ALPBIONET2030

Integrative Alpine wildlife and habitat management for the next generation

Concept JECAMI 2.0

Content

1 Introduction

JECAMI – The Joint Ecological Continuum Analysing and Mapping Initiative - is a web based map application developed as a result of the Interreg IV project ECONNECT and complemented within the framework of subsequent projects. It is based on GIS data and consists of several subtools allowing analysis and visualization of ecological connectivity (EC). Because the application was growing more and more complex by the integration of new issues over the last years, it is nowadays only applicable for persons with knowledge, training or reading through large methodology documentation. Within the Alpbionet2030 project JECAMI 1.0 (section 2) will be redesigned in order to make it an even more established tool for various user groups working on EC. JECAMI 2.0 will contain the up-to-date spatial results of the Alpbionet2030 project complemented with data and tools developed in previous projects. A new comprehensive user handbook will be elaborated and enhanced export functions will be added.

This report contains the concept of JECAMI 2.0. The whole concept is based on user scenarios (section 3) leading to the applications content and structure (section 4). The technical implementation is specified in section 5 and the further proceeding including tasks (section 6.1) and open questions (6.3) in section 6.

2 JECAMI 1.0

The application was initially built in 2010 as a result of the ECONNECT project and was becoming a well-known tool for experts working on EC during the past years. The web map is based on Google Maps JavaScript API including a set of layers of different methodical ecological connectivity approaches to help users analyse habitats, connectivity and barriers of the landscape based on a specific criterium. It also incorporates geoprocessing tools, which allow the user to analyse certain areas in detail or calculate a path of an animal through its habitat. The application was initially built using version 2 of Google Maps API in 2010, and rebuilt using Google Maps API v3 in 2014.

The first and the widest used EC approach included in JECAMI is the so-called "Continuum Suitability Index" (CSI) representing a model of the structural connectivity. The CSI was built for two spatial scales: a general approach with consistent but coarse data over the entire Alps and a more spatially and thematically detailed approach within several sub-regions. The functional connectivity is mapped by a Species Map Application (SMA) based on habitat modelling for six species (black grouse, griffon vulture, brown bear, lynx, red deer, wolf). Additionally, there is an analysis integrated based on river landscape for aquatic and semi-aquatic species (Connectivity Analysis of Riverine Landscape CARL). Furthermore, there is a tool describing the renewable energy potential for some pilot regions.

The application is open accessible via the webpage http://JECAMI.eu. It comprises exhaustive documentation on data and methodology. As the application is based on a dynamic web map, the content of the map is spatially and technically extendable. Making use of this, the content of the application was increased by functions and layers within the last years. This induced the app becoming more and more complex containing quite a lot of different issues regarding EC.

3 User scenarios

According to the decision protocol of the JECAMI workshop in Zernez in April 2017 JECAMI 2.0 will be for experts and transferable results for a wider public. In the following subsections, relevant user scenarios are defined. Users may be interested in different aspects of EC and the knowledge on EC of the different users varies considerably. In the user scenarios both components are taken into account.

3.1 People with a general interest in EC

People not familiar with the subject may want to know why EC matters and what it is about. Politicians and people with a general interest in EC may be interested in general project results. This could also include people using JECAMI for an educational purpose.

3.2 EC research

Researcher dealing with EC are interested in an overview of the project results and they may want to analyse and export the data in order to compare it with their own results.

3.3 Hunting / wildlife management

Professionals dealing with hunting and wildlife management may want to get an overview on EC in relation to wildlife strategies over the whole alpine arc or they might want to get results for their area of interest. A possibility of comparing project results with their own data is appreciated. This user scenario is susceptible to change depending on the results obtained by work package (WP) 2.

3.4 Spatial planning

Professionals working on spatial planning in general and/or projecting measures for the improvement of EC on a regional level may want to visualize and analyse different indicators or important areas with regard to EC for their area of interest. They may want to export results in order to compare it with their own data or to integrate it in their planning.

3.5   Social / legal barriers

Professionals, researcher and politicians dealing with legal and social aspects of EC may want to get an overview on legal and social aspects of EC, compare/analyse project results for their area of interest or they may want to export results. This user scenario is susceptible to change depending on the results obtained by WP 5.

3.6   Previous / further projects

People interested in previous projects including Recharge Green and Econnect and users of JECAMI 1.0 are granted access to previous project results and tools. Further projects and related user scenarios could be included.

4   Concept JECAMI 2.0

JECAMI 2.0 will include the user scenarios sketched in section 3 and lead the user accordingly to the corresponding application. It will consist of a welcome page providing different access possibilities to the actual JECAMI 2.0. The welcome page will as well provide general information on EC and highlight the importance of EC. Depending on the chosen access a predefined set of layers is selected and displayed in JECAMI 2.0. It consists of different data layers, analysis tools and a base map in the background. Plotting and printing functions will be integrated and information on the different layers and tools will be provided. Access to previous projects will be included in a subsequent section. For the detailed concept of JECAMI 2.0 we refer to section 4.1 for the welcome page and to sections 4.3 for expert version and 4.2 and for public version.

4.1   Welcome page

The welcome page aims to arouse interest on EC, highlight the importance of EC and guide the user to the corresponding access possibility of the tool. The aims of the welcome page and its implications are sketched in Fig. 1

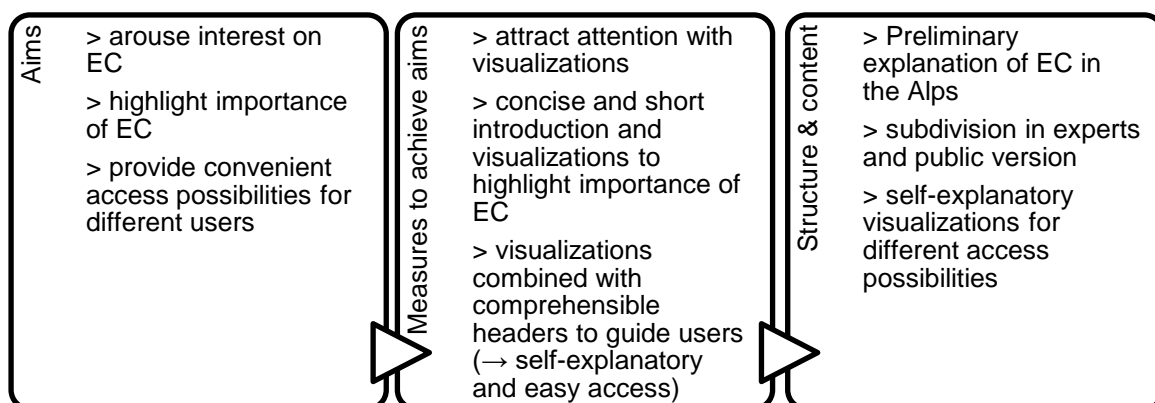| Aims	Measures to achieve aims	Structure & content
> arouse interest on EC > highlight importance of EC > provide convenient access possibilities for different users	> attract attention with visualizations > concise and short introduction and visualizations to highlight importance of EC > visualizations combined with comprehensible headers to guide users (→ self-explanatory and easy access)	> Preliminary explanation of EC in the Alps > subdivision in experts and public version > self-explanatory visualizations for different access possibilities

Fig. 1:   Aims of the welcome page and consequential implementation.

4.1.1   Structure and content of the welcome page

The welcome page consists of a short introduction on the project and on the importance of EC in general. For further information, a link to the project website is given as well as links to the project partner websites. The access possibilities of the JECAMI tool are represented by different pictograms/sketches. On mouse-over the pictogram / sketch becomes coloured. Further information on the subject may be given or an intermediate page containing an introduction on the subject might be integrated if it enhances user-friendliness. Below further/previous projects are listed in the same manner. Short project information is provided in a box displayed on mouse-over, via a link to the project website. For previous projects the user is redirected to the existing JECAMI 1.0. This structure allows also for including subsequent projects and additional access possibilities. A draft of the structure and the content is shown in Fig. 2.
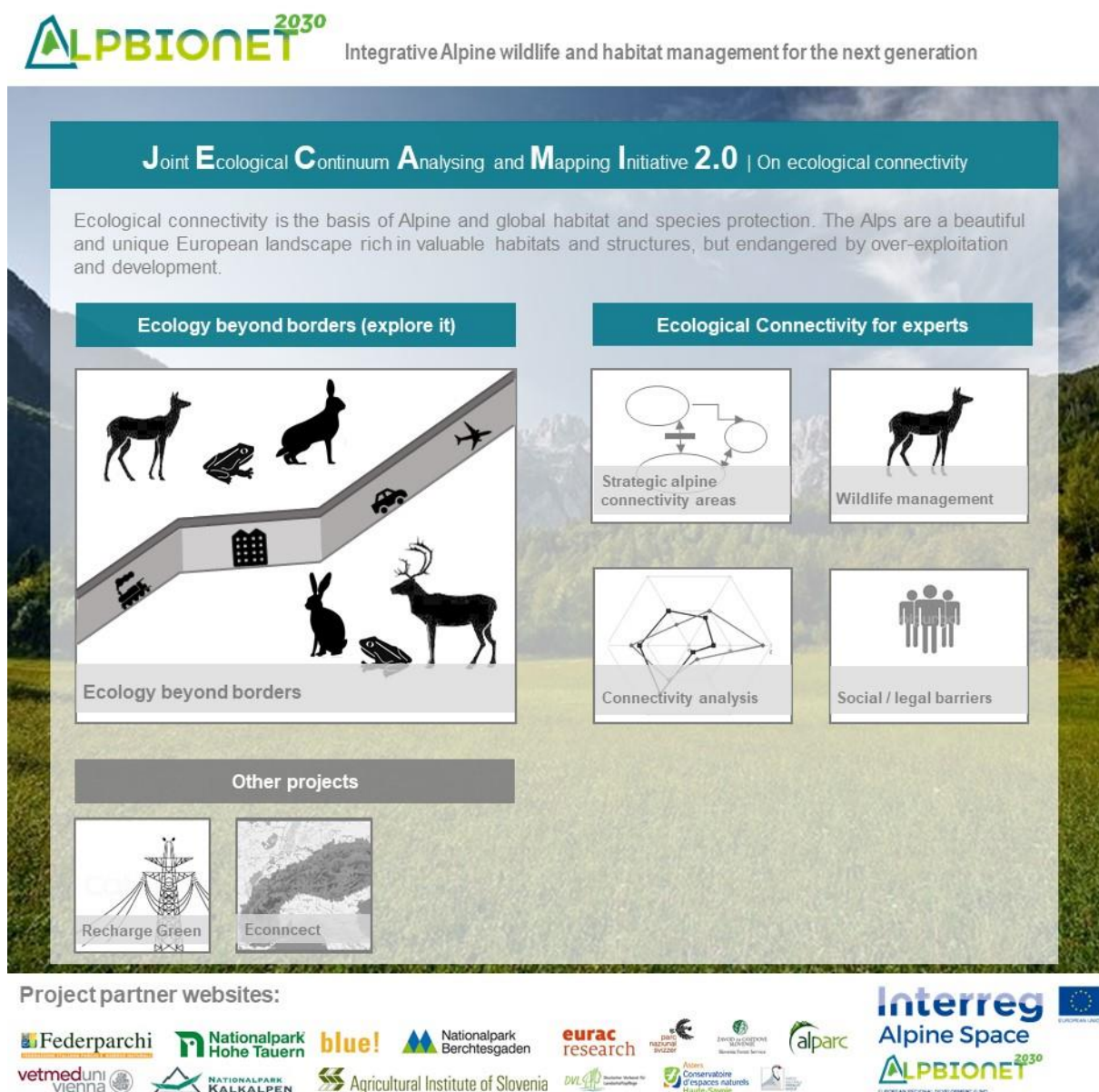

Fig. 2:   Welcome page.

JECAMI 2.0 for a wider public is listed first (reading-direction left to right) because it provides an introduction for people not familiar with the subject. Expert versions are consequently listed second. Further and other projects header is grey because it is not directly related to the other two categories and it refers the user to the existing JECAMI 1.0. Depending on screen size the three categories are shown in a row, in two rows or in a column.

4.2 JECAMI 2.0 for a wider public

In order to address people not familiar with EC an attractive and easy to understand access to the topic needs to be provided. This will include an explorative way to learn why EC matters and what it is. With the aid of a simple "game" the user can explore predefined reduced data layers allowing the understanding of the importance of EC and related spatial conflicts. The aims of JECAMI 2.0 for a wider public and their implementation are summarized in Fig. 3. Specifications of the components and the structure are provided in the following sections.

Aims	Measures to achieve aims
> Allow the user to learn how EC works in an explorative way. (→ learning-by-doing)	> "game" to experience how EC works
> The use of JECAMI 2.0 needs to be intuitive.	> story-telling / campaigning
> Users need to have fun by using the application.	> include real-world data and examples in the game
> highlight the importance of EC on the basis of real-world data	> appealing design
	> self-explanatory headers, functions
	> ranking-list
> show the most important project results (→ interface to JECAMI 2.0 for experts)	> include SACA map

Fig. 3:   Aims of JECAMI 2.0 for a wider public and consequential implementation.

4.2.1 Structure and content of JECAMI 2.0 for a wider public

JECAMI 2.0 for a wider public contains an accordion layer menu divided into a game and a summarized project results (SACA) section. In the background, a base map is displayed and at the bottom of the webpage the project website is linked and data credits are specified. The structure is sketched in Fig. 4.

The game section contains three different game modes with up to three game levels with increasing difficulty. The game modes are described in section 4.2.2. Information on the different games (→ campaigning / story-telling) is available via an info sign. The game can be activated by clicking on it. The user gets a story, his mission and a short concise instruction. Game progress and results are shown in a subsequent pop-up window. In the results' section further information on the example will be given in order to meet the educational purpose.

The summarized project results section contains the SACA layers for the regional and the Alpine analysis. Information on the different layers is available via an info sign. A short description and the corresponding legend are given in an info-box. A more detailed description can be gained via a link to a pdf-document indicated in the info-box. For more information on the layers we refer to the corresponding sections in JECAMI 2.0 for experts (see 4.3.2). The same applies to the more detailed description of the base map, the header and the footer.
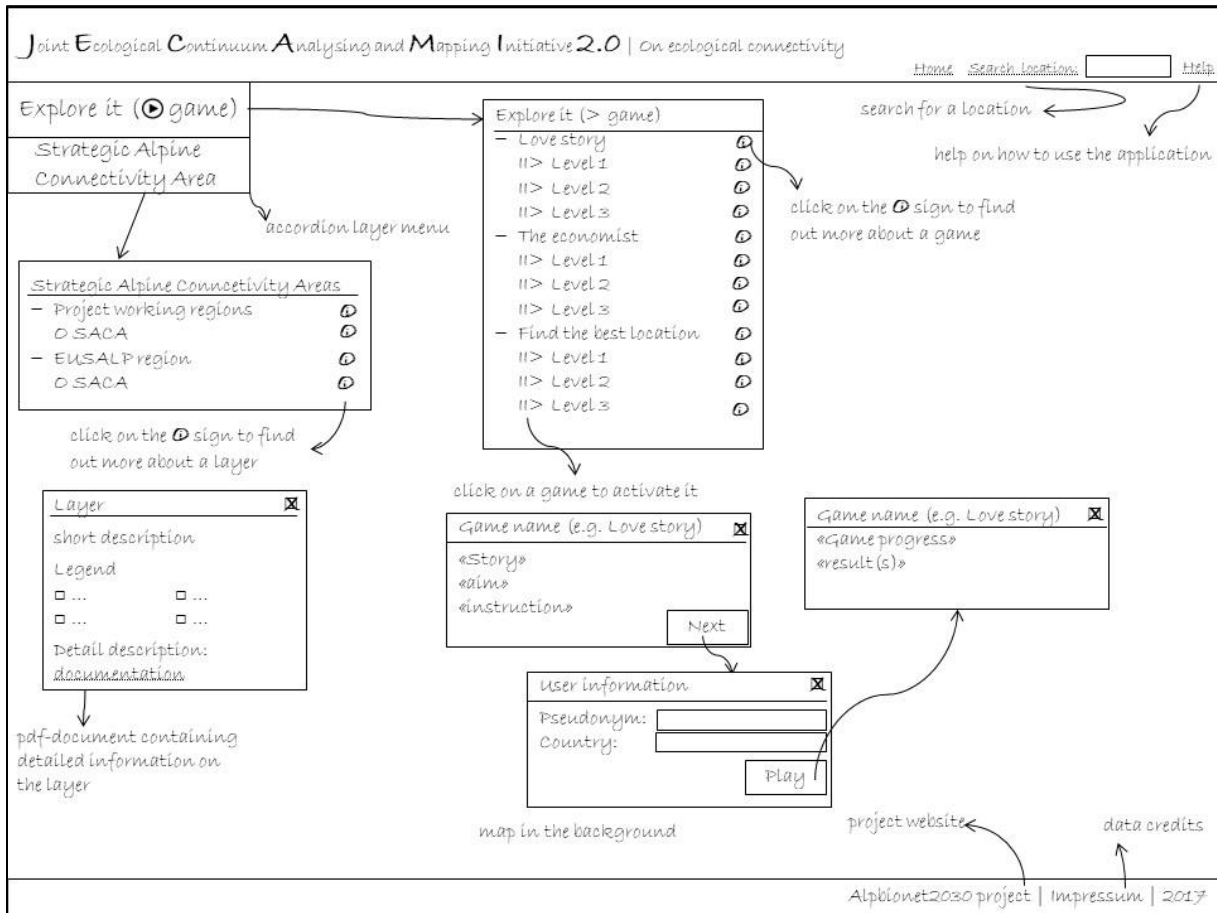

Fig. 4:   Structure of JECAMI 2.0 for a wider public

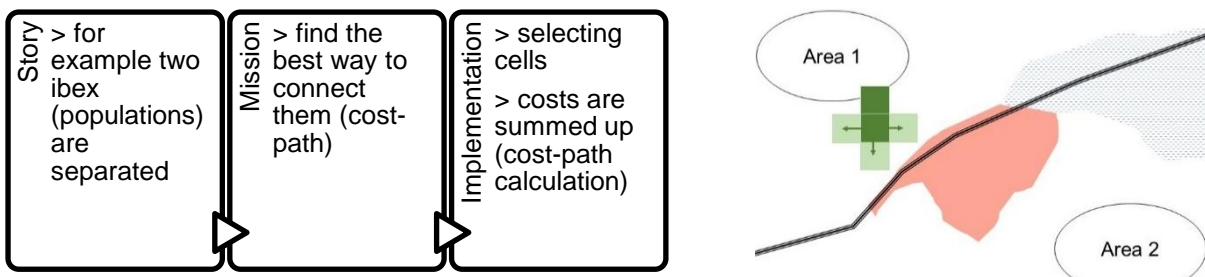## 4.2.2   Ecological connectivity games

4.2.2.1 Love story

Fig. 5:   Mission and their implementation of game mode "Love story"
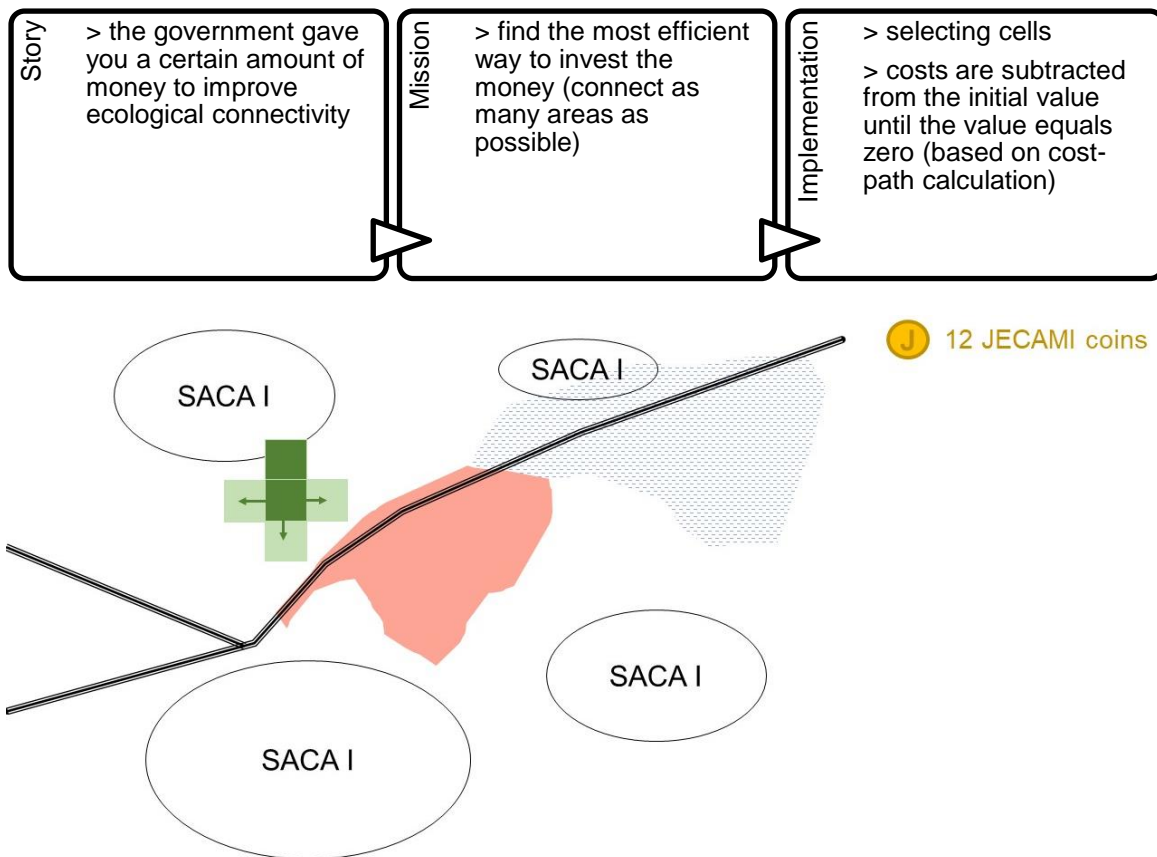
4.2.2.2 The economist

Story	Mission	Implementation
> the government gave you a certain amount of money to improve ecological connectivity	> find the most efficient way to invest the money (connect as many areas as possible)	> selecting cells > costs are subtracted from the initial value until the value equals zero (based on cost-path calculation)

J 12 JECAMI coins

Fig. 6:   Mission and their implementation of game mode "The economist"

4.2.2.3 Find the best location

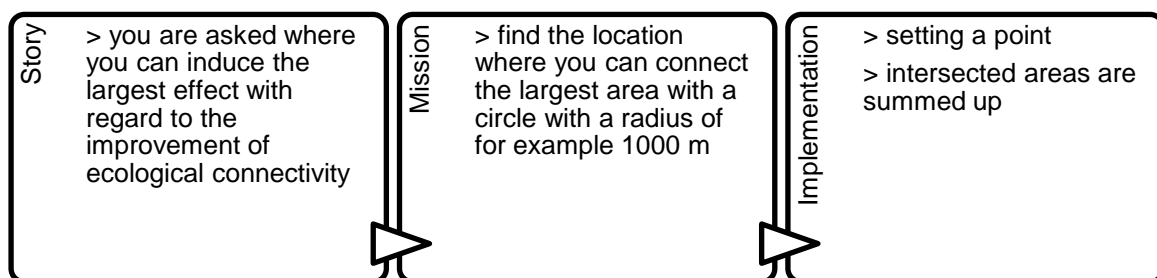| Story	Mission	Implementation
> you are asked where you can induce the largest effect with regard to the improvement of ecological connectivity	> find the location where you can connect the largest area with a circle with a radius of for example 1000 m	> setting a point > intersected areas are summed up

Fig. 7:   Mission and their implementation of game mode "Find the best location"

4.3 JECAMI 2.0 for experts

Experts on EC may not be experts using JECAMI consequently the use of JECAMI 2.0 needs to be intuitive. The aims of JECAMI 2.0 for experts and their implementation are summarized in Fig. 8. Specifications of the structure and the content are provided in section 4.3.1. Specifications of the components and for the different user scenarios are given in the following sections.
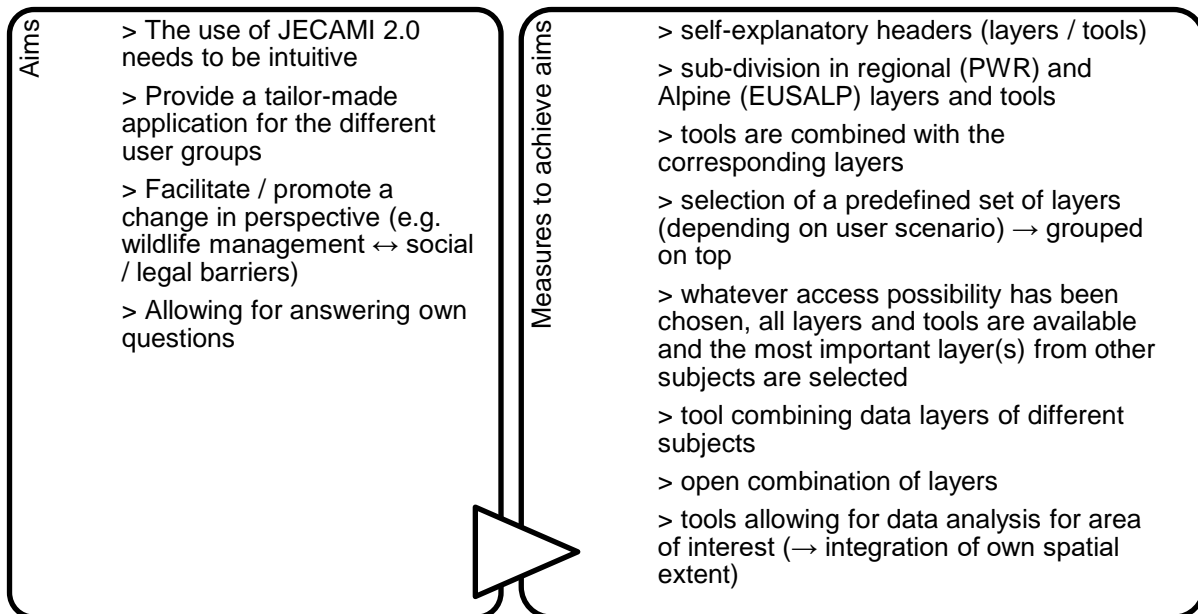
Aims
> The use of JECAMI 2.0 needs to be intuitive

> Provide a tailor-made application for the different user groups

> Facilitate / promote a change in perspective (e.g. wildlife management ↔ social / legal barriers)

> Allowing for answering own questions

Measures to achieve aims
> self-explanatory headers (layers / tools)

> sub-division in regional (PWR) and Alpine (EUSALP) layers and tools

> tools are combined with the corresponding layers

> selection of a predefined set of layers (depending on user scenario) → grouped on top

> whatever access possibility has been chosen, all layers and tools are available and the most important layer(s) from other subjects are selected

> tool combining data layers of different subjects

> open combination of layers

> tools allowing for data analysis for area of interest (→ integration of own spatial extent)

Fig. 8: Aims of JECAMI 2.0 for experts and consequential implementation.

4.3.1 Structure and content of JECAMI 2.0 for experts

The structure (Fig. 9) is adapted from JECAMI 1.0 containing layers and tools arranged as an accordion layer menu. In the background, a base map is displayed and at the bottom of the webpage the project website is linked and data credits are specified.

The layers and tools are divided into an Alpine and a regional subsection. Depending on the chosen access different layers are selected (but all layers are available). The subsections contain various layers and tools arranged by subject (e.g. wildlife management, CSI). The order of the displayed layers can be customised with buttons to move layers up and down.

Information on the different subjects and layers is available via an info sign. A short description and the corresponding legend are given in an info-box. A more detailed description (e.g. full report on methodology/project) can be gained via a link to a pdf-document indicated in the info-box.

Information on the different tools is also available via an info sign. Clicking on the tool opens a box where input can be specified and results are displayed. The different results (including plots) can be exported (print functionality → no data export) and/or shared via E-Mail.
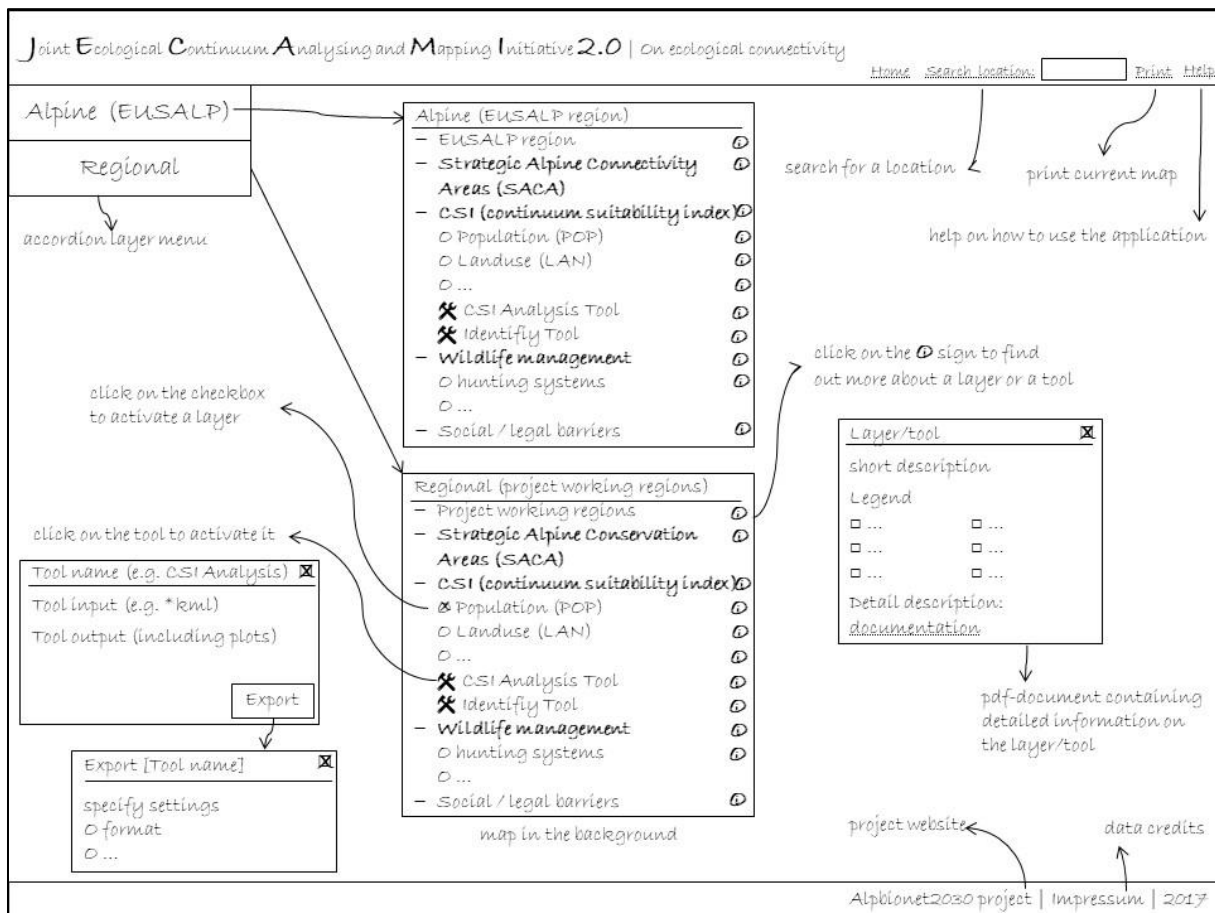
Fig. 9:   Structure of JECAMI 2.0 for experts.

4.3.2 Components

4.3.2.1 Map

A topographic map (and depending on the zoom level an aerial image) is displayed in the background. The map is tiled depending on the zoom level. Nine zoom levels including varying components and coming from different data sources will be integrated (subject to modifications):

Level 0:   1:10'000'000 to 1:5'000'000
base map created by SNP
layers and annotations: hillshade, country borders, country labelling, Mediterranean Sea

Level 1:   1:5'000'000 to 1:2'000'000
base map created by SNP
layers and annotations: hillshade, country borders, country labelling, Mediterranean Sea, most important cities, rivers and lakes

Level 2:   1:2'000'000 to 1:1'000'000
base map created by SNP
layers and annotations: hillshade, country borders, country labelling,

NUTS3, Mediterranean Sea, smaller cities, smaller rivers and smaller lakes

Level 4: 1:1'000'000 to 1:577'790
ESRI Topo Map (Level 9) without protected areas / aerial image

Level 5: 1: :577'790 to 1:288'895
ESRI Topo Map (Level 10) without protected areas / aerial image

Level 6: 1:288'895 to 1:144'447
ESRI Topo Map (Level 11) without protected areas / aerial image

Level 7: 1:144'447 to 1:72'223
ESRI Topo Map (Level 12) without protected areas / aerial image

Level 8: 1:72'223 to 1:36'111
ESRI Topo Map (Level 13) without protected areas / aerial image

Level 9: 1:36'111 to 1:18'055
ESRI Topo Map (Level 14) without protected areas / aerial image

4.3.2.2 Accordion layer menu

The accordion layer menu is divided into an Alpine (EUSALP) and a regional (PWR) section. Both contain the same thematic layers (**L**) and tools (⚒) – if available.

- Strategic Alpine Connectivity Areas (SACA)
  - SACA (**L**)
  - Compare two SACAs (⚒)
  - CSI Analysis of SACA (⚒)
  - Analyse area (⚒)
- Continuum Suitability Index (CSI)
  - Population (**L**)
  - Land use (**L**)
  - Fragmentation (**L**)
  - Infrastructure (**L**)
  - Altitude (**L**)
  - Topography (**L**)
  - Environmental protection (**L**)
  - River (eco-)morphology (**L**)
  - CSI Analysis (⚒)
  - Identify CSI (⚒)
  - Analyse area (⚒)
- Wildlife management
  - Hunting systems (**L**)
  - Species distribution (**L**)
  - Compare areas' wildlife (⚒)

- Analyse area (⚒)
- Social / legal barriers
    - Human / nature conflicts (**L**)
    - Species distribution (**L**)
    - Analyse area (⚒)

The layers can be activated by clicking on a checkbox. A legend and a short description are provided via an info sign displayed in an info-box on-click. It provides the most important information – sufficient for frequent users to understand the data. If a more detailed description on the data, the project and/or the methodology is available it can be provided via a link in the info-box referring to a pdf-document opening in a new tab. It reduces pop-up windows / overlaying content on the map to a minimum. The documentation is usually not read while the user applies a tool or explores a layer.

The information on tools is provided in the same manner as for the layer. Clicking on a tool opens a pop-up window containing the tool name as header. The new tools (differing from JECAMI 1.0) are described in the following:

- Compare two SACAs
  The mean CSI indicators of the two different SACAs are compared. The user can select two SACAs from the map.
- CSI Analysis of SACA
  CSI indicators of a SACA are analysed.
- Compare areas' wildlife
  The hunting systems and the species distribution of two different areas (selectable areas are predefined) can be compared. The user can select two areas from the map.
- Analyse area
  SACAs, CSI, hunting systems, species distribution, human / nature conflicts of an area can be analysed. The selectable areas are predefined. The user can select one of them and specify which layers shall be integrated. This tool aims to promote the combination of the various data layers.

Depending on the tool the user can define the input of the tool either by clicking on the map and/or by uploading a kml-file. The results are displayed as plots in the pop-up window. The results can be printed / shared via an export button. The export button opens another pop-up window allowing to specify the format (pdf or picture) and eventually to share the result via E-Mail.

4.3.2.3 Header and footer

The header consists of the application title and buttons to return to the welcome page, search a location on the map, print the current map and access the manual of JECAMI 2.0. The print button prints the current extent including the selected layers to a pdf-document in a new tab. The help button opens the manual as a pdf-document

in a new tab. Depending on the screen size the buttons are either listed alongside the header or in a second row. The buttons are arranged in the header in order to make it as clearly represented as possible. Pop-up windows and buttons on the map shall be reduced to a minimum – they are restricted to windows which can be removed on-click.

The footer contains relevant information not explicitly needed to use the application. It includes an additional link to the project website, a link to the pdf-document containing all data credits and the copyright and year.

4.3.3   Integration of user scenarios

4.3.3.1 EC research

According to the user scenario documentation of data and tools is integrated as well as analysis tools and possibilities to export project results. Analysis tools comprise the identify tool as well as the possibility of integrating the spatial extent of an area of interest (within EUSALP) for which the analysis shall be conducted.

Leading researchers to the most comprehensive analysis and data exploration possibilities the CSI is selected and the various CSI indicator layers are listed below followed by the CSI analysis tools. Right on top the SACA (strategic Alpine conservation areas) layer is displayed (→ polygons without fill-colour). Displaying SACAs aims giving summarized project results but also establishing them in all ranks of EC. Layers and tools on hunting / wildlife management and social / legal barriers are listed below but are not selected. This allows for the combination with other aspects of EC.

4.3.3.2 Hunting / wildlife management

According to the user scenario and depending on the results obtained from WP2 data layers on wildlife management will be integrated and an export function will be provided. For the area of interest results can be analysed by a specified spatial extent (within EUSALP).

For people dealing with wildlife management species distribution is selected because they are first of all interested in wildlife. Right on top the SACA layer is displayed in order to force them to include the strategic conservation planning in their evaluation as well. Below the layers and tools of the CSI as well as social / legal barriers are shown.

4.3.3.3 Spatial planning

According to the user scenario project documentation is given as well as analysis tools and possibilities to export project results are integrated. Analysis tools comprise the identify tool as well as the possibility of integrating the spatial extent of the area of interest (within EUSALP) for which the results shall be exported.

For people involved in spatial planning the SACAs are of highest importance and therefore selected. They are followed by the CSI in order to investigate for example which aspects (e.g. land use or environmental protection) needs most attention in order to improve the situation. Layers and tools on social / legal barriers as well as on wildlife management are listed below.

4.3.3.4 Social / legal barriers

According to the user scenario and depending on the results obtained from WP5 data layers on social and legal barriers will be integrated and an export function will be provided.

For people interested in social / legal barriers the corresponding layer are selected. The SACA layer is displayed on top in order to force them to include the strategic conservation planning in their evaluation as well. Below the wildlife management section follows because it also deals with legal aspects followed by the CSI section.

5 Concept of technical implementation

JECAMI 2.0 is implemented according to the system architecture sketched in Fig. 10. Detailed information on the technical implementation is provided in the following sections. First an overview on the components is provided (section 5.1), second the implementation of tools and games is described conceptually (section 5.2). The integration of layers and the base map as well as the overall design of the web application is not further described because it is an adaptation of the existing framework of JECAMI 1.0.
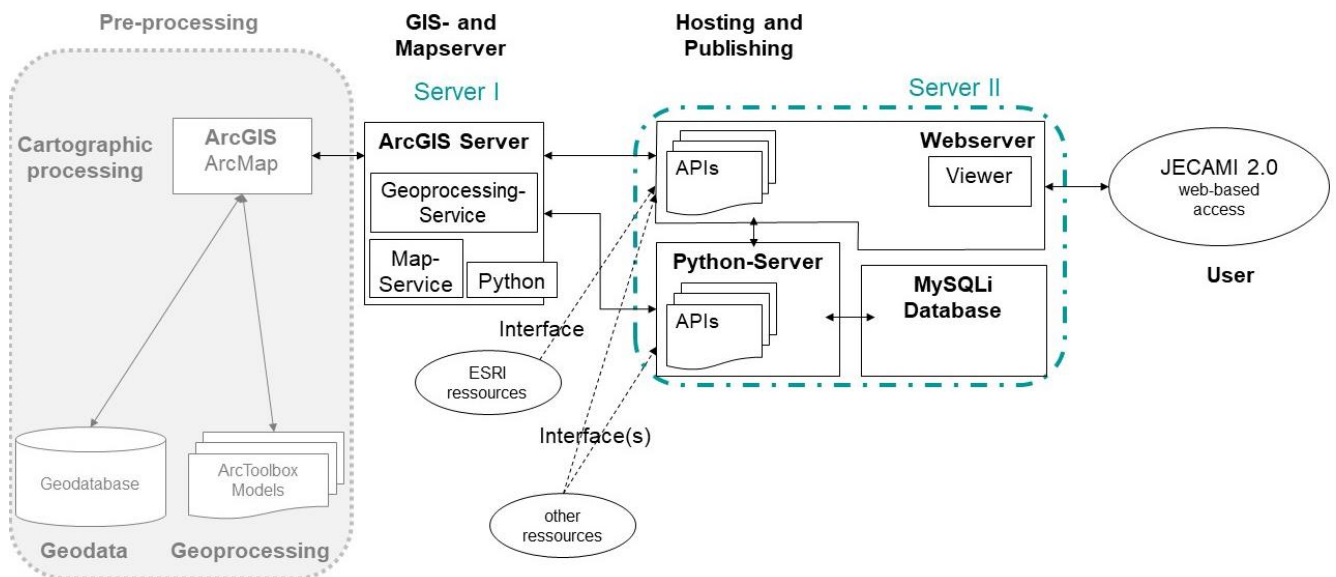

Fig. 10: System architecture.

5.1 System architecture

5.1.1 Data pre-processing

All data pre-processing is done with ArcGIS software. Data is stored in a geodatabase and geoprocessing is done by using ArcToolbox models.

5.1.2 GIS- and Mapserver

The pre-processed data layers and geoprocessing tools are published on the ArcGIS Server. The ArcGIS Server contains a Map and a Geoprocessing-Service. Python is included in the ArcGIS Server by default.

5.1.3 Hosting and publishing

Hosting and publishing services are located on the second server. The webservice is hosted on the Webserver requesting data from the ArcGIS Server and including other resources using the respective interfaces. On the same server runs a python-server.

It is used for plotting results and it connects to the MySQLi database hosted at the same server as well as to the ArcGIS-Server.

5.2   Implementation of tools and games

In the following sections the new tools and games are described. Existing tools – by name the CSI analysis tools and the identify tool – will be adapted to the new system architecture and are therefore not described here.

5.2.1   "Love story"

The user types nickname and country into the fields appearing in the game's pop-up window. This information is stored in a cookie.

The user selects raster cells by clicking on them. This calls every time an event-handler to temporary store the coordinates to a list. After clicking on one raster cell (event-handler on python-server), this raster cell is selected by location and the centre coordinates are returned (ArcGIS server) in order to draw a square on the map at the location of the selected raster cell (python-/webserver). After having finished - the user can click on a finish button – the following actions are called:

- check if the areas are connected (geoprocessing ArcGIS-Server)
- calculate with zonal statistics the sum of the selected cells (geoprocessing ArcGIS-Server)
- store value, nickname and country in database and return nickname, points and rank (python-server, database, webserver)

5.2.2   "The economist"

The user types nickname and country into the fields appearing in the game's pop-up window. This information is stored in a cookie.

The user selects a raster cell by clicking on it. The raster cell is selected by location and the value extracted by location (ArcGIS-Server). The value is subtracted from the initial value and stored in the cookie. For the representation of selected cells, the same procedure as for the game mode "love-story" (section 5.2.1) is applied. This procedure is repeated until the value equals zero (it will be circumvented to get values smaller than zero). When the value equals zero the connected area will be evaluated by applying the following procedure (geoprocessing on ArcGIS server):

- Recalculate raster cells - assign them the same value in order to be able to convert them to one polygon per corridor with the raster to polygon conversion tool (ArcGIS-server)
- Intersect the corridor feature class with the SACA feature class and add a field containing a count of overlapping features in other layers – if the count equals two or more the corridor connects areas. Features with lower count values are deleted.
- The corridor layer is used to select SACAs by location (intersect). The total area of the selected features is summed up and returned.

The area of the connected area is stored in the database together with the nickname and the country in the cookie of the user. The nickname, the points and the rank are returned in the web browser (python-server, database, webserver).

5.2.3 "Find the best location"

The user types nickname and country into the fields appearing in the game's pop-up window. This information is stored in a cookie.

The user selects a point on the map. This triggers the drawing of a circle with a predefined radius depending on the game level (web-/python-server). At the same time the location is passed to the respective geoprocessing tool (ArcGIS server) selecting SACAs by location (intersect) and returning the sum of the area of the selected polygons (see the more detailed description in section 5.2.2).

The area of the connected area is stored in the database together with the nickname and the country in the cookie of the user. The nickname, the points and the rank are returned in the web browser (python-server, database, webserver).

5.2.4 "CSI Analysis of SACA" and "Compare SACAs"

Mean CSI indicator values for SACAs will be calculated in advance (pre-processing) and stored in the attribute table of the feature class located on the map-server. The user can click on one or two polygons on the map (depending on the chosen tool). One or two of these polygons are then selected by location and their values are exported. For this purpose, a geoprocessing tool will be developed (map-/geoprocessing-server). The extracted values are plotted using python code (python-server) and the result is displayed on the webpage (web-/python-server).

5.2.5 "Analyse area"

The various values of the areas (CSI, wildlife management, SACA etc.) will be calculated in advance (pre-processing) and stored in the attribute table. The user can select a polygon on the map. The polygon is highlighted on the map (python-/webserver) and selected by location on the geoprocessing-server. The values are passed to the python-server, plotted and displayed in the web-application (web-/python-server).

5.2.6 Compare areas wildlife

The attributes of the various pre-defined areas are stored in the attribute table of the feature class located on the map-server. The user can select a polygon on the map. The polygon is highlighted on the map (python-/webserver) and selected by location on the geoprocessing-server. The values are passed to the python-server, plotted and displayed in the web-application (web-/python-server).

5.2.7 Export / print function

For printing and exporting two different functions will be available. The first prints the current extent of the map with the selected layers. The second exports the results of the applied tool.

For this purpose, a html page is composed on the webserver but not displayed. It contains either the current extent of the map or the results of the applied tool including a map with the extent of the analysis specified. The html page is then printed as a pdf (https://wkhtmltopdf.org/). For the composition of the html page, results stored in cookies, functions running on the python server and content of the webserver are used.

In addition to the printing function it shall also be possible to share results of the analysis done. For this purpose, a short link can be generated by clicking on the sharing button which will be sent to the email address specified by the user. Every short link refers to a database entry containing the respective values. For a CSI analysis for example the filename of the kml-file and 8 single indicator values need to be stored. Based on these values the results will be plotted again, the kml-file will be loaded and the spatial extent of the map will be adapted. In order to minimize storage used the links may expire after a pre-defined time-period. The kml-files used for analysis are stored on the webserver and deleted after the user terminate its session. For shared analysis results the corresponding kml-file needs to be stored either permanently or for a pre-defined time-period until the link expires.

6 Further proceeding

6.1 Tasks

Task	Description	Due time	Responsible
	Final definition of CSI indicator methodology	Oct. 2017	SNP, ASTERS, all PR[1]
	Deliver all missing geospatial data (format: WGS84 Web Mercator – epsg3857)	**Oct. 2017**	**all PR**
	Preparation of system architecture	Dec. 2017	SNP
	Deliver sample data of layers from WP 2, WP 3, WP 4 and WP 5	Jan. 2018	WP2, WP3, WP4, WP5
	Implementation of web application framework	Mar. 2018	SNP
	Design of pictograms / sketches for the application	Mar. 2018	SNP (→ external service)
D.T1.3.1	Indicator layers available	Jul. 2018	SNP, all PR
	Integration of indicator layers	Aug. 2018	SNP
	Development of tools	Dec. 2018	SNP
	First version of JECAMI 2.0 available	Dec. 2018	SNP
	First version of JECAMI 2.0 training handbook available	Dec. 2018	SNP
	JECAMI 2.0 training sessions	Jan. 2018 (onwards)	?
	Adaptations to JECAMI 2.0 (incl. the handbook)		SNP
D.T1.2.1	Final version of toolbox available	Mar. 2019	SNP
	Final versions of data layers (including documentation) from WP 2, WP 3, WP 4, WP 5 available – ready to be published	Jun. 2019	WP2, WP3, WP4, WP5
D.T1.4	Data layers from WP 2, WP3, WP4 and WP5 integrated in JECAMI 2.0	Aug. 2019	SNP
O.T1.1	Final version of JECAMI 2.0 available	Aug. 2019	SNP
D.T1.5.1	Final version of JECAMI 2.0 training handbook available	Oct. 2019	SNP

6.2 Data requirements

All data to be published needs to be in WGS84 Web Mercator coordinate system (epsg3857). For every layer the following data and documents needs to be provided (ready to be published):

- A precise legend containing symbols and categories:
  o Categories as plain text
  o Symbols as individual picture files (.jpg, .tif etc.) with unambiguous file names
  o In the case of raster files indicate the colours of the different categories as hex-code
- A short description of the data layer as plain text (max. 150 characters).
- A list containing all data sources used for the analysis. It must include the following information for each data source (a template will be provided on Basecamp):

[1] PR: Project region

- o (official) name of dataset
- o Region covered
- o Year (created / actualized)
- o Data source
- o Licence if applicable (e.g. "Creative Commons Namensnennung 3.0 Österreich")
- o File name
- Documentation on the data layer as a pdf-document ready to be published. The documentation may include the explanation of the methodology applied, of the data sources used and so on. A template will be provided on Basecamp.

6.3 Open questions

Q1: Which data layers do we exactly get from the other PP?
Q2: Which tools are necessary for the other PP?

7 References

[1] Füreder, L. & Kastlunger C. (2011). Towards ecological connectivity in the Alps. The ECONNECT Project Synopsis. Innsbruck: STUDIA Universitätsverlag. Retrieved from http://www.econnectproject.eu/cms/sites/default/files/Synopsis.pdf

[2] SNP (2017). ALPBIONET2030. Decision Protocol WPT1. JECAMI Workshop 04. / 05. April 2017.