Tutorial AlpES WebGIS

– what is the AlpES WebGIS and how to use it –

Version 17.09.2018

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Introduction

Purpose of this tutorial

This is a tutorial for the AlpES WebGIS. In this tutorial you will learn to

- use the AlpES WebGIS and its data sets,
- find metadata information of all integrated data, which is useful for the correct interpretation and use of the ecosystem service (ES) indicators,
- create your own ES related maps online,
- save the maps and print them (pdf), and
- download selected municipality-based ES indicators for further analysis (csv)

What is a WebGIS?

A WebGIS is a web-based Geographic Information System. It has selected GIS functionalities and can be easily accessed through the internet (Bartoschek, 2009). Painho et al (2001) define a WebGIS as "*A complex system with access to the Internet, for capturing, storing, integrating, manipulating, analyzing and displaying data related to locations without the need of having proprietary GIS software.*" In every WebGIS you can visualize the individual integrated spatial data; that is any kind of attribute data that is referenced by geographic coordinates or location (Curran, 1984). The aim of the providers of the WebGIS is to disseminate specific, often thematic information, about selected areas of the earth (Dueker & Kjerne 1989) in order to make the analysis of spatio-temporal phenomena/geodata and their relations possible (Goodchild, 2009). Advantages of a WebGIS are that a large number of people can use a specific WebGIS at the same time and that there is no need for proprietary GIS software (Painho et al., 2001), local storage capacity, and professional knowledge. It only requires a web browser. The best known example of a WebGIS is probably Google Maps.

The objective of the AlpES WebGIS

The AlpES WebGIS is an interactive and easy-to use tool, which the Institute of Interdisciplinary Mountain Research (Austrian Academy of Sciences) is developing within the AlpES project (http://www.alpine-space.eu/projects/alpes/en/home). The AlpES project deals with ecosystem services (ES) in the Alpine Space and the focus of the AlpES WebGIS is to present/visualize the eight derived ecosystem service indicators. The spatial extent of the WebGIS is the Alpine Space (see green line in AlpES WebGIS start page or http://www.alpine-space.eu/about/the-programme/which-area-is-covered-). *The purpose of the AlpES WebGIS is to make the spatial project data results available to the AlpES stakeholders and the public* (see also (http://www.alpine-space.eu/projects/alpes/en/wikialps).
Why does the AlpES project use a WebGIS? Because it is the easiest and cheapest way to publish spatial project result data to a broad audience. It can be used as planning tool concerning ecosystem services, without difficult or expensive requirements. Users can display ES data online, create their own ecosystem service related maps, and print them. They can inform themselves about the state of individual ES in a specific municipality or region within the Alpine Space. Users can also compare the different ES indicators (demand, supply and flow) of the eight selected ES within a municipality (Lau 2 region) or between several municipalities. It is possible to download municipality-based ecosystem service indicators for a single selected municipality or for the whole Alpine Space at once. The AlpES WebGIS will be available in the five AlpES project languages (EN, DE, FR, IT and SL) to guarantee that the application is understandable to the majority of the population in the Alpine Space.
The AlpES WebGIS is linked to the alpine knowledge platform WIKIAlps (www.wikialps.eu) where you can find important information about the AlpES project itself, ES in general, the selected ES in our

project, other integrated data, and so on. It serves as kind of a look-up tool for questions that might occur when working with the AlpES WebGIS. Especially relevant are the metadata and detailed and transparent information about the calculation of the ES indicators that users can access through links leading from the WebGIS to the related WIKIAlps pages.

AlpES WebGIS - facts and functions

The AlpES WebGIS…

- makes ES indicators in the Alpine Space accessible to stakeholders
- has pre-generated styled project results and background data
- is useful as planning tool: online display and print of ES-related maps
- is interactive and user-friendly
- has a responsive and up-to-date web design (modern look and feel)
- is multilingual (DE, EN, FR, IT, SL)
- is linked to WIKIAlps – especially metadata information
- allows the download of the project results
- only requires internet connection and a web browser
- is based on open-source WebGIS architecture
- uses open web standards (OGC WMS, WMTS, WFS)
- is provided by IGF/ÖAW

General idea behind AlpES WebGIS - Users can…

- create their own ecosystem-service related maps online
- save them and print them (pdf)
- download selected municipality-based ES indicators for further analysis (csv)
- find metadata information for the correct interpretation of the ES indicators

Detailed functions of the AlpES WebGIS - Users can...

- choose their language
- select and activate layers of interest
- zoom in and out
- shift to the area of interest
- zoom to a specific municipality
- change layer's transparency
- change layer's order
- access layer legend and metadata information
- download ES indicators for a single municipality or the whole Alpine Space
- query feature info of specific selected area
- get coordinates from a specific location
- change background map
- create and print map (as pdf)
- save the results through personalised view in the web browser

Which datasets are available in the AlpES WebGIS:

List with ALL datasets in the WebGIS – Available soon!

LAU 2 units as spatial dimension of all indicators

What are LAU 2 units?

LAU stands for Local Administrative Units (LAU). The number 2 is a historical relict without meaning anymore. Those units, maintained by Eurostat, comprise the municipalities and communes (or equivalent units) of the whole European Union (see http://ec.europa.eu/eurostat/web/nuts/local-administrative-units). Because there are frequent changes to the LAU unit boundaries, Eurostat offer yearly updated lists and datasets accordingly. The LAU 2 units that are used in the AlpES project are taken out of the EuroBoundaryMap v10, a DVD database offered by EuroGeographics, current in 2016 when the project started. EuroGeographics offers the most exact LAU 2 boundaries with the highest accuracy and resolution that fit perfectly together, even on country borders there are no overlaps or missing parts. Those harmonised and consistent boundaries, available for the total European territory, are furthermore perfectly synchronized with the additional datasets NUTS 1-3 and the AdminUnits 1&2, which are also taken from the described database and visible in the AlpES WebGIS.

Why are LAU 2 units the base for mapping and assessment?

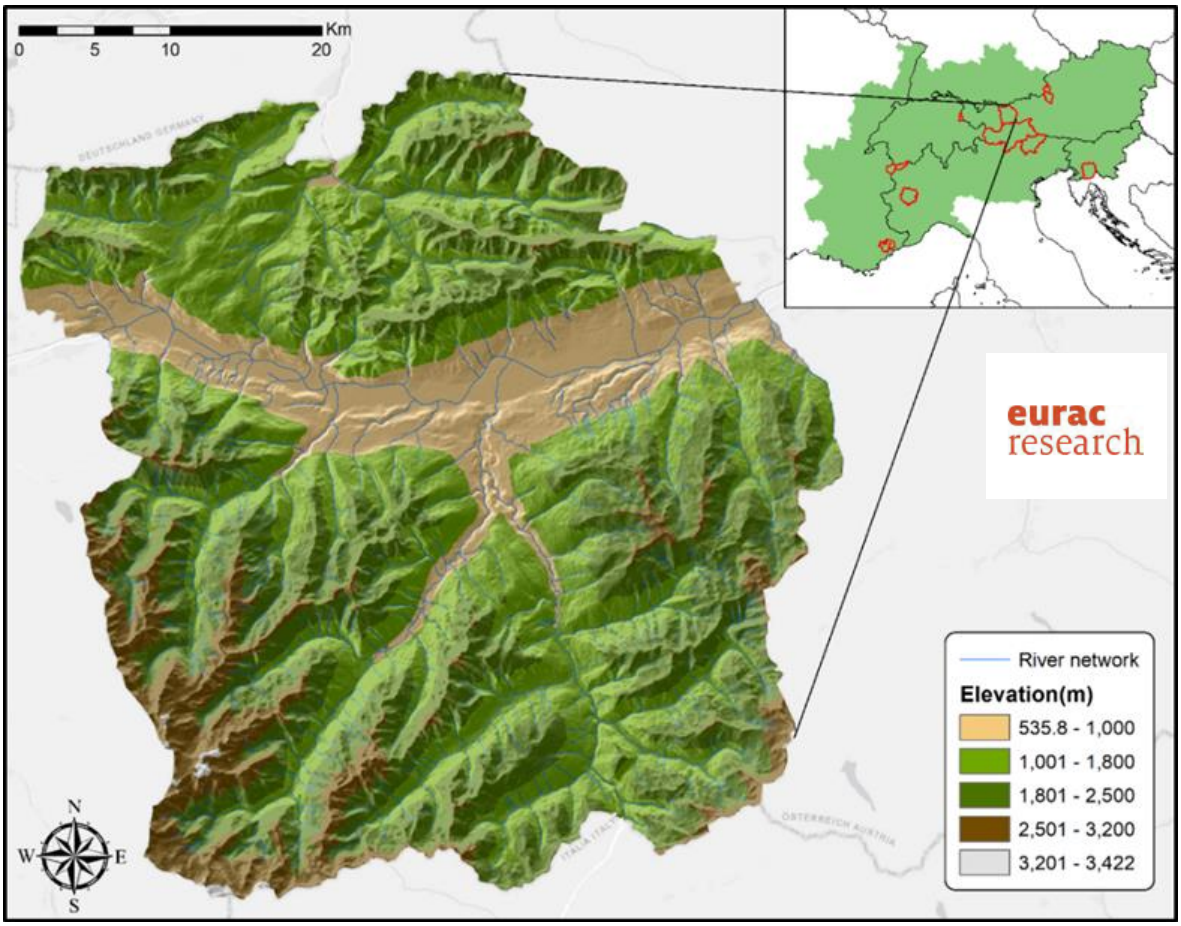
All project results, thus the ecosystem service indicators as well as the sustainability indicators, are calculated and visualised on LAU 2 basis. This is because the LAU 2 units are the smallest existing areal units all over the Alpine Space. This means that by using LAU 2 units as base for the mapping and assessment, we provide the project results with the highest accuracy and resolution possible. As LAU 2 units have the additional advantage that they are administrative units as well as statistical ones, the project results can be aligned to both interpretational areas. As planning decisions for example are made for administrative units of different size (local, regional, country-wide), you can see or aggregate the values of all contained LAU 2 areas. Since the statistical LAU 2 units are more or less of the same size, it's possible to compare values of the different municipalities directly.
Project results with a higher resolution than the municipality-based level are not possible within the AlpES project because only datasets that are available for the whole Alpine Space can be used. Higher resolution data as input for the ES calculation processes are simply not available or cannot be downscaled meaningfully or harmonised on higher resolutions than LAU 2.
Therefore, all AlpES project partners decided early on to use LAU 2 units as a unique data basis for calculation, data exchange between partners, and mapping and assessment purposes. Finally, the aim is to provide our users with the most exact computation and visualization of the ecosystem service indicators that is possible and useful.

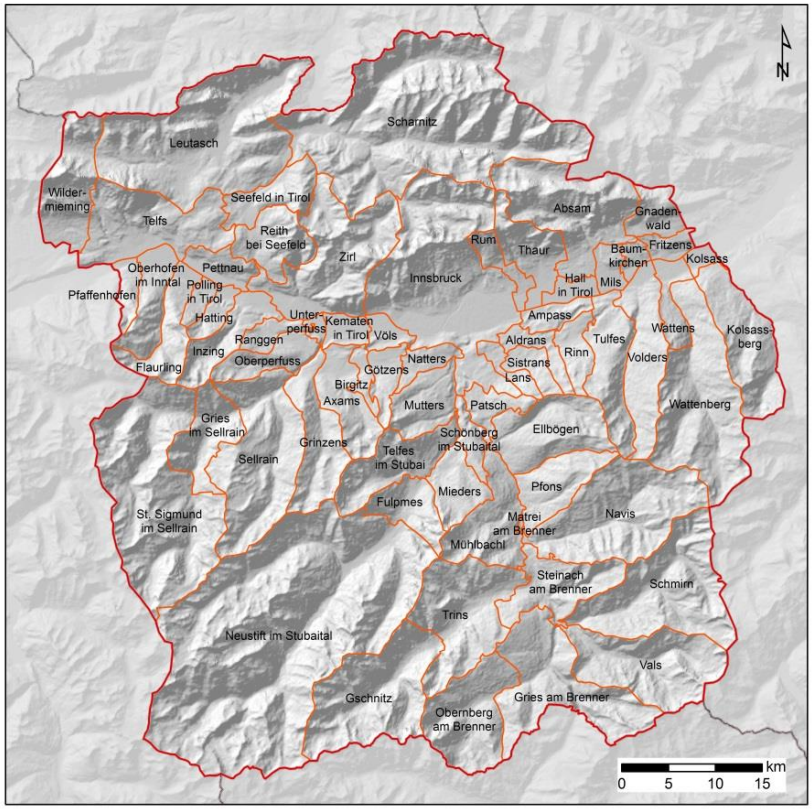
Tutorial Case Study

Imagine a regional council of the AlpES test region "Innsbruck"(see both maps below)… The main topic on the agenda for the next council meeting will be risk management against natural hazards. More specifically, the council will discuss the need for additional protection forest, partly in order to prepare for the predicted higher occurrence of severe weather events due to climate change. Protection forest is an ecosystem service, which protects people and infrastructure against different natural hazards like avalanches, rock falls, and debris flow simultaneously (see also Information box Protection Forest). As living space is very limited in the Alps, mainly due to topography reasons and related natural hazards, protection forest can create or secure living space. An example is the city of Innsbruck, which could not exist without the protection provided by the surrounding forests. The task of the council is to investigate if there is additional need (demand) for protection forest on the municipality level in the NUTS 3 region "Innsbruck" at the moment. The aim of the council is to support sustainable solutions (such as planting additional forest) in the individual municipalities that show an

imbalance between the current demand and supply, in order to protect residents, tourists, buildings, infrastructure, and other assets.
In preparation for the next council meeting, council member Mr. Curious uses the AlpES WebGIS to get a first impression of the distribution and the values of the demand indicator of the ecosystem service "Protection Forest" in the corresponding municipalities (see second map below). He wants to compile a list and create a map of all municipalities that show a high demand for protection forest and use this information as a basis for the discussion during the upcoming council meeting. In addition, he wants to use the gathered information as a basis to invite relevant local actors to the meeting, because he knows how important local knowledge is to evaluate the ES map. He is also aware that the involvement of local actors early on in the decision making process is crucial for creating local support, because it ensures that local actors' ideas and suggestions can be integrated into the municipal planning processes.

Protection Forest
"A protection forest is a forest that has as its primary function the protection of people or assets against the impacts of natural hazards or adverse climate. This definition implies the simultaneous presence of (i) people or assets that may be damaged, (ii) a natural hazard or a potentially adverse climate that may cause damage and (iii) a forest that has the potential to prevent or mitigate this potential damage" (Brang et al. 2001).
Protection forest provides protection in multiple ways: the loose soil surface is stabilized by the root layer so that the underlining bulk material cannot start to move, e.g. preventing of the build-up of debris flow start material. Furthermore, forest soil doses the runoff, so that an extreme heavy rain event cannot easily take away surface material. Part of the rain and snow is evaporated directly by the treetops. Another way to protect residential areas below the forest is, that the trees can stop falling rocks and other material physically. In winter the mountain forests prevent the formation of snow avalanches, among others, through an increased surface roughness.
Protection forest is likely the cheapest protection solution (in the opposite of expensive artificial technical constructions) and additionally the most effective and natural one. Not only because of the high and diverse protection function but also because it brings additional advantages with it that is typical for a natural solution. So for example forest is also habitat for animals and plants, serves as recreational area, as climate regulation and fresh air, and is important for its aesthetics in the tourism industry.

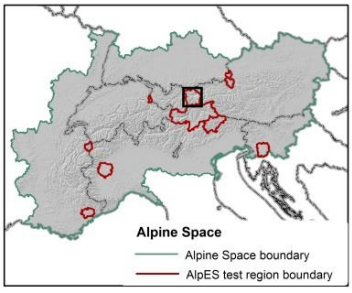




ÖAW AUSTRIAN ACADEMY OF SCIENCES IGF

AlpES test region "Innsbruck"

- NUTS 3 region boundary of Innsbruck
- LAU 2 region boundary
- national border



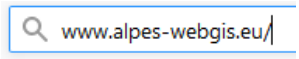
data sources:
administrative units: @EuroGeographics 2016
hillshade generated from EU-DEM:
@European Environment Agency (EEA)

projected coordinate system:
WGS 1984/Pseudo-Mercator, EPSG: 3857

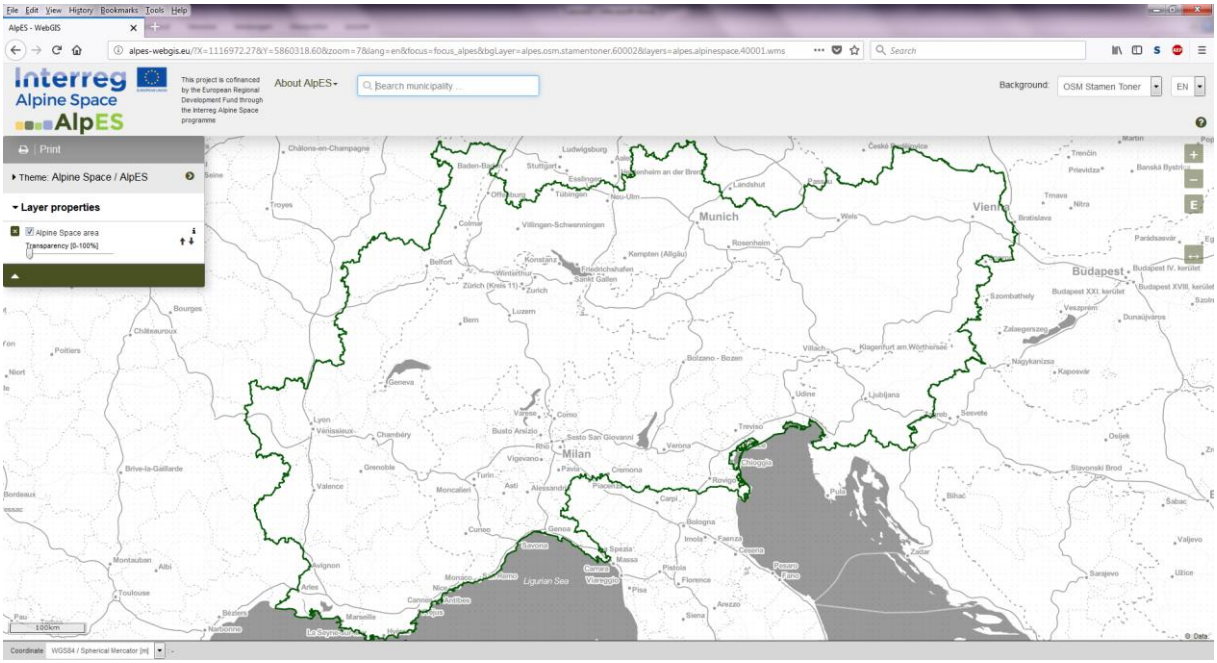
cartography:
Nadine Houbé, MSc; IGF/ÖAW, 2018

Getting Started

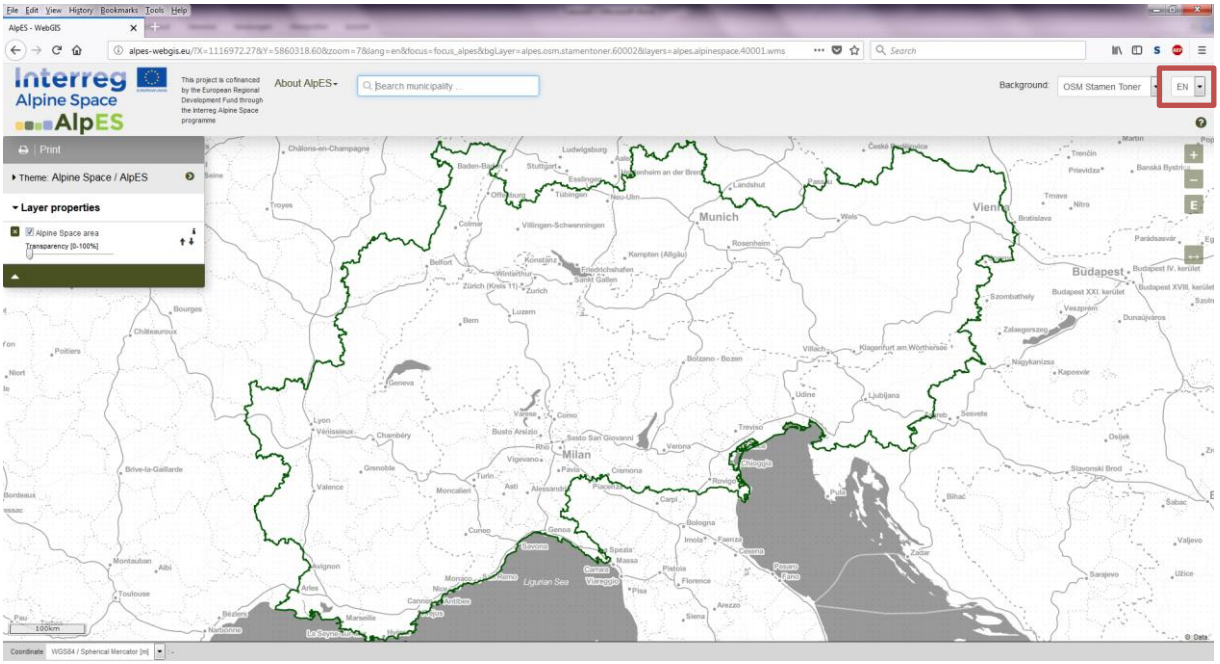
Access to AlpES WebGIS:



Council member Mr. Curious just heard about the AlpES project and its AlpES WebGIS and thinks that it sounds quite useful for his purpose. He enters “AlpES WebGIS” into the search engine of his web browser and the first returned search result leads him to the AlpES WebGIS. He clicks on the link and enter the AlpES WebGIS for the first time. He saves the URL www.alpes-webgis.eu for future use.

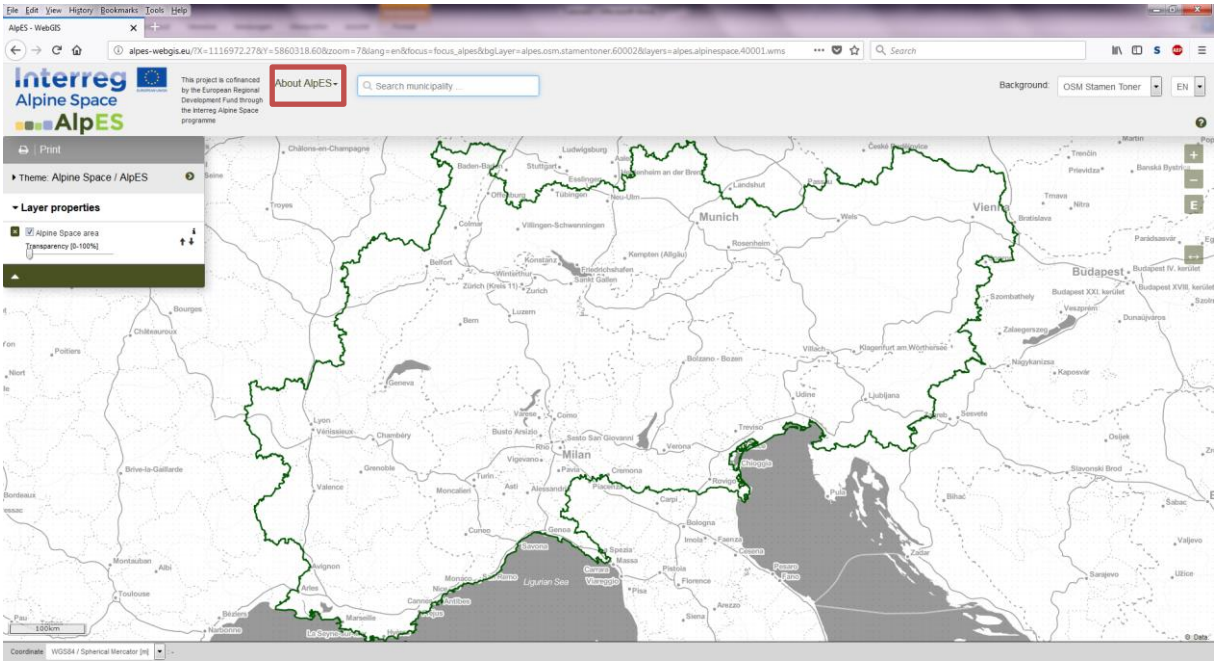


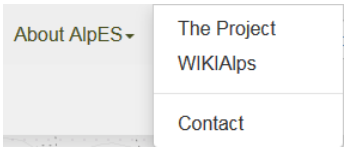
Choose your language



First thing he does is to choose his preferred language English in the upper right corner of his screen. It is possible to choose between English, German, French, Italian and Slovenian. Please note that layer attributes (characteristics) are only available in English.

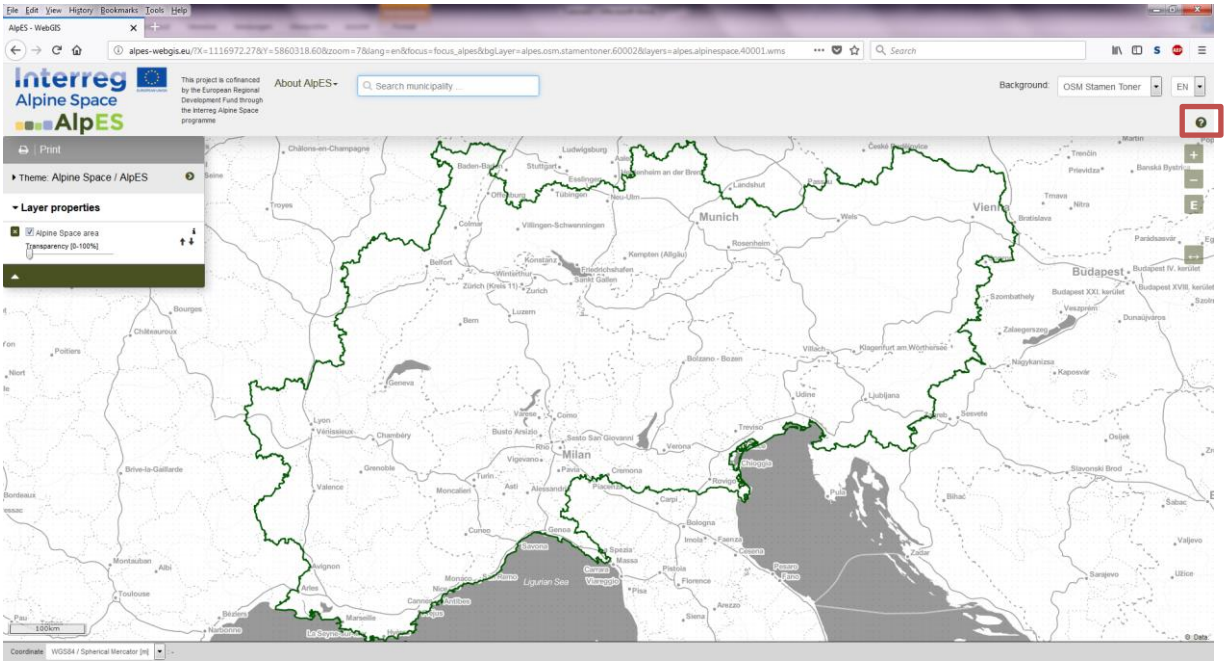
About AlpES





In the middle of the grey bar on the top of the website, he finds the "About AlpES" button. Because he is not that familiar with the AlpES project yet, he uses these links to inform himself a bit about the background of the project on the AlpES project homepage (http://www.alpine-space.eu/projects/alpes/en/home). He also clicks on the link to WIKIAlps, where in the glossary of the WIKIAlps homepage he finds an article about Ecosystem Services (http://www.wikialps.eu/doku.php?id=wiki:ecosystem_services_alpes), which explains the common understanding of ecosystem services (ES) in the AlpES project. The article "Protection against avalanches mudslides and rock-falls" leads him to a most relevant article namely "Protection forest" (http://www.wikialps.eu/doku.php?id=wiki:protection_forest). In addition, he finds in WIKIAlps detailed descriptions of all other selected ES available in the WebGIS and transparent documentation on their calculation methods.

Basic introduction



Now Mr. Curious is ready to start working with the AlpES WebGIS. Since he has no idea what to do, he starts with the basic introduction he finds on the right hand side in the grey bar on the top; the little green question symbol. He is lead through the main parts and possibilities of the WebGIS platform. After this short introduction he feels confident enough to try and play around with the AlpES WebGIS.

Create your own map

Change view extent

As he cannot wait to see some results for the municipalities of his interest, the first thing he does is to zoom to the area he is interested in. This can be done in multiple ways.

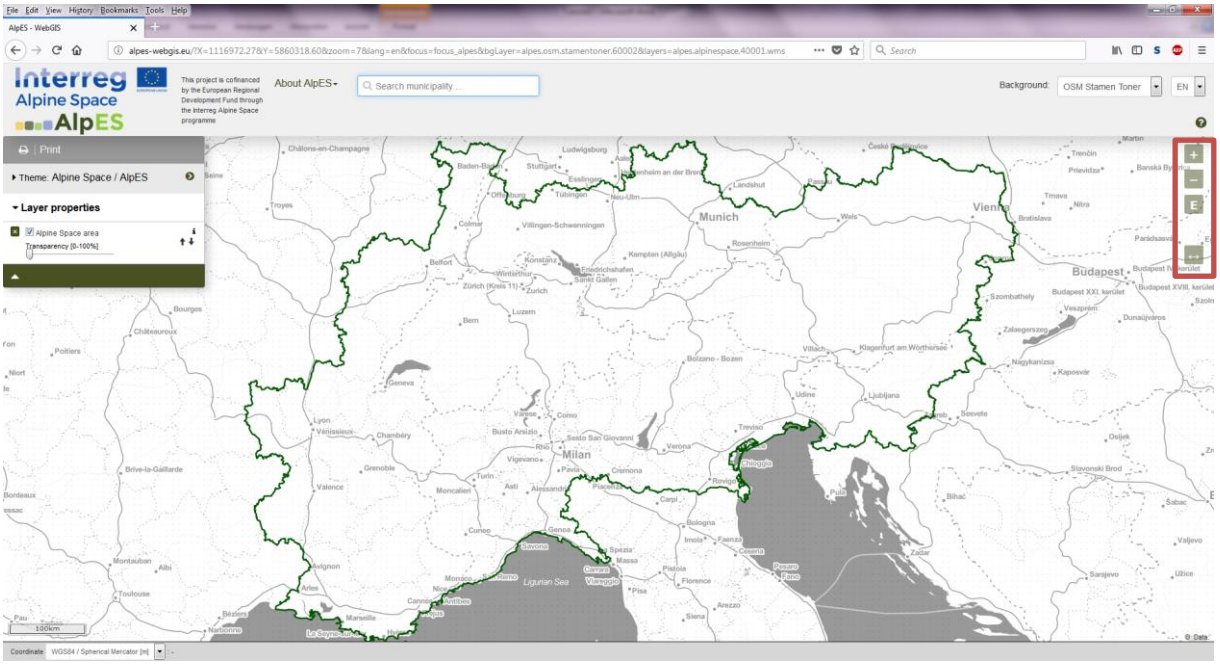
Zoom manually

Either just zoom in or out using the + and – symbol on the right hand side of the mapping window or use your mouse scroll wheel doing the same job. Note, that there are 19 zoom steps possible altogether and no steps in between. This might be important if you try to get the best resolution to see you region of interest in the mapping area of the AlpES WebGIS.
Clicking on the E-symbol brings you directly to the largest extent of the selected theme.

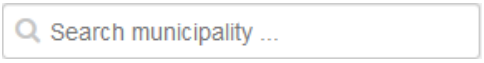
Full screen

To use the AlpES WebGIS in full screen modus he clicks on the “full screen” symbol below the zooming tools.

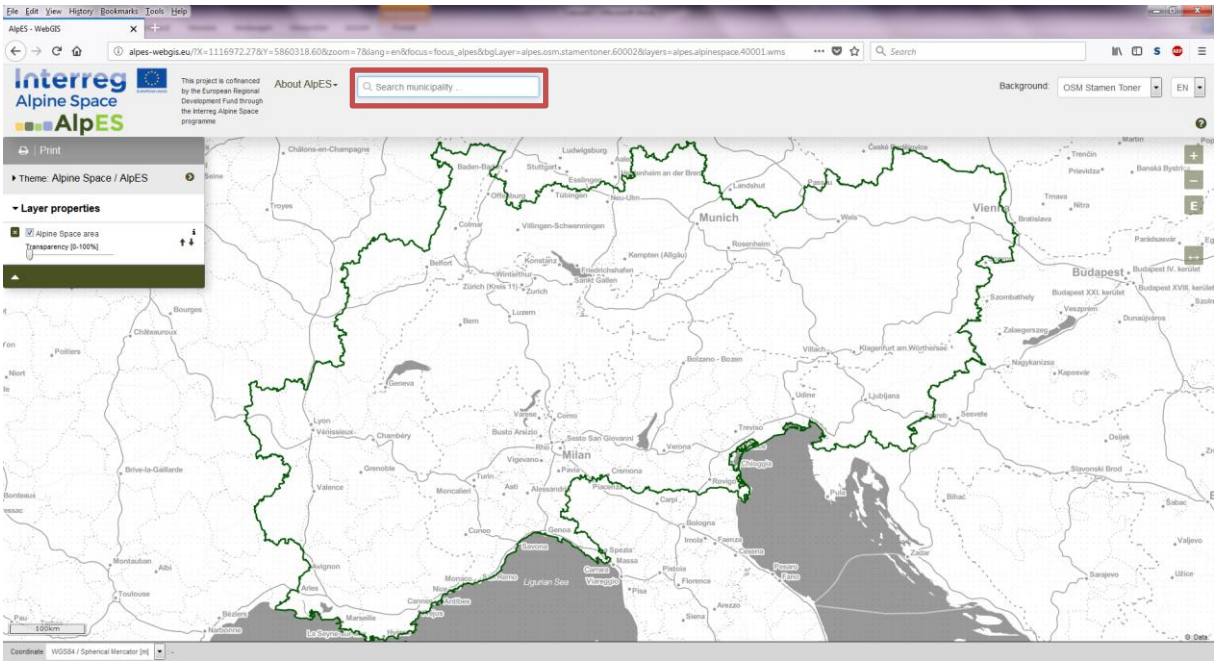
Additional Information – Why exactly 19 zoom steps?
As an orientation help for AlpES WebGIS users, for performance reasons, and for ensuring a short loading time, several open and free background maps are integrated in the AlpES WebGIS, such as OSM (OpenStreetMap) and Bing. Per convention, these external services are all based on the coordinate system WGS84 Web Mercator (EPSG 3857). As a result of using this specific Web coordinate system, the data is available in a pre-cached form for exactly 19 cache levels or zoom levels (e.g. zoom level 0 is the whole world and zoom level 19 is at street level). All data available in the AlpES WebGIS is based on the WGS84 Web Mercator coordinate system and embedded as WMTS (Web Map Tile Service). Therefore, all data are bound to the pre-rendered tiles of the predefined 19 zoom steps. Consequently, intermediate zoom steps are not possible.

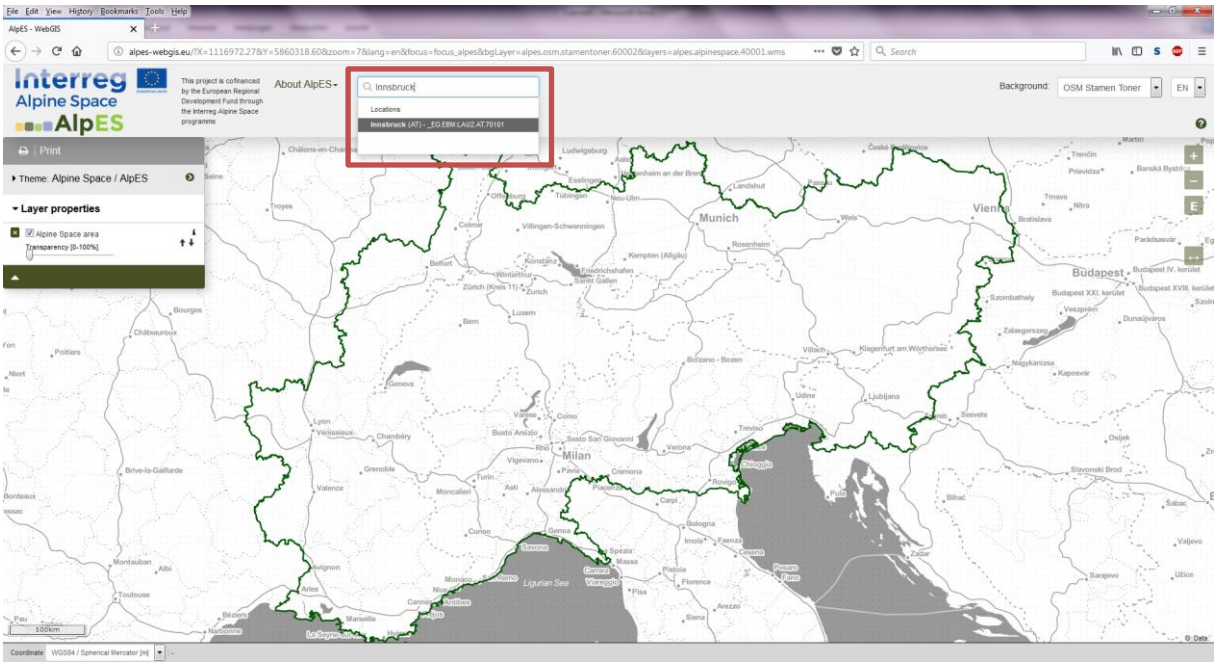


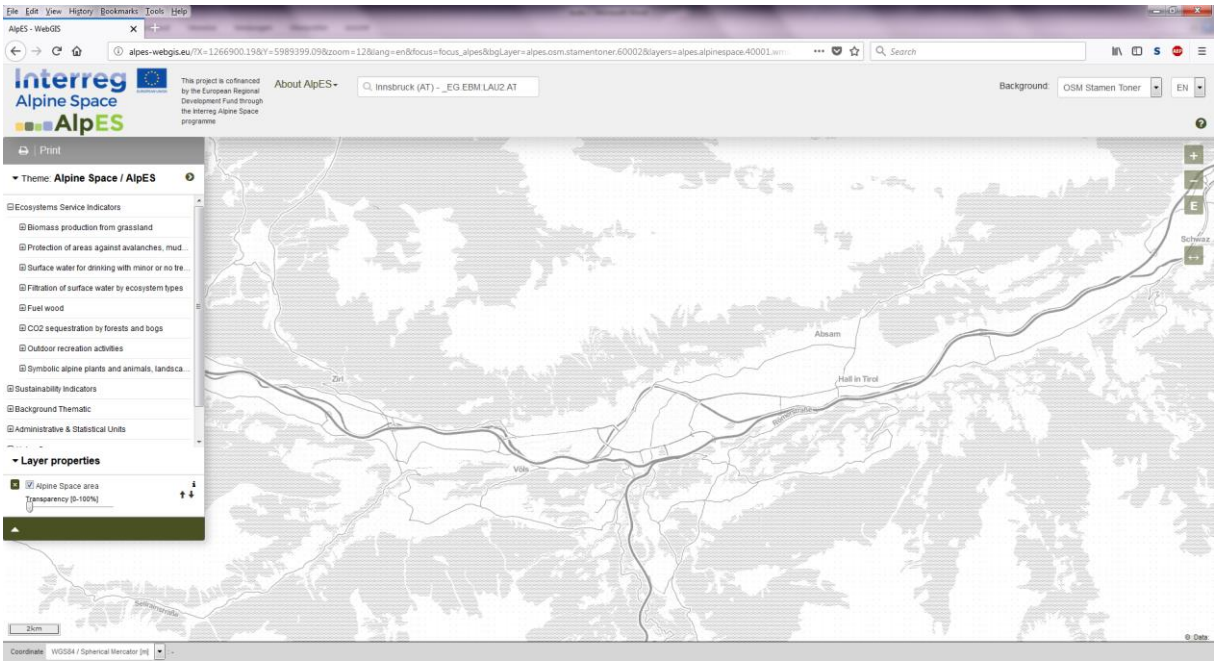
Zoom to a specific municipality



Mr. Curious uses also the search function within the grey bar as another way to zoom in to his area of interest. To zoom to a specific municipality, enter its name in the search field and select one of the proposed names, which appear below. Then hit <Enter>. The extent will be immediately zoomed to the selected municipality.
Our council member Mr. Curious types “Innsbruck” into this field and then uses the “–“-button to zoom out a bit to see the full region of his interest.

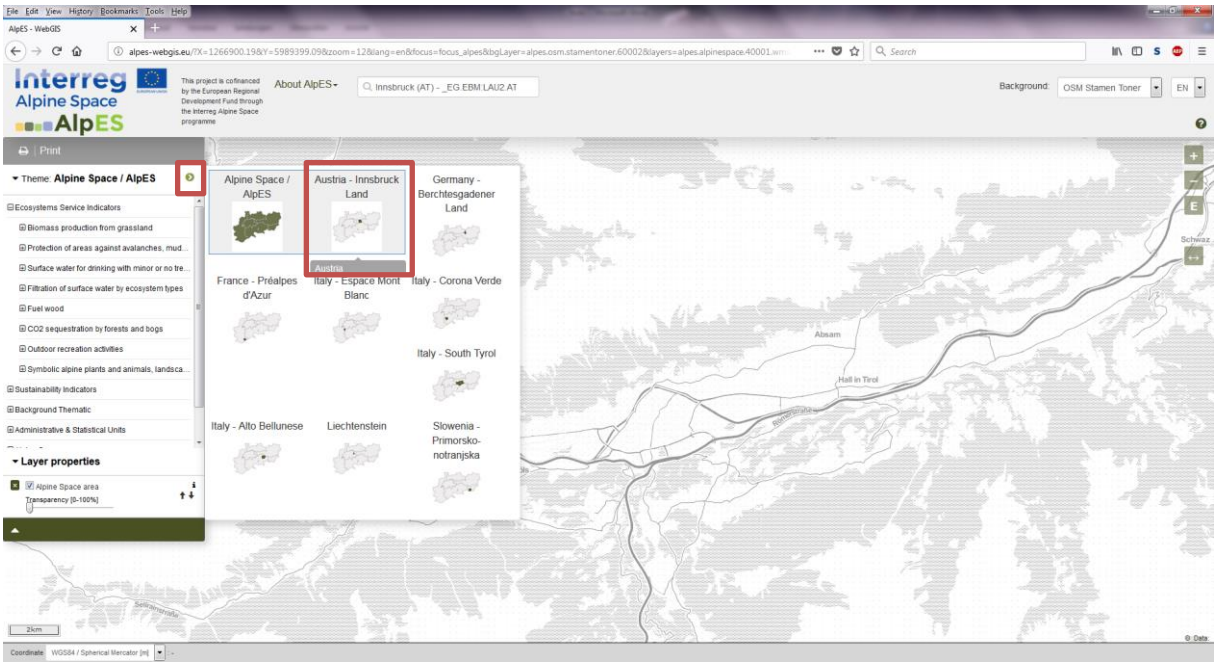

AlpES - WebGIS
alpes-webgis.eu/?X=1116972.27&Y=5860318.60&zoom=7&lang=en&focus=focus_alpes&bgLayer=alpes.osm.stamentoner.60002&layers=alpes.alpinespace.40001.wms
Interreg
Alpine Space
AlpES
This project is cofinanced by the European Regional Development Fund through the Interreg Alpine Space programme
About AlpES
Search municipality ...
Background:
OSM Stamen Toner
EN
Print
Theme: Alpine Space / AlpES
Layer properties
Alpine Space area
Transparency [0-100%]
Munich
Milan
Budapest
Ligurian Sea
Coordinate
WGS84 / Spherical Mercator [m]

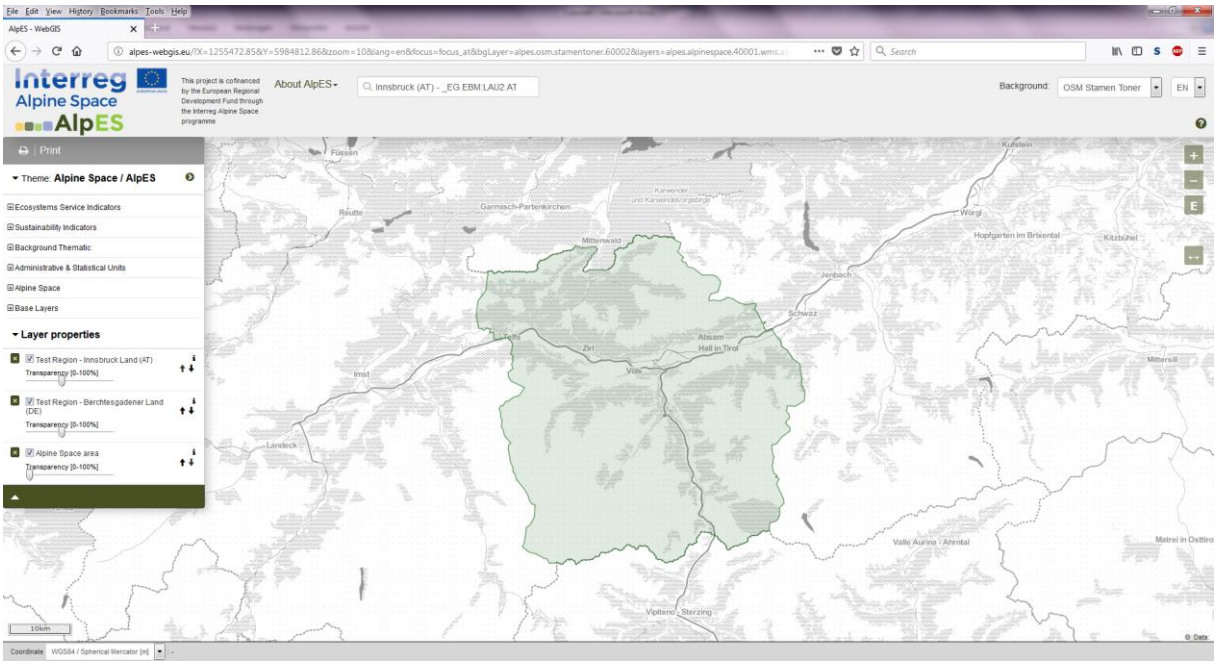

AlpES - WebGIS
alpes-webgis.eu/?X=1116972.27&Y=5860318.60&zoom=7&lang=en&focus=focus_alpes&bgLayer=alpes.osm.stamentoner.60002&layers=alpes.alpinespace.40001.wms
Interreg
Alpine Space
AlpES
This project is cofinanced by the European Regional Development Fund through the Interreg Alpine Space programme
About AlpES
Innsbruck
Locations
Innsbruck (AT) - _EG.EBM.LAU2.AT.70101
Background:
OSM Stamen Toner
EN
Print
Theme: Alpine Space / AlpES
Layer properties
Alpine Space area
Transparency [0-100%]
Munich
Milan
Budapest
Ligurian Sea
Coordinate
WGS84 / Spherical Mercator [m]



Zoom to an AlpES test region

To look at the AlpES test region “Innsbruck” as one of the pre-defined nine AlpES test regions, just click on the arrow on the right side of the “Theme” bar and then choose one. The default extent is the whole Alpine Space.

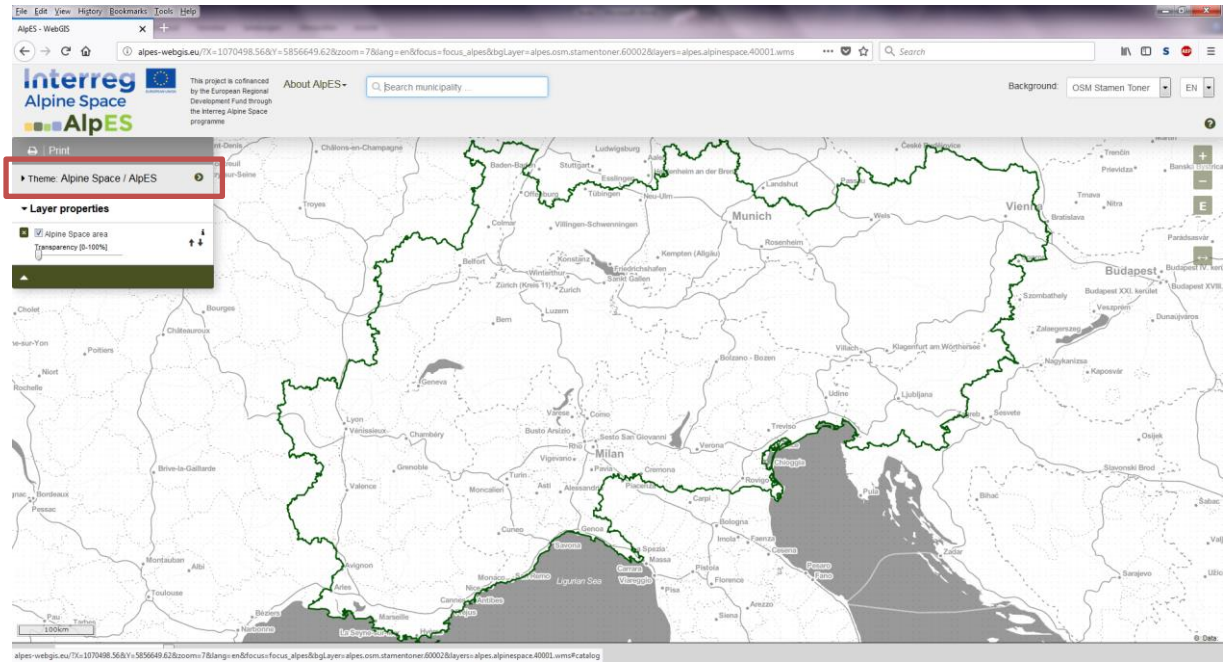


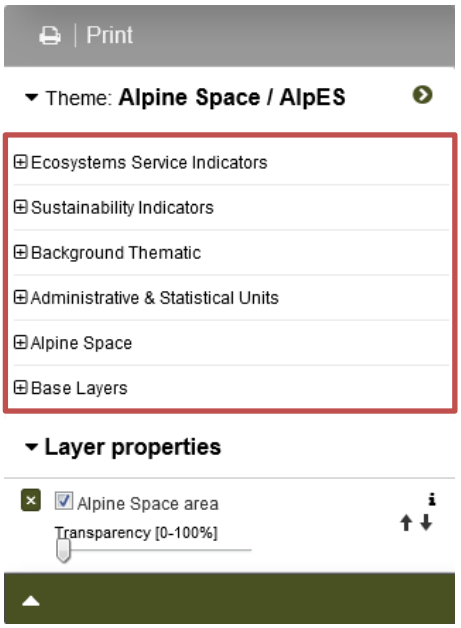


Choose and learn about single datasets

Choose layers

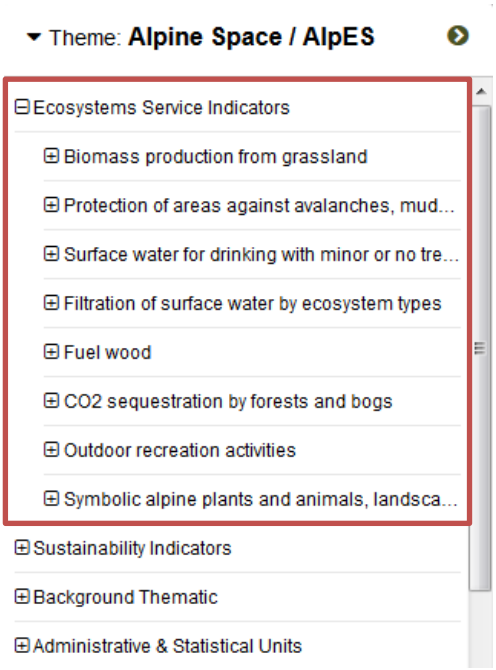
To see which layers are integrated in the AlpES WebGIS, Mr. Curious clicks on “Theme: Alpine Space” to pop up the layer tree. In the menu tree, he finds all datasets that are available in the WebGIS organized by content. You can fold up the menu by clicking on the field “Theme” again.

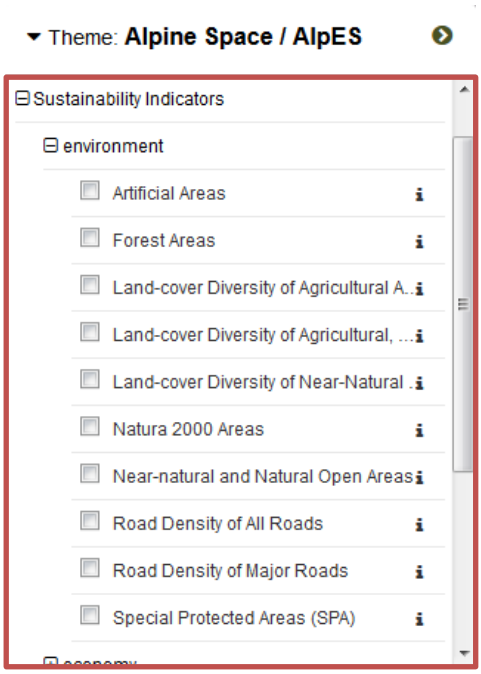




In the first menu category, he finds the eight ES indicators - the AlpES project data results-, which are accessible to the public through this AlpES WebGIS tool.

In the second menu category, Mr. Curious finds sustainability indicators, also project results that can be important for interpretation purposes.
All other data sets listed below can be used as additional information, including for finding a specific feature (e.g. protected areas) or altitude, for styling purposes, and for analysing and interpreting purposes. There are also thematic background datasets available including protection areas and land cover, administrative units, the Alpine Space category with project specific datasets like the Alpine Space boundary, and other base layers like the digital elevation model combined with the hillshade.

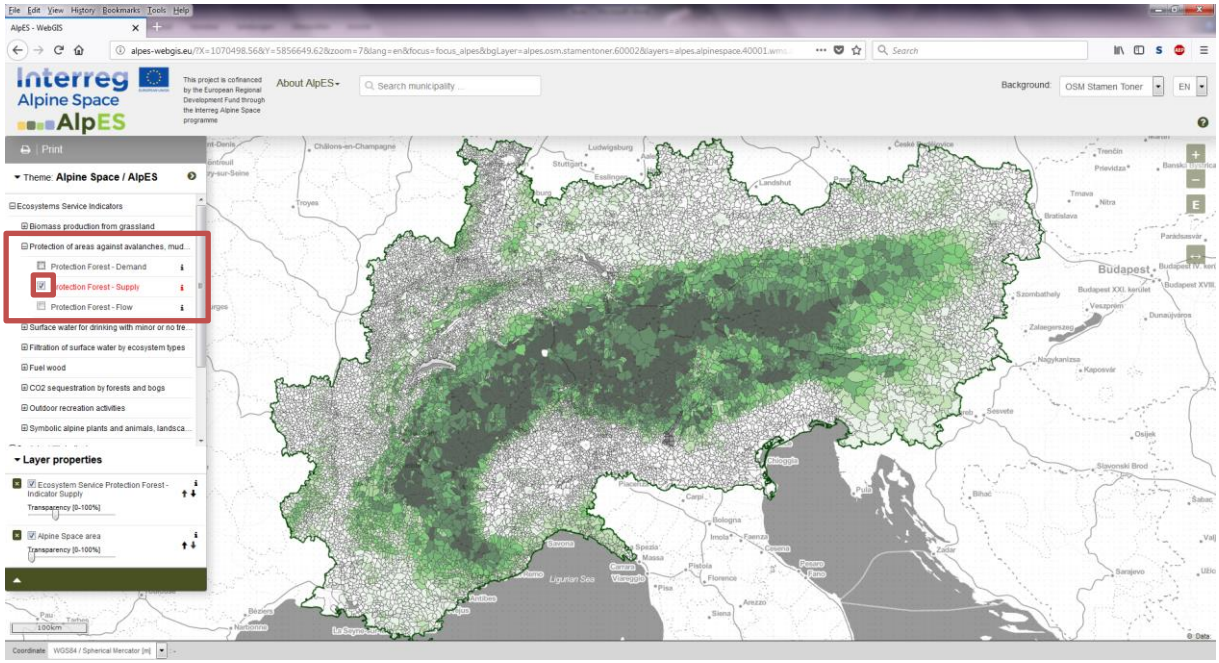




Activate layers

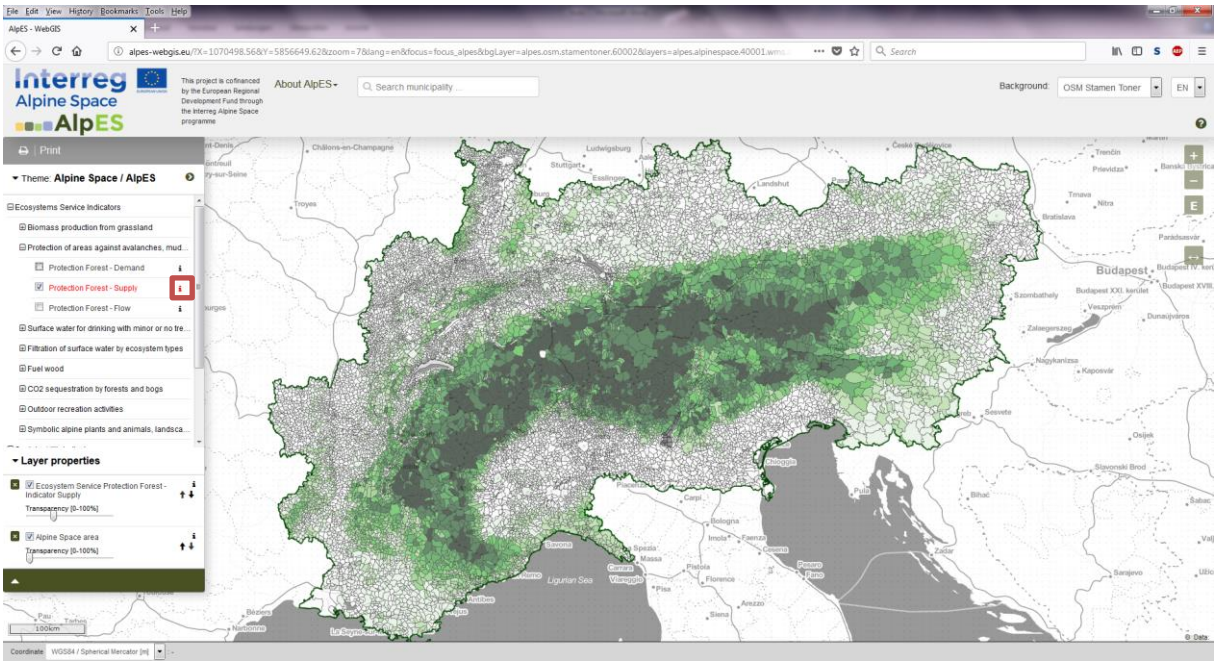
As Mr. Curious is interested in the ES Protection Forest, he folds down the Protection Forest bar and clicks on one of the given indicators: supply. He activates the layer through clicking the checkbox on the left hand side of the layer name. A pre-styled visualization of the selected layer appears on the map.

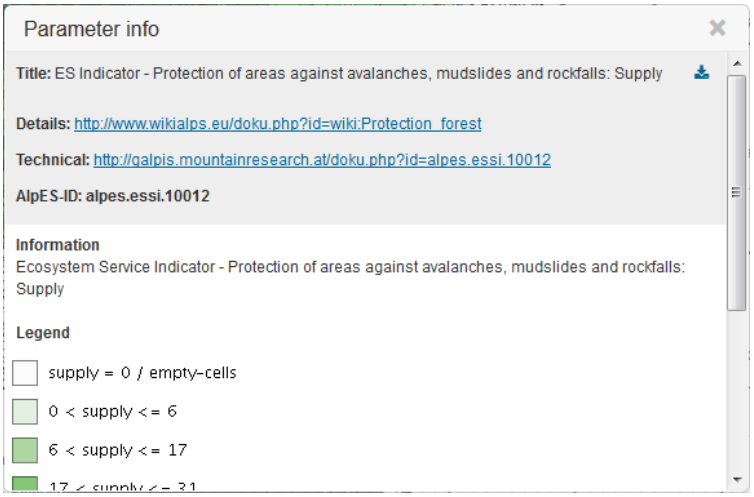
After playing around a bit, he finds out that there is a convention of showing the demand indicator always in red shades, the supply in green colours, and the supply indicator in orange.

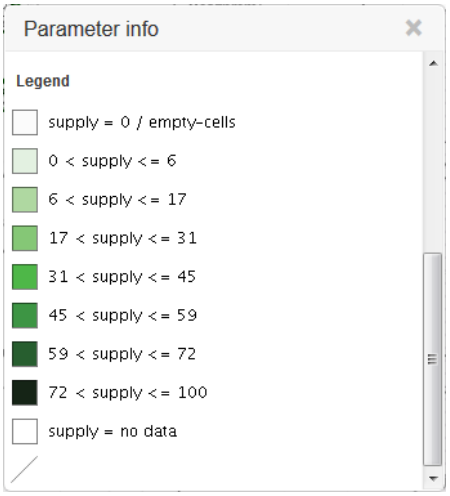


Get legend and further information

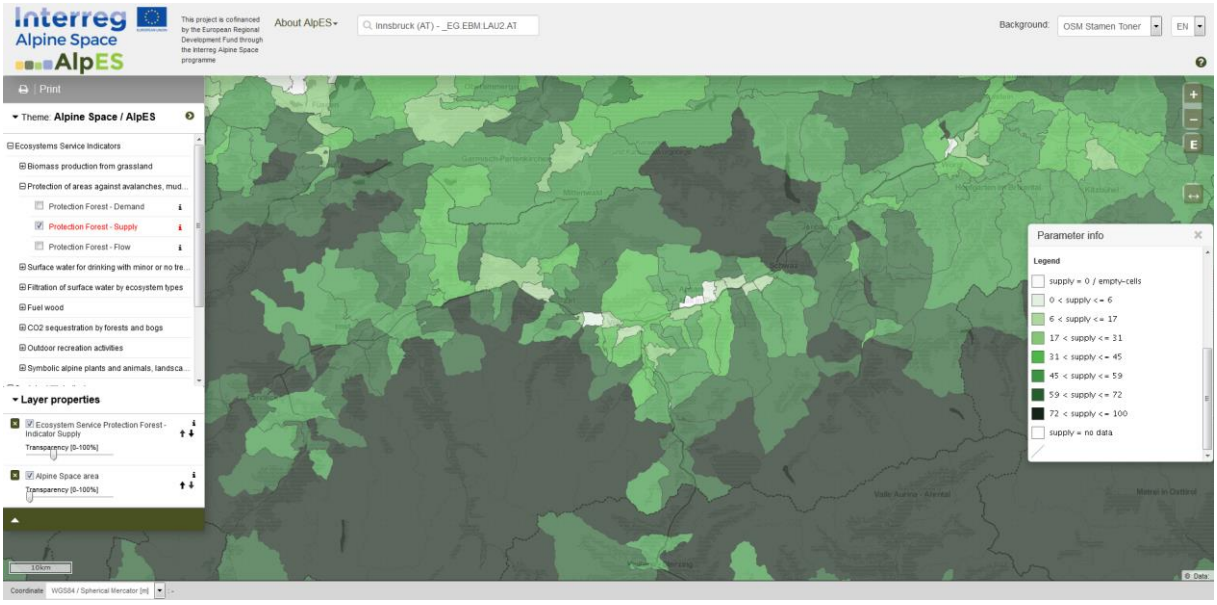
In order to understand what the green colours on his screen mean and which unit is represented, Mr. Curious looks for the legend. He finds the legend as well as further information (unit, data source, metadata, etc.) by clicking on the little “i"-symbol on the right hand side of each layer. The box “Parameter info” will then appear.







In the upper part of the parameter box, he finds some information about the dataset and a link to an informative article on the ES indicator in WIKIAlps. Mr. Curious, for example, finds out that the unit used for the Protection Forest indicators is “index”, meaning values without units.
In the lower part, he finds the legend that tells him which value is associated with a particular green shade. Now he has almost all information he needs to interpret the map, i.e. he has the information to ‘read’ the colours of the municipalities he is interested in.

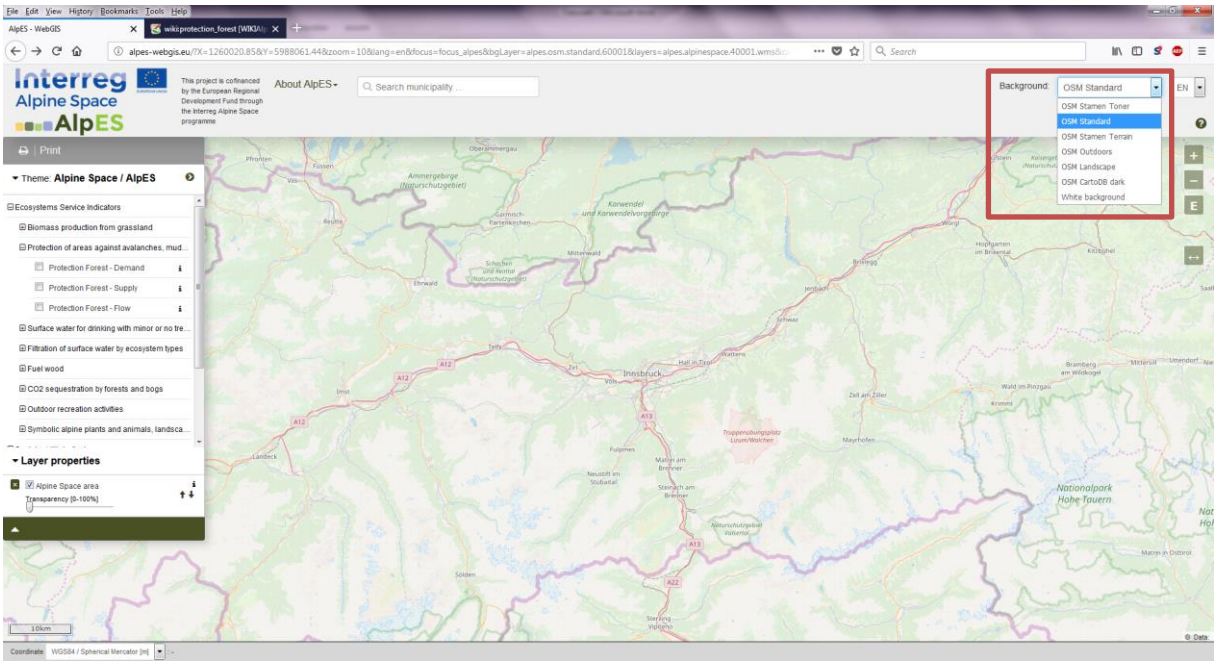


Besides knowing the value of the Protection Forest demand ES indicator, he also needs to understand what this value actually means. He finds this information under the link Details**:** http://www.wikialps.eu/doku.php?id=wiki:Protection_forest) and ends up with the following basic knowledge: "The ES indicator "Protection Forest – demand" is defined by the amount of human assets and infrastructures in potential hazard zones. The ES indicator "Protection Forest – supply" is represented by all the forest areas that have an actual regulating/protection function. The ES indicator "Protection Forest – flow" represents how often a natural hazard that would have negatively affected human lives has been prevented or mitigated."

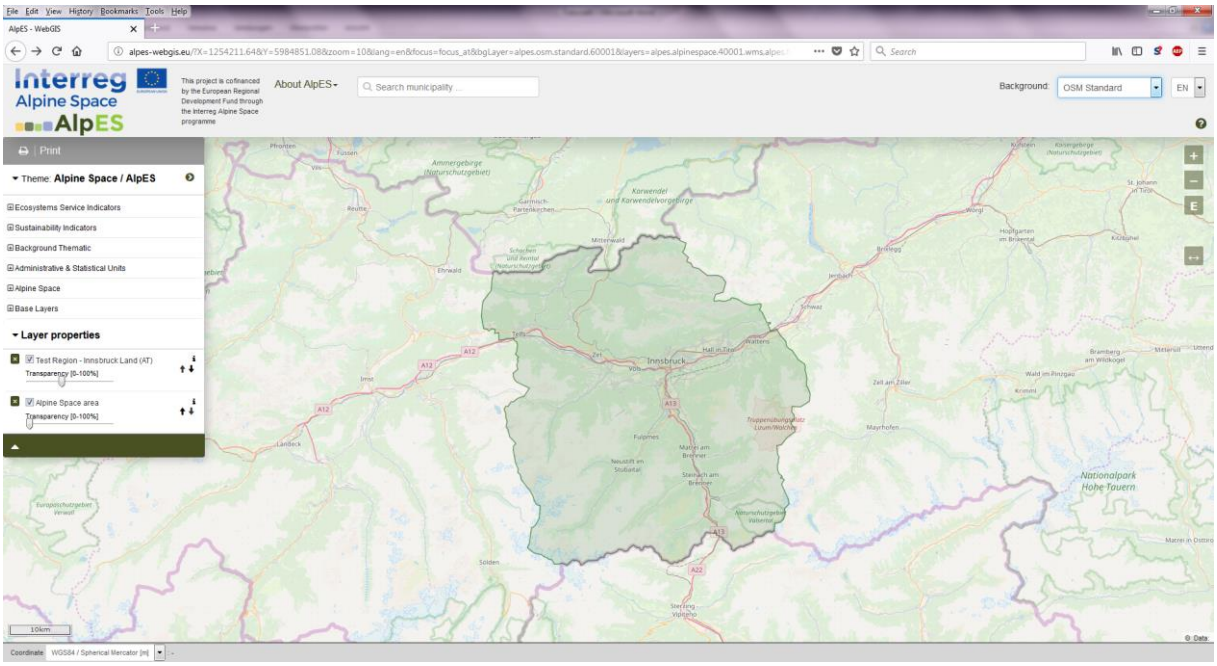
Styling of your map

Change background map

Mr. Curious is not satisfied with the background map, because the label for the city of Innsbruck is missing, which he likes to use for orientation purposes. He decides to change the background map by clicking on the "Background" drop down menu located in the upper right corner of the website. From the menu, he chooses his preferred background map: OSM Standard.

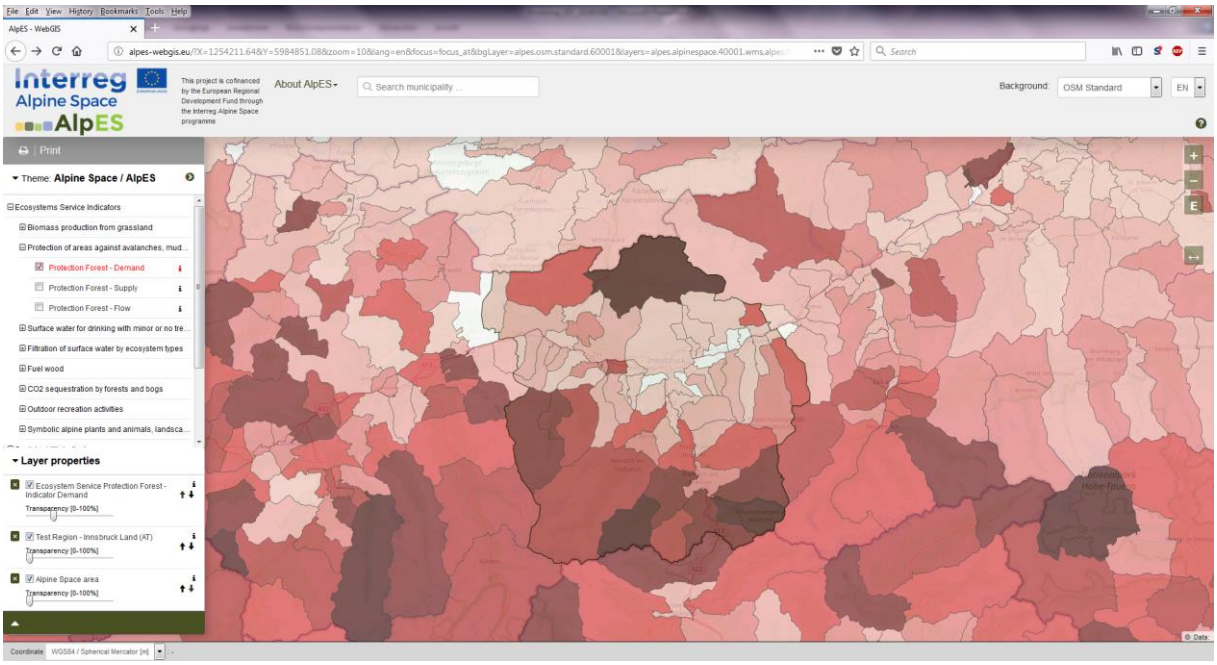


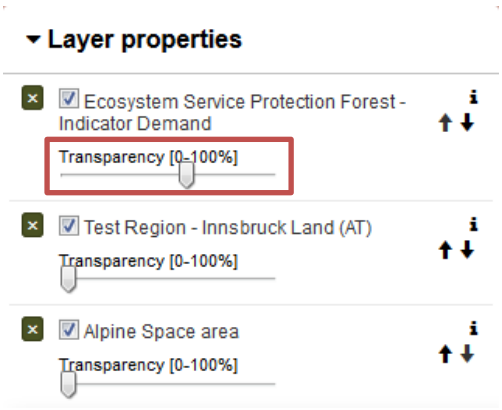
Afterwards he zooms to the extent of his interest: the AlpES test region “Innsbruck” by selecting the relating Theme.

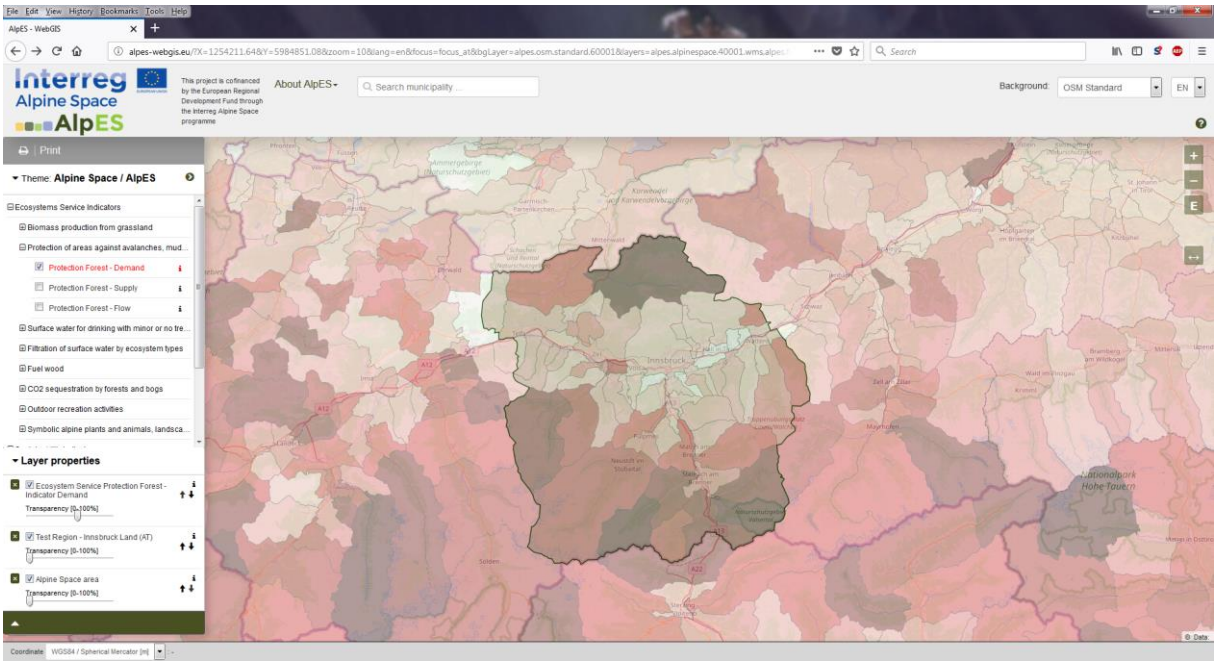


Change layer’s transparency

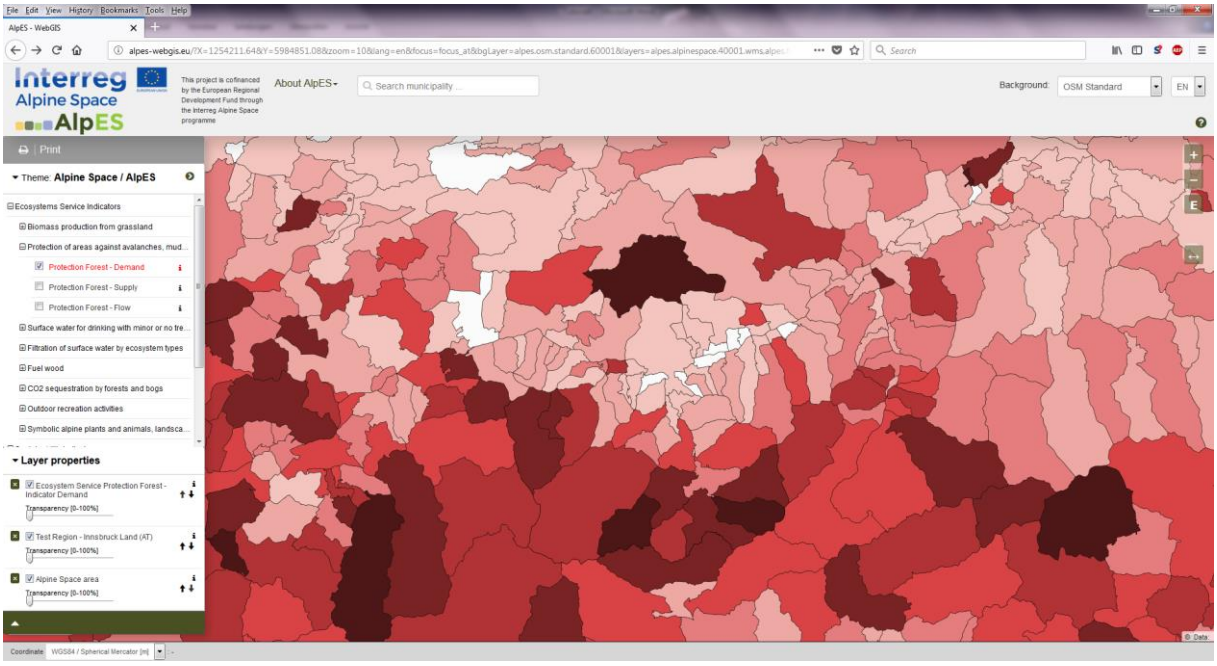
Curious as he is, he now wants to see some project data results for his region.
He activates the Protection Forest – demand layer by clicking on the layer name.


AlpES - WebGIS
About AlpES
Background:
OSM Standard
Print
Theme: Alpine Space / AlpES
Ecosystems Service Indicators
Biomass production from grassland
Protection of areas against avalanches, mud...
Protection Forest - Demand
Protection Forest - Supply
Protection Forest - Flow
Surface water for drinking with minor or no tre...
Filtration of surface water by ecosystem types
Fuel wood
CO2 sequestration by forests and bogs
Outdoor recreation activities
Symbolic alpine plants and animals, landsca...
Layer properties
Ecosystem Service Protection Forest - Indicator Demand
Transparency [0-100%]
Test Region - Innsbruck Land (AT)
Alpine Space area

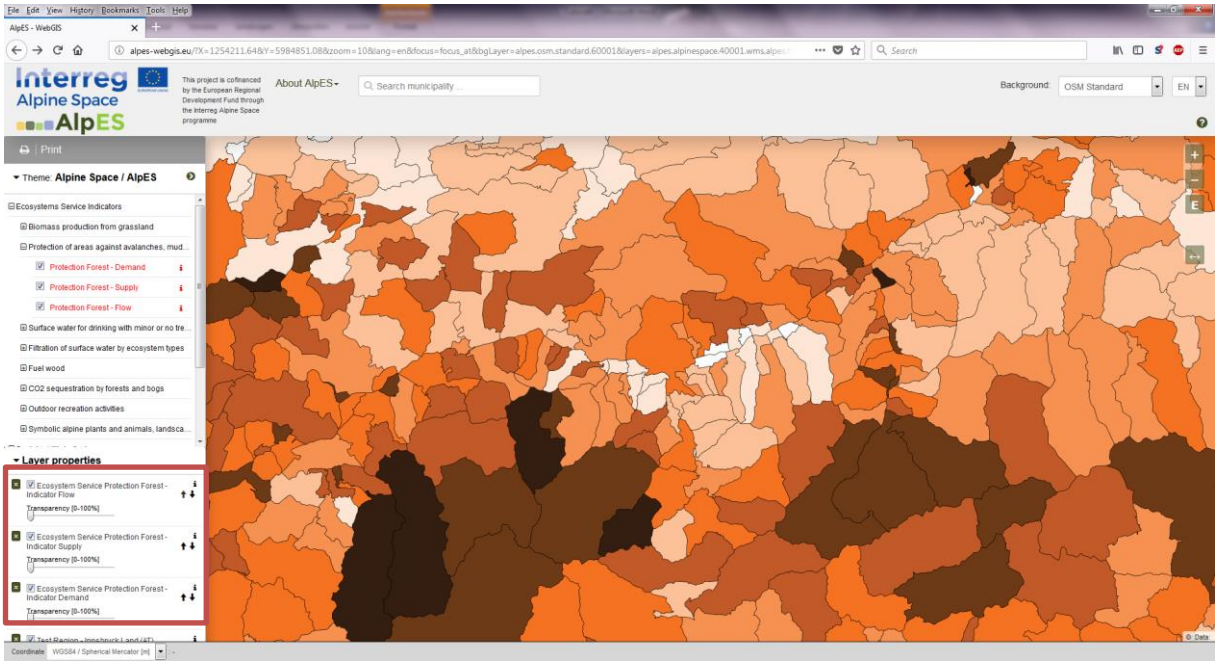

Layer properties
Ecosystem Service Protection Forest - Indicator Demand
Transparency [0-100%]
Test Region - Innsbruck Land (AT)
Transparency [0-100%]
Alpine Space area
Transparency [0-100%]


AlpES - WebGIS
About AlpES
Background:
OSM Standard
Print
Theme: Alpine Space / AlpES
Layer properties

Since he wants to see the background map through the resulting dataset, he needs to change the transparency of the demand indicator. He changes the transparency by moving the slider between 0% and 100% invisibility in the layer properties below the menu tree.
After looking at the map for a while, Mr. Curious decides that he prefers to see the selected dataset in solid colours in the front of all other datasets, so that the colours are easily comparable to the colours in the legend. This can be done by setting the transparency to 0%.

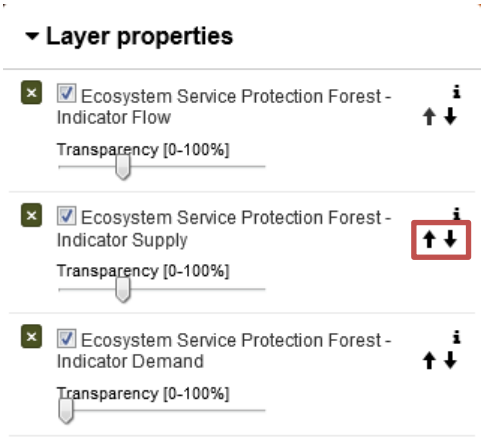


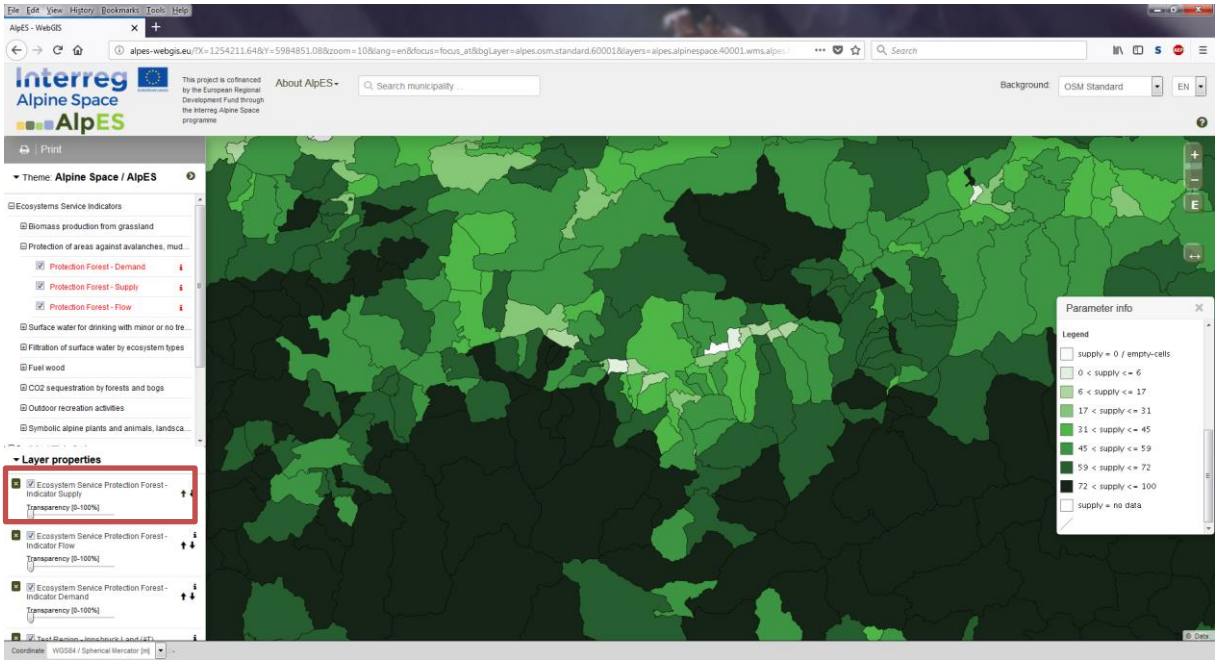
The way the selected layers appear in the map and in the layer properties, depends on the order in which Mr. Curious activates the single layers in the AlpES WebGIS. The latest selected layer is located at the top of the layer properties list. Mr. Curious first activates the demand, then the supply, and lastly the flow indicator and ends up with the following view:



Change layer's order

Mr. Curious first studies the flow indicator values in his area of his interest. Then he wants to see the supply indicator values. To do so, he changes the order using the arrows on the right hand side of the layers in the layer properties. The arrows change the order of the layers, so clicking on an upward arrow brings the layer one level higher.





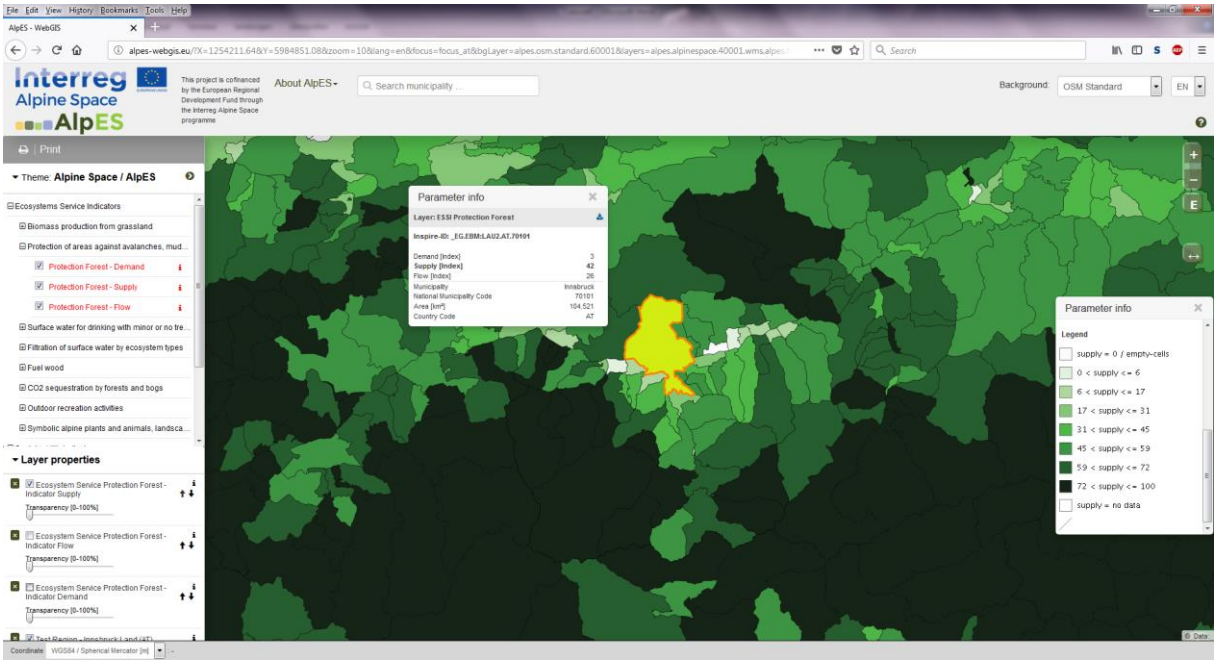
Now he has a first look at the supply values in his region. The unit, again, is "index", so his map visualizes an index of Protection Forests that indicates, if there is much or less forest with actual protection function in the selected municipality relative to other municipalities. The municipality of Innsbruck is somewhere in the middle of the range; i.e. in the class "31-45" according to the green shade in the legend.

Get information about specific locations/areas

Get single area's attributes

Since there are several municipalities in the same class (same green shade), Mr. Curious wonders if there is still a difference between them. Therefore, he wants to know the exact values of first the

municipality of Innsbruck and then of the municipalities, so he can compare them directly – value by value.
To get information of a single area's attributes is quite easy. Mr. Curious just selects the municipality of Innsbruck by clicking once on this area. The selected object colours yellow and the relating parameter info box appear immediately. In this box, the attributes of all activated layers on the exact clicking point position are listed in the same order like in the map. In his case these are the Protection Forest demand, flow and supply datasets. He could scroll to the Supply dataset, but he decides instead to click the checkboxes of the other two datasets in the Layer properties to disable them. This leaves him with only one dataset in the parameter info box. After this action he selects the area of Innsbruck again.

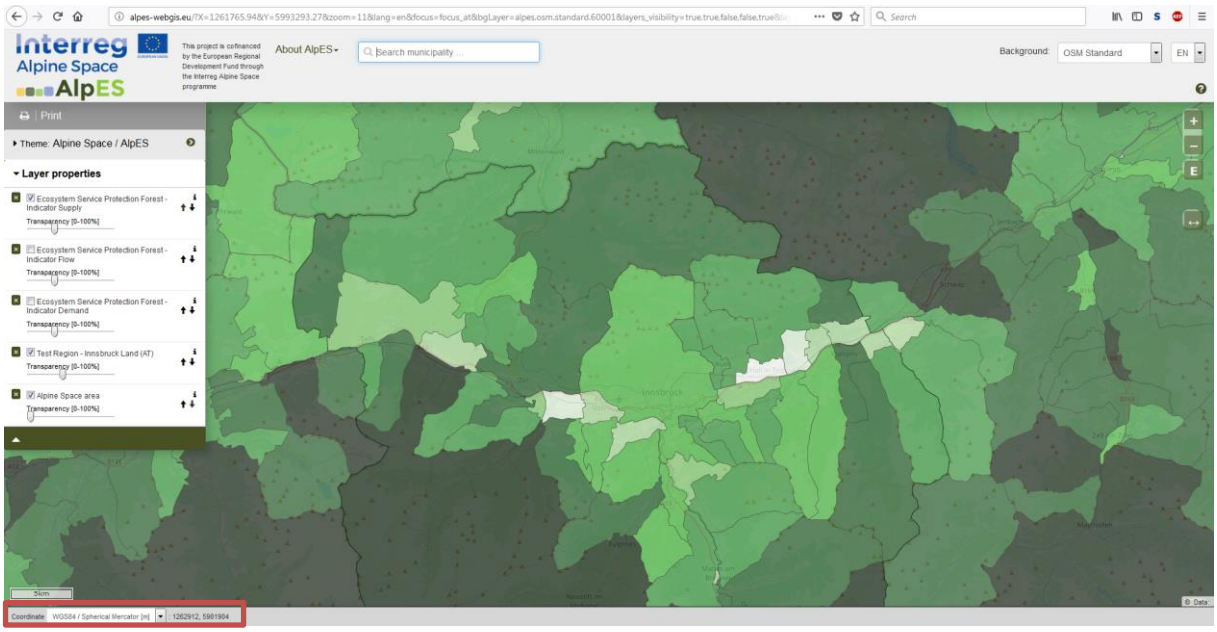


Mr. Curious finds out from the parameter info, that the supply value is 42 for the municipality of Innsbruck. Since the class is small (31-45), he decides that there is no significant difference within the class that has to be considered.

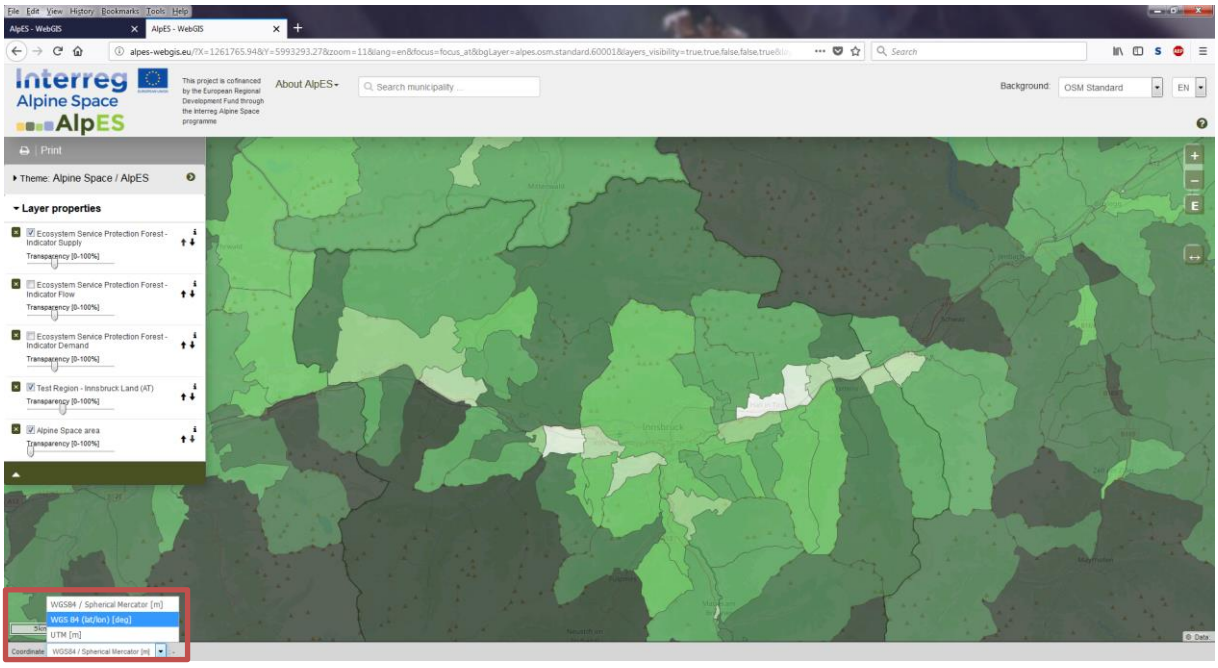
Get coordinates from a specific location

The telephone rings. A friend of Mr. Curious, who heard about his project and ambitions, wonders if Mr. Curious could look up the concrete ES indicator values of Protection Forest for a specific location, namely the location of his home. He has the coordinates of his house in the coordinate system WGS 84 from his

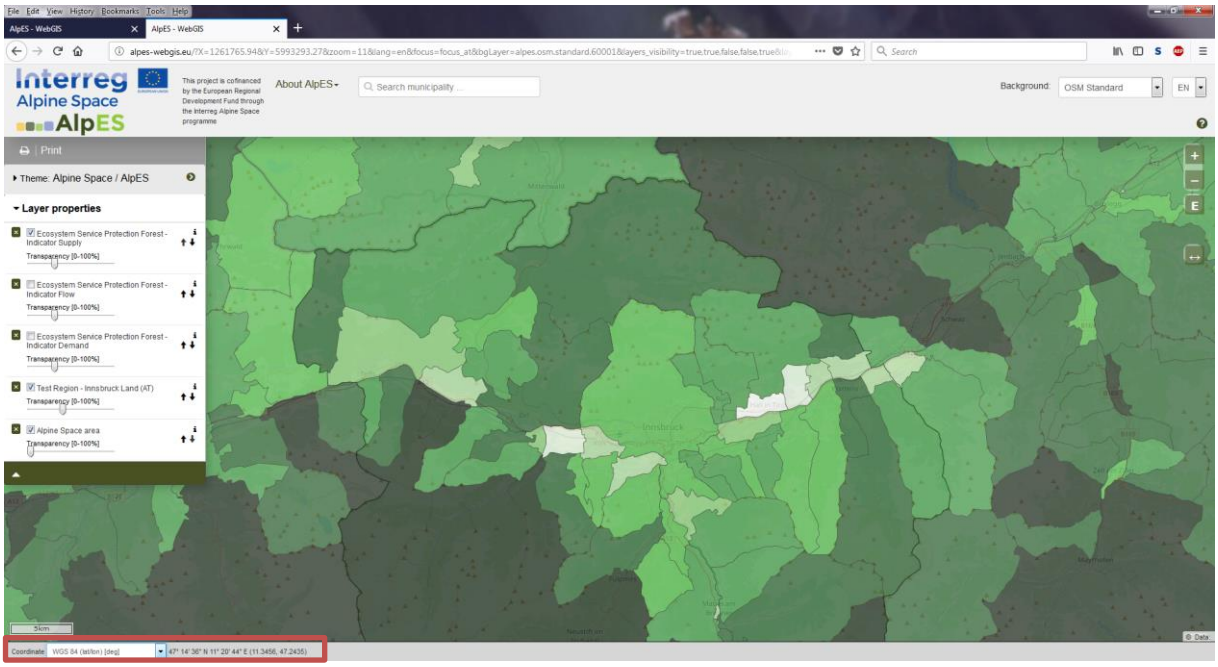
GPS. This is a new challenge for Mr. Curious, but he soon discovers the word “Coordinate” at the bottom of the AlpES WebGIS interface.



First thing he does is to switch the Coordinate System to WGS 84 using the drop down menu.



The coordinates on the right hand side directly besides the drop down menu show the coordinates of the current mouse cursor position in the chosen coordinates system. Thus, if Mr. Curious moves his cursor across the screen, the coordinates change accordingly. If the mouse cursor position is located outside the mapping area, no coordinates are shown.



When Mr. Curious understand how to find a specific coordinate, he moves his mouse cursor around in the area of the municipality of Innsbruck where he knows his friend is living and he soon locates the coordinates of his friend's house. The house is located close to the boundary of the municipality, but in Innsbruck nonetheless (LAU 2 of EuroGeographics as base dataset). Therefore, the values his friend is interested in are those of the municipality of Innsbruck. Selecting the area he soon has written down the precise values given in the parameter info box (for interpretation purposes, please remember that the calculated ES indicator values are estimates). His friend is glad to hear that Innsbruck has a certain amount of Protection Forest supply. After quickly consulting the legend and the Protection Forest article in WIKIAlps, Mr. Curious explains his friend that the ES supply value for Innsbruck lies somewhere in the middle off all possible values in the Alpine Space. He also reminds his friend that since the highest resolution of the ES indicator results is the municipality level, it is not possible to draw conclusions for smaller areas within the municipality, such as his friend's neighbourhood or his house.

Tutorial Case Study's Interpretation

Example of Interpreting values of one municipality

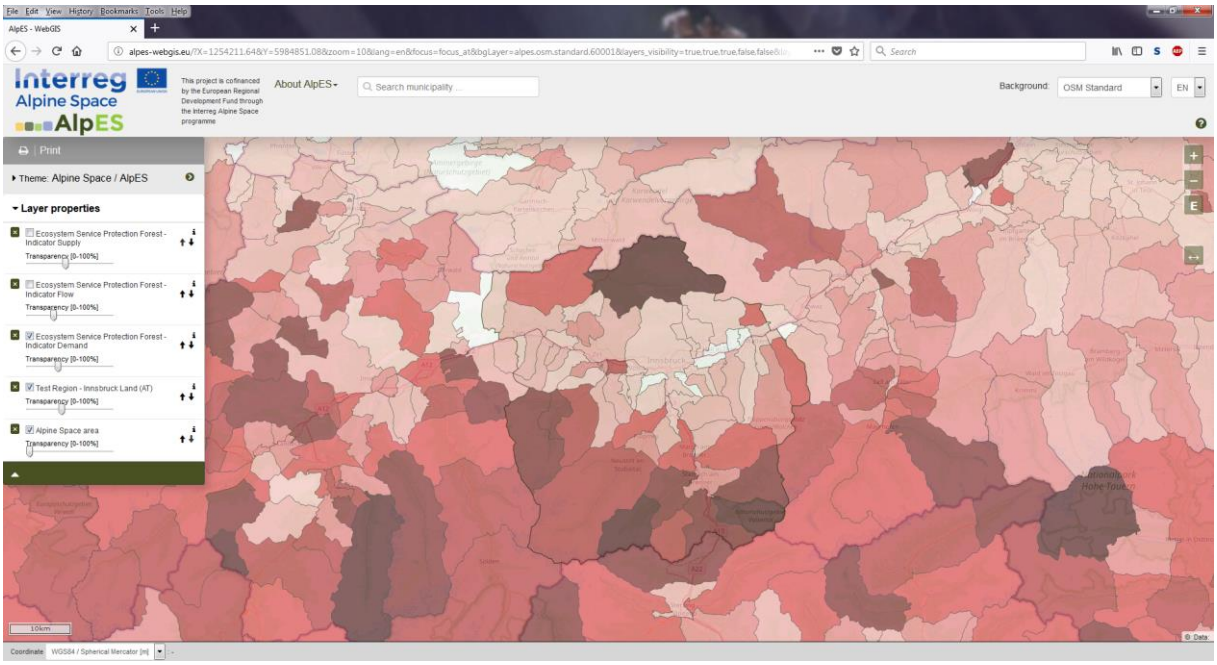
In order to analyse and correctly interpret the ES values of the municipality of Innsbruck, it is important to understand what the ES indicators values can tell us. For the municipality of Innsbruck, the Protection Forest demand value is very low, while the supply and flow values are in the mid-range, with the flow lower than the supply. Remembering the definition of Protection Forest demand, supply and flow (see page 18), the values tell us that there are few human assets and infrastructures in current potential hazard zones. Thus, the demand for additional Protection Forest in Innsbruck is low. The demand indicator is the only indicator that Mr. Curious needs for being able to answer his question.

Additional Information – Protection Forest Demand Indicator calculation
The demand indicator of the ES Protection Forest "shows the need of protection from natural hazards and quantifies this in a simplified manner. It is calculated by summing up areas of human infrastructure in potential hazard zones, whereby all areas are treated equally and are therefore not weighted by importance or value. The result is a qualitative approximation of the amount of human assets or infrastructure that is theoretically in danger within a given municipality" (see metadata).

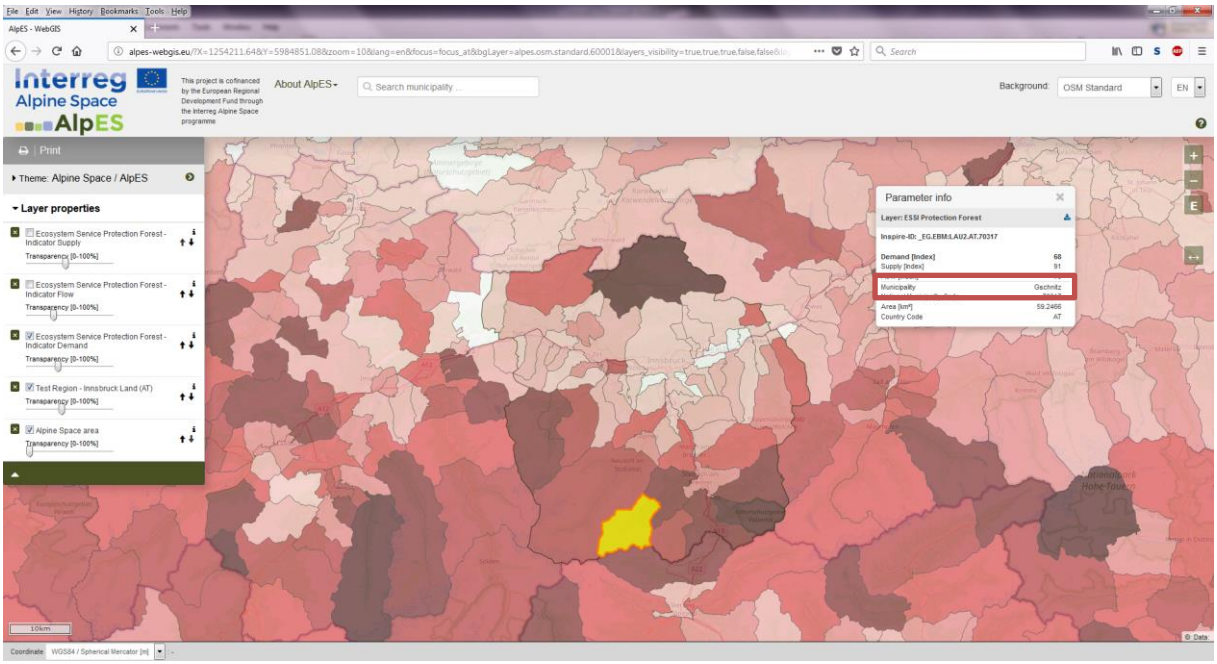
Although Mr. Curious is mainly interested in the demand indicator, he analyses also the supply and flow indicator for one municipality, Innsbruck, in order to get a complete understanding of the ES Protection Forest indicators in that area (you find the list values in the last Parameter info box figure).
The demand indicator represents the state of art, meaning that currently already large areas of Protection Forests surround Innsbruck resulting in a low demand for additional Protection Forests. He knows that Innsbruck could not exist without the Protection Forests that make up approximatively 60% of the surrounding forests. This is reflected in the high supply index value, which tells us that large forest areas in the municipality have an actual protection function. The flow indicator value shows, that potentially multiple natural hazards could occur destroying human lives or infrastructure, but Protection Forest can or could prevent this.
Overall, the ES values make clear that Protection Forest is very important in the municipality of Innsbruck and often used. They are crucial for human well-being in the municipality of Innsbruck. Since the actual demand is not high, Mr. Curious notes that this particular municipality has no need for additional Protection Forest. His question -where is additional Protection Forest needed in the region "Innsbruck"- has been partly answered.

Example of Interpreting values of a specific region of interest

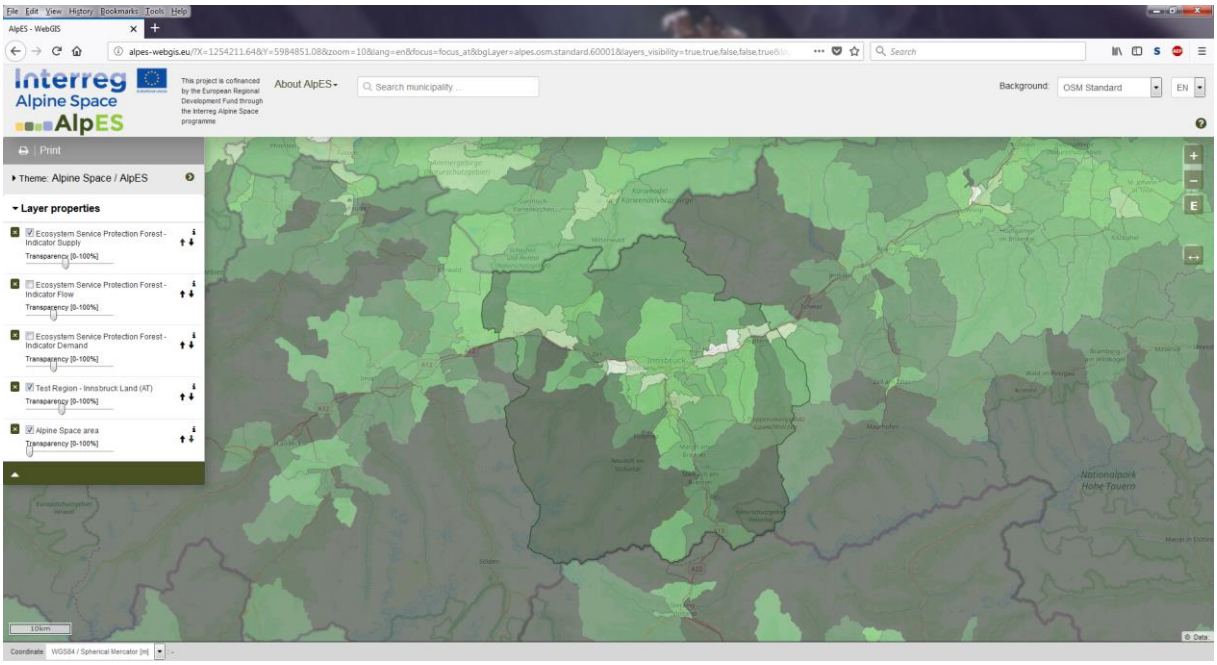
In order to answer his question fully, he now compiles a list of all municipalities in his region of interest with a high Protection Forest demand. In other words, these are the municipalities with an urgent need for new Protection Forest. This list will be the basis for the discussion at the next council meeting. To compile this list, he takes a look at all municipalities in the test region "Innsbruck" simultaneously. He is interested in the distribution of the Protection Forest demand among the municipalities and in particular in the overall overview that gives him an idea if, to which extent, and where Protection Forest is currently missing.



He ends up with this view. It shows that there are three municipalities with relatively high demand values, i.e. the ones with the darkest red colour. He selects them to check their names: Gschnitz, Vals and Scharnitz.



Mr. Curious thinks that the AlpES WebGIS is very useful for getting a fast overview and for enquiries about where to find the municipalities with the highest or lowest ES indicator values in a specific region. In a short time, he has compiled a list with the municipalities that currently have a high need or demand for Protection Forest.



When Mr. Curious compares the demand indicator with the supply indicator of these three municipalities, he finds out that although the supply of Protection Forest is very high relatively to the other municipalities, it is not high enough to meet the current demand. One reason could be that the existing Protection Forest is not located where it is needed. Mr. Curious comes up with this explanation, because the flow indicator shows middle values, meaning that only relatively small parts of the forest areas protect human infrastructures. He makes a note of his assumption, so he can ask an invited local actor about it during the discussion meeting.

Because Mr. Curious has a very organized working manner, he continues with his list. He selects all middle and dark red coloured municipalities, writes down the demand indicators, and orders the list from high to low demand values. He contemplates that this list can serve as a priority list of all municipalities in urgent need for additional protection forest.

Save your results

Print your own map

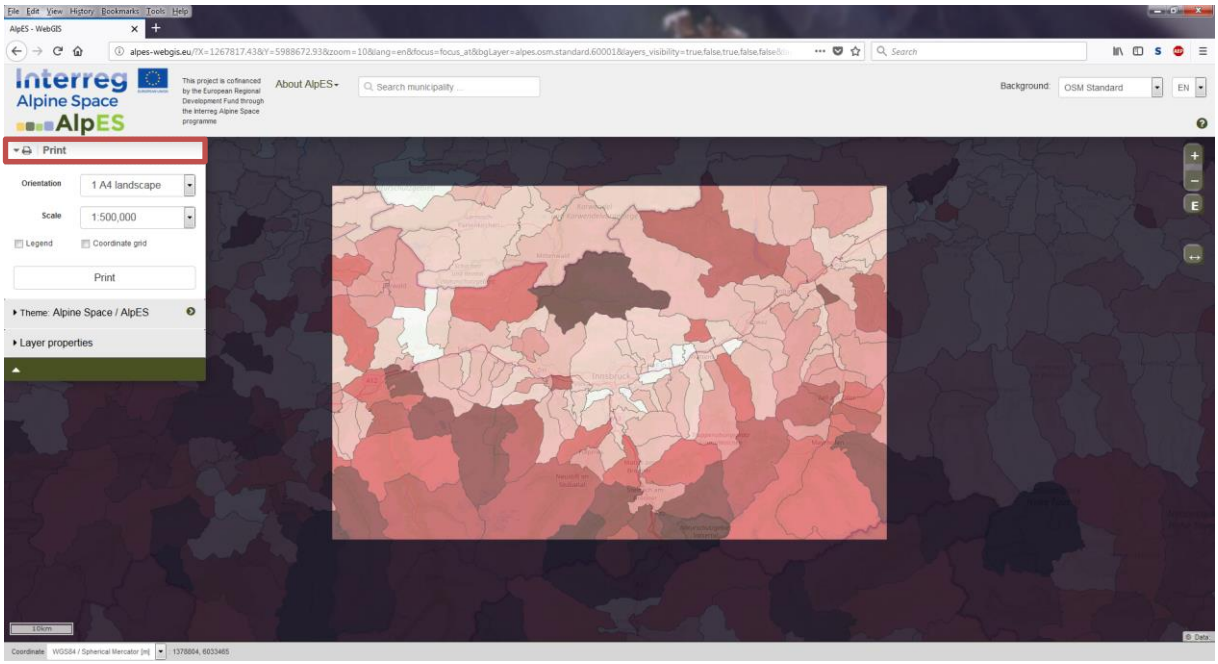
As a finishing touch, Mr. Curious wants to present a coloured map of the demand indicator in the test region “Innsbruck” to the council, so he can easily explain how he came up with the priority list.

Mr. Curious finds out that printing a map is easy. He uses the “Print” button, located above the menu tree. He moves his extent of interest in the middle of the print view. The print function then converts his current map view to pdf format. He saves the pdf and prints it.

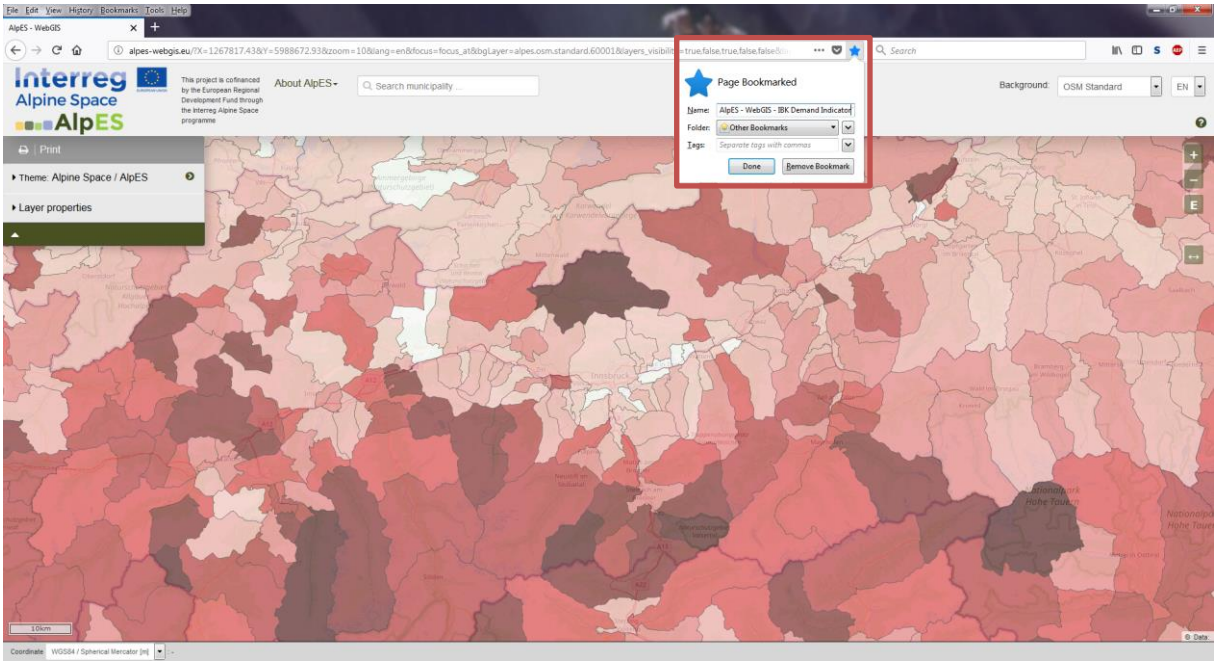
Mr. Curious is a bit proud of his first map that he created with the AlpES WebGIS. It is colourful and includes a scale and legend, so that people without any GIS experience can understand it. With this map, he can easily explain to the council that the municipalities with dark red values are in high need and high demand for additional Protection Forest.

Mr. Curious is looking forward to discuss the specific protection forest situation in the municipalities of region “Innsbruck” with local actors at the council meeting and to hear their ideas for a sustaina-

ble protection forest strategy, that better protects human assets and infrastructure in the future. He knows that good information and stakeholder involvement are key to a satisfactory planning processes, broad support, and sustainable solutions at the municipal level.

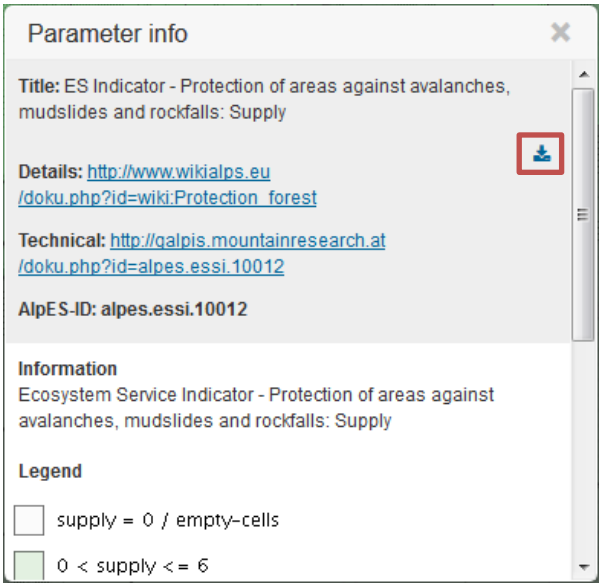


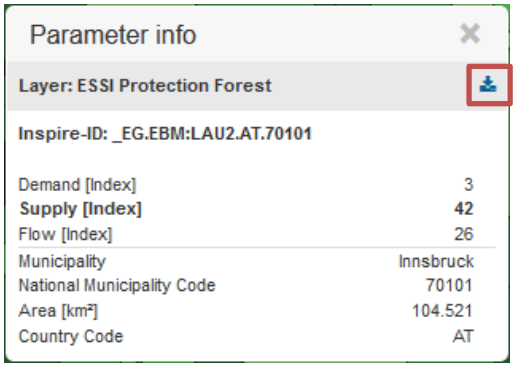
Return to your personalised view



As the working day comes to an end, Mr. Curious makes sure to save his own AlpES WebGIS map, so he can easily return to the same map, by saving the web address (URL) as favourite or bookmark (depending on the used browser).

Download of project results



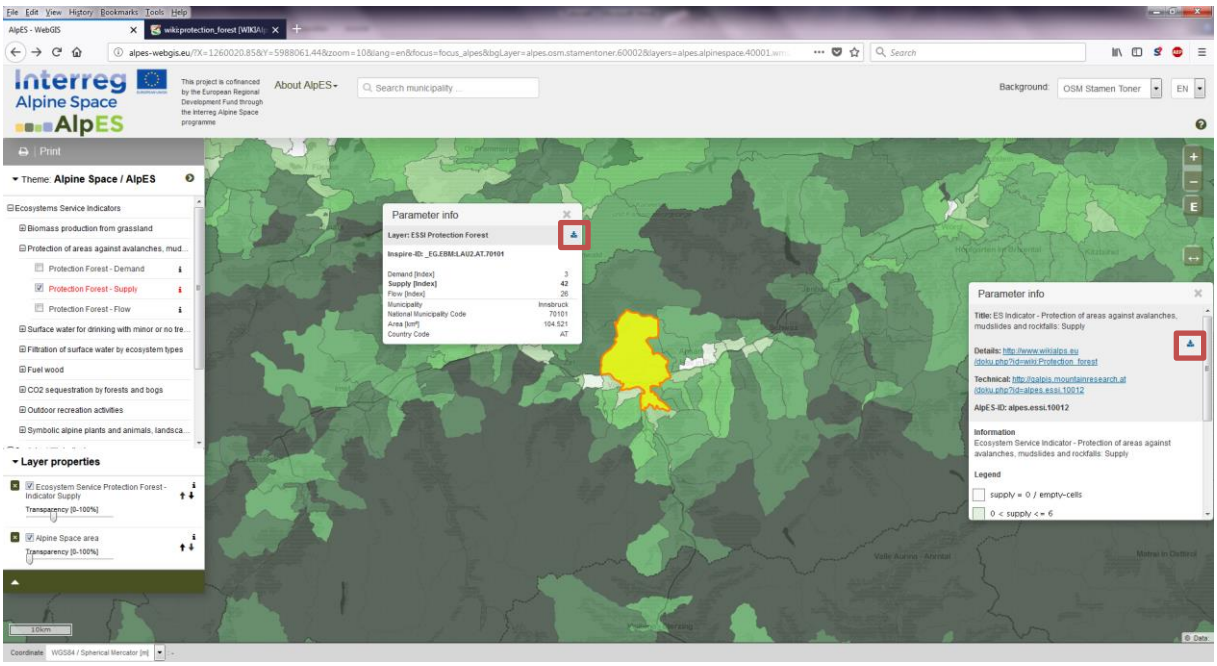


Before Mr. Curious goes home, one last idea comes to his mind: What about saving the ES indicator values as csv file for further analysis, for example for comparison purposes with the datasets in his own desktop GIS software.

Mr. Curious remembers that in the parameter info box of the layer (click the information symbol in the layer tree), he had seen a download-symbol in the upper right corner. With this button, you can download the selected dataset (for the whole Alpine Space Region). The download option is available for all project results, thus for all ES indicators and some sustainability indicators.

The download-format is .csv. It is important to know, that in each dataset there is one row for each municipality and each municipality has a unique ID called “inspireID” (based on the official dataset of EuroGeographics). The “inspireID” column can potentially serve as a join column, if the user has adequate administrative boundary geometries.

Since Mr. Curious is only interested in having the data for a single municipality and not in the whole dataset, he selects a municipality (click on the area) and uses the download symbol in the parameter info box of the selected municipality.



Here you can see the two different parameter boxes. The right one is the general parameter box for the whole activated layer (Protection Forest – supply), the middle one belongs to the selected municipality (Innsbruck) and shows all attributes of all layers that are activated on the click position (multiple if there are overlapping layers on that position activated). Mr. Curious tries out this particular function, so he is prepared in case he gets any data requests during the council meeting.
Mr. Curious now feels that he completed his task of investigating if there is additional need (demand) for protection forest on the municipality level in the region "Innsbruck" to the best of his ability. Satisfied he finishes his workday and goes home.

Have fun generating your own ecosystem service related maps in the Alpine Space!
Your IGF-Team:
Nadine Houbé, Annemarie Polderman, Andreas Cziferszky, Andreas Haller & Oliver Bender

Questions and Comments?
Please send your comments and questions to alpes[at]mountainresearch.at

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Goodchild, M. F. (2009): Geographic Information System. In: Encyclopedia of Database Systems, pp. 1231-1236. Springer US. DOI: 10.1007/978-0-387-39940-9_178. URL: http://link.springer.com/referenceworkentry/10.1007%2F978-0-387-39940-9_178
Painho, M., Cabral, P., Peixoto, M. & Sena, R. (2001): WebGIS as a Teaching Tool. URL: www.academia.edu/2861405/WebGIS_as_a_teaching_tool

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