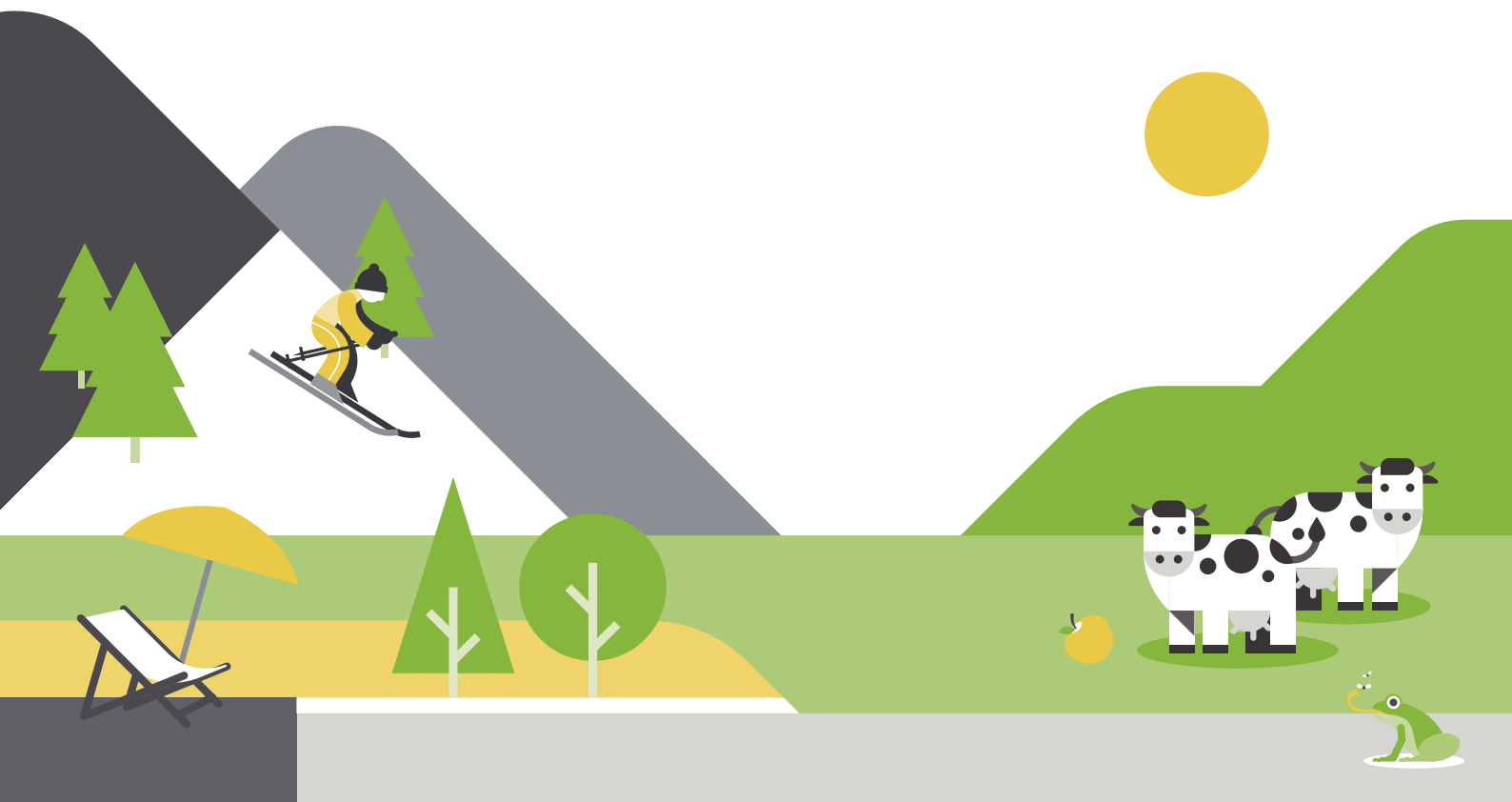




## **Ecosystem Services and Governance in the Alps:** Tools and Tips for Effective Environmental Management and Territorial Development



**Interreg**  
Alpine Space  




EUROPEAN UNION

The project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme.

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## The AlpES Project

### Alpine Ecosystem Services: Mapping, Maintenance, Management

#### The AlpES Project

The project “AlpES - Alpine Ecosystem Services - Mapping, Maintenance, Management” ran between December 2015 and December 2018. Its aim was to collect, analyse and distribute information about ecosystem services provided in the Alpine Arc. The project was carried out by a group of ten partners from six Alpine countries (Austria, France, Germany, Italy, Liechtenstein and Slovenia) and was led by Eurac Research of Bolzano/Bozen, Italy. The findings of AlpES were tested through stakeholder activities in nine test areas throughout the Alpine Arc (see map on page 3). Co-financed by the European Regional Development Fund through the Interreg Alpine Space programme, the AlpES project targets organisations involved in the management and protection of ecosystems and their services, including public authorities, policymakers, NGOs, researchers and economic actors. The overall objective of the project was to introduce a common understanding of ecosystem services as a regional and transnational environmental governance framework and to train and support the AlpES target groups to understand, value and manage ecosystem services.

#### Acknowledgements

We would like to thank the Alpine Space Programme for giving us the opportunity to pursue the project over the past three years. We also thank our test region stakeholders, whose help in assessing the project and exploring its implications in a local context was invaluable. We are very grateful to the project's observers, whose support and feedback was essential for the development of all activities and results. In particular, we would like to thank Serena D'Ambrogi (ISPRA, Italy) for her continuing review of our project outcomes and her valuable comments to the first draft of this text. Finally, we'd like to acknowledge all the individuals who followed our project and expressed interest in its activities: they gave us the motivation to pursue our objectives and constantly reassess our perspective on our work.

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Austrian Academy of Sciences (ÖAW), Institute for Interdisciplinary Mountain Research (IGF)  
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Safe Mountain Foundation, Italy  
Veneto Region, Italy  
Piedmont Region, Italy  
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# 1 What are Ecosystem Services?

Nature not only provides us with all kinds of goods and benefits—as human beings, we are part of a holistic natural system upon which our lives depend. From food and raw materials to energy, water and breathable air, we rely on nature for our survival. Natural processes support us and contribute to our quality of life: they control the climate in which we live, purify the air we breathe and the water we drink; they protect us from hazards and disease. Nature also provides us with other intangible benefits that inspire us and provide us with space to relax and recreate.

In the late nineties and early 2000s, there was a concerted effort from the scientific community to define and quantify the benefits that nature provides us with and that contribute to our well-being. Scientists believed that if we could see the hard data on what the environment gives us, we could more effectively coordinate how to protect these resources, for the sake of humans and nature. Out of this effort came the concept of “ecosystem services”, the benefits that humans receive from nature, and its three categories—Provisioning, Regulating and Cultural services (see box, Ecosystem Categories).

## ECOSYSTEM SERVICES CATEGORIES

- Provisioning services, which are raw materials such as food, water, timber, etc.
- Regulation and maintenance services, such as forests that sequester CO<sub>2</sub> from the air
- Cultural services, such as beautiful landscapes that inspire artists or open-air activities afforded by natural areas

## NATURE IS A CONNECTED SYSTEM... SO ARE ITS SERVICES

The essence of an ecosystem is the interdependence of its components—as much as we might like to eradicate mosquitoes, if we did so, dragonflies, frogs, birds and fish would suffer. Ecosystem services are likewise interconnected and their use often leads to conflicts. So when planning how to manage landscapes and their resources, we have to consider their interconnectivity: intensive farming can damage soil and water quality; using too much irrigation water from a river may cause problems in times of drought for populations down-

stream; excessive deforestation can expose forests to natural hazards and soil erosion—not to mention diminish their capacity to remove carbon dioxide from the atmosphere. Ecosystems are complex, interconnected and don't care much for political borders. We are obligated to develop reciprocal relationships if we want to avoid destroying what is uniquely important to us.

“Ecosystems are complex, interconnected and don't care much for political borders.”

## SO WE NEED TO COOPERATE...

When we look at ecosystem services in the Alpine Arc, we quickly understand how cooperation and coordination are essential, not only within nations and regions but between them. Ecosystem services are the main pillars of a green economy across the Alpine Space and a key driver of development.

However, the intersection of different socio-political boundaries in the Alpine Arc has created a spatial mosaic in which the values attributed to ecosystems services and their related management practices are often neither communicated or coordinated. This brings a number of challenges to developing transnational integrated management and sustainable use of ecosystem services and an integrated management, it is necessary to introduce a common framework for their adoption in decision-making processes across all scales. Public authorities, policy-makers, NGOs and economic actors need a shared understanding of ecosystem services, comparable data on their status and the relevant tools to bring them into their fields of work.

**GO IN DEPTH:** Examples of national and international frameworks that support an understanding of ecosystem services, their assessment and the need for cross-border collaboration can be found in the EU Biodiversity Strategy, the MAES (Mapping and Assessment of Ecosystem Services) Initiative and TEEB (The Economics of Ecosystems and Biodiversity).

## THE ECONOMICS OF ECOSYSTEM SERVICES

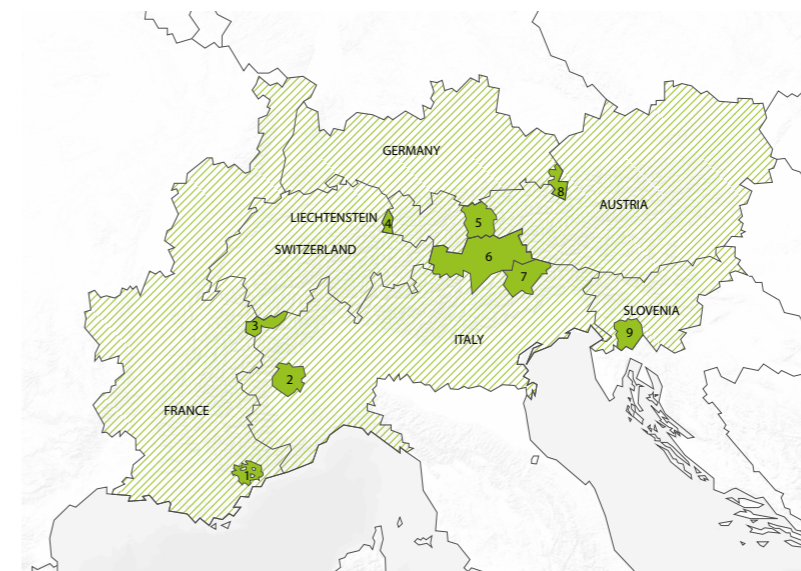
A look at the economic impact of ecosystem services proves the enormous relevance of ecosystems for the well-being of our society. For example, missing flood regulation from natural floodplain forests caused between 9 and 15 billion Euros in damages during the 2002 flooding of the Elbe river in Germany; in Switzerland, the yearly economic value of pollination by bee colonies was estimated to be approximately 225 million Euros, an amount which is five times larger than the profit generated by the direct products of beekeeping (honey, beeswax, etc.); and in Tyrol, the protective function of forests over settlements and infrastructure is evaluated at 10 €/m<sup>2</sup> per year, which over the total 60,000 ha of protection forest amounts to 6 billion Euros per year.

Despite the significance of these numbers, assigning a monetary value on ecosystem services does not aim at making them tradable goods. It is only meant to create the basis of common and socially-shared terms to enable a comparison of the services provided by nature with other services. In this way, economic valuation of ecosystem services can help decision-makers to address environmental issues and nature conservation by giving them a good reason, for example, to take care of bee colonies or to preserve forests reserves instead of cutting them down.

## ...BUT HOW?

The scientific experts and regional stakeholders of the AlpES project worked together to develop a common approach to addressing ecosystem services in Alpine Space. We brought together the relevant information and the capacity-building tools to help understand, recognise the value of and manage ecosystem services at all spatial levels. We mapped where ecosystem services are produced and consumed, as well as the current extent of their use, for every municipality in the Alpine Space.

We have made all these results freely-available on a web-based Geo-Information System (AlpES WebGIS), and we have created a wiki-style knowledge base (WIKIAlps) to give stakeholders quick access to up-to-date information on the concept. Finally, we have started to install a multi-level and cross-sectoral transfer of data to the widest possible range of stakeholders through a series of innovative, tailored and transferable learning tools and targeted activities.



- 1 Parc Naturel Régional des Préalpes d'Azur, France | PP Cerema
- 2 "Corona Verde" territory, Italy | PP Piedmont region
- 3 Italian part of the Espace Mont Blanc, Italy | PP Safe Mountain Foundation
- 4 Principality of Liechtenstein | PP Office of Environment, subcontractor CIPRA International
- 5 NUTS 3 Region "Innsbruck", Austria | PP UIBK & PP ÖAW/IGF
- 6 NUTS 3 Region "South Tyrol", Italy | LP Eurac Research
- 7 Local Action Group Alto Bellunese, Italy | PP Veneto Region
- 8 Biosphere Region Berchtesgadener Land, Germany | PP ifuplan
- 9 NUTS 3 Region "Primorsko-notranjska", Slovenia | PP IRSNC

The nine test areas of AlpES project and their AlpES partners.

**WHAT THIS DOCUMENT CAN DO FOR YOU**

This document is intended to help decision-makers in the Alpine Arc better integrate the strengths of the ecosystem service concept into their respective fields. It does not aspire to be exhaustive, but provides an introductory guide to readers to understand ecosystem services within the context of AlpES project findings. We've also included helpful links to external documents where you can find more detailed information on a topic of interest.

In Chapter 2 we offer an introduction to the main concepts and tools of Ecosystem Services to help you understand how ecosystem services can impact your work. Chapter 3 takes a look at four successful stakeholder communication processes that supported the development of the project and informed its results. Finally, in Chapter 4 we offer some basic advice as to what the scientific community and the public needs to consider to make ecosystem services one of the pillars of environmental policy.

Making informed, evidence-based decisions and encouraging the transnational and transregional sharing of those decisions is at the heart of this policy paper. The more informed decision-makers are about the factors that affect land and resource use, and the more they are aware of what other regions and countries are doing, the more sustainable their decisions will be for everyone in the Alpine Space.

## 2 The Strengths of Ecosystem Services

### 2.1 TOWARDS A COMMON UNDERSTANDING

The ecosystem services concept offers a shared vocabulary to address society's demands on ecosystems and the ability of ecosystems to meet those demands. For this reason, one of the principal objectives of the AlpES project was to establish a common understanding of the ecosystem services concept among the various stakeholders of the Alpine Arc, along with the current and potential use of the concept in planning processes. The following series of questions and answers can help you understand how the concept can be useful in planning processes.

#### HOW DO I INCLUDE ECOSYSTEM SERVICES IN DECISION-MAKING PROCESSES?

At the moment, ecosystem services are neither explicitly nor formally a part of decision-making processes about natural resources in the Alps. Nonetheless, they can play an important role, as is the case, for example, with the Common Agricultural Policy. In particular they can provide performance indicators for the definition of compensation and for the evaluation of agri-environmental measures. In the long-term they may become part of legal instruments to support decision-making, such as environmental impact assessments or spatial planning. In terms of a sustainable development, two aspects of the ecosystem services approach stand out as an advantage for decision-making:

1. Ecosystem services explain how we, as humans, are dependent on and affected by the provision and maintenance of natural goods and functions. It is in our own interest to consider and support ecosystem services for the provision of a good quality of life and enhanced well-being.
2. Revealing trade-offs between the different ecosystem services allows us to discuss the effects of our activities on different ecosystem services within a coherent and common framework. This could be one building block of regional environmental governance, in which a range of different stakeholders make common decisions about the sustainable development of their region.

#### HOW CAN I UNDERSTAND THE DATA ON ECOSYSTEM SERVICES?

The scientific community uses direct and indirect indicators to measure ecosystem services. Direct indicators are resources such as timber extracted from forests or water extracted from groundwater. Indirect indicators include data such as the quality of the water in semi-natural water carriers, the characteristics of soil fertility or the number of people visiting a beautiful natural location. Displaying the spatial distribution of these ecosystem services on maps makes this information more relevant for decision-making (see "Mapping and Assessment" in Chapter 2). It can show where certain ecosystem services are of major importance, and display changes over time.

It is important to learn about the supply (in the form of the natural potential and the actual provided stock) of ecosystem services; their flow, that is, their actual use by beneficiaries; as well as society's demand for ecosystem services.

Comparing ecosystem service supply and demand helps us to identify where and in what quantity ecosystem services are produced by nature and demanded by society. Ecosystem service supply-and-demand indicator maps clarify the spatial relationships and interdependence of ecosystem service provision and beneficiary regions. Comparing ecosystem service supply and flow can instead reveal unsustainable uses or untapped potential. It is important to consider the flow separately, and not just as a result of supply-and-demand dynamics.

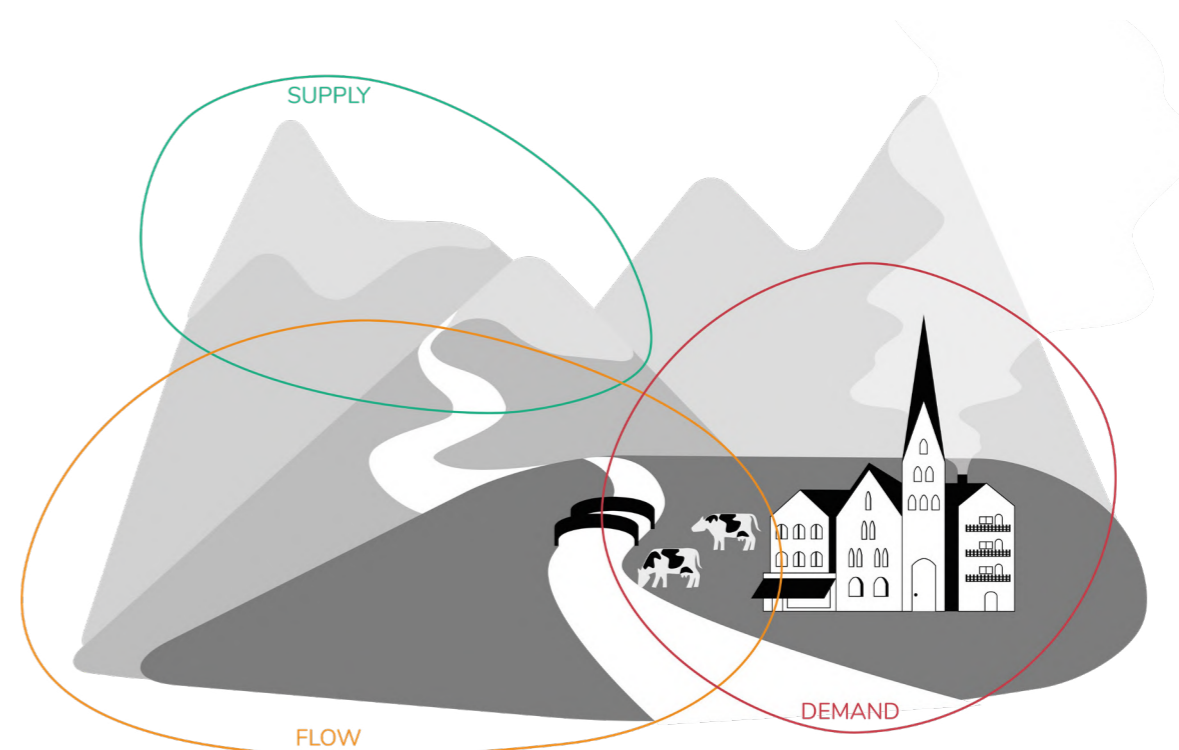


Diagram 1: The supply, flow and demand relationship of surface water for drinking.

**SUPPLY:** What ecosystem services are available and to what extent.  
**FLOW:** How much is extracted in a given time and area.  
**DEMAND:** How much is required by the beneficiaries in a given area.

It is important to look at the bundle or "cluster" of different ecosystem services that are provided in a specific area: ecosystem services rarely function independently, but are closely interrelated with others in the same area. It is next to impossible, however, to measure every ecosystem service—there are just too many of them and, at this time, the costs of efforts at data collection exceed the resources of public administration, scientific research and private/economic initiatives. With this in mind, the ecosystem services concept can improve and grow over time as public institutions begin to see it as a viable system and investment, both intellectual and capital, if its implementation continues to increase.

#### HOW IS THE ECOSYSTEM SERVICES CONCEPT CURRENTLY USED IN THE ALPS?

Governance instruments can be defined as formal and informal, and examples of both categories are available

among the policy tools for the Alpine environment. Formal Instruments are concrete actions and binding targets that are required by legislative decisions, treaties, preconditions and laws. These include urban plans, environmental impact assessments (EIAs) or nature conservation compensation schemes. Formal instruments tend to be top-down, medium-term measures that are focused on larger areas. A good example of this is the EIA, which is implemented into the national legislation of all EU-member states according to the relevant directive (with equivalent versions for Switzerland and Liechtenstein). The EIA is a well-established formal instrument that provides a comparable model for the whole Alpine Space. Informal instruments are processes and procedures that have no legally-binding commitments or reference to legal processes. Informal instruments are short-term measures available at a small (local to regional) scale with a bottom-up

approach. Some examples of these are civil/public forums, public panels, (future) workshops, citizen surveys, world cafés, public commissioned reports or participatory GIS methods.

Overall, formal instruments have a stronger impact on decision-making. However, there is still a lack of formal frameworks appropriate for the implementation of the ecosystem services concept. On the other hand, informal instruments, especially “Voluntary Approaches”, seem most suitable for its implementation. This is due to their flexibility and their ability to incorporate local knowledge and acceptance in the process.

During the AlpES project, we found that almost two-thirds of informal instruments and over a third of all formal instruments currently at use in the Alps integrate ecosystem services either partially or completely into their processes. Most of these instruments are not designed specifically for ecosystem services. Nonetheless, they expressly refer to them and to the importance of recognising, assessing and protecting ecosystem services.

Alpine countries present numerous examples of such instruments. National Rural Development plans are legally-binding in EU Member States and favour sustainable practices in agriculture in particular, through the recognition and protection of ecosystem services. As far as informal instruments are concerned, an interesting Alpine example is the Bergsteiger Dörfer, or Mountaineering Villages initiative, which guarantees an authentic and environmentally-friendly tourism experience in selected mountain villages committed to the preservation of local cultural and natural values.

#### **TO WHOM SHOULD I BE TALKING ABOUT ECOSYSTEM SERVICES?**

When considering a short-term implementation of the concept, the first point of contact should be with practitioners across all sectors and at all administrative levels. Within the different sectors you will find a wide range of ability and/or willingness to engage with the ecosystem service concept. This applies to the general population as well: the success of a wide-scale implementation of these instruments is influenced by attitudes to nature conservation, protection and management topics, as well as by their openness to new approaches. In the Alpine countries of the EU, the majority of people agree that nature, biodiversity and human well-being are intimately connected; however, when it comes to changing one's lifestyle to achieve a balance between the three, the commitment of the public is not as strong.

**GO IN DEPTH:** AlpES created three documents to help understand the basics of ecosystem services. These condensed, easy-to-read syntheses for non-experts available [here](#).



## 2.2 MAKING THE DATA MAKE SENSE: MAPPING AND ASSESSMENT

Although they reflect different aspects of an integrated process, the keywords “mapping” and “assessment” are often used together to describe ecosystem services. Assessment refers to the review and analysis of research destined to help a non-expert decision-maker reflect on an issue and evaluate potential actions. In this process, researchers assemble, summarise, organise, interpret and reconcile elements of existing knowledge and then communicate them in a way that is relevant to decision-makers. Closely related to this process, ecosystem service mapping is a method of making the information derived from the assessment process visually accessible and easily understandable, especially to those who are not familiar with the ecosystem services concept. Mapping ecosystem services offers an important set of tools to practitioners for the management of natural resources, planning of natural areas, as well as infrastructure and tourism development. Thanks to a growing body

of research, and as relationships between actions and outcomes become clearer, decision-makers will be more prepared to effectively address the issues of their sectors.

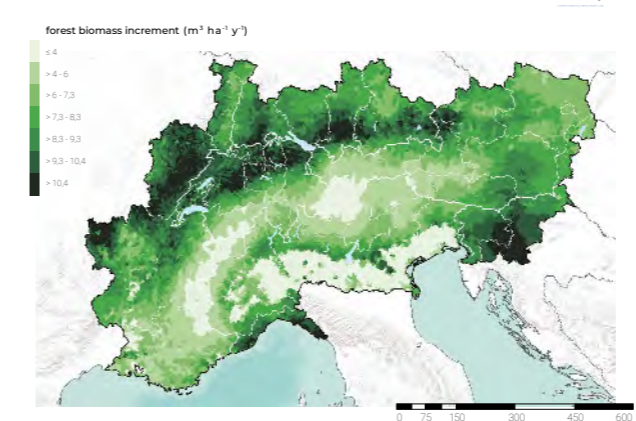
### MEASURING THE DATA

In the AlpES project, we created maps for decision-makers by using 22 different ecosystem services indicators that cover the three categories of provisioning, regulating, and cultural services. Indicators provide measurable data on ecological phenomena to identify trends in complex ecological processes such as ecosystem services. As such, they can highlight links between the social and environmental changes that influence the capacity of ecosystems to maintain provisioning, regulating and cultural services. We assessed the supply, flow and demand for nearly all of the 22 ecosystem service indicators, which can be seen in Table 1 below.

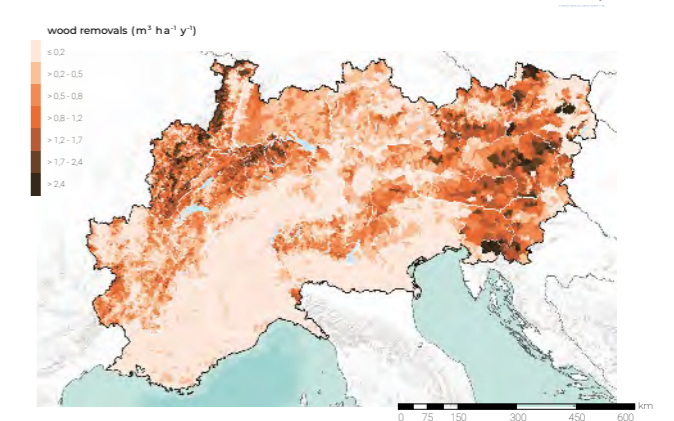
Ecosystem Service	Indicator type	Definition	Unit of measure
Surface water for drinking with minor or no treatments	Supply Flow Demand	Water availability Water use Water abstraction	m <sup>3</sup> ha <sup>-1</sup> y <sup>1</sup> m <sup>3</sup> ha <sup>-1</sup> y <sup>1</sup> m <sup>3</sup> ha <sup>-1</sup> y <sup>1</sup>
Biomass production from grassland	Supply Flow Demand	Gross fodder production Net fodder energy content Livestock feed energy requirements	t DM ha <sup>-1</sup> y <sup>1</sup> MJ NEL ha <sup>-1</sup> y <sup>1</sup> MJ NEL ha <sup>-1</sup> y <sup>1</sup>
Fuel wood	Supply Flow Demand	Forest biomass increment Wood removals Fuel wood requirements	m <sup>3</sup> ha <sup>-1</sup> y <sup>-1</sup> m <sup>3</sup> ha <sup>-1</sup> y <sup>-1</sup> m <sup>3</sup> y <sup>-1</sup>
Filtration of surface water by ecosystem types	Flow and Supply Demand	Nitrogen removals Nitrogen loads	kg ha <sup>-1</sup> y <sup>-1</sup> kg ha <sup>-1</sup> y <sup>-1</sup>
Protection against avalanches, mudslides and rockfalls	Supply Flow Demand	Site-protecting forest Object-protecting forest Infrastructure in hazard zones	% % %
CO <sub>2</sub> sequestration by forests and bogs	Flow and supply Demand	CO <sub>2</sub> sequestration by forests CO <sub>2</sub> emissions	t CO <sub>2</sub> ha <sup>-1</sup> y <sup>-1</sup> t CO <sub>2</sub> ha <sup>-1</sup> y <sup>-1</sup>
Outdoor recreation activities	Supply Flow Demand	Outdoor recreation availability Visitation rate Beneficiaries	index index index
Symbolic Alpine plants and animals, landscapes	Supply Flow Demand	Habitats of symbolic species Occurrence in hotel names Desired symbolic species and landscapes	index nr. of hotels not determined

Table 1: The 22 Ecosystem Service Indicators of the AlpES Project

### SUPPLY

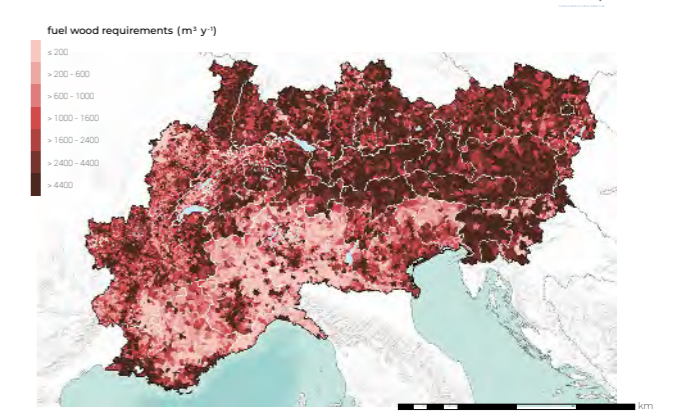


### FLOW



Maps showing the spatial distribution of the indicators of the Alpine ecosystem service “Fuel wood”. By comparing the maps, it is possible to visually understand the dynamics of supply (1), flow (2) and demand (3) related to the ecosystem service. The supply (1), representing the provision capacity of ecosystems, shows high supply rates at lower altitudes, where forests have a faster regrowth rate. The values of the flow (2) have a heterogeneous distribution, showing how much of the service humans actually subtract from the ecosystem, which is highly dependent on the accessibility and the topography of the forests. The hypothetical fuel wood consumption which represents the demand (3) for the ecosystem service is scattered throughout the Alpine Space, highlighting urban centres as pools of energy demand.

### DEMAND



### SEEING THE DATA

The AlpES Project developed maps for 20 of the 22 indicators across the whole Alpine Space.<sup>1</sup> These maps show the supply, flow and demand of ecosystem services in three different colours, with darker colour tones representing higher indicator values. All of the maps were created with a uniform layout and scale. External boundaries match those of the Alpine Space cooperation area. National borders help viewers to orientate themselves. Ecosystem service indicator values have been calculated for every municipality within the Alpine

Space, and each municipality is depicted with a colour tone relative to this value. These maps can be visualised in the AlpES WebGIS and are also available in the document noted in “Go In Depth” below. The indicators that they represent, along with their metadata, are further explained in WIKIAIps. Both AlpES WebGIS and WIKIAIps are described in further detail in the next section.

**GO IN DEPTH:** Find out more about Mapping and Assessment in the AlpES document, *Ecosystem Services in the Alps: A Short Report on Mapping and Assessment*.

<sup>1</sup> The flow indicator of the cultural ecosystem service “Symbolic Alpine Plants and Animals, Landscapes” was identified and conceptually developed, but due to the scarce availability and coherence of data across the entire area, the indicator was only mapped in certain municipalities. The demand indicator of the cultural ecosystem service “Symbolic Alpine Plants and Animals, Landscapes” was not spatially mapped but only described in the document *Ecosystem Services in the Alps: A Short Report*.

### 2.3 TOOLS OF THE TRADE – ALPES WEBGIS & WIKIALPS

The ecosystem services concept is not only an interesting cognitive tool to understand the relationship between humans and natural resources, it is also a concrete tool with which planners and policy-makers can make evidence-based decisions. The AlpES project created two new tools specifically designed to help planners and decision-makers. The first is the interactive and interoperable AlpES WebGIS, with 20 maps that use the quantifiable indicators of the selected provisioning, regulating, and cultural services and visually represent their spatial distribution over the entire Alpine Space. Secondly, AlpES further extended WIKIALps (the Alpine Space wiki) to include the AlpES project results and foster a common understanding of the ecosystem services concept and its benefits.

#### ALPES WEBGIS

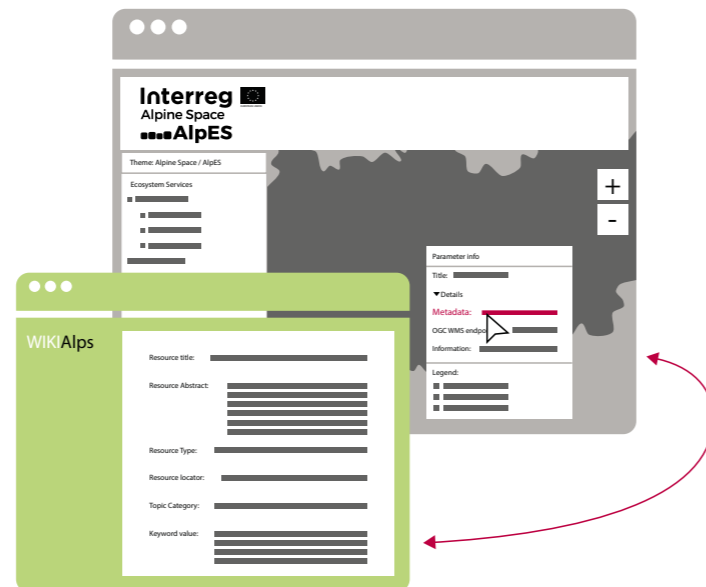
A geographic information system or “GIS” is a computer system for capturing, storing, checking and displaying data about positions on Earth’s surface. By relating seemingly unrelated data, a GIS can help individuals and organisations better understand spatial patterns and relationships (Source: National Geographic). A WebGIS does the same thing as a GIS, but in a simpler way (eg. GoogleMaps). One of the main outputs of the AlpES project is the AlpES WebGIS. An interactive and user-friendly tool, AlpES WebGIS makes ecosystem service indicator maps of the Alpine Space accessible to stakeholders. It can produce web and print versions in five languages (DE, EN, FR, IT, SL). Thanks to a calculation tool, stakeholders can also produce their own maps and use these maps to describe the state of individual ecosystem services in their municipality or region.

**GO IN DEPTH:** Find out more about the benefit of ecosystem services mapping with the AlpES WebGIS Tutorial.

#### WIKIALPS

WIKIALps is an online, open-access encyclopedia that aims to build common understanding of ecosystem services, their benefits and the natural capital of the Alpine Space. WIKIALps is freely available to the public, and everyone with expertise on Alpine Space topics is invited to share their knowledge on the site by editing existing pages or creating entirely new ones. Available in the five languages of the AlpES project, WIKIALps is built upon a previously existing wiki, whose main objective was to facilitate balanced and shared transnational and transregional territorial development of Alpine Space. WIKIALps is directly linked to the AlpES WebGIS; it houses general project descriptions, background information on the eight AlpES ecosystem services and the selected indicators, and a glossary of terms with more general entries on ecosystem services in the Alps. Also included are the methods and processes that AlpES used to calculate the ecosystem service indicators and produce the relative maps.

WIKIALps is the project’s knowledge platform and houses background information on the AlpES WebGIS indicator maps



### 2.4 LEARNING HOW TO LEARN

One of the hurdles to embedding ecosystem services into planning practices is understanding the impact of the conceptual framework on different sectors: it is one thing to look at data of ecosystem service tools such as WIKIALps and AlpES WebGIS, it is quite another to understand how to use that information in your daily planning processes.

For this reason, the AlpES Project has created training modules. We want to create the conditions by which Alpine Space stakeholders can increase their knowledge about the ecosystem services concept and implement it correctly, particularly with respect to environmental management and territorial development. To this end, we have designed three training products to help stakeholders become independent in their use of ecosystem services in planning processes.

#### ONE-DAY TRAINING SESSIONS

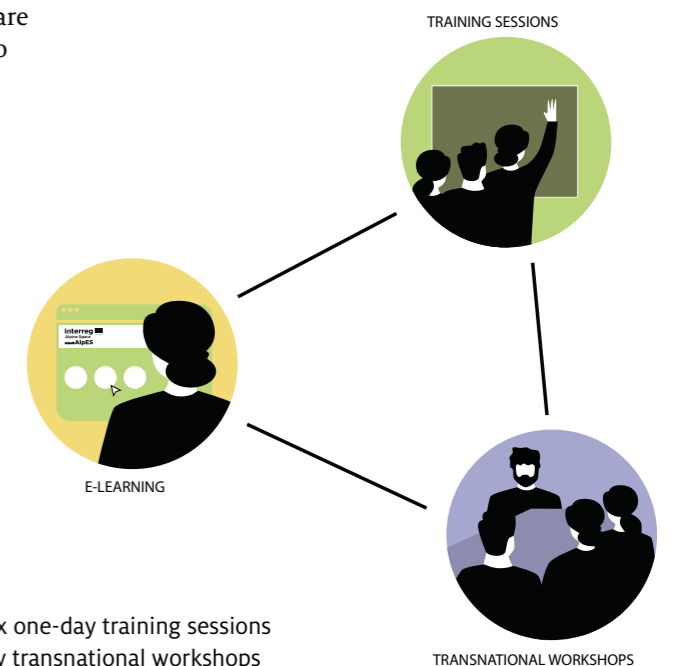
AlpES has developed one-day training sessions on the theory and practice of Alpine ecosystem services for decision-makers and planners. These interactive training sessions take participants through activities that are specifically tailored to local and regional contexts through a series of preparatory stakeholder interviews. The comprehensive training, offered in the native language of the participant groups, introduces specific sections or outputs of the AlpES methodology. Background materials about the project’s outcomes are provided prior to the session to allow participants to prepare for the training.

#### ONE-DAY PRACTICAL WORKSHOPS

We have developed a model for a one-day practical workshop that explores examples of negotiation, mediation, conflict resolution and participation adapted to regional Alpine space contexts. The workshop addresses the organisation, timeline and logistics of ecosystem service planning. We also have a series of presentation packages that can be used for information sessions, so that they can be adapted to the local contexts and needs of local stakeholders.

#### E-LEARNING TOOL

The AlpES team has developed a simple and effective e-learning platform to help stakeholders become independent in their use of AlpES capacity-building tools. With basic, intermediate and advanced levels, the modular design of the web-based platform can be customised to the training needs of the user. The tool allows users to navigate through all the AlpES project outcomes, while deepening their knowledge with subjects more relevant to their interests. An introduction shows users how to navigate through the different modules, either through a pre-defined course or by selecting their own modules. To make the overall learning experience more engaging, the tool features innovative infographics and videos.



The AlpES training products: an online e-learning tool, six one-day training sessions in each of the Alpine languages, and a model for one-day transnational workshops

### 3 Four Communication Examples

One of the biggest challenges to incorporating ecosystem services into planning activities is ensuring that all concerned parties share a common understanding of the concept. Many stakeholders with differing experience and interests must be coordinated for the concept to work. Thus, the more innovative and creative the communication plan, the more successful the integration of the concept will be across sectors and scales. This is why the ALPES project invested considerable time and effort into testing its tools and data with stakeholder organisations who are tasked with implementing the ecosystem services concept.

We analysed our project in nine different regions of the Alps and involved a range of stakeholders in the process—from park conservation authorities, to municipal planners to representatives of environment ministries. Some of them were familiar with the ecosystem service concept and were already using it in their planning processes; others were completely new to the idea. We asked these stakeholders to challenge the tools we were developing and to help us understand how to better communicate the concepts they represented. After all, it is these same planners and decision-makers who must later go back to their desks and do the subtler work of leveraging the benefits of the concept in their practices.

Chapter 3 recounts four stories from four of our nine test sites. These four stories stand out for the originality of their approach or lessons they learned from the challenges they encountered in their work.



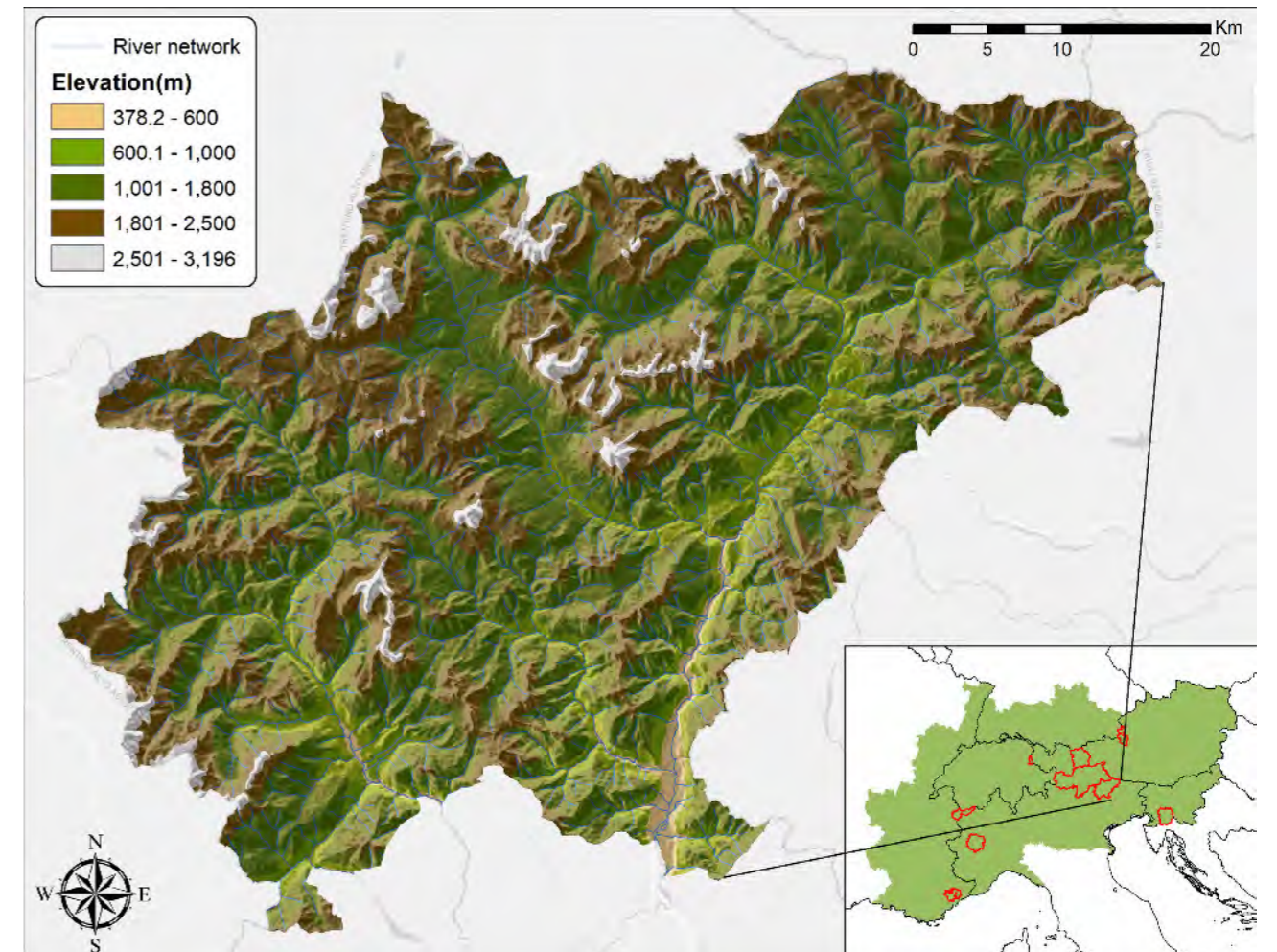
**3.1:**  
**BUILDING PUBLIC AWARENESS**  
**Alto Bellunese, Veneto, Italy**

**THE REGION**

The Alto Bellunese is found in the northernmost area of the Veneto region in Italy and covers an area of 233,172 km<sup>2</sup>. The area includes five mountain unions (Comelico Sappada, Centro Cadore, Valle del Boite, Agordo and Cadore Longarone Zoldo) and 41 municipalities. Despite demographic issues related to outmigration and ageing, it presents a good quality of life and enjoys a wealth of forests and natural resources. Recognised as a UNESCO World Heritage site, the natural value and beautiful landscape of the Belluno Dolomites make the area a famous tourist destination. It includes the Ampezzo Dolomites Regional Park and a part of the National Park of the Belluno Dolomites, as well as 17 sites of community importance and seven Special Protection Areas, which overlap in some cases. The AlpES Project test site focused on the Zoldo Valley, where the Civetta and Pelmo Dolomite mountains are located.

**THEIR STORY**

In the Alto Bellunese, the AlpES Project communicated the concept of ecosystem services to stakeholders, each of whom had different levels of knowledge and understanding. They developed a series of creative engagement strategies designed to interact with the public. First, they created a theatre production to highlight all the values of the forest. Secondly, they placed a cardboard tree in the municipality to gather comments from residents and tourists on the simple question: "Tourism in Val di Zoldo is...". The communication tools contextualised the region's ecosystem services within their own cultural and sectoral language. Subsequent stakeholder workshops adopted a participatory approach that enabled participants to express their own opinion about ecosystem services and the challenges and opportunities related to their valorisation. A key insight to emerge from the testing was the need for destination management as a method of coordinating and organising public and private stakeholders of well-defined tourism products to valorise an ecosystem service such as recreation and tourism. This way, tourism can serve the community rather than the community serving tourism.

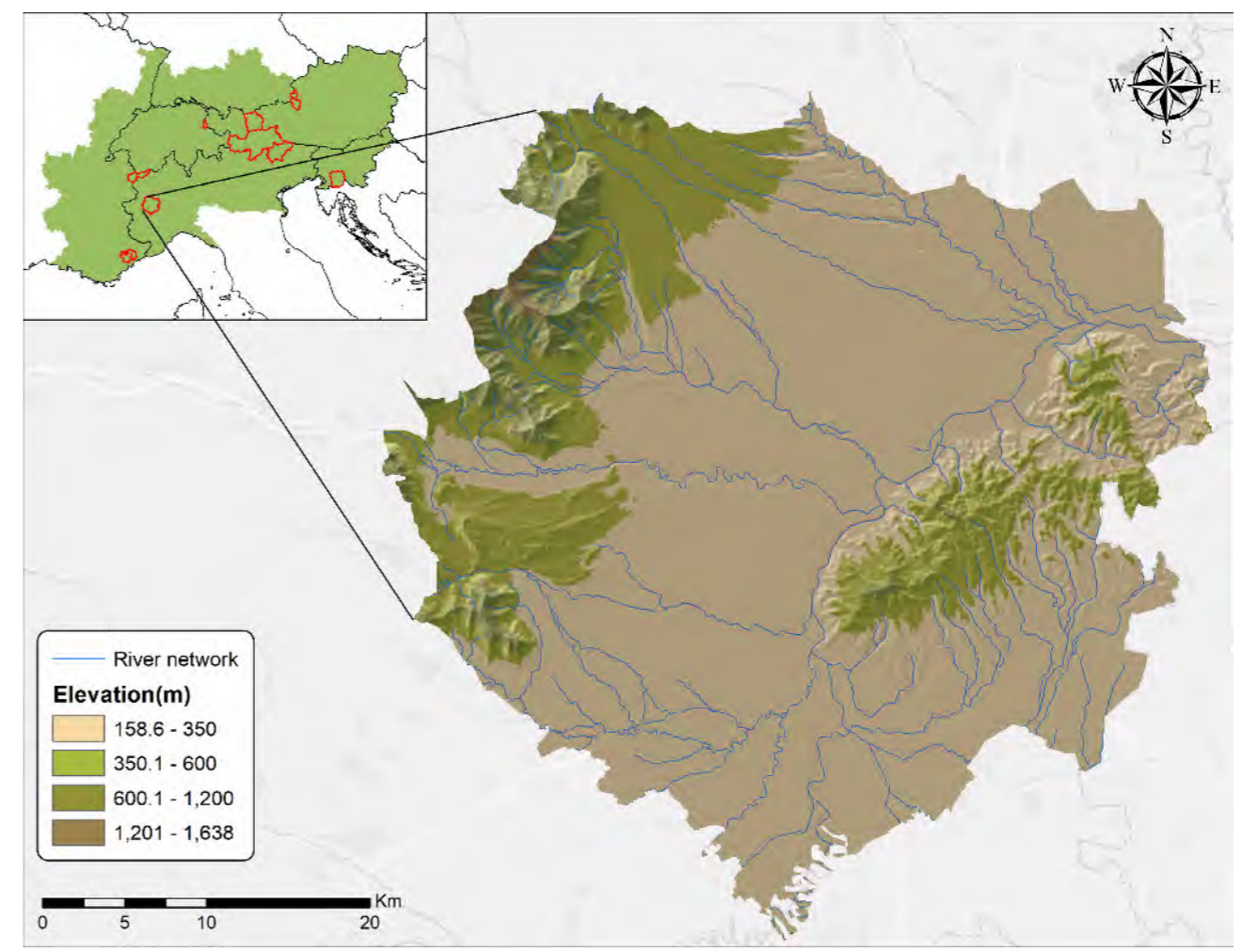




**3.2:**  
**CREATING FORMAL INSTRUMENTS**  
**Corona Verde, Piemonte, Italy**

**THE REGION**  
 Corona Verde in Piemonte, Italy, extends from the City of Turin to include 93 other municipalities. It represents an area of almost 165,000 hectares and a population of about 1,800,000 inhabitants. The territory integrates the two UNESCO World Heritage Site of the Crown of Delights and Savoy Residences with a green belt of parks, rivers and rural areas in the metropolitan area of Turin, thus creating a green infrastructure to implement sustainable management plans.

**THEIR STORY**  
 One of the challenges of introducing ecosystem services into planning processes is communicating the concept of the valuation of those services in a given area, and in particular understanding the difference between “value” and “price”. Stakeholders in the Corona Verde test region were concerned about the potential manipulation of the valuation of ecosystem services by private business interests. To overcome these conceptual difficulties, AlpES partners concentrated their work in three principal veins: first, they held workshops in which they carefully communicated to stakeholders the difference between value and price; secondly, they worked with regional politicians to introduce new formal instruments for ecosystem services (modifications to a law on land-use, an article about ecosystem functionality and an explanation of the system of valuation as a standard for organisation); and, finally, they wrote guidelines for inserting ecosystem services and their economic evaluation in particular as instruments for territorial planning at the regional and municipal levels.





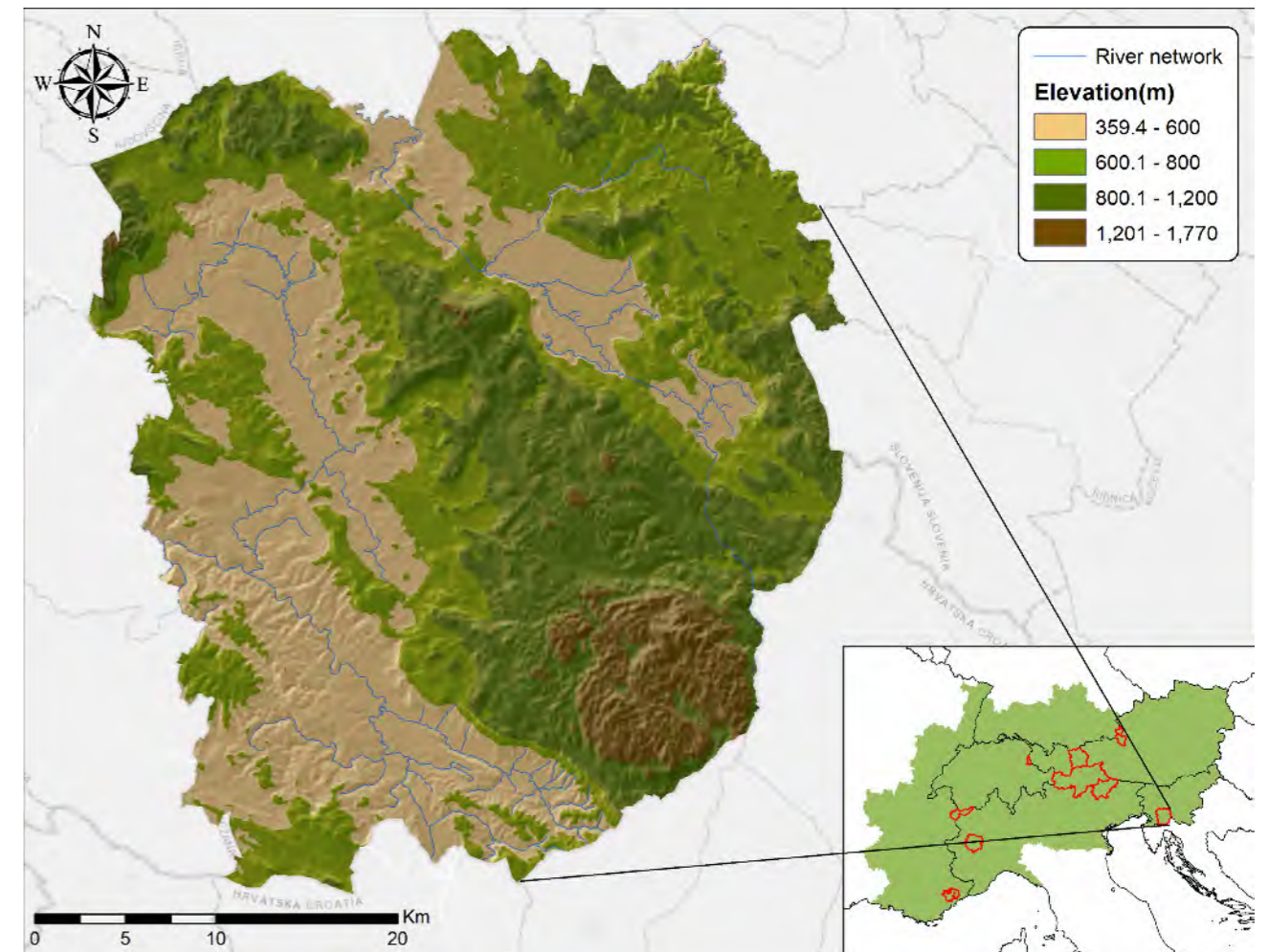
**3.3:**  
**CLOSING DATA GAPS**  
**The Region of Primorsko-notranjska,**  
**Slovenia**

**THE REGION**

Located in south-western Slovenia, the region of Primorsko-notranjska stretches over 1,456 km<sup>2</sup>. It is a rural region, with the lowest population density in the country (36 inhabitants per km<sup>2</sup>). The rugged “dinaric” region of the Alps is known for its large carnivores, old forests and impressive cultural life. There are also some unique grasslands (dry karst meadows, pastures and scrubland areas) and wetlands. The region has ample water resources, mainly because of the karst aquifer and springs. Timber is the most significant natural resource in the area.

**THEIR STORY**

AlpES partners in the Primorsko-notranjska region encountered local stakeholders who challenged some of the data and the results of the project. In response, the team focused on adapting ecosystem service methodologies and better communicating the results. For example, as a Dinaric region, Primorsko-notranjska is distinguished by its diverse landscape, influenced by unique underground water flow characteristics due to karst phenomena. For this reason, stakeholders found a discrepancy between the data of some of the AlpES indicators and the reality of the region. To solve this, the group collaborated closely with all the stakeholders on the development of a questionnaire on “Symbolic Species and Landscapes” in the Primorsko-notranjska statistical region to make the indicator more accurate. They also contracted an external expert to carry out a study on ecosystem service mapping and implementation in the Primorsko-notranjska region. This consultant made a proposal for how the ecosystem services concept could be incorporated into forest management planning.





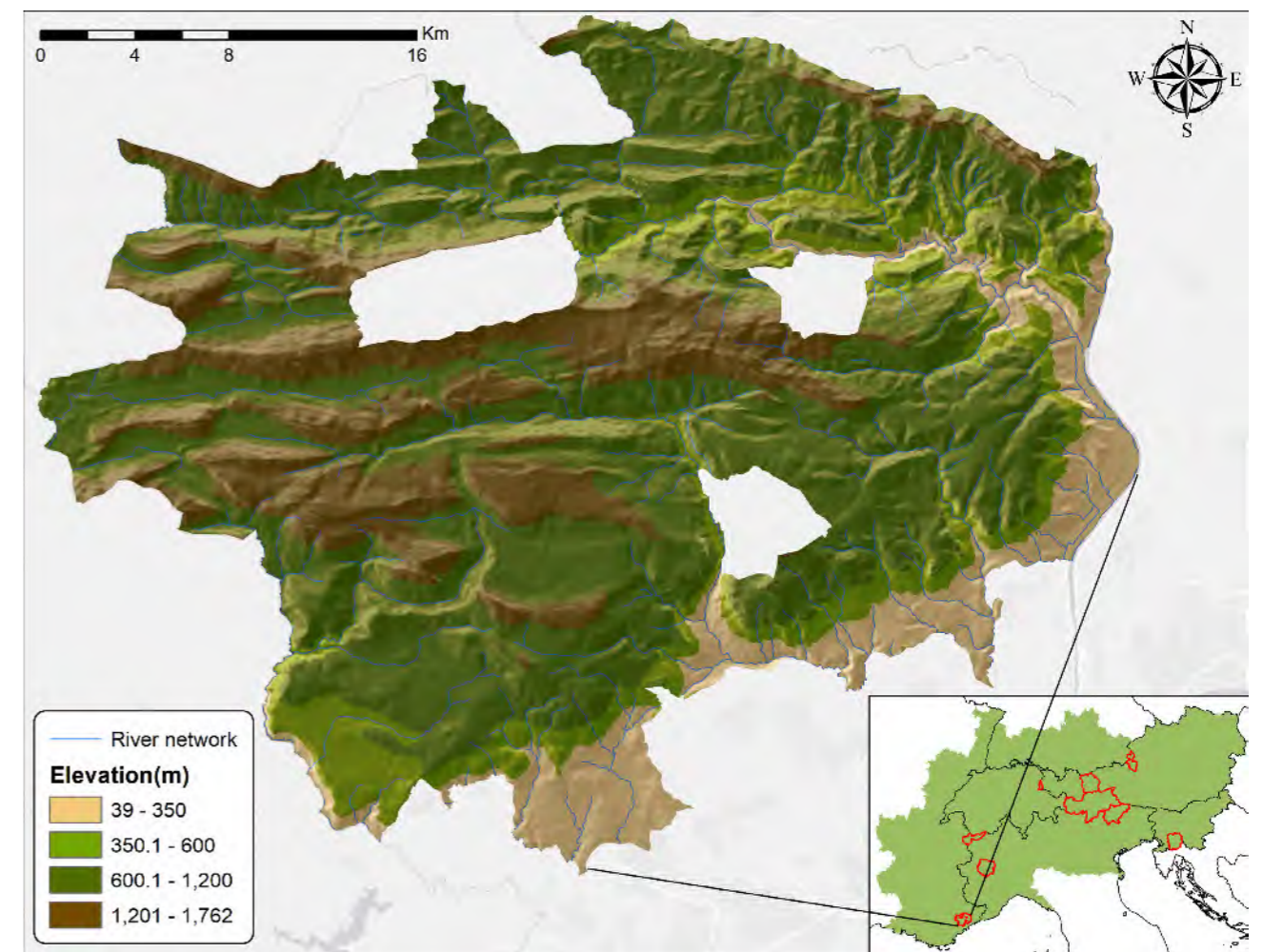
### 3.4: LOOKING FOR ALTERNATIVE SOLUTIONS Regional Park of Préalpes d'Azur, France

#### THE REGION

The “Préalpes d'Azur” Regional Park is a well-preserved mountainous rural area in the south of France along the coastline of the Mediterranean Sea. Established by executive decree in 2012, the park's altitude varies between 300 to 1,800 m, and its dual Alpine and Mediterranean climatic profiles influence its biodiversity. The park is home to over 2,000 plant species, which represent approximately one third of the flora in France. The park comprises 45 municipalities with 31,270 inhabitants living in 88,940 ha, and is 44 km from the city of Nice. It has the largest area of pastures in the Alpes Maritimes. As a regional natural park (PNR), the park's stakeholders must strike a balance between supporting human activity and preserving its natural resources.

#### THEIR STORY

The AlpES team and the stakeholders opted to create a land-use map to represent different ecosystem service conflicts that could occur in the region. For example, within a single territory that provides a habitat for wolves, pasture for shepherds and recreational activities for tourists, the simultaneous provision of these related ecosystem services (habitat regulation, food provision, outdoor recreation) might be challenged by their own contrasting nature. Tourists might be a disturbing element if they are too numerous and not aware of the interactions between the different elements of the natural capital of the territory; they could cause habitat fragmentation for wild species or disturb livestock. On the other hand, wild species as wolves could be a threat to flocks of sheep, causing economic losses to the shepherds. The analysis of the bundles of ecosystem services and their potential conflicts with particular socio-cultural relevance for the region can thus help decision-making and planning by identifying stakeholders who might encounter conflicts of interest and creating alternative development paths, especially those support the sustainable development of the economic activities.



## 4 Recommendations

The AlpES project has helped to bring the ecosystem services concept onto the agendas of decision-makers. It has also broadened the pool of stakeholders who understand and practice the concept. That said, the complexity of the theme and its relative youth as a conceptual view of the link between ecology and society, mean that the analysis of specific territorial zones and the concept's implementation in planning processes are still a work-in-progress. The AlpES project (and others that will follow) can serve to sort through these complex intersectoral, transregional and transnational processes. In the meantime, we have developed a series of recommendations to highlight the most pertinent discoveries that our project brought forth.



### 1. USE TERMS THAT ARE EASILY UNDERSTANDABLE AND THAT FIT THE CONTEXT.

Communication of the ecosystem services concept should start with language that is easily understood by local stakeholders. Adapt your terminology to fit the territory, development, identity and culture of the places and the people with whom you work.

**EXAMPLE:** In the Veneto region, in order to map the ecosystem service indicator of recreation, the word “tourism” was described as “a common and territorial good that can be cultivated by businesses and the community alike to support local development”. This definition enabled the community to identify its own needs, resources and opportunities. .



### 2. BE AWARE OF THE SCALE AT WHICH YOU ARE WORKING.

When using ecosystem services maps you must know at what scale you are using them and assure that your data sources are harmonised. Large-scale mapping of ecosystem services is appreciated at higher levels of strategic or policy governance, but gives a resolution that is too coarse for local and regional planners. Different scales require different maps, and zooming in or out of the map can change the results.

**EXAMPLE:** AlpES discovered that, when using a coarse indicator resolution, timber appears as an important ecosystem service on Alpine mountain valley floors; however, when zooming in at a finer resolution, for instance, on the dry valley floors of the Southern French Alps, results differ.



### 3. FOSTER COLLABORATION BETWEEN SCIENTISTS AND DECISION-MAKERS.

There is still a gap between the use of ecosystem services mapping in research and its practical implementation in decision-making. For this reason, it is important to combine innovative approaches from science with local expertise in planning and decision-making.

**EXAMPLE:** Several AlpES tools can contribute to creating points of interaction between research and planning. In particular, use of the teaching tools described in the section “Learning how to Learn” of this document can be effective mediums with which to bridge knowledge gaps



### 4. FIND OUT WHAT INSTRUMENTS AND PRACTICES ARE ALREADY EXISTING THAT MAY FIT YOUR NEEDS.

Before using the ecosystem services concept, look at what existing instruments are already available. The AlpES project revealed several examples in which elements of the ecosystem services concept are active without the knowledge of their users. Therefore, it is always good to reflect on one's customary instruments and tools to see whether they can be expanded or revised according to the ecosystem services concept.

**EXAMPLE:** The following informal instruments are suitable for implementing ecosystem services: civil/public forums (in which about 20 randomly chosen people discuss a problem), public panels, workshops, citizen surveys, world cafés, publicly-commissioned reports or participatory GIS methods.



### 5. USE THE ECOSYSTEM SERVICES CONCEPT TO AVOID MISUNDERSTANDINGS BETWEEN DIFFERENT INTEREST GROUPS.

Conflicts between the agendas and strategies of policy-makers, sectoral experts and the public are inevitable; having a common vocabulary can help to mitigate differences. One of the strengths of the ecosystem service concept is that it provides such a vocabulary. Furthermore, ecosystem services can be used as a factual basis to justify decisions that were previously thought of as only motivated by ethical values.

**EXAMPLE:** AlpES analysed ecosystem service trade-offs in the test region in Austria. As a part of this process, stakeholders from different sectors (forestry, agriculture, research, tourism and natural risk management) were asked to identify existing ecosystem service trade-offs. The stakeholders reported that the discussion of land-use conflicts based on ecosystem service terms and maps led to an objective depiction of the existing problems and helped to effectively communicate individual interests.



### 6. USE THE ECOSYSTEM SERVICES CONCEPT TO RESOLVE LAND-USE CONFLICTS.

The ecosystem services concept helps to clarify the link between resources, their use and the different processes of land transformation. As such, the concept can help to show conflicts between the use of natural resources and can serve as the basis for holistic environmental management. This advantage still has much untapped potential and can be taken into account both in the application of regional and cross-border environmental governance measures and in the management of local actions.

**EXAMPLE:** It is useful to perform stakeholder surveys in terms of ecosystem services when considering construction projects or the designation of protected areas. In the first case, the use of ecosystem services mapping can illustrate the effects and expected conflict zones between the project and the existing ecosystem services. In the second case, the aesthetic value of the area to be protected can be displayed by the representation of ecosystem services hotspots.



### 7. ECOSYSTEMS AND THEIR SERVICES GO BEYOND ADMINISTRATIVE BOUNDARIES.

As ecosystems rarely coincide with administrative borders, transboundary frameworks are generally needed for their protection and management. The maps produced within the AlpES project help visualise the spatial distribution of important ecosystem services, and especially the interconnection of their supply, flow and demand, across the many countries of the Alpine Arc. In this way it should be easier to identify important pools of resources and their respective demand, and consequently focus governance efforts and cross-boundary cooperation when necessary.

**EXAMPLE:** Nitrogen emissions occurring upstream in a river will have effects downstream, sometimes in a different country than their origin. The same is true with carbon sequestration or air pollution removal by forests.



