

Econnect - Restoring the web of Life



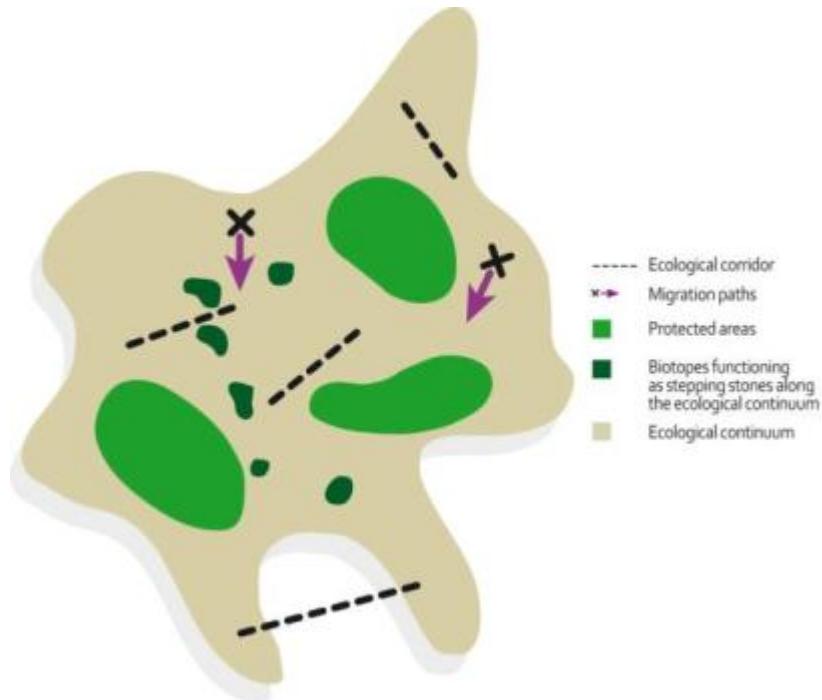
The Joint Ecological Connectivity Analysis and Mapping Initiative (JECAMI) and the ECONNECT GeoPortal



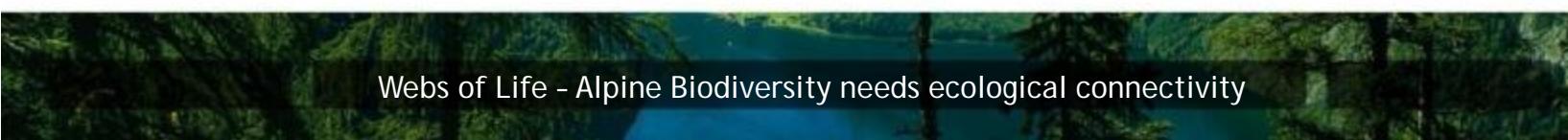
Webs of Life - Alpine Biodiversity needs ecological connectivity



The theory for both species...



<http://www.alpine-ecological-network.org>



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The managers tasks in the ecological connectivity

Leading

Planning

Implementing

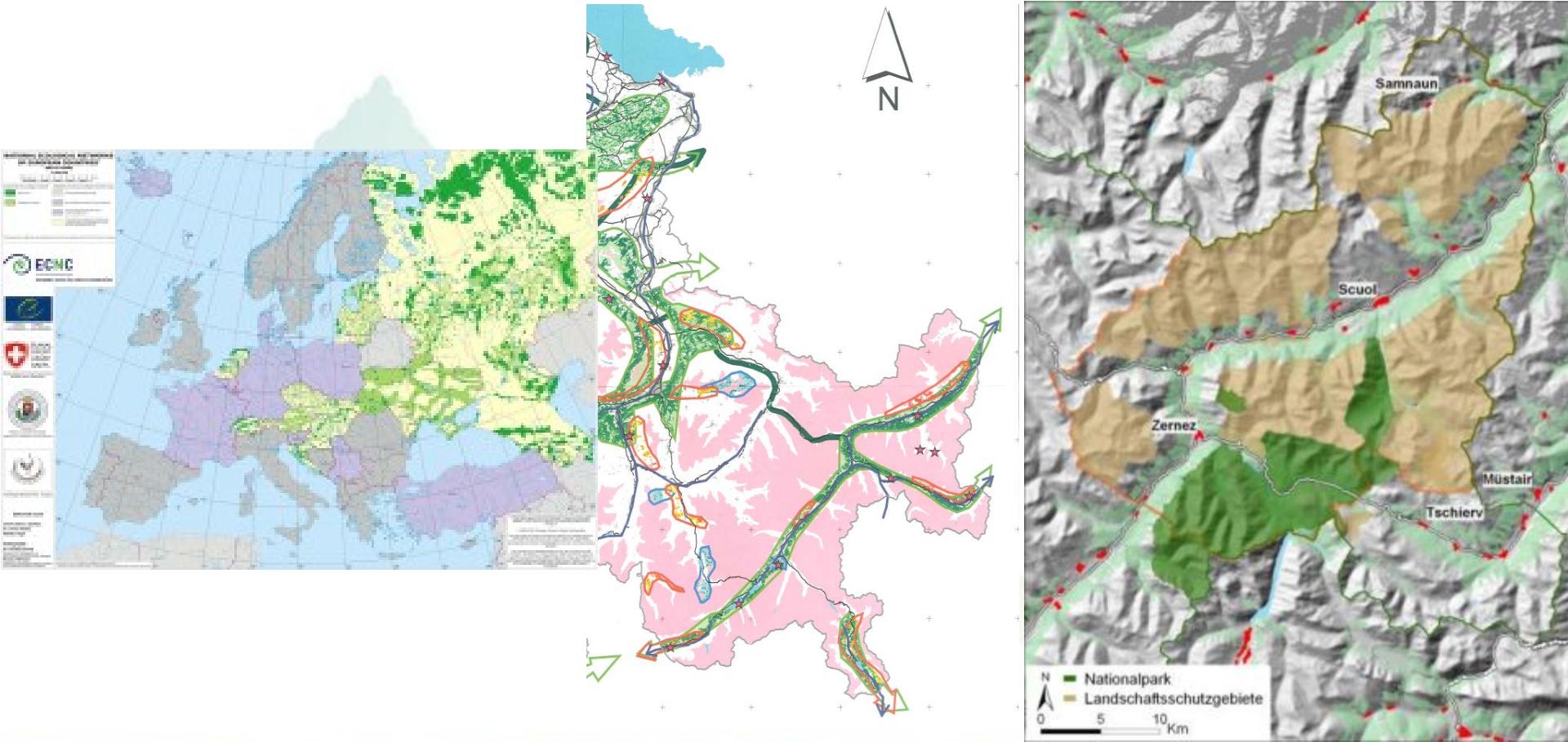
Evaluating

- ... in the entire connectivity site area
- ... on national state scale
- ... on landscape scale
- ... on international transboundary scale
- ... on individual site level

Worboys, 2010



How to concatenate these spatial levels?



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Aim

“Where is the ecological continuum (the corridors and barriers) in the pilot areas and how can they be estimated and compared over all pilot regions? ”

WP4 - Data Management (GIS platform)

WP5 - Barriers and corridors (Analysis of species and habitat types)

WP7 - Implementation in Pilot areas

- Connectivity mapping and landscape modeling
- Identification of connectivity potential



Econnect's response to spatial permeability

The screenshot shows the econnect web interface. At the top, there is a navigation bar with links: HOME, ABOUT THE PROJECT, PILOT REGIONS, WORK PACKAGES, PARTNERS & OBSERVERS, NEWS & EVENTS, DOWNLOAD AREA, and LINKS. The econnect logo is on the left, and the tagline "Restoring the web of life" is below it. The main area features a map of a mountainous region with different colored layers representing ecological data. A legend on the right side identifies these layers, including "Protected areas", "Landscape (LAM)", "Landscape Planning (LAP)", "Patch Collocation (PC)", "Edge Density (ED)", "Environmental Protection (EP)", and "Ecological Reserves (ER)". Below the map, a large text overlay reads "„Mapping relevant factors“". At the bottom of the interface, there are buttons for "Search", "Select & Upload", "Calculation", "Chart", "Table", and "Report". The footer contains links for "www.hab.it/OSIG-Orsi", "Programma Agip P.I. IT 02121111006 agip@hab.it", "Reserved Area", "News RSS", "HTML", "CSI", "Requirements", and "Credits".

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„Mapping relevant factors“



CSI

„The landscape approach“
Structural Connectivity



SMA

„The species approach“
Functional Connectivity



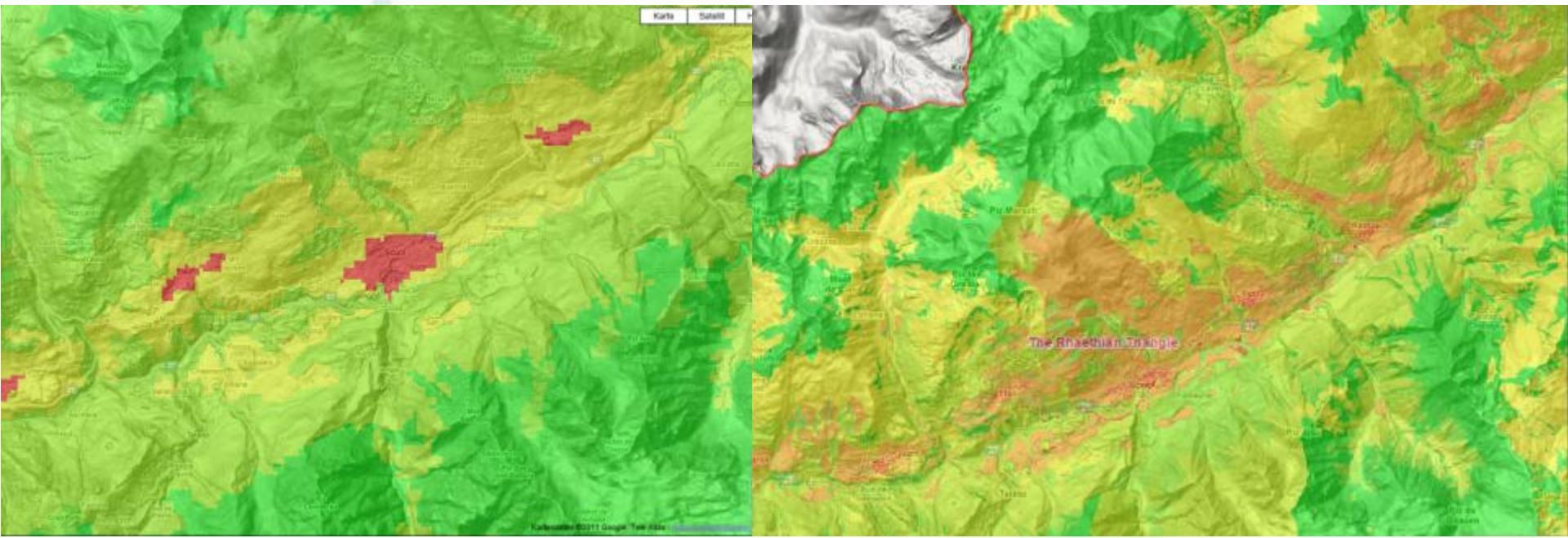
CARL

„The network approach“
Structural and functional c.

JECAMI: *Joint Ecological Continuum Analysis and Mapping Initiative*
A platform to analyze and visualize ecological connectivity in the Alps



Locally high precision data needed

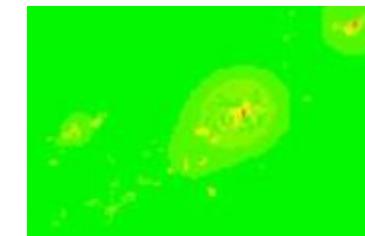
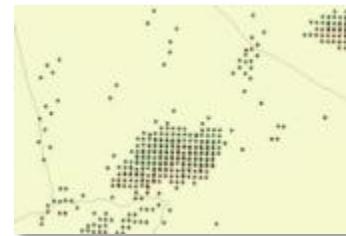


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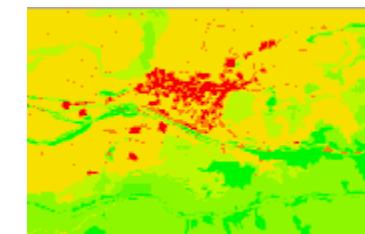
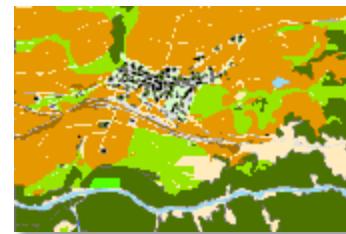
10 Indicators

Population



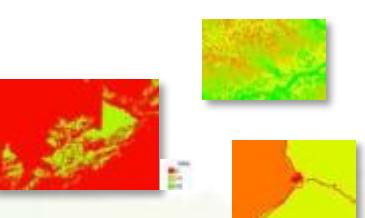
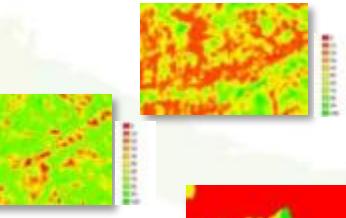
Landuse

Landuse Planning



Altitude and Topography

Fragmentation



Infrastructure

Landscape Heterogeneity

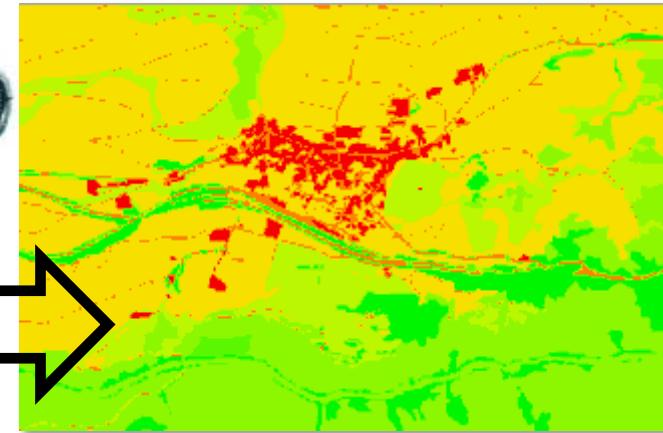
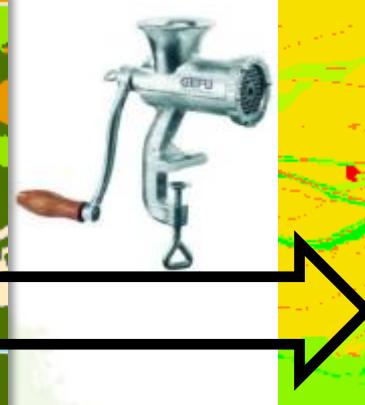
Edge density

International Protected Areas

Ecological Measures



Data processing



0
1
5
10
20
40
50
60
70
100

7 Pilot regions

Many Political regions

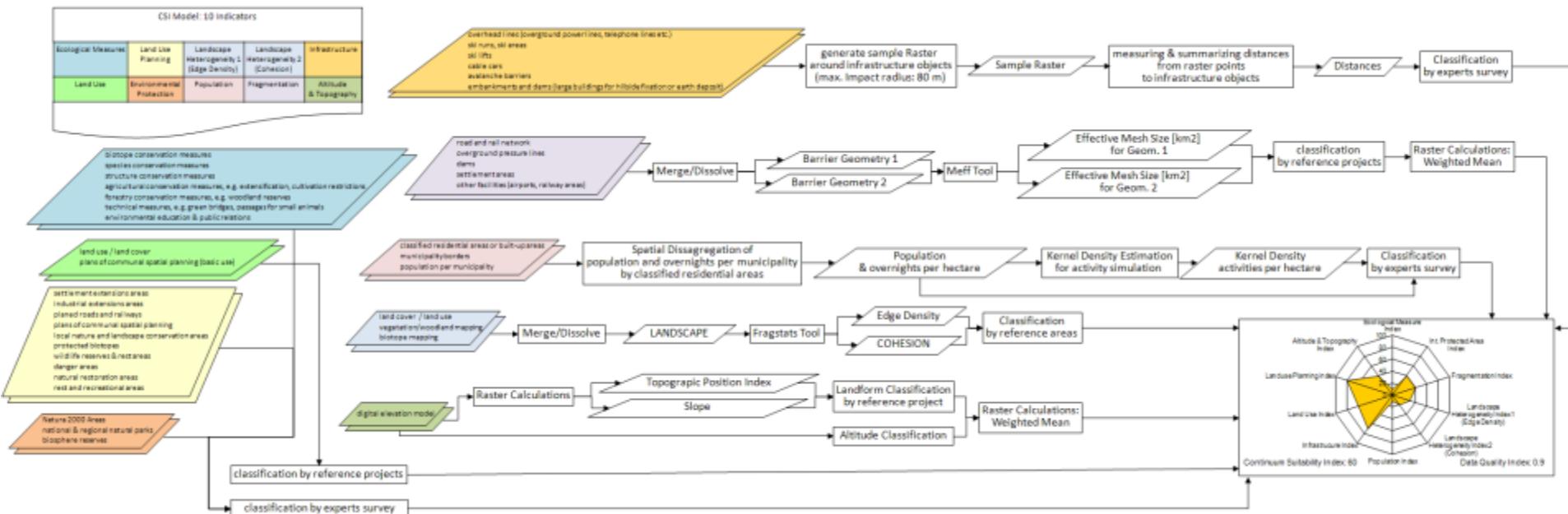
A few Coordinate systems

A bunch of Datasets

1 Coordinate system

10 Indicators (raster datasets)

Indicator model scheme



CSI Model: 10 Indicators

Ecological Measures	Land Use Planning	Landscape Heterogeneity 1 (Edge Density)	Landscape Heterogeneity 2 (Cohesion)	Infrastructure
Land Use	Environmental Protection	Population	Fragmentation	Altitude & Topography

overhead lines (overground powerlines, telephone lines)
 ski runs, ski areas
 ski lifts
 cable cars
 avalanche barriers
 embankments and dams (large buildings for hillside fix)

biotope conservation measures
 species conservation measures
 structure conservation measures
 agricultural conservation measures, e.g. extensification, cultivation restrictions
 forestry conservation measures, e.g. woodland reserves
 technical measures, e.g. green bridges, passages for small animals
 environmental education & public relations

road and rail network
 overground pressure lines
 dams
 settlement areas
 other facilities (airports, railway areas)

land use / land cover
 plans of communal spatial planning (basic use)

classified residential areas or built-up areas
 municipality borders
 population per municipality

settlement extensions areas
 industrial extensions areas
 planned roads and railways
 plans of communal spatial planning
 local nature and landscape conservation areas
 protected biotopes
 wildlife reserves & rest areas
 danger areas
 natural restoration areas
 rest and recreational areas

Natura 2000 Areas
 national & regional natural parks
 biosphere reserves

Merge/Dissolve

land cover / land use
 vegetation/woodland mapping
 biotope mapping

Raster Calculations

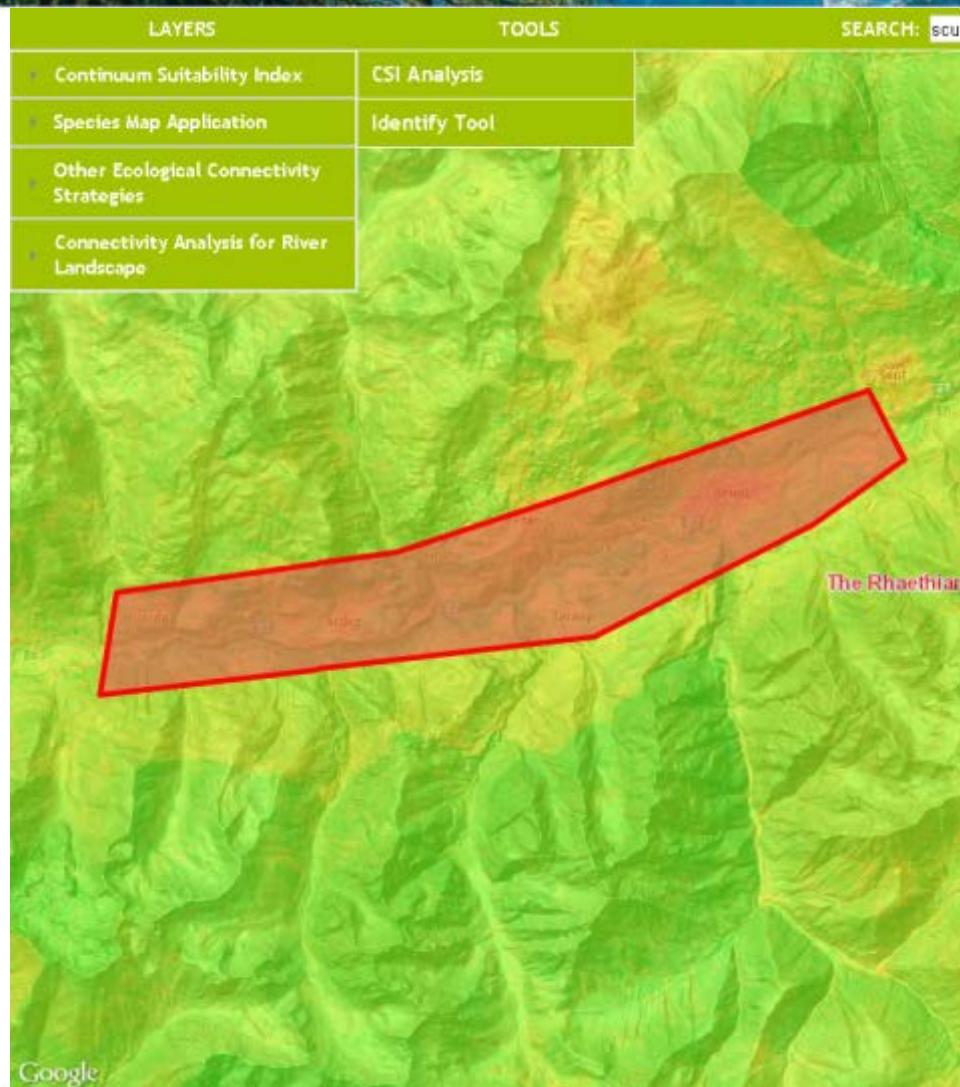
digital elevation model

classification by reference projects



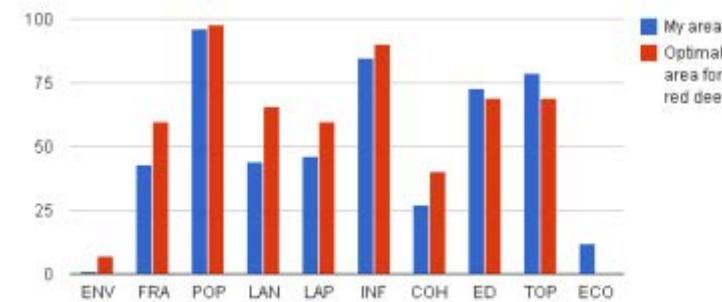
Continuum Suitability Index

Webs of Life - Alpine Biodiversity needs ecological connectivity



CSI Analysis Tool

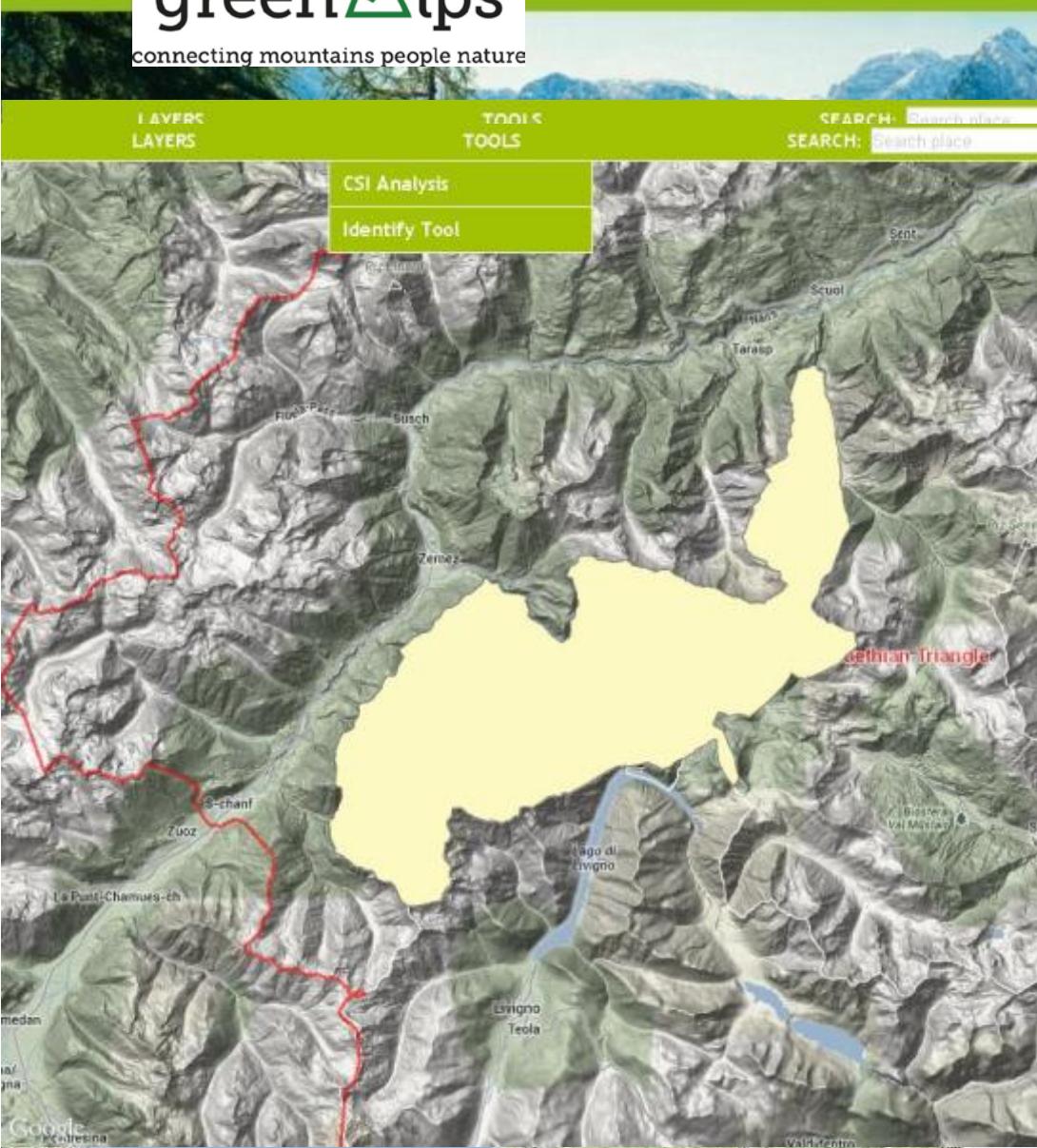
Step 4. Analyse the results:



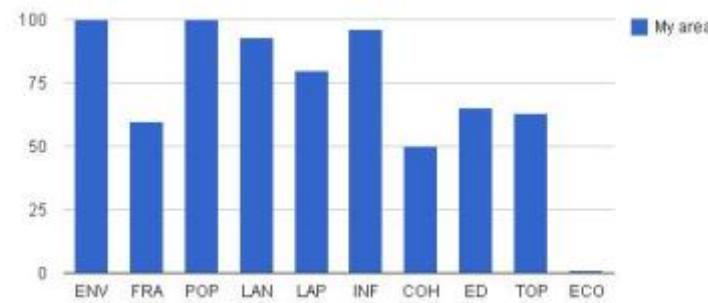
Brown Bear Bearded Vulture Red deer Wolf Lynx Grouse No comparison

Index	Mean	Q Geom	Q Them	Q Comp	Q Actu
ENV	1	49	33	100	75
FRA	43	52	83	100	83
POP	96	47	75	100	58
LAN	44	52	74	100	1
LAP	46	95	50	71	96
INF	85	91	80	100	92
COH	27	51	36	100	61
ED	73	51	36	100	1
TOP	79	66	95	100	1
ECO	12	98	17	31	100

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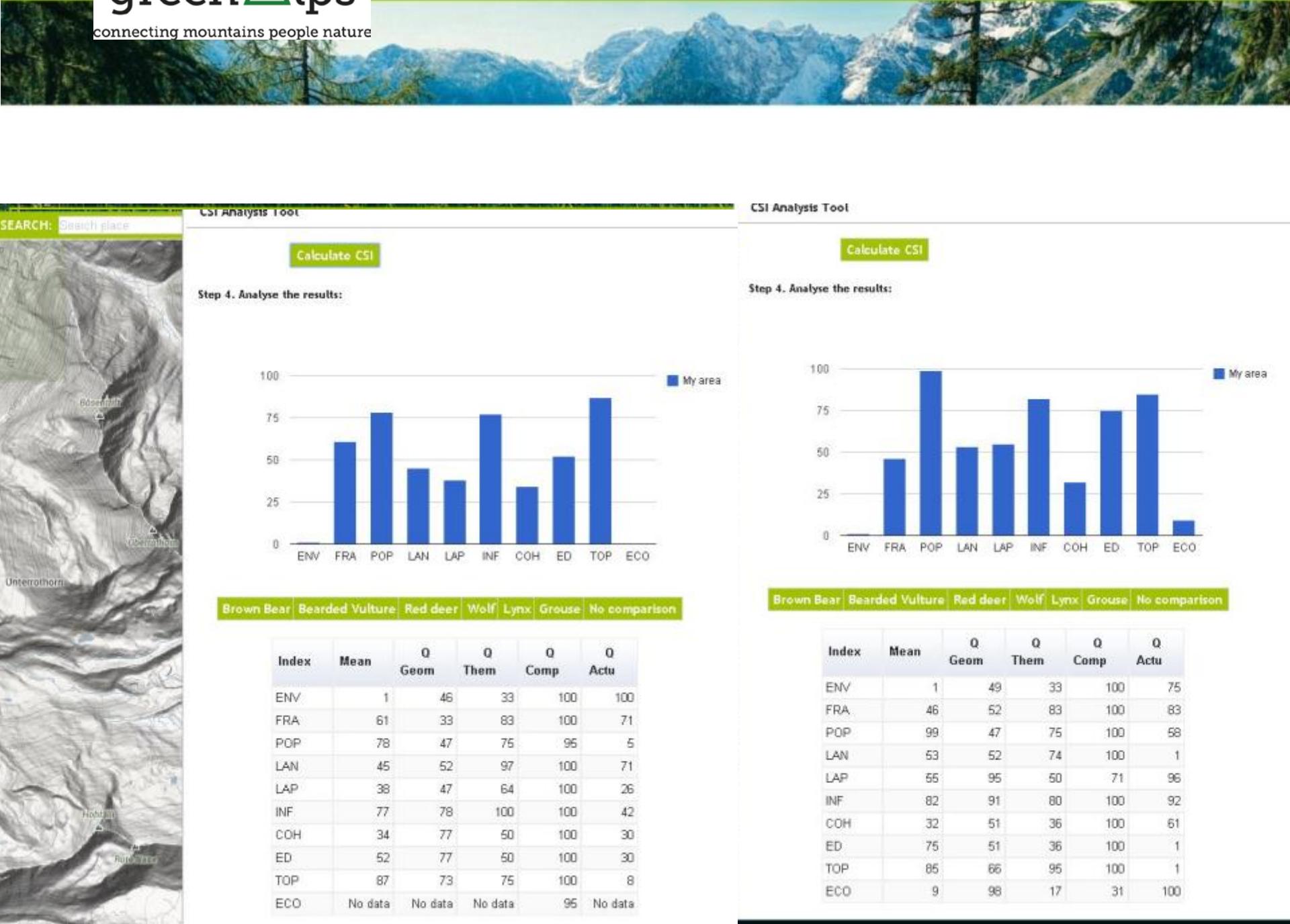
Step 4. Analyse the results:



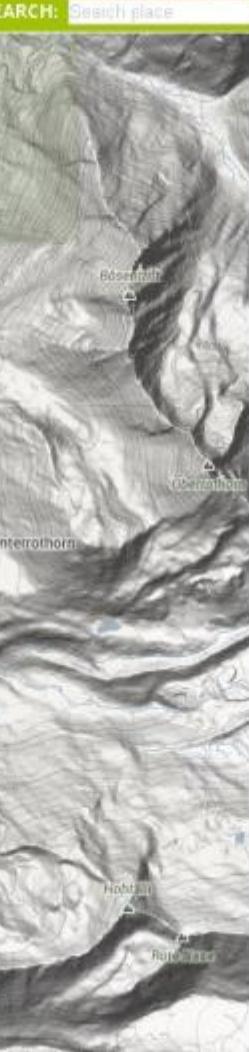
Brown Bear Bearded Vulture Red deer Wolf Lynx Grouse No comparison

Index	Mean	Q Geom	Q Them	Q Comp	Q Actu
ENV	100	87	33	100	50
FRA	60	52	33	100	1
POP	100	90	50	100	8
LAN	93	87	61	94	8
LAP	80	No data	No data	No data	No data
INF	96	91	40	100	1
COH	50	85	57	94	8
ED	65	85	57	94	8
TOP	63	87	95	100	25
ECO	1	No data	No data	No data	No data

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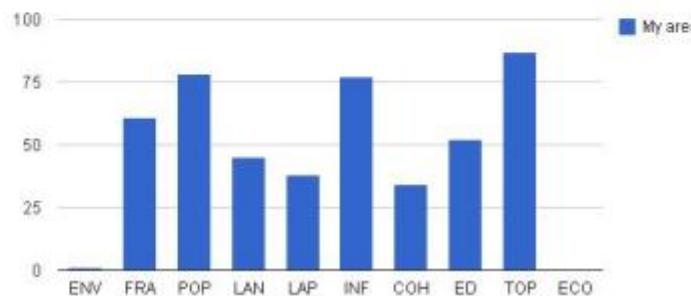
SEARCH: Search place



CSI Analysis Tool

Calculate CSI

Step 4. Analyse the results:



Category	Value
ENV	1
FRA	61
POP	78
LAN	45
LAP	38
INF	77
COH	34
ED	52
TOP	87
ECO	No data

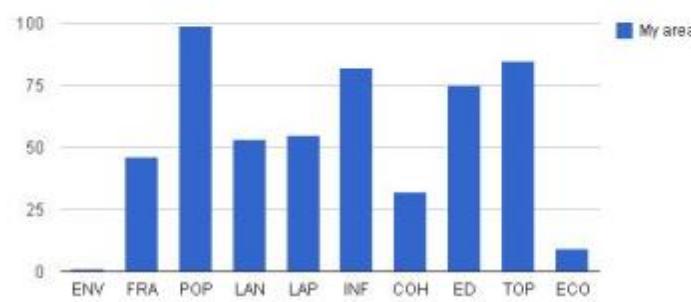
Brown Bear | Bearded Vulture | Red deer | Wolf | Lynx | Grouse | No comparison

Index	Mean	Q		Q		Q	
		Geom	Them	Comp	Actu	Comp	Actu
ENV	1	46	33	100	100	75	
FRA	61	33	83	100	71	83	
POP	78	47	75	95	5	58	
LAN	45	52	97	100	71	1	
LAP	38	47	64	100	26	96	
INF	77	78	100	100	42	92	
COH	34	77	50	100	30	61	
ED	52	77	50	100	30	1	
TOP	87	73	75	100	8	1	
ECO	No data	No data	No data	95	No data	100	

CSI Analysis Tool

Calculate CSI

Step 4. Analyse the results:



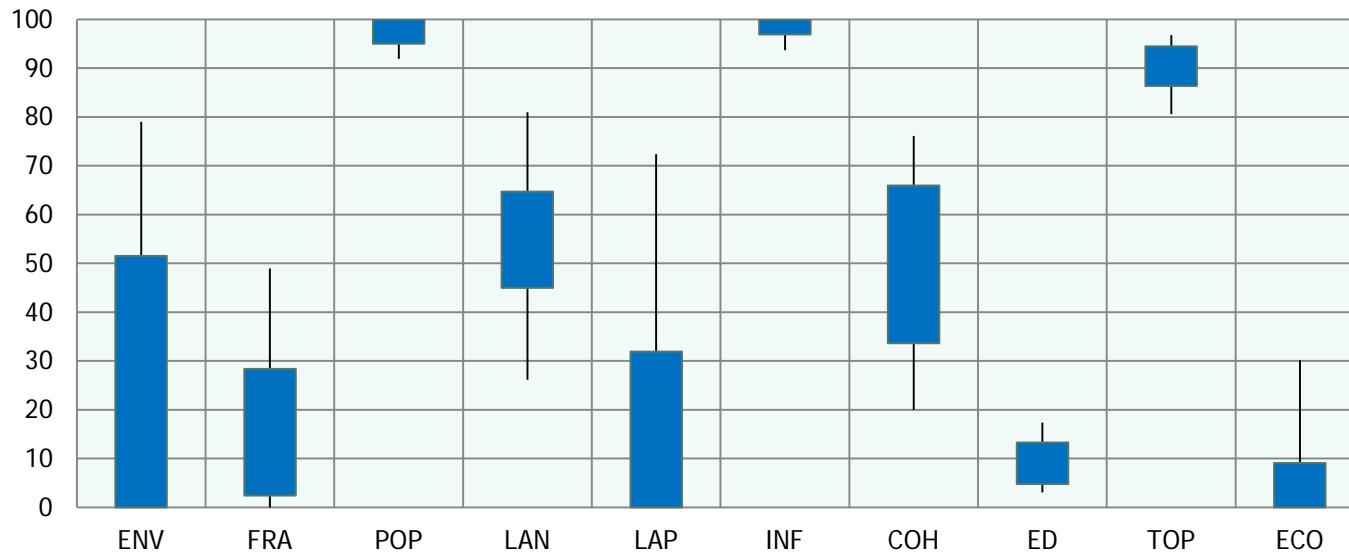
Category	Value
ENV	1
FRA	46
POP	99
LAN	53
LAP	55
INF	82
COH	32
ED	75
TOP	85
ECO	9

Brown Bear | Bearded Vulture | Red deer | Wolf | Lynx | Grouse | No comparison

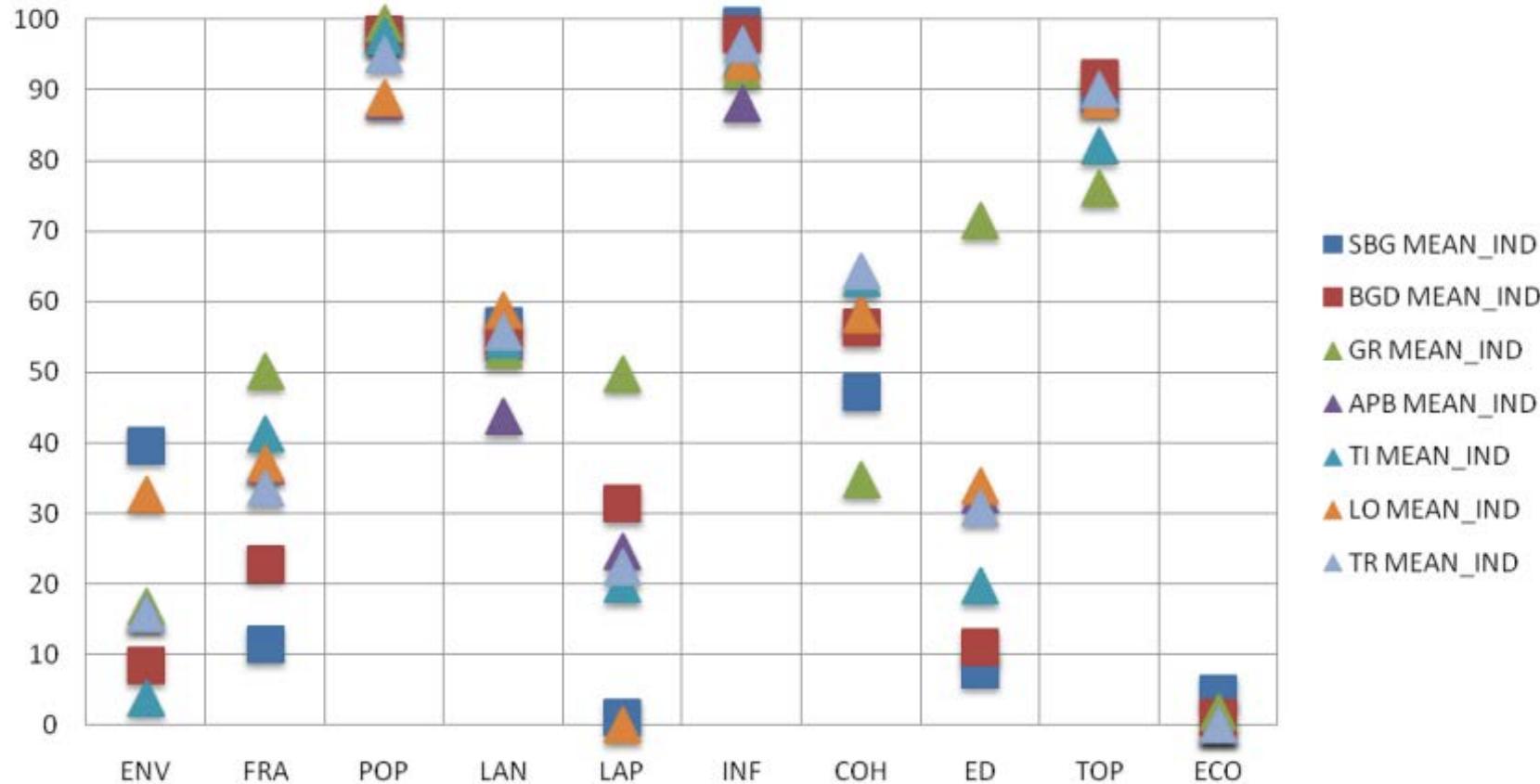
Index	Mean	Q		Q		Q	
		Geom	Them	Comp	Actu	Comp	Actu
ENV	1	49	33	100	75		
FRA	46	52	83	100	83		
POP	99	47	75	100	58		
LAN	53	52	74	100	1		
LAP	55	95	50	71	96		
INF	82	91	80	100	92		
COH	32	51	36	100	61		
ED	75	51	36	100	1		
TOP	85	66	95	100	1		
ECO	9	98	17	31	100		

Continuum Suitability Index

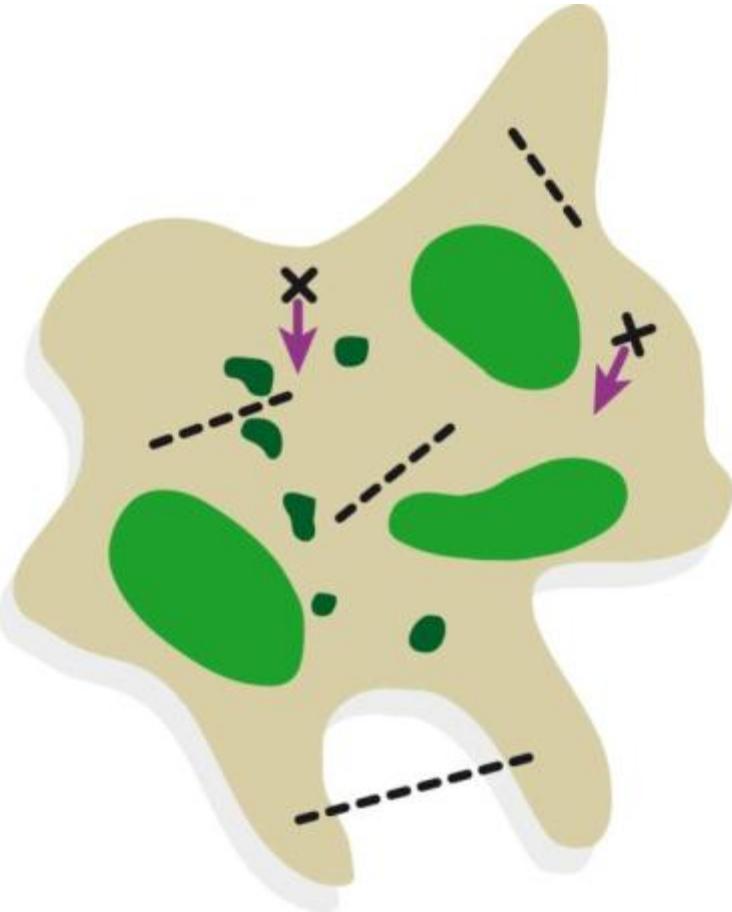
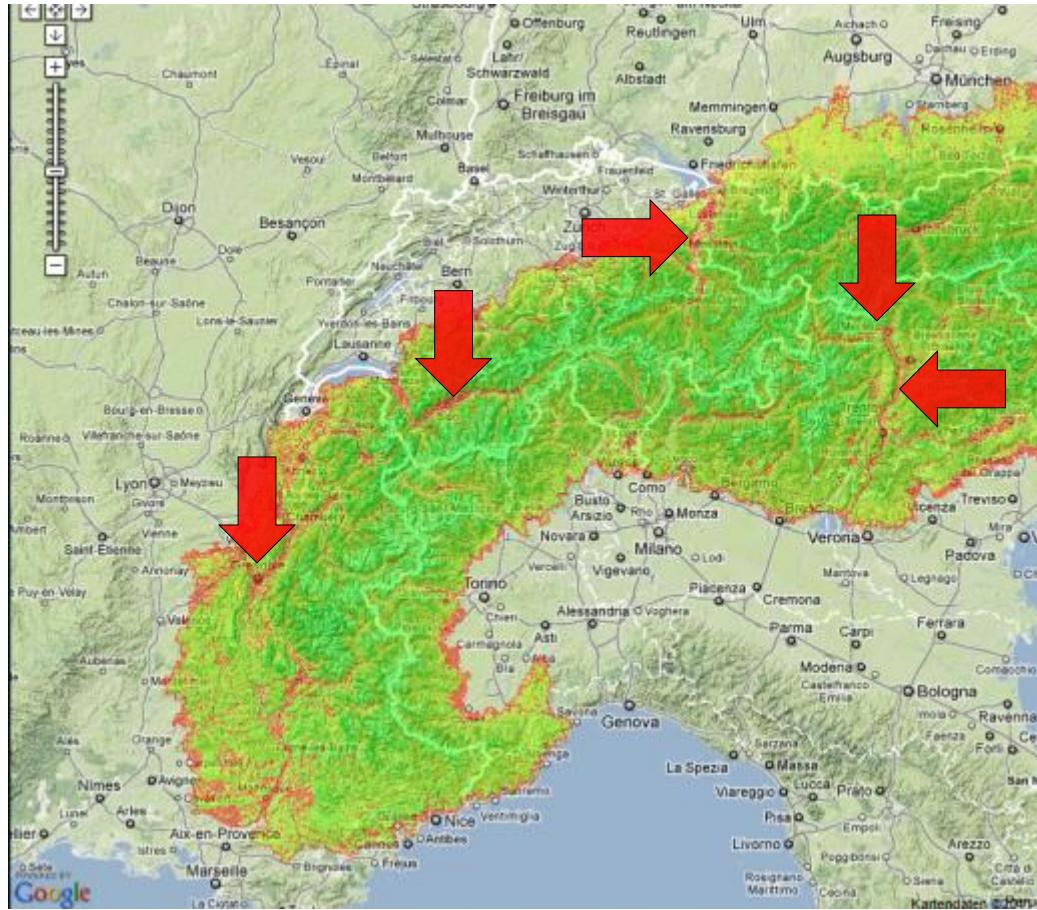
CSI indicators values for Berchtesgaden and Salzburg



Mean indicators values from all pilot regions



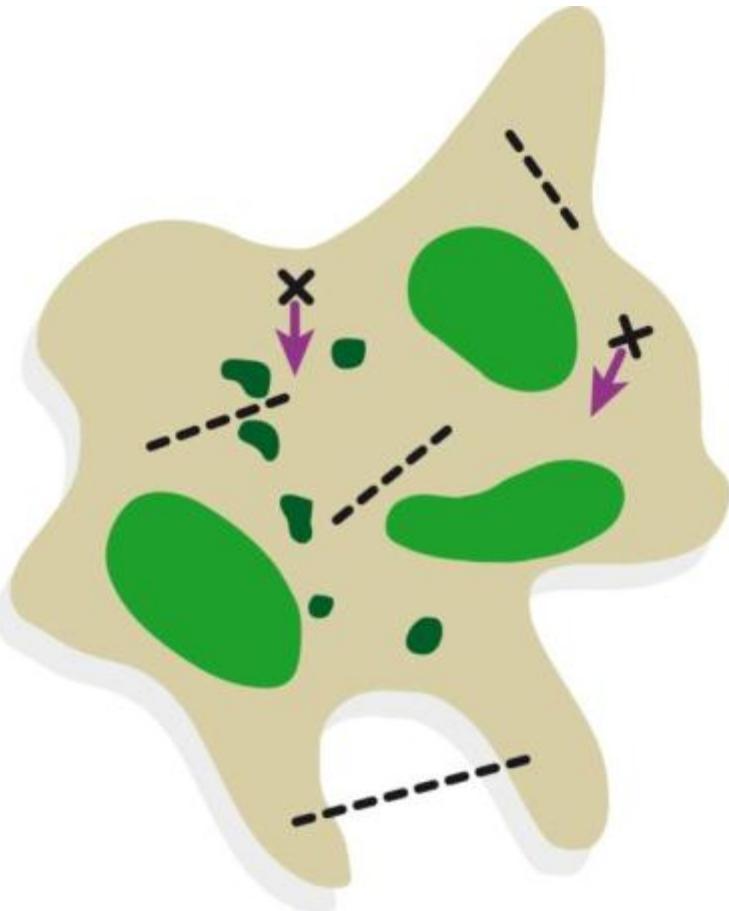
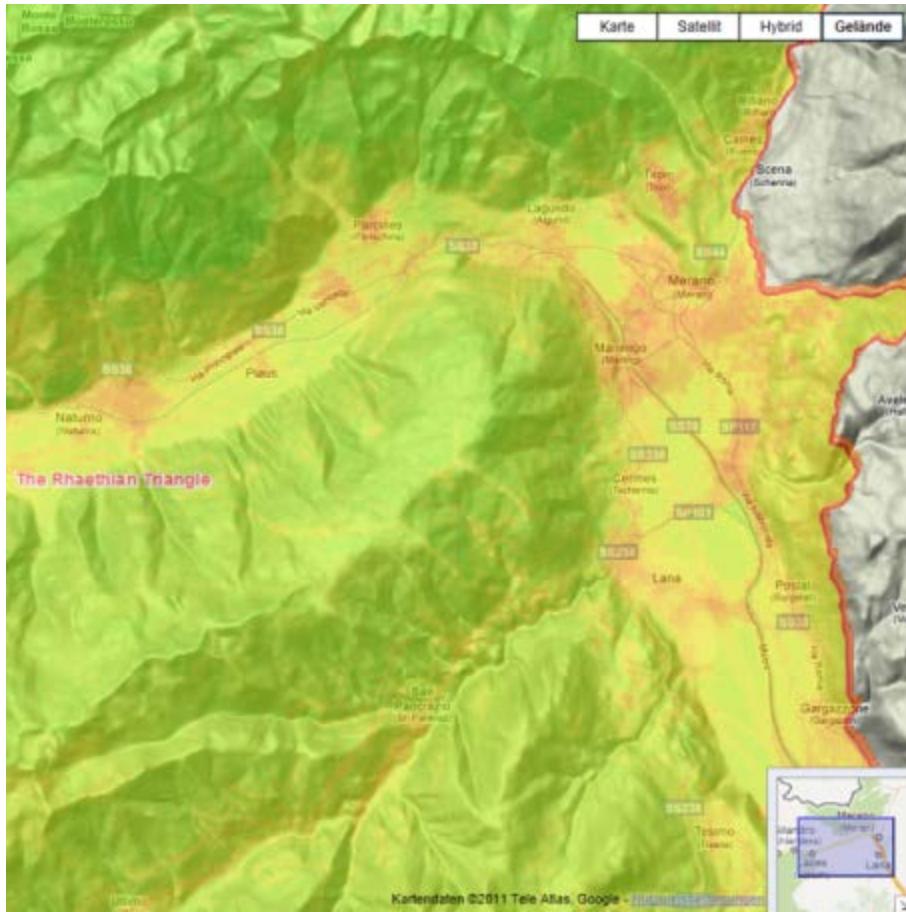
A step into real environments and real scales



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A step into real environments and real scales



Webs of Life - Alpine Biodiversity needs ecological connectivity



„Mapping relevant factors“



CSI

„The landscape approach“



SMA

„The species approach“



CARL

„The network approach“



Selected species for terrestrial models

Black grouse



Griffon vulture



Brown bear



Lynx



Wolf



Red deer



Copyright: touristik.freepage.de (grouse), naturschutzbuero-zollernalb.de (vulture), fullmoons.ch (wolf), maxwaugh.com (bear), naturfotografen-forum.de (lynx), new-forest-national-park.com (red deer)

Webs of Life - Alpine Biodiversity needs ecological connectivity

Workflow:

Identification of habitat needs, search for observation records and/or species specific models



Identification of habitat suitability (Maps of potential distribution)



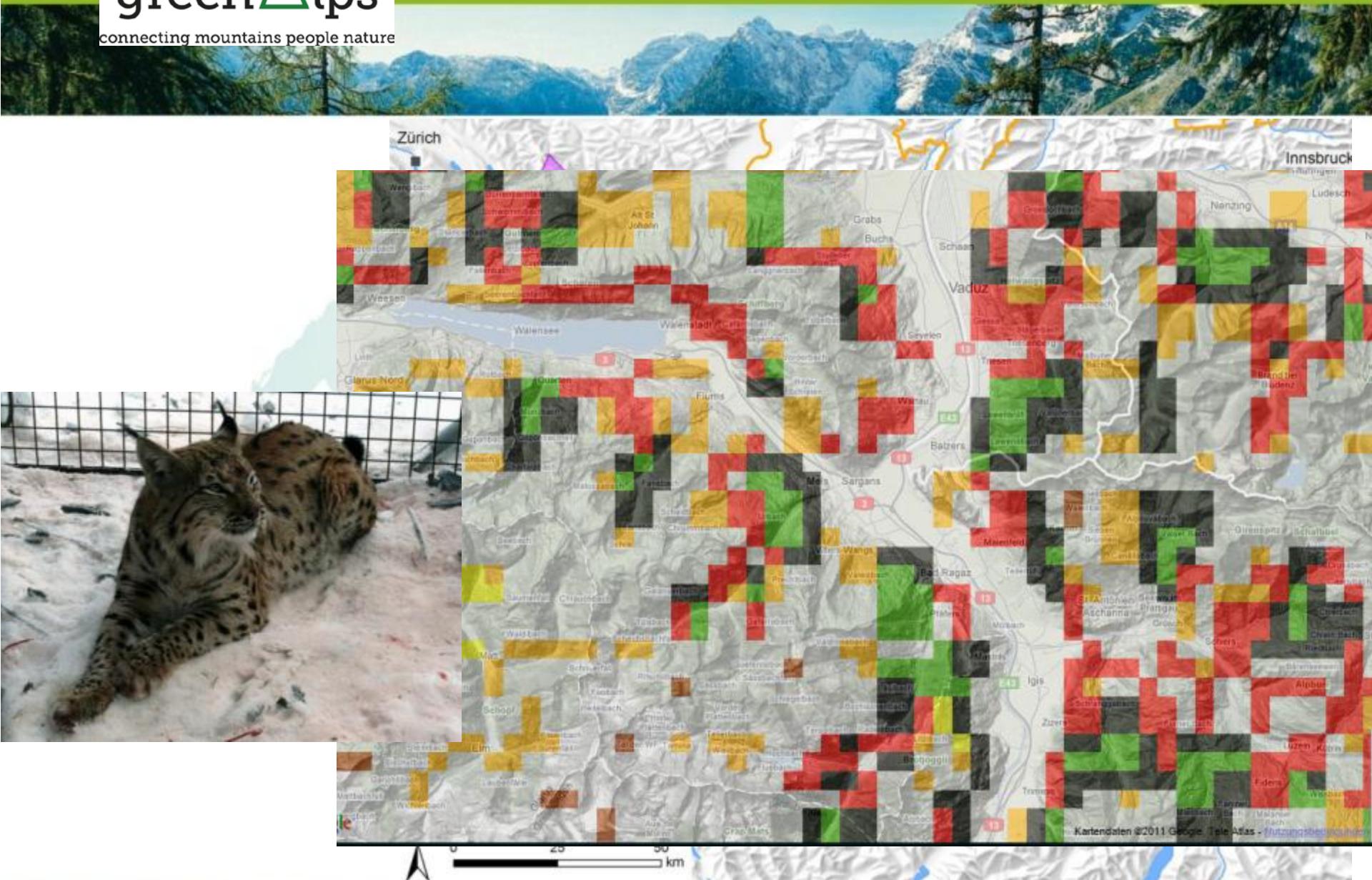
Categorisation of Habitat into Core area, corridors and isolated habitat patches (morphological spatial pattern analysis, MSPA, Software GUIDOS)

The screenshot shows the econnect web application interface. At the top, there is a navigation bar with links: HOME, ABOUT THE PROJECT, PILOT REGIONS, WORK PACKAGES, PARTNERS & OBSERVERS, NEWS & EVENTS, DOWNLOAD AREA, and LINKS. A logo for "econnect Restoring the web of life" is also present. The main area features a map of the Alpine region, specifically the Salzburg area, with various ecological models overlaid. The legend on the right side lists the following models:

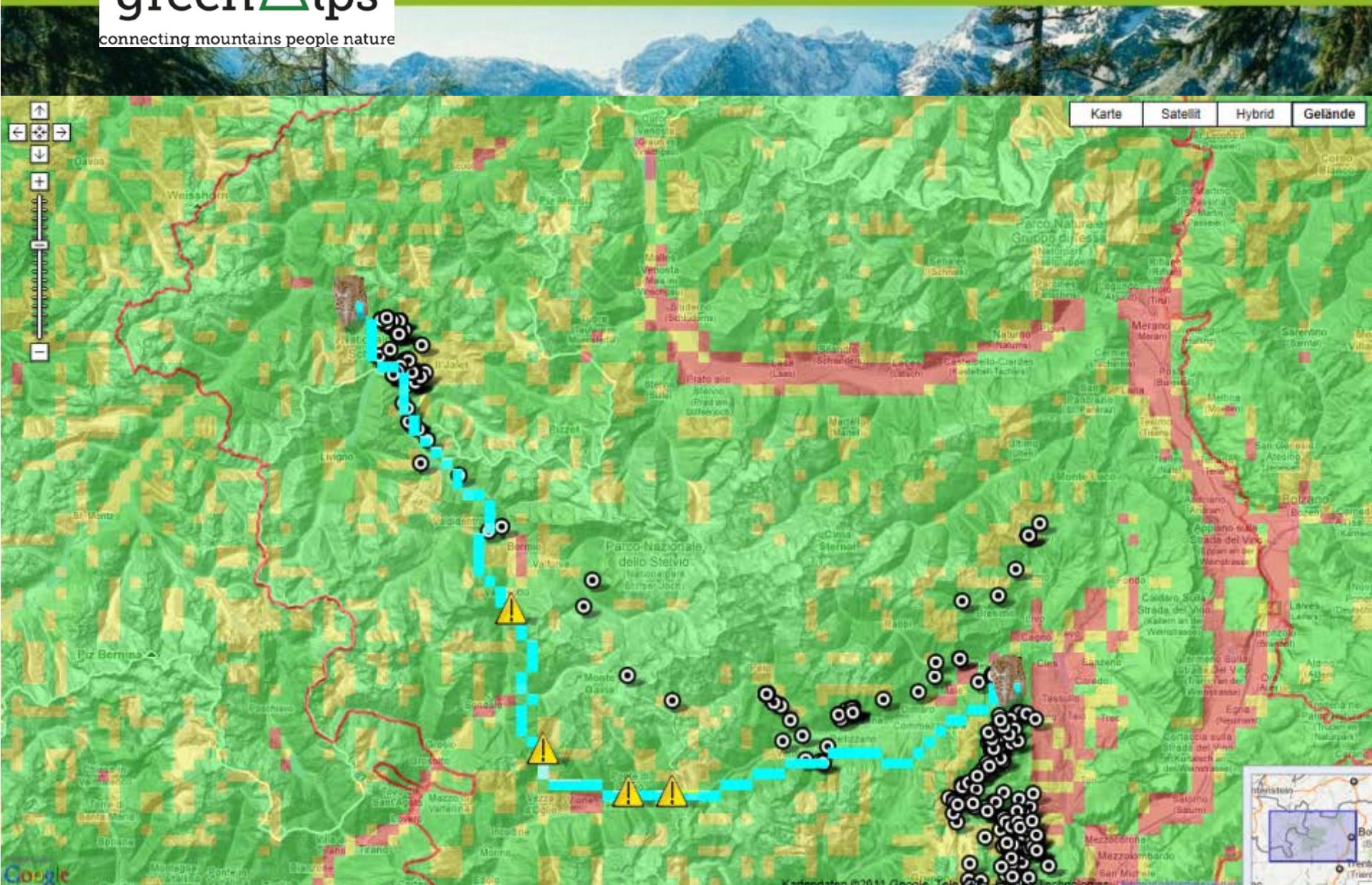
- Black grouse model
- Black grouse GUIDOS
- Brown bear model
- Brown bear GUIDOS
- Lynx model
- Lynx GUIDOS
- Griffon vulture model
- Felid deer habitat
- Red deer GUIDOS
- Wolf model
- Wolf GUIDOS

Below the legend, there is a section titled "SMA Service (v.8)" with an information icon and a link. It includes a "Control data" section where users can upload their own spatial distribution data using Google Earth KML files. The bottom of the map interface has a toolbar with buttons for "Search", "Select & Upload", "Calculation", "Chart", "Table", "Report", and "Instructions".

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Kartendaten ©2011 Google, Terra Technologies, Alpine

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Conclusion

Strengths +++

Scalability and flexibility

Access

Open technology

Extensibility

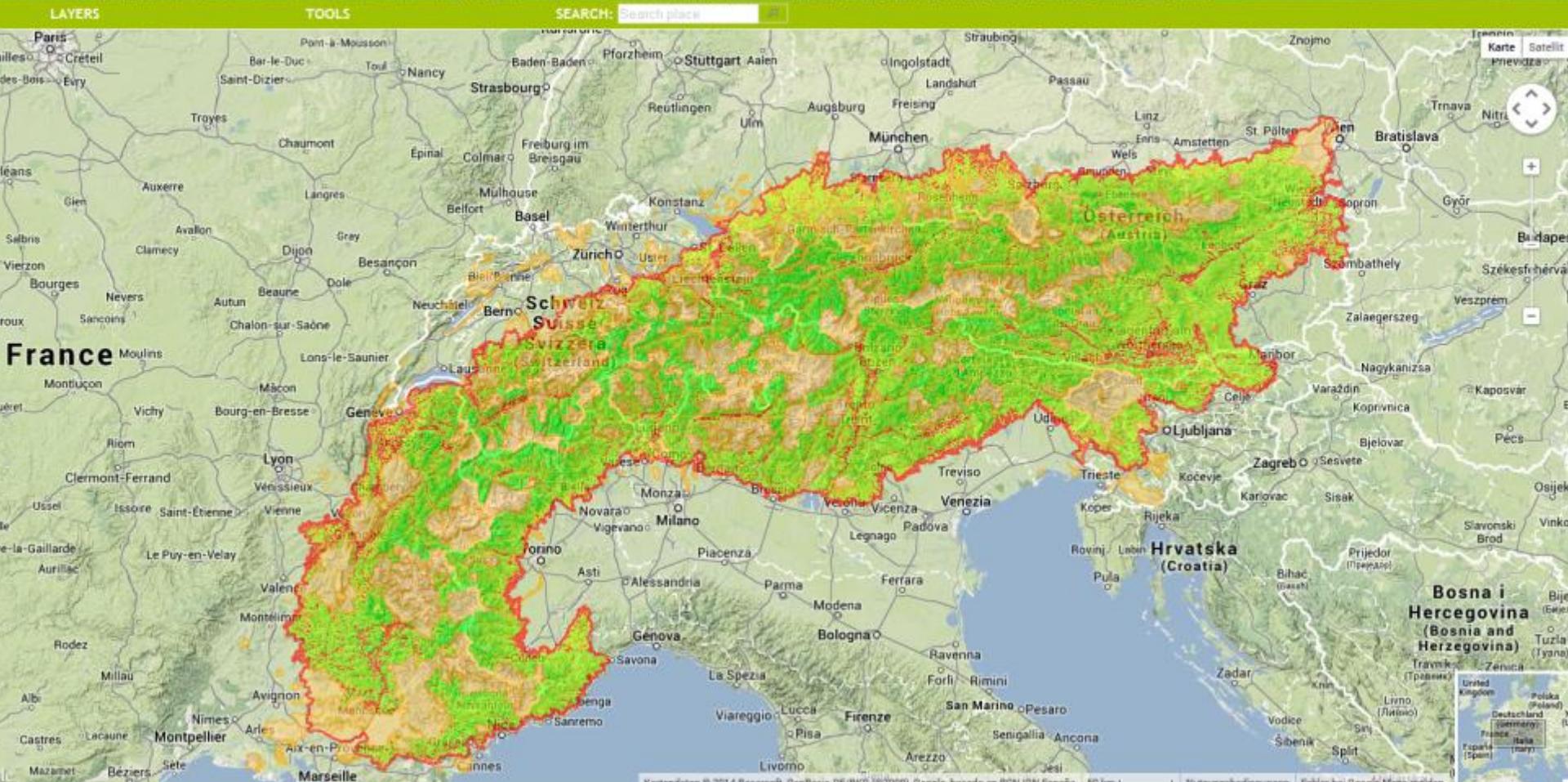
Weakness ---

Assessments (ecosystem value?) based on expert opinions

Just a few indicators, no time dynamic data

Online Version needs support and adaption

Data acquisition and data preparation for regional analysis is time consuming and only available in certain regions.



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LAYERS

TOOLS

SEARCH: Search place



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www.econnectproject.eu
www.nationalpark.ch



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Angelika Abderhalden, Kathrin Sedy,
Johannes Signer, Andrea Bouvinals, Leo
Füreder, Katrin Renner



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