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connecting mountains people nature

Econnect – Restoring the web of Life

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

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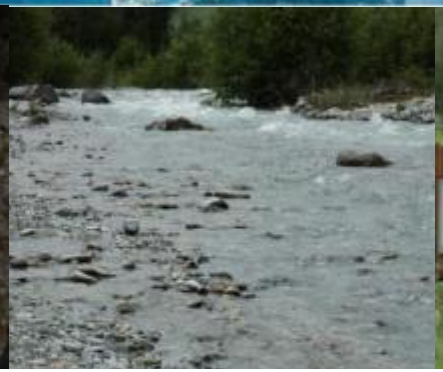
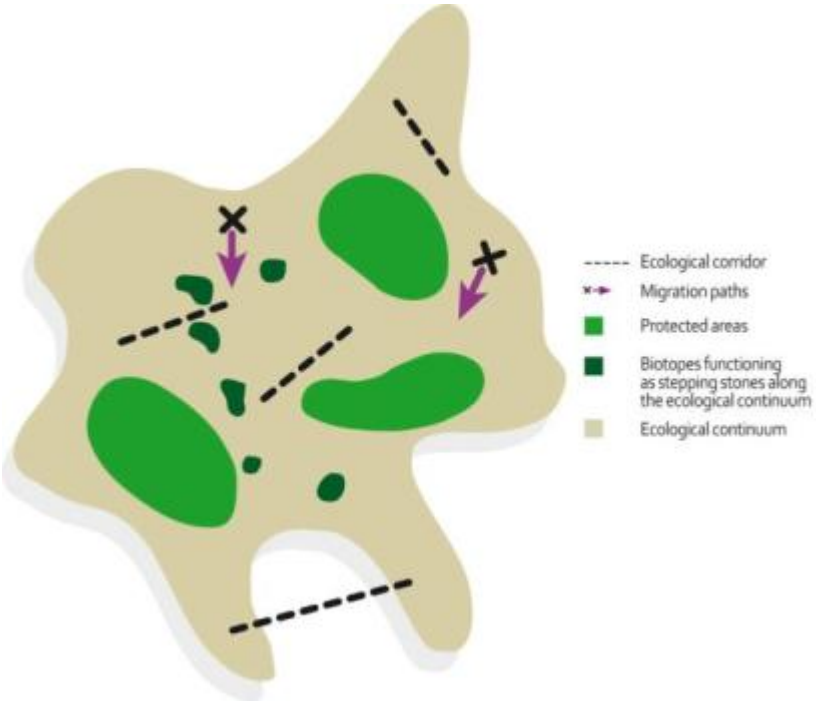


econnect

Restoring the web of life

Webs of Life – Alpine Biodiversity needs ecological connectivity

The theory for both species…



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

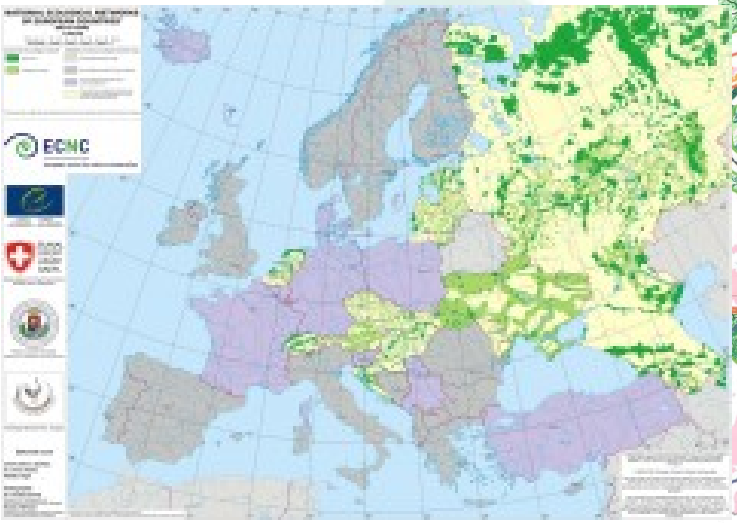
The managers tasks in the ecological connectivity

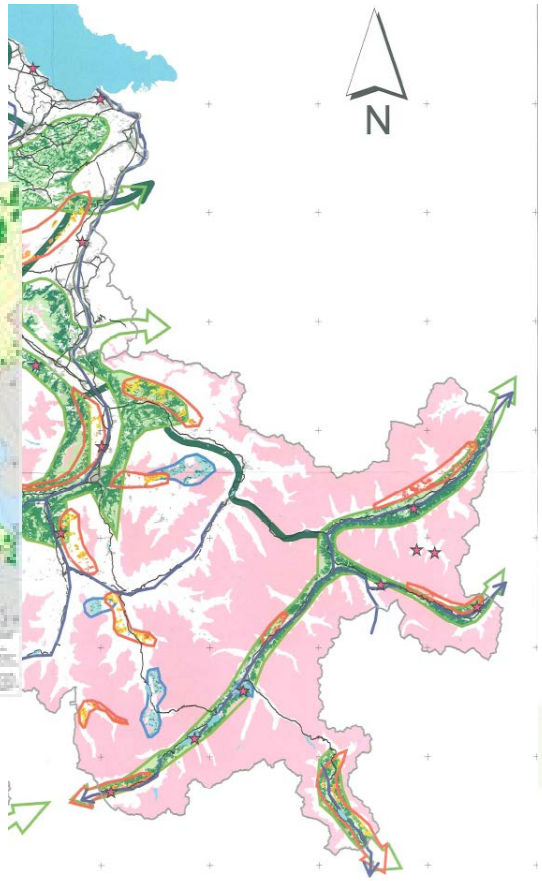
Leading **Planning** **Implementing** **Evaluating**

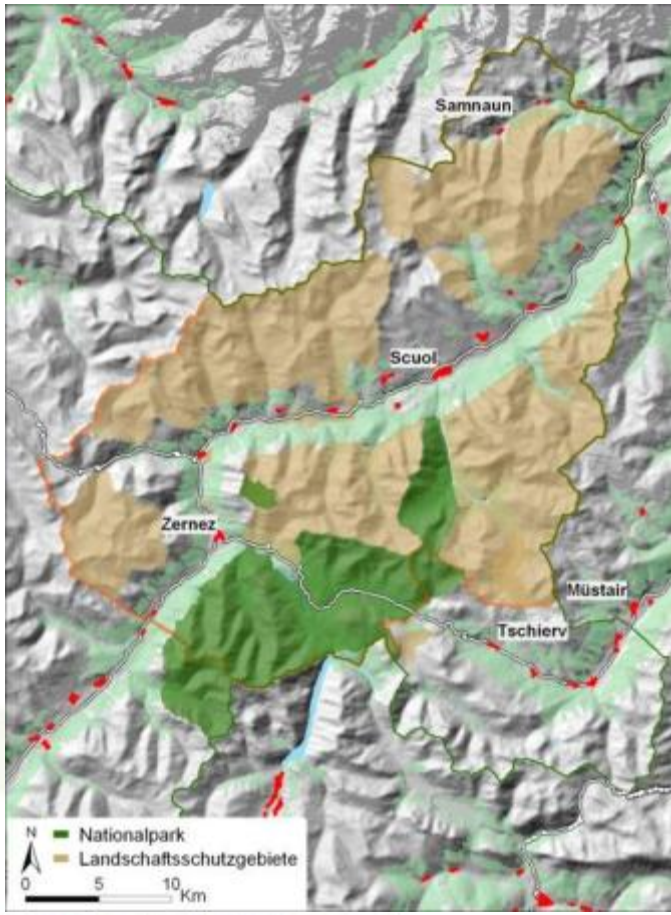
... in the entire connectivity site area
... on national state scale
... on landscape scale
... on international transboundary scale
... on individual site level

Worboys, 2010

How to concatenate these spatial levels?







Aim

"Where is the ecological continuum (the corridors and barriers) in the pilot aeas 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

„Mapping relevant factors“

„Mapping relevant factors“

CSI

„The landscape approach“
Structural Connectivity

SMA

„The species approach“
Functional Connectivity

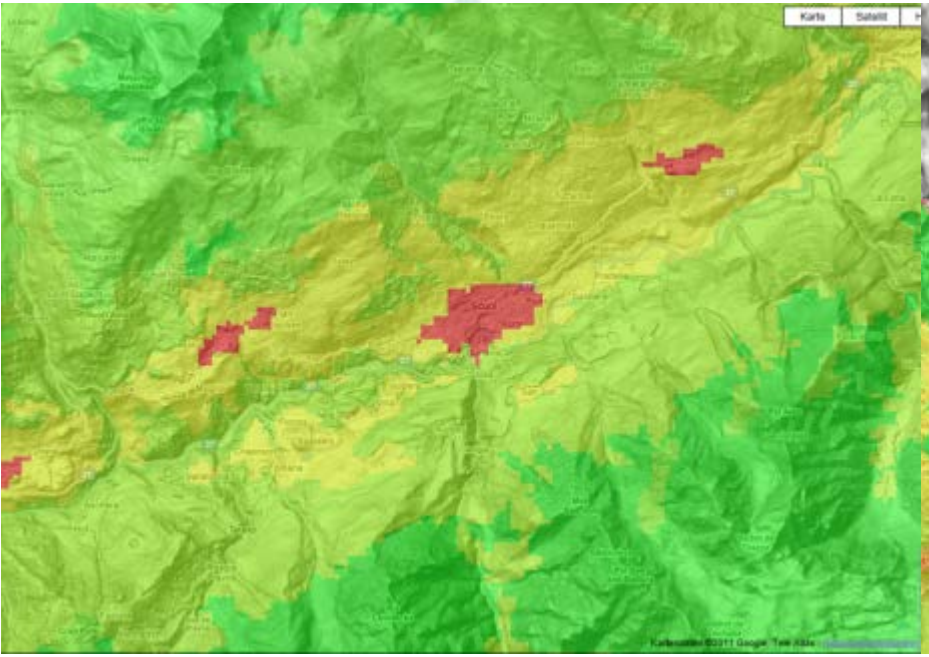
CARL

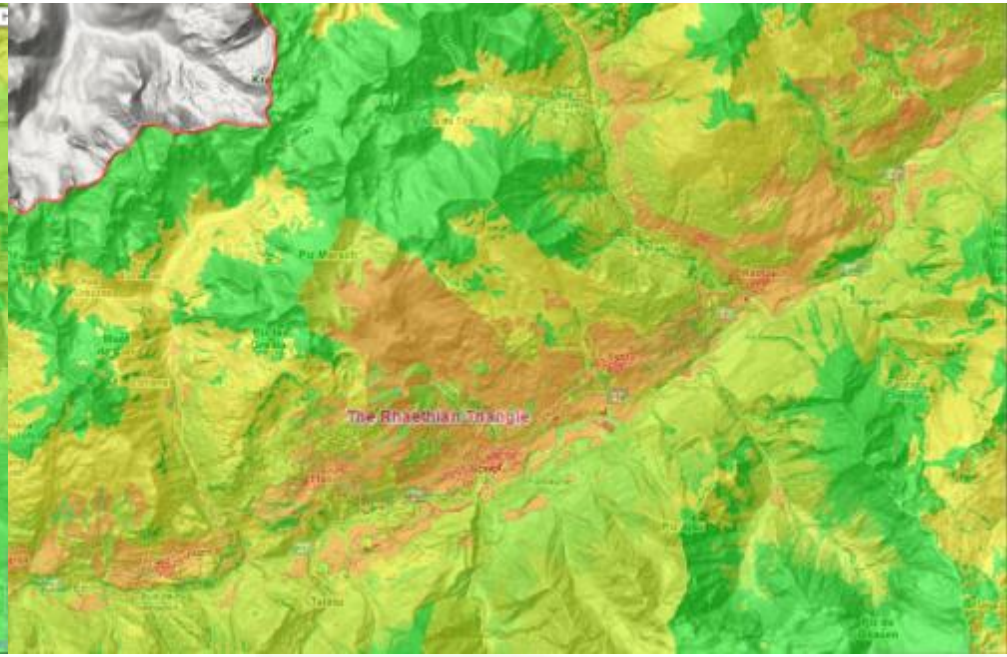
„The network approach“
Structural and functional c.

JECAMI: *Joint Ecological Continuum Analysis and Mapping Initiative*

A platform to analyze and visualize ecological connectivity in the Alps

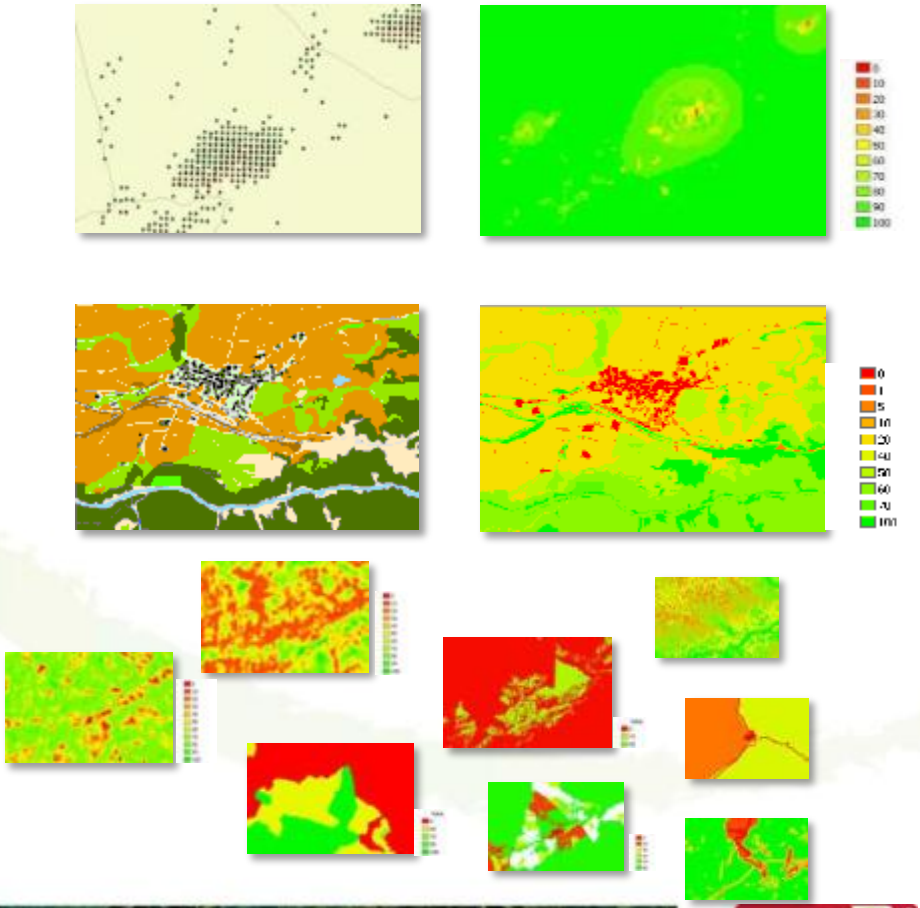
Locally high precision data needed



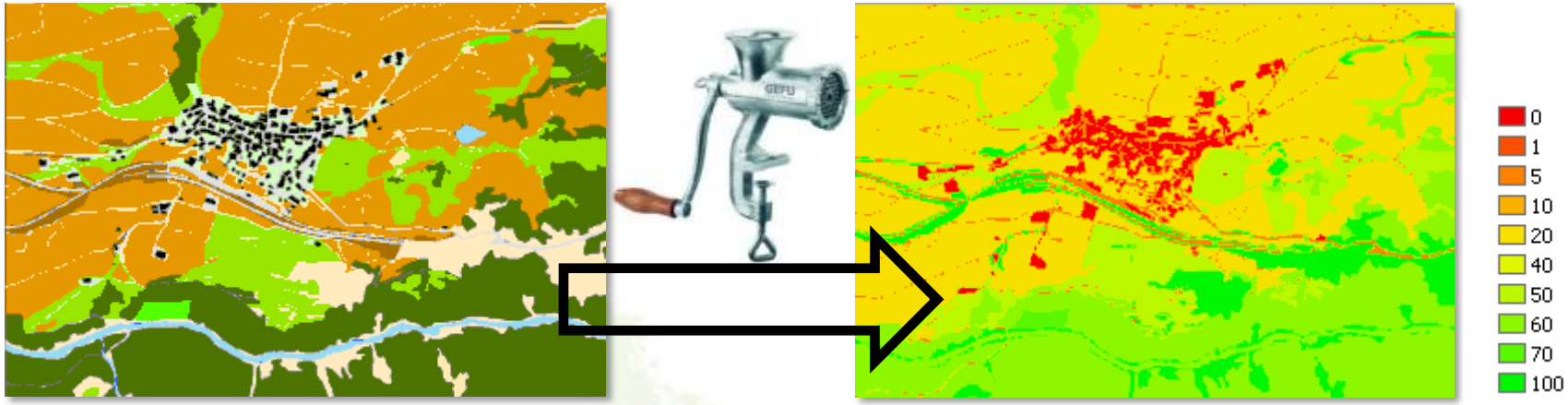


10 Indicators

- Population
- Landuse
- Landuse Planning
- Altitude and Topography
- Fragmentation
- Infrastructure
- Landscape Heterogenity
- Edge density
- International Protected Areas
- Ecological Measures



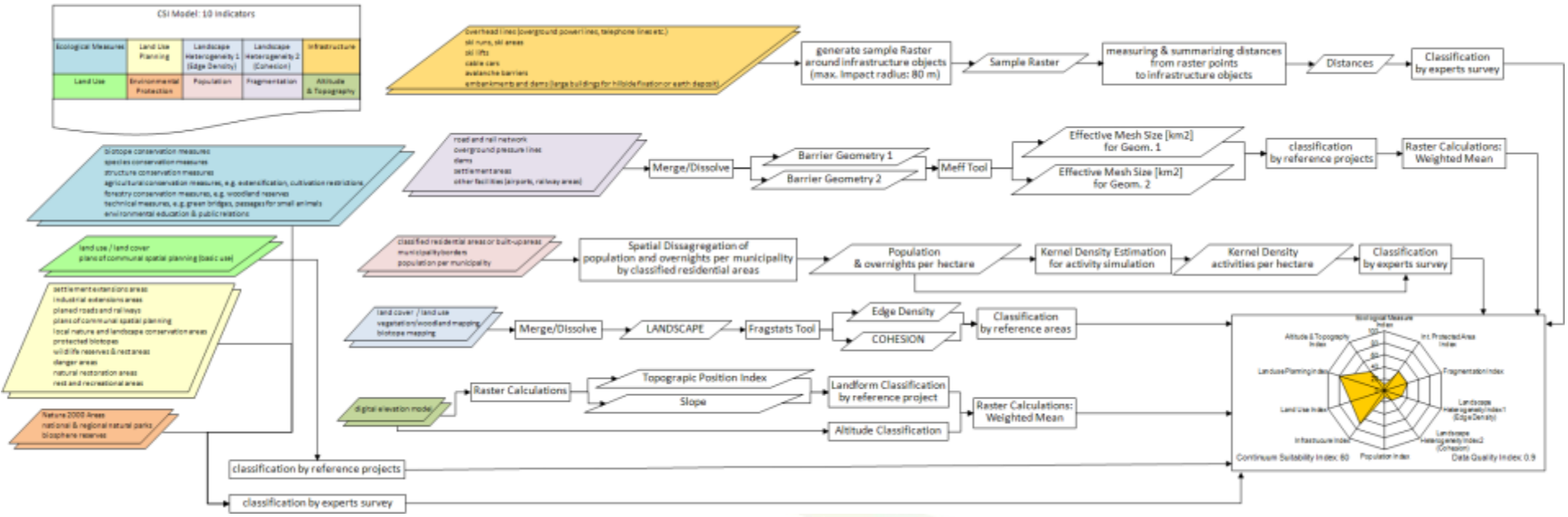
Data processing

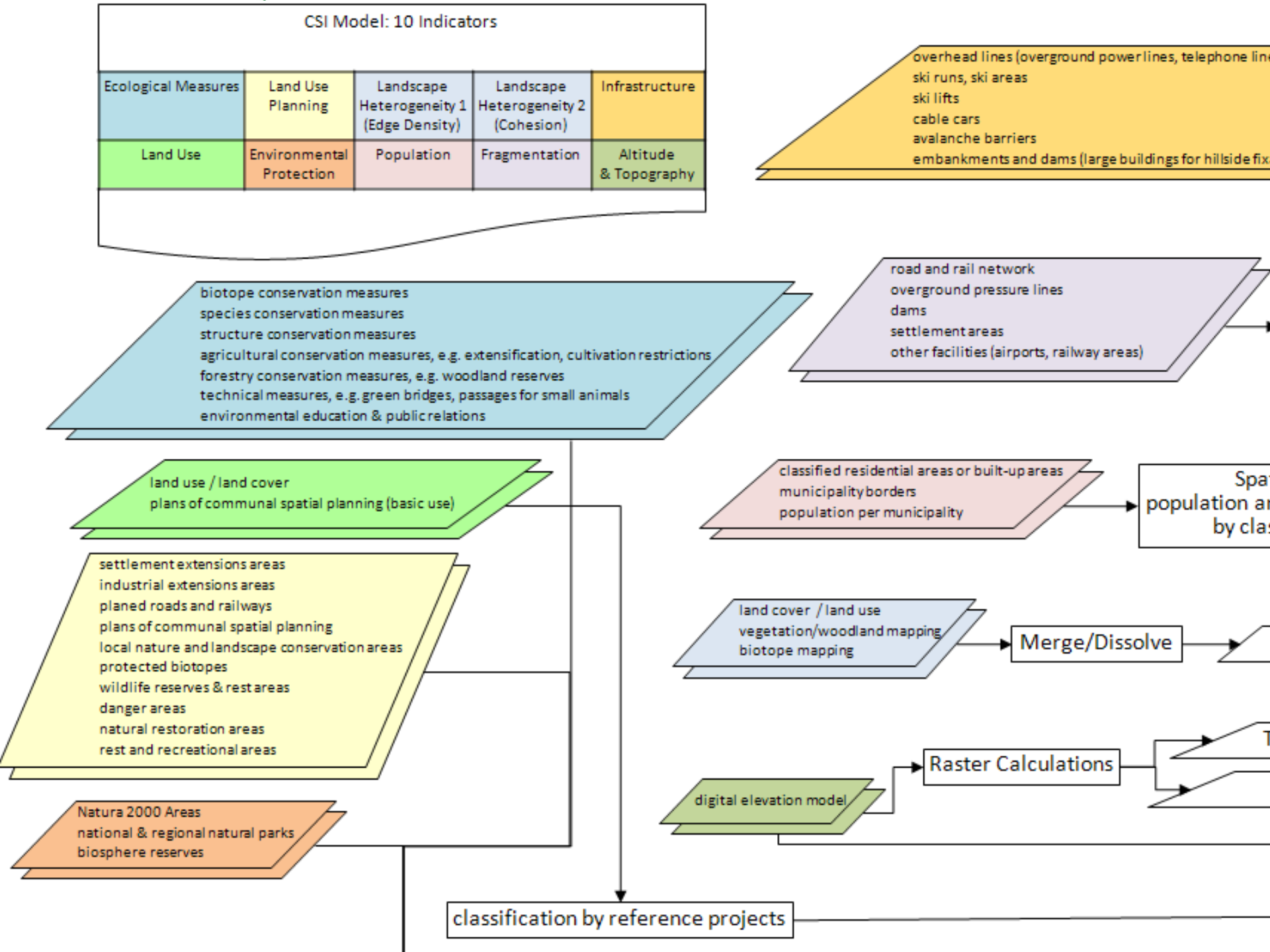


7 Pilot regions
Many Political regions
A few Coordinate systems
A bunch of Datasets

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 power lines, telephone lin
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
Spa
population a
by cla
settlement extensions areas
industrial extensions areas
planed 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
land cover / land use
vegetation/woodland mapping
biotope mapping
Merge/Dissolve
Raster Calculations
digital elevation model
Natura 2000 Areas
national & regional natural parks
biosphere reserves
classification by reference projects

Continuum Suitability Index

The CSI web service

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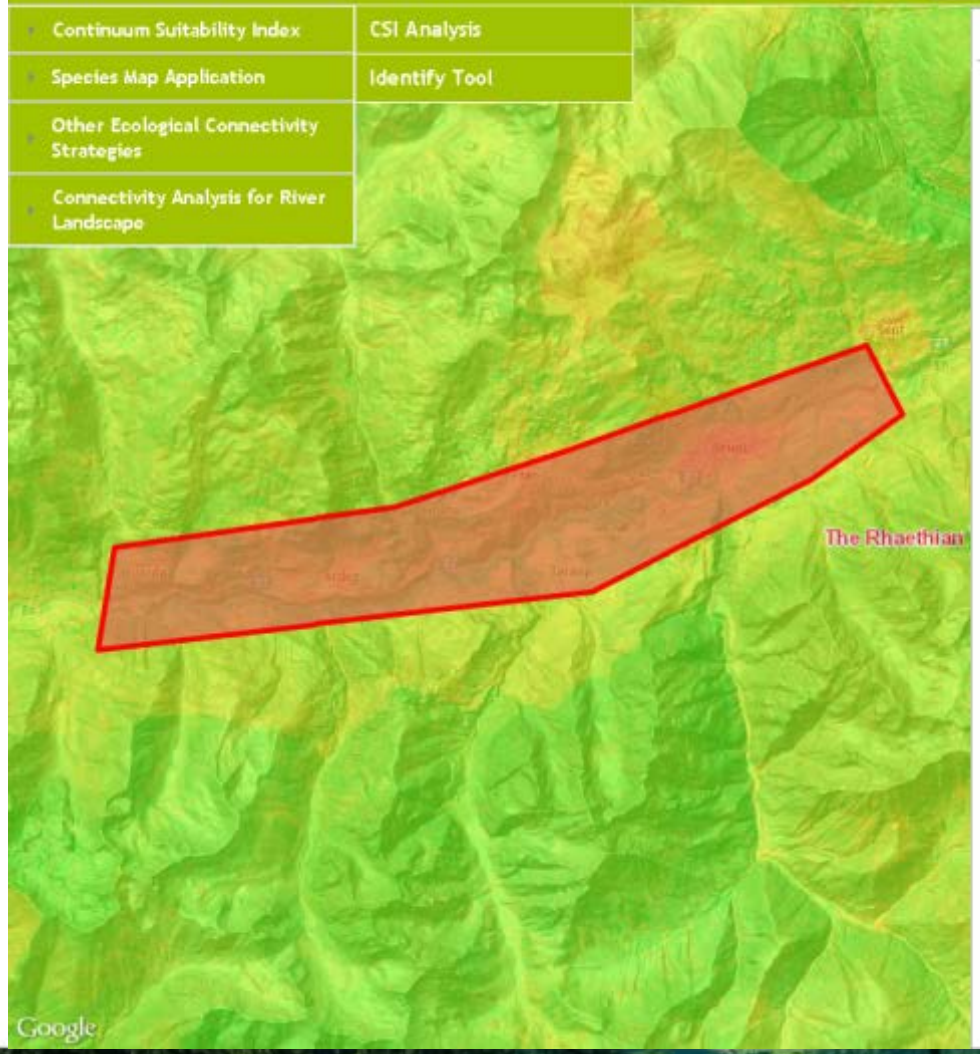
LAYERS | TOOLS | SEARCH: scuol

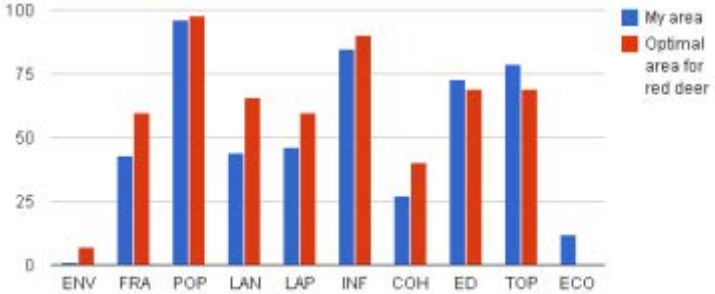
- Continuum Suitability Index
- Species Map Application
- Other Ecological Connectivity Strategies
- Connectivity Analysis for River Landscape

- CSI Analysis
- Identify Tool



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

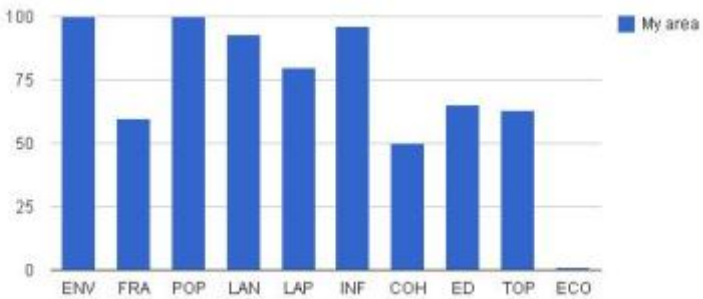
LAYERS TOOLS SEARCH: Search place

CSI Analysis

Identify Tool

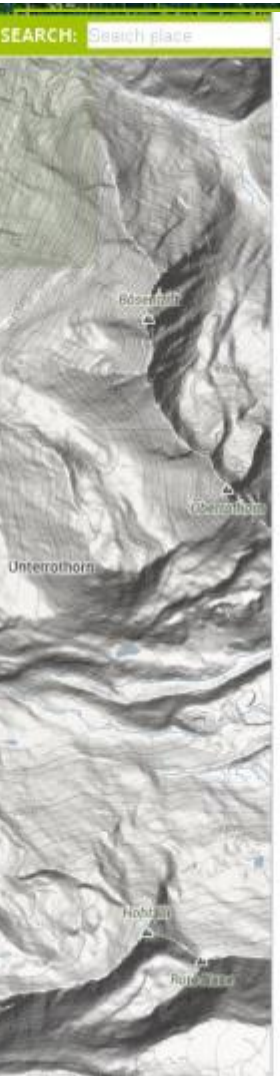
Calculate CSI

Step 4. Analyse the results:



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

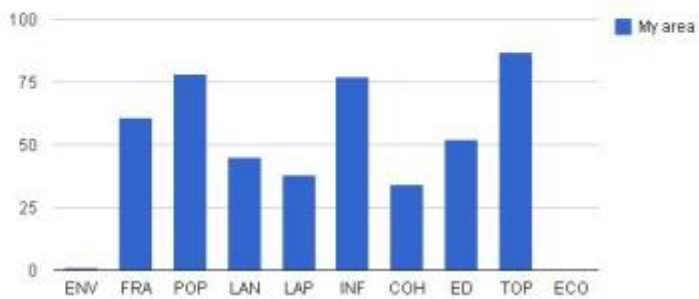
Index	Mean	Q Geom	Q Them	Q Comp	Q Actu
ENV	100	87	33	100	50
FRA	60	52	33	100	1
POP	100	90	50	100	8
LAN	93	87	61	94	8
LAP	80	No data	No data	No data	No data
INF	96	91	40	100	1
COH	50	85	57	94	8
ED	65	85	57	94	8
TOP	63	87	95	100	25
ECO	1	No data	No data	No data	No data



CSI Analysis Tool

Calculate CSI

Step 4. Analyse the results:



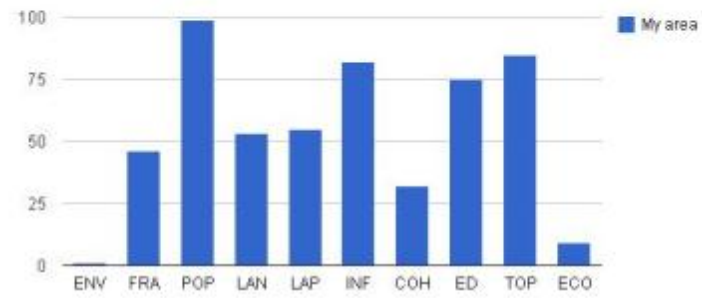
Brown Bear | Bearded Vulture | Red deer | Wolf | Lynx | Grouse | No comparison

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

CSI Analysis Tool

Calculate CSI

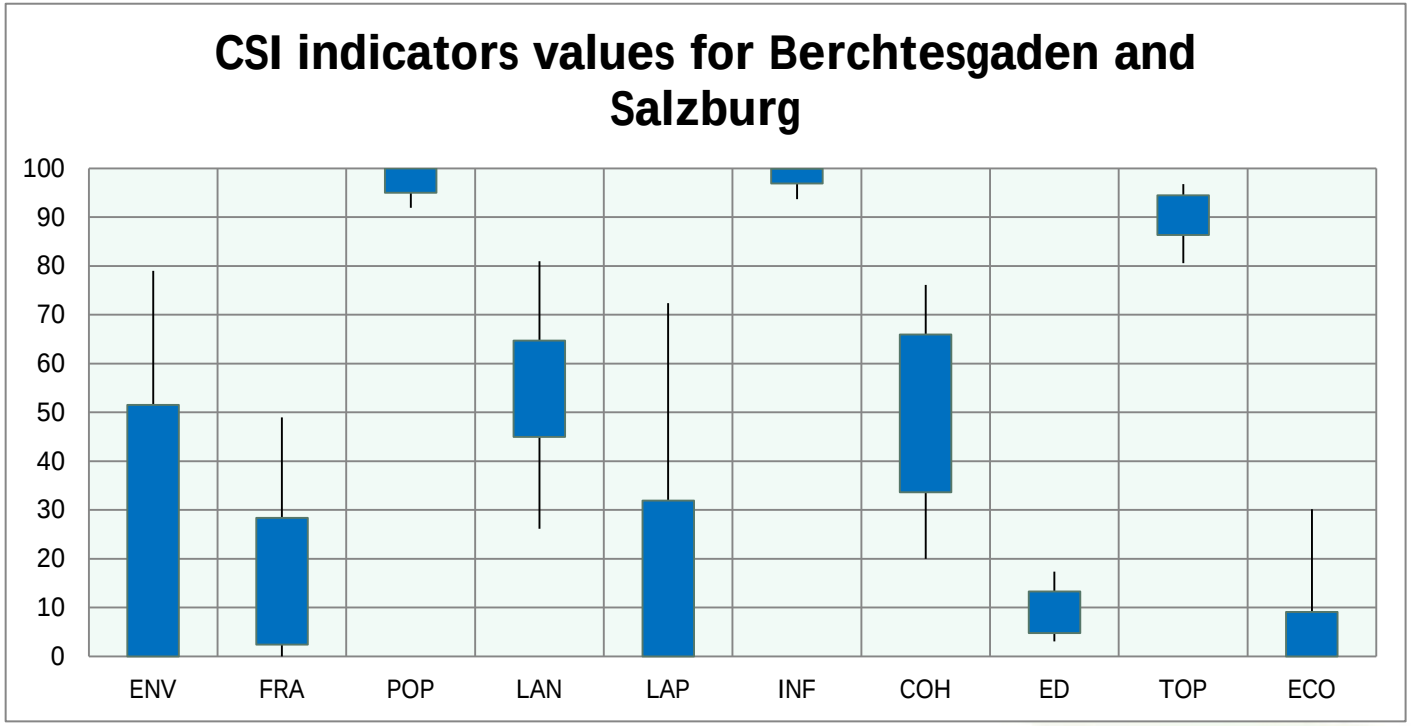
Step 4. Analyse the results:



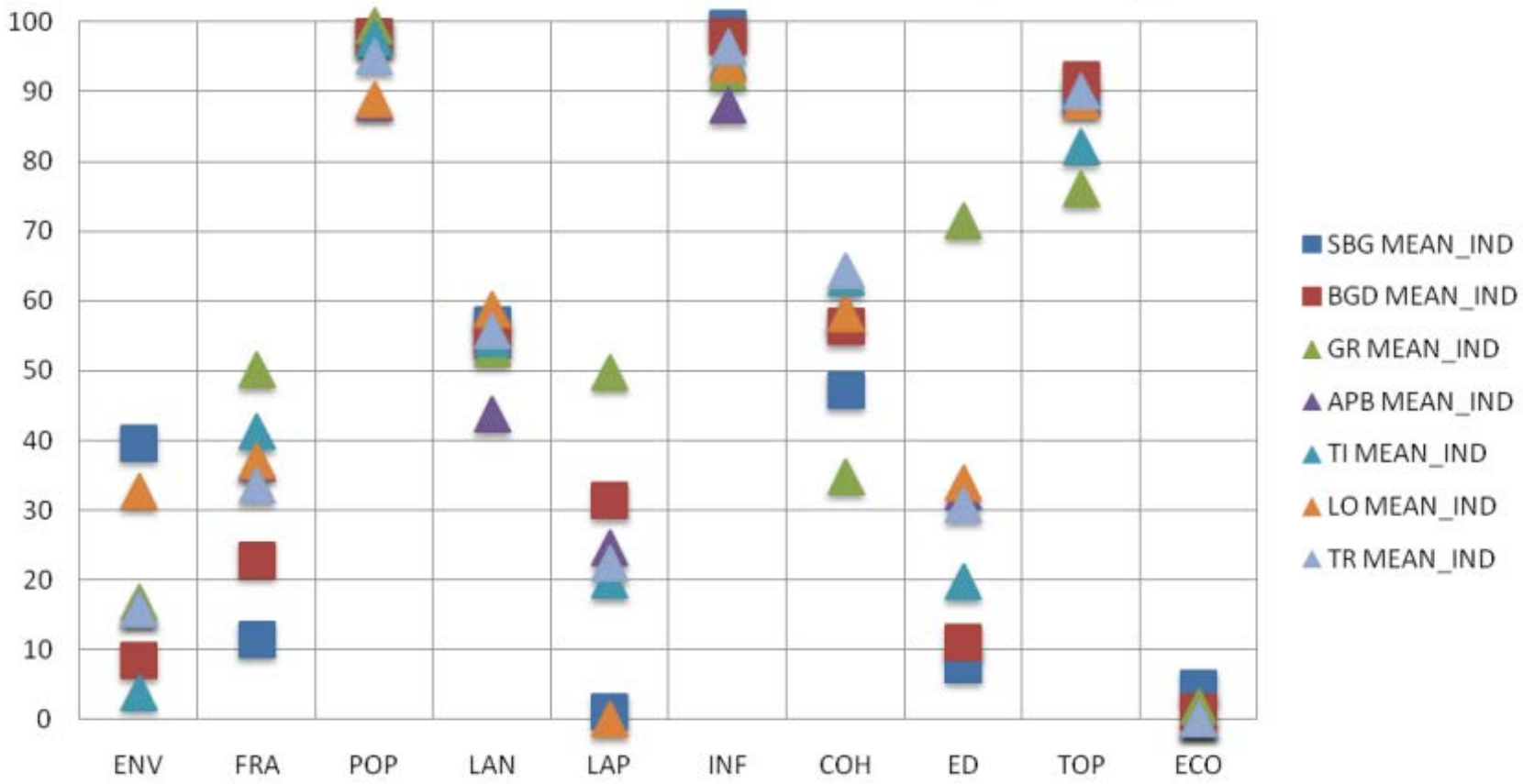
Brown Bear | Bearded Vulture | Red deer | Wolf | Lynx | Grouse | No comparison

Index	Mean	Q Geom	Q Them	Q Comp	Q Actu
ENV	1	49	33	100	75
FRA	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

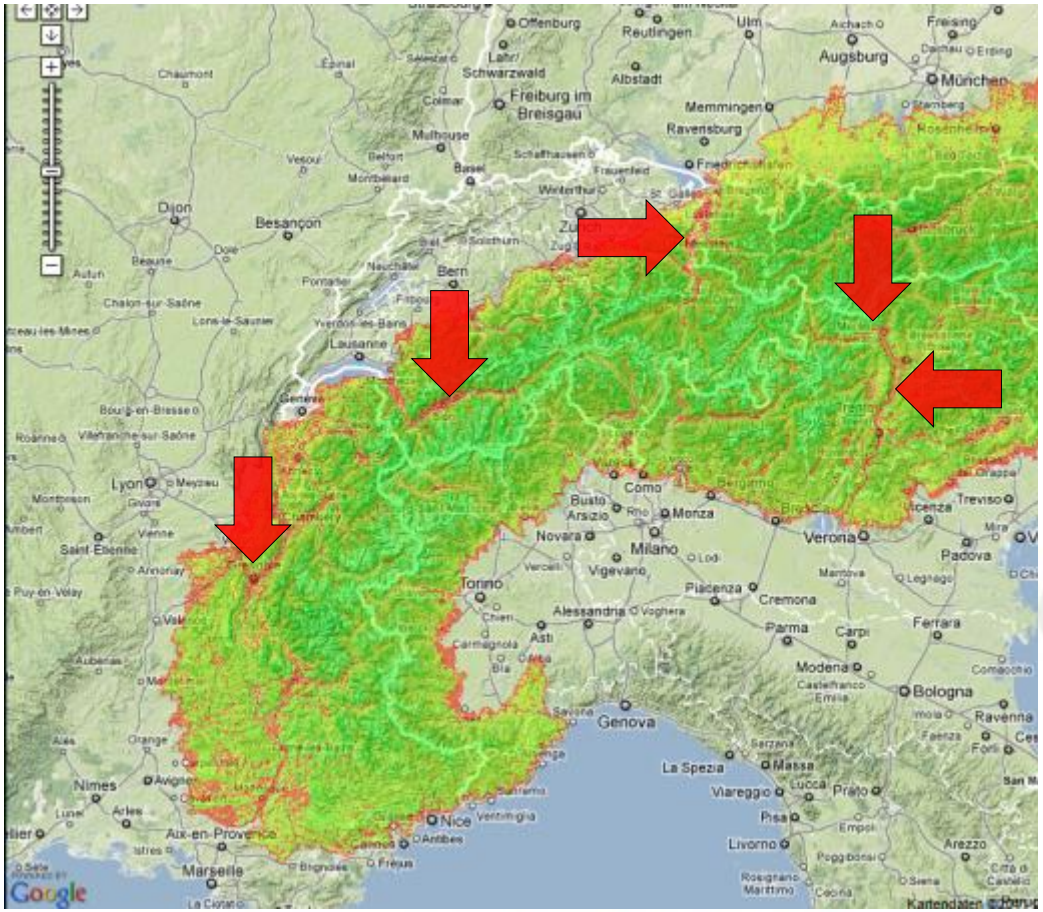
Continuum Suitability Index

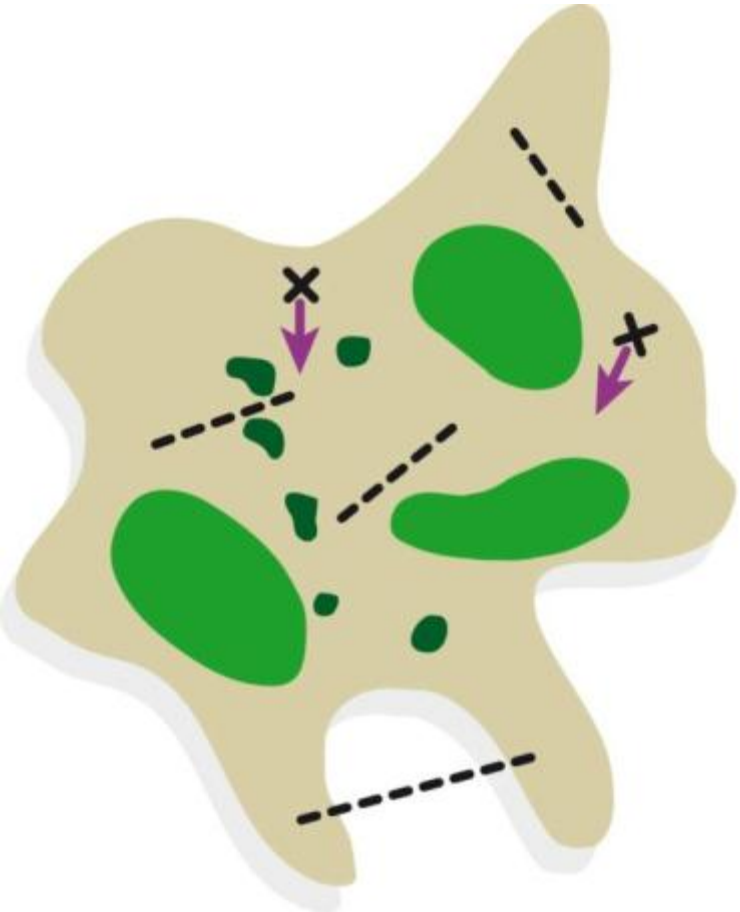


Mean indicators values from all pilot regions

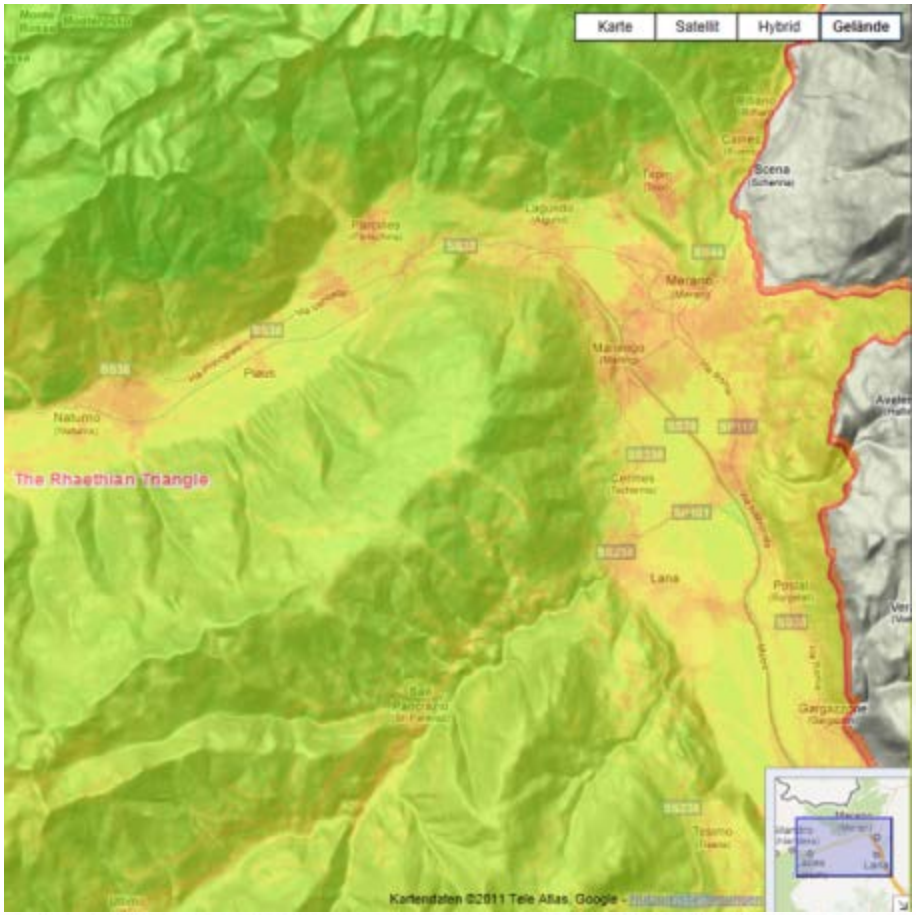


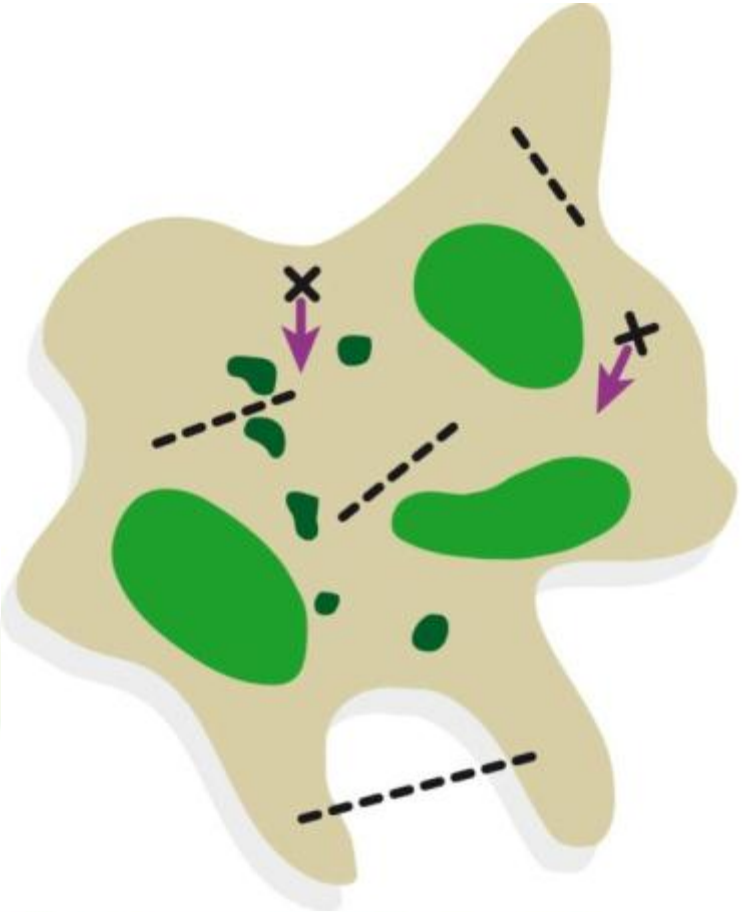
A step into real environments and real scales





A step into real environments and real scales





„Mapping relevant factors“

CSI

„The landscape approach“

SMA

„The species approach“

CARL

„The network approach“

Selected species for terrestrial models

Black grouse

Wolf

Griffon vulture

Lynx

Brown bear

Red deer

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)

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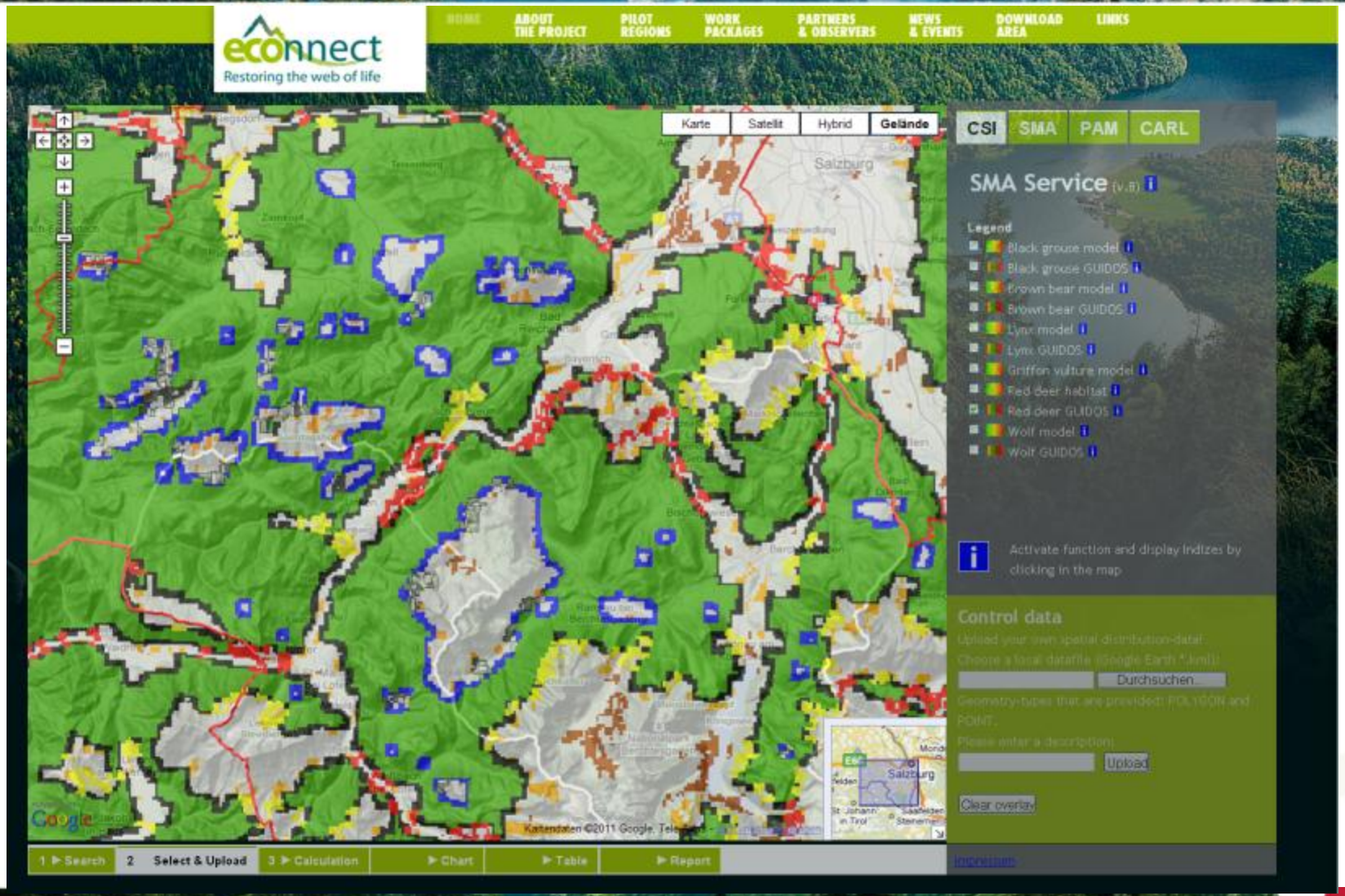
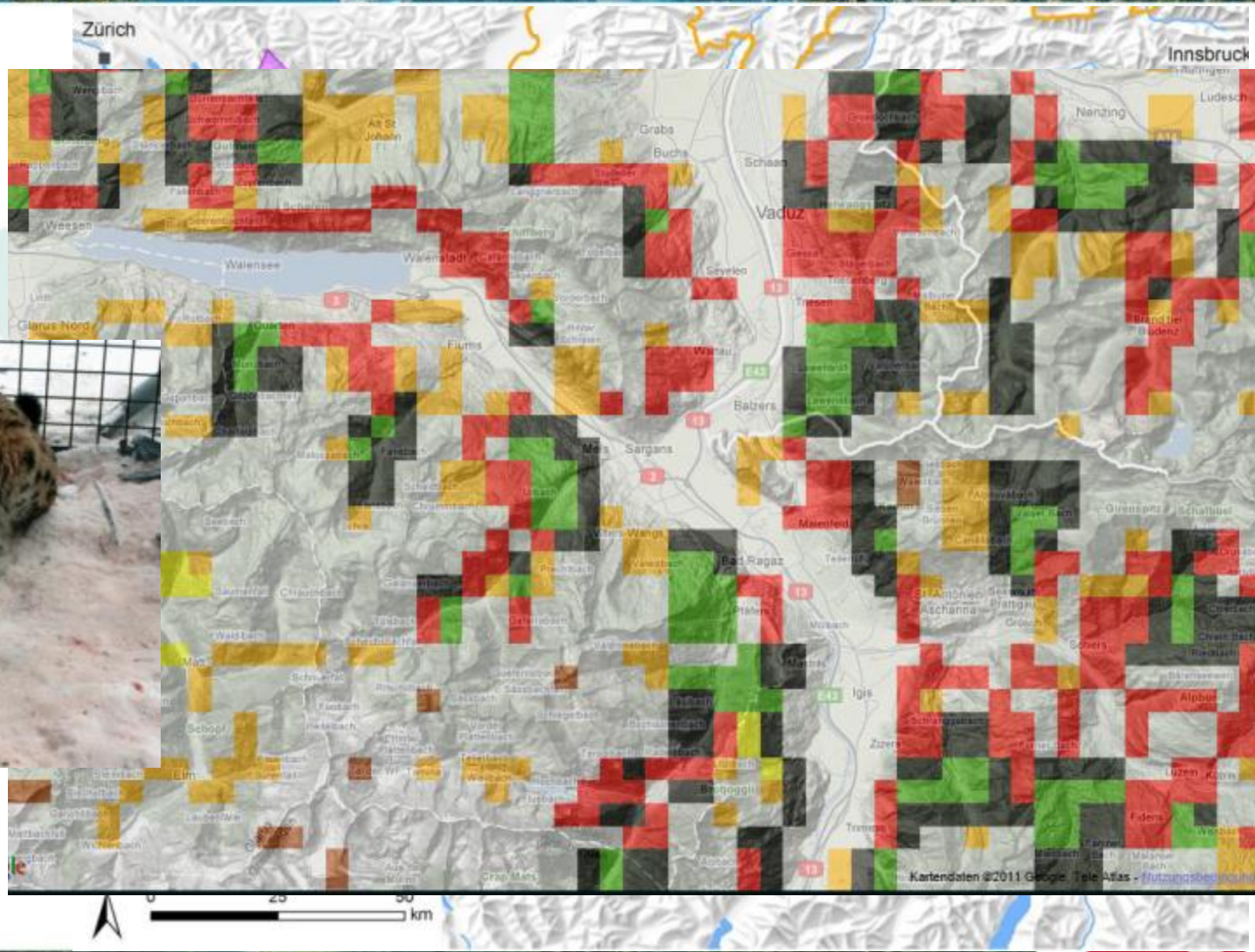


Webs of Life – Alpine Biodiversity needs ecological connectivity


Zürich
Innsbruck
Vaduz
Walensee
Flums
Balzers
Bad Ragaz
Igis
Kartendaten ©2011 Google, Tele Atlas
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25
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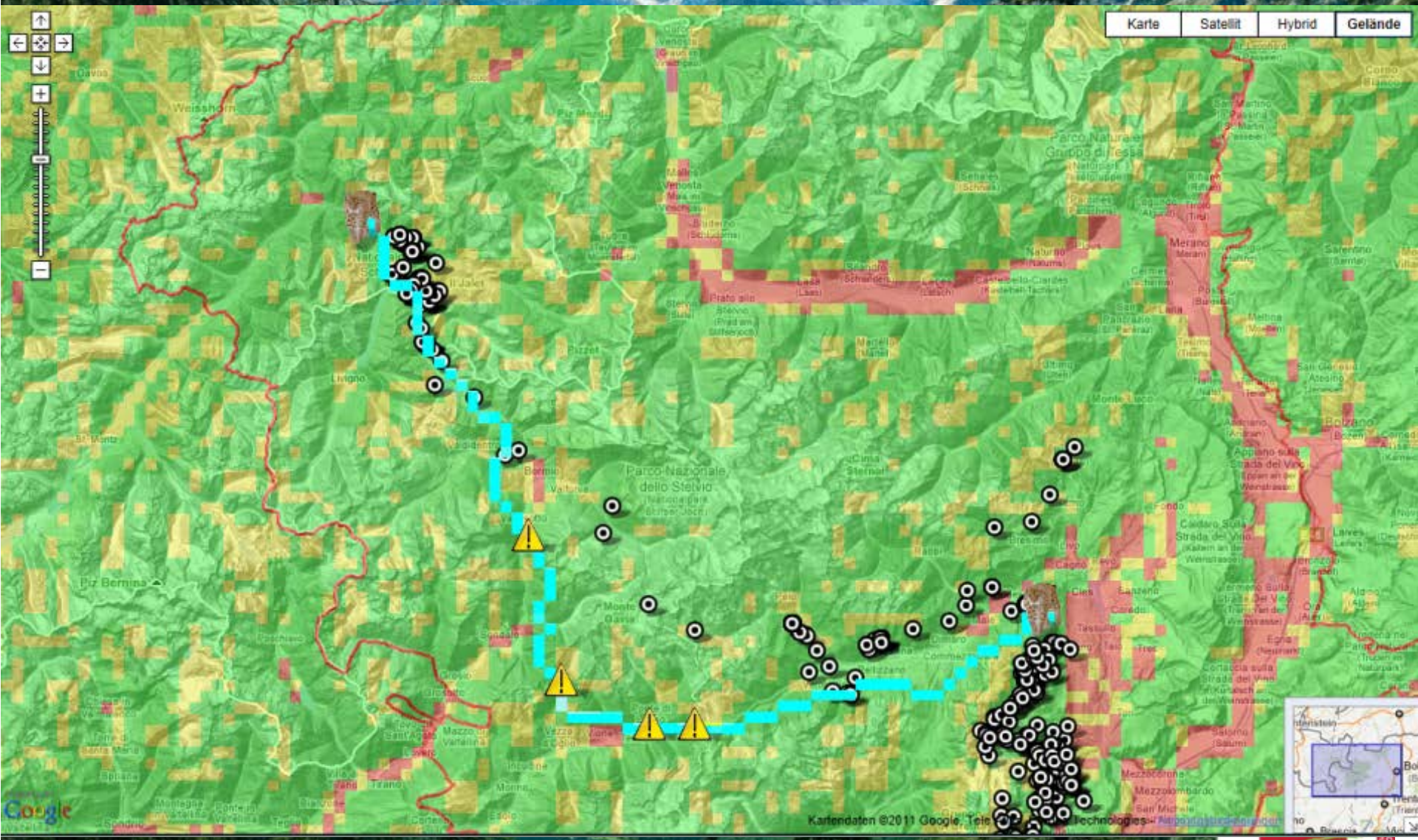
Karte
Satellit
Hybrid
Gelände
Parco Nazionale dello Stelvio
Kartendaten ©2011 Google

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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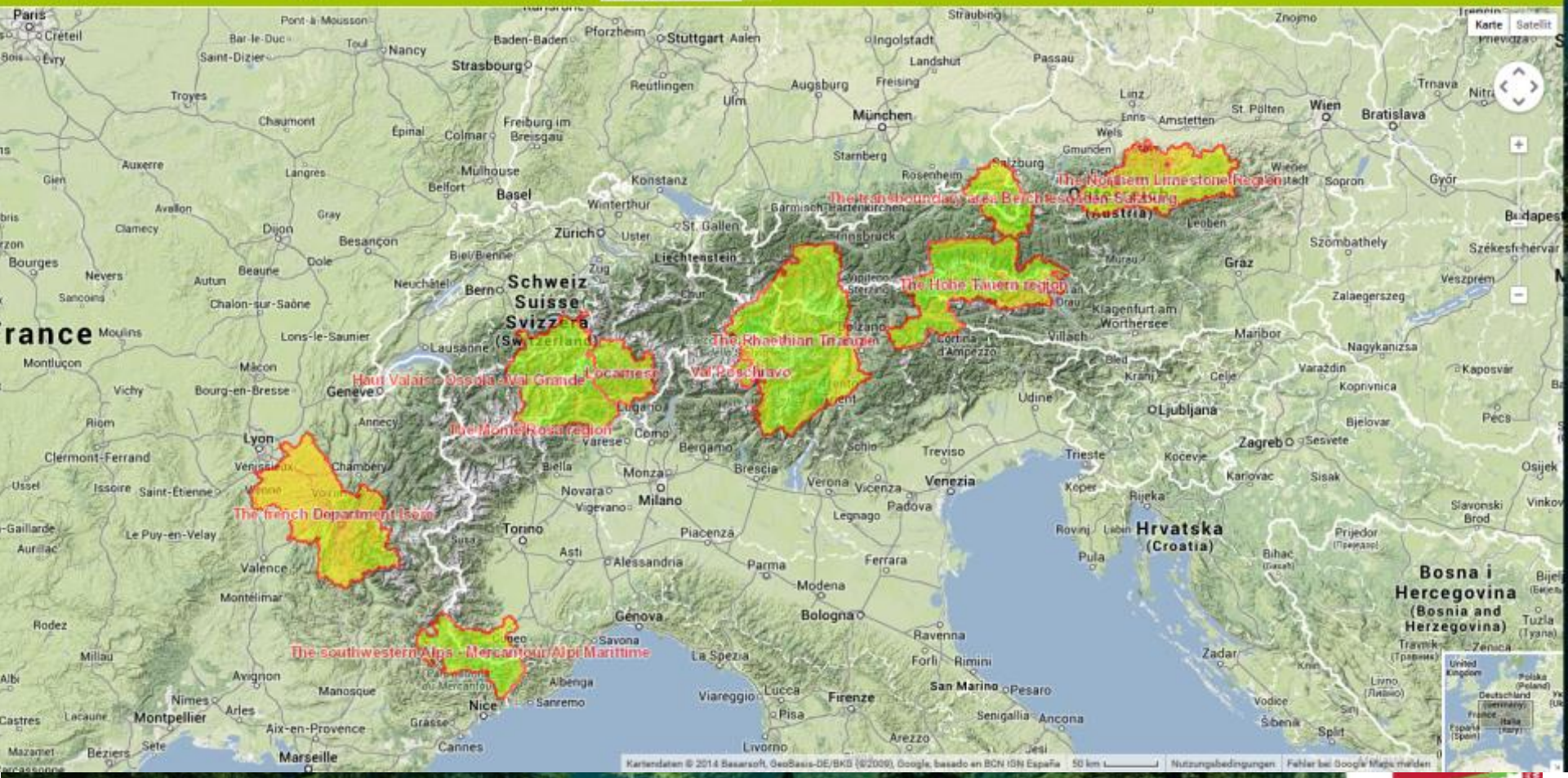

Webs of Life – Alpine Biodiversity needs ecological connectivity

Alpine Space

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EURAC research

Kathrin Renner
European Academy of Bolzano

parc naziunal svizzer

Ruedi Haller
Swiss National Park

Christian Schmid, Dominik Affolter, Angelika Abderhalden, Kathrin Sedy, Johannes Signer, Andrea Bouvinals, Leo Füreder, Katrin Renner

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www.econnectproject.eu
www.nationalpark.ch

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