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GRETA BRIEFING 2 //

Relating Green Infrastructure to the Strategic Environmental Assessment

August 2019

https://www.espon.eu/green-infrastructure

The Strategic Environmental Assessment (SEA) is an administrative procedure and an instrument that accompanies the approval and adoption of strategies and plans (SP) with a potential environmental impact.

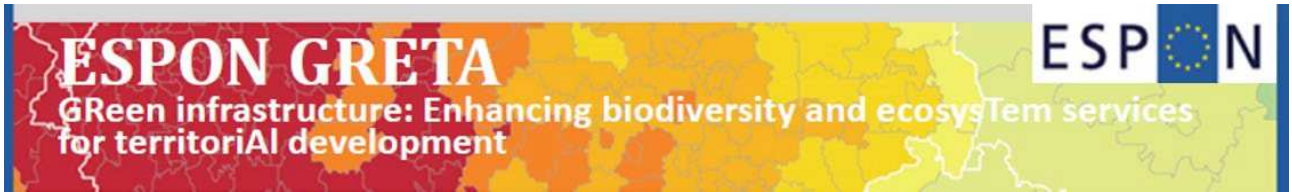
The SEA aims to provide a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of all SP. It is applicable at various planning scales (i.e. national, regional, local).

The GRETA project sought to explore concepts and methods for the integration of the benefits and challenges of green infrastructure into decision making and to inform planning (See Briefing 1 and 3).

The purpose of this briefing is to reflect on:

- How to think more strategically about green infrastructure and ecosystem services to **inform spatial and urban planning**.
- To what extent is there any room for **the concepts of green infrastructure and ecosystem services in the context of the SEA**.

The thoughts and suggestions made in this briefing are based on the future opportunities that the SEA procedure could offer, rather than on assumptions or learnings from its current practice. Good practice examples are illustrated in boxes.



Given the wide-ranging benefits of green infrastructure, the audience for this briefing is purposefully broad, including:

- **Public administrations** responsible for delivering integrated spatial plans at any level in European Union (EU) countries (and those seeking EU membership). This includes spatial planners and any supporting agencies which, in the exercising of their duties, are willing to promote a more inclusive and resilient spatial planning and urban design by means of innovative procurement processes
- **Knowledge providers, professionals and consultants** who conduct Strategic Environmental Studies for public authorities and their entities.
- **Ecology groups and educational institutions** running environmental education programmes to raise awareness about the value of integrating green infrastructure as a relevant planning criterion.
- **General public** willing to understand how planning decisions are made and to engage with an integrated vision of the benefits that a "planning with nature" approach may have on the environment, and on their health and well-being.

Green infrastructure in the context of integrated spatial planning

Spatial planning is an enabling discipline for territorial development that articulates the deployment of other public policies affecting the spatial organization and governance of land – including. biodiversity, climate change and water.

The EU defines green infrastructure as a ***strategically planned network*** *of natural and semi-natural areas with other environmental features designed and managed to* ***deliver a wide range of ecosystem services.*** *It incorporates* ***green spaces (or blue*** *if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas.*[1] *On land, green infrastructure is present in urban, peri-urban and rural settings.* Box 1 sets out the strong interrelationship between green infrastructure and spatial planning.

Box 1. Key Features of Green Infrastructure:

- Connectivity – creating networked geographical areas.
- Multifunctionality – performing several functions while also providing valuable ecosystem services.
- Multi-scale approach – integrating spatial planning across urban, peri-urban and rural settings.

In general, the integration of green infrastructure into spatial planning has followed two approaches:

- Green infrastructure considered as a distinct sector of policy, spatial planning and urbanism (at the same level as housing, land use and transport). In this approach, green infrastructure is seen primarily as an 'object' of planning (rather than a result of planning) – to be applied to existing protected areas such as the Natura2000 network.
- Green infrastructure as a 'product' or result of an integrated approach to planning, where development needs and protective demands are reconciled into the same spatial plan – applicable at different levels (regional, local/city).

The GRETA project supports the idea that ecological processes should inform integrated spatial planning – and that this consideration is a pre-requisite for sustainable ecological, economic and societal development.

It is therefore appropriate that the concept of green infrastructure and its approaches could provide an integrative framework that supports the comprehensive assessment of such ecological processes, their patterns and spatial distributions.

Despite relevant good practice examples of mature spatial planning systems that incorporate a green infrastructure approach (see Box 2), there is still great uncertainty in planning practice on how, and at which scales and phases of the planning process, it is feasible to make use of the green infrastructure and ecosystem services approach. It can also be unclear how to best benefit from the approach's integrative capacity for supporting sustainable development.

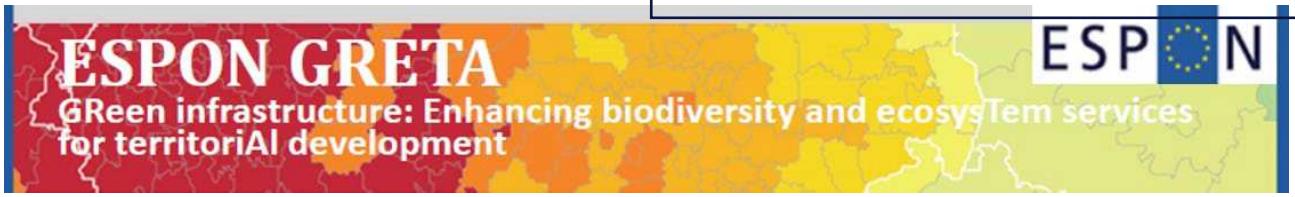
Box 2. In Practice - Basque Country: Consideration of the green infrastructure for climate change adaptation in the regional spatial planning guidelines

The Basque Country has a robust spatial and urban planning system that: i) is integrated, multi-scale and multi-sectoral through the articulation of planning instruments; ii) uses operative governance mechanisms; iii) includes complementary competence distribution between public administrations (regional, provincial, local); and iv) is characterized by a territorial management culture. There is also a strong consideration of natural capital protection and green infrastructure enhancement, with substantial activities in the field of Nature-Based Solutions (co-benefits and no-regret approach), as well as key complementary capacities, i.e. territorial and urban regeneration, or consideration of health in urban design.

'The Basque Country has also approved a robust Climate Strategy with explicit actions for mainstreaming adaptation into spatial planning and for deploying resources towards resilient urban development. The existence of substantial information developed on climate hazards and impacts (climate projections, flooding risk maps, urban heat island studies, local vulnerabilities) has also been crucial for reaching a cutting-edge operative consideration of climate adaptation in spatial and urban planning instruments.

The Basque Spatial Planning Guidelines are the instrument that defines the territorial model and development in the region and defines the recommendations for the comprehensive, sectoral and urban planning. They represent a pioneering and novel experience in integrating climate change into planning where green infrastructure and Nature-based Solutions are the back-bone of climate change adaptation. These guidelines have been materialized in two pilot instruments: The Integrated Plan of Bilbao Metropolitan Area and the subsequent Master Plan of Bilbao City. Lessons learned from this process at the three levels of planning could serve as inspiration in other territorial contexts.

[1] European Commission. 2013. Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions 'Green Infrastructure (GI) — Enhancing Europe's Natural Capital'.



Strategic Environmental Assessment to legitimize the value of green infrastructure

Although different planning systems exist in the EU, the Strategic Environmental Assessment (SEA) is a procedure that is required by an EU Directive transferred into national polices in all EU countries for all strategies and plans (SP) with a potential environmental impact. It supports the implementation of EU sector policies (i.e. Climate Change, Water, Biodiversity, Marine, Waste, Energy, Transport, Rural development, Fisheries, Structural Funds & Cohesion) as illustrated in Figure 1.

The SEA is a tool based on Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014[2] and there are minimum standards and provisions that have been transposed into national law across Europe.

The SEA is intended to ensure that all parties integrate environmental assessment into the preparation and adoption of all SP at the earliest opportunity in order to provide a high level of protection for the environment and encourage long-term sustainable practices.

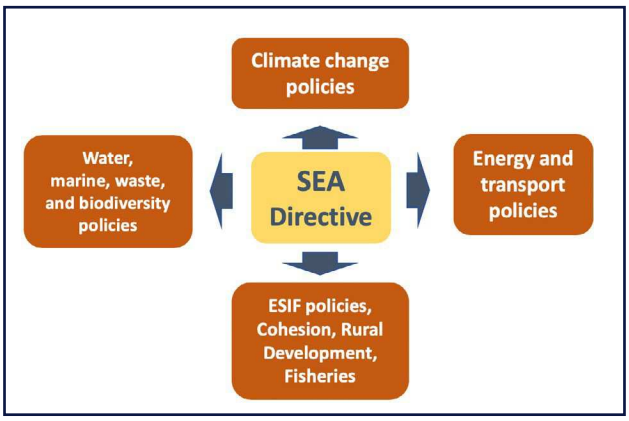


Figure 1. Sector policies which can be supported by Strategic Environmental Assessment (SEA).

Article 3 of the Directive states that: "The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the context of each individual case, the direct and indirect significant effects of a plan on the following factors:

a. population and human health;

b. biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

c. land, soil, water, air and climate;

d. material assets, cultural heritage and thelandscape;

e. the interaction between the factors referred to in points (a) to (d)"

The integrated nature of the green infrastructure and ecosystem services concepts ensures that the above factors listed in the Directive (a) to (d) and their interactions are addressed.

In Article 5, the Directive also refers to:

"(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;"

In this regard the green infrastructure approach could be used for benchmarking planning and design alternatives, considering green infrastructure and ecosystem services as planning criteria:

- Enhancing the ecosystem services, when diminishing trade-offs.
- Promoting balance between supply and demand of ecosystem services to support sector policies.
- Supporting physical and functional connectivity for natural process and for the shake of biodiversity.
- Providing land use principles for spatial planning based on the main elements of the green infrastructure definition/concept: i) Connectivity – the idea of a network which implies not only physical but functional connectivity; ii) Multifunctionality; iii) Multi-scale approach.

Green infrastructure contributes to enhancing strategic thinking and the positioning of ecological processes and their benefits as relevant planning criteria for more resilient territorial development.

Based on GRETA research, we suggest a SEA methodological process for how to evaluate green infrastructure and ecosystem services in the context of SP, particularly for Integrated Spatial Plans and Land Use Plans, for effectively complying with the requirements stated by the Directive (see Figure 2).

The remaining sections of this briefing provide further insight from a green infrastructure perspective for relevant stages in the SEA process, with focus on the integrated planning instruments.

[2] Amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. SEA currently undergoing evaluation http://ec.europa.eu/environment/eia/s-refit.htm

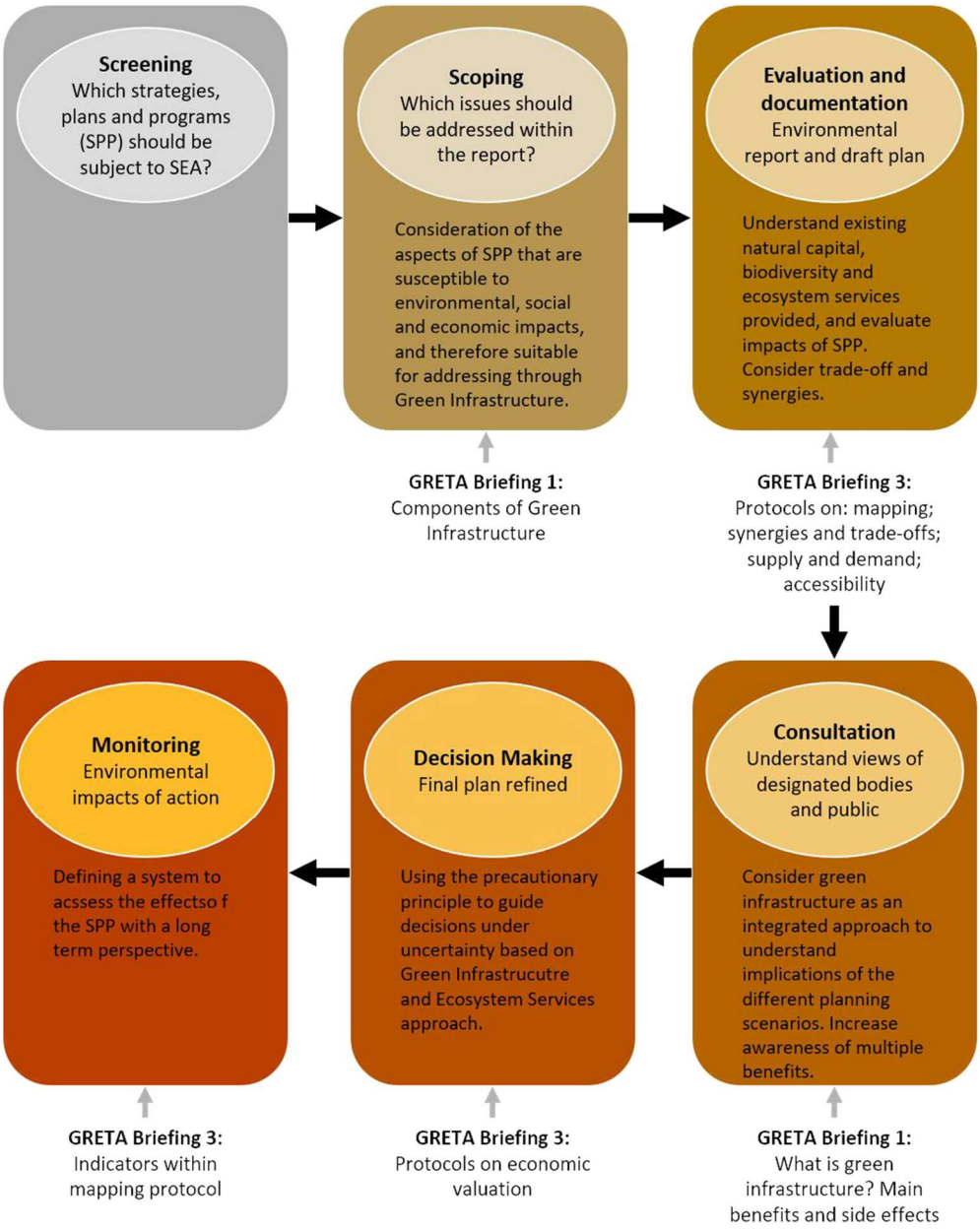


Figure 2. Determining entry points for the consideration of green infrastructure (GI) and ecosystem services (ES) concept and approach in the Strategic Environmental Assessment (SEA) process for Spatial Plans and Land Use Plans. [SP – strategies and plans]

SCREENING Which strategies, plans and programs should be subject to SEA?

The screening procedure should ensure that an assessment is only conducted for plans likely to have a significant effect on the environment, based on criteria set out in Annex II of the Directive.

SCOPING Which issues should be addressed within the environmental report?

This phase of the SEA procedure helps to set out the scope of the assessment, defined according to the different levels of planning.

Including green infrastructure into scoping will allow a more in-depth consideration of which aspects of the SP are likely to have a negative impact on the environment and on the provision of ecosystem services (e.g. related to climate change and biodiversity impacts) and will help determine which experts to include in the SEA team.

The stakeholders´ consultation stage is one of the key components of the plan elaboration that could provide very valuable understanding concerning which aspects should be covered in the Environmental Report.

The consultation phase of the plan elaboration should aim to reach out to as wide range of stakeholders as possible, from agriculture, forestry and water management to transport, energy and health. This proactive approach to wide consultation, is seen feasible within the framework of current national environmental laws.

- Besides civil society, do not forget about the unusual suspects (think about who are often omitted, e.g. land owners, real estate/ investors).
- Good governance is crucial, considering horizontal (different sectors/ departments/ stakeholders) and vertical (multi-scale approach/ administrative levels).

*To find more about the components benefits and side effects of the green infrastructure visit **GRETA Briefing 1. Unpacking Green Infrastructure** at https://www.espon.eu/green-infrastructure*

EVALUATION and DOCUMENTATION:

Environmental report and draft plan

This phase of the SEA concerns the evaluation of the expected impacts and outlining the corresponding documentation, namely the environmental report and draft plan.

Integrating the green infrastructure concept and approach into the evaluation phase requires a knowledge of existing natural capital, biodiversity and ecosystem services provided, and an evaluation of the impacts of SP, considering connectivity (i.e. physical and functional), trade-offs and synergies, as well as the contribution of the network to the SP policy targets

The Evaluation phase could be structured in two stages:

- Evaluation of impacts of the SP on the green infrastructure network (i.e. ecosystem services loss, fragmentation) as well as contribution of the network to the SP policy targets (i.e. balance between supply and demand of ecosystem services).
- Benchmarking alternative planning scenarios considering green infrastructure as a planning criterion.

*To find more about the GRETA methods for decision making and Evaluation of Impacts visit **GRETA Briefing 3 Planning for Green Infrastructure: Methods to support policy and decision-making** at https://www.espon.eu/green-infrastructure*

Evaluation of impacts

One of the roles of the SEA is to seek to manage the complexity of the relations, conflicts and potential synergies that the different actions of the strategy or plan under evaluation could have. The SEA should evaluate the impact that a SP may have in environmental, including biodiversity. Importantly it should also consider how the ecosystem services provided by the green infrastructure are supporting the objectives of the SP.

Having a good baseline and diagnosis is crucial

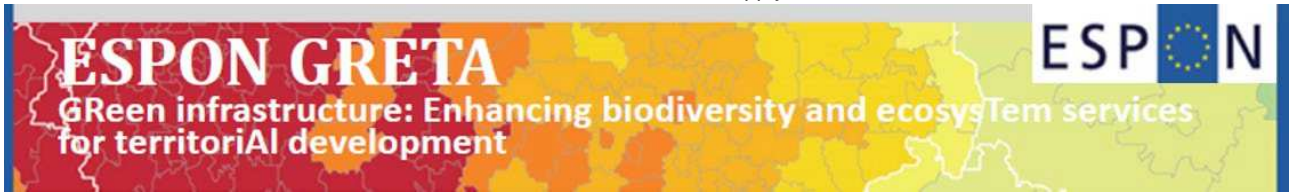
Ideally the SP under evaluation, should have defined a good baseline and diagnosis of the natural capital, biodiversity and ecosystem services. GRETA methods for mapping the physical and multifunctional green infrastructure could serve to develop a baseline and diagnosis and will help in:

- Identifying and delineating potential green infrastructure elements (see GRETA Briefing 3 Physical Mapping Method – Assessing and connecting valuable natural areas).
- Identification of hotspots of potential green infrastructure, but also deficiencies due to landscape fragmentation. (See GRETA Briefing 3 'Physical Mapping Method – Assessing and connecting valuable natural areas'; and 'Ecosystem Service Base Mapping Method –Assessing multifunctionality').
- Identification of areas of opportunity that either require increased safeguarding or restoration for maximization of investment priorities. (see GRETA Briefing 3 Synergies and Trade-offs method: Statistical graphical analysis).

Methods supporting impact

GRETA methods support the evaluation of impacts in two distinct ways:

1. Evaluation of the significant impacts of the SP on the existing green infrastructure network, biodiversity and provision of ecosystem services. See GRETA methods for physical and multifunctional green infrastructure mapping and accessibility in Briefing 3.
2. Evaluation of the green infrastructure contribution to the achievement of the SP planning priorities, objectives and policy targets. See GRETA Briefing 3 'Supply and Demand Method – Mapping' for assessing green infrastructure supply and demand.



The green infrastructure and ecosystem services approach used by the GRETA research would assist in dealing with the complexity of the system, with a comprehensive assessment of the linkages between different environmental issues and policies, to reduce the risk of:

- Negative interactions and inconsistent policy targets.
- Missed opportunities for exploring and promoting positive interactions.
- Suboptimal allocation of resources, increased investments in mitigation or compensation measures

Benchmarking alternative planning scenarios

SEA requires that each SP consider different planning scenarios.

Scenarios are an effective way to deal with the uncertainty inherent to complex systems and lack of data. Green infrastructure and ecosystem services could be used to generate alternative planning scenarios for the SP, benchmark and decide which ones have less significant impacts and maximize the green infrastructure network and provision of ecosystem services.

Enhancement of the ecosystem services, while diminishing trade-offs

The GRETA method for assessing ecosystem services trade-offs and synergies can certainly be a resource for benchmarking planning alternatives. It offers a comprehensive and integrated approach for selecting the best alternative or best planning scenarios – considering the trade-offs and synergies between the ecosystem services provided by the green infrastructure network as prioritization criteria. Figure 3 shows the ES contribution to the three policies prioritized in GRETA research.[3]

The ecosystem services synergies and trade-offs can be assessed when comparing planning alternatives. This can be done to identify the best option – the one with most synergies and least significant trade-offs such that the most resilient and cost-effective plans are delivered. The optimal planning alternative should be able to support physical and functional connectivity for natural processes and to protect biodiversity.

Could alternatives be focused on specific policy objectives?

The GRETA method for the analysis of supply and demand could also be used for:

- Promoting balance between the supply and demand of ecosystem services to support sector policies.
- Framing each planning alternative according to specific policy objectives (biodiversity, water, or climate change) and using green infrastructure as the focus of the scenario.
- Using Geographic Information System (GIS) layers to spot land use conflicts.
- Assessing the possibility of mitigating an impact supplying green infrastructure (flood prevention for example, with recreation).

*To find more about the GRETA methods for accessibility analysis and assessment of supply and demand visit **GRETA Briefing 3 Planning for Green Infrastructure: Methods to support policy and decision-making** at https://www.espon.eu/green-infrastructure*

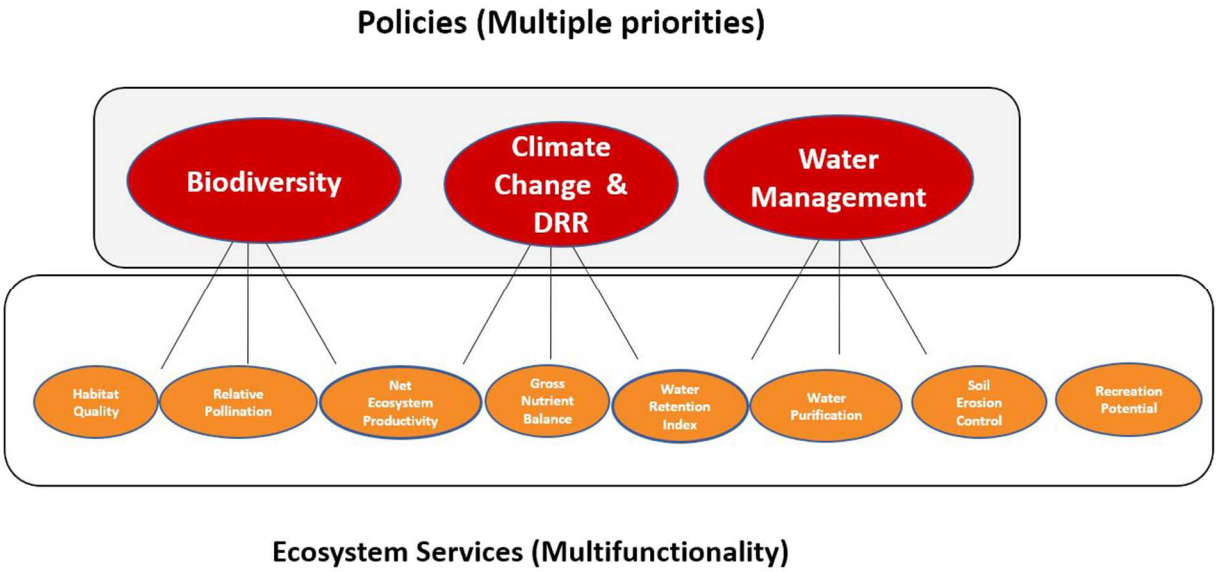
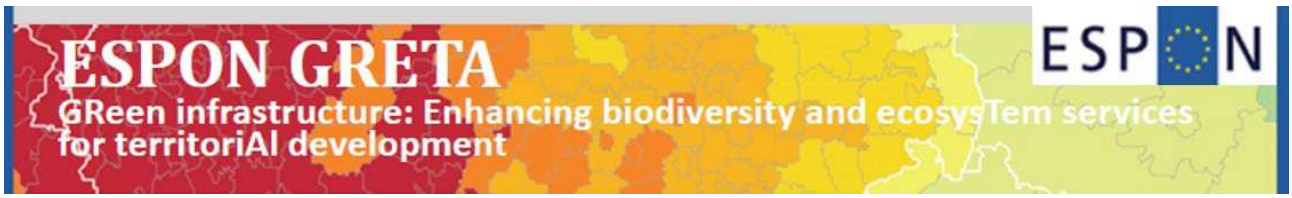


Figure 3. Ecosystem services serving the objectives of biodiversity, climate change and water management policies

[3] For the GRETA project, eight ES indicators were selected to measure the ability of potential GI elements to provide multiple functions in the same spatial area. The selection was based on the capacity of each ES to support the achievement of some objectives defined in the context of the three selected policy frameworks: Biodiversity, Climate Change and Disaster Risk Reduction, and Water Management



CONSULTATION PHASE

The SEA phase for Consultation aims to understand the views of designated bodies and the public concerning planning proposals and possible environmental impacts.

This phase of the SEA process could be a very powerful tool to disseminate green infrastructure and ecosystem services concept and approaches, as a planning solution to multiple issues:

- Planning- resilient
- Finance- cost effective
- Politics- politically expedient

A good practice example of inclusive participatory consultation process linked to green infrastructure planning is included in Box 3. This illustrates a process for considering local knowledge as a way of ensuring socially sustainable and inclusive planning.

Box 3. In Practice – Participatory hearing process to ensure the quality of green infrastructure in long-term perspective

One of the proactive components in Greater Copenhagen's spatial planning is the participatory consultation process. For the Fingerplan 2017, draft plans were sent out via a web portal. As prescribed in the law, the plan is also sent for hearing to a long list of authorities. All the comments, including those from NGOs and private actors, are shared on the web platform. The suggested changes are discussed with the responsible minister and some alterations might be made based on the comments. All comments that have been received get an answer to acknowledge that their concerns have been considered. The hearing process prevents and handles possible conflicts over the use of land and ease the implementation of the development suggestions in the plan.

Challenges: Hearing processes can be administratively heavy, especially in terms of personnel costs. It can also be a challenge to reach out to different groups of inhabitants.

DECISION MAKING Final plan refined

Using the precautionary principle to guide decisions under uncertainty based on the dissemination of green infrastructure and ecosystem services concepts and approaches.

Some considerations for the Decision-making Phase:

- Decisions on the final SP are made based on results from the report delivered in the Evaluation & Documentation phase as well as the consultation with the designation bodies and the public,
- Green infrastructure and ecosystem services would benefit from using the precautionary principle to guide decisions under uncertainty.
- GRETA methods for economic valuation applied to green infrastructure could be used as guidance for decision making.

A good practice example on the use of greening in decision making is presented in Box 4.

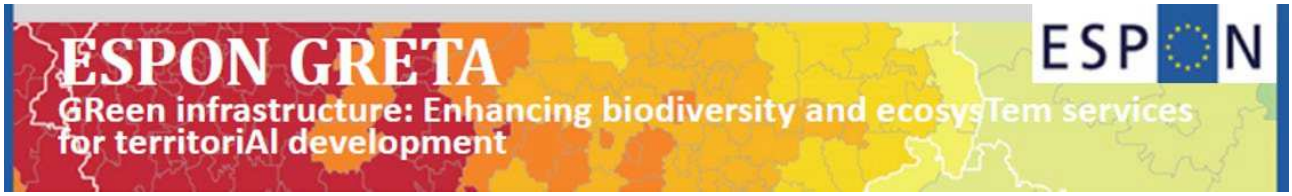
To find more about the GRETA approach to economic valuation methods applied to GI visit ***GRETA Briefing 3 Planning for Green Infrastructure: Methods to support policy and decision-making*** *at https://www.espon.eu/green-infrastructure*

Box 4. In Practice – 'Green space factor' for incorporating green-blue infrastructure in territorial planning

In the comprehensive territorial plan for Malmö (in Scania, Sweden), approved by the political board in 2014, it is stated that Malmö shall be developed to a sustainable, dense, green and mixed city. One of the strategies to fulfil a greener city is the 'Green Space Factor' which has been included as part of the local authority's Environmental Building practice. This means that for every surface that a developer wants to seal (buildings, asphalt or concrete) they will need to compensate this through e.g. retaining or creating a blue or green space. The green space factor is meant to secure a minimum amount of green and blue spaces in new development areas. Reduction of noise, air pollution and water purification are three ecosystem services that are especially important in cities. The idea for a green space factor was initially introduced at the housing and planning fair Bo01 in Malmö in Sweden in 2001. Inspired by this idea, the planning authorities in Malmö developed a formula for development of greener housing blocks. Since then the planning authorities are using the green space factor in many projects.

The green space factor measures how ecosystem services are produced by the green and blue environments. The tool has its emphasis on assessing the noise and air pollution reduction and water purification that are especially important ecosystem services in cities. Within the green space factor, qualitative values are created with the help of a quantitative formula. The formula in Malmö is Green Space Factor = eco-efficient space/property space. The idea behind, the method, the user guide for calculating the green space factor, and housing blocks that have been transformed using the green space factor are transparently communicated and available for public, private and any other actor on the Swedish local authority webpage.

Challenges: The tool is not necessarily applicable for rural context, because the required compensative blue or green areas are not relevant to locate into the same area where green infrastructure areas are diminishing because of some land use changes.



MONITORING environmental impacts of actions

This phase entitles monitoring the evolution of the green infrastructure network and ecosystem services provision as a basis for adaptative management towards future changes.

This implies defining a monitoring and evaluation system to:

- Define a monitoring and evaluation system to assess the effects of the SP with a long-term perspective, considering GI physical and functional indicators to address territorial challenges (including social).
- Evaluate the progress of the actions that are planned, defining process indicators and how often they will be updated.
- Determine coverage percentage of green infrastructure,
- Assess number of core areas connected by green infrastructure
- Assess number of ecosystem services supplied by green infrastructure;
- Determine number of policy frameworks benefiting from green infrastructure

Good practice example of long-term monitoring applied to the effectiveness of habitat conservation is displayed in Box 5.

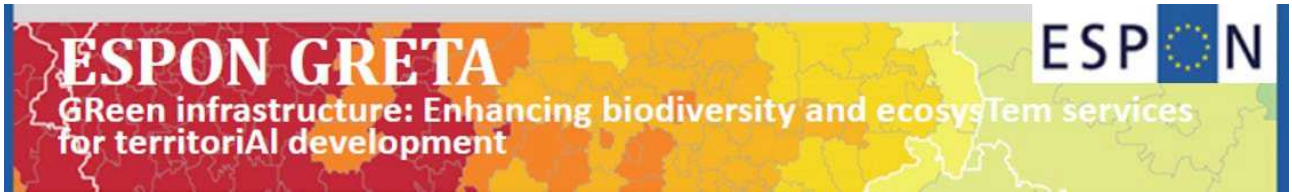
Box 5. Long-term monitoring applied to the effectiveness of habitat conservation

In Switzerland a programme was created as part of an initiative to develop governance practices in a way that green infrastructure can be preserved more systematically. Among other activities, the Confederation have adopted four monitoring programmes that are specifically focused on Switzerland's biodiversity. One of these programmes is the long-term monitoring of biodiversity in areas with formal status and zoned as 'nationally important habitats'.

This program examines whether the alluvial zones, mires (fens and raised bogs), amphibian spawning sites and dry meadows and pastures are changing in line with their protection goals and whether their area and quality are preserved according to set goals and management plans.

The process used to record the vegetation in the various types of biotopes is the same one used for areas that do not have the national important habitats status. This makes it possible to compare changes in landscapes with no protection status with those in the biotopes of national importance.

Challenges: A definition of "high value biodiversity" areas needs to be determined before implementing the monitoring mechanism. Availability of applicable data (or method to record data) are needed in order to monitor the vegetation changes in "high value biodiversity" areas and compare these changes to other landscape areas.



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