, or regional goals.

Strategies

The strategies shall specify how to reach the goals and act as a link between the goals and the guidelines and measures proposed. There are many names for this concept, such as position, milestone etc. The number of strategies depends on the situation and the needs of the organisation.

Overarching strategies that may be referred to include the mitigation hierarchy and the principle of balance. The mitigation hierarchy is related to the precautionary principle and serves to primarily avoid damaging ecosystems, secondly to minimise, thirdly to restore, and finally to offset. The goal is the balancing principle, which says the quality of the ecosystem services shall be equal after a change, i.e. balanced. In this work reference is sometimes made to nature-based solutions where the multifunctionality of ecosystems often adds many more qualities than those primarily requested. If the municipality builds a stormwater dam for water purification, biological diversity, recreational experiences, climate change adaptation, and other ecosystem services follow.

Mapping and analysis

One important part of green planning is to map the green and blue structure and carry out analyses to better understand its qualities and deficiencies. Several municipalities have used the ecosystem services in this work to broaden and structure the analyses. Geographic information systems are very important in green planning work. It is mainly used for data handling, quality and gap analyses as well as visualisation of the result.

Vegetation and land use

The most important basis for green planning is knowledge of land use, water areas, and

vegetation. The municipalities and the Swedish Mapping, Cadastral and Land Registration Authority (Lantmäteriet) have good supporting documentation for land use in the form of municipal maps and the topographic map, while vegetation may be a bit harder to map. The county administrative boards provide national land cover data with a 10-metre resolution that provides information on many different habitats. This data is primarily based on satellite images.

Analyses

Using the vegetation map, ecological dispersal and outdoor recreation conditions, for example, can be analysed.

Addendum

It may be difficult to extract information on various types of broad-leaved deciduous forests and open grasslands from the land cover data. These habitats require extra work in the form of air photo interpretation. Normally, infrared aerial photographs and colour orthophotos are used to analyse the vegetation types, combined with field visits to calibrate the interpretation. The work is fairly time-consuming, and a standard-sized municipality may require six months of full-time work for the air photo interpretation and digitalisation. Good examples of this can be found in the Stockholm area's municipalities and in Kristianstad Municipality.

Example: Kristianstad

In Kristianstad Municipality, a 2-metre resolution for the vegetation map in and around the urban areas was requested in order for the municipality to have good planning support material for their green plan. This material was ordered from

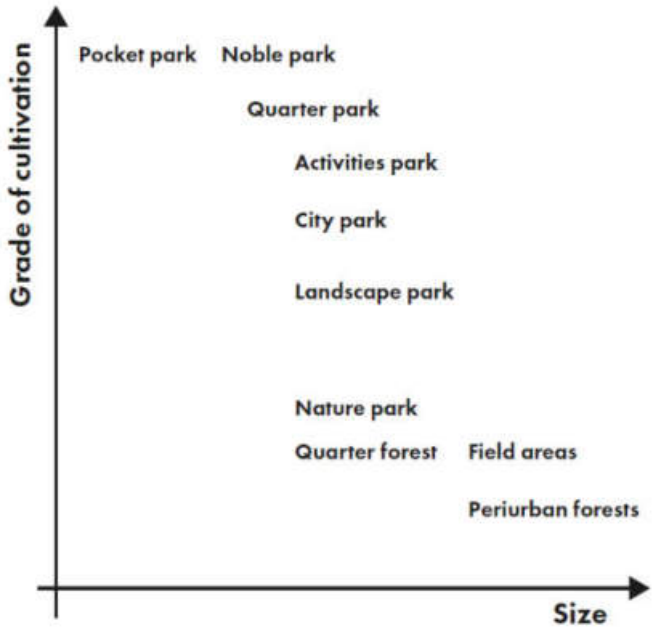

Figure 3.2.5. Jönköping Municipality has a new green structure plan created in 2019 which provides a good description of the size and cultural impact of the various green areas.

Metria with associated scanning of the height of the vegetation. In order to distinguish between different species of broad-leaved trees and different types of grasslands, a newly graduated landscape scientist with GIS experience was recruited on a project basis to assist in air photo interpretation. It took the municipality approximately six months to get a high-resolution map of all types of vegetation, based on which the municipality then carried out ecological dispersal analyses.

Link to report on the preparation of the Kristianstad Municipality vegetation map >>

The trees in the city are very important for ecosystem services and in order to get better information about which trees that grew, Kristianstad municipality executed a special tree inventory of all trees on public land in the central city. This included both data relevant for planning and management. The inventory was done by a project-employed arborist who had an iPad mini with a specially developed application to easily enter data linked to geographical location and to take pictures of the trees.

Link to report on mapping of trees in the city of Kristianstad >>

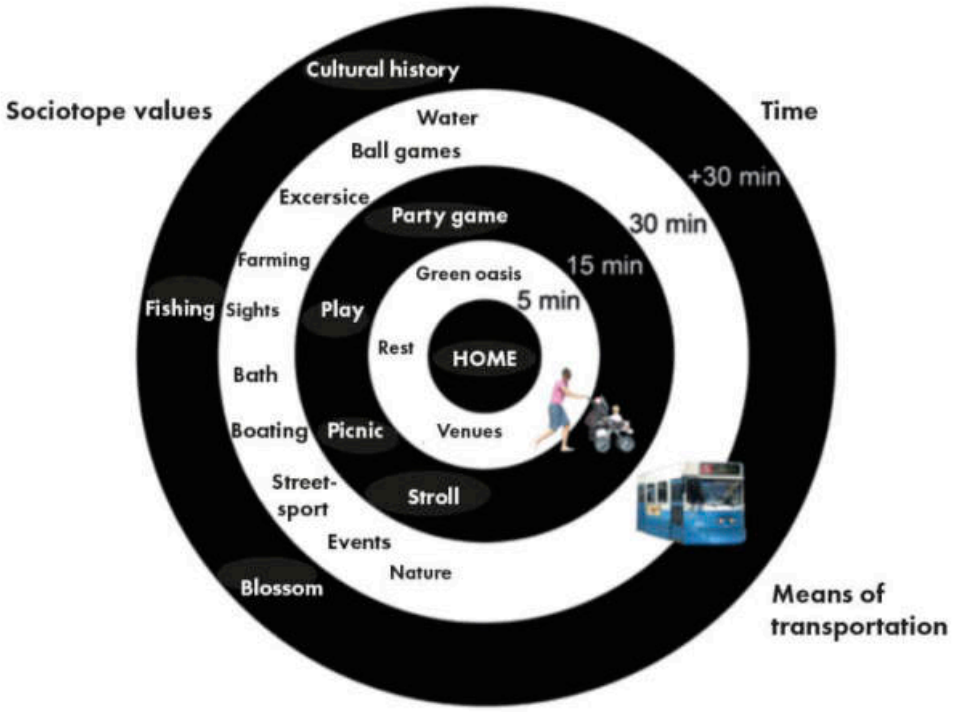

Figure 3.2.6. The green strategy for Gothenburg presents the work on 20 sociotope values, which has been the starting point for the social values of the green structure.

Recreational values

Many municipalities have both park plans and recreational plans that describe the recreational values in the municipality. If this documentation does not exist, there is cause for mapping the recreational values. Preferably, green spaces in urban areas, nature near urban areas, and areas of importance to outdoor recreation (friluftsliv) outside the urban areas are mapped. The Swedish Environmental Protection Agency has prepared guidelines for the mapping of outdoor recreation, which may be of use. The municipalities themselves have some information on the conditions for outdoor recreation by using land cover data, topographical maps, municipal land use plans for parks, land registry, and information on functions such as schoolyards, churchyards, golf courses etc. The county administrative boards and the region also have information on trails, exercise tracks, and cycle paths that may be used.

Analyses

Based on existing maps, it is possible to prepare an overview of the recreational conditions in and around urban areas. For example, distance analyses may be conducted to establish the percentage of the population that has a green area within a certain distance (accessibility) and where there is no green space within a certain distance (gap analysis). It is also possible to, correspondingly, analyse how many people live within a certain distance of a green area. Other interesting analyses cover open space and green space for pre-primary schools and schools, distance to green areas around preschools schools and schools, access to green spaces surrounding workplaces and access to walking areas.

Addendum

With respect to recreational qualities, the method of sociotope mapping is valuable and there are good examples from municipalities in the Stockholm area, Uppsala, Gothenburg, and Kristianstad. The eight experienced qualities prepared by Patrik Grahn at SLU Alnarp for parkland can also be used outside the urban areas. For example, Uppsala has prepared another three qualities for outdoor recreational areas. It is also possible to measure the number of visitors to various areas using different types of measuring equipment and to conduct interviews and surveys to learn more about how residents use various areas for leisure and outdoor recreation. When metering visitor numbers, meters are purchased or rented and placed in strategical locations where many people pass. This is often an infrared beam with a transmitter and a receiver. There are also traffic counters, tubes that can be placed on a road to count the number of vehicles that pass. The latest versions are equipped with transmitters and can be read from a distance.

Example: Kristianstad

In order to get more information on the importance of green areas for recreation, Kristianstad Municipality carried out a sociotope inventory, where the green spaces were divided into qualitatively and extensively used spaces. These green areas are described based on qualities of experience as well as all the functions available, such as playing fields, benches, refuse bins, information signs etc. This inventory was conducted using applications in iPad mini with pre-set lists, which made inventory in the field easy. The map layer was a compilation of the base level for recreation.

Länk, rapport om sociotopkarteringen i Kristianstads kommun >>

Additional mapping of all marked footpaths, parking spaces with the number of cars allowed. Another option would have been to hike/cycle on trails to mark the route exactly using geographic positioning.

Report on outdoor recreation in Kristianstad Municipality >>

Surveys on use and valuation are good data when beginning work on the green plan. Kristianstad Municipality used a consulting company to formulate questions and mailings, and to compile the material. Questions included: how often inhabitants went out and where they went and what they did when visiting green areas.

Link to report on citizen survey in Kristianstad Municipality >>

A report on public health matters in Kristianstad Municipality and the role green structure has in public health was also produced.

Link to report on public health in Kristianstad Municipality >>

Ecosystem and biological diversity

Many municipalities and almost all counties already have a landscape conservation plan or nature conservation programme that serves as important documentation in physical planning. These documents set a value for core areas for nature conservation but often take a broader approach than strictly biological values, also covering landscape values, geological values, and green cultural heritage values. In the work on green infrastructure, the county administrative boards have prepared a knowledge base on the landscape ecology connectivity that exists in the area, which completes the nature conservation programmes/plans with respect to core areas for biological diversity. Established Natura 2000 areas with spatial planning are also important support material, as are regulations relating to nature reserves, biotope protection areas, and nature conservation agreements.

The Swedish Species Observation System (Artportalen) is an important basis for getting a better idea of the biological diversity in the area. In particular, the occurrence of red-listed species may provide valuable information for green plans. It is possible to transfer data to the municipality or the region in order to analyse it using GIS.

In many municipalities, the nature conservation programmes have mainly included natural areas outside the urban areas and there would be good reason, therefore, to review the biological values in urban areas and to supplement the material. The greatest changes to land use in the future will take place in urban areas and their immediate surroundings.

Analyses

Based on the vegetation map and the data in the Swedish Species Observation System, it is possible to analyse potential dispersal connectivity in the landscape for various species groups and between different types of nature. There is various software that enables ecological dispersal analyses. (Example: Regional action plans for green infrastructure and Green structure strategies in Skåne).

Addendum

More advanced landscape ecological analyses require the use of consultants and there are several examples from all around the country. Kristianstad Municipality contracted consultants who, based on the detailed vegetation map and data on species, were able to present dispersal connectivity for species found in broad-leaved deciduous forests, sandy soil, mosaic landscapes/pollinators, and amphibians tied to ponds and otters tied to watercourses and lakes.

Example: Kristianstad Municipality

The municipality hired consultants to analyse important ecological dispersal connectivity in the municipality based on the vegetation map and

data on species. They focused on the locally most interesting connections, such as sandy grasslands, broad-leaved deciduous forests, mosaic landscapes and watercourses and wet meadows.

Report on landscape ecological connections in Kristianstad Municipality >>

Like many other municipalities in Sweden, the nature conservation programme in Kristianstad Municipality did not include the green spaces in the city and, to complete the material, a natural values assessment of the city's green spaces was made. The greatest changes to land use in the future are expected to take place in and around the city.

Report on nature conservation in the city of Kristianstad >>

Landscape values and green conservation of cultural heritage

Aside from recreational values, there are a number of other cultural ecosystem services that are valuable but difficult to map and analyse. Important documentation may include regional cultural environment programmes and countryside programmes. There may also be descriptions and analyses of landscape aesthetic values tied to wind power installations.

Analyses

The Swedish Transport Administration's method of Integrated Landscape Character Assessment may support analyses of the landscape values. The topographic map is good source material for analysing landscape values.

Landscape Character Assessment is an established method of assessing landscape values and their sensitivity to change. With respect to green cultural heritage, there are experiences from people in England working with historical landscape character analyses and time-depth analyses in order to better understand how the historical landscape is visualised. The county administrative boards' Rural Development Programme may act as source material when assessing landscape values. Description of and data for landscape values are often the most difficult to prepare and require special competence.

Example

Kristianstad Municipality performed a landscape character analysis as a basis for assessment of building permits and change in land use. The analysis is a deepening of the Rural Development Programme, prepared by the county administrative board, and is also supported by the strategy for wind power establishment. The analysis is based on the Swedish Transport Administration's method of Integrated Landscape Analysis which, based on a landscape character analysis, studies obstacles and potential for the development of landscape values.

Report on the landscape character analysis in Kristianstad Municipality >>

Addendum

Other types of analyses that may provide a basis for landscape values include studying the landscape's time depth, i.e. the long continuity that the current landscape has or some form of historical landscape analysis. It is also possible to deepen the knowledge of geological and landscape morphology values, areas of importance to science and other areas important to nature pedagogy.

Example from Kristianstad Municipality

Kristianstad Municipality also ordered an analysis of the historical time depth and of the green cultural heritage in the municipality. Both these analyses were performed by the regional museum. The historical time depth is based on historical maps and when the landscape gained its current character. The green cultural heritage is based on areas where nature and cultural heritage values interact and is based on municipal and regional nature conservation and heritage protection programmes.

Report on the historical time depth in Kristianstad Municipality >>

Report on the green cultural heritage in Kristianstad Municipality >>

Figure 3.2.7. Luleå Municipality constructed their green plan based on ecosystem services. It provides good maps that illustrate different qualities and ecosystem services in the municipality.

Regulating ecosystem services

Ecosystem services are receiving more and more attention in physical planning. The Swedish National Board of Housing, Building and Planning (Boverket) has prepared a guide for the work on ecosystem services in the built environment, which provides important support in this work. In addition to the aforementioned ecosystem services, it is important to highlight the regulating ecosystem services, such as pollination, carbon sequestration, erosion protection, water purification, etc. These services are important, and mapping and analysis methods need to be developed.

The Swedish National Board of Housing, Building and Planning's guideline for ecosystem services in the built environment >>

Addendum

Several municipalities have put in extra work to map the regulating ecosystem services. These are some examples.

Upplands Väsby Municipality's mapping of ecosystem services >>

Vaggeryd green structure plan >>

Regulation of local climate

Through measuring temperature and humidity in various environments, it becomes evident how much these parameters vary, even on a small scale. Mixed leafy vegetation may lower the temperature by 6-9 degrees in park and street environments and by 2 degrees in impervious urban environments. Green roofs may limit the roof temperature to a maximum of 50 degrees where temperatures may otherwise reach up to 80 degrees with dark sheet metal or asphalt roofing felt. The density of the canopy class can be analysed based on the vegetation map. There should be a special focus on retirement homes and pre-primary schools where the most vulnerable groups dwell. SMHI has produced maps for heat islands in urban areas that may support the planning work.

Air purification

Vegetation has a well-documented ability to bind

harmful particles in the leaves and thus decrease concentration of particles in the urban air. The effect is due to the immediate local conditions and the air circulation and may be difficult to predict. However, one single leaf may absorb as many as 10,000 particles and thus a large, old tree is of great importance. The vegetation surrounding point source pollution and roads with a high pollution load is the most important and this is where mapping and analysis of ecosystem services should be concentrated.

Erosion protection

Trees, shrubs and grass bind, stabilise and drain land and reduce the risk of erosion during heavy rainfall and floods. Alternative methods using sheet pile driving or walls often become costly and may in certain cases worsen the effects of erosion. Certain soils are more sensitive to erosion and mapping and analysis can be carried out with the help of a soil map and knowledge of erosion-exposed locations along beaches and watercourses.

Delay of stormwater

Different vegetation brings varying degrees of delay and reduction of stormwater flow on land. The delay may vary by a factor of more than 100 between impervious roofs and asphalt surfaces on the one extreme via permeable gravel surfaces and lawns to natural meadows and dense woodland on the other. Different types of soil have different infiltration characteristics. Based on the land use map, the soil map, and the vegetation map, it is possible to analyse the delay in a given surface area. Special measures to increase delay may be swales, rain beds, rain gardens, stormwater dams, and wetlands.

Noise regulation

Green spaces in an urban setting have a strong capacity for reducing environmental noise levels. Sound does not bounce off plant-covered ground surfaces, roofs, and walls the same way it does off smooth surfaces. The sounds of nature may also impact the experience of noise. With the help of the vegetation map and noise simulations of the existing noise situation, it is possible to map and analyse the noise-reducing vegetation in the areas in question. Bear in mind that this reduction effect significantly lessens during the winter.

Water purification

Water pollution may be reduced through plant absorption or accumulate in the bottom sediments in bodies of water. The purification efficiency in different types of biofilters may be as much as 99% for heavy metals and 20–80% for nitrogen and phosphorus. By mapping and analysing stormwater runoff in the area, gap analyses may be conducted to see where biological purification will be most useful.

Provisioning ecosystem services

Provisioning ecosystem services are not usually included in green planning but are handled in other planning documentation. The land use most often included is forest management, where many municipalities have an influence through forest holdings.

Example: Upplands Väsby

Upplands Väsby Municipality has mapped provisioning ecosystem services >>

Addendum

It is possible to investigate the municipality's provisioning ecosystem services in financial and ecological terms. Among other things, it is interesting to study the municipality's ecological footprint in the world based on consumption and production.

Summary description

Based on the various mappings and analyses that

Figure 3.2.8. Västerås Municipality has prepared a green structure plan that describes the green structure and its qualities with development strategies in an informative way. Among other things, the plan addresses schools' need for green areas in an informative way.

the municipality has chosen to carry out, there is a need to summarise all the material that provide a good overview of the green structure situation. It would be desirable to cover geology, geomorphology, hydrology, cultural history, vegetation types, recreational conditions and the landscape values that should be highlighted in broad strokes. Some municipalities have started with ecosystem services in order to explain the overall picture.

Green structure planning support material

Often, the most important purpose of green planning is to create support material for comprehensive planning. Then, it is helpful to have the green plan to provide support for physical planning of areas under consideration and development areas for the green and blue structure. Important green areas then become a balance of recreational and ecological values taking regulatory and cultural ecosystem services into consideration. This may be done in different scales and it is usually practical to first produce an overall strategic picture, as has been done in the Stockholm area and Gothenburg, for example.

Core areas

Core areas are the most important areas for the qualities of green structures and often consist of a weighing of priorities between recreational and ecological values based on cultural heritage and landscape values. The delimitation often runs along the border of the functional nature types included in the core area. A minimum size for the area should be considered.

Figure 3.2.9. Just like in Stockholm and many other Swedish municipalities, Gothenburg offers green corridors that stretch between the city's central areas and the surrounding landscape of neighbouring municipalities. In Skåne, with its distinctive open agricultural landscapes, there is a multi-core structure that does not feature the typical corridors.

Development areas

Development areas are areas with potential or which are located in the green structure very strategically such that there is reason to develop their qualities. They may be urban-adjacent areas where there is no green structure and there is great need for improvement. Some municipalities have instituted special areas of compensation when there is a shortage of spaces to offset within urban areas or when there are general shortages that need to be

replenished, such as water purification, biological diversity, or recreation that requires larger areas.

Connections

It is important to mark and describe connections between different core areas when it comes to recreational, ecological, and cultural heritage connections. For recreational connections, a physical connection is usually required, while ecological connections may operate in a matrix with several smaller core areas, sometimes referred to as 'stepping stones' where certain species have the ability to spread easily, moving between objects. For cultural heritage connections tied to the green and blue environment, there are usually more overarching structures but sometimes there are clear physical connections such as tree-lined avenues, estate boundaries, old roads, and watercourses.

Development connections

Development connections are connections that today are weak or broken but which should be developed to achieve a continuous green structure. It is important to prioritise and select the key connections as the resources for creating new connections are limited. It is usually possible to repair the connections during development or by implementing measures for particularly tangible barriers in the green structure.

Value tracts

Buffer zones or value tracts are a way of describing important connections in the landscape. They work better when there are many and various types of connections that do not follow clear paths in the landscape. When working with green infrastructure, value tracts for different types of nature are reported and provide a picture of areas with many core areas and many different dispersal connections between these core areas.

Figure 3.2.10. Region Skåne's strategies for a green structure in Skåne presents a regional planning map to coordinate the municipalities' green planning on a regional level. The regional multi-core structure typical of Skåne is apparent here and differs from the rest of the country but can be found in central Europe and in the British Isles.

Action plan

Action plans for the execution of green planning include special measures that require a special budget and project design. It is also valuable to have some form of key performance indicator to monitor execution of the measures and the results thereof.

Decision guidelines

For physical planning, having guidelines for how the planning shall take green and blue structure into consideration is helpful. Which qualities should be preserved, and which should be created? What is a reasonable distance between residence/school and green space and how much open space should a school or pre-school have? Which species of trees should be prioritised when planting new ones? How should meadowland be cared for in relation to park management? etc.

Measures (responsibilities & budget)

For slightly larger scale measures that do not fall within the scope of day-to-day operations, a special budget and project organisation with clear responsibilities are required. These should be summarised and prioritised in the action plan. In certain municipalities, special funds are set aside for the execution of measures over a longer period of time, while others consider these during the annual budget discussions.

Example from Lund Municipality

For several years in the beginning of the 2000s, Lund Municipality had a system whereby a three-year budget document with all the investments and projects within green structure and nature conservation was presented and adopted each year by two committees, the Technical Services Committee and the Building Committee. This way, the implementation of the green structure and nature conservation programme became very clear. The municipality also added special funds to execute the programme. This concerned everything from major parks under development to small inventory projects. The system is no longer active and there is no more information on the municipality's website.

Example from Helsingborg Municipality

The municipality prepared a special action programme for the execution of the green structure programme, set aside a large sum of money and an implementation service, and then followed up on all the measures via the municipality website:

Link to information on Helsingborg Municipality's action plan for the green structure programme >>

3.3 DIALOGUE

Green planning is mainly about dialogue, both internally in the municipal or regional organisation and externally with other stakeholders and the public. An experienced project manager is often experienced in internal dialogue, but when it comes to external dialogue there may be cause for enlisting help, especially in reaching out to the public.

Internal dialogue

The first thing the project should ask is which parties within the organisation may be or should be affected by the work on the green plan? How is it possible to organise a good dialogue with everyone to generate support for and understanding of the work and its purpose? Do special resources need to be allocated to the dialogue in the form of educational aids and new forms of meetings? In the dialogue with the politically elected officials, it is especially important to find methods that work for everyone based on the different roles performed by permanent officials and elected representatives. The structures of internal dialogue vary greatly between small and large municipalities and depending on the organisational structure. Carefully consider which methods work best for you.

External dialogue

If the green plan is executed within the comprehensive plan in accordance with the Swedish Planning and Building Act, the consultation procedure stipulated therein should be used. Usually, however, green plans are independent documents that form the basis for comprehensive plans and the municipalities are thereby free to use any consultation method they wish. However, it is important for the green planning to leave room for early consultation where the local public's know-how and engagement is utilised. Including a well-thought-out plan for consultation in the project schedule is very helpful for the project. Good examples of how consultations may be carried out are available on the websites of the

Swedish Association of Local Authorities and Regions (SKR) and the Swedish National Board of Housing, Building and Planning (Boverket).

Link to SKR's information on dialogue and consultation process >>

Link to the Swedish National Board of Housing, Building and Planning information on dialogue and consultation process >>

The Swedish National Board of Housing, Building and Planning splits the dialogue on physical planning into five steps:

Preparation

Well-executed dialogue needs careful preparation. It is important to consider what the organisation wishes to achieve with dialogue, how much time and resources will be needed, at which point in time the dialogue should be executed, who within the organisation needs to participate, how much and with what the public should be involved, and how the result should be handled and documented. It is also important to analyse the target group and methods and tools used in the dialogue based on the needs of the target group. The dialogue should be scheduled before too much of the planning has been locked in and cannot be changed.

Information

It is difficult to reach citizens with information on dialogue meetings. Focus on the target groups you wish to prioritise and attempt to reach them

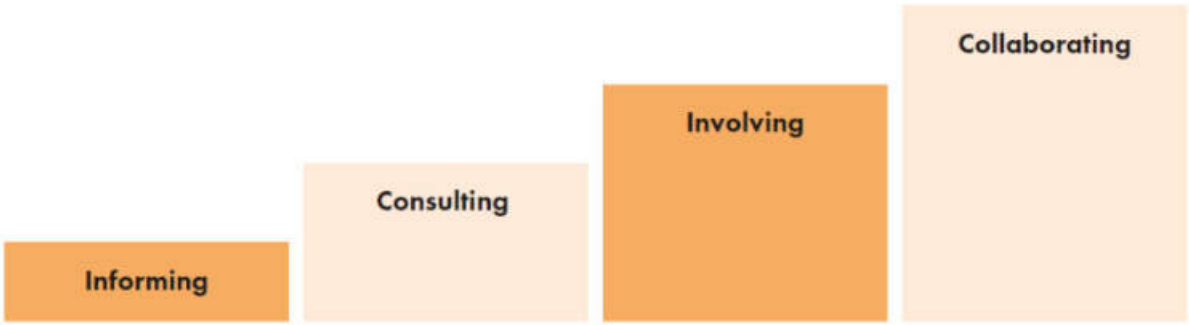

Figure 3.3.1: Arnstein's ladder of citizen participation displays the various levels of citizen participation and provides a clear image of the consultation's level of ambition and which target groups are in focus. Swedish National Board of Housing, Building and Planning website.

through the channels they monitor. Make sure to prepare early so that everyone will have time to adjust their schedule around the meeting, but not too early as the meeting may be forgotten. Provide information on what the result of the dialogue will be used for and for how long the work will continue. It is important to not set expectations of the outcome too high, as they may not be met. It is a good idea to start the invitation with concrete questions that members of the public are interested in.

Dialogue

Hold a bona fide dialogue, or else risk eroding confidence, which may make it more difficult to attract citizens to future dialogue meetings. Appoint a communications professional who can lead the process and remain neutral to the opinions put forth in the discussion. Select a local meeting hall that is accessible to people with disabilities and which is ideologically and religiously neutral. In general, it is much easier to seek out the public on their home ground than to make them come to the municipal or regional building. It is a good idea to host the same type of meeting on several occasions, as people have different work hours. During dialogue meetings, opinions on other parts of the municipality's activities always come up. Forward opinions that are unrelated to physical planning to the department within the municipality that will handle the matter. Be prepared to handle potential conflicts during the meetings.

Feedback

It is fine to invite the media to dialogue meetings so that people know that they took place and which key issues were discussed. Compile opinions received and account for these in some form of consultation document available via the organisation's website or similar. It is also an idea to hold meetings that summarise the opinions received during dialogue meetings.

Figure 3.3.2: Vaggeryd Municipality is a small municipality that has worked very ambitiously with green planning in its green structure plan, adopted in 2019 after two years of preparation. The plan was implemented with the support of a LONA grant from the county administrative board and is presented in an informative and easily accessible way. The work on gathering support within the municipal council was very intense, including debriefings in the municipal executive board every other month over a period of two years. Photo, drone: Albin Hübsch.

Confirmation

The finished proposal for a green plan becomes a confirmation of how the organisation has taken into account the opinions received during the dialogue. In a formal planning process, under the Swedish Planning and Building Act, the finished proposal should be displayed and reviewed, including the consultation process and how opinions have been handled. It is then possible for people to make objections if there have been misunderstandings or if important issues have not been taken into account. This will then serve as a supporting document for the organisation to consider.

Example from Kristianstad Municipality

Kristianstad organised a kick-off meeting with all interested parties in the municipality administration to get the project off to a good start and pick up the expectations on content, delimitations, and final product.

Kristianstad also organised two seminars with a broad invitation to the county during the course of the project, where the completed surveys, mapping and analyses were presented. This way, experience gained through the work was disseminated and the project received good feedback from colleagues in other municipalities in Skåne and Blekinge.

The proposal for a green strategy and a green plan was the subject of wide public consultation to gather as many opinions as possible for inclusion in the final proposal. Consultation bodies included all municipal administrations and companies, associations connected to matters of green structure, government authorities, and local community associations.

The proposal was also displayed in libraries and in the municipal building and several consultation meetings were organised together with associations.

Silesian Park in Katowice, Poland is one of Europe's largest public park facilities, twice the size of Central Park in New York. The park was built in the 1960s on post-industrial land and is today a very important asset for the entire metropolitan area surrounding Katowice. More than half of the park's area has been developed into a fairly natural forest area, while other parts contain traditional park facilities, amusement park, zoo, football arena and ski area and more. In order to link the different parts of the park, a cableway has been built, which will be further expanded. The park's management is part of the UL2L project and has provided inspiration for this green planning guide.

Photograph: Per Blomberg, 2019. Artwork: Caroline Axelblom.

4. PUTTING A GREEN PLAN INTO ACTION

4.1 IMPLEMENTATION

It is important that the green plan addresses how it will be put into action and that the project organisation allocates resources and administrative functions to ensure that the work will be successful.

Many municipalities draw up ambitious green plans and do not follow up the implementation, but rather hand its running over to a single committee or administrative group. As green planning affects the whole of the municipality, cooperation between various committees and administrators is needed in order for it to be successful. Particularly important tools when putting a green plan into action include the inclusion in comprehensive plans and detailed development plans, land development contracts and land allocation agreements, through the design stage and on to the management and administration stage. The most difficult phase, where most difficulties occur, is often between the detailed development plan and the administration phase.

Adoption

A decision by the council to adopt raises the green plan to a higher status and it becomes difficult for the local authority planning process to ignore it. This also makes it possible for it to attain a status equal to building structure and traffic infrastructure, which means that it also becomes easier for the guidelines and recommendations to be followed. At the same time the final document becomes a more obvious compromise as all the administrative groups and committees have to agree, while a single committee would be able to be more ambitious in their positions adopted as they would have sole responsibility.

Local authority planning process

Successful green planning needs to be part of the

comprehensive local authority planning process. Green issues need to be integrated at an early stage in the planning and given the attention they need for the priorities between land development and traffic infrastructure to be weighed up in a good way. In this work is also important to connect and integrate the final green plan into the organisation so that all the relevant parties, including full-time officials, politicians and developers are familiar with it. If green structure issues are brought into the local authority planning process at an early stage it is easier to use the mitigation hierarchy and to make compensation measures possible.

Comprehensive plan

The green plan should be integrated into the comprehensive plan and a balancing of priorities should be made between the green structure, building structure and traffic infrastructure. It is important that the green plan functions as documentary support for the comprehensive planning, aiding in the weighing of priorities which takes place in the comprehensive plan. There are municipalities which have developed comprehensive plans with a very green character, for example Upplands Väsby and Vilhelmina Municipalities. The comprehensive plan may also be a good place to propose a green plan if the municipality does not have one. There are also opportunities to supplement with extra support documentation and positions in topic-based strategy documents. It is also advantageous to create the green plan immediately before or in parallel with the comprehensive plan, since this can save time and resources in the preparation of inventories and analyses. There is, however, one advantage to the green plan constituting a thematic support document, standing independently by means of a separate political decision: it then does not need to weigh up priorities between different interests, and becomes clearer on the issue of which values the green structure represents.

Detailed development plan

The detailed development plan consists of a plan map showing provisions made by the plan; the plan should include a ”description of the plan”. It is the plan map and the provisions made by the plan that are legally binding, while the description of the plan with the implementation part describes the balancing of priorities which underpinned the plan. In the detailed development plans the development of the green structure in newly developed areas is regulated, but there are limits to how much green structure can be governed in development districts. Public space plays a very important role in how the green structure is developed within the detailed development plan and makes it possible for the organisation to design and manage land in an appropriate way. It is important to think how the aims of the plan are written: this is an opportunity to insert the green structure. If the area covered by the plan is covered by management provisions or by state interests under the Swedish Environmental Code these also give cause to raise the values of the green structure. Significant environmental impact is also a reason

for making a strategic environmental assessment where the values of the green structure can be highlighted.

Land allocation agreements and land development contracts

In its land allocation agreements for development of municipal land or its development contracts for private land the municipality must regulate how the green structure is to be developed and financed. Formulating and drawing up the contracts becomes important, therefore, producing the conditions for subsequent planning and implementation of the green plan.

Testing, building permission and design

Upon the establishment of new green spaces in development districts and public spaces the formulation of contracts may take place in different ways and it is important to make sure that the intentions in the comprehensive plan and the detailed development plan are also implemented during the design and construction phases. The first step is when a preliminary ruling comes in meaning that the suitability of the project is assessed, and when such shall be harmonised with the green plan. The second step is when the issue of building permits comes in and adjustments may become necessary. The third step is when a building permit has been issued and construction can begin; attention has to be paid during the design phase and also in the construction phase so that encroachment, damage and disruption may be minimised.

Management and administration

Management of green spaces is crucial for how recreational and ecological values are preserved and developed. It is important to follow up the intentions of the green planning in the ongoing administration and to draw up management plans and administration plans in line with the intentions and guidelines from the green plan. The administration phase is the longest phase in the case of the built environment and the conditions will change as and when the vegetation matures and use of the area changes. The planning of the management therefore requires periodic review and renovation of green spaces as well as ongoing management measures. Recommendations in the green plan may also provide support in the management of private land, on a voluntary basis.

Consultation

It is important to have an ongoing consultation process with stakeholders and interested parties in the implementation of the green plan too. This includes staff in the project organisation, those living close to the development who will be affected and the general public. In the continuous management phase it is also valuable to have a forum for consultation, particularly for those periodic measures needed for park renovation.

An example from Helsingborg Municipality of the implementation of the green structure programmet >>

Schloss Dyck is a historically important garden between Cologne and Düsseldorf in Germany. The garden forms an important centre in the green structure of the area. Today, the facility is owned by a foundation and is open to visitors. The foundation is also the head of the European Garden Heritage Network and the European Garden Award and partner in the EU project Urban Links 2 Landscape. Photograph: Per Blomberg, 2018.

4.2 FOLLOW-UP AND UPDATING

How successful is green planning? Without updating, follow-ups and evaluations it is difficult to know whether a green plan is being implemented in a successful manner.

Follow-up and updating

The simplest things to follow up are the measures which are stipulated in the action plan and which have a specific project organisation and budget. But it is also possible to monitor changes by means of questionnaires, measurements and remote sensing with satellite images, aerial photographs and drone images. In this it is important to have a clear organisation structure for follow-ups with resources for evaluation and analysis of indicators. Some municipalities use green accounting or environmental barometers which can be coordinated with the follow-up of the green plan and other strategic documents, including the comprehensive plan.

Updating

Green planning is a continuous process, and just because a green plan has been adopted the work should not stop. It is particularly important to update the knowledge base as and when new knowledge arises. It is important to decide whose task it is to carry out the updates if this is to function properly. Procedures are also necessary for how map data and other information are updated and quality assured. One way to manage updating is for knowledge bases not to be decided politically, but rather delegated to administrators; thus they can be easily updated with new reports and maps which are made available to full-time officials as planning support material.

Organisation and resources for follow-up

Before the green plan is adopted, decide what kind of follow-up will be done and make a timetable for evaluation. The time when the comprehensive plan is updated is a good time to also assess whether some parts of the green plan need updating. It is also necessary to carry out yearly follow-ups to see how the work is developing from the point of view of guidelines and measures. The follow-up work needs a clear division of responsibilities and time and resources must be allocated for analyses and measurements of key figures and indicators. A suitable interval for follow-up and evaluation is one year for the action plan; every mandate period for planning support material linked to updating the comprehensive plan; every two to four mandate periods for the green strategy and knowledge base. This means that a green plan normally remains valid for 8 to 16 years. Bear in mind that it usually takes several years to revise a green plan so the work should be begun in good time before it becomes out of date.

Follow-up indicators

It is crucial that during work on the green plan, indicators are found which can be followed up so that there are baselines when evaluations are to take place. Appropriate indicators might be numbers of measures implemented, area of green structure per capita within 300m, area of open space per student at preschool and schools,

depending on what issues have been deemed important in the green plan. It is a major advantage if the indicators are mapped during the creation of the green plan so that there is a baseline before the evaluations. Different indicators require different amounts of time and resources to create and therefore the intervals for the update vary. It is, however, desirable that the organisation should be able to update the indicators at least every fourth year.

Follow-up reporting

Following up the green planning often results in different types of statistic which need to be replaced in informative presentations which make the statistics understandable. Different kinds of maps and diagrams are usually the simplest way of explaining statistics. Follow-up should be reported to the part of the organisation which has the mandate to influence decisions and resource allocations if adjustments and implementation are needed. Every municipality and region finds its own form and design for implementation and evaluation.

An example from Katrineholm municipality

Figure 4.2.1. In its green plan from 2018, Katrineholm municipality writes: "The plan should be followed up annually in connection with the annual report in the Building and Environment Committee. Since the green plan is linked to the Master Plan – part of the city, it should be topicality tested at the same time."

4.3 COMMUNICATION

Communication is a very significant part of green planning and it is important that this is prioritised in work on the green plan.

Good communication is also needed during the implementation phase, with the decision-makers, full-time officials within the project organisation and outwardly to landowners, developers and the general public. Part of this communication may be taken care of by the relevant officials, but in many situations it is an advantage to engage communications professionals, externally or internally. During work on the green plan, illustrations and maps are needed which describe the green structure and which also present proposals for developments as support material for discussions and decisions. It is a good idea to bring in GIS and communication staff at an early stage in the project so that the project managers are given support in communicating their work. It is advantageous to produce a special communications plan to guide this work in an effective way.

The adopted green plan

It is also important that after it has been adopted the green plan is accessible, both internally in the organisation and externally for the general public on the municipality website, in digital form as a PDF file or on a digital platform and in the map service. It is worth remembering that zoomable maps make it possible to zoom in to such a level of detail that was perhaps not intended when an area or boundary was originally delineated. This may be regulated by locking the scale at a certain zoom ratio. Many municipalities still print out a hard copy of the final green plan and nowadays it is important that the design, illustrations and maps are attractively presented. Factor in costs for

communication, both during the dialogue phase, when the plan is being developed, and after it has been adopted, during implementation.

Examples from Kristianstad and Jönköping
Kristianstad Municipality has examples of digital platforms which they created using their own models developed using Q-gis. Q-gis is an open source map program which is free for all users. GIS technicians and programmers have since developed their own web environment where text and maps are shown together and where map environments are zoomable and spaces are clickable.

Link to the Kristianstad platform for the green plan >>

Other examples are Jönköping Municipality which also presents its green structure on a pre-designed digital platform which is available on the market.

Link to the Jönköping platform for the green structure >>

Embedding

It is important to engage ”ambassadors” for the green plan during the creation phase through the task forces and reference groups which are created. These ”ambassadors” can then disseminate the information and aid the implementation process as knowledge sources and follow-up support. The embedding process is extremely important in green planning and ought to receive major focus in the green plan. Lund Municipality devoted a large amount of time and resources to dispatching their officials round to different departments in the organisation to discuss implementation when the green structure and the conservation programme had been adopted. This process made implementation much simpler. Producing presentation material that many people could use meant that there were many ”ambassadors” for the plan.

Visualisation

What will the developed green structure look like? Reading the maps and understanding the positions adopted in the green plan may be somewhat abstract for both politicians and the public. One possible measure to simplify communication here is to visualise the changes in the form of photographs and photomontages of how the green area might develop. This helps people understand those measures which are proposed and clarifies, internally as well, what the aims are for the different areas.

Symbols

Important concepts such as goals, strategies and ecosystem services often function better as symbols than as words. Pictures in combination with words make things easier to remember and make context and concepts clearer. The Swedish National Board of Housing, Building and Planning has developed symbols for ecosystem services which are friendly to use when communicating about the services. There are also good reasons for creating illustrations at an early stage

to illustrate the main message in the green plan such as the Copenhagen Finger Plan or the green wedges of Stockholm. Simple images and symbols which convey the message so that it reaches many people.

Maps

Geographical information is often key to green planning and clear and informative maps are important for communicating it. Planners and GIS engineers are used to reading maps, but not everyone is. For this reason, it is important to find a style and a graphic design concept which are accessible and easy to understand. It is a good idea to test out the maps on people who are not used to reading maps to see if they work. In order to make images easy to understand, it might be easier to use orthophotos as a basis or perhaps it would be worth trying 3D if you have access to the technology. In other contexts, a drawn map might visualise the most important information more clearly.

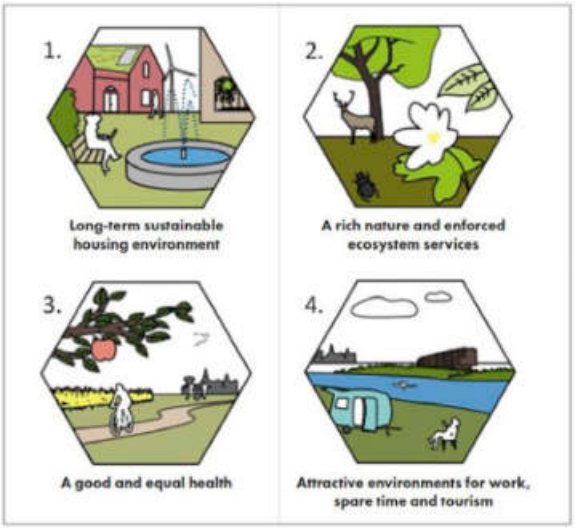

Figure 4.3.1. The four objectives of the Kristianstad Municipality green plan as symbols. Illustration: Juho Riikonen.

Figure 4.3.2. The green and blue wedges of the Gothenburg area. From the Gothenburg green strategy – a compact, green city.

Figure 4.3.3. An example of the development of a park in Kristianstad under the green plan. Visualisation by Juho Riikonen.

5.

APPENDIX

Buildings can also be integrated in greenery as in the example of Bosco Verticale in Milan, Italy by Boeri Studio. Two high-rise residential buildings are fitted with balconies planted with shrubs and trees, which creates a vertical garden in the city.

Photograph: Per Blomberg 2017. Artwork: Caroline Axelblom.

5.1 GLOSSARY

A good built environment
One of the 16 national environmental objectives.

Accessibility
What is possible for a given person depends on, for example, that person's physical mobility and geographical proximity to where he or she wishes to go. Factors such as opening times and admission policies can also have an impact.

Arable land
Defined as land which is used or which could appropriately be used for crop cultivation or pasture and which is suitable for ploughing. Arable land is delineated geographically in the report, based on information from the Swedish Board of Agriculture block database. The information is based on details of type of land use provided by farmers themselves.

Assembled built environment
Assembled built environment is a built environment on sites that adjoin each other, or are separated only by a road, street, or parkland. (The Swedish Planning and Building Act)

Biological diversity
Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems. (*Definition from the UN Convention on biological diversity.*)

Biotype protection zone
A form of protection which may be used for small land and water areas known as biotopes. A biotope is an area which, by dint of its specific properties, provides a valuable living environment for threatened animal or plant species.

Blue values
Water values in the form of lakes, canals etc.

Building
A permanent construction consisting of a roof or roof and walls, which is permanently placed on land, or entirely or partially underground, or is permanently placed in a certain space in water, and is intended to be constructed so that people can dwell within it. (The Swedish Planning and Building Act)

Building permit
Authorisation needed to build, renovate or change the appearance or use of a building or facility.

Bus stop plazas
The idea of having sequences of stops, arranged in a series of plazas in the main thoroughfares of development strips.

Climate adaptation
Measures aimed at protecting the environment and the lives, health and property of humans by adapting society to the consequences that a changed climate might entail for land, water and buildings.

Comprehensive plan
The overarching focus of the municipality over an extended time period, it leads to the production of

detailed development plans and the granting of permits. Municipalities are obliged to have a current comprehensive plan.

Consultation process
Regulated in the Swedish Planning and Building Act section on comprehensive plans. The consultation process provides the different partners with timely knowledge about the plans and the opportunity to influence the content and about whether there are impediments that need to be taken into account.

Core area
The most important areas for the qualities of the green structure, often consisting of a balanced mix of recreational and ecological values with the support of cultural history and countryside values.

Crow flies distance
Distance calculation (also called Euclidean distance) that does not take into account spatial barriers that for various reasons cannot be crossed. Neither road, street or bicycle and pedestrian networks are taken into account in the calculation of crow flies distances.

Cultural environment
Historical and contemporary traces of how humans use the countryside, in terms of land use, construction and biological cultural heritage.

Densification
More development on a given surface area by means of smaller distances between buildings or higher buildings.

Detailed comprehensive plan
The second level of planning in Sweden.

Detailed development plan
The third and most detailed of the three planning levels in Sweden. The detailed development plan is legally binding.

Develop
The instalment of one or more construction works in an area. (The Swedish Planning And Building Act)

Development district
A development district is land that, in accordance with a detailed development plan, is not to be a public space or a water area. (The Swedish Planning and Building Act)

Ecological footprint
A statistical measure of consumption and production to estimate how much of the planet's renewable assets would be needed to produce everything that we consume and to absorb the waste which is created.

Ecosystem
All the living organisms and their environment (biotic and abiotic) within a given area.

Ecosystem services
All the products and services that nature's ecosystems provide humans with and which contribute to our welfare and quality of life. Pollination, natural water regulation and enjoyment of nature are some examples.

FSI
Floor space index, the degree of density, measure of total area of construction per unit of lot.

Geographic information system (GIS)
System which uses computers to facilitate the analysis of geographical data.

Goal conflict
Conflict which arises when different interests need to be attended to.

Green corridor
Strip of vegetation which connects large natural environments.

Green harbours
A name for the interface between constructions and green structures used to stress how this interface should be designed front on, with the same care as is if it were a coastline.

Green plan
The Green Plan is the strategic document created by the municipality or the region covering how the green structure should be developed and administered. The Green Plan is of concern to the sector, so during the comprehensive planning it must be coordinated with the development of construction and traffic infrastructures. The Green Plan covers a range of different subject areas in the green planning family, such as environmental protection, friluftsliv (outdoor recreation), water quality, the look of the countryside and the green cultural heritage, in order to create a combined picture before establishing a balance with construction and traffic infrastructure.

Green space
Green space is a generic term for all the areas covered by vegetation, both in urban parks and outside in the natural and the cultural landscape. Water is often included in the concept and sometimes the term green and blue space is used.

Green spaces
All types of areas which are part of the total green structure within urban areas, such as public parks and open green spaces and other tree or grass covered areas, surplus green surfaces from building work, gardens in private houses, green spaces between apartment blocks or industrial buildings and also greenways between walls etc. Green spaces break down further into the subcategories open land and forest.

Green structure
The interactions and structures that exist in the countryside linked to green values. This includes opportunities for animals to move in the countryside and for both animals and plants to spread and exchange genetic material with other animals and plants. It also includes the opportunity for humans to move in the countryside for recreation and enjoyment. The green structure can also involve ecosystem services which are delivered in certain locations but which have an impact elsewhere, such as the purification of water and cultural interactions between places.

Greenways
Strips of land in developments, linked physically or visually, which are surrounded by or adjacent to vegetation and/or water.

Impervious land
Defined here as artificially covered land with no vegetation. This covers building roofs, car parks, roads and streets, railways, footpaths, storage tanks and so forth.

Intersections
Places that generate meetings, events.

Joint land development contract
This is regulated in the Swedish Planning and Building Act and is defined in law as a contract between a municipality and a developer or a real property owner for implementation of a detailed

development plan, regarding land not owned by the municipality, although not a contract between a municipality and the state for the expansion of state transport infrastructure.

Land allocation agreements
The Swedish Planning and Building Act defines land allocation as a contract between a municipality and a developer that provides the developer with the sole right to negotiate with the municipality, for a limited time and under defined conditions, over the transfer or concession of a certain land area owned by the municipality, for development.

Land development
Measures to acquire, process and prepare undeveloped land in order to be able to build homes, shops, offices or industrial premises A land development process also involves building, communal infrastructures such as roads, green areas, water and sewage, district heating and electrical power.

Local natural areas
Natural areas with green qualities within walking distance of preschools/schools/work/homes.

LONA grants
The local environmental protection initiative known as LONA provides the opportunity for municipalities, and in the long run organisations and private individuals, to receive government grants for the implementation of projects of benefit for environmental protection, outdoor recreation (friluftsliv) and public health.

Lot
An area that is not a public space but contains land intended for one or more buildings and land that is directly connected with the buildings and is required for the buildings to be used for the purpose intended. (The Swedish Planning and Building Act)

Maintenance
One or more measures that are taken for the purpose of retaining or restoring a building's design, function, use, appearance, or cultural-historical value. (The Swedish Planning and Building Act)

Management plan
The management plan is a strategic document which sets out the vision and objectives for the area, and stipulates measures to be taken to reach those objectives.

Microclimate
Conditions for growth in a specific place.

Municipal planning monopoly
Decentralised land planning at the municipal level by means of the set of areas of responsibility regulated in the Swedish Planning and Building Act.

Natura 2000
A network of protected areas across the whole of the EU.

Nature
The classical definition of everything that humans cannot make, in contrast to the cultural and the artificial.

Nature close to population centres
Natural area connected to developments where the recreational values should be valued highly. Under the Swedish Forestry Act special attention should be paid to social values and health considerations.

Noise pollution
Environmentally unfriendly, often undesirable noise which is disturbing, and in some cases damaging for the hearing.

Open space (pervious land)
A generic term for land in urban areas which is not impervious, i.e. the sum of green spaces and arable land.

Outdoor recreation
Popular Swedish concept involving spending time

outdoors in nature and in the cultural landscape for well-being and the enjoyment of nature, without the need for competition.

Outdoor recreational area
An area with good conditions for friluftsliv, recreation and the enjoyment of nature.

Park
Man-made natural area which can be given different forms depending on how it is managed, from pleasure garden to nature park. The park is an area that may be used for recreation. Park is also a concept in the detailed development plan which states that the area is secured as a public space.

Physical barrier
Obstacle to movement/expansion For example busy roads and barriers for fish.

Physical planning
How land and water areas should be used, where buildings and infrastructure should be placed and how they should be designed.

Planning
The work on producing a regional plan, a comprehensive plan, a detailed development plan, or area regulations. (The Swedish Planning and Building Act)

Planning process
The term for the process from idea to finished building/facility.

Play areas
Areas where children can play, which contribute to children's physical and mental development. There is a need for both formal (man-made playgrounds) and informal (e.g. forests) areas in children's local environment.

Population centre/Urban area
Basically defined as contiguous developments with a maximum of 200m between buildings and at least 200 inhabitants. Delimitation of urban areas is made independently of administrative divisions.

Provisioning ecosystem services
Category of ecosystem service, for example grain, drinking water, wood.

Public space
Public space means a street, a road, a park, a square or other area that, in accordance with a detailed development plan, is intended for a common need.

Publicly accessible green spaces
Comprises a proportion of the total green area. Includes such green spaces that the public, while respecting ownership circumstances and land use, has the right to walk on and enjoy, regardless of the time of year. Applies mainly to publicly owned or administered land, but also to green spaces on privately owned land, if they are considered as accessible under the Right of Public Access.

Real property
A piece of real property consists of one or a number of defined areas of land. This might contain buildings, forest and water. All land in Sweden is divided up into pieces of real property, each of which has a unique designation, for example Berga 1:8 in Lyckeby Municipality.

Recreation
Personal refreshment. Many people do this in nature (forests and green areas). The more different types of environment there are in a local area, the more people are given the opportunity for recreation.
Resilience
The ability of the system to deal with and recover from different types of destruction, in such a way that important functions which the system supplies are not lost. Such a system might be an ecosystem, a society, an economy or a city. It might be a matter of the ability of a forest to recover after a storm or fire, or the ability of the society to recover after a natural disaster.

Reference group
Has an advisory and support function for the project and may contribute with ideas and opinions.

Regulating ecosystem services
Category of ecosystem services, for example air purification, pollination, climate regulation.

Remote sensing
Collection of information about an object/area from a distance, for example via maps.

Socio-economic values
Refers to the social and economic benefits and values that the ecosystem generates for our society. The benefits and values that are important for human health and welfare.

Stakeholder
A physical or legal person who can have an influence on/be influenced by physical planning.

Stormwater
Temporarily occurring rain and snow melt water which runs from land, roofs and other constructions and which may also be rising groundwater.

Straight-line distance
A.k.a. Euclidean distance, or more colloquially ”as the crow flies”. A way of measuring distance while not taking into account spatial barriers which for various reasons cannot be traversed. When calculating straight-line distance road networks, and cycle and pedestrian paths are not taken into account.

Target group
Category of, for example, humans, companies or organisations that information is targeted at.

The 2030 Agenda
An international agenda drawn up by the UN for a change towards sustainability. Its implementation involves a gradual change by all countries to a modern and sustainable welfare state, both at home and as part of the global system. The Agenda comprises 17 goals and 169 targets to support this work.

The mitigation hierarchy
Firstly, damage resulting from land development should be avoided. Secondly, damage should be minimised and rehabilitated in situ. Then the admissibility of the activity should be assessed. Only in the final instance should compensation be paid for damage.

The National Environmental Objective system
This comprises a generational goal, 16 environmental quality objectives and a number of milestone targets within the fields of waste, biological diversity, dangerous substances, sustainable urban development, air pollution and climate. The Swedish Environmental Objectives are the national implementation of the ecological dimension of the global sustainability objectives.

The Swedish Environmental Code
Legislation passed in June 1998 which came into power on January 1, 1999. The Swedish Environmental Code replaced a large number of older environmental laws, whose names reflect the contents of the new code quite well. Literally translated, laws which were revoked include the Environmental protection act, the Sanitation act, the Health protection act, the Water act and the Environmental damage act.

The Swedish Planning and Building Act (Swedish acronym PBL)
The law containing provisions on the planning of land and water areas, and on construction. According to the introductory paragraph the purpose of the law is, with regard to the freedom of the individual, to promote societal progress with equal and proper living conditions and a clean and sustainable habitat, for people in today’s society and for future generations.

Urban biotope
Biotope in a city.

Urban environment
The external environment which characterises the city/inner city. Stands in contrast to, for example, suburbs and rural areas.

Urban greenery
Green qualities in the urban environment.

User involvement
Involving stakeholders and interested parties in processes.

Value tract
Area with significantly higher density of core areas for animal and plant life, including biologically significant structures, functions and processes, than in the surrounding countryside.

Wildlife corridor
Strip of vegetation in developments where plants and animals can live and move about.

Woodland
Woodland consists of land covered with trees with a crown cover of at least 10% and tree height of at least 5 metres. Woodland comprises a proportion of the total green space.

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https://www.ne.se/uppslagsverk/encyklopedi/l%C3%A5ng/buller

https://www.ne.se/uppslagsverk/encyklopedi/l%C3%A5ng/ekosystem

https://www.ne.se/uppslagsverk/encyklopedi/lång/målgrupp

https://www.ne.se/uppslagsverk/encyklopedi/l%C3%A5ng/fj%C3%A4rranalys

https://www.ne.se/uppslagsverk/encyklopedi/lång/miljöbalken

https://www.ne.se/uppslagsverk/encyklopedi/lång/geografiskt-informationssystem

The Swedish Environmental Protection Agency
https://www.naturvardsverket.se/Var-natur/Skyddad-natur/Biotopskyddsomraden/

https://www.naturvardsverket.se/upload/stod-i-miljoarbetet/vagledning/gron-infrastruktur/begrepp-gron-infrastruktur2017.pdf

http://www.naturvardsverket.se/Miljoarbete-i-samhallet/Miljoarbete-i-Sverige/Uppdelat-efter-omrade/Klimat/Klimatanpassning/

http://www.naturvardsverket.se/Stod-i-miljoarbetet/Vagledningar/Miljobedomningar/Specifik-miljobedomning/Underlag-kompensation/

Statistics Sweden
https://www.scb.se/contentassets/e2ef67822f8043549f-1554b4f7759bb7/mi0805_2015a01_br_miftbr1901.pdf

Ulricehamns Municipality
https://www.ulricehamn.se/innehall/2020/08/Riktlinjer-för-exploateringsredovisning.pdf

Örnsköldsviks Municipality
https://www.ornskoldsvik.se/download/18.47c4a8a-5137f2aabb974d0/1443529117289/Gr%C3%B6nplan_120423.pdf

5.2 TOOLS AND METHODS

Surveys and analysis

Accessibility analysis

By means of an accessibility analysis actual distances, barriers, ease of navigation and space syntax analysis can be surveyed. There are a number of digital tools for this type of analysis, such as DepthMap, Segmen, and Place Syntax Tool. For example, an analysis can be carried out to ensure the proximity of green spaces.

Read more about accessibility analysis here:
https://www.boverket.se/contentassets/f01a36e281a-14fe697468b527a448094/delad-stad---sociala-stadsrums-analyser.pdf

https://trafikverket.ineko.se/Files/sv-SE/54783/Ineko.Product.RelatedFiles/2018_208_%20tillganglighet_definition_matt_och_exempel.pdf

https://www.boverket.se/globalassets/publikationer/dokument/2007/bostadsnara_natur.pdf

The 8 experienced qualities

Researchers at SLU Alnarp have produced a model with eight experienced qualities or characteristics for open green urban areas which capture the characteristics that the majority of the population look for. All eight qualities need to be present for the creation of a city quarter which is a sustainable environment to live in or visit. The eight experienced qualities for recreation in parks and green spaces are serenity, variety, wildness, fascinating landscape and contents, no demands, safety and security, accessibility and function.

Read more about the experienced qualities here:
https://www.folkhalsomyndigheten.se/contentassets/f5981a14af284331aa957f724bbdbcf4/r2009-2-gronomraden-for-fler.pdf (sidan 15).

https://www.boverket.se/globalassets/publikationer/dokument/2007/landskapets_upplevelsevarden.pdf

Vegetation analysis

In order to get an overview of the vegetation in the area, vegetation analysis can be carried out, either by remote sensing or by inventory.

Information on this can be found on the Swedish National Land Cover Database (Nationellt marktäckedatabas):
https://www.naturvardsverket.se/Sa-mar-miljon/Kartor/Nationella-Marktackedata-NMD/Ladda-ned/

or via the NILS project at the Swedish University of Agricultural Sciences:
https://www.slu.se/centrumbildningar-och-projekt/nils/

Natural value inventory

The objective of a natural value inventory is to describe and assess natural areas in order to identify biological diversity in a defined area. Since 2014 there has been an international standard for natural value inventories at the Swedish Institute for Standards, namely SS 199000.

Read more about this standard at:
https://www.sis.se/standardutveckling/tksidor/tk500599/sistk555/

Crown cover

Crown cover is a parameter which, in a simple way, can show the coverage of tree crowns and thereby the area of the city which can contribute to climate equalisation such as cooling and shade. Vegetation can also slow down drainage during heavy rainfall and in such a way reduce the risk of flooding. i-Tree is a digital tool from USDA Forest Service which provides tools for such things as analysis of crown cover in the municipality.

Read more about i-Tree at:
https://www.itreetools.org/

Sociotope survey

A sociotope survey maps social values which exist in the outdoor environment of the city. It involves highlighting the values and meanings which places have from a user perspective. The empirical material is usually obtained from observations and interviews.

Read more at:
https://www.boverket.se/contentassets/5431e675fee04023b4785dd49cfdd8a0/jamstalldhetsintegrering-av-gronstrukturplanen-genom-sociotopkartering.pdf

Green infrastructure for children

It is important for children to have good access to well-designed outdoor environments. Creating attractive green spaces and outdoor environments promotes children's psychological, social, physical and motor development.

The city of Gothenburg has created a matrix in order to include children's perspectives in their planning. Read more here:
http://kunskapsmatrisen.socialutveckling.goteborg.se/

Read more about the Public Health Agency of Sweden report on children and green structure here:
https://www.folkhalsomyndigheten.se/contentassets/f5981a14af284331aa957f724bbdbcf4/r2009-2-gronomraden-for-fler.pdf (sidan 22)

Green cultural heritage

Nearly all green and blue environments have been impacted on by humans. This impact is a part of our cultural heritage and is often described as green cultural heritage. Knowledge about green cultural heritage is still scarce and much of the collection and evaluation of knowledge has previously been concerned with developed environments.

Read more here:
https://www.kristianstad.se/contentassets/9704e052009f452b863a54ad689531ad/7-det-grona-kulturarvet-161206.pdf

Landscape ecology

To a certain extent local populations, society and ecosystems always interact with their surroundings in various ways. Surveying and analysing the local landscape ecology, i.e. ecological processes from a landscape perspective, is important for both planning and administration.

Read more here:
https://www.slu.se/institutioner/ekologi/kontakt/vetenskapliga-amnen/landscape-ecology/

Landscape character assessment

A landscape character assessment may be a roadmap for how a landscape is changing in terms of character, values and key functions. This is important in ensuring that the new development will fit in and interact with existing characteristics and features of the landscape.

The need to be able to create a knowledge base which can manage the entirety of nature and cultural landscapes along with structural issues in an integrated way has increased. Therefore, the Swedish Transport Administration has produced a description of the method for integrated landscape character assessment.

Read more here:
https://www.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/Planerings--och-analysmetoder/Miljobedomning/landskap/Metodiken/landskapet-ar-arenan--metodbeskrivning-for-integrerad-landskapskaraktarsanalys-ilka/

Read more about landscape assessments and good examples here:
https://landscape.nu/project/statsbyggnad-landskapsanalys/

Survey of ecosystem services

By conducting a survey of the benefits and values of the ecosystem services, information is developed on which ecosystem services should be retained and what potential there is for developing or creating more ecosystem services. An analysis of what ecosystem services are lacking or will be lacking due to a change in land use, for example building development, may be carried out.

Upplands Väsby Municipality has produced a survey of ecosystem services in the municipality. Read more on this here:
https://www.upplandsvasby.se/download/18.4a3462da15f4d86bb802570/1513245744550/Kartläggning+av+ekosystemtjänster.pdf

Read more about work on ecosystem services here:
https://www.boverket.se/sv/PBL-kunskapsbanken/Allmant-om-PBL/teman/ekosystemtjanster/metod_planering/op/utred-op/

Questionnaires and focus groups

Questionnaires and focus groups are powerful tools in creating a dialogue with the public about their local environment. They may, for example, look at the public's movement patterns, their experiences and what they would like to see in their environment in the future.

Planning and design

Green space factor

Green space factor is a planning tool which can be used to ensure there is a certain amount of vegetation or water in a built-up environment in development districts and public spaces while ecosystem services on biological diversity may be strengthened.

Read more here:
https://www.boverket.se/sv/PBL-kunskapsbanken/Allmant-om-PBL/teman/ekosystemtjanster/verktyg/gronytefaktor/

Kajer mot det gröna (Green harbours)

Kajer mot det gröna (green harbours) is a name for the interface between constructions and green structures used to stress how this interface should be designed front on the same care as is if it were a coastline.

This concept was developed by Järfälla Municipality. You can read more about their work here:
https://www.boverket.se/sv/samhallsplanering/stadsutveckling/delegationen-for-hallbara-stader/stadsbyggnadsprojekt/kajer/

Stormwater planning

Creating overflow areas and planting vegetation in parkland and in open land can reduce flooding during heavy rain. If the entry of some of the stormwater into the ecosystem can be delayed, the

risk of flooding, erosion, pollution and other water damage can be reduced. By reducing the amount of stormwater the burden on the stormwater systems downstream can be reduced which may, for example, mean that construction of a stormwater system and purification are not necessary.

Read more about stormwater planning here:
https://www.vattenplanering.se/?fbclid=IwAR0CuaB8A-4TuE63k1FIK7Lnrg7DZirTkML7PjfOMEP_Ulurn_YZJjBOBaes

Compensation

Planning and development can have a negative impact on ecosystem services. To counteract this reduction in the values and functions of the ecosystem services, compensation can act as a final measure, after all other opportunities to avoid, minimise and remedy damage have been exhausted. Compensation measures involve the creation of completely new natural or green environments, or improvements to existing ones. The Swedish Planning and Building Act does not make provision for demanding compensation, but more and more municipalities are deciding to work with voluntary compensation for types of land development.

Read more about compensation in the Swedish National Board of Housing, Building and Planning website:
https://www.boverket.se/sv/PBL-kunskapsbanken/Allmant-om-PBL/teman/ekosystemtjanster/verktyg/kompensation/

Read about the example of compensation for the impact of the Bothnia Line Railway on the plains and delta of the Ume River here.
https://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6818-9.pdf?pid=22062

Therapy gardens

Therapy gardens can be used to build a multifunctional meeting place with a positive impact on health. By involving different sectors of society, for example associations and the general public, a place for growing crops, relaxation and recreation activities may be created.

The therapy garden in Tivoli Park in Kristianstad is an example of a multifunctional therapy garden. Read more here:
https://www.kristianstad.se/sv/uppleva-och-gora/idrott-motion-bad-och-friluftsliv/friluftsliv-och-motion/parker-och-gronomraden/halsotradgarden/

The Alnarp Rehabilitation Garden is an example of how therapy gardens can be used for treatment purposes. Read more here:
https://www.slu.se/institutioner/arbets-vetenskap-ekonomi-miljopsykologi/alnarps-rehabiliteringstradgard1/

Pocket parks

By making the most of small spaces, which are often not seen as having any function, what are known as pocket parks can bring many values to the city in the form of, for example, ecosystem services and stormwater management.

https://stud.epsilon.slu.se/1371/1/lundblad_i_100615.pdf

Participatory planning

I Participatory planning involves a number of different stakeholders in the planning process. Individuals and organisations who might be affected by or have an impact on the planning process can be said to be stakeholders. By means of, for example, user involvement, the planning process can be made more inclusive. Without resources to facilitate participation and the existence of a structure and leadership it is difficult to implement successful participation. Mutual trust is needed for a participatory process to be successful. Inhabitants and visitors who use the green areas are often very knowledgeable about the conditions and development possibilities. In order for this knowledge and engagement to be of benefit, these people need to be given the opportunity to take part in the green planning process. Participation also creates greater understanding of the importance of the areas and reinforces local democracy.

Read more at the links below:
https://www.slu.se/institutioner/skoglig-resurshushallning/omraden/skoglig-planering/forskningsomraden/deltagande-planering/

https://www.slu.se/forskning/kunskapsbank/future-forests/deltagande-planering-att-fa-fler-aktiva-i-besluten/

https://www.boverket.se/sv/samhallsplanering/sa-planeras-sverige/kommunal-planering/medborgardialog1/varfor-satsa-pa-utokad-medborgardialog/starka-demokratin/

Outdoor recreation planning

Attractive outdoor recreation (friluftsliv) and nature tourism depend a lot on information, ease of access, convenience, quality of experience and service. It is critically important to develop ease of access with public transport, cycle and footpaths in order to strengthen sustainable mobility and reduce the impact on the environment.

Read more here:
https://www.boverket.se/sv/samhallsplanering/uppdrag/avslutade-uppdrag/folkhalsa-och-fysisk-aktivitet/friluftsliv-och-rekreation/

Educational tools

Information centre

Information centres give the general public the chance to learn more about nature, both in their immediate local environment and in the whole municipality.

Naturum Vattenriket i Kristianstad (the Kristianstad Wetlands Visitor Centre) is an information centre with a strong focus on education, both for schools and the public:
https://vattenriket.kristianstad.se/naturum/

Educational installations

Educational installations can be used to increase the public's knowledge. They can be placed strategically in areas with key values, in order to highlight green issues.

Alnarp landscape laboratory is an example of how research can function as an educational installation, for students and the public. Read more here:
https://www.slu.se/fakulteter/ltv/resurser1/alnarps-landskapslaboratorium/

City farming

The term city farming covers everything from small herb gardens to organised agricultural areas in urban environments. There may, for example, be terraces, pallet rims, fruit trees, or allotments. City farms are primarily a social activity which engages people from different countries and brings together people with similar interests. This has a number of positive effects, including social intercourse and creativity.

Read more about city farming here:
https://www.boverket.se/sv/PBL-kunskapsbanken/Allmant-omPBL/teman/ekosystemtjanster/det_har/typer/

https://www.hallbarstad.se/tag/stadsodling/

Green schoolyards

By being designed in a different way, school yards can serve as an educational resource providing experiences of nature, showing ecological relationships and providing space for creative projects. The outdoor environment is seen as a complimentary classroom that stimulates the different interests and abilities of children and young people.

Read more about Lund Municipality's work with green school yards here:
https://www.lund.se/naturskolan/grona-skolgardar/

Ecological footprint

The ecological footprint is calculated based on statistics of consumption and production to estimate how much of the planet's renewable assets would be

needed to produce everything that we consume and to manage the waste which is created.

Read more about the ecological footprint here:
https://www.wwf.se/klimat/ekologiska-fotavtryck/

Evaluation and follow-up

Key indicators

In the evaluation and monitoring of green planning, key indicators are useful. These may then be presented in, for example, green accounts or through the Environmental Barometer tool.

Read more about the Environmental Barometer here:
https://miljobarometern.se/kommuner/

Management and administration

Management plan

The management plan is a strategic document which sets out the vision and objectives for the area, and stipulates measures to be taken to achieve the objective.

Read more about management plans here:
https://www.boverket.se/sv/PBL-kunskapsbanken/Allmant-om-PBL/teman/ekosystemtjanster/forvaltning/skotselplanen/

User involvement

User involvement in planning and management creates greater engagement and can increase the quality of green areas. Engagement is stimulated most for the local environment and local green areas. It is therefore important to find ways to convey opinions to the administrators of the green areas.

5.3 ECOSYSTEM SERVICES

Supportive services

The supporting services are the basic functions of ecosystems, such as biodiversity, ecological interaction, biological processes and soil formation. They are necessary prerequisites for the other ecosystem services to function.

1.1 Biodiversity

Variety within species, between species, and in ecosystems, enables adaptation and provides resilience.

1.2 Ecological interaction

Interactions between two or more species contribute to ecosystem functions.

1.3 Habitats

Natural habitats are a prerequisite for supporting the survival, growth and propagation of plant and animal species.

1.4 Biological processes

Ecosystems enable the natural cycles of water, carbon, nitrogen, phosphorus, and other nutrients.

1.5 Soil formation

Organisms break down material, releasing nutrients into the soil.

Regulating services

The regulating services are about the ecosystem's capacity for air purification, pollination, improvement of the local climate and protection against extreme weather. They contribute to safeguarding and improving our living environment and are often at least as effective and profitable as technical solutions.

2.1 Regulating local climate

Green space and natural areas contribute locally to more uniform temperature, increased humidity, shade and wind protection.

2.2 Protection from erosion

Plant roots bind together earth and sediment on land and in water. Leaves and branches prevent soil from being washed away.

2.3 Extreme weather

Green space and natural areas protect against extreme weather such as storms, high waves, flooding, downpours, landslides and droughts.

2.4 Improving air quality

Vegetation purifies air by filtering and capturing pollutants.

2.5 Regulation of noise

Vegetation and non-hardened soil dampen noise and create calmer environments for people and animals.

2.6 Water purification and regulation

Wetlands, green areas and other ecosystems delay, filter and purify water while preventing flooding, erosion and drought.

2.7 Pollination

Insects pollinate flowering plants that develop fruit, berries and seeds for plant reproduction and for the production of food for humans and animals.

2.8 Regulation of pests and invasive plants

Animals and other organisms can regulate and reduce the amount of pests, invasive plants and harmful insects.

Provisioning services

Provisioning services are products and services that we get directly from ecosystems and that enable us to live on our planet, including raw materials, energy, water and food.

3.1 Food supply

Ecosystems provide food through opportunities for cultivation, animal husbandry, fishery and hunting.

3.2 Water Supply

Ecosystems store, purify and regulate access to water for drinking, irrigation of crops and other purposes.

3.3 Raw materials

Plants and animals provide raw materials such as wood, leather, biochemicals and manure.

3.4 Energy

Wood, crops and organic waste can give us heat and energy through biogas and other fuels.

Cultural services

The cultural services define the well-being we get from nature. The green structure contributes to experience values, provides knowledge and inspiration and is important for our physical and mental health.

4.1 Physical health

Green spaces and natural areas encourage physical activity such as exercise, play and outdoor activities.

4.2 Mental wellbeing

Being present in green spaces and nature promotes physical and mental health.

4.3 Knowledge and inspiration

Green spaces and natural areas can provide knowledge and inspiration, increase creativity and productivity, and improve our understanding of our relationship with nature.

4.4 Social interaction

Green spaces and natural areas promote social diversity by offering common intersections for people from different backgrounds, communities, and ages.

4.5 Cultural heritage and identity

Green spaces and natural areas create attractive environments, contributing to local identity and forming part of cultural heritage.

GREEN PLANNING

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