GREEN INFRASTRUCTURE IMPLEMENTATION AND EFFICIENCY

ENV.B.2/SER/2010/0059

Annex V: Policy Area Audits

22 December 2011

Institute for European Environmental Policy

Together with:
Ecologic Institute, Germany
GHK, United Kingdom
Syzygy, Netherlands
TAU Consultora Ambiental, S.L, Spain
University of Antwerp, Belgium
VITO, Belgium

Institute for European Environmental Policy (IEEP)

London office:
15 Queen Anne's Gate
London SW1H 9BU, UK
United Kingdom

Brussels Office:
Quai au Foin, 55
Hooikaai 55
1000 Brussels
Belgium

Contact persons:

Graham Tucker (Project director)
Direct tel.: +44 (0)20 7340 2688
Fax: +44 (0)20 7799 2600
Email: gtucker@ieep.eu

Leonardo Mazza (Project coordinator)
Direct tel.: +32 (0) 2 738 74 77
Fax: +32 (0)2 732 40 04
Email: lmazza@ieep.eu

TABLE OF CONTENTS

Contents

1 ANNEX IV: POLICY AREA AUDIT OVERVIEW FACTSHEETS 4

1.1 Agricultural Policy 4

1.2 Forestry 10

1.3 Biodiversity and nature Conservation 13

1.4 Water Policy 19

1.5 Soil Policy 24

1.6 Climate change policy 27

1.7 Regional Policy/ Territorial Cohesion and Innovative Financing 31

1.8 Green Growth: EU 2020 Strategy and Resource Efficiency Flagship Initiative 37

1.9 Transport and Energy 40

1.10 Impact assessment, damage prevention and remediation 49

1.11 Spatial planning 54

1.12 Marine and Coastal Zones Policy 59

1.13 Environment and Health 65

1.14 EU Research and External Development Cooperation 68

1 ANNEX IV: POLICY AREA AUDIT OVERVIEW FACTSHEETS

The green boxes below provide three 'SWOT for green infrastructure' analyses of EU policies and instruments. In total, 40 such SWOT assessments have been carried out. This extensive exercise has aimed to ensure that:

1. the right options for green infrastructure are identified (ie those that are relevant, potentially societally beneficial, and practical) and that there is coherence and "joined up thinking" in the policy choices (hence they follow principles of good governance)
2. we don't aim to suggest new instruments when there may be existing ones that, with due reform or change of implementation, can fulfil the objectives
3. in an eventual framework legislation for green infrastructure (option 4, see later), that the interconnectivity of EU acquis is taken into account; this should facilitate legal drafting to ensure due policy coherence and good governance/better regulation.

In addition, the existing tools and instruments which exist in each one of the policy areas are identified in the blue tables, entitled 'existing tools and instruments in a specific policy area', below. This was done to ensure that changes proposed under the policy options 2 - 4 build on existing tools and instruments where those exist.

1.1 Agricultural Policy

Overview

The current EU policies and instruments in the areas of agriculture potentially relevant to Green Infrastructure include:

- CAP Pillar 1 – Cross-compliance (Reg 73/2009)
- CAP Pillar 1 - CAP 2020 Communication
- CAP Pillar 2 - EAFRD Funding
- CAP Pillar 2 - Training, advice, extension services, planning provisions; and Farm Advisory System (under CAP Pillar 1)

Pillar 1 – Cross-compliance (Reg 73/2009)	
How is GI addressed (directly or indirectly), if at all?	The actions in the Habitats Directives which are relevant for maintaining ecological coherence at farm level are set out under the Statutory Management Requirements (SMRs) within cross-compliance. Also under cross-compliance, the standards for Good Agricultural and Environmental Condition (GAEC) (Reg 73/2009), outline several standards that make an indirect contribution to maintaining GI. Of particular relevance are three standards for ensuring a minimum level of maintenance and avoiding the deterioration of habitat, a standard for the protection of permanent pasture, and a standard for the maintenance of terraces (the primary goal of which is to counter soil erosion). In addition, the quantitative requirement for maintaining the share of permanent pasture at Member State level is also relevant for GI.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The SMRs help enforce the actions relevant to GI at farm level under the Habitats Directives by making legal compliance a pre-condition to farmers' receiving direct payments under the CAP. Among the compulsory GAEC standards, the standard

	for protection of landscape features have a potential to bring benefits for birds, insects and small mammals, for maintenance of extensive farming systems (by providing woody forage for livestock) and for supporting soil services, thereby maintaining healthy ecosystems. Semi-natural grasslands, which are the key component of high nature value (HNV) farming and help maintain ecological coherence of agricultural habitats and sequester soil carbon, benefit from the compulsory GAEC standard for the protection of permanent pasture. Among the voluntary standards, the measure for establishment and retention of habitats can directly contribute to maintaining and enhancing ecosystems and improving connectivity for wildlife in intensively and extensively farmed areas. Another voluntary standard for minimum livestock stocking rates and appropriate regimes is beneficial to water and soil ecosystem services as well as supporting wildlife in extensive pastures. The voluntary standard for maintaining terraces can bring benefits to ecosystems through soil, biodiversity and connectivity benefits due to provision of shelter to small mammals in agricultural habitats, particularly relevant in arid and semi-arid zones. The quantitative permanent pasture requirement at Member State level seeks to prevent massive loss of pastures to abandonment.
What are the **W**eaknesses or barriers for GI?	The weakness of the quantitative permanent pasture requirement is that it protects both the semi-natural pastures which contribute to GI, and the improved and reseeded pastures with hardly any benefits for GI. As the rule is set at national level, it effectively allows a certain amount of ploughing of semi-natural grasslands on the condition that the improved and re-seeded pastures are brought into the reporting system instead. The weakness of the measure to protect landscape features is that in some MS, landscape features have been excluded from the eligible agricultural land and in some new MS, have also been physically removed. In other cases, they are not a part of eligible land and are left unprotected. The weakness of the voluntary standards that make contribution to GI is that MS authorities are free to decide whether to implement them or not.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	Certain GAEC provisions are directly contradictory to the maintenance of HNV farmland. This holds for some elements of the compulsory GAEC standard for minimum level of maintenance that focuses on avoiding the encroachment of unwanted vegetation on agricultural land. Alongside certain eligibility rules for Pillar 1 payments (eg the guidance on differentiating agricultural from forest land by the '50 trees per hectare' rule) they have had the perverse effect of leading farmers to comply with the payment conditions by cutting scrub, bushes and trees in HNV habitats.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	- To make the voluntary GAEC measures compulsory. - To introduce strict protection of semi-natural grasslands at farm level. - To include all landscape features on farmland in eligible hectares and enforce their strict protection. - To remove the rule for the unwanted vegetation. - To remove the eligibility rule for 50 trees per hectare.

CAP 2020 Communication[1] – Pillar 1	
How is GI addressed (directly or indirectly), if at all?	GI is not addressed directly. However, the Communication proposes enhancement of environmental performance of the CAP Pillar 1 through a mandatory "greening" component introduced in direct payments. This would involve simple, generalised, non-contractual and annual environmental actions that go beyond cross-compliance and are linked to agriculture (eg permanent

[1] The Commission Communication "The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future", published on 18 November 2010.

	pasture, green cover, crop diversity and maintenance of ecological focus areas). In addition, the possibility of including the requirements of current Natura 2000 areas, and enhancing certain elements of GAEC standards, has been proposed.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The maintenance of ecological focus areas is a greening measure with a high potential for maintaining and enhancing ecological coherence of rural land both in extensive and intensive systems. It delivers synergistic benefits for biodiversity, water and soil by increasing connectivity, providing shelter for species, helping mitigate water pollution by reducing the overall inputs, and improving resilience against soil erosion. Green cover is a simple measure for intensive arable systems that can deliver basic benefits for GI.
What are the **W**eaknesses or barriers for GI?	The weakness of the ecological focus area measure is that its effectiveness depends on the in-field location which determines the ecosystem value of the set-aside. As long as the measure is implemented at farm level and farmers are not constrained by any planning provisions relevant for GI, it is likely that the factors determining which part of the field will be attributed to the set-aside will be agronomic and economic, rather than ecological. This can substantially reduce the benefits for GI. A potential weakness of the 'greening' component under Pillar 1 vis-à-vis GI lies in its potential consequences for Pillar 2 and agri-environment, but these cannot be determined at present.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	Not in the broad outline. However, a potential threat to GI benefits currently provided by agri-environment schemes can arise if the outcome of the CAP political process directly or indirectly prioritises Pillar 1 greening measures over the Pillar 2 agri-environment measures. In such a case, the net dilution of agri-environment policy would threaten the existing benefits to GI.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	To develop policy safeguards so that farmers attribute in-field plots to the ecological set-aside rather than field edges, and to ensure that the in-field fallow has an uptake on larger spatial scales. This would ensure the GI benefits of the measure.

EAFRD funding - Pillar 2	
How is GI addressed (directly or indirectly), if at all?	Indirect but very important contribution to GI is being made through agri-environmental measure, the only compulsory rural development measure. The agro-forestry measure (particularly the actions involving traditional pastoral woodland management), well-designed and implemented afforestation actions, and the forest-environment measure also have potential to contribute to GI. The measure focusing on rural heritage under the objective of improving the quality of life in rural areas allows for GI-friendly actions to restore habitats such as wetlands, and to finance Natura management plans.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	Agri-environment provides an efficient and tested framework for voluntary contracts with farmers to ensure management options that help maintain, enhance and restore habitats, and protect soil and water. It is a long-standing policy in many countries which has been main-streamed as the only compulsory rural development measure in most of the EU over the past two programming periods. Forestry measures allow for support to ecological functions of forest, relevant to GI through well-designed agro-forestry actions, afforestation, restoration of forestry potential, and the forest-environment measure.
What are the **W**eaknesses or barriers for GI?	The uptake of the more efficient agri-environment options remains low, which reduces its overall effectiveness as well as the potential benefit for building up GI across rural landscapes. Certain schemes suffer from insufficient targeting, monitoring, and lack of training and extension services to farmers, with the impact of reducing the spatial scale which is needed for ensuring the effectiveness for green infrastructure. The forest environment and agro-forestry

	actions have a very low uptake, often because of difficulties with setting up the legal baseline for forest management actions in absence of EU-wide forest policy.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	Forest access roads, and fences to protect newly planted forest from deer in areas where deer populations surpass the habitat carrying capacity, can be supported through measures under the competitiveness objective. These capital investments often result in habitat fragmentation.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The agri-environment measure is an opportunity that needs to be further promoted by: - Keeping the compulsory character of the measure. - Attaching a minimum spend requirement to the measure. - Improving the training, advisory and extension services to overcome barriers to its uptake. To use more fully the potential of the forest-environment measure, the setting up of a reference baseline for forest management through eg standards similar to GAEC for agriculture would be most beneficial.

Training, advice, extension services, planning provisions – CAP Pillar 2; Farm Advisory System – CAP Pillar 1	
How is GI addressed (directly or indirectly), if at all?	GI is not addressed directly in the training, advice, and extension services under the CAP (Pillar 2 training and advisory measures, and the Farm Advisory System). Indirectly, it can be addressed through information relating to sustainable land management and to cross-compliance. Certain measures under Pillar 2 enable support to the development of Natura 2000 management plans with indirect benefit for GI.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	Training, advice and extension services are critical for uptake and implementation of the GI-relevant measures. Equally important are the policy components allowing for spatial planning to reconcile the agriculture and forestry land use, nature protection, and healthy ecosystems, as well as enabling the utilisation of land as a resource for a range of human interventions which do not undermine the GI function.
What are the **W**eaknesses or barriers for GI?	The Pillar 2 training measures do not require that information relevant for GI is a compulsory part of the training package. The FAS advisory system provides advice to farmers to help them understand and meet the EU rules for environment, public and animal health, animal welfare and the GAEC, when this is voluntarily requested by farmers, and at their cost. As GI is a new concept, it will depend on farmers' knowledge, and on the provision of the targeted advice. If farmers do not request such advice, the voluntary approach will not be effective. The costs accrued by the farmer are likely to be a barrier as well.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The more targeted design of training, advisory and extension services measures may significantly improve implementation and uptake of measures relevant for GI. Strengthening and enhancing Pillar 2 provisions which enable development of planning tools so that the spatial and ecosystem planning is allowed for rural development support would be a progress compared to the current situation.

Table 1: Policy tools and instruments potentially relevant for GI implementation in the agriculture policy area

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	Community strategic guidelines for rural development (2006/144/EC) set out three priority areas under the objective of improving the environment and the countryside: (1) biodiversity and the preservation and development of high nature value farming, forestry systems and traditional agricultural landscapes; (2) water; and (3) climate change. These priorities are relevant for GI.
Information gathering and mapping	
Identification and mapping of GI elements and requirements	It is recommended that identification and mapping of landscape features at MS level is included in the 'Land parcel identification system' (LPIS). This system serves as a point for records for data on agricultural parcels and is linked to the control system for Pillar 1 direct payments. The opportunity has not been widely used so far. Identification of high nature value (HNV) elements according to the guidance for the HNV indicator is a part of the monitoring procedures. So far MS have made uneven progress with this recently established obligation. Eurostat datasets for 'fallow land' which would include, but not identify as a separate component, the ecological focus areas. EEA mapping to identify distribution of HNV farming in Europe.
Monitoring of GI elements and their impact objectives (incl. using indicators & accounting)	The Common Monitoring and Evaluation System (CMEF) which is the basis for monitoring of Pillar 2 measures, includes the HNV indicator in the set of Baseline and Impact indicators. The CMEF includes output and result indicators for agri-environment, agro-forestry and forest-environment measures
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	
Regulation and planning	
Regulation of land use	Constraints on land management in Natura 2000 areas are set out in Natura 2000 management plans. Constraints on use of mineral fertilisers are set out in Nitrates Action programmes for Nitrates Vulnerable Zones. Certain GAEC measures (eg bufferstrips along watercourses) involve a spatially limited regulation of land use (eg restrictions on cultivation, or the use of fertilisers and pesticides)
Spatial planning/integrated territorial development	Spatial targeting of agri-environment measures has been undertaken in a number of MS
Procedural requirements: EIA/SEA	Legal obligation to carry out an environmental assessment is applied to the RD programmes by Article 3(2.a) of the SEA Directive, which states that an environmental assessment shall be carried out for all plans and programmes which are prepared for agriculture, forestry and fisheries. Article 3(2.b) of the SEA Directive requires an environmental assessment to be undertaken for plans and programmes subject to an assessment under Art. 6 or 7 of the Habitats Directive.

	Capital investment actions supported from Pillar 2 must comply with the EIA procedures. The programming at MS level should undergo SEA.
Standards	
Liability and compensation	
Economic/ market instruments	
Resource pricing (e.g. taxes, charges, fees, land values)	
Land management contracts/agreements (incl. PES-schemes)	
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and "greener products" such as organic, FSC, MSC on the other).	
Public investments (EU expenditure for GI incl. co-funding)	
Land purchase	Provisions under Pillar 2 enable land purchase for environmental farm management.
Restoration projects/programmes	Provisions under Pillar 2 (agri-environment, rural heritage measures, and infrastructure of agriculture and forestry) enable restoration of habitats eg wetlands
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	
Securing long-term financing/maintenance	
Respond to the value of GI when setting priorities	
Governance	
Institutions	
Participatory decision-making process (e.g. negotiations for CP OPs)	Compulsory stakeholders' consultation at MS level integrated in the programming, implementation and monitoring procedures for Pillar 2.
Reporting on implementation	Provisions under Pillar 2 for compulsory annual reports, ex ante assessments, and mid-term and ex-post evaluations at MS level.
Coordination of policies	
Communications and advisory measures	
Awareness raising	Training measures under Pillar 2.
Advice and guidance	Support to setting up and use of advisory services under Pillar 2; Farm Advisory System as a separate policy component aiming to provide advice to farmers to help them understand and meet the EU rules for environment, public and animal health, animal welfare and the GAEC.

Capacity building	Possible to support under Technical assistance within Pillar 2.
Technical assistance on EU level (for policy making)	Guidance documents by the Commission dedicated to specific policy issues; Rural Development Committee; Management Committee (deals with certain cross-compliance issues); MARS technical guidance to MS led by JRC.
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (e.g. regional administrations (e.g. CP OP elaboration, farmers, NGOs, etc.)	Technical assistance under Pillar 2

1.2 Forestry

Overview

The current EU policies and instruments in the areas of Forestry potentially relevant to Green Infrastructure include:

- EU Forest Action Plan (FAP)
- Green Paper on Forest protection and information in the EU
- Forestry measures under the CAP Pillar 2 (addressed in section 1.1)

[EU Forest Action Plan]	
How is GI addressed (directly or indirectly), if at all?	While GI is not explicitly addressed, benefits provided by GI (see below) and features associated with GI (eg restoration, afforestation, connectivity, urban forests) are discussed.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The FAP outlines the potential for more widely implemented sustainable forest management (SFM), including actions that may optimise forest biodiversity, carbon sequestration, integrity, health and resilience. It also allows for habitat restoration and afforestation as well as the reduction of forest fragmentation. The potential role of urban and peri-urban forests is also highlighted.
What are the **W**eaknesses or barriers for GI?	The FAP is a voluntary framework of actions to which Member States have committed themselves but does not link these actions to an EU-wide policy in the forestry sector. The SFM standards to which the FAP defers, potentially relevant for GI, were adopted through a non-EU voluntary process (MCPFE), thus they are not legally binding at EU level and cannot be enforced. Although all the MS formally commit to the implementation of SFM standard, their definition is vague, the link to pan-European policy objectives is missing, there is no monitoring and no evaluation process, and their implementation is linked to a range of national forest policies that vary considerably across the EU. Linked with this, lack of a coordinated European forest monitoring system limits the available information on forest use and functions, and undermines policy options for protection.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No. While the unsustainable extraction of forest resources could pose a threat to the provision of ecosystem services and the connectivity of forest ecosystems, the FAP aims to increase forest coverage through afforestation and improve forest health via restoration and SFM.
What are the **O**pportunities for greater support for GI / overcoming the	A coordinated approach to monitoring and mapping European forest functioning could promote the identification of GI forest elements and monitor the conversion of key multifunctional or corridor forests. This information could help determine key focus areas and enhance the protection of EU forests and

weaknesses?	provisioning of ecosystem services via targeted actions.

Green Paper on Forest Protection and Information in the EU	
How is GI addressed (directly or indirectly), if at all?	GI is indirectly addressed in terms of the socio-economic and ecological benefits provided by maintaining healthy forests (protecting settlements and infrastructure, providing ecosystem services and regulating climate) and the need for increased EU forest protection.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The Green Paper highlights the potential of enhancing the protection of EU forests and safeguarding their multi-functionality via SFM. The potential of the Rural Development Regulation (2007-2013) to co-finance afforestation, payments for Natura 2000 areas, restoration and other forest environmental measures is also mentioned.
What are the **W**eaknesses or barriers for GI?	The Green Paper identifies fragmented forest ownership as a hindrance to sustainable forest management. Further, it underlines the fact that information produced by National Forest Inventories are not harmonized and are therefore of a limited use at an EU level.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No. The Green Paper underlines the threat from the growing demand to meet future renewable energy needs with forest biomass which could potentially cause an imbalance between supply and demand due to the need to mobilize additional forest resources through intensification of forestry. Thus, by triggering a decline in the growing forestry stock, the growing demand for forest resources can have negative impacts on the health and resilience of forest ecosystems. The use of forest residues such as deadwood and stumps may pose a threat to ecological functions of forest and to the associated GI as well. Therefore, the Green Paper seeks to secure sustainability of the range of forest policies across the EU and to enhance the protection of EU forests.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The Green Paper stresses the need for setting an EU-wide monitoring system based on agreed policy objectives and a more complete set of harmonised SFM definitions and indicators. This can be further implemented through enhanced National Forest Inventories. Development of such monitoring and information framework would enable collecting data relevant for GI elements linked to European forests. The Green Paper encourages strategies for overcoming fragmented forest ownership eg through joint forest management programs. Local and regional cooperation amongst owners can also play a role.

Table 2: Policy tools and instruments potentially relevant for GI implementation in the forestry policy area

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	Biodiversity Strategy 2011: Ecosystem based measures to increase the resilience of forests against fires as forest fire prevention schemes (in line with EFFIS); wider use of forest management plans; mechanisms to facilitate collaboration among farmers and foresters to achieve continuity of landscape features FAP: "To maintain and appropriately enhance biodiversity, carbon sequestration, integrity, health and resilience of forest ecosystems at multiple geographical scales"; "to contribute to the quality of life by preserving and improving the social and cultural dimensions of forests. Eg maintain and enhance the protective functions of forests, explore the potential of urban and peri-urban forests."
Information gathering and mapping	

Identification and mapping of GI elements and requirements	National forest inventories
Monitoring of GI elements and their impact objectives (incl. using indicators & accounting)	National forest inventories
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	
Regulation and planning	
Regulation of land use	
Spatial planning/integrated territorial development	
Procedural requirements: EIA/SEA	
Standards	
Liability and compensation	
Economic/ market instruments	
Resource pricing (e.g. taxes, charges, fees, land values)	
Land management contracts/agreements (incl. PES-schemes)	
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and "greener products" such as organic, FSC, MSC on the other).	
Public investments (EU expenditure for GI incl. co-funding)	
Land purchase	
Restoration projects/programmes	Forestry measures can be supported by the CAP Pillar 2 (EAFRD). Incentives for ecological reforestation and afforestation can be provided through the CAP Pillar 2 (EAFRD); LIFE+ funding for forest restoration
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	Measures for compensation of non-productive investments in forests exist under the CAP Pillar 2(EAFRD) in certain Member States; this includes GI relevant investments (related to resilience, ecosystem services, or connectivity)
Securing long-term financing/maintenance	
Respond to the value of GI when setting priorities	
Governance	

Institutions	Standing Forestry Committee and Advisory Group on Forestry and Cork – currently no specific GI activity Ministerial Conference on the Protection of Forests in Europe (MCPFE) – voluntary forest policy process based on a series of ministerial conferences with the central objective of establishing sustainable forest management (SFM). It has no clear mandate regarding GI, but the MCPFE commitments refer to forest resilience and forest ecosystem services
Participatory decision-making process (e.g. negotiations for CP OPs)	"National forest programmes" (participatory and consultative forest planning process) are promoted through the FAP Consultation on Green Paper on forest protection and information (does not currently address GI explicitly)
Reporting on implementation	Voluntary reporting to the MCPFE on progress towards sustainable forest management currently exists
Coordination of policies	Forest Action Plan (2007-2011) is based on the principle of subsidiarity and is mainly a tool for coordination between MS
Communications and advisory measures	
Awareness raising	
Advice and guidance	
Capacity building	
Technical assistance on EU level (for policy making)	
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (e.g. regional administrations (e.g. CP OP elaboration, farmers, NGOs, etc.)	

1.3 Biodiversity and nature Conservation

Overview

The current EU policies and instruments in the areas of Biodiversity and Nature Conservation potentially relevant to Green Infrastructure include:

- Habitats Directive
- LIFE +
- Birds Directive
- EU 2020 Biodiversity Strategy

[Habitats Directive]	
How is GI addressed (directly or indirectly), if at all?	The Habitats Directive does not refer to GI directly, but has the intention under Article 3(1) of forming 'a coherent ecological network' referred to as the Natura 2000 network, which forms the cornerstone of the nature legislation in the EU. The term 'coherence' is of key importance as it indicates that Natura 2000 sites may not be seen as isolated ecological hot spots that can survive on their own, but as elements of a broader network with numerous functional links amongst sites, which relates to the GI concept.

Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The Directive includes specific measures to maintain or restore the coherence of the Natura 2000 network. In particular, Article 3(3) states that 'where they consider it necessary, Member States shall endeavour to improve the ecological coherence of Natura 2000 by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora, as referred to in Article 10'. Article 10 states that 'Member States shall endeavour, where they consider it necessary, in their land-use planning and development policies and, in particular, with a view to improving the ecological coherence of the Natura 2000 network, to encourage the management of features of the landscape which are of major importance for wild fauna and flora. Such features are those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species'.
What are the **W**eaknesses or barriers for GI?	Article 10 provisions unequivocally subject decisions on how and where to implement connectivity measures to the full discretionary power of the Member States. Probably partly as a result of this, there is little evidence that Member States have taken additional measures to protect important landscape connectivity features (Kettunen et al, 2007). Some Member States are using the CAP Cross-Compliance Regulations to protect landscape features in agricultural habitats (see CAP), but the ecological benefits are typically likely to be low.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	There is increasing awareness that many habitats and species listed in the Directive have an unfavourable conservation status due to habitat fragmentation, and that climate change impacts will exacerbate the problem. Furthermore the Commission is concerned that Article 10 provisions are not being implemented sufficiently. This will need to change to meet the new EUBAP targets of increasing the proportion of habitats and species that are in Favourable Conservation Status as assessed in accordance with Article 17 monitoring guidance. Better coordination of Appropriate Assessment according to Article 6(3) with EIA and SEA for optimal incorporation of GI.

[Life+ Financing Instrument for the Environment]	
How is GI addressed (directly or indirectly), if at all?	The current financing instrument for the environment, Life+ 2007-2013, has not specifically addressed the development of EU green infrastructure. However, in addition to contributing to co-financing the implementation of Natura 2000, several projects provide examples of actions that support certain green infrastructure features/elements. This in particular includes projects to enhance the connectivity of species and habitats (eg corridors, stopover areas for migrating birds etc), strengthening the resilience of ecosystems (eg management measures to safeguard provision of ecosystem services, restoration of wetlands, climate change adaptation), and integrated spatial planning (eg stakeholder cooperation, more sustainable use of urban land).
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	By funding projects which focus on green infrastructure particularly in the context of spatial planning, LIFE+ supports efforts to improve the integration of biodiversity policy into other policy areas (eg Cohesion Policy) by encouraging collaborations amongst sectors to decide on land-use priorities in an integrated way.
What are the **W**eaknesses or barriers for GI?	It needs to be emphasised that the budget of the Life+ instrument is relatively small compared to other EU financing instruments. As such, its current main purpose is to provide best practice examples rather than providing substantial investment to address environmental problems and opportunities directly. Consequently, the instrument does not have the capacity to provide the large-

	scale and long-term funding generally needed for restoration of green infrastructure. Given its limited budget, the catalytic role of the instrument is often emphasised. Though the latest evaluation of the instrument demonstrates its multiplier effect, its success in leveraging financing for biodiversity from other EU financing instruments (eg EAFRD, ERDF, EFF) has been partly suffocated by the general low uptake of payments for reasons such as; difficulties of biodiversity conservation in competing with other demands, eligibility gaps, and lack of capacity and coordination.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	The instrument covers a wide range of environmental issues including waste, climate and energy, industry and production, environmental management, urban environment nature and biodiversity. This reduces the risk of financing activities undermining environmental policy objectives as the different policy areas are not addressed in isolation. Nevertheless, the financing of contradicting activities, including those related to green infrastructure, cannot be entirely excluded. In addition, the small budget bears the high risk of different policy areas and related actors 'competing' over the limited financing available (eg wider green infrastructure versus Natura 2000).
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	Some of the opportunities to overcome barriers are strongly related to the issue of scaling-up the overall financing provided under Life+ to allow the establishment of green infrastructure at a larger scale. However, improving the quality of spending is equally important. The clear ring-fencing of spending could help to ensure that financing for wider green infrastructure is additional to Natura 2000 financing. In the case of a non-substantial increase of the Life+ budget, increased financing of best practice examples on green infrastructure could help to promote understanding of the opportunities for multiple benefits and synergies across different policy areas. This could be achieved by targeting 'test-bed' green infrastructure projects which could then be mainstreamed into other funds with significantly more resources available eg Cohesion Policy. An explicit financing of green infrastructure projects provides additional scope for ecosystem based climate change adaptation activities to be funded under the "biodiversity" theme. In addition, the green infrastructure theme would allow exploration of in best practice approaches in the use of innovative financing instruments to leverage private investors financing.

[Birds Directive]	
How is GI addressed (directly or indirectly), if at all?	The Directive does not refer to GI directly, but Article 2 requires Member States to take the requisite measures to maintain or enhance the population of wild birds to a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements. Thus, it is necessary to take measures to ensure the coherence and connectivity of sites, such as through GI initiatives, where this is necessary to achieve the aims of the Directive. In addition, Article 3 indicates that measures need to be taken both within and outside protected areas. The enhancement of the movement and existence of species outside the sites designated for their protection is also supported by Articles 4.3 and 4.4. Furthermore, it should be remembered that Special Protection Areas designated under the Birds Directive form part of the Natura 2000 network (under Article 7 of the Habitats directive). Therefore, the coherence of the SPA network is also promoted through the measures in the Habitats Directive (see above)
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	It is clear that GI measures such as the improvement or expansion of core sites, restoration of habitats and protection/ creation of functional connectivity should be widely undertaken to meet the aims of the Directive.
What are the **W**eaknesses or barriers for GI?	As with the Habitats Directive, few Member States have taken significant measures outside protected areas, and the coherence of the SPA network has not

	been properly evaluated.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	There is increasing awareness that many species listed in the Directive are declining due to habitat fragmentation and that climate change impacts will exacerbate the problem. Future assessments of the status of birds in accordance with the Directive may therefore highlight these problems and stimulate further action

EU 2020 Biodiversity Strategy	
How is GI addressed (directly or indirectly), if at all?	The EU Biodiversity Strategy aims to support the EU 2020 biodiversity target of ensuring that 'by 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems', and its 2050 vision that 'By 2050, European Union biodiversity and the ecosystem services it provides — its natural capital — are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided. It includes six mutually supportive and inter-dependent targets, and packages of supporting actions, that aim to halt biodiversity loss and the degradation of ecosystem services. Of these, Action 6b to support Target 2 (the maintenance and restoration of ecosystem services) explicitly calls for the development by the Commission of 'a Green Infrastructure Strategy by 2012, the potential benefits of which are the focus of this study. However, it's important to note that, if implemented, most actions in the Biodiversity Strategy would provide green infrastructure benefits, in particular those relating to the improved implementation of the Birds and Habitats Directives, increasing ecosystem restoration, developing systems for ensuring no net loss of biodiversity and ecosystem services, and enhancing the positive contribution of agriculture and forestry to biodiversity conservation. SWOT analyses for these policy areas are provided elsewhere in this section.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The main strength is that the strategy provides a comprehensive framework that together would address all the most significant pressures on biodiversity. This is important as action is needed on all pressures to achieve the EU's target of halting biodiversity loss.
What are the **W**eaknesses or barriers for GI?	The Commission's Biodiversity Strategy has no legal force in itself and has no clear adequate funding mechanism. Although the Environment Council endorsed the 2020 Target and 2050 Vision in 2010, and the Biodiversity Strategy in June 2011, discussions are on-going on many of the actions and there is no clear political commitment to them.
Is this policy/ instrument currently resulting in **t**hreats to GI (eg more fragmentation)?	No
What are the **O**pportunities for greater support for GI / overcoming the	The effectiveness of the Biodiversity Strategy as a whole, and therefore its combined impact on green infrastructure, will be dependent on the political acceptance of its proposed actions and their implementation, especially at the Member State level. However, the main opportunity for directly promoting the green infrastructure concept lies through the development of the EU Green

weaknesses?	Infrastructure Strategy, which received reasonable political support in the December 2011 Environment Council meeting.

Table 3: Policy tools and instruments potentially relevant for GI implementation in the nature and biodiversity policy area

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	As noted above, the EU Biodiversity 2050 vision, 2020 target and Biodiversity Strategy provides the overarching framework for EU-level biodiversity conservation policies, which include numerous measures that would directly and indirectly support green infrastructure objectives. Of particular importance are the Habitats Directive (HD) and Birds Directives (BD), which follow a GI approach in requiring the establishment of coherent protected area networks.
Information gathering and mapping	
Identification and mapping of GI elements and requirements	The selection of SACs for inclusion in the Natura network is based on spatial planning of core GI element needs using a biogeographical approach. SPA designations are also often based on spatial mapping of site networks
Monitoring of GI elements and their impact objectives (incl. using indicators & accounting)	HD Article 11 requires that Member States undertake surveillance of the conservation status of habitats and species of Community interest HD Article 17 refers to the reporting cycle
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	
Regulation and planning	
EU Expenditure for GI	HD Article 8 has provisions for Community funding to support the implementation of the Directive, but the EU has chosen to finance the Natura 2000 through an integrated model whereby funds are to obtained from across different instruments (eg see CAP, Structural Funds etc) The current financing instrument for the environment, Life+, does not specifically address green infrastructure, but has funded a range of projects relevant for different GI elements.
Regulation of land use	HD Article 6 requires Member States to protect and manage Natura sites as necessary to achieve the aims of the Directive, ie in order to maintain and achieve Favourable Conservation Status The BD also requires necessary measures to be taken to ensure populations are maintained.
Spatial planning/integrated territorial development	
Procedural requirements: EIA/SEA	Under the HD, an appropriate assessment is required of plans and projects that may have a detrimental impact on Natura sites (including SPAs). This is a specific process that focuses on the objectives of the

	Natura site, but can be combined with, and drawn from, SEA and EIA processes.
Standards	
Liability and compensation	The Habitats Directive requires (Article 6.4) compensation for residual impacts of projects and programmes etc on N2K sites. The Liability Directive links to the Habitats Directive by imposing obligations on those that have detrimental environmental impacts on the conservation status of habitats and species of Community interest (ie as listed in the Habitats Directive)
Economic/ market instruments	
Resource pricing (e.g. taxes, charges, fees, land values)	
Land management contracts/agreements (incl. PES-schemes)	
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and "greener products" such as organic, FSC, MSC on the other).	
Public investments (EU expenditure for GI incl. co-funding)	
Land purchase	The LIFE Programme supports the implementation of the Directive. But given the small overall budget allocation it only allows for highly targeted land purchase.
Restoration projects/programmes	Under the HD, Member States should undertake all necessary measures (including restoration where this is necessary) to achieve the Favourable Conservation Status of a habitat or species of Community Interest Life+ funding for GI restoration mainly focused on restoring ecosystem functions and improving ecosystem resilience.
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	As above Life+ provided financing for enhancing connectivity for species and habitats and tackling fragmentation.
Securing long-term financing/maintenance	Life+ does not provide long-term financing, although it may help leverage long-term financing from other sources.
Respond to the value of GI when setting priorities	
Governance	
Institutions	
Participatory decision-making process (e.g. negotiations for CP OPs)	
Reporting on implementation	HD Article 17 requires Member States to report on the status of habitats and species (other than birds) of Community interest every six years.

Coordination of policies	
Communications and advisory measures	
Awareness raising	The Commission has produced a variety of products to help increase awareness of the Directives and of issues relating to GI. No financing of GI under the current information and communication strand has yet been provided under Life+.
Advice and guidance	In support of the Directive, the Commission has produced a variety of guidance documents and tools to assist with the implementation of the Directive. Also see the LIFE Programme, which supports the implementation of the Directive
Capacity building	The LIFE+ Programme includes support to certain key conservation organisations and some projects also have a capacity building element (eg for local stakeholders)
Technical assistance on EU level (for policy making)	In support of the Habitats and Birds Directives, the Commission has produced a variety of guidance documents and tools to assist with the implementation of the Directives
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (e.g. regional administrations (e.g. CP OP elaboration, farmers, NGOs, etc.)	Member States help promote the LIFE programme, identify funding priorities and assist applicants.

1.4 Water Policy

Overview

The current EU policies and instruments in the areas of Water and Floods policy potentially relevant to Green Infrastructure include:

- Water Framework Directive including River Basin Management Plans
- Floods Directive
- EU Water Scarcity & Drought Policy
- Future EU Water Blueprint

[WATER FRAMEWORK DIRECTIVE]	
How is GI addressed (directly or indirectly), if at all?	The Water Framework Directive does not address GI directly. However, it aims to prevent further deterioration and to protect and enhance the status of aquatic ecosystems and related terrestrial ecosystems and wetlands. It also promotes sustainable water use by protecting available water resources, ensures the progressive reduction of pollution of groundwater and prevents its further pollution, and contributes to mitigating the effects of floods and droughts.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The WFD offers great potential for GI through its ambitious ecological status objectives for water that are to be met by 2015. Measures that help implement the WFD include limiting development on floodplains and promoting non-engineering flood management (ie giving space to rivers), restoration of wetlands. Achieving these objectives also furthers the quality of the Natura 2000 sites.
What are the **W**eaknesses or barriers for GI?	It has already become clear that the objectives of the WFD will not be achieved in many Member States. The WFD establishes the framework for the protection of inland surface waters, transitional water, coastal water and groundwater and

	thus aims to contribute to build foundations for GI. However the large scope of the policy framework means that implementation differs between Member States and river basins.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	Article 4 of the WFD draws out the environmental objectives as well as exemptions. Exemptions can consist of the extension of the deadline for achieving 'good' status (by 2027 at the latest), achievement of less stringent objectives, the temporary deterioration of objectives in case of natural causes or "force majeur" and modifications to the physical characteristics of a water body or failure to prevent status deterioration due to new sustainable human development activities.[2] Some water bodies may also be designated as heavily modified water bodies (HMWB) since "the beneficial objectives served by those modifications of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option." For such HMWB good ecological potential, rather than good ecological status shall be achieved. Common to all these exemptions are strict conditions to be met and a justification to be included in the river basin management plan.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	Continuous monitoring of the implementation of the WFD aspects supportive of GI is necessary so that their implementation is effective and coherent among MS. Also, it needs to be ensured that development of the renewable sector is planned at a strategic level. Big investment decisions such as hydropower dams must be an integrated part of river basin planning and should consider climate change impacts.

[FLOODS DIRECTIVE]	
How is GI addressed (directly or indirectly), if at all?	GI is not directly addressed in the Floods Directive. However, the Directive aims to reduce and manage the risks that floods pose to the environment as well as human health, cultural heritage and economic activity.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The Floods Directive is based on the 2004 Communication on flood risk management, flood prevention, protection and mitigation, which states that flood risk management programmes should address *Prevention* (eg avoiding construction of houses and industries in flood-prone areas, promoting appropriate land-use, agriculture and forestry practices); *Protection* through reducing the impact of floods in a specific location; *Preparedness*; *Emergency response*; and *Recovery and lessons learned*. If implemented correctly, the Directive should lead to more sustainable flood management with more space for rivers including natural floodplains and wetlands.
What are the **W**eaknesses or barriers for GI?	While potential for GI is provided for in the objectives of the Directive, the implementation of the Directive requires a preliminary assessment due by December 2011 to identify the river basins and associated coastal areas at risk of flooding. Where real risks of flood damage exist, they must by 2013 develop flood hazard maps and flood risk maps for such areas and by 2015, flood risk management plans must be drawn up for these zones. The extent of the potential for GI will depend upon the results of the assessment and the further development of flood hazard maps and flood risk management plans.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	The policy does not result in threats to GI. However, floods can have severe environmental consequences, such as in the case of inundation of waste water treatment plants or factories operating with toxic chemicals. Floods can destroy wetland areas and reduce biodiversity. Climate change is also likely to increase the frequency of floods. While the policy aims at managing these flood risks, management plans need to be based on a solid information base and coordinated action will only be taken in 2015 with the implementation of

[2] Common Implementation Strategy for the Water Framework Directive, Environmental Objectives under the Water Framework Directive, Policy Summary and Background Document, Final version, 20 June 2005

	management plans.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	To prepare and support the implementation of the Directive, a Floods Working Group under the Common Implementation Strategy was established. The Group focuses on the development of reporting formats, coordination with the Water Framework Directive and information exchange on Flood risk management. The opportunities lie in the requirement that the flood risk management plans to address areas which have the capacity to retain floodwater, the environmental objectives of the WFD, soil and water management, nature protection, spatial planning and land use. Opportunities also lie in the focus on the adaptation and mitigation of climate change related risks, including floods, in funding instruments like the new CAP.

[EU Drought Policy]	
How is GI addressed (directly or indirectly), if at all?	GI is not directly addressed in the 2004 Communication on Water Scarcity and Droughts in the EU which outlines the strategy for improving water scarcity drought risk management. However, the 2011 follow-up report mentions an upcoming Commission Communication that will address the multiple benefits of GI, including its role in water retention and mitigating the effects of extreme events, which will help develop the water retention measures currently undertaken.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	Amongst the main elements of the WS&D policy are water efficiency and better planning for land-use, enhancing integration of WS&D in the River Basin Management Plans, and adequate implementation instruments, mainly through water pricing and allocation. One instrument to achieve these objectives is water accounts, which supports the adoption of a sustainable approach to water resource management through quantifying the water availability at river basin scale and identifying and quantifying hotspots of water stress. This allows for unsustainable water use to be addressed in a targeted manner.
What are the **W**eaknesses or barriers for GI?	Although efforts to establish a common policy framework for drought management (through the Communications and the Drought Management Plan Technical Report) and to foster national initiatives exist, the implementation of measures awaits the development of the Drought Management Plans and will partly depend on the interpretation of the MS. Also, increasing integration among the existing policy tools and frameworks at national and EU level is needed to enable meeting the short, mid and long-term objectives. In addition, several gaps have been identified by the Xerochore FP7 project. Drought management needs to give more consideration to secondary impacts such as land degradation and ecosystem impacts, and their interrelations.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	Over the past thirty years, droughts have dramatically increased in frequency and intensity in the EU. The policy does not result in direct threats to GI, but there is an urgent need to implement a European Drought Policy in accordance with the WFD and related EU legislations. The development of such a common roadmap is currently still under construction.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	Cooperation between Drought Management and River Basin Management Plans are important to avoid overlap or contradicting actions. The WS&D policy partly relies on the implementation of other policies, for example, the measures taken under the cross compliance of the WFD and the CAP. Agriculture can contribute to a greater resilience to floods and droughts, but many farming practices can also put pressure on the environment, leading to soil depletion, water shortages, pollution and loss of biodiversity. In order to address sound water management, which may be beneficial for GI, additional guidance in the form of Farm Advisory Services has recently been set up (see section 1.1. on agricultural policy for recommendations relating to these).

[FUTURE EU WATER BLUEPRINT]	
How is GI addressed (directly or indirectly), if at all?	The Blueprint to Safeguard Europe's Water will represent the EU policy filling the gaps of all current policies addressing water issues and will provide responses to remaining and emerging needs. The Blueprint will focus on land management and water-related green infrastructure measures.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The focus on land management represents a huge potential for GI. The main tool will be measures related to green infrastructure such as reforestation, floodplain restoration, soil management, and sustainable urban drainage systems. Policy instruments /options that can enable these measures such as the development of methodological framework for the wider application of payments for ecosystem services, and the integration into territorial management instruments (i.e. CAP) will be identified and assessed.
What are the **W**eaknesses or barriers for GI?	It is difficult to assess weaknesses or barriers for GI at this point, as the policy will only be developed in the course of 2011 – 2013. There may be a possible risk related to the need to base the policy on scientific information on water availability and demand in the future, which are unknown variables. In addition, the time horizon of the ambitious objectives of the Blueprint is tight, as results are expected by 2020.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	Currently, no threats have been identified.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	Currently, no opportunities to overcome the weaknesses have been identified.

Table 4: Policy tools and instruments potentially relevant for GI implementation in the area of water and floods policy

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	Document setting out overall approach: Blueprint to safeguard Europe's Waters. Additionally, the WFD environmental objectives of reaching 'good status' of all water bodies by 2015 are relevant to GI.
Information gathering and mapping	
Identification and mapping of GI elements and requirements	River Basin Management Plan Maps of monitoring networks and results for Surface water (ecological and chemical status), groundwater (chemical and quantitative status) and status of protected areas. Flood hazard maps and flood risk maps (to be developed by 2013) Some MS map pressures for better River Basin Management (eg THIS-GIS project for the Tyne River in the UK)
Monitoring of GI elements and their impact objectives (incl. using indicators & accounting)	Principles and communication of results of the first analysis under the WFD, electronic data, and an information system on water called WISE (Water Information System for Europe).

Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	Floods Directive: costs and benefits calculation of flood extent and flood conveyance routes, and areas which have the potential to retain flood water, such as natural floodplains.
Regulation and planning	
Regulation of land use	WS&D, in its 2007 communication, specifies how to improve land-use planning. Floods Directive: requires land-use and spatial planning to be addressed in the flood risk management plans. WFD considers land use in its annex.
Spatial planning/integrated territorial development	
Procedural requirements: EIA/SEA	Links to SEA and EIA Directives through requirements in Article 4, 11 and 13 of the WFD
Standards	
Liability and compensation	
Economic/ market instruments	
Resource pricing (e.g. taxes, charges, fees, land values)	WFD: basic measures according to article 11.3 (c), Article 9 requires the recovery of costs, including environmental and resource costs, for water services, with a view of achieving the environmental objectives of the Directive and provide a price incentive function to sustainable use of water resources. Several Member States apply water abstraction taxes/fees, recovery of operational and investment costs of drinking water supply and wastewater treatment, wastewater tax, regulatory permits etc
Land management contracts/agreements (incl. PES-schemes)	Some MS apply land management contracts and agreements, notably Scotland and France
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and "greener products" such as organic, FSC, MSC on the other).	
Public investments (EU expenditure for GI incl. co-funding)	
Land purchase	Practiced in some MS
Restoration projects/programmes	Catchment Restoration Project (SNIFFER), Life funding for river restoration
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	Blueprint
Securing long-term financing/maintenance	
Respond to the value of GI when setting priorities	
Governance	

Institutions	Ministries and other competent authorities responsible for the implementation of the WFD in the respective MS. Involved in activities in support of its implementation are also: International River Basin Commissions (Odra River, Elbe River, Meuse, Danube, Rhine River, Scheldt), European Drought Observatory, Euro-Mediterranean Information System on know-how in the water sector. UN Convention to Combat Desertification
Participatory decision-making process (e.g. negotiations for CP OPs)	Article 14 (WFD) requires a three stage consultation of the public and interested parties on the preparation of river basin management plans, a process to be repeated every 6 years, and which shall be coordinated with the equivalent process under the Floods Directive (Flood risk management plans).
Reporting on implementation	The Member States are reporting electronically for each implementation steps and key information is displayed in WISE. Implementation reports in 2007 and 2009 (for WFD), follow-up reports for the Water Scarcity and Droughts Policy in 2008, 2009 and 2010 as well as the Blueprint, which will conduct an overall Fitness Check of the Water Policy, assess the RBMPs under the WFD, and review EU action on Water Scarcity and Droughts, as well as the vulnerability of water resources to climate change and other man made pressure.
Coordination of policies	Common Implementation Strategy for Implementing the EU Water Framework Directive & the Floods Directive
Communications and advisory measures	
Awareness raising	Through brochures, factsheets, websites
Advice and guidance	WFD: CIS Guidance Documents, Farm Advisory System; Floods Directive (2007): Communication on flood risk management, flood prevention, protection and mitigation (2004)
Capacity building	WFD CIRCA - the Information Exchange Platform FP 7 projects
Technical assistance on EU level (for policy making)	CIS Guidance document on all aspects of the implementation of the WFD. Handbook on good practice on flood mapping in Europe. Chemical pollution - A database on ”priority substances”.
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (e.g. regional administrations (e.g. CP OP elaboration, farmers, NGOs, etc.)	Available through the responsible authorities and agencies in the MS

1.5 Soil Policy

Overview

The current EU policies and instruments in the area of soil policy, potentially relevant to Green Infrastructure include:

- 2006 Thematic Strategy for Soil Protection
- Proposal for a Directive establishing a framework for the protection of soil and amending Directive 2004/35/EC

T	
How is GI addressed (directly or indirectly), if at all?	Green infrastructure is not explicitly mention in the Thematic Strategy (TS). It is however clear that there are very strong links between green infrastructure and soils as both are mutually interdependent. It is arguably difficult to clearly separate soil from the green infrastructure and while soil cannot be seen as part of the green infrastructure there is arguably no green infrastructure without soil. The Strategy implicitly acknowledges some of these links, pointing out that soil functions contribute to areas such as biodiversity, coastal management, mitigation of climate change. Furthermore, the TS recognises the benefits of sustainable use zones for soil by pointing to land management practices such as organic and integrated farming or extensive agricultural practices in mountain areas", which can be seen as part of a green infrastructure approach (i.e. strategic approach to using the same area of land to deliver a range of ESS simultaneously and sustainably). The role of organic matter in combating the decline in soil organic matter is mentioned and it is highlighted that not all organic matters contribute to the same extent to combating the decline in soil organic matter. Overall, however, links could arguably have been much more clearly acknowledged and the importance of green infrastructure for soils much more explicitly addressed. This would have to be reflected much more clearly in the actions and means that are foreseen to respond to the challenges relating to soil.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	There is a strong interrelationship between green infrastructure and soil. Soil is essential for a wide range of 'biomass', including green infrastructure of any kind and green infrastructure de facto plays a key role in formation of soil and soil formation and the prevention from soil erosion can be seen as two key ecosystem services relating to soil from green infrastructure. Green infrastructure may play a key role in ensuring soil can fullfill its important functions (including filtering, transforming and storing water (water retention capacity), nutrients and carbon) at optimal levels and maintain high levels of soil fertility/avoid soil exhaustion. The green infrastructure has a clear role to play in addressing some of the threats to soil, including erosion, decline in organic matter, contamination, salinization, floods and landslides. Phytoremediation[3] projects have already been used in some instances to use vegetation clean polluted or contaminated land, polluted land. Soil can also only use its potential as a major carbon store in combination with a clear strategy as regards green infrastructure. A future Green Infrastructure Strategy should recognise the positive effects of certain green infrastructure elements on soil (and its contribution to soil formation) and the key role of healthy soils for a well-functioning green infrastructure. Further research should be initiated to better understand the interrelationships and how green infrastructure can be used to address some of the threats facing soils.
What are the **W**eaknesses or barriers for GI?	The role of green infrastructure in preventing further soil degradation and preserving its functions is not acknowledged. The added value of ecosystem based solutions for addressing these challenges is not highlighted. The potential role of green infrastructure in restoring degraded soils is not acknowledged. This weakness reflects in the "next steps" identified in section 6 of the TS.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more	No, although the lack of emphasis of the link between green infrastructure and soils might result in sub-optimal responses being provided which in many instances might not be as cost effective and sustainable as green infrastructure

[3] Phytoremediation consists of mitigating pollutant concentrations in contaminated soils, water, or air, with plants able to contain, degrade, or eliminate metals, pesticides, solvents, explosives, crude oil and its derivatives, and various other contaminants from the media that contain them.

fragmentation)?	approaches.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The TS mentions that the implementation of a potential Framework Directive would probably require that specific risk areas are identified. Such risk areas could become prime targets for green infrastructure investments and ecosystem based solutions to address the threats (erosion, organic matter decline, compaction, salination and landslides) in those areas. The TS should also have called for ensuring that funding for the required projects or programmes is available from the EU budget (beyond the CAP) – as this would not only help MS address the challenges but also contribute to raising awareness on the role of green infrastructure for addressing challenges to soils and on the importance of soils more generally (cf point 4.4. of the TS). Where relevant, sectoral guidance documents (agriculture, water, etc) should also include examples of green infrastructure to support soil in delivering its functions. Under 4.3. the TS identifies the policies which have significant impacts on soils and in which soil protection should be further integrated. In some instances, green infrastructure approaches/measures could be one of the channels through this could happen in those policy areas. The need for research on the interlinkages between soil functions and green infrastructure is also insufficient. In addition, an exhaustive research agenda would also need to include an identification of the potential of green infrastructure to be used to address some of the threats to soil identified in the Strategy.

Proposal for a Directive establishing a framework for the protection of soil	
How is GI addressed (directly or indirectly), if at all?	The proposed Strategy does not make direct reference to green infrastructure. This is primarily due to the fact that the Directive focuses on the identification of soil/areas at risk and does very little in terms of suggesting concrete measures to address the challenges for soil.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The explanatory memorandum of the proposed Directive recognises that inappropriate agricultural and forestry practices are amongst the environmental pressure on soil, thus identifying areas where green infrastructure (esp. sustainable use/ multifunctional use zones) could be part of the response to the challenges. The proposed Directive clearly acknowledges the functions provided by soils in its article 1 (incl. biomass production, storing, filtering and transforming nutrients and water. Carbon pool, etc) and the links to human health, water, climate change, nature and biodiversity and food safety but fails to clearly point to the crucial role and interactions of soils with green infrastructure in these processes. It is clear that there is scope for green infrastructure approaches to help address the aim of the Directive, which is preservation of soil functions, its sustainable use, control transboundary soil degradation effects, etc.
What are the **W**eaknesses or barriers for GI?	Nowhere, not even in an Annex, approaches such as ecosystem based measures or green infrastructure measures to address the threats in/ reach target set for these risk areas are identified. This does not help in implementing a green infrastructure approach in this area.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The proposed FWD reiterates the processes which result in soil degradation in the EU, including erosion, organic matter decline, contamination, salinization, compaction, soil biodiversity loss, sealing, landslides and flooding. While the proposed Directive leaves ample freedom on how to implement requirements to MS, it could arguably do more to acknowledge the role of green infrastructure approaches in addressing the challenges and making a case for these to be used where appropriate. If these cannot be directly addressed in the Directive itself, a guidance document should certainly be foreseen and developed as soon as

	possible, whether the proposed Directive is ultimately adopted at European level or not. Linking opportunities for EU funding to these specific risk areas for soils would give a strong signal to MS which would have a higher incentive to invest into identifying their risk areas (e.g. erosion by water or wind, salinization…) and developing projects to address the threats, including ecosystem based solutions (green infrastructure approaches), especially if at EU level guidance identifying best practice in this area has been produced and made widely available to responsible authorities (at relevant geographical and administrative levels).

1.6 Climate change policy

Overview

The current EU policies and instruments in the area of climate change policy, potentially relevant to Green Infrastructure include:

- White Paper on adaptation
- Roadmap for moving to a competitive low carbon economy in 2050

[White Paper on adaptation[4]]	
How is GI addressed (directly or indirectly), if at all?	GI is addressed in the White Paper by providing its definition (*see below) and stressing its crucial role in adaptation. The document, however, does not foresee concrete actions to support or protect GI. As a White Paper, it contains only proposals for European Union action in adaptation area. This White Paper sets out an EU's Adaptation Framework to reduce the EU's vulnerability to the impact of climate change and aims to improve the EU's resilience to deal with the impact of climate change. The framework is designed to evolve as further evidence becomes available. It intends, in the first phase 2009-2012, lay the ground work for preparing a comprehensive EU Adaptation Strategy that is planned to be implemented during the second phase, starting in 2013. On this basis, it is difficult to assess how GI will be addressed in the future EU Adaptation Strategy. *The GI definition provided in the document: "Green Infrastructure is the interconnected network of natural areas including some agricultural land, such as greenways, wetlands, parks, forest preserves and native plant communities, and marine areas that naturally regulate storm flows, temperatures, flooding risk, and water, air and ecosystem quality."
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The document recognises that "'Green Infrastructure' can play a crucial role in adaptation in providing essential resources for social and economic purposes under extreme climatic conditions." For example, improving the soil's carbon and water storage capacity, and conserving water in natural systems to alleviate the effect of droughts and to prevent floods, soil erosion and desertification. The Impact Assessment of the White Paper states that "'Green' structure approaches are contributing to the increase of ecosystems resilience and, while addressing goals such as halting biodiversity loss, degradation of ecosystem or restoring water cycles, at the same time use the functions and services provided by the ecosystems to achieve a more costs effective and sometimes more feasible adaptation solution than relying solely on grey infrastructures alternatives. Increasing the resilience of green infrastructures therefore can be considered as synergy and no regret actions." This recognition may influence support of GI in the future EU Adaptation Strategy. However, a clear signal should be given by the EU Biodiversity policy.

[4] White Paper. Adapting to climate change: Towards a European framework for action. Brussels, 1.4.2009. COM(2009) 147 final. The Commission of the European Communities.

What are the **W**eaknesses or barriers for GI?	It is difficult to assess weaknesses or barriers for GI at this point, as a comprehensive EU Adaptation Strategy is planned to be prepared by 2012 and implemented starting in 2013. Nevertheless, the document identifies financial constraints as one of the main barriers to adaptation measures. It stresses that more quantified information on the costs and benefits of adaptation is also urgently needed. In addition, the White Paper sets an action for EU and Member States to develop indicators to better monitor the impacts of climate change, including vulnerability impacts and progress on adaptation. The Commission is currently examines ways to improve the monitoring of impacts and adaptation measures in order to develop vulnerability indicators.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No, the current policy does not result in threats to GI (see above under the potential for GI).
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The White Paper identifies existing scope for improving the uptake of adaptation action by Member States and for targeting better the use of available financial resources and instruments. Attention should be paid to ensuring that public funding and state aid do not foster mal-adaptation. In addition, this document foresees an integrated and coordinated approach at EU level in order to strengthen the adaptation measures that will be mostly taken at national, regional and local level, due to the regional variability and severity of climate impacts.

[A Roadmap for moving to a competitive low carbon economy in 2050[5]]	
How is GI addressed (directly or indirectly), if at all?	GI is not addressed in the Roadmap for moving to a competitive low carbon economy in 2050. This Roadmap sets out a plan to meet the long-term (2050) target of reducing domestic greenhouse gas emissions and shows how the key sectors responsible for Europe's greenhouse gas emissions – power generation, industry, transport, buildings and construction as well as agriculture – can make the transition to a low-carbon economy over the coming decades.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The improved agricultural and forestry practices that are seen as having a potential to increase the capacity of the sector to preserve and sequestrate carbon in soil and forests can also positively contribute to GI. This is in particularly relevant for the targeted measures to maintain grassland, restore wetlands and peatlands, low and zero tillage and allow for the development of forests. These elements will be further addressed in the Common Agriculture Policy legislative proposals for 2013. The Commission intends to use the Roadmap as a basis for developing sector specific policy initiatives and Roadmaps. In this case, GI should be addressed by the Common Agricultural Policy legislation.
What are the **W**eaknesses or barriers for GI?	It is difficult to assess weaknesses or barriers for GI, since it is not addressed directly. Nevertheless, the document identifies several indirect weaknesses and barriers. Generally speaking, the document foresees the following main ways to reduce greenhouse gas emissions which can be applied at different levels in deferent sectors: switch to low carbon technologies, improv energy performance of buildings and increase the use of renewables. While the first two ways do not have any link to GI, the increased use of renewables (in particular biofuels) "could lead, directly or indirectly, to a decrease of the net greenhouse gas benefits and increased pressure on biodiversity, water management and the environment in

[5] A Roadmap for moving to a competitive low carbon economy in 2050. Brussels, 8.3.2011, COM(2011) 112 final. The European Commission, http://ec.europa.eu/clima/documentation/roadmap/docs/com_2011_112_en.pdf. Also: http://ec.europa.eu/clima/policies/roadmap/index_en.htm.

	general". Another weakness identified by the document is that the agriculture sector is "potentially at some risk of carbon leakage and changes in production and trade patterns should not in the long-term undermine global reduction of emissions". These changes in production and trade patterns should also not undermine the development of GI in the long-term. Furthermore, the increased use of renewable energy, in particular wind energy and at a certain extent solar energy, might have a negative impact on the landscape.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	The Roadmap is a current (2011) EU initiative and will be implemented through the sectoral policies and at the EU, national and regional levels; therefore it is not possible to state at the moment whether the current policy does or does not result in threats to GI.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	There is a need "to advance in 2nd and 3rd generation biofuels and to proceed with the ongoing work on indirect land use change and sustainability".

Table 5: Policy tools and instruments potentially relevant for GI implementation in the area of climate change policy

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	The White Paper on adaptation does not foresee a strategic approach to GI. As a White Paper, it contains only proposals for European Union action in adaptation area. This White Paper sets out an EU's Adaptation Framework to reduce the EU's vulnerability to the impact of climate change and aims to improve the EU's resilience to deal with the impact of climate change. The framework is designed to evolve as further evidence becomes available. It intends, in the first phase 2009-2012, lay the ground work for preparing a comprehensive EU Adaptation Strategy that is planned to be implemented during the second phase, starting in 2013. On this basis, it is difficult to assess how GI will be addressed in the future EU Adaptation Strategy. The Roadmap does not address GI and therefore does not foresee a Strategic approach to GI.
Information gathering and mapping	
Identification and mapping of GI elements and requirements	
Monitoring of GI elements and their impact objectives (incl. using indicators & accounting)	
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	The White Paper on adaptation recognises a crucial role of GI in adaptation by providing essential resources for social and economic purposes under extreme climatic conditions. Taking into consideration the fact that the Commission is currently examines ways to improve the monitoring of impacts and adaptation measures in order to develop vulnerability indicators; this may enhance an analysis of GI benefits in view of integration of adaptation approach into EU policies.
Regulation and planning	
Regulation of land use	

Spatial planning/integrated territorial development	
Procedural requirements: EIA/SEA	The White Paper on adaptation proposes to develop guidelines by 2011 to ensure that climate impacts are taken into account in the EIA and SEA Directives. "Commission will work with Member States and stakeholders setting guidelines and exchanging good practice, to ensure that account is taken of climate change impacts when implementing the Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) Directives and spatial planning policies."
Standards	The White Paper on adaptation proposes to assess the feasibility of incorporating sustainability criteria —including taking into account climate change impacts — into harmonised standards for construction, with for example a possible widening or extension of the existing Eurocodes.
Liability and compensation	
Economic/ market instruments	
Resource pricing (e.g. taxes, charges, fees, land values)	
Land management contracts/agreements (incl. PES-schemes)	The White Paper on adaptation suggests giving consideration in any adaptation framework to the role of specialised Market Based Instruments (MBIs) and encourages public-private partnerships with a view to the sharing of investment, risk, reward and responsibilities between the public and private sector in the delivery of adaptation action. Examples of MBIs include incentive schemes for protecting ecosystem services or for projects enhancing the resilience of ecosystems and economic sectors in the form of Payments for Ecosystem Services (PES).
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as organic, FSC, MSC on the other).	
Public investments (EU expenditure for GI incl. co-funding)	
Land purchase	
Restoration projects/programmes	
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	
Securing long-term financing/maintenance	The White Paper on adaptation suggests utilising the possibility of using revenue generated from auctioning allowances under the Community greenhouse gas emission allowance trading system (the EU ETS) for adaptation purposes. The revised Directive governing the scheme from 2013 provides that at least 50% of the revenue generated from auctioning allowances should be used, inter alia for adaptation in Member States and developing countries. This additional revenue will be crucial for sharing adaptation costs between the public and private sector.
Respond to the value of GI when setting priorities	
Governance	

Institutions	According to the White Paper on adaptation, the Commission intends to set up an Impact and Adaptation Steering Group (IASG) and provide the secretariat in order to support cooperation on adaptation and with a view to taking this framework forward. This group will be composed of representatives from the EU Member States involved in the formulation of national and regional adaptation programmes and will consult with representatives from civil society and the scientific community. The Steering Group will be supported by a number of technical groups, who will deal specifically with developments in key sectors (agriculture and forestry, biodiversity, water, oceans and seas, energy, health etc.).
Participatory decision-making process (e.g. negotiations for CP OPs)	This White Paper on adaptation builds on the wide-ranging consultation launched in 2007 by the Green Paper on Adapting to Climate Change in Europe and further research efforts that identified action to be taken in the short-term.
Reporting on implementation	
Coordination of policies	The White Paper on adaptation foresees an integrated and coordinated approach at EU level in order to strengthen the adaptation measures that will be mostly taken at national, regional and local level, due to the regional variability and severity of climate impacts.
Communications and advisory measures	
Awareness raising	
Advice and guidance	
Capacity building	
Technical assistance on EU level (for policy making)	
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (e.g. regional administrations (e.g. CP OP elaboration, farmers, NGOs, etc.)	

1.7 Regional Policy/ Territorial Cohesion and Innovative Financing

Overview

The current EU policies and instruments in the areas of regional policy and territorial cohesion potentially relevant to Green Infrastructure include:

- Cohesion Policy
- EU Strategies for the Danube/Baltic Regions
- Innovative Financing (Jaspers, Jessica, etc)

[Cohesion Policy]	
How is GI addressed (directly or indirectly), if at all?	Under Cohesion policy there are a growing number of ERDF projects which are financing Green Infrastructure, although they are only now beginning to be recognised explicitly as such. These projects aim to allow species to move and adjust but they also restore ecosystem services. Many Operational Programmes provide co-financing for managing Natura 2000 sites and implementing measures

	that support ecological coherence and connectivity in the context of regional development. These measures are often funded under the budget line for the promotion of biodiversity and nature protection.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The potential to integrate Green Infrastructure into Cohesion Policy lies in the growing recognition that investment in nature can lead to regional economic growth, employment and social benefits. Green Infrastructure has the potential to play a decisive role in integrating biodiversity into policy whilst at the same time leveraging additional economic benefits. Furthermore there is an increasing emphasis on resource efficiency across Europe which aims for the conservation of natural resources and natural capital as well as highlighting ecosystem services. This principle is consistent with the concept of territorial cohesion that looks to support more balanced and sustainable development. This could be achieved in Cohesion Policy through greater use and investment of Green Infrastructure post 2013.
What are the **W**eaknesses or barriers for GI?	Some interest in Green Infrastructure projects already exists, however these measures often do not directly match the objectives of the funding mechanisms and are therefore not funded. A more strategic inclusion in regulation articles is required. In addition budget lines that are well suited to supporting Green Infrastructure measures need to be introduced.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	Traditionally, EU Cohesion Policy has focused on conventional infrastructure investments that pose the risk of negative impacts on biodiversity through fragmentation of landscapes, air pollution, or soil degradation (eg developing transport infrastructure). To integrate Green Infrastructure into Cohesion Policy effectively and to ensure that funds are adequately absorbed at the regional level it is essential to emphasise the economic and social benefits that will derive from Green Infrastructure policy.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	Many projects on Green Infrastructure are already supported by Regional Policy, and there are therefore opportunities for this to be recognised formally and encouraged. At the central level Structural Funds could prioritise directly measures to create or maintain Green Infrastructure, in particular the connectivity and robustness of natural areas on land and in water, to safeguard the provision of valuable ecosystem services such as water purification or erosion control. At the regional level the managing body of the Operational Programmes could ensure that new infrastructure projects that are funded integrate Green Infrastructure needs from the beginning and include investment in measures to avoid or minimise negative effects. Similarly, all transport investment projects for improving and upgrading existing transport networks should include adequate measures to avoid or mitigate fragmentation effects.

[EU Strategies for the Danube Regions/ EU Strategy for the Baltic Sea Region]	
How is GI addressed (directly or indirectly), if at all?	Under the heading "Protecting the environment in the Danube Region", the Danube Strategy points to the role of regional cooperation in facilitating Green Infrastructure/ecosystem based solutions to risk management. The role of the Danube Region as a major ecological corridor is acknowledged and the need for a regional approach to nature conservation, spatial planning and water management is stressed, thus opening up opportunities for the use of Green Infrastructure. The role of Green Infrastructure to combat floods and droughts is however not recognised. The rich environmental assets of the region are identified and the need to sustainably preserve and restore them identified. Reference is made to the 2020 EU target for biodiversity and the need to restore ecosystem services and reconnecting habitats is mentioned clearly . The Baltic Strategy identifies "enabling a sustainable environment" and adaptation to climate change and reducing other environmental pressures as key challenges, most prominently limiting the impact of excess nutrients flowing into the Baltic Sea. It identifies the "relatively unspoilt land environment rich in

	natural resources" as one the region's assets. Although the Strategy calls for a macro-regional approach to combat the Baltic Sea's deterioration, Green Infrastructure is not mentioned explicitly and the possibility for ecosystem-based responses to be part of the solution is only acknowledged to a very limited extent.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	While both Strategies acknowledge that the regions they concern are functional areas, they fail to make a clear link between each functional region's specific natural capital and the ecosystem services derived from it, on which some sectors of the region's economy depend. The Strategies therefore fail to recognise that natural capital and ecosystem services are key for the sustainable development of the region and should therefore be supported through targeted measures to preserve the region's Green Infrastructure, in particular in the light of climate change (ie investments in increasing ecosystem resilience). In particular the reference to minimising risks and disasters such as floods in the Danube Strategy or minimising nutrient concentrations in the Baltic Sea offer scope for Green Infrastructure to be used.
What are the **W**eaknesses or barriers for GI?	One of the four pillars for action identified in the Danube Strategy is "connecting the Danube Region". The risks with regard to Green Infrastructure are not sufficiently acknowledged and responded to. Similarly, the Baltic Strategy foresees the development of transport but does not highlight risks and potential trade-offs.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	Freight water transport and other transport infrastructure should be developed in a way which minimises adverse impacts on Green Infrastructure.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The Strategies are primarily implemented by mobilising and aligning existing funding to its objectives. The Green Infrastructure concept should be integrated into the EU's regional Strategies and within the Strategies an eco-region's specific natural assets, which have made key contributions to its development, should be recognised clearly. These assets should be considered key to maintaining the sustainable economic development of the region in the future. It should be clear that each region will share similar patterns in investing in its natural capital, in particular in the context of adapting to climate change and that sharing of best practice at the eco-regional level is probably most effective. The Action Plans accompanying the two Strategies are the prime place for greater emphasis on measures for sustainable management and sustainably and preservation of the regions' Green Infrastructure. Targets specific to the regions' Green Infrastructure and its particular features could be set to ensure it contributes to implementing the Green Infrastructure Strategy in a relevant, effective and comprehensive way. One of the four pillars for action In the Danube Strategy, , "protecting the environment in the Danube Region" clearly opens up possibilities for using Green Infrastructure: restore and maintain the quality of water, to manage environmental risks, to preserve biodiversity, landscapes and the quality of air and soils. The Action Plan of the Baltic Strategy covers issues including the preservation of natural zones and biodiversity and mitigation and adaptation to climate change; both areas where Green Infrastructure could contribute. Beyond Cohesion Policy, funding for fisheries policy plays quite an important role in the region and could help to support initiatives for Green Infrastructure in marine and coastal areas in the future, should the provisions of the fund allows this. It is probable that Green Infrastructure could contribute in a cost-effective way to a reduction in the flow of nutrients into the sea and could be relevant for the development of fish

	nurseries.

[Innovative Financing: JASPERS, JESSICA]	
How is GI addressed (directly or indirectly), if at all?	Under JASPERS (Joint Assistance to Support Projects in European Regions) technical assistance with a specific focus on Green Infrastructure projects is not offered. This might be because JASPERS focuses on large projects costing more than € 50 million. JESSICA (Joint Europe Support for Sustainable Investment in City Areas), has an important role to play. The scheme emphasises integrated urban development policy and its funds can be used to support the development of urban infrastructure, energy efficiency improvements, heritage or cultural sites: all issues which, although not sufficiently exploited for the implementation of Green Infrastructure, could be linked to it.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	Both instruments have the potential to support Green Infrastructure, which has so far been unexploited. The potential of JASPERS lies in terms of ensuring that impacts on Green Infrastructure are considered and mitigated adequately. JESSICA has the greater potential than JASPERS to provide funding for Green Infrastructure in urban areas. Consideration should also be given to supporting pilot projects for the integration of Green Infrastructure into urban planning in municipalities that are interested in developing appropriate tools (eg mapping, stock taking etc). A whole range of the objectives pursued by this fund resonate with the benefits that Green Infrastructure may deliver, it therefore appears that there is quite some room for JESSICA to fund ecosystem- based approaches to manage storm water runoff (green roof programmes) or urban heat wave mitigation/ climate change adaptation programmes (green urban areas) air quality/health/quality of life improvements (trees).
What are the **W**eaknesses or barriers for GI?	The mitigation of Impacts on the natural environment, including through the use of Green Infrastructure, should be a core element of technical assistance under JASPERS. Emphasis on Green Infrastructure and on the use of ecosystem-based solutions is currently limited within JESSICA. This emphasis could arguably be increased greatly, in particular within JESSICA, which is concerned with integrated urban planning.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	JASPERS is not directly resulting in threats to Green Infrastructure. However in the future technical assistance given in the context of JASPERS could take into account to a greater extent the need to preserve Green Infrastructure and to mitigate impacts on Green Infrastructure caused by the projects for which it provides guidance and support. Projects funded under JESSICA may currently not take the need to preserve Green Infrastructure in urban areas into account sufficiently.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	Technical assistance for applicants and implementing authorities would initially be important to ensure the funds are absorbed and opportunities for using these funds are seized. Should more funding for Green Infrastructure projects be made available in Regional Policy or through other EU funding instruments, initially much of this might focus on the identification of project opportunities.

Table 6: Policy Tools and Instruments Potentially Relevant for the Implementation of Green Infrastructure in the area of Cohesion Policy and Regional development

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	The EU Strategies for the Danube Regions/ EU Strategy for the Baltic Sea Region, along with the accompanying Action Plans, provide a highly relevant opportunity for the integration of the Green Infrastructure concept. Within the Action Plans it would be very relevant to suggest specific Green Infrastructure measures that are considered to contribute to the objectives and will receive funding.
Information Gathering and Mapping	
Identification and mapping of GI elements and requirements	Under Cohesion Policy there is scope to fund projects which map natural assets and land use, thus creating regional networks of preserved areas based on ecological corridors.
Monitoring of GI elements and their impact objectives (including using indicators & accounting)	
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	Under Cohesion Policy, projects exist at the regional level which demonstrate the positive outcomes of Green Infrastructure and therefore allow for the identification and quantification of benefits, albeit at a local or regional scale.
Regulation and Planning	
Regulation of land use	
Spatial planning/integrated territorial development	Within Cohesion Policy, Green Infrastructure links to the concept of territorial cohesion that looks to support more balanced and sustainable development. A growing number of projects are looking to make greater use of spatial planning to achieve environmental protection alongside economic development.
Procedural requirements: EIA/SEA	Under Cohesion Policy, Operational Programmes are generally subject to Environmental Impact Assessment (EIA)/Strategic Environmental Assessment (SEA)/ex-ante evaluation to ensure that environmental considerations have been taken into account in programme design.
Standards	
Liability and compensation	
Economic/ Market Instruments	
Resource pricing (e.g. taxes, charges, fees, land values)	
Land management contracts/agreements (incl. PES-schemes)	Several projects under Cohesion Policy at the regional level incorporate land management schemes and are introducing payments for ecosystem services.
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as organic, FSC, MSC on the other).	In the case of Cohesion Policy, managing bodies of Operational Programmes are increasingly directing funding to green projects by promoting the need for and benefit of Green Infrastructure projects and in some cases setting up new sources of funding for certain environmental investments.
Public Investments (EU Expenditure for Greem Infrastructure including Co-funding)	
Land purchase	
Restoration projects/programmes	Many Operational Programmes for the Regional Development Fund provide co-financing for managing the Natura 2000 network and implementing measures that support ecological coherence and connectivity in the context of regional development. These measures

	are often funded under the budget line for the promotion of biodiversity and nature protection.
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	Under Cohesion Policy, there are some examples of ERDF projects that have built infrastructure that has consequently led to negative effects on biodiversity (eg road development projects). However other projects are beginning to use Green Infrastructure principles that promote ecological improvements and reconstruction. For example, a project was established to promote ecosystem services and estuary conservation alongside existing port developments. Other projects have focused on removing barriers in aquatic habitats.
Securing long-term financing/maintenance	Innovative financing is being explored in Cohesion Policy for the next programming period including the use of Equity and Debt Platforms which could help to secure long-term funding for Green Infrastructure projects.
Respond to the value of GI when setting priorities	DG REGIO recognises the need to inform individuals at local and regional level about the the relatively new concept of Green Infrastructure. Training is also important to provide a sense of ownership.
Governance	
Institutions	Under Cohesion Policy, SEAs/EIAs, programme monitoring committees and Environmental Steering Groups have been used as institutional governance mechanisms at the regional level to promote projects that conserve the green environment. In some regions Environmental Steering Groups are also enforced on projects which may pose a threat to the natural environment. These steering groups aim to find ways in which the impact can be minimised.
Participatory decision-making process (eg negotiations for CP OPs)	The environmental appraisal system under Cohesion Policy has led to participatory decision-making on the selection of projects and in some regions this has resulted in a higher numbers of projects selected that support Green Infrastructure.
Reporting on implementation	
Coordination of policies	Environmental sustainability manager positions have been established in some regions under Cohesion Policy, eg South West UK. This role has enabled a Green Infrastructure to be promoted more effectively, along with co-ordination and integration across policies.
Communications and Advisory Measures	
Awareness raising	Many projects focusing on Green Infrastructure are already being supported by Regional Policy through projects that preserve valuable ecosystem services. Action is being taken by many of the Operational Programme managing bodies to ensure that the win-win benefits of Green Infrastructure projects are realised by a wider majority.
Advice and guidance	Best practice examples of projects under Cohesion Policy that lead to win-win outcomes through supporting Green Infrastructure are being collected at a central EU level and will need to be disseminated to Member States in the future.
Capacity building	Several regions are now promoting the preservation of natural capital over and above traditional investment in infrastructure under Cohesion Policy.
Technical assistance on EU level (for policy making)	

Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (eg regional administrations (eg CP OP elaboration, farmers, NGOs, etc.)	Under Cohesion Policy, regional administrations that promote Green Infrastructure can provide some technical assistance to beneficiaries to ensure a wider capacity for designing and delivering Green Infrastructure projects.

1.8 Green Growth: EU 2020 Strategy and Resource Efficiency Flagship Initiative

The current EU policies and instruments in the areas of growth, jobs, innovation and resource efficiency potentially relevant to Green Infrastructure include:

- EU 2020 Strategy
- 'A resource efficient Europe' - Flagship Initiative under EU2020

The EU 2020 Strategy	
How is GI addressed (directly or indirectly), if at all?	Although providing the blueprint for the EU's move towards "smart, sustainable and inclusive" economic growth, the EU2020 Strategy does not address Green Infrastructure directly. However, it does recognise that a resource efficient and climate resilient economy is necessary to protect the EU's natural capital and for biodiversity targets to be achieved.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The clearest potential for Green Infrastructure lies in the resource efficiency flagship initiative (discussed in more detail below) and through the potential role of Green Infrastructure in addressing climate change. Reducing the EU's resource intensity might impact positively on Green Infrastructure in that fewer raw materials would be needed or could be substituted which could reduce threats to Green Infrastructure areas which might otherwise have been exploited. Moreover, the new strategy on raw materials that sits under the EU2020 strategy aims to create the right framework conditions to ensure the sustainable supply and management of domestic primary raw materials. This might serve to protect to a greater degree existing that Green Infrastructure which coincides with other land use areas. There is also some potential for Green Infrastructure under the flagship initiative to develop "an industrial policy for the globalisation era", which calls for the competitiveness of the European tourism sector to be enhanced and for investment in the EU's existing natural assets. Green Infrastructure can play an important role with respect to both of these aspects.
What are the **W**eaknesses or barriers for GI?	The key weakness of the EU 2020 strategy with regards to Green Infrastructure is the lack of recognition given to the potential for Green Infrastructure to deliver the EU2020's objectives and targets. For instance, the role of Green Infrastructure in helping the EU to reach its emission reduction commitments and in adapting to the impacts of climate change is not acknowledged. With respect to climate change adaptation, the Strategy instead focuses primarily on the role of innovative technological solutions in meeting these targets.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	The EU 2020 Strategy does pose a potential threat where growth, technological developments and extraction activities damage existing Green Infrastructure. For instance, the Strategy highlights the need to promote increased investment in the EU's extractive industries, as part of the EU's natural assets. However, the Strategy does call for guidelines to be developed to clarify how to reconcile extraction activities in or near Natura 2000 areas with environmental protection. Nonetheless, this only covers a subset of GIreen Infrastructure and only a limited number of potentially harmful activities.
What are the **O**pportunities for greater	There are several opportunities within the Strategy for Green Infrastructure to be supported. For instance, the Strategy calls for the EU's resilience to climate risks

support for GI / overcoming the weaknesses?	to be strengthened; an area where Green Infrastructure can play a significant role. Green Infrastructure can also help the transition to a low carbon economy through its potential role in mitigating climate change. There is also scope for Green Infrastructure to be supported if it is recognised as a source for job creation and retention and if investment is made in re-skilling individuals to shift their career into Green Infrastructure. There is also scope for Green Infrastructure to be supported through the innovation flagship, through environmentally friendly land management. Certain renewable energy developments outside the Natura 2000 network have the potential to prompt the use of biodiversity offsets or habitat banking, with a beneficial impact on Green Infrastructure. A certain weakness is that Member States would have to recognise explicitly the potential for Green Infrastructure to contribute to the Strategy's delivery when the EU targets are translated into national targets and trajectories. The Commission could highlight the role of Green Infrastructure more clearly when proposing a more concrete range of actions to sit under the Strategy.

Strategy for Resource Efficiency – Flagship Initiative under EU2020 (Roadmap not yet published))	
How is GI addressed (directly or indirectly), if at all?	The Strategy for Resource Efficiency addresses Green Infrastructure to the extent that it aims to reduce the use and consumption of resources, whereby resources include not just raw materials, but also "soil, water, air, biomass and ecosystems". However, the Strategy focuses mostly on the extent to which resource efficiency could deliver climate change targets and how reduced emissions would therefore help to protect valuable ecological assets. The Strategy therefore considers Green Infrastructure mostly in a reactive, rather than proactive, way. However, the associated 'Roadmap for moving to a competitive low carbon economy in 2050', which sits under the Resource Efficiency Flagship Initiative, is slightly more explicit. It, mentions specifically that targeted measures within agriculture and forestry, such as the maintenance of grasslands and the restoration of wetlands and peatlands, can be used to preserve and sequester carbon.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The potential for Green Infrastructure under this Strategy lies in the extent to which the Strategy will reduce pressures upon it. For instance, improved energy efficiency reduces the need to generate energy and therefore also the need for additional energy infrastructure. This eases pressure on land resources, which can then be used instead to support biodiversity or provide ecosystem services. Similarly, increasing recycling rates will also ease the demand for primary raw materials, which reduces the need for extraction. As highlighted in the associated 'Roadmap to a low carbon economy', there is also potential for Green Infrastructure under the Resource Efficiency flagship through its role in mitigating and allowing adaptation to the effects of climate change. For instance, the Strategy calls for medium-term measures which include early action on adaptation to climate change to minimise threats to, for instance, ecosystems.
What are the **W**eaknesses or barriers for GI?	Similarly to the EU 2020 Strategy, the key weakness is the small role given to ecological assets as a 'resource', and the focus that is put instead on raw materials and energy efficiency.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	Potentially, in so far as increased resource efficiency could lead to technological developments which might damage existing Green Infrastructure (eg some types of renewable energy developments).
What are the **O**pportunities for greater support for GI / overcome the weaknesses?	There is the potential for Green Infrastructure to be supported through its role in mitigating climate change, eg carbon sequestration. There is also the potential to expand the knowledge base behind Green Infrastructure given that the Commission intends to undertake further analytical work to estimate the economy-wide impacts of resource use, including the effects on ecosystems, and

	to improve its ability to model in other areas relevant to resource efficiency, such as agriculture and the environment. Perhaps most useful is the intention of the Commission to develop indicators covering, for instance, the availability of natural resources, where they are located, how efficiently they are used, and the impacts on the environment and biodiversity. If ecological assets are understood as being part of these natural resources, it could be a useful opportunity to improve the Green Infrastructure knowledge base and also the environmental impacts of resource use on Green Infrastructure.

Table 7: Policy Tools and Instruments Potentially Relevant for the Implementation of Green Infrastructure in the Areas of Green Growth, Resource Efficiency, Innovation, Growth, Jobs

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	The EU 2020 and Resource Efficiency Strategies have the potential to contribute to the overall strategic approach to Green Infrastructure provision but this potential is currently not maximised.
Information Gathering and Mapping	
Identification and mapping of GI elements and requirements	There is scope for the Resource Efficiency Strategy to play a role in mapping and identifying Green Infrastructure elements, through the intention to develop indicators which will map the availability, location and impacts of the EU's natural resources.
Monitoring of GI elements and their impact objectives (including using indicators and accounting)	The EU 2020 Strategy requires that the EU monitors progress across the headline targets and structural reforms. Although there is little scope at present for Green Infrastructure to be considered within the framework, where Member States recognise the role that this could play in delivering the Strategy's targets, national reporting could be used as a potential tool for the monitoring of Green Infrastructure elements.
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	Under the Resource Efficiency Strategy, there is scope for the analysis of the benefits of Green Infrastructure within the Commission's intention to estimate economy-wide impacts of resource use, including the effects on ecosystems.
Regulation and Planning	
Regulation of land use	
Spatial planning/integrated territorial development	
Procedural requirements: EIA/SEA	
Standards	
Liability and compensation	
Economic/ Market Instruments	
Resource pricing (eg taxes, charges, fees, land values)	The Resource Efficiency Strategy calls for the use of regulation, building performance standards and market-based instruments such as taxation, subsidies and procurement to reduce energy and resource use and the use structural funds to invest in energy efficiency. The Commission also notes that in order to achieve the EU 2020 objectives, innovative instruments are required to finance the necessary investment.

Land management contracts/agreements (including PES schemes)	
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as organic, FSC, MSC on the other)	The Resource Efficiency Strategy highlights the need for green public procurement in order to increase resource efficiency and the need to use procurement to adapt production and consumption methods.
Public Investments (EU expenditure for GI incl. co-funding)	
Land purchase	
Restoration projects/programmes	
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	
Securing long-term financing/maintenance	
Respond to the value of GI when setting priorities	
Governance	
Institutions	
Participatory decision-making process (eg negotiations for CP OPs)	
Reporting on implementation	The Resource Efficiency Strategy notes that in each policy area and for each policy instrument, appropriate analysis must be carried out to determine the most appropriate policies to implement resource efficiency by considering the respective costs and benefits of action.
Coordination of policies	
Communications and Advisory Measures	
Awareness raising	
Advice and guidance	
Capacity building	
Technical assistance on EU level (for policy making)	
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (eg regional administrations (eg CP OP elaboration, farmers, NGOs, etc)	

1.9 Transport and Energy

Overview

The current EU policies and instruments in the areas of Transport and Energy, potentially relevant to Green Infrastructure include:

- Trans-European Transport Network (TEN-T)
- EU White paper on transport impact assessment

- Trans-European Energy Network (TEN-E)
- Energy Policy, ie Renewable Energy Directive and Energy Efficiency Plan

Trans-European Transport Network (TEN-T)	
How is GI addressed (directly or indirectly), if at all?	The Impact Assessment of the 2011 EU Transport White Paper[6] defines green infrastructure as "*infrastructure designed in a way to minimise environmental impact*". This definition is incorrect and indicates that European transport policy does not consider Green Infrastructure adequately. The Impact Assessment also includes a definition of a sustainable transport system (by the EU Transport Council), which is related to Green Infrastructure. It states that transport policy should, amongst other considerations '*allow the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations*'. The Impact Assessment recognises the potential for transport infrastructure to increase ecosystem and habitat fragmentation: '*transport infrastructure, along with energy infrastructure, and land use changes such as uptake by urban sprawl and agricultural intensification contributes to the fragmentation of ecosystems*'. It also identifies potential impacts of the White Paper relevant to Green Infrastructure: '*The greatest impact on other environmental resources would be caused by an increase in land use for infrastructure, generating increased pressure on biodiversity and ecosystem services due to direct damage linked to construction, habitat fragmentation and degradation and disturbance*'. In addition to potential impacts, the Impact Assessment proposes that habitat fragmentation should be monitored to show the state of fragmentation of land and ecosystems due to transport infrastructure. The Impact Assessment suggests that the indicator should be calculated on the basis of the mesh size of un-fragmented areas, related to the construction of new or improved transport infrastructure.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The TEN-T policy has the potential to make a significant positive contribution to Green Infrastructure across Europe. The policy encourages strategic planning across the EU and between Member States and as such could offer a mechanism to encourage the consideration of Green Infrastructure at strategic level. The principal objective of the policy is the delivery of improved transport infrastructure, through several key priorities related to road, rail and water travel. If the TEN-T policy included specific objectives related to Green Infrastructure these could potentially be delivered alongside transport infrastructure. For example, the policy could include provisions to ensure roadside verges and rail corridors are designed to maximise their potential contribution to Green Infrastructure.
What are the **W**eaknesses or barriers for GI?	The objective of the TEN-T policy is achieved through the construction of transport infrastructure. This is often delivered at the expense of Green Infrastructure. Thus a significant weakness of the TEN-T policy from the perspective of Green Infrastructure is that it is focused on delivering an objective that often necessities the destruction of existing Green Infrastructure elements.
Is this policy/ instrument	The TEN-T policy is currently resulting in threats to Green Infrastructure. For

[6] European Commission (2011) White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resources efficient transport system. Impact Assessment. Commission Staff Working Paper. SEC(2011)358

currently resulting in **T**hreats to GI (eg more fragmentation)?	example, the delivery of roads and rail increase habitat fragmentation. Due to the scale and location of many of the TEN-T priorities and projects, there is a risk that the TEN-T policy could deliver projects that have a negative effect on existing Green Infrastructure. Previous evaluations have demonstrated the potential negative effects of TEN-T priority projects on sites designated for nature protection[7].
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	A re-evaluation of the TEN-T policy could help to ameliorate its potentially negative effect on Green Infrastructure. The TEN-T policy could become an enabling policy for Green Infrastructure, joining up fragmented habitats and providing wildlife corridors. However, this would require the policy to be changed to include explicit provisions for the protection and delivery of Green Infrastructure alongside traditional transport infrastructure.

EU White Paper on Transport Impact Assessment	
How is GI addressed (directly or indirectly), if at all?	Green Infrastructure, as defined by DG Environment and this project, is not directly addressed in the White Paper. Indirectly, the vision for a competitive and sustainable transport system in practice implies reducing transport's negative impacts on the environment and key natural assets (water, land, ecosystems). In addition, the White Paper addresses ex-ante project evaluation criteria for modern infrastructure and smart funding. Under these criteria, the White Paper promotes integrated planning 'which takes environmental issues into account in early stages of the planning procedure'. It also introduces Public Private Partnership (PPP)-screening to the ex-ante evaluation to ensure that the option of PPP has been carefully analysed before a request for EU funding.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The main potential for Green Infrastructure in this White Paper is the use of the concept of integrated planning as ex-ante evaluation criteria of Public Private Partnership (PPP). In this sense, this concept allows Green Infrastructure to be considered at the first stages of the planning process. This would require the availability of information (mapping, indicators, etc) of Green Infrastructure to be used in these processes.
What are the **W**eaknesses or barriers for GI?	The White Paper makes no direct reference to Green Infrastructure elements nor are there specific actions to integrate Green Infrastructure into transport planning, except the ex-ante evaluation mentioned above.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	The greatest threats to environmental resources would be caused by an increase in land use for infrastructure, generating additional pressure on biodiversity and ecosystem services due to direct damage linked to construction, habitat fragmentation, degradation and disturbance. The White Paper assumes that this trend will be more significant in the cohesion countries. The European Commission has included an indicator system to monitor, evaluate and review the White Paper on transport policy five years after its adoption. One of the indicators will be 'Fragmentation due to transport infrastructure'.
What are the **O**pportunities for greater support for GI more/ overcoming the weaknesses?	The main opportunities for supporting Green Infrastructure further lie in developing Integrated Transport Planning at all territorial levels (European, national, regional and local).

Trans-European Energy Network (TEN-E)	
How is GI addressed (directly or indirectly), if	Green Infrastructure is not addressed directly by TEN-E; it is related to improving the functioning and interconnectedness of European energy networks to increase

[7] Birdlife (2008) TEN-T and Natura 2000: the way forward. An assessment of the potential impact of the TEN-T priority projects on Natura 2000.

at all?	the competitiveness and openness of the EU internal energy market. However, the potential effect of developing Europe's energy infrastructure is contained in the Impact Assessment (IA) of the Blueprint for an Integrated European Energy Network[8]. The IA recognises that, in certain circumstances, it may be necessary to change the choice of technologies (eg switch from overhead to underground power transmission lines) and the route of transmission networks, to avoid adverse impacts to protected areas such as Natura 2000 sites. Where adverse impacts cannot be avoided, the IA suggests that compensating measures may be necessary. The IA also acknowledges the potentially negative impacts on habitats of developing European energy infrastructure, but says that these negative impacts should be considered in the context of what would happen in the absence of an improved European energy network. Not upgrading the network could, according to the IA, increase the severity of the consequences of climate change, which would have negative impacts on European habitats.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	TEN-E could improve the explicit consideration of the potential impacts of energy infrastructure on Green Infrastructure. Although there is some consideration of impacts in the IA of the Blueprint for an Integrated European Energy Network, there is no mention of anything related to Green Infrastructure in the Blueprint itself. Energy infrastructure could offer significant potential in terms of habitat connectivity. Energy infrastructure involves long networks of transmission lines, either above or below ground and other associated infrastructure, such as electricity sub-stations. These networks could include Green Infrastructure elements, and thus promote a coherent network across Europe.
What are the **W**eaknesses or barriers for GI?	Energy infrastructure could threaten the integrity of Green Infrastructure; transmission lines or gas pipelines could, for example, have to transverse protected areas such as Natura 2000 sites. If appropriate measures are not taken this could have a negative impact on protected habitats and ecosystems.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	The development of Europe's energy infrastructure, without adequate consideration of appropriate compensatory measures, could threaten Green Infrastructure. It could, for example, reduce the integrity of protected habitats.
What are the **O**pportunities for greater support for GI more/ overcoming the weaknesses?	Opportunities for supporting Green Infrastructure directly are limited. However, if there was an explicit requirement to protect and enhance Green Infrastructure, developing Europe's energy infrastructure could offer some indirect opportunities. For example, areas under overhead transmission lines may be difficult to develop. Instead, they could be used to form a Green Infrastructure network, connecting habitats and ecosystems across Europe. Co-locating energy infrastructure with transport infrastructure (such as locating power lines alongside roads or rail lines) could help to overcome the weaknesses of TEN-E and mitigate the potentially negative effects of energy infrastructure on Green Infrastructure.

Energy Policy – Renewable Energy Roadmap and Energy Efficiency Plan	
How is GI addressed (directly or indirectly), if at all?	Green Infrastructure is not directly addressed in the EU Renewable Energy Directive, although there are some indirect links. Besides the overall 20% EU renewable energy target (national targets are differentiated by Member State), the Directive includes a target to increase the proportion of renewable energy in

[8] European Commission (2010) Energy infrastructure priorities for 2020 and beyond – A blueprint for an integrated European energy network. Impact Assessment. SEC(2010)1396

	the transport sector (ie a target to include 10% renewable energy in power for transport to be met by each Member State by the year 2020). The Member States' National Renewable Energy Action Plans have shown that over 90 per cent of renewable energy for transport will come from biofuels and that bioenergy will contribute around half to the overall EU renewable energy needs to meet the 20% target by 2020. These targets therefore require a significant increase in the supply of biomass, including from forest biomass and arable bioenergy crops. The resource use associated with increased demand for bioenergy crops and biomass from forest should be assessed with caution in individual Member States to prevent negative impacts on ecosystems. One of the risks is the conversion of grassland to arable crops. The EC's 2011 Energy Efficiency Plan mentions Green Infrastructure in relation to the new Smart Cities and Communities initiative, which focuses on speeding up the translation of research results into real, practical innovation in selected population centres. According to the plan this should also include supporting large scale demonstration projects on Green Infrastructure
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	Developing Europe's renewable energy capabilities could improve the extent and connectivity of Green Infrastructure across Europe. For example; wind turbines could provide land owners with an income to protect and enhance areas of Green Infrastructure; areas under power lines transporting renewable energy could be used to develop interconnected green areas. The Energy Efficiency Plan lists a range of opportunities for large scale demonstration projects on Green Infrastructure (ie 'Green Infrastructure includes use of trees and plants to cool urban temperatures, reducing energy needs for cooling (…) it can mitigate flood risk and water, air and ecosystem quality').
What are the **W**eaknesses or barriers for GI?	Increasing demand for bioenergy crops could have a negative effect on Green Infrastructure. It could result in the conversion of Green Infrastructure to intensively cultivated agricultural land, potentially decreasing the provision of ecosystem services and thus the role of Green Infrastructure in facilitating adaptation to climate change. A weakness of the Renewable Energy Directive is that no sustainability criteria for energy from solid and gaseous biomass are currently included. Therefore the use of forest biomass for energy purposes, making up a large share of EU bioenergy use, is not subject to requirements in relation to sustainable forest management, for example.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	Yes. The policy might result in certain unsustainable practices in agriculture and forestry with negative impacts on the size of fields, cropping, landscape features, deadwood in forests and other elements vital for ecological connectivity in certain parts of Europe. Only the use of genuinely residual wastes (eg organic manure for anaerobic digestion), use of arisings produced by habitat conservation and landscape management and use of agricultural residues (eg straw) materials on certain types of soils can lead to benefits to Green Infrastructure and increase the viability of European agriculture. Also, the policy is likely to result in the development of areas under Green Infrastructure, such as the construction of wind farms in upland (potentially protected) areas. Such development is likely to threaten certain aspects of Green Infrastructure. In addition, the development of the infrastructure necessary to accommodate an increase in renewable energy generation (e.g. wind, wave / tidal) might have negative impact on Green Infrastructure.
What are the **O**pportunities for greater support for GI more/ overcoming the	The impacts of the Renewable Energy Directive on European Green Infrastructure could be reduced/ mitigated if it included specific requirements to consider the potential adverse effects of renewable energy projects on these elements. A renewable energy policy aiming to bring undermanaged woodlands back into

weaknesses?	management and/or trigger the creation of carefully sited new multi-functional woodlands could enhance ecological connectivity and buffering of valuable habitats. The restoration and subsequent use for bioenergy purposes of severely degraded or contaminated land of no biodiversity value could add to ecological connectivity. The corresponding provisions in the Renewable Energy Directive hinge upon the definition of degraded land still to be adopted by the European Commission. The Energy Efficiency Plan points in a footnote on page 6, to the opportunities green infrastructure may offer, including in the area of energy savings: "Green infrastructure includes use of trees and plants to cool urban temperatures, reducing energy needs for cooling – and is one adaptation to climate change. It can also mitigate flood risk and water, air and ecosystem quality."

Table 8: Policy Tools and Instruments Potentially Relevant for the Implementation of Green Infrastructure in the Areas of Transport and Energy Policy

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	There is no strategic approach to the provision of Green Infrastructure in these policies. However, the policies are themselves strategic, concerning medium-term infrastructure developments in Europe. Each of the policies includes medium-term targets, that is, they contain targets for transport infrastructure development and connectivity, energy transmission infrastructure, and renewable energy sources. If the policies included explicit consideration of Green Infrastructure, their strategic nature could be used to enhance its provision across Europe. They set out a framework for development over the medium-term which could deliver multi-functional infrastructure that enhances Green Infrastructure. The Impact Assessment of the EU transport paper promotes the use of the concept of integrated planning as ex-ante evaluation criteria of Public Private Partnerships.
Information Gathering and Mapping	
Identification and mapping of GI elements and requirements	The TEN-T and TEN-E policies require identification and mapping of transport and energy infrastructure, respectively. If the identification and mapping considered Green Infrastructure, it could offer a viable mechanism for increasing the amount and interconnectedness of European Green Infrastructure. The following maps are available for the TEN-T network: 1. Priority axes and projects; 2. Railway axis Berlin-Verona/Milano-Bologna-Napoli-Messina-Palermo; 3. High-speed railway axis Paris-Bruxelles/Brussel-Köln-Amsterdam-London; 4. High-speed railway axis of south-west Europe; 5. High-speed railway axis east; 6. Betuwe line;

	7. Railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukrainian border; 8. Motorway axis Igoumenitsa/Patra-Athina-Sofia-Budapest; 9. Multimodal axis Portugal/Spain-rest of Europe; 10. Railway axis Cork-Dublin-Belfast-Stranraer; 11. Malpensa; 12. Öresund fixed link; 13. Nordic triangle railway/road axis; 14. UK/Ireland/Benelux road axis; 15. West Coast Main Line 16. Galileo 17. Freight railway axis Sines-Madrid-Paris 18. Railway axis Paris-Strasbourg-Stuttgart-Wien-Bratislava 19. Rhine/Meuse-Main-Danube inland waterway axis 20. High-speed rail interoperability on the Iberian Peninsula 21. Fehmarn Belt railway axis 22. Motorways of the sea: a. Motorway of the sea of western Europe (leading from Portugal and Spain via the Atlantic Arc to the North Sea and the Irish Sea); b. Motorway of the sea of south-east Europe (connecting the Adriatic Sea to the Ionian Sea and the Eastern Mediterranean to include Cyprus); c. Motorway of the sea of south-west Europe (western Mediterranean), connecting Spain, France, Italy and including Malta, and linking with the motorway of the sea of south-east Europe. 23. Railway axis Athina-Sofia-Budapest-Wien-Praha-Nürnberg/Dresden; 24. Railway axis Gdansk-Warszawa-Brno/Bratislava-Wien; 25. Railway axis Lyon/Genova-Basel-Duisburg-Rotterdam/Antwerpen; 26. Motorway axis Gdansk-Brno/Bratislava-Wien; 27. Railway/road axis Ireland/United Kingdom/continental Europe; 28. Rail Baltica axis Warsaw-Kaunas-Riga-Tallinn-Helsinki; 29. Eurocaprail on the Brussels-Luxembourg-Strasbourg railway axis; 30. Railway axis of the Ionian/Adriatic intermodal corridor; 31. Inland waterway Seine-Scheldt;
Monitoring of GI elements and their impact objectives (including using indicators and accounting)	Progress against the targets of TEN-T, TEN-E and the Renewable Energy Directive must be monitored. Monitoring could be adjusted to include elements of Green Infrastructure. For example, monitoring of the TEN-T policy could include assessing progress regarding how much Green Infrastructure was created (along road verges, for instance) versus the impact of transport infrastructure development on habitat integrity or protected areas. The Impact Assessment of the EU Transport White Paper suggests that habitat fragmentation should be monitored, although it is not clear how feasible this would be in practice. Monitoring of the Renewable Energy Directive is primarily concerned with meeting objectives on the quantity and share of renewable energy consumed; it is less amenable to monitoring related to Green Infrastructure.
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	There is scope to include the benefits of Green infrastructure in decision-making related to the three projects. However, this is on a case-by-case or project basis, rather than strategically. Under the TEN-T policy there is the potential to include the scope of GI

	benefits within the policy's strategic objective of improving Europe's connectivity and efficiency. There is the scope to consider GI benefits in decision-making related to individual infrastructure projects. For example, projects in some MS (such as the UK) are subject to compulsory cost benefit analysis (CBA), which could include the value of the ecosystem services provided by Green Infrastructure likely to be affected by a proposed infrastructure development. The potential of TEN-E to integrate the benefits of Green Infrastructure into decision- making is similar to the TEN-T policy; there will be the opportunity to do so on an individual project-by-project basis. Integrating the benefits of Green Infrastructure into decision-making related to the Renewable Energy Directive is less obvious; the policy relates to targets for renewable energy generation. There may be scope to consider Green Infrastructure on an project-by-project basis, principally for projects related to infrastructure development.
Regulation and Planning	
Regulation of land use	The implementation of the TEN-T network requires the consideration of land use planning frameworks and regulations on a project by project basis.
Spatial planning/integrated territorial development	Both the TEN-T and the TEN-E networks are intended to facilitate integrated territorial development. Both require spatial planning at a strategic scale.
Procedural requirements: EIA/SEA	Individual projects under the TEN-T and TEN-E policies will be subject to SEA, EIA and Appropriate Assessment. These procedural requirements offer the opportunity to consider Green Infrastructure in decision-making.
Standards	Standards for bioenergy crops could include a requirement for farming methods that enhance Green Infrastructure and do not compromise protected areas.
Liability and compensation	
Economic/ Market Instruments	
Resource pricing (eg taxes, charges, fees, land values)	European Energy Policy requires a reduction in greenhouse gas emissions, which will be delivered in part through an emissions tax.
Land management contracts/agreements (including PES schemes)	Wind farms developed as part of the Renewable Energy Roadmap could be considered as Payments for Ecosystem Services (PES).
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as organic, FSC, MSC on the other).	Opportunities for public procurement and Green Infrastructure are limited to the Renewable Energy Directive. The Directive highlights that public procurement will be important to promote the use of renewable energy sources and foster clean energy, in particular with regard to transport. The TEN-T and TEN-E policies relate to infrastructure development across Europe; opportunities for public procurement and Green Infrastructure are limited.
Public Investments (EU Expenditure for Green Infrastructure including Co-funding)	
Land purchase	Land purchase under the TEN-T and TEN-E policies could facilitate and promote the development of a coherent Green Infrastructure network across Europe. Substantial amounts of land are purchased for

	infrastructure development projects under both; these land purchases could include specific targets for the development of a European Green Infrastructure network which could, for example, improve habitat connectivity and reduce the impact of fragmentation.
Restoration projects/programmes	Infrastructure development related to TEN-T and TEN-E projects may lead to the loss of Green Infrastructure. Restoration or compensation projects could help to offset this loss, and in certain circumstances could enhance Green Infrastructure.
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	Infrastructure developments related to TEN-T and TEN-E projects could be designed to include Green Infrastructure elements. For example; road verges could be designed to support high levels of biodiversity, and improve the connectivity of habitats; similarly, the area under power lines could be preserved as 'green corridors'.
Securing long-term financing/maintenance	Including requirements for Green Infrastructure in the development of transport and energy infrastructure would help to secure long-term financing for Green Infrastructure. Financing for maintenance of Green Infrastructure could be secured by requiring the operators of the transport / energy infrastructure to maintain associated elements. The rationale for such an approach would be strengthened if the Green Infrastructure provided ecosystem services of benefit to the transport / energy infrastructure, eg providing sustainable drainage for transport infrastructure, or reducing the impact of extreme temperatures on energy infrastructure.
Respond to the value of GI when setting priorities	It is not clear if any of the policies currently include the value of Green Infrastructure when setting priorities. If the benefits of Green Infrastructure were articulated clearly, in terms of the ecosystem services provided to transport or energy infrastructure, it could improve the consideration of the value of the GI.
Governance	
Institutions	The institutions responsible for developing transport infrastructure are well established across Member States. It is likely that such institutions do not have responsibility, at least explicitly, for delivering Green Infrastructure. The remit of organisations such as transport departments, or highway agencies, could be changed to require them to deliver this alongside traditional transport infrastructure. The responsibility for developing energy infrastructure may not be as straightforward; organisations responsible for this in Member States may be public or private. It is not clear how Green Infrastructure could be included in their remit.
Participatory decision-making process (eg negotiations for CP OPs)	The planning processes associated with energy and transport infrastructure developments are likely to provide a mechanism for participatory decision-making. However the level of influence of a wide range of stakeholders will depend on the specific characteristics of the planning process in individual Member States. The need for Strategic Environmental Assessment (SEA) also includes stakeholder consultation; rigorous application and enforcement of SEA regulations could improve stakeholder consultation and the consideration of Green Infrastructure. The Impact Assessment of the EU Transport White Paper calls for open public participatory processes.
Reporting on implementation	The SEA process requires monitoring and reporting of environmental effects. Improving the application of SEA to transport and energy infrastructure projects could improve the reporting related to Green Infrastructure.

Coordination of policies	
Communications and Advisory Measures	
Awareness raising	Rising awareness amongst professionals involved in the design and implementation of energy / transport infrastructure with respect to the benefits of Green Infrastructure could improve its delivery alongside traditional infrastructure.
Advice and guidance	
Capacity building	Vocational education and training, including through higher education institutions, could be encouraged to educate professionals involved in infrastructure design and implementation (eg civil engineers) about the benefits of Green Infrastructure.
Technical assistance on EU level (for policy making)	Support could be provided to Member States in terms of how to deliver Green, in conjunction with traditional, Infrastructure. This could include the opportunity to work across borders to ensure the delivery of integrated Green Infrastructure networks. For example, Member States may already have established relationships in terms of planning for and delivering transport infrastructure, but may need assistance in establishing links for the delivery of Green Infrastructure.
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (e.g. regional administrations (e.g. CP OP elaboration, farmers, NGOs, etc.)	TEN-T has an information portal that stores and manages technical and financial data for analysis, management and political decision-making related to the network. It includes data for modelling future policy / budgetary scenarios, compiling briefings, creating GIS maps, and monitoring and reporting of progress. The portal provides a mechanism for information exchange between ministries in Member States, and other key stakeholders (DG REGIO, EIB etc). The portal is currently private, but a public version is planned for 2011. The information portal could be used to provide technical assistance at the Member State/regional/local level. A similar tool was not identified for TEN-E.

1.10 Impact assessment, damage prevention and remediation

Overview

The current EU policies and instruments in the areas of Impact assessment and planning, potentially relevant to Green Infrastructure include:

- Environmental Impact Assessment (EIA) Directives
- Strategic Environmental Assessment (SEA) Directive
- Environmental Liability Directive

EIA Directives	
How is GI addressed (directly or indirectly), if at all?	The Directives do not refer directly to Green Infrastructure. This is likely to be considered indirectly through the content required in the environmental impact study, in the description of the aspects of the environment likely to be significantly affected by the proposed project, including, in particular: population, fauna, flora, soil, water, air, factors climatic, material assets, including the archaeological and architectural heritage, landscape and the inter-relationship between the above factors. Overall, one can say that the EIA Directive does consider impacts on some elements of Green Infrastructure, more specifically core areas, but impacts on others are generally considered worth mitigating only to a very limited extent. There is of course variation when it comes to national transposition but generally reference is made only to Natura 2000 sites and

	protected species than to preserving overall coherence and connectivity.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	As a result of the EIA, measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment need to be considered. This means that, if correctly implemented, the EIA Directives have the potential to contribute to the preservation and creation of new Green Infrastructure (where off-setting/compensation is considered a solution). Therefore the EIA and SEA Directives have the potential to identify positive opportunities for the development of Green Infrastructure.
What are the **W**eaknesses or barriers for GI?	The quality of the EIA is an essential element for the effectiveness of the Directive. The pursuit of the objectives of the Directive is arguably undermined by the very open delimitation regarding its scope, resulting in variations across Member States in applying EIA to developments. Although no major problems have been reported, the Commission's experience of implementation shows that the requirements of Article 6(3)-(4) of the Habitats Directive are not taken into account sufficiently in the context of EIA procedures. Furthermore, these procedures focus on the impact on Natura 2000 sites, while the species protection provisions tend to be neglected.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	There is an opportunity to incorporate the Green Infrastructure concept into the scope of the EIA to ensure its due consideration in the entire EIA process. Harmonising the scope and providing unified EIA guidelines could contribute to the understanding and consideration of Green Infrastructure. In addition, a single or efficient assessment procedure for projects falling under the EIA Directive and Article 6 (3),(4) of the Habitats Directive could be established for an adequate assessment of and mitigation of impacts on all types of Green Infrastructure elements. Reference to ecological coherence and connectivity would be important in this context.

SEA Directive	
How is GI addressed (directly or indirectly), if at all?	The Directive does not refer to Green Infrastructure directly, and does not request explicitly that the coherence of ecological and/ or protected area networks be maintained and fragmentation avoided.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The potential of SEA for Green Infrastructure is to be found in Article 2.b which requires a Strategic Environmental Assessment of plans and programmes in accordance with the regulations governing Natura 2000 network (Habitats Directive). Green Infrastructure can also be incorporated into the scoping stage of the SEA Directive. According to Article 5(1), significant effects on the environment have to be covered in the environmental report for the issues listed in Annex I, which includes biodiversity, flora and fauna. Hence Green Infrastructure could play a role here, not only in terms of mitigating environmental impacts but also identifying positive opportunities in its development. In addition Article 11 of the SEA Directive stipulates that Member States may provide for coordinated and joint procedures in situations where an obligation to carry out assessments of the effects on the environment arises from both the SEA Directive and other Community legislation. This encompasses explicit links with the EIA Directives and Appropriate Assessment under the Habitats Directive as well as other Directives (Water, Nitrates, Waste, Noise and Air Quality) which include requirements for the establishment and assessment of plans and programmes in sectors covered by the SEA, and also related to the SEA Protocol (transboundary effects).
What are the **W**eaknesses or barriers for GI?	A major constraint is the lack of coordination and uniform criteria for evaluation across countries.

	The limited requirements set by the SEA for the scope of the environmental report results in Member States applying different methods for 'scoping', as well as for consultation of the authorities concerned. 'Scoping' procedures are mostly developed on a case-by-case basis, since most Member States do not prescribe specific methods; hence the need for greater focus on certain concepts such as Green Infrastructure. There are no guidelines for coordination of the joint procedures for fulfilling the requirements governing assessments under other Directives. Another limitation is the fact that the SEA Directive does not apply to policies which set the framework of plans and programmes, thus those policies that may pose threats to the GI (transport policy, energy policy, etc) are not covered by the SEA.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	It cannot be said that this instrument results in threats to GI. Overall, the SEA Directive contributes to the systematic and structured consideration of environmental concerns in planning processes, better integration of environmental considerations upstream and the "greening" of plans and programmes. A majority of Member States agree that the contents of plans and programmes are gradually being modified as a consequence of these being prepared alongside the iterative process of conducting the SEA (eg specifically, the expensive mitigation measures which were previously adopted may now be superfluous as a direct consequence of the early inclusion of environmental considerations within the plans and programmes).
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The SEA Directive offers the opportunity to use integrated approaches, taking a broad perspective and considering Green Infrastructure for social and economic well-being. Green Infrastructure underpins ecosystem services, on which human well-being relies. Therefore Green Infrastructure represents a range of opportunities and constraints for sustainable development. Recognition of these opportunities and constraints as the point of departure of the information to develop plans and programmes at a strategic level, enables optimal outcomes with regard to green infrastructure conservation and development/enhancement. Green Infrastructure can be integrated in the SEA through the ecosystem services which the green infrastructure provides to humans, as these are likely to be raised in the context of a public consultation which is part of state of the art SEA implementation. Thus, stakeholders can represent 'Green Infrastructure interests' and be involved in the SEA process. Consequently, the SEA process has the capability to be used in a positive manner, identifying opportunities where Green Infrastructure can not only be protected from impacts but further developed. In addition, the SEA provides for significant environmental effects of the implementation of plans and programmes to be monitored so that unforeseen adverse effects can be identified at an early stage and remedial action can be taken where needed.

Environmental Liability Directive	
How is GI addressed (directly or indirectly), if at all?	The Environmental Liability Directive implements the polluter pays principle and is meant to ensure prevention and remediation of damage to 'animals, plants, natural habitats and water resources, and damage affecting the land'. Arguably, some of this damage could affect Green Infrastructure elements which currently would have to be restored in the following ways: (a) For damage affecting water or protected species and natural habitats, the Directive requires that the environment is restored to how it was before it was damaged;

	(b) For damage affecting the land, the Directive requires that the land concerned be decontaminated until there is no longer any serious risk of negative impacts on human health.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The potential vis-à-vis Green Infrastructure is rather limited given current implementation of the Directive and the number of cases which have so far triggered its application. The most important Green Infrastructure elements are already covered by the Directive (core areas) and it is not expected that changes to the Directive would result in huge benefits in this respect.
What are the **W**eaknesses or barriers for GI?	There are no specific weaknesses, apart from the fact that the role of Green Infrastructure in risk and damage prevention could be more strongly emphasised. The targeted use of Green Infrastructure could probably contribute in some cases to reducing the risk of some of the activities to which the Directive applies, resulting in important damage to protected habitats, species and water bodies. Green Infrastructure could for example serve as a buffer between dangerous activities and high value nature land in some cases. Green Infrastructure could be used to dissipate the risk to the natural environment where cumulative negative impacts can be expected (ie ecological wastewater treatment plants to decrease the risk of emissions from industrial plants and agricultural holdings harming the environment).
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	No, but the incentives to invest in the preventing environmental damage could be increased by requiring the operator to remediate environmental damage to land beyond the point where 'there is no longer any serious risk of negative impact on human health'. For example, competent authorities could be granted the power to require operators to restore the land to higher value ecosystems for the benefit of overall ecological coherence. This might imply maximising the capacity of the contaminated land to contribute to resilience and provide ecosystem services, eg through creation of adequate Green Infrastructure elements.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The Directive could expand to a wider range of Green Infrastructure elements the cases in which restoring the environment to how it was before it was damaged is necessary. In some cases authorities could request that restoration activities which take place even increase the capacity of the habitat affected to deliver benefits compared to the habitat prior to damage (with the majority of the costs being borne by the operator). In addition, the Directive could allow competent authorities to oblige operators to purchase the land which has been contaminated or to donate it to public authorities for free (depending on the set up which seems most effective) and to manage the land in such a way as to maximise the provision of ecosystem services, until there is no longer any serious risk of negative impact on human health (eg the land could be managed as a carbon sink). This could be organised through land-management contracts with public authorities. This task may be delegated to local nature conservation NGOs by the operator.

Table 9: Policy Tools and Instruments Potentially Relevant for the implementation of Green Infrastructure in the Areas of Impact Assessment and Planning Policy

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	EIA: reflected in measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment. SEA: the potential of SEA for Green Infrastructure is related to Article 2.b which requires an Environmental Impact Assessment of plans and

	programmes in accordance with the regulations governing the Natura 2000 network (Habitats Directive).
Information Gathering and Mapping	
Identification and mapping of GI elements and requirements	
Monitoring of GI elements and their impact objectives (including using indicators and accounting)	
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	
Regulation and Planning	
Regulation of land use	
Spatial planning/integrated territorial development	
Procedural requirements: EIA/SEA	EIA: establishes an evaluation procedure at project level which can be coordinated with the assessment process required for Public Private Partnership by the Habitats Directive. SEA: establishes the assessment of the plans and programmes affecting Natura 2000 sites in coordination with the assessment process required for Public Private Partnerships by the Habitats Directive (Article 2.b) and with other EU Directives (Article 11)
Standards	
Liability and compensation	SEA: the environmental report establishes compensatory measures as a response to plans and programmes in protected sites. EIA: compensatory measures derived from an EIA are related to the Habitats Directive assessment process (Article 6.4)
Economic/ Market Instruments	
Resource pricing (eg taxes, charges, fees, land values)	
Land management contracts/agreements (including PES schemes)	
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as organic, FSC, MSC on the other).	
Public Investments (EU Expenditure for Green Infrastructure including Co-funding)	
Land purchase	
Restoration projects/programmes	
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	
Securing long-term financing/maintenance	

Respond to the value of GI when setting priorities	
Governance	
Institutions	EIA/SEA: national and regional institutions.
Participatory decision-making process (eg negotiations for CP OPs)	EIA/SEA: participatory decision-making processes are promoted by national or regional authorities.
Reporting on implementation	EIA/SEA: establish the elaboration of environmental impact study/ environmental report as a consequence of a project/plans and programmes.
Coordination of policies	EIA/SEA: assessment process coordination between EIA/SEA Directives and other sectoral Directives.
Communications and Advisory Measures	
Awareness raising	
Advice and guidance	
Capacity building	
Technical assistance on EU level (for policy making)	
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (eg regional administrations (eg CP OP elaboration, farmers, NGOs, etc.)	

1.11 Spatial planning

The current EU policies and instruments in the area of spatial planning, potentially relevant to Green Infrastructure include:

- European Spatial Development Perspective (ESDP)
- ESPON (European Observation Network for Territorial Development and Cohesion) 2013 Programme
- Territorial Agenda of the EU 2020 (TA 2020)
- EC 2006 Thematic Strategy on the Urban Environment

European Spatial Development Perspective	
How is GI addressed (directly or indirectly), if at all?	The ESDP does not refer explicitly to Green Infrastructure but can be seen as supporting the implementation of at least some aspects of a Green Infrastructure approach This is the case for example, with respect to the objective of 'prudent management of natural and cultural heritage,' which is committed to the restoration of biodiversity, respect for protected areas (Natura 2000) and to recognising the important role of ecological corridors and the need to reconcile ecological functions with economic exploitation. The ESDP also proposes the preservation and restoration of large wetlands endangered by excessive water extraction or by the diversion of inlets, and the concerted management of the seas, in particular preservation and restoration of threatened maritime ecosystems.

	In addition, under the objective 'territorial polycentric development and a new rural-urban relationship,' the ESDP points out the importance of green spaces in cities.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The potential of ESDP for the delivery of Green Infrastructure is quite broad, encompassing almost all Green Infrastructure elements. This is reflected in the ESDP policy options proposed to harmonise the Regional Development Policy to always consider Natura 2000 and concerted action to protect areas that are part of the network; the need to protect the links and corridors between protected areas due to problems that many protected areas constitute isolated islands; or the importance of defining transition zones. There is also the potential for Green Infrastructure to be incorporated into integrated territorial development strategies at regional level by promoting the natural and cultural values of the landscape, recovery of landscapes damaged by human intervention, through the promotion of traditional methods of managing the landscape, or reforestation.
What are the **W**eaknesses or barriers for GI?	The main barrier that could be identified is that the ESDP is not a mandatory instrument for Member States, although it offers a way to achieve the objective of territorial cohesion in the EU. In this sense, each country can adopt different strategies to integrate Green Infrastructure into their territorial development strategies.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	The ESDP aims to improve transport networks and connections, facilitate access to urban services and strengthen telecommunications infrastructure. These developments may constitute an impediment to the protection of natural areas and efforts to develop connection mechanisms between them, leading to habitat fragmentation.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The ESDP offers the opportunity to create a territorial development framework favourable to Green Infrastructure, following the recommendations to design land use policies discussed above. Moreover, the ESDP suggests Member States submit regular information on planning aspects, to enable trends in territorial development to be determined and to facilitate coordination. This should allow opportunities to identify the need to improve and combine efforts in the EU for the development of Green Infrastructure.

ESPON 2013 Programme	
How is GI addressed (directly or indirectly), if at all?	The Programme does not make any explicit reference to the Green Infrastructure concept. It is possible to consider that Green Infrastructure can be promoted through ESPON 2013 indirectly, as one of its priorities supports research applied to the environment, natural resources, risks, biodiversity, Natura 2000 sites and other themes, with the purpose of aiding in the elaboration of territorial planning tools that incorporate territorial cohesion and sustainability.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The programme can provide useful information for Green Infrastructure development as it foresees relevant measures in the area of research and scientific support. According to the priorities of ESPON 2013 (particularly priorities one and three), the Programme can support projects which aim to identify territorial weaknesses, ecosystem health, degrees of connectivity, risks or compatible conservation use. This would allow to gather some of the evidence/data needed for the creation and/or enhancement of Green Infrastructure.
What are the **W**eaknesses or barriers for GI?	As ESPON does not focus directly on Green Infrastructure, its potential to improve Green Infrastructure information might not be fully utilised.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	No. ESPON offers the possibility to generate information regarding territorial potentials and the larger territorial context of regions, the territorial impacts of

	sectoral policies, territorial challenges resulting from mega-trends, the possible evolution of the EU Cohesion Policy and the diversity of policy makers involved.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	There is to potential to exploit the advantages offered by priorities one, two and three of ESPON 2013 to finance projects incorporating the concept of Green Infrastructure to create information, indicators, territorial data and tools as a contribution to the territorial cohesion approach.

Territorial Agenda of the EU 2020	
How is GI addressed (directly or indirectly), if at all?	GI is addressed directly in point six under the 'Territorial Priorities for the Development of the European Union', managing and connecting the ecological, landscape and cultural values of regions: 'We support the integration of ecological systems and areas protected for their natural values into green infrastructure networks at all levels.' In addition through the priority, 'Encouraging Integrated Development in Cities, Rural and Specific Regions', the Agenda is meant to support the natural values of rural areas and ensure a sustainable utilisation of the territorial capital and the ecological functions and services it provides'.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The Agenda promotes the high value of European urban and rural landscapes which should be protected and developed in qualitative terms. Areas rich in natural and cultural landscapes may need special attention in order to make the best use of these assets. The Agenda supports the protection, rehabilitation and utilisation of heritage through a place-based approach, which has potential for the development of Green Infrastructure.
What are the **W**eaknesses or barriers for GI?	As in the case of the European Spatial Development Perspective (ESDP), the main barrier identified could be that the agenda is not mandatory for Member States, although it offers a way to achieve the objective of territorial cohesion in the EU. In this sense, each country can adopt different strategies to integrate Green infrastructure elements into their territorial development strategies.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	One of the challenges involved in approaching the Agenda is to break the territorial dynamics which pose barriers to regional integration and can lead to under-utilisation of resources, including human, cultural, economic and ecological, in the peripheral regions, thereby increasing their isolated position and social exclusion. However, this could imply extending the operating border, introducing impacts on well-preserved areas or the obstacle of establishing protected areas.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The Agenda offers a straightforward, clear opportunity to incorporate Green Infrastructure into all levels of territorial development because it includes the strategic priorities mentioned above. Territorial development projects that incorporate the concept of Green Infrastructure are a good opportunity to exchange experiences as proposed in the Agenda but it is necessary to create an appropriate framework with concrete, tangible results and which incorporates analysis tools.

Thematic Strategy on the Urban Environment	
How is GI addressed (directly or indirectly), if at all?	Green Infrastructure is not mentioned explicitly in the Thematic Strategy and its role for sustainable urban development is arguably largely underestimated. Under the heading "nature and biodiversity", the issue of "sustainable urban design"/"appropriate land use planning" is briefly mentioned (on page nine) but remains vague with regard to what this means and no role for Green Infrastructure in delivering this objective is foreseen. The design of 'sustainable land use policies which avoid urban sprawl and reduce soil-sealing' would merit further elaboration.
Where does the potential for GI lie?	Green Infrastructure has a key role to play in urban areas. Urban areas without Green Infrastructure result in a low quality of life and inhabitants are deprived of

(**S**trengths vis-à-vis GI)	a range of important ecosystem services. In urban areas, Green Infrastructure has an important contribution to make to recreation, improved air quality, micro-climate regulation, water runoff management, sustainable transport (ie green lanes for pedestrians and cyclists), etc. In short, Green Infrastructure is a key element of any sustainable urban development Strategy. Sustainable wastewater treatment (ie ecological wastewater treatment plants) and the potential contribution of GI to energy saving may also to be considered in specific contexts. Green Infrastructure may also, in some cases, support adaptation to climate change and limit environmental risks.
What are the **W**eaknesses or barriers for GI?	Sustainable urban development is not given its full meaning and the range of options mentioned to meet the Strategy's objectives ('improve the quality of the urban environment, making cities more attractive and healthier places to live, work and invest in, and reduce the adverse environmental impact of cities on the wider environment, for instance as regards climate change') is too limited. Integrated environmental management is not fully applied and while there is much focus on transport, other areas are neglected. While the opportunities for assistance from Cohesion Policy to address environmental priorities in urban areas are hinted at, no mention of the potential advantages of ecosystem-based solutions is made.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	Local authorities have generally important competencies in the area of spatial planning.- It is therefore important, for the preservation of Green Infrastructure and a range of significant ecosystem services, that the value of Green Infrastructure is acknowledged and integrated into spatial planning. This thinking is absent from the Thematic Strategy despite the fact that deterioration and loss of Green Infrastructure in and around urban areas has important negative implications for human health and well-being. Sound urban planning is also important to avoid the unnecessary fragmentation of the natural environment which further undermines the Green Infrastructure of a region or country.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	A revision of the Thematic Strategy should acknowledge much more clearly the benefits provided by Green Infrastructure and its key role in sustainable urban development. Financial and technical support is required if the full potential of Green Infrastructure in urban areas is to be exploited. A tool to implement such an Agenda already exists: the types of activities which might be eligible for funding under the Financial framework for the urban environment are: • information and exchanges of information on sustainable urban development and local Agenda 21 and improvement of environmental quality in areas where environmental problems occur alongside socio-economic problems; • cooperation between the partners concerned by sustainable development and Agenda 21 at European level; • Accompanying measures. Broadly, all measures which help the potential of Green Infrastructure to be explored as described above (see Strengths) in one way or another could qualify for financial support.

Table 10: Policy Tools and Instruments Potentially Relevant for the implementation of Green Infrastructure in the Areas pf Impact Assessment and Planning pPolicy

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	ESPD: the potential of ESDP for Green Infrastructure is quite broad, encompassing almost all Green Infrastructure elements (see above). ESPON 2013: can support projects which try to identify territorial weaknesses, ecosystem health, degree of connectivity, risks or compatible conservation use, which would allow to produce some of

	the evidence needed to support Green Infrastructure.implementation TA 2020: support the integration of ecological systems and areas protected for their natural values into Green Infrastructure networks at all levels.
Information Gathering and Mapping	
Identification and mapping of GI elements and requirements	ESPD: recommendation to create territorial observatory network which include GIS territorial information. ESPON 2013 Programme: could support compilation of territorial data and analytical tools.
Monitoring of GI elements and their impact objectives (including using indicators & accounting)	ESPD: recommendations to create monitoring indicators for the follow-up of the ESPD application.
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	TA 2020: support the sustainable utilisation of the territorial capital, the ecological functions and services provided. European tools for data collection are relied upon to 'improve European data on urban environment issues (…) in order to improve environmental performance of European urban areas over time'. INSPIRE (Infrastructure for Spatial Information in Europe) and Group on Earth Observation (GEO), Global Monitoring for Environment and Security (GMES) initiatives do not currently integrate data collection on Green Infrastructure and benefits but might offer potential.
Regulation and Planning	
Regulation of land use	
Spatial planning/integrated territorial development	ESPD: recommends and internalises integrated territorial development through strategies at all levels (EU, national and local). The Green Infrastructure elements are incorporated within these definitions. TA 2020: provides strategic orientations for territorial development, fostering integration of territorial dimension within different policies and at all governance levels. Financial framework for the urban environment: (established by Decision No 1411/2001/EC, Community framework for cooperation to define, exchange and implement good practices with regard to sustainable urban development and in the framework of Agenda 21).
Procedural requirements: EIA/SEA	
Standards	
Liability and compensation	
Economic/ Market Instruments	
Resource pricing (eg taxes, charges, fees, land values)	
Land management contracts/agreements (including PES schemes)	
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as organic, FSC, MSC on the other).	
Public Investments (EU Expenditure for Green Infrastructure including Co-funding)	

Land purchase	ESPD: Cohesion Funds (eg INTERREG Programme) and ERDF.
Restoration projects/programmes	ESPD: see Cohesion Funds and ERDF.
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	ESPON 2013: supports projects with information on Green Infrastructure and impacts of existing grey infrastructure. ESPD: as above.
Securing long-term financing/maintenance	ESPD: as above.
Respond to the value of GI when setting priorities	
Governance	
Institutions	ESPD/TA 2020: Ministers responsible for Spatial Planning and Territorial Development. At regional level, regional authorities can develop their own territorial strategies. WP/ESPON 2013 Programme: European Commission.
Participatory decision-making process (eg negotiations for CP OPs)	ESPON 2013 Programme: supports dialogu,e networking and participation to elaborate policies. WP: open public participatory process.
Reporting on implementation	
Coordination of policies	
Communications and Advisory Measures	
Awareness raising	ESPD: promotes the creation of ESPON. ESPON 2013 Programme: supports technical assistance, analytical support and communication as a priority.
Advice and guidance	ESPD: includes a wide range of recommendations to consider territorial integrated planning (eg Green Infrastructure elements). 'European Knowledge Platform', a pilot network of national focal points co-financed under the Urban Development Network Programme (URBACT). The pilot was evaluated at the end of 2006 to consider whether it could be used as a building block for a 'European Framework Programme for the exchange of experience on urban development' under Cohesion Policy.
Capacity building	ESPD: Cohesion Funds (eg INTERREG Programme) and ERDF.
Technical assistance on EU level (for policy making)	ESPON 2013 Programme: see above.
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (eg regional administrations (eg CP OP elaboration, farmers, NGOs, etc)	ESPD: Cohesion Funds (eg INTERREG Programme) and ERDF. Financial framework for the urban environment (established by Decision No 1411/2001/EC, Community framework for cooperation to define, exchange and implement good practices with regard to sustainable urban development and in the framework of Agenda 21). Under this financial framework technical assistance in working towards sustainability can be provided.

1.12 Marine and Coastal Zones Policy

Overview

The current EU policies and instruments in the areas of Marine and coastal zones policy, potentially relevant to Green Infrastructure include:

- Marine Strategy Framework Directive (MSFD)

- EU Maritime Spatial Planning Communication
- Integrated Coastal Zone Management (ICZM) Recommendation
- European Fisheries Fund (EFF)

Marine Strategy Framework Directive	
How is GI addressed (directly or indirectly), if at all?	The MSFD does not refer to Green Infrastructure directly. It does however support the establishment of areas under the Habitats and Birds Directives and other international and regional agreements and lends strong support to the Community's commitment to the CBD target for the network of MPAs by 2012 (Paragraphs six,seven and 18 in the Preamble). Furthermore, it emphasises that 'It is crucial for the achievement of the objectives of this Directive to ensure the integration of conservation objectives, management measures and monitoring and assessment activities set up for spatial protection measures such as special areas of conservation, special protection areas or marine protected areas.' (paragraph 21. In the preamble).
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The MSFD has a very detailed set of actions to be undertaken by Member States to achieve its objective of Good Environmental Status (GES) by July 2016. There is a timeline for the set of activities which Member States are expected to respect. For example, by July 2015, Member States are expected to develop a programme of measures to achieve and maintain GES by 2020. Marine Protected Areas (MPAs) are to be included in the programme of measures to maintain GES (Article 13. paragraph four). The potential of Green Infrastructure in the context of the MSFD is reliant on Member States meeting their objectives under the Directive.
What are the **W**eaknesses or barriers for GI?	The identification of a programme of measures is dependent on Member States' determination of Good Environmental Status and the inclusion of MPAs in the package of measures to achieve or maintain this.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	The MSFD in unlikely to result in any threats to Green Infrastructure. Programmes of measures and subsequent action by Member States should be based on the ecosystem approach. Based on the transboundary nature of the marine environment, Member States are obliged to cooperate to ensure the coordinated development of marine strategies for each region and sub region. Article 6, paragraph two also states that coordination and cooperation shall be extended , where appropriate, to all Member States in the catchment area of the marine region or sub-region, including land-locked countries.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The MSFD has a detailed set of actions and timelines. In the first instance, it is important that these obligations are met. The first opportunity for supporting Green Infrastructure would be during the establishment of the programme of measures (Article 13). On the basis of the information provided by the Member States by 2013, the Commission shall report by 2014 on progress in the establishment of Marine Protected Areas. At this time, there may be an additional opportunity to support Green Infrastructure. Finally, there is a requirement for Member States to report every three years, after the programme of measures have been adopted. This will provide opportunities for supporting Green Infrastructure further within the context of the MSFD.

European Maritime Spatial Planning Communication	
How is GI addressed (directly or indirectly), if at all?	The EU Maritime Spatial Planning (MSP) Communication does not refer to Green Infrastructure directly. However the roadmap for maritime spatial planning provides a framework for arbitrating between competing human activities and managing the marine environment, including promoting the efficient use of maritime space and renewable energy and cost-efficient adaptation to the impact of climate change. The ecosystem approach is highlighted as an overarching principle for MSP.
Where does the potential	Marine Spatial Planning is a challenge and is dependent on coherence between

for GI lie? (**S**trengths vis-à-vis GI)	terrestrial planning and coastal use. There are demands for good science and data to support marine spatial planning and the Commission is already funding a number of projects which would assist with this process, including the European Marine Observation and Data Network (EMODNET). A further project, onmarine socio-economic statistics (currently under development by ESTAT), has launched the Atlas of the Sea (which has been improved in 2011) and other monitoring systems. There is synergy between this Communication and the MSFD and other Directives, such as the Habitats Directive.
What are the **W**eaknesses or barriers for GI?	The MSP roadmap sets out a timetable for action but it is not a binding agreement and if very reliant on governments taking action. Funding?
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	No, the Roadmap is broadly supportive of other initiatives which will have a positive impact on Green Infrastructure.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The Commission has launched an impact assessment which will evaluate possible options to develop Integrated Coastal Zone Management (ICZM) options further. This will include non-binding and legislative options. Opportunities for supporting Green Infrastructure may be presented as part of the impact assessment.

2002 Recommendation on Integrated Coastal Zone Management	
How is GI addressed (directly or indirectly), if at all?	The ICZM Recommendation does not refer directly to Green Infrastructure. However, the Recommendation sets out the common principles including coherent spatial planning across the land-sea boundary and calls for Member States to develop ICZM strategies. It also encourages Member States to cooperate with neighbouring third countries.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The Recommendation promotes a holistic approach to the management of the coast. This includes the need to recognise the natural capital of coasts, the need to preserve and use this sustainably within the context of sustainable development and the demands on the coast from other sectors (economic and social).
What are the **W**eaknesses or barriers for GI?	Implementation of the Recommendation depends on buy-in from all stakeholders and interest groups. Diversity of the coasts means that one size does not fit all and therefore there is a need to design specific systems. Data on which to base analyses are lacking.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	There is a need for coordination with other policy instruments, eg with respect to climate change (strategies to adapt to risks) to ensure that actions undertaken through the Recommendation are not undermined.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	Opportunities for supporting Green INfrastructure under the Recommendation include through national strategies and regional coordination. DG Research is funding a new set of projects on ICZM and MPAs within the context of regional management of seas (OCEANS 2012 call) and the results of these studies are likely to influence decision for future instruments at a regional level.

Fisheries Policy / European Fisheries Fund	
How is GI addressed (directly or indirectly), if at all?	Green Infrastructure is not addressed directly in the European Fisheries Fund (EFF). However, Article 16 (under 'Priority Axis 3: measures of common interest') provides opportunities for pilot projects in support of conservation measures for Natura 2000 sites.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	The potential for Green Infrastructure lies in the opportunity to fund pilot projects under two articles in the EFF implementing regulation: 'Article 11: Aqua-environmental measures' and 'Article 16: Measures intended to protect and

	develop aquatic fauna and flora'. Axis four, which is focused on the sustainability of coastal communities, also offers some potential for Green Infrastructure, as there is the expectation that coastal communities are likely to establish fisheries projects which will lead to sustainable fisheries, sustainable ecosystems and by default local employment and supplies.
What are the **W**eaknesses or barriers for GI?	A weakness is conflicting priorities within Member States in terms of fisheries; that is, between minimising impacts on the sector and the environment. The uptake of the current EFF funds have been low and delayed as Member States have struggled with setting up administrative systems. Very few Member States have prioritised projects which support the restoration of habitats (Natura 2000 site establishment) with most Member States still focused on projects under Axis one of the EFF which pertains to adaptation and modernisation of the fishing fleet.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	The EFF is the key financial instrument in support of the Commonf Fisheries Policy and its objectives. This includes progressive implementation of the ecosystem-based approach to EU fisheries management. Whilst the EFF is greener than its predecessor in not providing subsidies for modernisation of the EU fleet and thereby are contributing to overcapacity and overfishing, the current EFF is likely to continue to threaten Green Infrastructure against a background of economic crisis and dwindling fish stocks.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	The current EFF runs until 2013. The current debate on the EFF points to a smart, greener policy. Following 2013, the level of overall funding is likely to be a lower than it currently is and funds currently directed to activities which threaten Green Infrastructure will be redirected to projects which are focused on long term sustainability. Reform of the EFF offers an opportunity to support Green Infrastructure.

Table 11: Policy Tools and Instruments Potentially Relevant for the Implementation of Green Infrastructure in Marine and Coastal Zone Policy

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	MSFD: this Directive has a strategic approach to meeting its objective. It specifies a set of actions and timelines for Member States to achieve Good Environmental Status (GES), including the adoption of a programme of measures which indirectly support Green Infrastructure. MSP Communication:identifies key principles for MSP and a basis for a broad debate on a common approach to MSP in the EU. ICZM Recommendation: provides for a strategic approach to the management of coasts based firstly on the ecosystem approach, preserving coasts' integrity and functioning. EFF: in terms of providing opportunities for funding projects under Axss three and Axis four.
Information Gathering and Mapping	
Identification and mapping of GI elements and requirements	MSFD: has very detailed specifications on the approach to achieving GES. This includes qualitative descriptors for determining GES and indicative lists of characteristic pressures and impacts. MSP Communication: will be reliant on data from a number of sources included ICZM Recommendation: through the development of national strategies (Chapter IV) there is a need to identify initiatives (bottom up), instruments, players and systems for monitoring information. EFF: projects funded under EFF likely to be more supportive of

	activities relating to green infrastructure under CFP. Under Axis four, local projects provide funding which could contain Green Infrastructure elements.
Monitoring of GI elements and their impact objectives (including using indicators and accounting)	MSFD: monitoring systems for ongoing assessment of the environmental status of their marine waters need to be set up.. ICZM Recommendation:see above and national stocktaking (see Chapter III of the Recommendation) EFF: Periodic evaluations report on progress implementing relevant projects. MCS audits.
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	MSFD: includes:i) analysis of essential features and characteristics and current environmental status of waters ii) Analysis of predominant pressures and impacts iii) an economic and social analysis of use of those waters and of the cost of degradation of the environment. MSP Communication: Impact Assessment on options will provide some analysis of the impact. ICZM Recommendation: evaluation report done in 2007. Synergies with the MSFD and therefore future analysis of the benefits EFF: ex-ante evaluations of National Operational Programmes and interim evaluation of the EFF.
Regulation and Planning	
Regulation of land use	
Spatial planning/integrated territorial development	MSFD: spatial planning elements are included in the requirements pertaining to consideration of MPAs as a measure in support of GES. MSP Communication: the rationale for the Communication – increased activity on Europe's seas leads to competition between sectoral interests and Marine Spatial Planning is a tool for improved decision-making which provides a framework for arbitrating between these interests. ICZM Recommendation: includes the identification of mechanisms to ensure full and coordinated implementation and application of Community legislation and policies that have an impact on the coastal zone, including Marine Spatial Planning. EFF: funds available for projects in support of the establishment of Natura 2000 sites or related projects of common interest. Axis four focused on territorial development.
Procedural requirements: EIA/SEA	
Standards	MSFD: Member States must ensure that assessment methodologies are consistent across marine region or sub-region. Criteria and methodological standards to be used by Member States.
Liability and compensation	
Economic/ Market Instruments	
Resource pricing (eg taxes, charges, fees, land values)	
Land management contracts/agreements (including PES schemes)	ICZM Recommendation: Member States should consider the appropriateness of developing contractual or voluntary agreements with coastal zone users.
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as	

organic, FSC, MSC on the other)	
Public Investments (EU Expenditure for Green Infrastructure including Co-funding)	
Land purchase	ICZM Recommendation: Member States should consider use of this mechanism.
Restoration projects/programmes	ICZM Recommendation: identify sources of durable financing for ICZM where needed. EFF: support grant compensation for the use of aquaculture production methods helping to protect and improve the environment and to conserve nature (Axis 2); support measures of common interest intended to protect and develop aquatic fauna and flora while enhancing the marine environment; (Axis 3)
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	MSP Communication: the Communication refers to and draws on a number of EU-funded research projects including Monitoring and Evaluation of Spatially Managed Areas (MESMA) and Trans-European Transport Networks in Europe (TEN-T). EFF: Axis 1 funds measures for the adaptation of the Community fishing fleet. Support for: recovery plans; national decommissioning schemes; investments onboard fishing vessels and selectivity.
Securing long-term financing/maintenance	MSFD: at the Community level, support for associated research. At Member State level, also need to provide finances for supporting research. ICZM Recommendation: European Cohesion Policy; DG Research. EFF: current financing period of EFF 2007- 2013; due for review in 2013.
Respond to the value of GI when setting priorities	
Governance	
Institutions	
Participatory decision-making process (eg negotiations for CP OPs)	MSFD: Article 19 requires that Member States ensure that all interested parties are given early and effective opportunities to participate in implementation of the Directive. MSP: all stakeholders should be involved early in the Marine Spatial Planning process. Beneficial for Marine Spatial Planning to have a single administrative entity, eg MMO in the UK for the Marine Act. EFF: stakeholders consulted during preparation of the National Operational Programmes.
Reporting on implementation	MSFD: Chapter IV, Articles 18, 20 and 21 refer to different types of reporting to be undertaken by the Member States and the Commission in respect to implementation of the MSFD. ICZM Recommendation: Member States report to the Commission on the experience in implementation of this Recommendation 45 months after its adoption. EFF: annual report on implementation presented to the European Council and the Parliament by the Commission. To date, three annual reports. Ernst and Young have also conducted an interim evaluation on behalf of the Commission.
Coordination of policies	MSP: will simplify decision-making, speed up licensing and permit procedures; MSP will also help ensure greater coherence with regard to ICZM.

	MSFD the Directive contains several references to ensuring coherence with other related policies, including the Common Fisheries Policy.
Communications and Advisory Measures	
Awareness raising	ICZM Recommendation: through the national strategies Member States can determine how education programmes can support ICZM. MSFD: Articles 19 and 20 contain elements relating to raising awareness.
Advice and guidance	MSFD: Commission to advise.
Capacity building	EFF: under Axis 4; projects in support of development of coastal communities
Technical assistance on EU level (for policy making)	
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (eg regional administrations (eg CP OP elaboration, farmers, NGOs, etc)	ICZM: training support through national strategies. EFF: May finance technical assistance under the appropriate priority axis (ie 5) ("…subject to a ceiling of 0.8% of its annual allocation, the EFF may finance the preparatory, monitoring, administrative and technical support, evaluation and audit measures necessary for implementation of this Regulation").

1.13 Environment and Health

Overview

The current EU policies and instruments in a range of cross-cutting areas, potentially relevant to Green Infrastructure include:

- Environment and Health Action Plan 2004-2010

Environment and Health Action Plan 2004 - 2010	
How is GI addressed (directly or indirectly), if at all?	Green Infrastructure is not directly or indirectly addressed in the Action Plan (AP).
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	One of the objectives of the AP is to step up cooperation between stakeholders in the environment, health and research fields, which seem to be of particular relevance with regard to Green Infrastructure.There is the potential for Green Infrastructure to contribute to achieving health related targets, particularly in the area of health quality and in the future also possibly in the area of access to high quality green spaces in urban area. Green roofs and urban green spaces could mitigate the urban heat island effect (and decrease the magnitude and duration of heat waves). Urban green spaces could also contribute to improving air quality further. In addition they may contribute to decreasing obesity by offering space for outdoor recreation and exercise.
What are the **W**eaknesses or barriers for GI?	The main weakness with regard to Green Infrastructure is that, because its benefits are being underestimated, its positive impact on environmental factors such as air quality and temperatures is not being fully acknowledged and exploited. This leads to an underestimation of the monetary benefits associated with urban green spaces and an erroneous assessment of the opportunity costs of creating and managing them. This is a major shortcoming since many Member States have development health and environment action plans and repeat this mistake within them. Consideration of this aspect in the EC level strategic document would most probably trigger inclusion into national level documents in the environment and health area.

	In rural areas and in the periphery of cities Green Infrastructure has a role to play in reducing the concentration of pollutants in water bodies that are used to provide drinking water. This is particularly the case with respect to riparian vegetation which can for example reduce the risks of high nitrate concentrations from agriculture, or with regard to forests dedicated to the provision of drinking water. As a result, the instrumental role of Green Infrastructure in improving environmental factors in view of improved health is also not adequately acknowledged in European Air Quality Directives and the Water Framework Directive.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	No.
What are the **O**pportunities for greater support for GI more/ overcoming the weaknesses?	A future action plan should acknowledge the role of Green Infrastructure in reducing air pollution (reduced exposure to pollution, noise and micro-climate regulation (attenuation of the urban heat island effect which further decreases air quality (ie ozone)) etc.) and supporting healthy lifestyle choices. It should also promote the inclusion of 'proximity to urban green space' or 'urban green space per capita' amongst health related indicators as these have proven to be correlated with health outcomes. A Research Agenda into the links between Green Infrastructure and respiratory diseases should be promoted further.

Table 12: Policy Tools and Instruments Potentially Relevant for the Implementation of Green Infrastructure in the Area of Environment and Health

Strategies and Action Plans	
Setting out overall strategic approach to GI provision	
Information Gathering and Mapping	
Identification and mapping of GI elements and requirements	
Monitoring of GI elements and their impact objectives (including using indicators and accounting)	
Analysis of GI benefits (identification, quantification and valuation) in view of integration into decision-making	Research Agenda focuses on environmental factors and impacts on health but this does not include Green Infrastructure at this stage. This should certainly be included and funding should go to research projects in this area.
Regulation and Planning	
Regulation of land use	Land use regulations may already forbid (economic/industrial) activities which result in health risks (noise, pollution) to take place in close proximity to inhabited areas. There is scope for land use regulations and town and country planning to take into account to a greater extent the need to ensure the provision of Green Infrastructure where this may result in important health benefits.
Spatial planning/integrated territorial development	
Procedural requirements: EIA/SEA	When development projects are being assessed for their

	environmental impacts, including potential health impacts, the scope for mitigating those through Green Infrastructure should be considered.
Standards	
Liability and compensation	
Economic/ Market Instruments	
Resource pricing (e.g. taxes, charges, fees, land values)	
Land management contracts/agreements (incl. PES-schemes)	
Public procurement (eg primarily via Procurement requirements for road, rail, energy on the one hand, and 'greener products' such as organic, FSC, MSC on the other).	
Public Investments (EU Expenditure for Green Infrastructure Including Co-funding)	
Land purchase	
Restoration projects/programmes	
GI creation projects/programmes (including reducing impacts of existing grey infrastructure)	
Securing long-term financing/maintenance	
Respond to the value of GI when setting priorities	
Governance	
Institutions	
Participatory decision-making process (eg negotiations for CP OPs)	
Reporting on implementation	
Coordination of policies	
Communications and Advisory Measures	
Awareness raising	Under a new Environment and Health Action Plan the EC could do more to communicate the health benefits associated with Green Infrastructure elements, in particular with regard to managing better those environmental factors which pose risks to health.
Advice and guidance	
Capacity building	
Technical assistance on EU level (for policy making)	
Technical assistance at MS/regional/local levels for potential beneficiaries of EU financed projects (eg regional administrations (eg CP OP elaboration, farmers, NGOs, etc.)	

1.14 EU Research and External Development Cooperation

Overview

The current EU policies and instruments in a range of cross-cutting areas, potentially relevant to Green Infrastructure include:

- Research Policy
- EU external development cooperation

EC Research Policy	
How is GI addressed (directly or indirectly), if at all?	Under previous Framework Programmes as well as under the current Framework Programme (FP-7) some projects relevant in the context of Green Infrastructure have been funded. Some of the most prominent projects include: - SCALES (Securing the conservation of biodiversity across administrative levels and spatial, temporal, and ecological scales), which could make an important contribution to Green Infrastructure in identifying what can be achieved at which scale in this respect (where competencies for issues affecting Green Infrastructure currently are and whether this is appropriate in view of the needs). - SITXELL (development of 'A Territorial Information System for the Multidisciplinary Analysis of Open Areas of the Province of Barcelona').. A tool to support spatial planning at the municipal and regional level, through offering accurate and rigorous ecological and socioeconomically information. - GRABS (Green and blue space adaptation for urban areas and eco towns). A project looking at ecosystem-based solutions for adaptation in urban areas. It acts as a network of leading pan-European organisations involved in integrating climate change adaptation into regional planning and development. Other research relevant to Green Infrastructure is being carried out by the European Environment Agency and the Joint Research Centre.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	These projects all result in the collection of data and information which is needed for the successful implementation of a Green Infrastructure strategy and which is currently lacking. Projects such as SITXELL are effective pilots which provide insights into the difficulties involved in mapping but also the opportunities for land use planning which exist and how Green Infrastructure could be integrated into such a tool. GRABS includes a wide range of case studies and one can expect it will result in a great deal of information being collected on ecosystem-based solutions for adaptation in cities.
What are the **W**eaknesses or barriers for GI?	The weakness of these projects with regard to Green Infrastructure is that they have not been framed in view of producing research results specifically relevant in the context of the Green Infrastructure Agenda. Some of the findings can be expected to be of relevance to Green Infrastructure but if no effort is made to bring those findings together under a coherent umbrella and make them available to those actors responsible for the implementation of Green Infrastructurestrategies they will not directly serve this purpose.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg greater fragmentation)?	No.
What are the **O**pportunities for greater support for GI / overcoming the	There seems to be room for funding research projects which are targeted more specifically at the creation of a sound evidence base on Green Infrastructure (current stocks and benefits) to support policy making. Tools (such as the SITXELL but concerned to a greater degree with mapping Green Infrastructure elements

weaknesses?	and associated ecosystem services) that can be used by public authorities throughout Europe, need to be developed to support the effective implementation of a Green Infrastructure Strategy by public authorities across relevant scales. The DG Research Framework programmes seem to offer the right context for supporting and developing research capacity on Green Infrastructure-related issues and creating a pool of knowledge to support the development of future policies. Special attention would need to be given to monitoring biodiversity and the ecological/physical (including ecosystem service) impacts of Green Infrastructure initiatives/measures as this one of the main issues preventing the benefits of Green Infrastructure being acknowledged adequately in policy making.

EU Development Policy	
How is GI addressed (directly or indirectly), if at all?	Green Infrastructure was not mentioned in important strategic documents regarding EC development cooperation.The 2009 EU Strategy for supporting disaster risk prevention in developing countries for example, which would have been an obvious candidate for such a reference, does not mention Green Infrastructure or ecosystem-based solutions, for example to flood prevention. EC development cooperation and aid offers support for projects related to biodiversity, water and energy as well as in the area of climate change and disaster risk reduction. The Environment and Natural Resources Thematic Programme (ENRTP) – 2011-2013 Strategy Paper and Multiannual Indicative Programme outlines current activities in those areas.
Where does the potential for GI lie? (**S**trengths vis-à-vis GI)	Given some of the issues which are meant to be addressed through the funding (see above) there seems to be important room for delivering these objectives through ecosystem-based solutions whenever this is possible. A whole range of ecosystem-based solutions require less maintenance and result in more limited long term costs than technology based/ engineered solutions, thus making them potentially more interesting in developing countries than these alternatives. This is particularly the casewhere the know-how does not exist in the beneficiary country to maintain the new infrastructure in operation or long-term funding is not available.
What are the **W**eaknesses or barriers for GI?	One of the barriers is that the beneficiaries need to be convinced of the added value of ecosystem-based solutions compared with traditional man-made'/engineered solutions as Green Infrastructure projects should be financed in response to a demand from the potential beneficiaries. Also, ecosystem-based solutions, although they might effectively serve their purpose, are relatively unspectacular, which might decrease their appeal.
Is this policy/ instrument currently resulting in **T**hreats to GI (eg more fragmentation)?	EU development policy supports various types of grey infrastructure projects which in many cases result in damage to the Green Infrastructure in recipient countries. This is unavoidable but measures should be taken for Environmental Impact Assessments and cost-benefit analysis of such infrastructure projects to clearly acknowledge their impacts on Green Infrastructure and devise ways to minimise these. This could be made part of the key requirements.
What are the **O**pportunities for greater support for GI / overcoming the weaknesses?	There is much scope for the ENRTP to promote to a greater extent ecosystem-based approaches to delivering services such as carbon storage, flood prevention/water management, water purification and wastewater management. There is room to expand the funding under this credit line as the European Parliament came to the conclusion that it is "a very useful and under-funded instrument in particular with regard to climate change adaptation". Poor people particularly depend on natural capital for their livelihoods and can be particularly affected by the rapid degradation of ecosystems; their Green

	Infrastructure. This undermines achievement of the Millennium Development Goals. Supporting Green Infrastructure in developing countries may have both global benefits (forests as carbon sinks; REDD+; restoration of mangroves which are nurseries for fish) and important local benefits (eg sustainable food, energy security, risk prevention, in particular for Small Island Developing States). Particularly with regard to adaptation to climate change impacts, projects restoring and developing GI can be an option.