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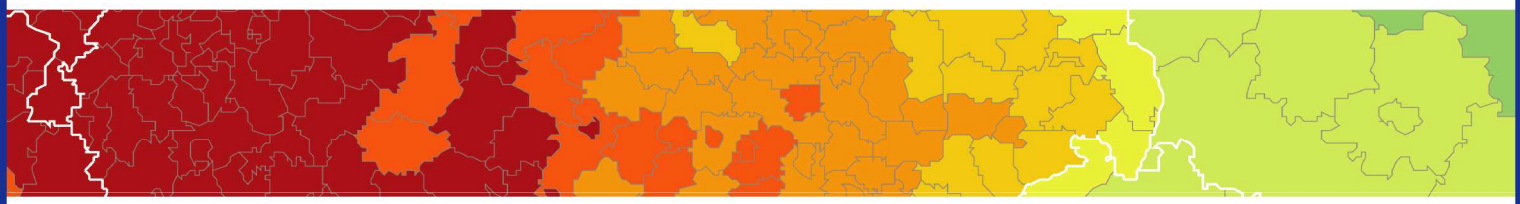

GRETA - “GReen infrastructure: Enhancing biodiversity and ecosysTem services for territoriAl development”

Applied Research

Alpine Macroregion

Version 06/08/2019

This applied research activity is conducted within the framework of the ESPON 2020 Cooperation Programme, partly financed by the European Regional Development Fund.

The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.

This delivery does not necessarily reflect the opinion of the members of the ESPON 2020 Monitoring Committee.

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Acknowledgements
We would like to thank the members of the EUSALP Working Group 7 that generously collaborated with GRETA research and shared their insight into green infrastructure throught the online consultations, phone interviews and meetings.
We would also like to thank the Members of ESPON Contact Points and the Members of ESPON Monitoring Committee for their support. in identifying key stakeholders in the case studies.

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Contact: info@espon.eu
ISBN 978-99959-55-36-6

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Table of contents

List of Maps

List of Tables

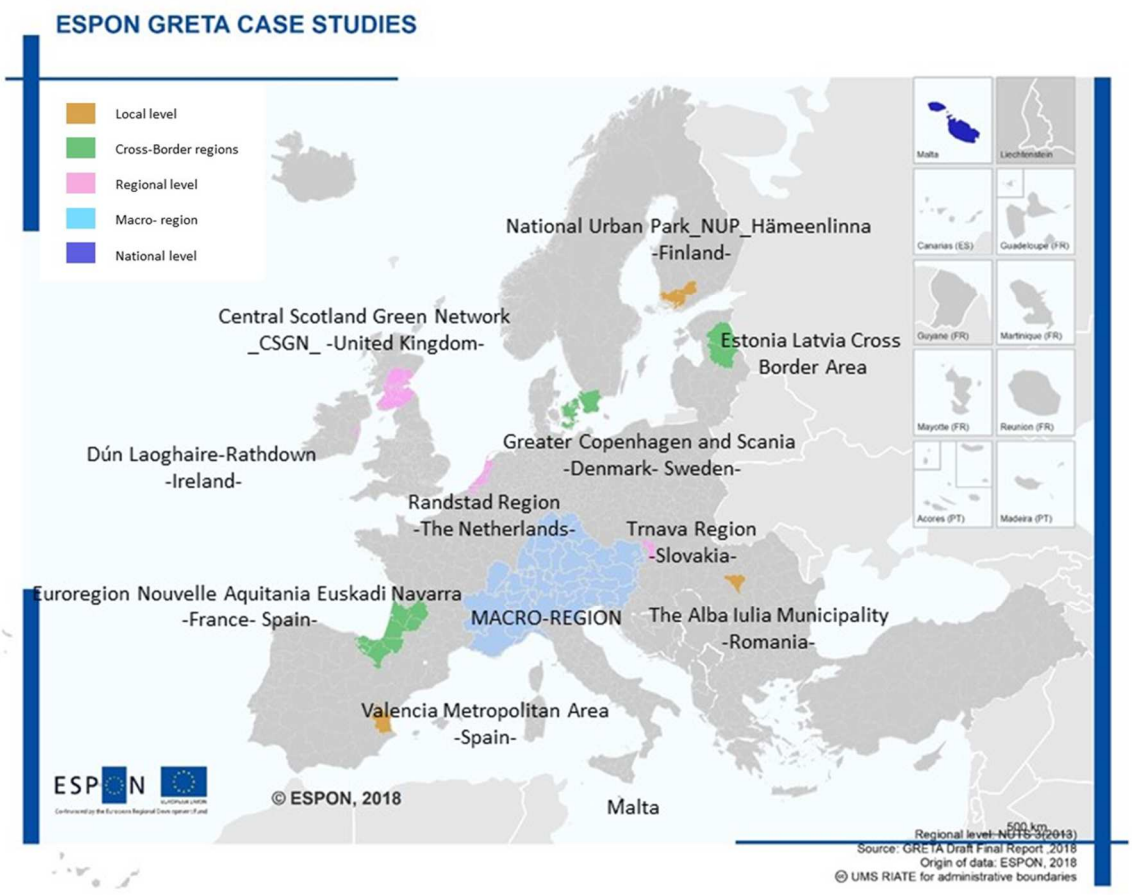
Abbreviations

EC	European Commission
ES	Ecosystem Services
ESPON	European Territorial Observatory Network
EU	European Union
GI	Green Infrastructure
NUTS	Nomenclature of Territorial Units for Statistics
EUSALP	EU Satrategy for the Alpine Region

1 Introduction

GRETA investigated 12 case studies that represented different spatial, institutional and governance settings and that ranged from urban centres to rural countryside. The case studies served to:

i. gain knowledge on implementation factors, drivers and constraints in different planning systems and territorial realities;
ii. gain insights on the use and applicability of economic methods in decision making; and
iii. gather knowledge for policy and practice as input and inspiration for the policy recommendations.



Map 1. ESPON GRETA selected case studies

Method

The activities undertaken at the case study level incorporated a combination of desk-based analysis alongside online questionnaires and pre-structured interviews to key actors in each of the case study areas, including: (i) decision and policy making representatives; and (ii) those involved in designing, planning, implementing and managing green infrastructure (GI).

A series of three consultations were developed to gather relevant information from case studies on different aspects of GI spatial analysis, policies, planning and implementation. The consultation process was a combined approach of an online survey and or a telephone interview (which used the survey questions as the basis) with stakeholders to facilitate getting good engagement and to address any clarifications needed.

Consultation A – Economic Valuation

The questionnaire included 20 questions structured in 2 main parts. The first part aimed at understanding the current use and awareness of valuation methods by respondents while the second part aimed at identifying their perceived barriers and interest of using such methods. We used a mix of open-ended and closed-ended questions to combine comparable results as well as qualitative material; respondents also had the possibility to comment on their responses. Analysis of Consultation A is described in Annex III-C.

Access to Consultation A

https://survey.tecnalia.com/limesurvey/index.php/214247?lang=en

Consultation B – Characterising green infrastructure and ecosystem services characterisation

The objective of this consultation was to identify good practice guidelines, opportunities and challenges that could be useful for a variety of regions and cities. Responses to Consultation B were used to assess the usefulness of the GRETA methodology, a methodology specifically developed to delineate and map the main green infrastructure (GI) elements and their multifunctionality, as well as identifying their capacity to support three main policy domains: Biodiversity, Climate Change and Disaster Risk Reduction, and Water Management. Questions in Consultation B were designed to help us gain further insight into the enabling factors that exist in different regions and cities. We also sought to gather information on the challenges and barriers that may compromise the implementation of GI. The final set of questions focused on identifying the general benefits and potential synergies and trade-offs associated with GI projects.

The maps produced for Consultation B in the GRETA project were intended to provide a starting point for discussion about the applicability of the GRETA methodology from European to local application. As such they did not aim to be a substitute for the maps or other planning material that already exist at local level. They were not developed to be used as an output from case study levels.

The landscape elements in the maps are produced based on standardized European data sets with a minimum mapping unit of 25ha (i.e. CORINE Land Cover 2012) – smaller geographical features are not depicted. The Consultation B aimed at finding the gaps between datasets produced at the European level and any other data sets produced at regional and local scales.

Access to Consultation B

https://survey.tecnalia.com/limesurvey/index.php/614564?lang=en

Consultation C - Analysis of governance, policy and financial frameworks

The successful implementation of green infrastructure (GI) projects requires a combination of governance structures, integrated policies and financial support. This consultation therefore aimed to investigate the governance systems in place in each case study area in order to determine how policies and policy makers enable the implementation of GI projects in the case study areas.

Responses to Consultation C aimed to help us identify: (i) how much funding (money and personnel) is currently used for GI in the case study regions; (ii) if this funding is enough for implementing and maintaining GI; and (iii) the main sources of funding (public tax-based funds, private investments, NGOs or others). Consultation C also examined whether policies compliment or conflict with GI and assesses policy makers' knowledge needs for making full use of GI development potential.

Access to Consultation C

https://survey.tecnalia.com/limesurvey/index.php/129674?lang=en

The content in this report is based on a mixed-method approach. The results presented are interpretations of semi-structured interviews, responses to a questionnaire on national policy and planning, responses to three consultations (Consultation A, B and C) via email, document analysis of plans and strategies (via desk-based analysis), statistics, and spatial analysis using GIS resulting from the GRETA project. For all case studies, telephone conversations (and for some cases face-to-face meetings i.e. Copenhagen and Scania, Alpine region, Euroregion Aquitania- Euskadi-Navarra) allowed the completion of the consultations B and C.

Based on the UAB in-depth competence about the Alpine Macro region governance structures the results presented is interpretations of face to face and phone interviews, document analysis of plans and strategies, and statistics. The stakeholders that have contributed to this study are persons working on different institutional levels in public administration, private land and business owners, researchers, policy makers.

There has not been active engagement on the online consultations from this case study. But this does not have any negative impact on the quality of the analyses undertaken for this case study. On the contrary, the participation of the UAB in the Alpine Macro Regio meeting on the 17th October 2018 has served on the one hand to present GRETA approach and analysis in detailed, and on the other to get first-hand knowledge and understanding on the GI implementation and policy process in the case study region.

2 Geographic description of the Alpine Macroregion

2.1 Case study outline

The Alpine Macro Region is one of the four Macroregional Strategies endorsed by the European Council. Its objective is to address common challenges faced by a defined geographical area relating to Member States and third countries located in the same geographical area which thereby benefit from strengthened cooperation contributing to achievement of economic, social and territorial cohesion-

The Alpine Macroregion concerns seven Countries, of which five EU Member States (Austria, France, Germany, Italy and Slovenia) and two non-EU countries (Liechtenstein and Switzerland), and 48 Regions, covering an area of 450 000 km^2, with a population of 80 000 000 inhabitants (see Map 2). Therefore, this is a region of high territorial specificities, characterised by its morphology and, at the same time, by several borders as interfaces between states.

The delineation of the Alpine Macroregion includes the Alps, which could be considered the core area, and the surrounding region, which is characterised by an agglomeration ring all around the mountainous area. In fact, there are three transnational cooperation initiatives that have in common the core area:

- The Alpine Convention entered in force in March 1995, to ensure the sustainable development of the area.
- The INTERREG Alpine Space. It provides a framework to facilitate the cooperation between economic, social and environmental key players in seven Alpine countries, as well as between various institutional levels such as: academia, administration, business and innovation sector, and policy making. The programme is financed through the European Regional Development Fund (ERDF) as well as through national public and private co-funding of the Partner States.
- The macro-region EUSALP (launched in 2016) which goes beyond the mountains and includes the surrounding metropoles and 'hinterland'.

The Alpine mountains are an ecological hot spot – diverse, unique, and vulnerable, since this is one of the largest natural areas in Europe. This is paired with a rich cultural and historic heritage, reflected in the fact that there are also several UNESCO World Heritage Sites.

Important parts of the natural richness of the Alps are, also, the rivers, lakes and glaciers, which make this Region the 'water tower' of Europe. This natural storage mechanism benefits some very important rivers in Europe, including the Rhine, Danube, Po and Rhône. These four rivers flow through 15 countries, including ten EU Member States. In some seasons the Alps provide up to 90 percent of water to lowland Europe, particularly to arid areas during the summer months

At the same time, its geographic location in the heart of Europe makes it a space with important internal linkages and characterised by an embeddedness in global network.

Given its extension, there is a large diversity form socio-economic perspective. For example, the inner-Alpine areas tend to be more tourist intensive, and the agricultural sector is more relevant on the economy. The share of labour in the agricultural sector is the highest in the Eastern Austrian and in the Slovenian regions (in both cases beyond the capital regions).

Map 2. Overview of the Alpine area with the delineation of different territorial entities: EUSALP (Macro Region), Alpine Space (Transnational cooperation programme), and Alpine Convention.

2.2 Territorial challenges

The diversity of the Alpine territory poses some challenges:

- In terms of demography metropolises and the larger cities are the centre of growth, whereas the patterns in rural areas are much more divers.
- The trends in employment and in GDP have developed much more positive on the Northern side of the Alps region than on the Southern side. This refers to the post 2008 economic crisis that (most regions of) Germany, Switzerland, Liechtenstein and Austria overcame much quicker than the French, Italian and Slovenian regions.

These regional differences are embedded in a common need for balancing development opportunities and protection regimes: managing settlement growth, responding to climate change, reducing fragmentation of ecosystems, or steering agricultural transformation. Climate change requires improvement of risk management (e.g. avalanches).

3 The GI network and its potentialities for territorial development in Alpine Macroregion

3.1 What is the approach to GI and Ecosystem Services

3.1.1 Approach of the Alpine Macroregion

The Alpine Macroregion is implemented by nine Action Groups, covering the main priorities identified in the founding documents of EUSALP. Action Group 7 is devoted to green infrastructure, and the focus is on developing **ecological connectivity** and thus to strengthen, improve and restore **biodiversity**, as well as **ecosystem services**. Its implementation is intended to increase the degree of connection between natural and semi-natural landscapes in the entire EUSALP territory.

One important aspect is the composition of the Action Group, including a broad representation of members from Alpine countries and regions as well as advisors with different institutional and sectoral backgrounds, AG 7 builds on a dialogue including stakeholders from all relevant sectors. This set up is oriented to develop a comprehensive macro-regional scheme, in line with the EU Strategy for Green Infrastructure (GI).

GI is considered at different geographical scales and it includes natural, semi-natural areas, and features in rural and urban areas which together – functionally interconnected – ensure diverse advantages for nature, as well as social benefits and economic prosperity for humans.

The specific objectives are defined as follows:

- To identify Alpine GI elements of transnational relevance, improve governance approaches and explore funding opportunities.
- To promote the various benefits of GI as complementary solutions to Grey Infrastructure and bring GI onto the political agenda of the Alpine Region.
- To trigger tangible implementation initiatives and liaise with implementation partners from all relevant sectors to make GI visible and close gaps in the trans-European “matrix for life”.
- To allow the benefits of ecological connectivity to emerge at ecosystem and societal dimensions, enhancing resilience to threats such as climate change.
- To develop solutions to halt biodiversity loss and address challenges such as missing connections between natural areas and homogeneous and impoverished lowlands.

3.1.2 Approaches at national level

Austria

In Austria, the states (*Bundesländer*) have legislative and executive powers regarding spatial planning, nature protection and transport. *Bundesländer* are also responsible for the administration, implementation and enforcement of certain federal laws at the lower levels of government.

The Austrian Biodiversity Strategy 2020+ includes actions to strengthen biotope connectivity. Austria has specific targets for integrating biodiversity and ecosystem services in spatial planning, with measures such as incorporating ecological infrastructure in spatial planning, consideration of functional connectivity and the habitat network when establishing compensating areas, increase of grasslands in urban areas, the provision of features that promote biodiversity in newly established green areas, and the preservation of un-fragmented areas and migration corridors (European Commission, 2017).

The Lower Austrian Nature Protection Concept ("*Naturschutzkonzept*") published in 2011 divides Lower Austria into several regions based on its natural landscapes and provides a basis for nature conservation in these regions. In 2015, the topic area "green infrastructure – wildlife corridors – habitat connectivity" has been.

France

In France, a strategy for green infrastructure (GI) was adopted in 2010. In compliance with the European Union's Green Infrastructure Strategy (EC, 2013), this green and blue frame (trame verte et bleue, TVB) is composed of cores and corridors of green and blue areas. The national strategy is a biodiversity conservation tool which aims to maintain and strengthen the functionality of natural environments into planning and development projects. Further, the national strategy (TVB, 2018a) acknowledges that the French green and blue infrastructure does not exclude or replace but rather interacts with other environmental policies, such as policies for protected areas, Natura 2000, and national action plan for endangered species. In addition to environmental objectives such as biodiversity conservation, the green and blue frame also aim to achieve social and economic objectives by maintaining the services provided by biodiversity and maintained habitats. Such as, wood energy production, benefits for agriculture, improvement of water quality, flood regulation, improving the living environment and hosting recreational activities.

In addition to the European GI strategy (2013), the French green and blue frame is also a response to other European policy processes. For instance, the Pan-European Ecological Network, and the EU 2011-2020 Biodiversity Strategy, which the Mapping and Assessing Ecosystem and their services are a vital part of (MAES 2017). The first phase of the MAES in France, called EFESE for "Evaluation française des écosystèmes et des services écosystémiques", was finished in 2016. The ongoing work, which will be synthesized in a report during 2018, includes reviews of the six ecosystem types in France (forest, wetlands, urban,

agro-ecosystems, mountains and marine ecosystems) and studies on ecosystem services in relation to these ecosystems. (MAES, 2017). BISE (2018) acknowledge that a national biodiversity law was established in 2016.

Germany

Legislative competences are shared between the federal level ("Bund") and the level of the 16 Länder in Germany. The 2006 reform of the Constitution transferred more policies to the federal level. Most environmental policies (waste disposal, air protection, water and nature protection) are "concurrent [shared] competences", where the Länder have the right to adopt their own provisions. However, the general principles of nature conservation, the right to protection of species and the protection of the marine environment are exempted from this possibility of deviations in the area of nature conservation and landscape conservation.

The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) is responsible for many policies relevant for Green Infrastructure. The Federal Agency for Nature Conservation (*Bundesamt für Naturschutz*, BfN) is the scientific authority with respect to national and international nature conservation. The ministries for Environment of the 16 Länder are coordinated within the Conference of Environment Ministers (*Umweltministerkonferenz*).

In the following list, the key legislative frameworks, policies and initiatives most relevant for GI on federal level are described. It should be noted that these are further complemented from the individual Länder level.

- The most important legal basis for nature conservation in Germany is the **Federal Nature Conservation Act** (BNatSchG), which includes, among other things, the transposition of European Nature Conservation Directives, in particular the Habitats Directive (Directive 92/43 / EEC) and the Birds Directive (Directive 2009/147 / EC) into national law. In addition to the requirements for the protection of nature various other regulations across policy areas are of importance for green infrastructure. These include regulations on landscape planning, compensation for nature and landscape impacts, ecosystem defragmentation and connectivity, protection of the marine environment, recreation in nature, as well as the participation of recognized nature conservation associations in relevant decision-making procedures. These federal regulations are then further supplemented by national regulations of the 16 states (Länder), which may result in deviations from the federal regulations. Therefore, it is indispensable in practice to cross-check the relevant national nature protection law as well.

According to the division of powers under the German basic law (Grundgesetz), the implementation of nature protection related laws and regulations falls within the exclusive competence of the Länder with few exceptions. According to Article 83 of the Basic Law, this is the case when implementing the federal laws, such as the Federal Nature Conservation Act.

This is based not least on practical considerations, as the state authorities can best assess the special circumstances on the ground.

- The **nature conservation law** (§§ 13 - 18 BNatSchG) regulates the handling of interventions in nature and landscape and thus pursues a comprehensive approach. At the heart of the interventions are the mitigation hierarchy and the polluter pays principle. Other important fundamental principles are the precautionary principle, the balancing act, and, in the case of compensation requirements, the priority of substantive compensation before compensation payments. In accordance with these principles, the polluter is obliged to avoid preventable damage by the intervention and to minimize it as far as possible (precautionary principle). Unavoidable damage/impairments must be compensated or replaced by compensatory measures (substitute measures). A damage is compensated when the impaired natural functions are restored and function in an equivalent way as before the intervention, and the landscape is restored or redeveloped. If the impairments cannot be avoided nor compensated or replaced within a reasonable timeframe, and the interests of nature conservation and landscape management weigh heavier than other interests, the intervention may not be allowed (balancing rule). Only when an intervention is permitted by overcoming the interests of nature and landscape conservation, and a material compensation is not possible, the polluter has to compensate in the form of money.
- The **landscape planning law** (*Landschaftsplanung***,** §§ 8-12 BnatSchG) was, like the intervention regulation (*Eingriffsregelung*), implemented in 1976 with the nature conservation law (*Bundesnaturgesetz*). It is the central planning instrument of nature conservation and landscape management and spatially defines the aims of nature and landscape conservation/management as the basis for acting in a precautionary way at local and regional levels. Requirements and measures to achieve these aims must be presented and justified and should contribute to their implementation. The concrete objectives, requirements and measures that are formulated in landscape planning on the national, regional and local level are addressed to nature conservation administration, regional and land use planning authorities, specialist administrative departments, municipalities (also besides their responsibility for land use planning), associations and indirectly to land users and citizens.

The content of landscape planning needs to be considered in all planning and administrative procedures whose decisions influence nature and landscape. If it cannot be taken into consideration, this must be justified. In this way, landscape planning can contribute to the establishment of green infrastructure. It doesn ‘t just makes statements concerning the conservation and development of species and biotopes, but also analyses and assesses the functions and services of water bodies, soil, climate, landscape-related recreation, scenery and develops measures for its sustainable development. It is thus already largely compliant with the

broad requirements of a green infrastructure as defined by the EU initiative, as it takes many regulating and cultural ecosystem services for humans into consideration.

- Articles 20 and 21 in the Federal Nature Conservation Act (Bundesnaturschutzgesetz, latest update 2009) regulate the development of **a national ecological network** (*Biotopverbund*), covering at least 10% of the territory of Germany. The ecological network is designed to serve the enduring conservation of populations of wild fauna and flora, including their living sites and biotopes and communities, as well as the preservation, restoration and development of functioning ecological interaction relationships. It also has the purpose of improving the coherence of the "Natura 2000" network. The ecological network shall consist of core areas, connecting areas and connecting elements. Surface waters, including their peripheral zones, shoreline zones and riparian meadows can serve as connecting links over large areas. At the regional level, and especially in landscapes shaped by agriculture, the linear and punctate elements needed to link biotopes, especially hedges and field borders and "stepping-stone" biotopes, should be conserved and created (BfN, 2014).
- The **National Biodiversity Strategy** (*Nationale Strategie zur biologischen Vielfalt*, 2007) is the basis for the protection and restoration of biodiversity and the integration of biodiversity and ecosystems into other sectors, such as agriculture, building and infrastructure(BMUB, 2007). In setting priorities for the implementation of Target 2 Action 6a of the EU Biodiversity Strategy, Germany has focused on ecosystems suffering severe deterioration (BMUB, 2015a). The intention is to fully exploit the synergy effects between biodiversity conservation, climate action and adaptation to climate change. Thus, in agreement between the Federation and the Länder, Germany's work towards meeting the EU restoration target focuses on peatland and floodplain ecosystems. Realisation of a biotope network, reforestation and restoration of peatland are important climate mitigation and adaptation measures, for flood management.
- The **Federal Biodiversity Programme** (*Bundesprogramm Biologische Vielfalt*, 2011; see also section 4)) launched in 2011 supports the implementation of the National Strategy with projects that are particularly exemplary and benchmarking. Projects are assigned to four funding priorities: National responsibility species, biodiversity hotspots, ecosystem services, and other measures. Some measures that are considered important are restoration of natural river beds, increasing ecological value of forests, creating more green spaces in the city and connecting ecosystems (BfN, 2016).
- The **Nature Conservation Initiative 2020** (*Naturschutz-Offensive 2020*, 2015) has the aim of improving and accelerating the implementation of the National Strategy for Biodiversity. Within 10 areas of action, which have been identified as the action fields with the largest deficits, it describes 40 measures that should improve the condition of

biodiversity in Germany. Some of the areas directly linked to GI are: to restore natural river beds, to connect nature areas and to increase green infrastructure in the city. Concrete measures to reach these aims are: give room to the rivers to mitigate floods and to restore nature; to make non-managed forest areas part of the national network of natural forest development; to increase wilderness area; to take into account priority areas for nature (e.g. national parks, core and restoration areas) when looking for suitable locations for renewable and conventional energy infrastructure; to interlink better urban development with landscape/green space planning; support municipalities with the development of urban GI (BMUB, 2015b).

- The **Federal Defragmentation Programme** (*Bundesprogramm Wiedervernetzung*, 2012) was adopted in 2012 to maintain, restore and develop green infrastructure across the national German road network, thereby reconnecting habitat corridors for flora and fauna that have been disconnected. It focuses on the existing road network, networks for 4 different types of networks (dry biotopes, wet biotopes, valuable forest biotopes and the network for silvicolous mammals) that have been disconnected (Hänel and Reck, 2011). The programme is currently financed from budget of the ministry of transport. The implementation of the programme by the various Federal Länder is currently at different stages (BfN, 2014).
- In order to promote the restoration of rivers and floodplains, the German Government issued the **Federal Government Programme "Germany's Blue Belt"** (*Bundesprogramm Blaues Band Deutschland*, 2017). The programme aims at the development of a nationally important system of interlinked biotopes along the federal waterways and their associated floodplains. The programme focuses on the sections that are no longer needed for cargo shipping ("minor waterways") with a length of about 2,800 km but also implements "ecological stepping stones" in the major waterways. The programme sets up a framework for action for the next years and decades (BMUB and BMVI, 2015).
- The Federal Programme "**chance.natur**" (since 1979, latest update 2015; see also section 4) serves to establish and protect large areas of nature and landscape with national importance. Since 1979, more than 3700 km2 (around 1% of Germany's total surface area) have been designated as valuable areas for the protection of landscape and biodiversity. Criteria are: area size, naturalness and the level of representation, endangerment, pilot project character (in terms of natural value and management). Measures taken in designated areas are the development of maintenance and development plans, the purchase of land, compensation payments for use restrictions, measures for biotope management such as rewetting and monitoring of results (BfN, n.d.).
    - Germany's **National Natural Heritage scheme:** According to the coalition agreements adopted in 2005, 2009 and 2013, about 155,000 ha of federal land

with a high value for nature conservation are transferred to Länder, agencies, nature conservation organisations or foundations to be conserved in perpetuity. More than 70 % of the area of the first two transferred tranches includes former military training grounds (BMUB, 2017a).

- The importance of urban green infrastructure is outlined in "**Green in Cities - for a liveable future**" (*Grünbuch Stadtgrün: "Grün in der Stadt – für eine lebenswerte Zukunft"*, 2015). It discusses the multiple functions of urban GI, current challenges and perspectives and recommends action to be taken to improve GI in the German urban areas (BMUB, 2015c). The publication of the *Grünbuch* was the start of a longer process with which new integrated strategies for urban green were developed and implemented. In a 'white book process for city green' (*Weißbuchprozess zum Stadtgrün*), a wider dialogue was encouraged about the future status of green and open spaces in German cities. The *Weißbuch Stadtgrün* (2017) contains 10 action areas with concrete measures that the national government will support to strengthen urban green infrastructure. The implementation follows in consultation with Länder, municipalities, associations, civil society, scientific and practical experts and additional actors (BMUB, 2017b).
- The **National Green Infrastructure Concept** (*Bundeskonzept Grüne Infrastruktur* (BKGI), 2017) is a spatially defined integrated concept, which helps to incorporate existing nature conservation and landscape management concepts and models into national planning processes, such as floodplain development, national road planning, defragmentation and expansion of ecological networks. The aim of this national concept, besides the implementation of the EU concept of Green Infrastructure on national level, is to practically define the National Biodiversity Strategy and to support orientation for planning of third parties, especially the national government. The BKGI determines priority areas and tasks for nature conservation and gives instructions for successful implementation on a national level. The BKGI presents a spatial nature conservation concept, which points out areas of national importance for the protection of biodiversity and ecosystem services. Specific concepts that are still in development will be gradually fed into the National GI Concept, such as landscapes of national importance for natural and cultural heritage, the national program *Blaues Band* and the national action plan conservation areas (BfN, 2017a).
- The Ministry for Climate Protection, Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia (NRW) called for applications of public and private stakeholders to create models for **integrated action plans for green infrastructure on a community level** that

are to be implemented within the European Regional Development Fund time-frame. Action plans can be handed in up to 1 June 2017. Funds of 83 million Euro are made available by EU and federal state resources, as well as from municipalities, associations and private funds (Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz NRW, n.d).

- Germany published their **Restoration Prioritisation Framework** in 2015 (*Priorisierungsrahmen zur Wiederherstellung verschlechterter Ökosysteme in Deutschland* - BMUB, 2015), as asked under the EU Biodiversity Strategy Target 2 (action 6a). Germany focuses on the restoration of moors and meadows (*Moore und Auen*), based on the highly degraded conditions of these ecosystems in Germany and their wide range of functions (BMUB 2015a). Several Länder with valuable peat lands or extensively used moors with high restoration potential have developed moor protection concepts or provide appropriate considerations. Most of the goals for moors set in the National Biodiversity Strategy have not been reached yet, because the required measures are substantial. Chance.natur supports measures to restore moors, as well as the "Moor-Futures" initiative (see below). The renaturalisation of meadows is largely taken care of within water management initiatives (retention areas) and the *Bundesprogramm Blaues Band*, which was mentioned above. Chance.natur and the National Biodiversity Programme further support the restoration of meadows in Germany and the Länder have their own programmes for financing measures. The current state of meadows in Germany was assessed in 2009 and will be updated in 2020 to monitor progress.

Italy

- National Law 221/2015 "*Environmental measures for promoting green economy and limiting the excessive use of natural resources*" established the Italian Natural Capital Committee (INCC), composed of institutional members along with experts appointed by the Italian Minister of Environment, Land & Sea. The INCC's mandate is to provide arguments for consideration of the Natural Capital within public policy in Italy. The INCC published in February 2017 the **1st Report on the State of Natural Capital in Italy**. The aim is to deliver environmental information and data expressed in both physical and monetary units, following the methodologies defined by the United Nations and the European Union, as well as ex ante and ex post assessment of the effects of public policies on Natural Capital and Ecosystem Services. Regarding green infrastructure, the Report includes the following perspectives and recommendations:
    - to improve the system of ecological connections and green infrastructure;

- to strengthen green finance tools to build green infrastructure, in order to cope with climate change and to enhance Natural Capital recovery measures, representing a model of sustainable development.

- In 2013, Italy adopted the **National Law on the Development of Green Urban Areas** (Law n. 10, 14.1.2013) aimed at promoting green areas for the provision of ecosystem services (air quality, hydrological risks, soil protection and cultural dimensions). The law identifies a set of measures including green urban planning and monitoring, support to local-level initiatives, safeguarding trees and tree lines as significant features for landscape, heritage, nature, history and culture (Italian Ministry for the Environment and the Protection of Land and Sea and Italian Botanical Society, 2016).
    - Law 10/2013 establishes, in Art. 3, the **Committee for Green Public Development**, which has to prepare a report to be forwarded to the Chambers by 30 May each year, with the results of the monitoring and the interventions necessary to ensure the full implementation of sectoral legislation. Art. 3 also provides that the Committee should propose, in agreement with the Unified Conference, a National Green Plan. The Committee, in its function, is supported by ISPRA and the Ministry of the Environment as set out in the Ministerial Decree 18/02/2013. The Committee for Green Public Development has prepared, in collaboration with ANCI (National Association of Italian Municipalities) and ISPRA, guidelines for management of urban green areas and first indications for a sustainable planning that provides local governments with technical, scientific and socio-cultural orientation criteria, useful for planning, cultivation and management of public green.[1]
    - Despite the heterogeneity of the urban planning tools in the different Italian regions, there are some sector tools that the municipal authority can adopt for the regulation of urban and peri-urban green systems. These include the Green Census and the Green Plan. The data analysed (updated in 2015, published by ISTAT) show that the Green Census is the most widespread tool, both in the Centre-North as well as in the South and Islands; in fact, it is present in 89 of the 116 municipalities analysed. Another important operating tool for planning, maintenance, protection and utilization of public green is the Green Regulation, which by 2015 was adopted in 52 Municipalities, mostly located in the Central-North Regions. Finally, the Green Plan – an urban planning instrument – identifies how to enhance and increase areas for urban green or recreational activities.
    - The ISPRA **Report on Quality of the Urban Environment** (2016) focuses on urban nature (green infrastructure chapter) and provides useful information for evaluating natural capital on a sample of 116 municipalities.

- The **Charter of Rome on Natural and Cultural Capital,** launched in 2014 under the Italian Presidency of the Council of the EU, underlines that the GI concept is a driver for transition to a green economy and has many natural, cultural, social and economic connections. To address this challenge, the Charter specifically promotes: i) identification of inter-connections and multi-functionality of natural and semi-natural areas; ii) Improvement of synergies between natural and semi-natural areas (including protected areas), green infrastructure, urban and rural areas; iii) mapping, assessment, monitoring, evaluation, planning and management of the territorial links between natural and semi-natural areas; iv) considering GI as a cost-effective alternative or complementary measure to 'grey infrastructure' in support of both nature and people.
- Several regions have established **Regional Ecological Networks** (Ministry for the Environment, Land and Sea, 2014) as more or less prescriptive tools in land planning. Similarly, several Provinces and municipalities (Guccione and Schilleci, 2010) adopted the Land Ecological Network model to promote sustainable development at the different administrative levels (Blasi et al., 2008b).
- The national conference **"*La Natura dell'Italia*"** organised by the Ministry of the Environment in December 2013 proposed several green infrastructure objectives. Green infrastructure is viewed to strengthen biodiversity conservation and promote and enhance natural capital, in order to develop a greener economy (Sustainable Development Foundation, 2014).
    - A comprehensive initiative for the implementation of both the EU Biodiversity and GI Strategies is carried out by the Italian Ministry for the Environment with the support of the Italian Botanical Society (SBI). This initiative represents important progress in terms of ecosystem mapping, assessment of ecosystem condition and restoration prioritisation, mapping and assessment of ecosystem services (for selected pilot case studies), and promotion of GI.[2]Regarding the last point, which is specifically aimed at defining a framework for the development of GI according to the land ecological network approach, some pilot proposals have been developed for the metropolitan area of Rome.
        - **The Central Apennines** is a vast natural area with many reserves and Natura 2000 sites, such as the Abruzzi and Majella National Parks and the Sirente-Velino Regional Park. Together with strict protection measures and positive management actions over the past decades in the protected areas, a spontaneous and vast rewilding process has been taking place due to land abandonment and decreasing traditional activities. The Rewilding initiative aims to generate an up-scaling of the conservation effort in the Central Apennines by focusing especially on the buffer zones of the parks and the ecological corridors in-between, and by involving local administrations and stakeholders. The

initiative aims to demonstrate that land abandonment is a new opportunity to revitalize natural dynamic processes, the socio-economic potential of the region, as well as people's quality of life. In the buffer zones and connection areas, all new major infrastructure projects such as windmills, power lines, road building or water power/dam constructions will be actively held away. This will be secured through agreements with local administrations and land owners, which will see rewilding as a real opportunity to maintain the natural assets while at the same time boosting the socio-economic development (Rewilding Europe, n.d.).

- The **Vertical Forest** (*Bosco Verticale*) is an innovative project in the Porta Nuova district of Milan, containing plants roughly equivalent to 2.5 acres of forest (European Commission, 2017).

Liechtenstein

Liechtenstein does not have specific policy on green infrastructure. However, different objectives are integrated across different policies:

- **Law on the Protection of Nature and Landscape** (1996). This is the main enforcement instrument in the field of nature and landscape: "The entire area of habitats shall be protected and restored where necessary". It has been subsequently reinforced by series of strategies.
- **Water protection act** (2003). It defines both the ecological targets and the water quality requirements for surface and subterranean waters. The objective is to achieve little structured river morphology to guarantee the exchange between groundwater and surface waters. The act also defines the "water space". The use of this space by agriculture is limited by law as well as any structural use. In addition to preserving a self-cleaning capacity, the linking of habitats is also a priority.
- **Environmental Protection Act** (2006). The purpose is to protect human beings, animals and plants, as well as their biotic communities against harmful effects and to conserve permanently natural living space and biological varieties, soil fertilization and water and air quality.
- **National Biodiversity Strategy 2020** (2010). Strategic goals set in this Strategy include: conservation of habitats and the promotion and upgrading of current habitats; conservation of species; conservation of landscape, forest and soil; and the incorporation of more nature in the utilized landscape.

Slovenia

- The **Environmental Protection Act** (2006) regulates the system of environmental protection based on sustainable development principles.
- **The Natura 2000 Management programme for Slovenia for 2015-2020** (coordinated by the Ministry of Environment and Spatial Planning) was adopted in April 2015. Once implemented, its outcome could be a coherent Natura 2000 network providing many of the core areas with healthy ecosystems by developing functional green infrastructure. It comprises concrete and operational measures for the Natura 2000 network based on the approach of the Priority Action Frameworks (PAFs). The preparation of the Programme was funded under the LIFE programme. In the Natura 2000 Programme, priority Natura 2000 areas were defined[1], where active measures of improvement and restoration need to be done in order to improve conservation status of target species and habitat types. Projects proposing such measures in priority Natura 2000 areas are eligible for funding from the Operational Programme for the Implementation of the EU Cohesion Policy in the Period 2014-2020.
- In addition to a coherent Natura 2000 network, there is a **network of ecologically important areas (Decree on ecologically important areas)** covering 50% of the country that are considered in spatial planning procedures. The decree on ecologically important areas was adopted in 2004 and amended in 2013. This decree establishes ecologically important areas and conservation policies to maintain or achieve favourable conservation status of habitat types and species of wild flora and fauna species and their habitats in these areas.
- **Slovenia's Development Strategy 2014–2020** is a national strategic document that defines the well-being of the population as the highest development goal. According to the draft strategy, Slovenia's development will be directed toward ensuring a green living environment by investments in green infrastructure, measures for nature protection and biodiversity conservation, and the provision of a biosafety system (parts, relevant for green infrastructure). The Government Office for Development and European Cohesion Policy (GODC) is the lead institution for Slovenia’s development Strategy.
- **Spatial Development Strategy of Slovenia** is a strategic spatial planning document, adopted by the National Assembly of the Republic of Slovenia at its session as of 18 June 2004, published in the Official Gazette of the Republic of Slovenia, no 76/2004, and in force since 20 July 2004. The Spatial Strategy is the basic strategic spatial development document and an integrated planning document which implements the concept of sustainable spatial development. Together with the Strategy for Economic Development of Slovenia, it represents the umbrella document for guiding development

and forms the basis for the harmonization of sectoral policies. The Strategy preparation process involved all ministries and services, whose work is of relevance to the implementation of spatial development and to the territorial cohesion of the country and its participation in the European spatial development. The basic premises and policies which they laid down are included in the spatial development objectives and policies of the Spatial Development Strategy. The Strategy imposes conditions for balanced economic, social and cultural development while ensuring the kind of development which will also enable the conservation of the environment, nature, heritage, and the quality of living. The national spatial development strategy consists of three interwoven spatial systems, settlement, infrastructure and landscape. The strategy provides a wide concept of landscape development, describing it as optimal "*when by locating the activities, landscape works as functionally, ecologically and visually balanced system of spatial structures, which enables healthy, safe and pleasant living environment, when development conserves as much as possible of the natural structure, retains cultural layers, and provides space for natural processes, and when landscape development enables the landscape to become a carrier of national and local identity*."

The landscape spatial system is defined by its basic cultural and natural components offering potential for biodiversity conservation, cultural heritage conservation, agriculture, forestry, water management, mineral resources extraction, natural hazards management, tourism and recreation. Landscape should be developed as natural, cultural and urban landscape, territorially shown in the landscape concept map. The strategy emphasises the need to provide "balanced proportion of built and green areas in the settlement and link to the open landscape." Cities are obliged to prepare "green systems" for which the strategy provides a definition (p. 10); elements and principles of its establishment can be understood as GI elements in cities. The strategy mentions GI elements, e.g. the maintenance and establishment of landscape structures, which are important for the conservation of biodiversity (continuity and interconnection) (CBD 5th national report – Slovenia, 2015).

- **The new Spatial Development Strategy of Slovenia 2050** is in preparation. It will include significant national infrastructure, including green infrastructure, as a strategically planned multifunctional system of different spatial/landscape elements on national level with the guidelines for developing on regional and local levels in spatial plans.
- The proposal for the **new National Environmental Action Programme 2017-2030 (NEAP)** is being prepared by the Ministry of the Environment and Spatial Planning, which will include also the new National Nature Conservation Programme (NNCP). NEAP will be adopted by the National Assembly of the Republic of Slovenia and it will include main objectives and measures to achieve the objectives. The green infrastructure objectives and measures with special emphasis on the Natura 2000

network and achieving the nature conservation objectives on state property (forests, agricultural land and waters) is intended to be included in the NEAP-NNCP.

Switzerland

The **Action Plan for the Swiss Biodiversity Strategy** (2017) is the main instrument for the adoption of the green infrastructure, there referred as ecological infrastructure.

By 2040, Switzerland must have a functional ecological infrastructure in both rural and urban areas, on the Plateau, in the Jura and in the Alps. The Swiss Biodiversity Strategy Action Plan outlines the measures and timetable needed for this purpose. To do this, the biological quality of existing protected areas must be improved and the spatial and functional connectivity between habitats that are worthy of protection must be ensured. The functional connectivity of habitats exists when the exchange and movement of individuals, genes and ecological processes (for example through migration) between these habitats is ensured by wildlife corridors and stepping stones. Where necessary, protected areas should be extended, specifically for the promotion of certain species. All sectors will have to contribute to the construction of ecological infrastructure.

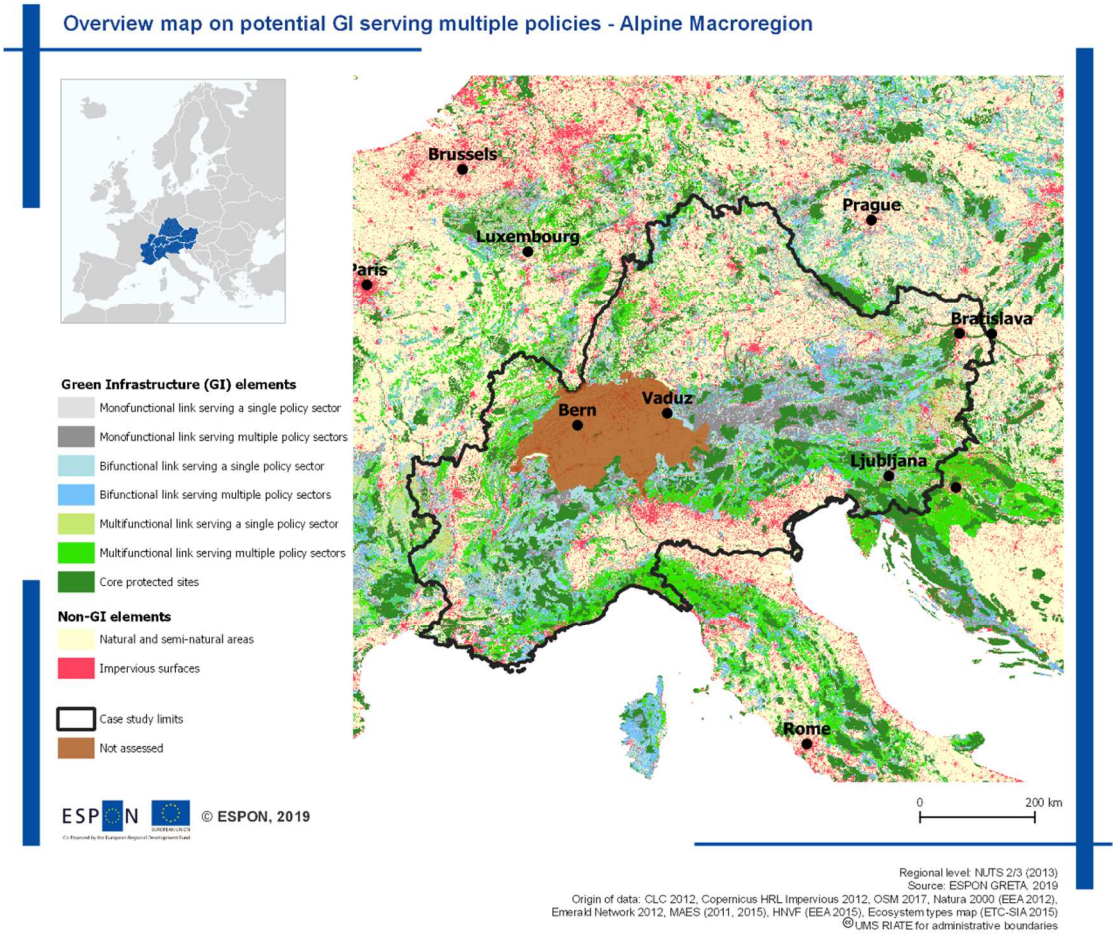
The implementation of the ecological network is foreseen in two areas:

- Synergy measures. In cooperation with the cantons, the Confederation will develop a holistic system of targets for the ecological infrastructure incorporating substantive and spatial principles and objectives for the safeguarding of space for the long-term conservation of biodiversity (quantitatively, qualitatively and regionally distributed). Existing elements of ecological infrastructure in the regions shall be conserved or promoted through the establishment and development of the countrywide ecological infrastructure. Working in close cooperation with the cantons and other interested circles – primarily actors involved in the protection and use of biodiversity – the Confederation will begin by developing a conceptual basis for the further development of the ecological infrastructure. Data available for the portrayal of the ecological infrastructure will be verified and deficits identified. Further measures ensuring an efficient and comprehensive portrayal will be applied. The added value of a concept in accordance with Art. 13 of the Spatial Planning Act (RPG) and the integration of the principles of ecological infrastructure into an existing planning instrument (e.g. Swiss Landscape Concept, LKS) will be examined.

- Measures with pilot projects. The Action Plan Pilot Projects guarantee initial concrete and effective steps for the implementation of complex and costly measures. This applies to the establishment or further development of the ecological infrastructure (e.g. through the promotion of the regional network planning), species promotion (national priority species), and the raising of aware-ness among user groups and the public for the relevance of biodiversity in terms of human and social welfare. The pilot projects

demonstrate how the available resources can be used effectively and efficiently to promote biodiversity in practice..

3.2 Benefits of GI and ecosystem services for smart, sustainable and inclusive territorial development;



Map 3. Alpine Macroregion of GRETA case study. Overview map on potential GI serving multiple policies.

The Potential GI covers about half of the Alpine Macroregion with large regional disparities:

- Austria, Slovenia, Northern Italy (except Poo Valley), France, and Switzerland[1]: the potential GI covers almost 80% of the corresponding regions.
- Germany and Poo Valley have lower coverage and very fragmented GI. In the case of Northern Italy, rivers play an important role as part of the GI in a region densely populated which faces strong pressures from transport networks, metropolitan areas and agricultural intensification.

It should be noted that the datasets used for ecosystem services, which are the ones with largest European coverage, have some gaps for Switzerland and Liechtenstein. However, the

[1] For Switzerland only the biphysical delineation of the GI has been assessed.

Interreg project AlpES has developed a comprehensive mapping of ecosystem services for the region -note yet available at the beginning of GRETA. Therefore, the assessment for the complete area is only available for the biophysical delineation, but not for ecosystem services. Moreover, the availability of data on ecosystem services for the complete region allows for the application of the proposed methodology in the future.

In terms of the integration of protected areas, the Alpine region shows a high level of connection of hubs (protected areas). Protected areas represent medium to high share of the total GI.

- Potential GI is well structured in the sense that it ensures connectivity of protected areas. Therefore, GI could be a valuable instrument to ensure connectivity in the whole region.

The extension of the Alpine region and its geographic diversity is reflected on the different situations regarding the potential multifunctionality of GI. One constrain is derived from the high elevation areas in mountains, characterized by the presence of bare rock on the surface. This results in very low values for most of the ecosystem services. Therefore, these areas need to be considered in this context.

- Slovenia, the Northern part of Italy (excluding the Poo Valley) and part of France (Franche-Comté NUTS FRC2) are the regions with highest capability to provide multifunctionality for the three policies analysed.
- The rest of the region has some limitations. It's worthwhile to mention the case of Austria, where there is a large network of protected areas, however, the connecting areas have lower capacity to provide ecosystem services.

In relation of the synergies and trade-offs between the ES, most of the ES have a neutral relationship, i.e. changes in on ES does not have impact on other ES. However, there is a strong trade-off between gross nutrient balance and soil erosion control, and gross nutrient balance with net ecosystem productivity in Northern Italy.

- There are conditions to improve the multifunctionality in the region, for example in Austria where no trade-offs have been identified.
- A major concern is the Poo Valley, were more detailed information is required to understand its potential limitations.

There is a high variability on the available GI inside the cities. However, accessibility is medium to high in the cities of the region. The evaluation from stakeholders have concluded that:

- This approach may be useful to provide a broad regional context.
- At more detailed level there is enough data in the region. Therefore, to develop a GI map this detailed information should be used.
- There are discrepancies on the evaluation of the GI produced by GRETA. These discrepancies are partly linked to different interests. For example, one criticism arose from the need to better integrate recreational aspects.

- The larger discrepancies have been observed on the definition of the policy priorities and related ecosystem services. The priorities and the perspective of the stakeholder are relevant on this regard.
- There is a lot of knowledge on GI. Projects like GRETA could help to visualize and disseminate GI in more understandable way. Maps are good tools for communication.

4 Capacity of GI network in Alpine Region to meet the demand of ES

According to stakeholders consulted, cost-benefit analyses and methods have been used in the decision-making process when deciding about best ways to manage or invest in GI in the municipality, particularly as ex-ante evaluation, although, as it has been already pointed out, ecosystem services as such are not explicitly assessed. The information included in the analysis to describe the benefits generated by the GI are: ecological and socio-economic information in non-monetary terms. The analyses that have been undertaken are linked with recreation, climate change (mitigation and adaptation) and health.

4.1 What do GRETA analysis on ES supply and demand reveal?

GRETA have explored the capacity of GI network to meet the demand of ES where:

ES supply is defined as the capacity of ecosystems to provide ES, irrespective of them being used.

ES demand can be defined as the amount of a service required or desired by society in a given location and time. This demand depends on several factors such as socio-economic conditions, cultural/behavioural norms, technological innovations, availability of alternatives, among others.

	ES Supply – benefits provided	ES Demand -specific definitions	Approaches to quantify Demand
Regulating services	Benefits are provided by maintaining desirable environmental conditions	Amount of regulation needed to meet target conditions	Reduction of risk
Cultural services	Benefits are provided by experiencing the natural environment	Desired total use (if rival service) or individual use (if nonrival service)	Preference and values // direct use
Provisioning services	Benefits are derived from consumption of final goods	Amount of goods obtained per unit of space and time or per capita	Direct use // Consumption

Table 1 Relation between benefits provided by ES supply and the corresponding ES demand definitions and operationalisation approaches. Adapted from: Villamagna et al., 2013 and Wolff et al., 2015.

Demand for **regulating services** can be defined as the amount of those environmental conditions that ensure the provision of a desired regulation level. A reduction of risk approach has been usually applied to quantify demands for these services. Vulnerability to potential

changes in regulating services may provide valuable insight into society's needs capturing main linkages from the socio-ecological system.

Demand for **cultural services** has been mostly assessed by preferences and values for attributes of certain landscapes, ecosystems or heritage sites. Preferences may be either quantified through stated preferences that relate to the desired level of services, or through revealed preferences (a proxy for the actual use of the service). Demand for cultural services has also been assessed by the direct use of a specific ecosystem, e.g. for recreation. This can be quantified by total visitor days per year or the number of fishing/hunting licenses, the presence of tourists or accounting the accessibility or proximity to recreational areas.

Demand for **provisioning services** has been quantified based on direct use and consumption of final. It is worthy to note that there is normally a spatial mismatch between the area where the service is provided and the area where the service is consumed, especially true for provisioning services. For this reason, interregional linkages must be considered in order to properly identify faraway dependencies and assess magnitude of potential impacts

Following the proposed conceptual framework, we have combined demand and supply for each of the selected ES. The focus of this approach was to highlight those areas where there is a high demand and a low supply, i.e. those areas where GI is unable to cover the ES demand. It should be noted that these results are of a more exploratory nature in the whole GRETA project considering the following limitations:

- This is a research area still under development;
- There is need for a higher resolution of the data sources given the nature of the phenomena analysed;
- Balance between supply and demand is semiquantitative; and
- In some cases, a more sophisticated modelling would be required to have an appropriate quantitative balance.

Therefore, these results should be illustration on how this demand and balance could be approached.

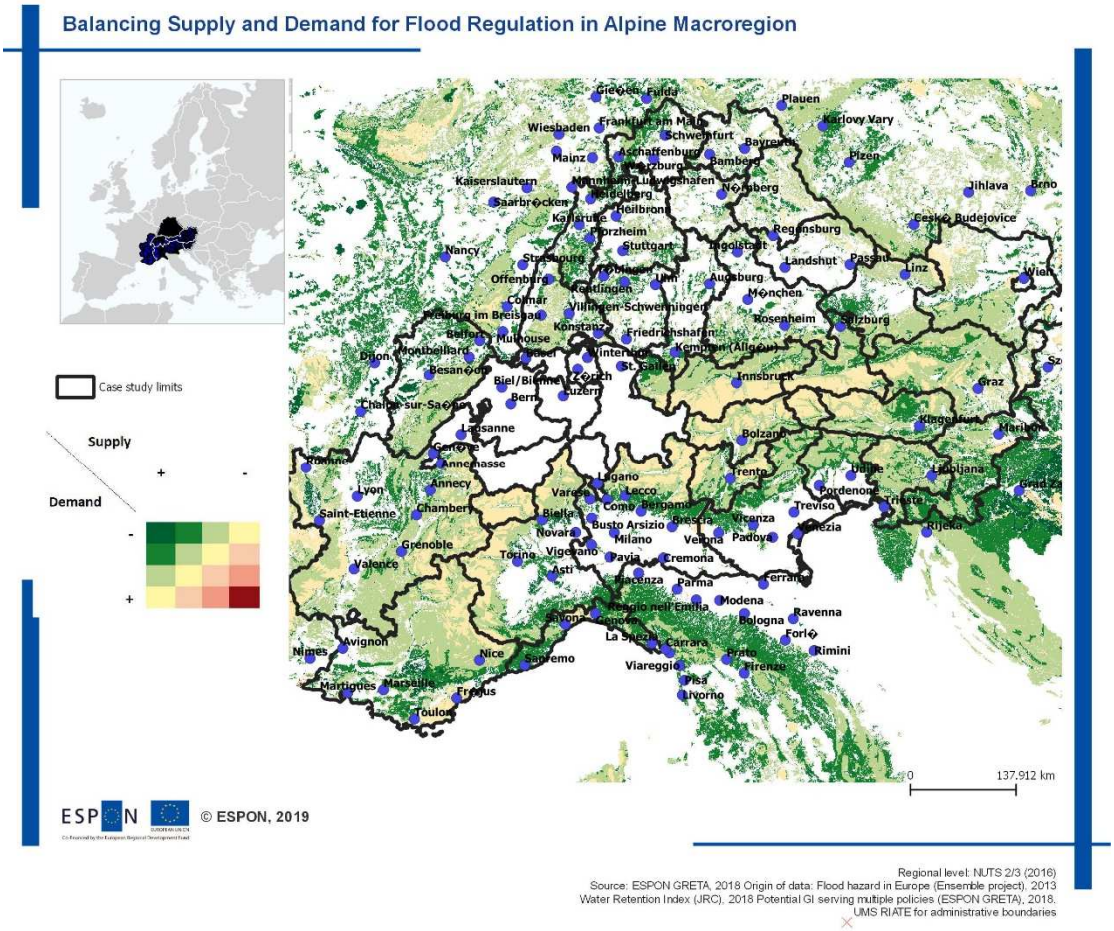
4.1.1 Analysis of supply and demand for Flood Regulation in Alpine Region

We have quantified demand for flood regulation based on the potential flood hazard. Exposure is described by the projected potential flooding risk[2]. On the other hand, benefits are provided by the water storage capacity of land to regulate floods. The supply for flood regulation is quantified by the Water Retention Index, which assesses the capacity of landscape to retain and regulate water passing through. This index is dimensionless and considers the role of interception by vegetation, the water-holding capacity of the soil, and the relative capacity of

[2] for the period 2011-2044 that results after applying the LISFLOOD model from the ENSEMBLES project

both the soil and the bedrock to allow percolation of water. The influence of soil sealing and slope gradient are additionally considered.

Map 4 presents a semi-quantitative balance between supply and demand in the Alpine Region. Dark green areas are those with maximum capacity of supply and demand is very low. These conditions are met mainly in the core protected areas. Other substantial part of the region is in yellow, i.e. Germany and Poo Valley which have lower coverage and very fragmented GI. In practical terms these areas would require a more detailed analysis to identify to what extent there is an equilibrium between supply and demand (indicated by yellow colour), and the implication of increased flooded risk as consequence of climate change.

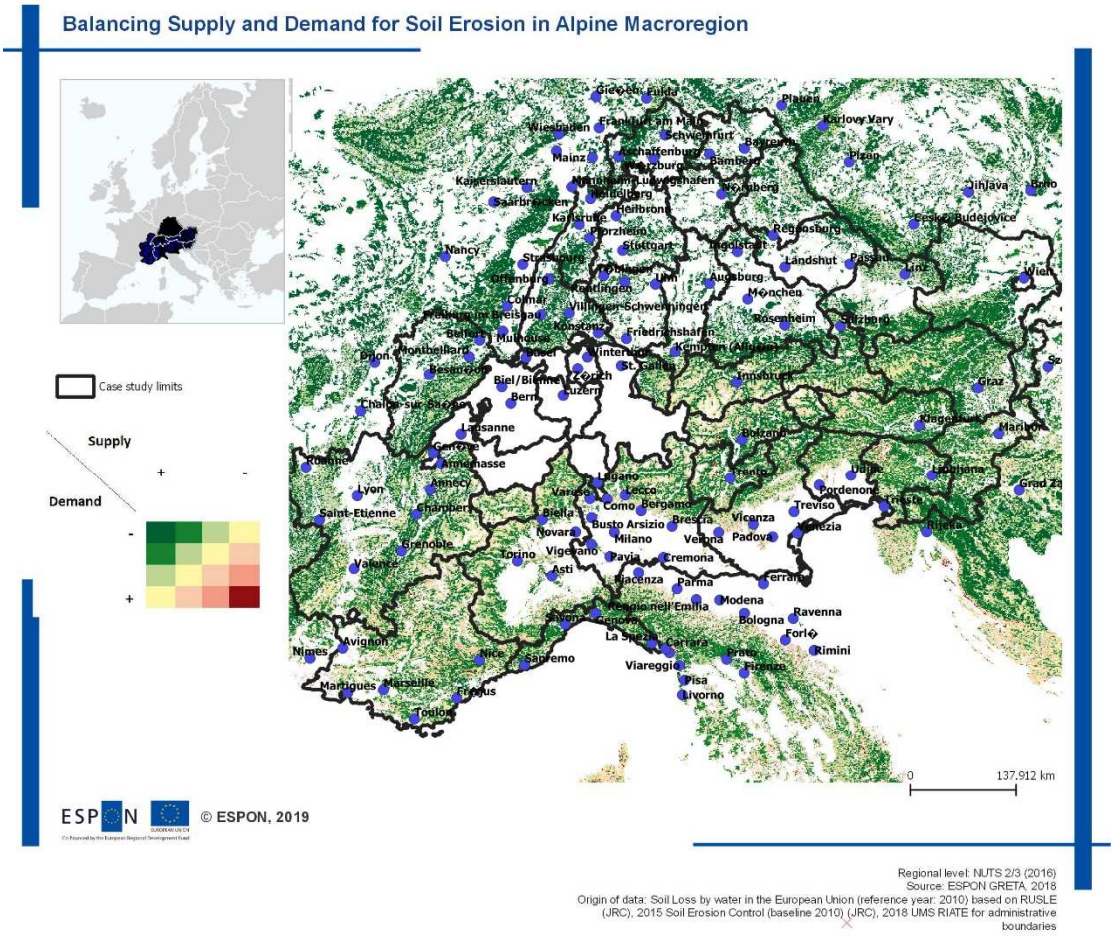


Map 4 Balancing Supply and Demand for Flood Regulation in Alpine Region.

4.1.2 Analysis of supply and demand for Reducing Soil Erosion in Alpine Region

We have assessed the demand for the reduction of soil erosion by water producing a negative impact on several ES; to the ones related to crop production, drinking water and carbon stocks. Soil erosion by water is mainly affected by precipitation, soil type, topography, land use and land management. Exposure is described by the soil loss rate[3] (t ha^{-1} yr^{-1}). Benefits are provided by the capacity of vegetation to control or reduce erosion rates. The supply is quantified by the Soil Erosion Control dataset (JRC) that describes the capacity of ecosystems to avoid soil erosion.

From the resulting Map 5, we can observe in general terms a positive balance pattern, with dispersed areas (yellow cells) aligned with the Alps.



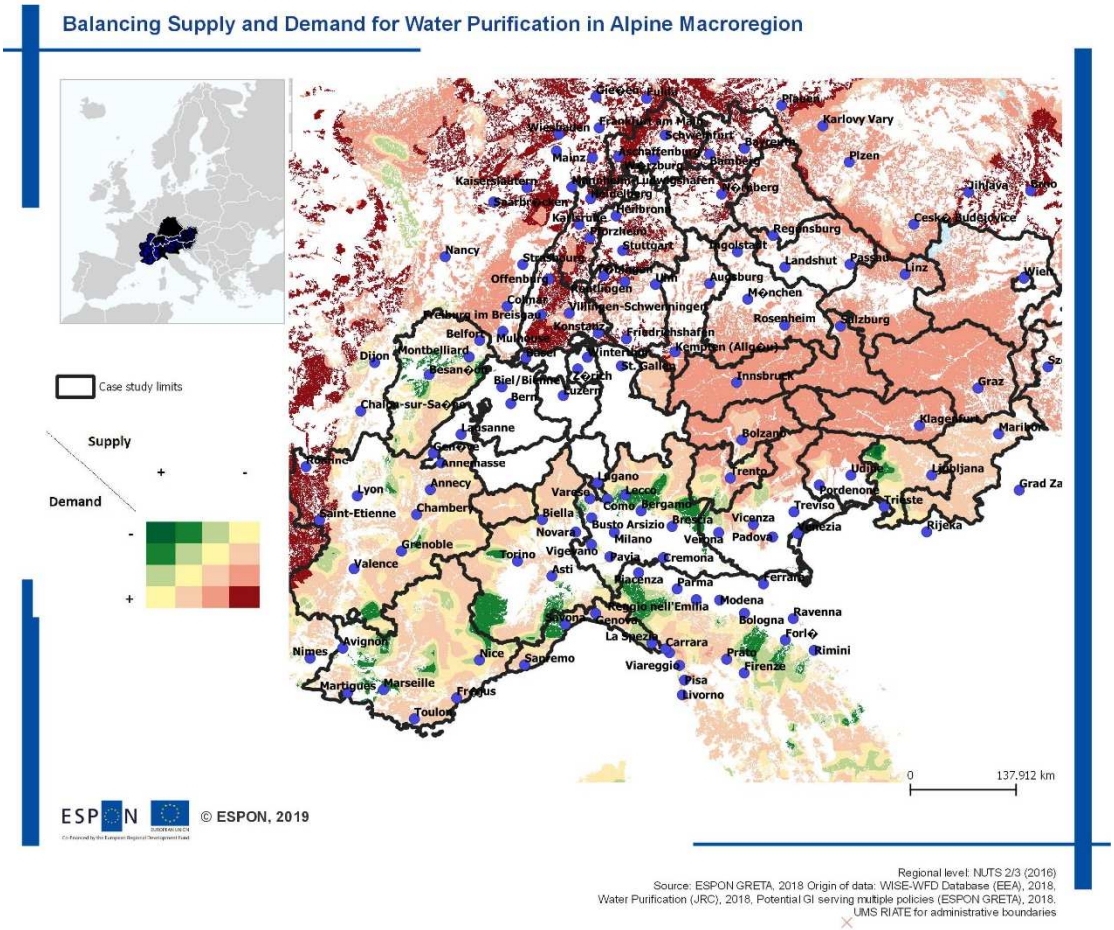
Map 5. Balancing Supply and Demand for Soil Erosion in Alpine Region

[3] as estimated by the modified version of the Revised Universal Soil Loss Equation (RUSLE) model

4.1.3 Analysis of supply and demand for Water Purification in Alpine Region

We have quantified demand for water purification based on the level of pollutants emitted to freshwater ecosystems by polluting sectors, primarily agriculture and waste water treatment discharges from industry and households. Exposure is described by mean annual concentration of nitrates in water [4]. The supply is quantified by the Water Purification dataset (JRC) that assesses the in-stream retention efficiency of ecosystems to dilute or degrade nutrients.

Resulting Map 6 shows that water pollution is still a big challenge in the region particularly relevant in the eastern part i.e. Austria and Slovenia. It should be noted that the data used in this report is aggregated by rivers and, therefore, the resolution may be coarser than the available at country level. This is the case of Slovenia where the assessments at country level problematic areas have a much lower extension.



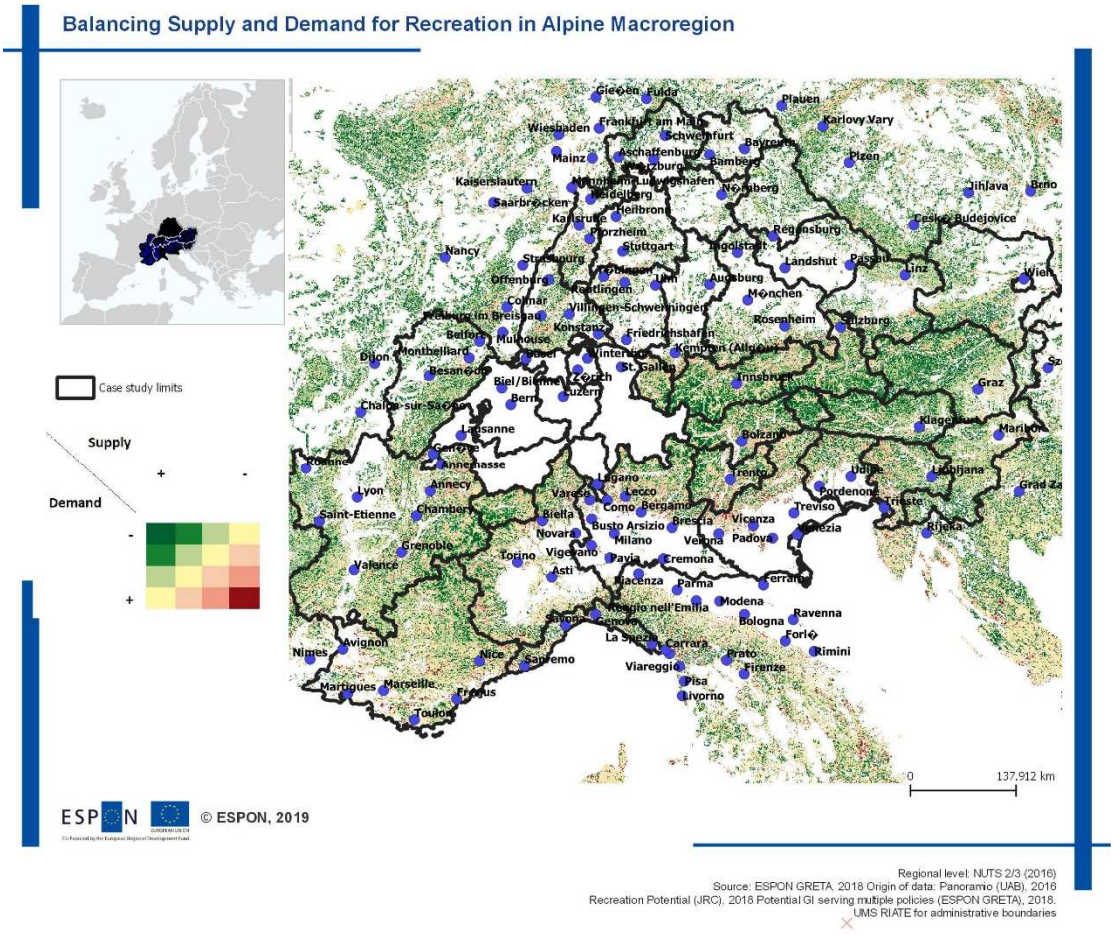
Map 6. Balancing Supply and Demand for Water Purification in Alpine Region

[4] tonne per year captured in monitoring stations and aggregated by rivers (the WISE-WFD database)

4.1.4 Analysis of supply and demand for Recreation in Alpine Region

We have described demand for recreation by means of a proxy for visitation. Recreation and tourism are important elements for national and local economies, that also contribute to other intangible benefits. Recreation directly depends on environmental attributes like species richness, diversity of habitats, and climate. The usability of crowd-sourced information by means of location photographs has already been shown to be as a reliable proxy for visitation rates to recreational sites. We have used the location of photographs in Panoramio as a proxy for landscape attractiveness for visitors. Demand is quantified by the number of pictures per square km. On the other hand, supply is described by the Recreation Potential dataset (JRC) that quantifies the potential for citizens for outdoor recreation.

The resulting Map 7 shows some deficit of recreational service (low supply together with high demand) in the region along south-western Germany, towards Northern Italy. This shows a direct link with population density.



Map 7. Balancing Supply and Demand for Recreation in Alpine Region

5 Governance practices, policy and planning instruments to implement GI and enhance ecosystem services in Alpine Macroregion

The competences for nature protection are spread through numerous territorial levels, and systematic coordination is lacking. While nature protection may be a topic of national relevance in some countries (France, Italy and Slovenia), it is more of a decentralised issue for the federal states of the Alps (Austria and Germany) within the “Bundesländer”. For Switzerland nature protection is, apart from the sites of national importance, a concrete competency of the Kantons. Different levels of legal competences do not always permit international coordination between essential decision makers and policies. European policies, by definition, are drafted in order to improve a given situation or maintain existing features. Most environmental policies are, however, not tailored to specific landscapes or regions, and they do not need to be, because they are defining general and logical principals that can be implemented in all sorts of regions with or without adaptations. Mountains, like other landscapes, have ecological, economic and sometimes social peculiarities. Thus, the way in which policies are implemented and adapted by involved partners, stakeholders and decision makers is essential, and need strong coordination.

Against this backdrop, the Joint Declaration of Alpine States and Regions “Alpine Green Infrastructure – Joining forces for nature, people and the economy”[5] (2017) sets the objectives and framework for cooperation in this area. This has been an important step, in the context of the EUSALP, to facilitate the coordination in a diverse and complex institutional context.

To understand its relevance and effectiveness, it should be seen in the context of the general governance of the EUSALP. The General Assembly gathers the high-level political representatives of States and Regions involved in the Strategy, the European Commission, and the Alpine Convention as observer. The Executive Board is formed by representatives of States and Regions and representatives from the European Commission, and as Observers, the Alpine Convention and the Alpine Space Transnational Programme. It oversees the implementation of the EUSALP, and it is meant to provide strategic guidance with respect to management and implementation of the EUSALP and its Action Plan.

The core of the implementation level is the Action Groups and Action Group leaders. The Action Group leaders are the drivers of day-to-day implementation. Their role, capacities, resources and engagement are a key element to the success of the Strategy. There the Action Group 7 is the responsible for the implementation of the Joint Declaration on GI.

The Interreg INTERREG Alpine Space AlpGov project is the financial instrument that facilitates the establishment of joint transnational EUSALP governance framework: setting up of

[5] https://www.alpine-region.eu/sites/default/files/uploads/inline/956/eusalp_joint_declaration_green_infrastructure_final_en.pdf

harmonized mechanisms to run the single AG including joint participation models for the civil society, developing a joint knowledge management (technically by using the same digital platforms, content wise by providing, using and capitalizing harmonized data and information also for monitoring, reporting and evaluation purposes), mapping of institutional frameworks, actors and funding schemes for projects and actions as a basis to prepare policy decisions and to further develop policies, identifying and promoting project/actions which have high leverage effects and help creating ownership and awareness.

The Action Group 7, on GI, has a key role by promoting different type of actions:

- Identify the relevant actors and stakeholders for successful implementation of GI.
- Promoting the coordination and interchange of different actors. It is of special importance to identify different practices, approaches or institutional settings in the different countries involved, in order to address the right actors and find the common grounds.
- Mainstreaming GI as part of the different actions and projects
- Identify priority areas for further development. There is a clear approach to evaluation of different proposals in order to develop a coherent set of projects. These criteria area based on promoting multifunctionality and multistakeholders' projects.

All these tasks reinforce a wide community related to GI from different perspectives (research, practitioners, planers, NGO,). This ground is the start of the specific projects. According to the objectives and criteria already described, there starts a process that will ideally end financed. Given the transnational nature of projects, most of them are financed, largely, by European funds (INTERREG Alpine Space, LIFE, LEADER,…).

The main domains of action that have been identified so far:

- Strength the connectivity, with strong biodiversity focus
- Promotion of rural areas to better embed agricultural practices in the GI
- Relevance of rivers as blue infrastructure also related to climate change and management of risk.

6 Lessons learned and good practice examples from the Alpine Macroregion

6.1 Challenges

Although GI is well integrated on the EUSALP strategy and governance, and to a variable extent in the different member countries, it remains a concept attached to academy and high policy level. Communication is still a barrier. The concept is not easy to explain to non-experts, which at the end it is an obstacle for its adoption. On the other side, many practices in land planning are very close to GI without using this terminology.

A cross-sectoral communication is needed for better understanding among spatial planners and other experts (e.g. biologists). This is critical to be properly included GI in spatial planning processes on local, national and macro-regional level. It should also be clearer who is responsible for running the planning process on different levels.

There is a need for a coherent perspective on GI and related projects. There are already many initiatives with the risk to be very much fragmented. Definition of geographic priority areas would also help.

Although the EUSALP provides an institutional framework for implementation of GI, a key question is who is the responsible to lead the process

Although scientific knowledge can still be improved, there is enough knowledge to act.

6.2 Opportunities

The EUSALP provides a good institutional framework for regional cooperation and implementation of GI. In that sense the cooperation with other Action Groups, the AG 8 (climate change and natural risks prevention), could improve the approach to multifunctionality and benefit the synergies from different stakeholders; and, AG 4 on forest management.

6.3 Good practice examples

Two projects are presented here which cover two different levels: regional GI (trans-Alpine) and peri-urban GI. Both projects have in common the strategic vision to tackle some of the (institutional) difficulties that hamper the implementation of GI. Therefore, while implementing GI, they improve the conditions that would facilitate its adoption.

ALPBIONET[6] project (2016-2019). The overall objective is to consolidate and enhance transnational cooperation in the field of nature conservation while providing a harmonized concept of preserving natural habitats and common planning tools to realize a high level of ecological connectivity for biodiversity conservation. The project aims to implement a coherent and complementary Alps-wide system of Strategic Alpine Connectivity Areas (SACA), reflecting the valuable and potential areas for ecological connectivity, defined at large scale and implemented at the level of Ecological Connectivity Pilot Regions (in cooperation with the Alpine Convention). Moreover, it includes the development of an integrated wildlife management for the Alps to overcome the increased level of fragmentation in sectoral policies (hunting, forestry, agriculture, tourism, spatial development, etc.).

LOS_DAMA![7] (2016-2019) strives for enhanced peri-urban landscapes in Alpine metropolitan areas. Peri-urban pilots in Landscape and Open Space Development in Alpine Metropolitan Areas" focuses on the `unspectacular´Alpine landscapes on its doorsteps. These valuable

[6] http://www.alpine-space.eu/projects/alpbionet2030/en/home

[7] http://www.alpine-space.eu/projects/los_dama/en/home

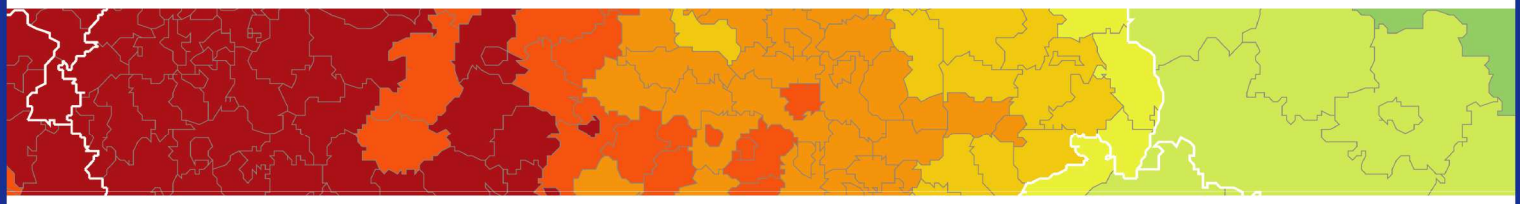
green spaces in and around the cities are exposed to heavy pressures and a variety of demands. The project, therefore focus on cooperating to protect liveable open spaces while also connecting people and green spaces throughout the Alpine region. In 2017, at the first EUSALP conference of environment ministers, the LOS_DAMA! Network of Cities and Metropolitan Regions for Green Infrastructure was launched, which will ensure its continuity beyind teh project. This provides the network with a permanent cooperation structure and close collaboration with the regional and national levels, whereas cities set up concrete actions. AG7 also works as a catalyst for networking opportunities, which often result in new project ideas.

7 Policy messages and recommendations in Alpine Macroregion

EUSALP offers a mechanism that facilitates the cooperation in a large and complex area. This provides the basis for a good development and implementation of GI.

There are already many ongoing initiatives related to GI at different scales and with different focus in the Alpine Macroregion. There is an opportunity to have a more integrated perspective on these initiatives to avoid fragmentation and disconnected approaches which could result in inconsistencies.

There is a need for a better integration of GI in spatial planning on the different steps and levels. Nevertheless, it is not easy to include ecological connectivity in the spatial planning, if there is no spatially articulated need or a concept, where it is needed, what is required and how it can support other spatial functions. The Ecological connectivity platform of the Alpine Convention is a good instrument to advance in this domain.



ESPON 2020 – More information

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The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.