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Alpine Space



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Planing ecological connectivity Alpswide

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Does your project or daily work refer / contribute in any way to...

...land use planning

Indirectly by spatial analysis of biodiversity and connectivity

...transport & energy
infrastructure planning

Indirectly by considering fragmentation

...intensive agricultural
areas

Indirectly by excluding those areas from potential areas for the 30x30 goal and a permeable landscape matrix

...protected areas

Directly by promoting the 30x30 goal and by realising the international network of protected areas in both dimensions: thematically and spatially



Did you apply a specific method to analyze connectivity / successful implementation procedures / stakeholder processes?

- *CSI*
- *Spatial analysis by different criteria*
- *JECAMI*



What is your approach?

How can our project gain an added value from your project learnings (regarding approach, results, network integration, etc.)?

Spatial analysis with indicators and connectivity and protection goals

How should your approach/method be applied further in ecological connectivity planning / research?

By described indicators and goal definition – defining % of permeable landscape surface / total area to be planned
Impact assessment of urbanisation and linear infrastructure on ecological connectivity network

Other

Analyse corridors and ecological permeability to neighbour areas



Mapping potential ecological network – Implementation into spatial planning

1- Identification of areas with high biodiversity value essential to ensure long-term nature preservation.

- Identification of core zones and large continuities (ALPBIONET2030, Alpine Parks 2030)
 - Designated protected areas
 - Identification of complementary natural areas to protect
 - Suitability analysis

2- Evaluate the current state of the ecological network

- Obstacles and barriers identification
 - Urban infrastructures
 - Road and railway infrastructures
 - Landscape fragmentation

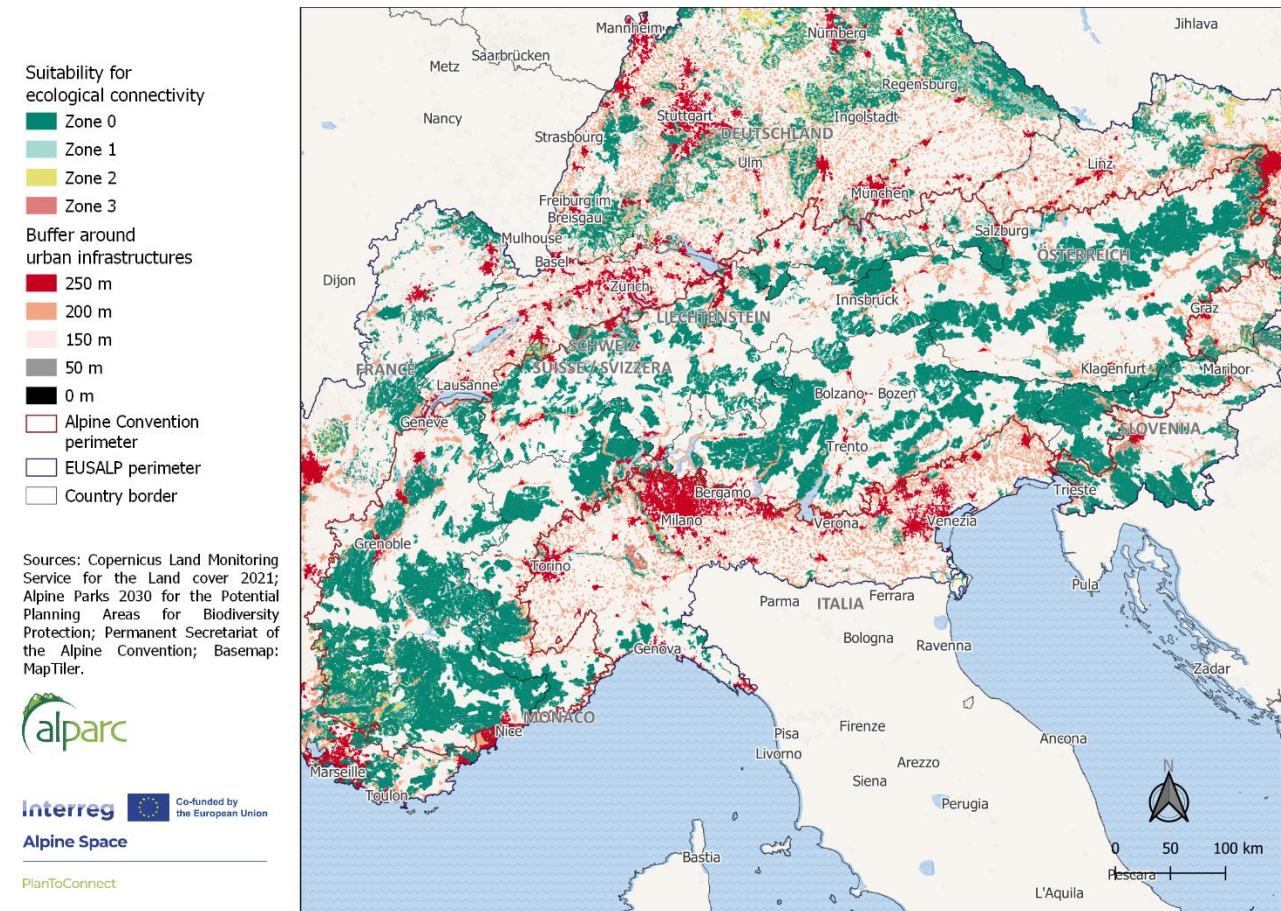


Working Step	Description
1. Compilation of the protected areas within the corridor	<p>Alpine protected areas under designations:</p> <ul style="list-style-type: none">- National Parks, Nature / Regional Parks, Nature reserves, UNESCO (Biosphere reserves, world heritage, geopark)- Natura 2000 and emerald network sites- IUCN categories I-IV
2. Compilation and analysis of GBI elements within the corridor (connectivity evaluation)	<p>In a second step, all GBI elements (based on the categories of CORINE Land Cover (2018) within the network are listed and summarised according to the main categories:</p> <ul style="list-style-type: none">- Artificial surfaces- Agricultural areas- Forests and semi natural areas- Wetland (marshes, peatbogs)- Water bodies (flowing and standing water)
3. Definition / refinement of objectives for ecological connectivity	<p>The objective is to identify the current status of priority areas for the development of the alpine ecological network and to analyse potential corridors for connecting these areas.</p>
4. Compilation and analysis of regional and local data	<p>Different datasources were integrated into the analysis; however, the data collection does not extend to regional or local datasources to the extensive geographical scope of the case study.</p>
5. Barrier Analysis	<p>Identification of possible barriers and threats to the components of the potential ecological network of the Alpine space, including core zones, stepping stones and corridors.</p>



2 classes Ecological Favourable Areas Index > 65	Surfaces with high ecological potential, low spatial development, important for ecological connectivity.	88 Categories regrouped into 4 Zones
44 Land Use classes (CORINE LANDCOVER)	Identification of current land use compatibility with ecological connectivity.	

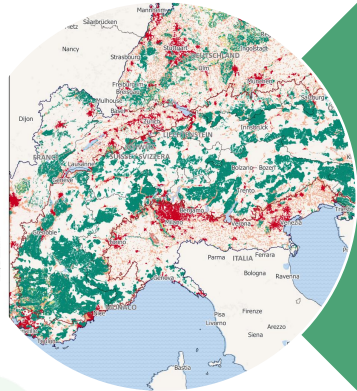
Potential Planning Areas for Biodiversity Protection
Cover 37,72% of the Alpine Convention perimeter



Zone	Categories
Zone 0	45
Zone 1	7
Zone 2	8
Zone 3	28

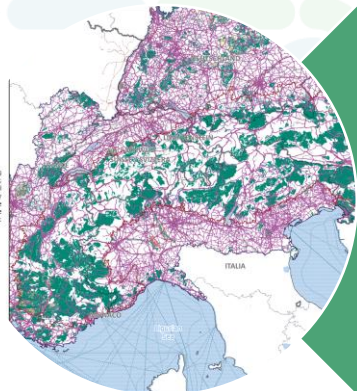


2- Evaluate the current state of the ecological network



Urban barriers

- Disturbances from artificial land, spatialisation of conflict points
- Integration of population density



Road and railway barriers

- Linear disturbances, crossing cores and corridors
- Representation of noise disturbances

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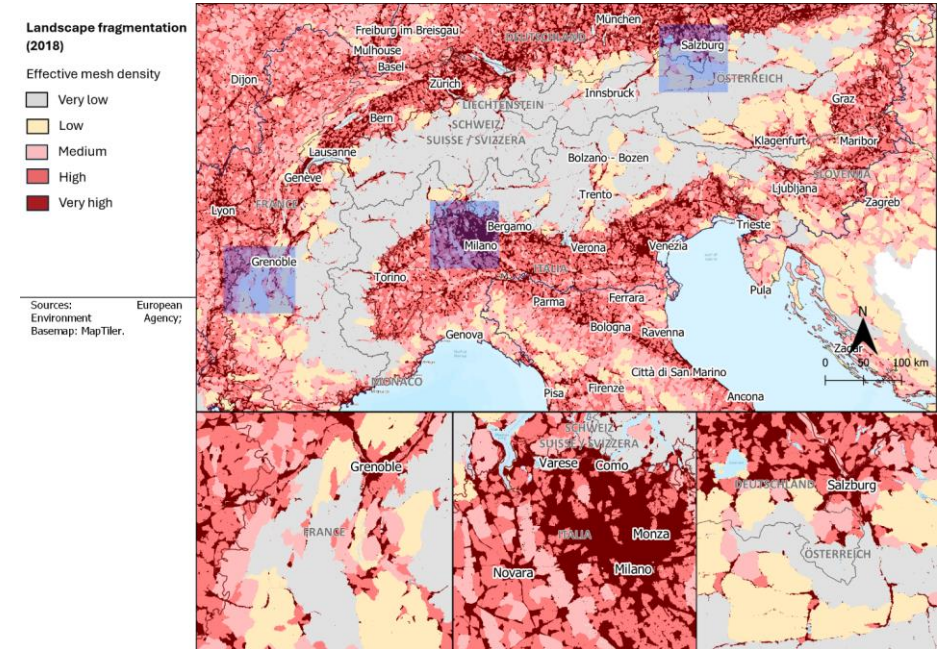


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Other indicators



Different approach

Landscape fragmentation measured accordingly to the presence of anthropogenic barriers (built-up areas) and natural barriers (lakes, major rivers and mountains)

The Effective Mesh Density (seff) is a measure of the degree to which movement between different parts of the landscape is interrupted by a Fragmentation Geometry (FG).
European Environment Agency



Urban barriers

General overview of the degree of urbanisation inside the Alps, most of the surface categorised as rural areas and towns and suburbs.

Detailed representation of the disturbed areas inside the Alps:

Method

- Buffering infrastructures, accordingly to surface covered by urban areas and integrating population density.

Suitability for ecological connectivity

- Zone 0
- Zone 1
- Zone 2
- Zone 3

Buffer around urban infrastructures

- 250 m
- 200 m
- 150 m
- 50 m
- 0 m

- Alpine Convention perimeter
- EUSALP perimeter
- Country border

Sources: Copernicus Land Monitoring Service for the Land cover 2021; Alpine Parks 2030 for the Potential Planning Areas for Biodiversity Protection; Permanent Secretariat of the Alpine Convention; Basemap: MapTiler.



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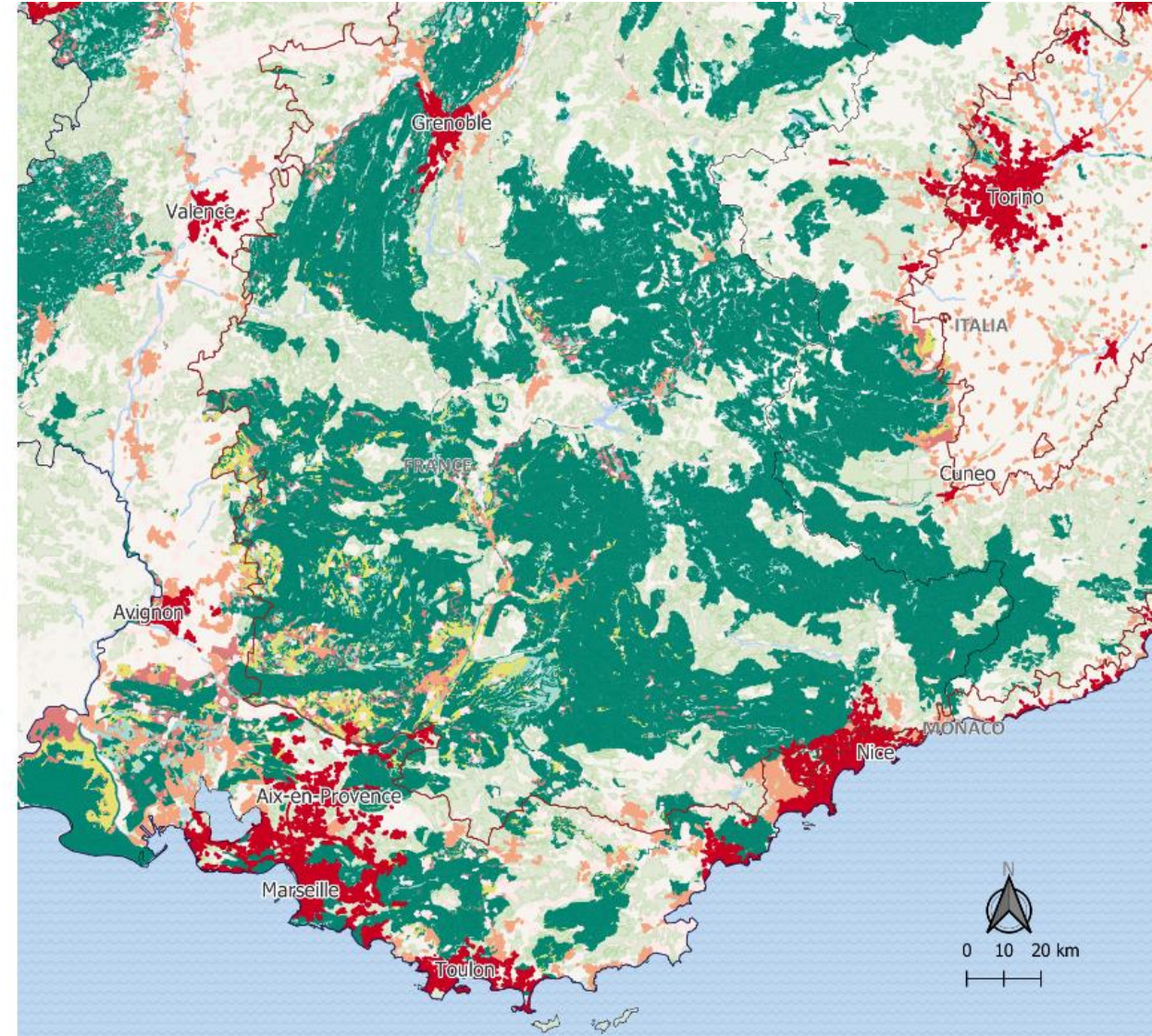
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Potential Ecological Network

Protection of the Spatial Planning Areas for Biodiversity Protection connectivity - natural areas of high ecological value in the Alps.

Prevent isolated patches, vulnerable to fragmentation.

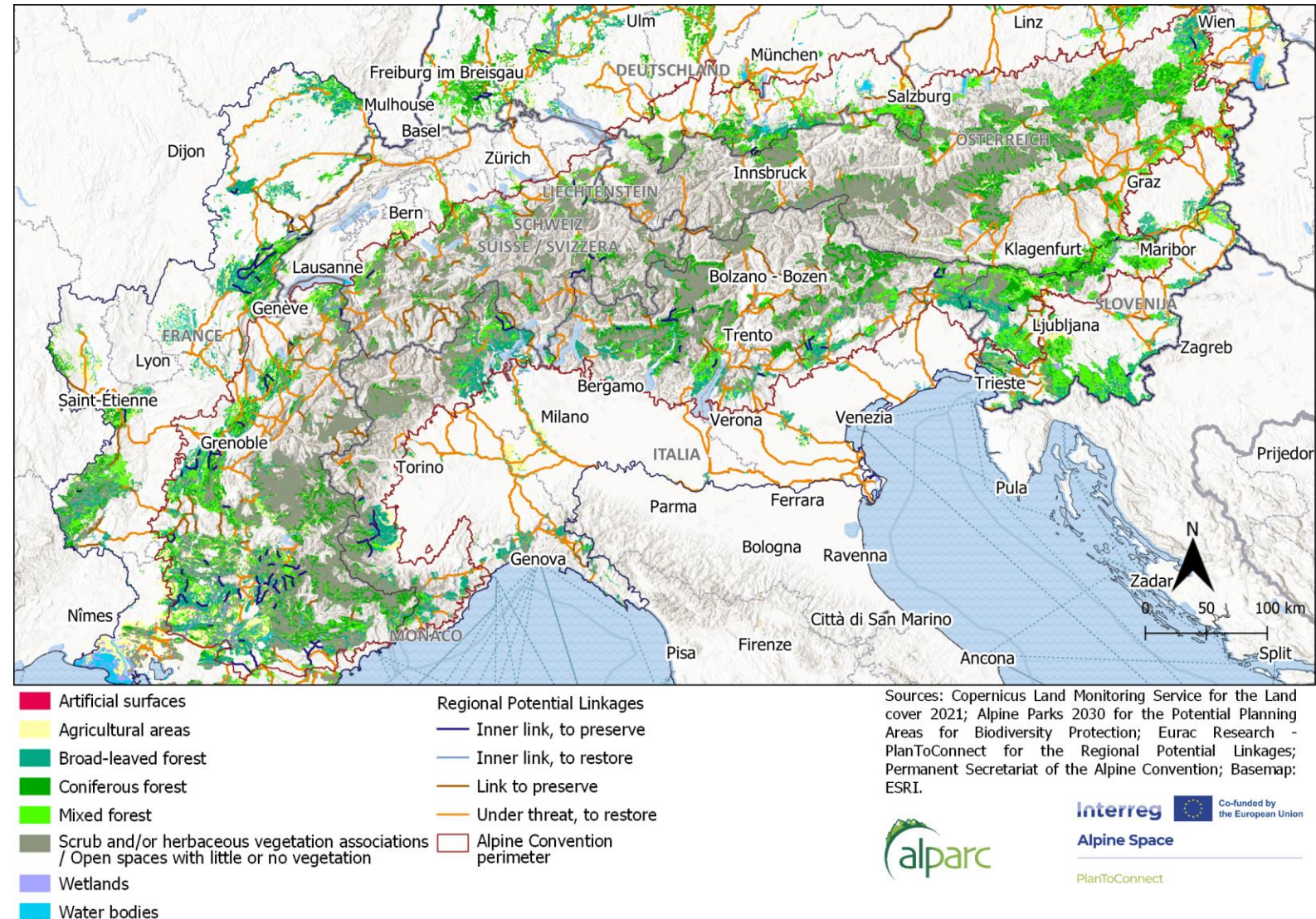
Identification of corridors linking areas to preserve, corridors threatened by infrastructure barriers to restore.

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More biodiversity protection by ecological connectivity in the Alps



Econnect

Improve the understanding of the concept of ecological connectivity and to enhance it across the Alpine range.



greenAlps

Improve the framework conditions for sustainable, efficient European environmental policies that will protect and maintain nature in the Alps.



ALPBIONET2030

- Strategic Alpine Connectivity Areas (SACA) approach
- Target actions.



Alpine Nature 2030

- Creating [ecological] connectivity for generations to come.



OpenSpaceAlps

Criteria and methods to identify and safeguard near – natural open spaces.



Alpine Parks 2030

- New generation of Protected Areas.
- 30x30 Goal



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Ecological connectivity tools and methods to be integrated into spatial planning.

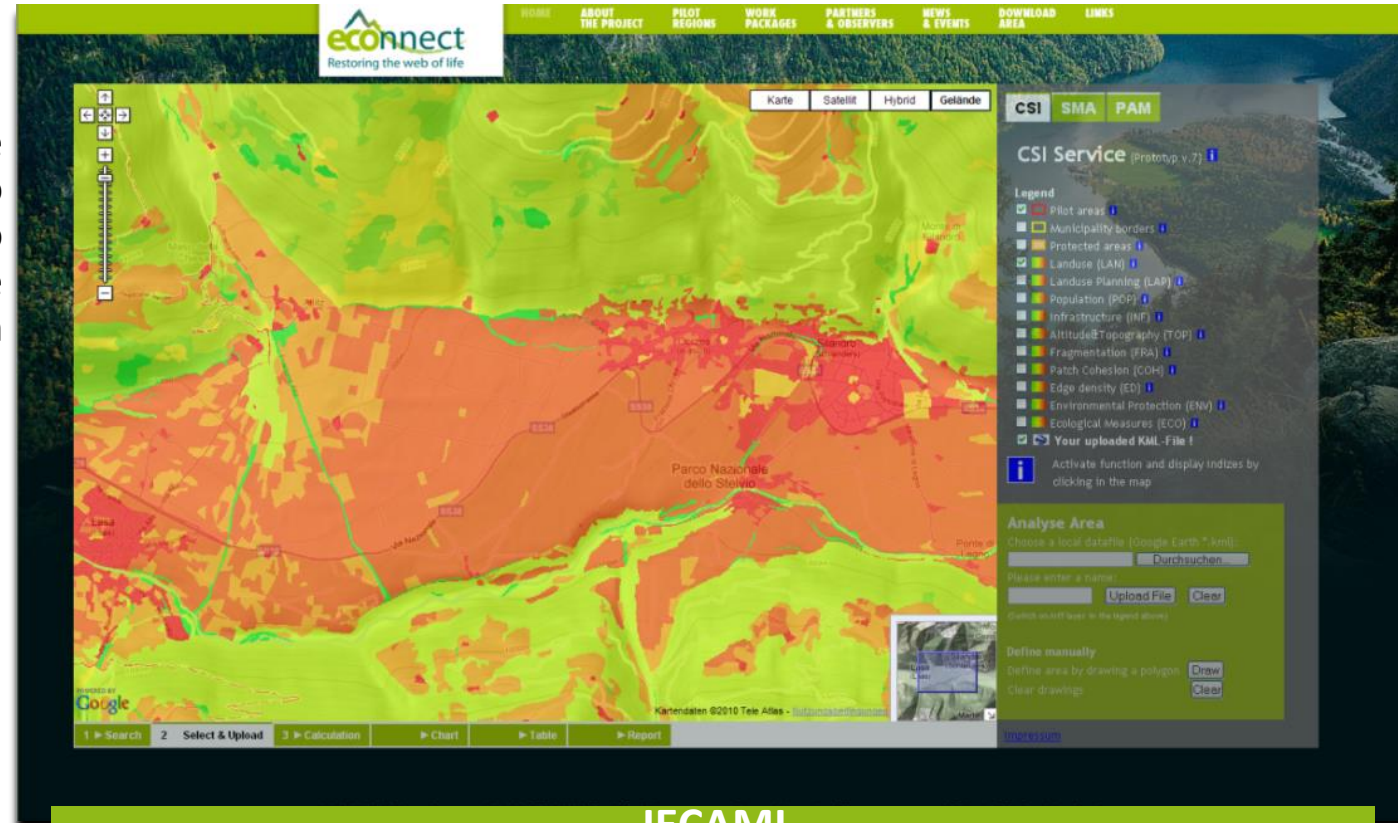
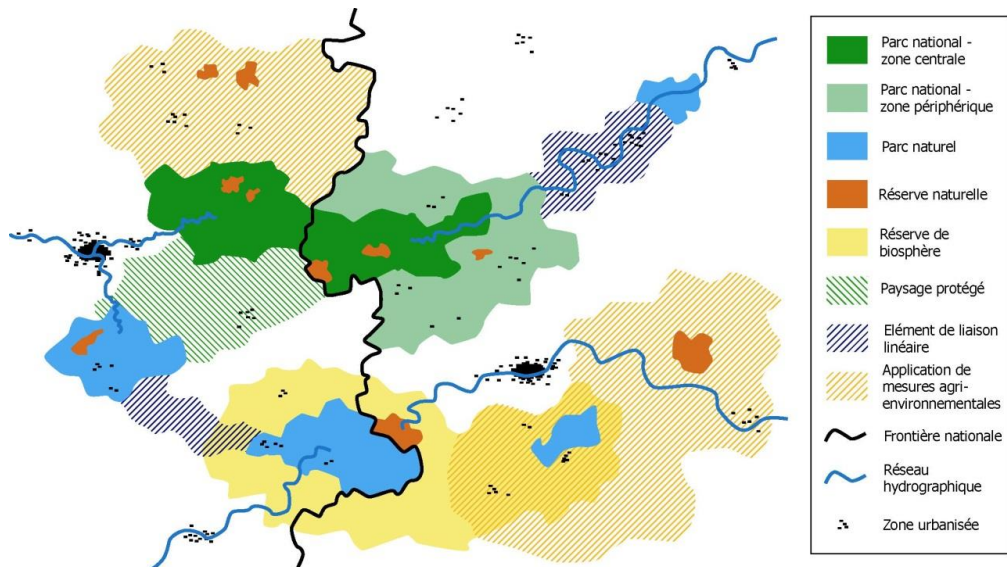


JECAMI since 2010



Different approaches to identify Alpine ecological network

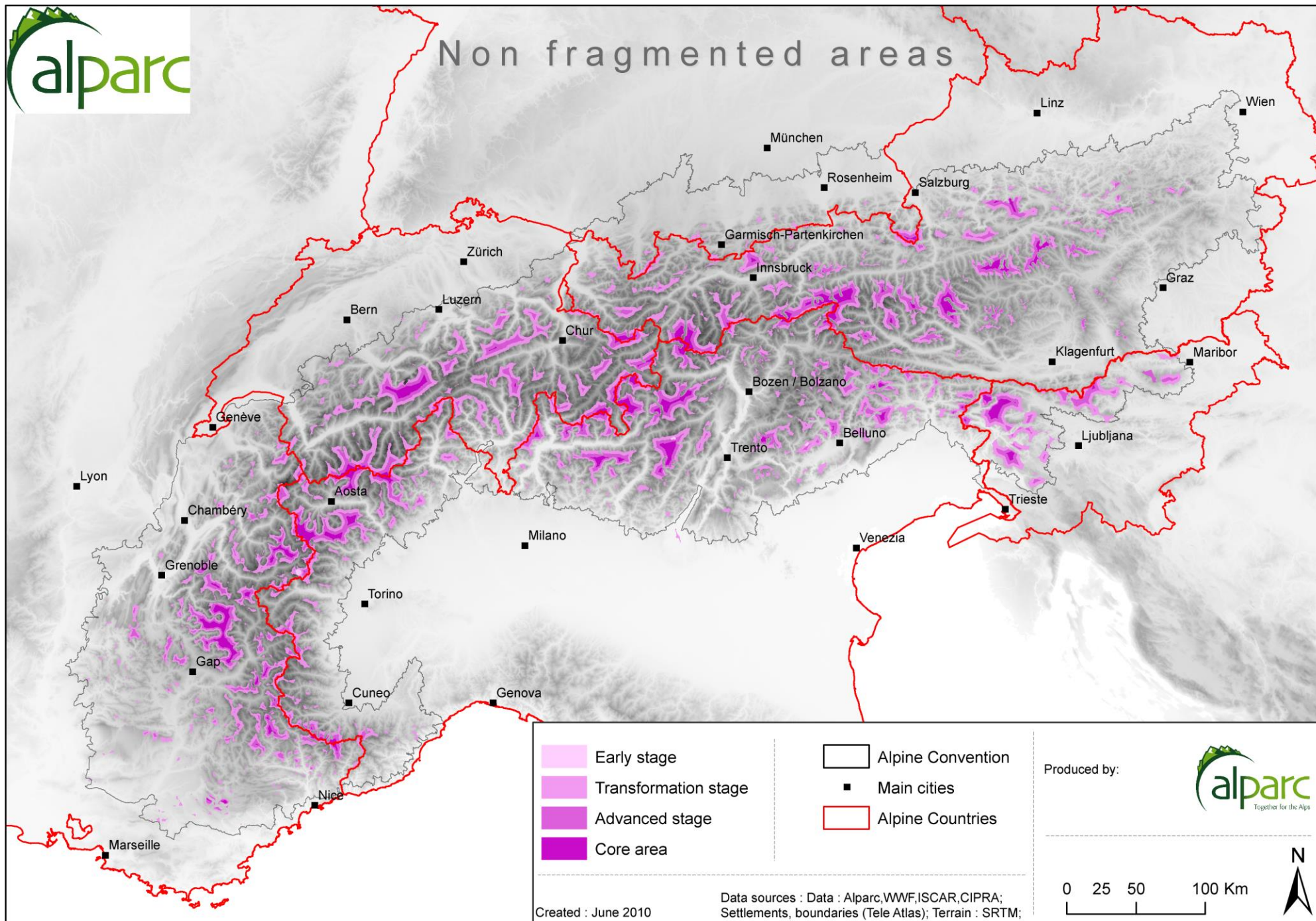
The ECONNECT project was designed to improve the understanding of the concept of ecological connectivity and to enhance such connectivity across the Alpine range and to analyse whether the “habitat” or “species-approach” would be more adapted to define priorities for ecological connectivity in the Alps

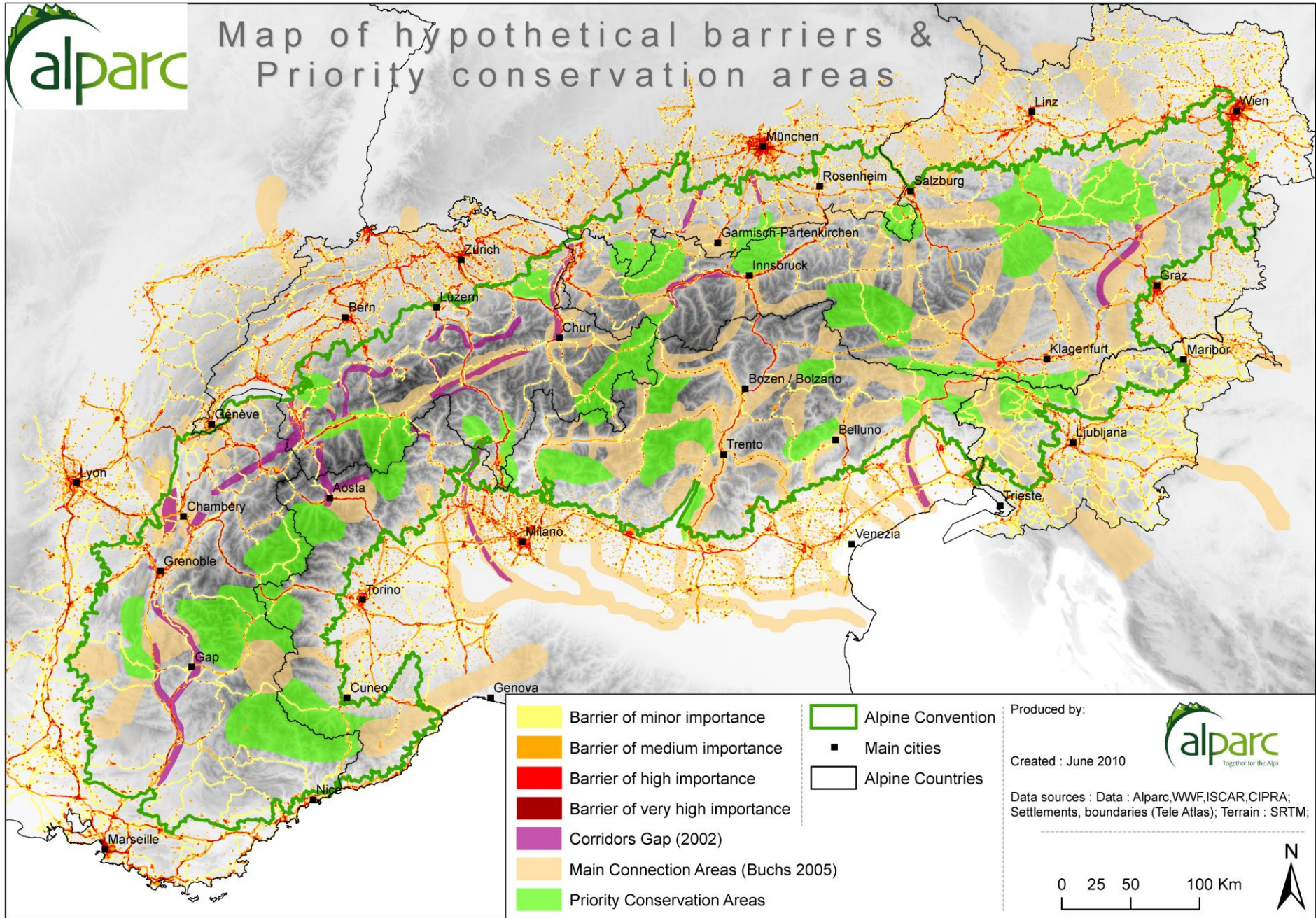


JECAMI

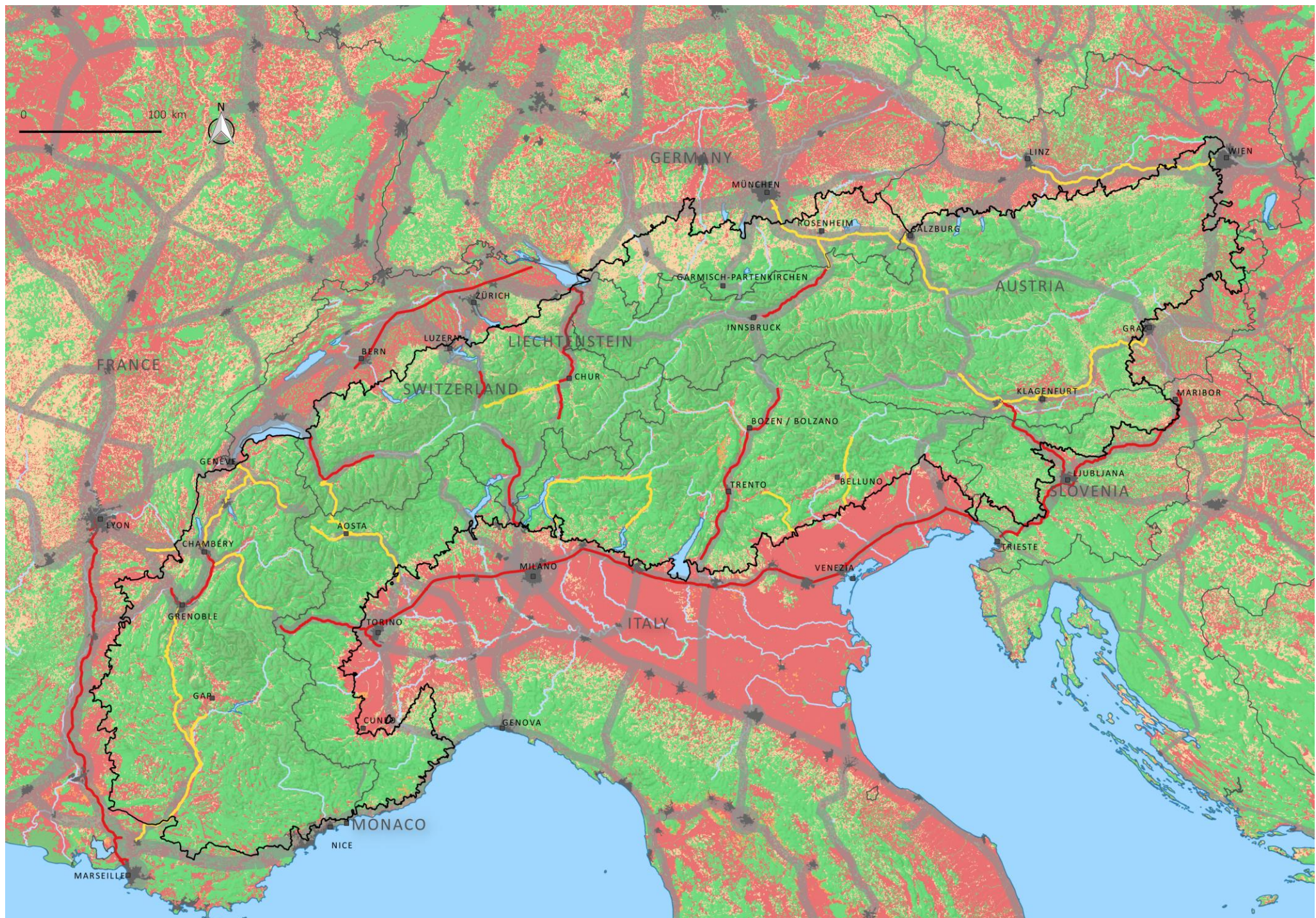
Joint Ecological Continuum Analysis and Mapping Initiative
A platform to analyze and visualize ecological connectivity in the Alps

Non fragmented areas





Continuum
Initiative
2008-2010





Different approaches to identify Alpine ecological network

ALPBIONET2030 2017 - 2020

- ALPBIONET2030 facilitates an Alpine Ecological (Connectivity) Network.
- It heads for integrating wildlife management and defragmentation approaches into sectoral policies.
- It extends its spatial focus to the EUSALP perimeter, which helps to tackle main connectivity barriers towards the Alps

SACA 1 : Ecological Conservation Areas

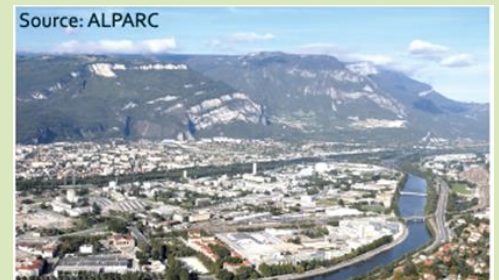
- ✓ Connectivity is working quite well
- ✓ Mainly need conservation of the status

SACA 2 : Ecological Intervention Areas

- ✓ Important links between SACA 1 areas
- ✓ Connectivity is currently working to some extent but would benefit from enhancements
- ✓ Development (e.g. restoration)

SACA 3 : Connectivity Restoration Areas

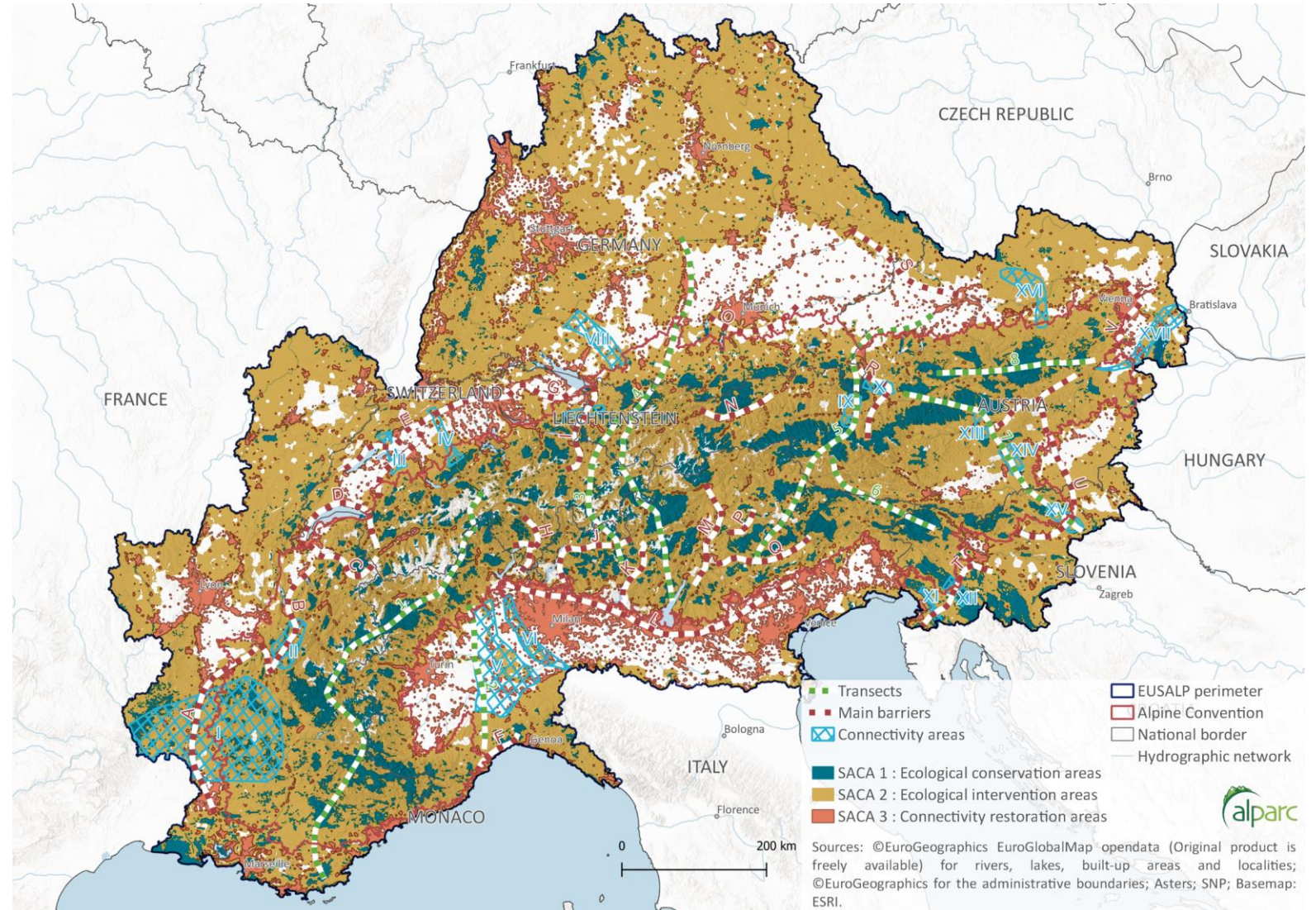
- ✓ Barriers for connectivity between SACA 1
- ✓ Mitigate negative impacts





ALPBIONET2030

The Strategic Alpine Connectivity Areas (SACA) classification of the alpine and EUSALP area in three types of categories offers the possibility to better target actions and funds in favour of ecological connectivity has led to an innovative cartography of the territory.



2018-2023



Alpine Parks 2030

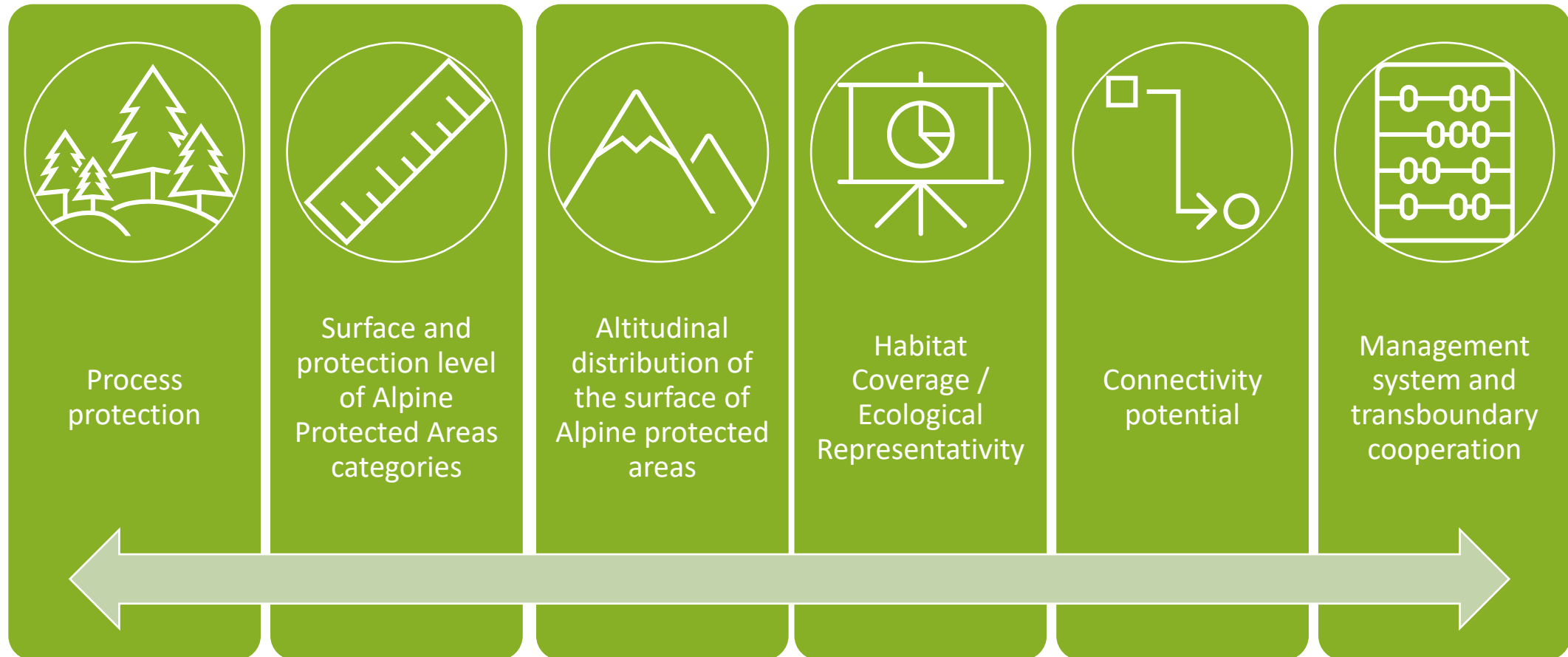
A New Generation of Alpine Protected Areas

Project supported by the German Ministry of the Environment





Assessment of the Existing Network of Alpine Protected Areas - Criteria for the Evaluation of the Effective Conservation of Ecosystems and Habitats





Alpine Protected Areas

❖ Protected areas in the Alps

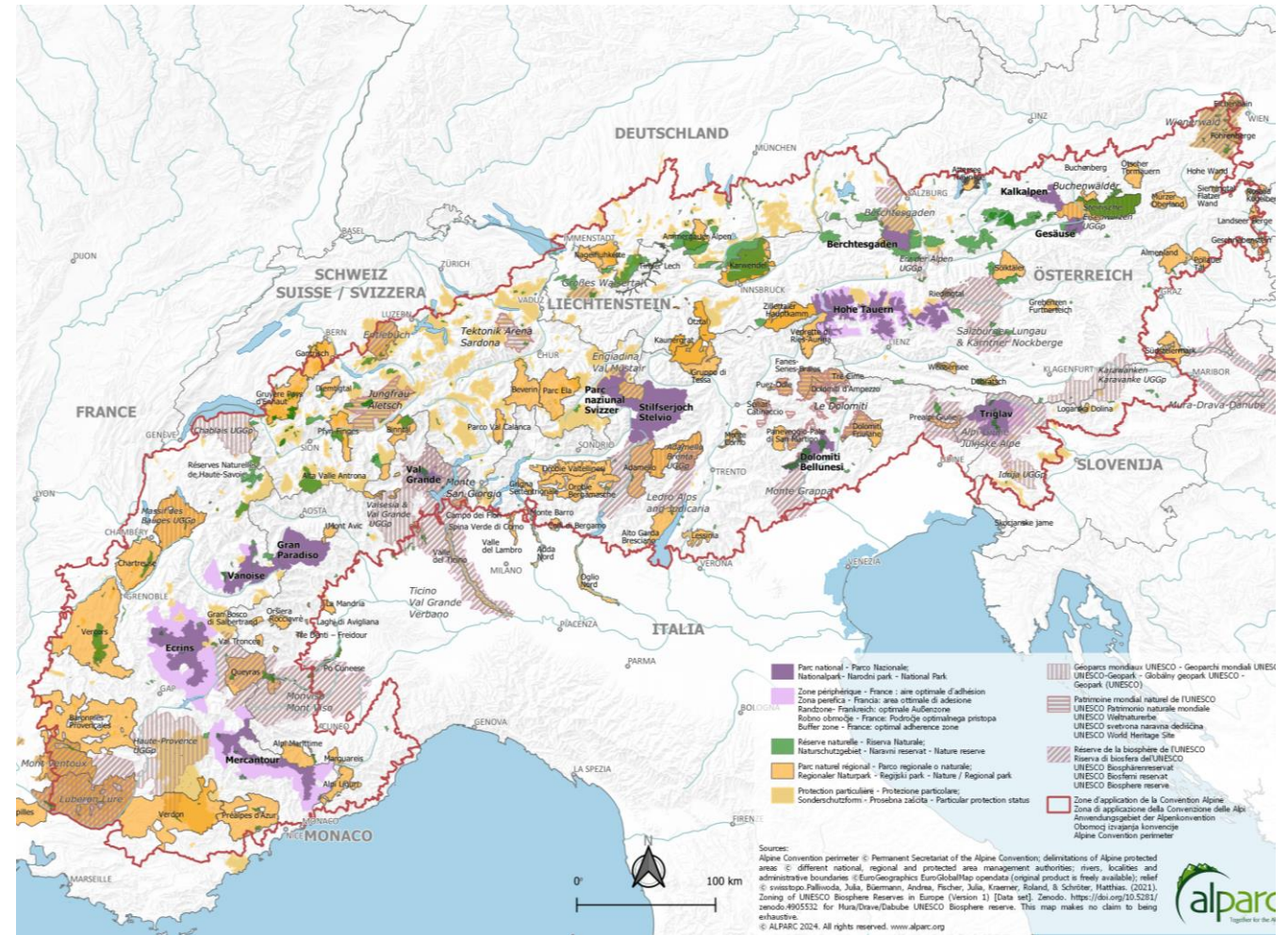
present a mosaic of different situations and types even within the same denomination.

❖ Mission and protection status

differ from country to country / region to region – all categories have their legitimacy!

❖ Level of protection

is generally low. Only a small number of the **28.5%** of alpine protected areas is strongly protected according to IUCN and ALPARC classification systems – allowing ecological process protection.



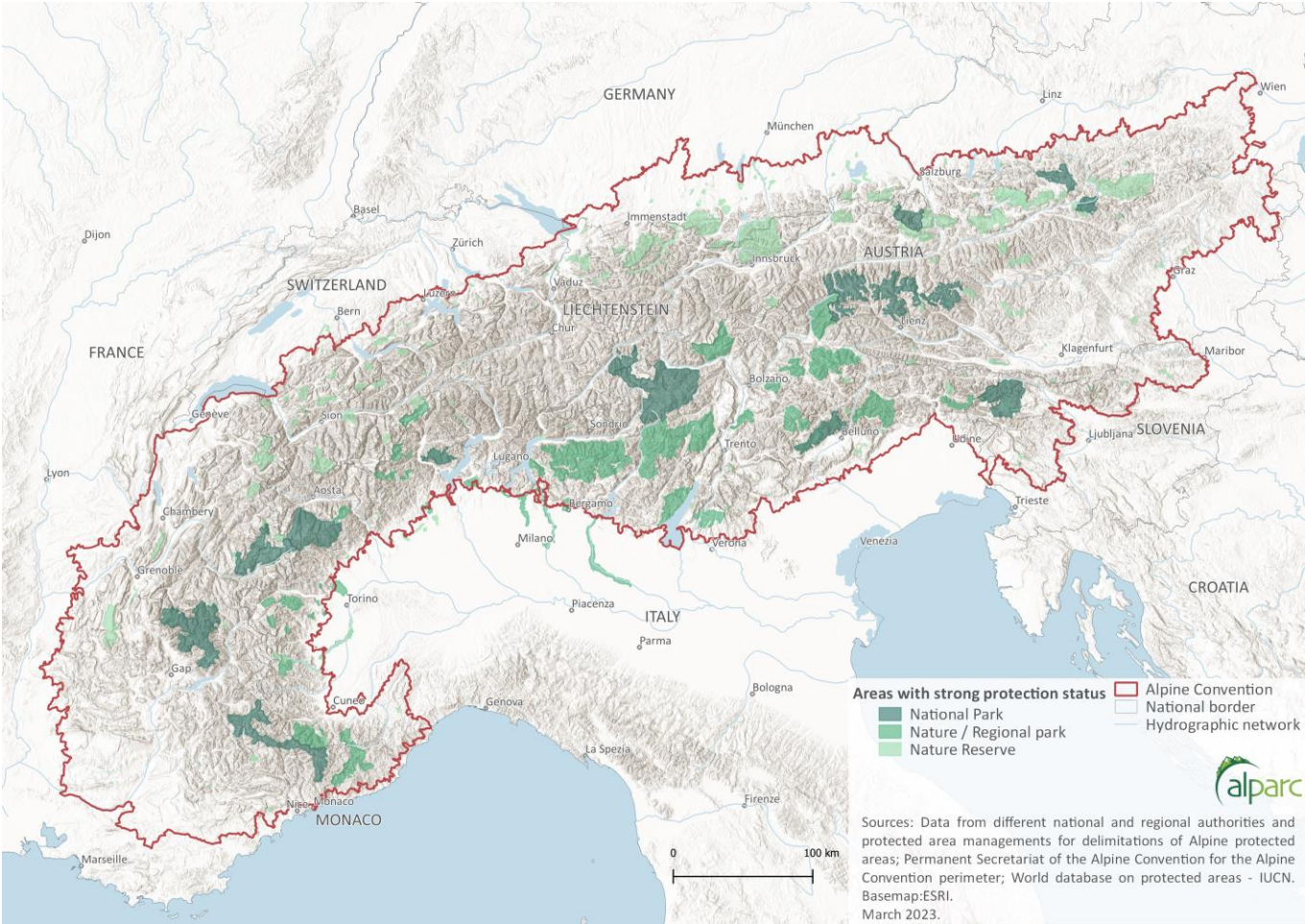


The concept of strong protection

Strong protection in the Alps is limited and the extension of wilderness areas across the Alpine Arc is even very small. Wilderness can be considered by the IUCN categories Ia/Ib and mostly by category II (core areas of national parks). Several nature reserves and nature parks (especially in Italy) can also be considered as strong protection.

IUCN Category	Surface Km²	% Alpine Convention
Ia	514	0.3%
Ib	164	0.1%
II	7,526	3.9%
III	139	0.1%
IV	12,046	6.3%
Weighted surface according to overlaps (redundancies between PAs)*	19,900	10.4%

 IUCN protected areas categories with the strongest protection





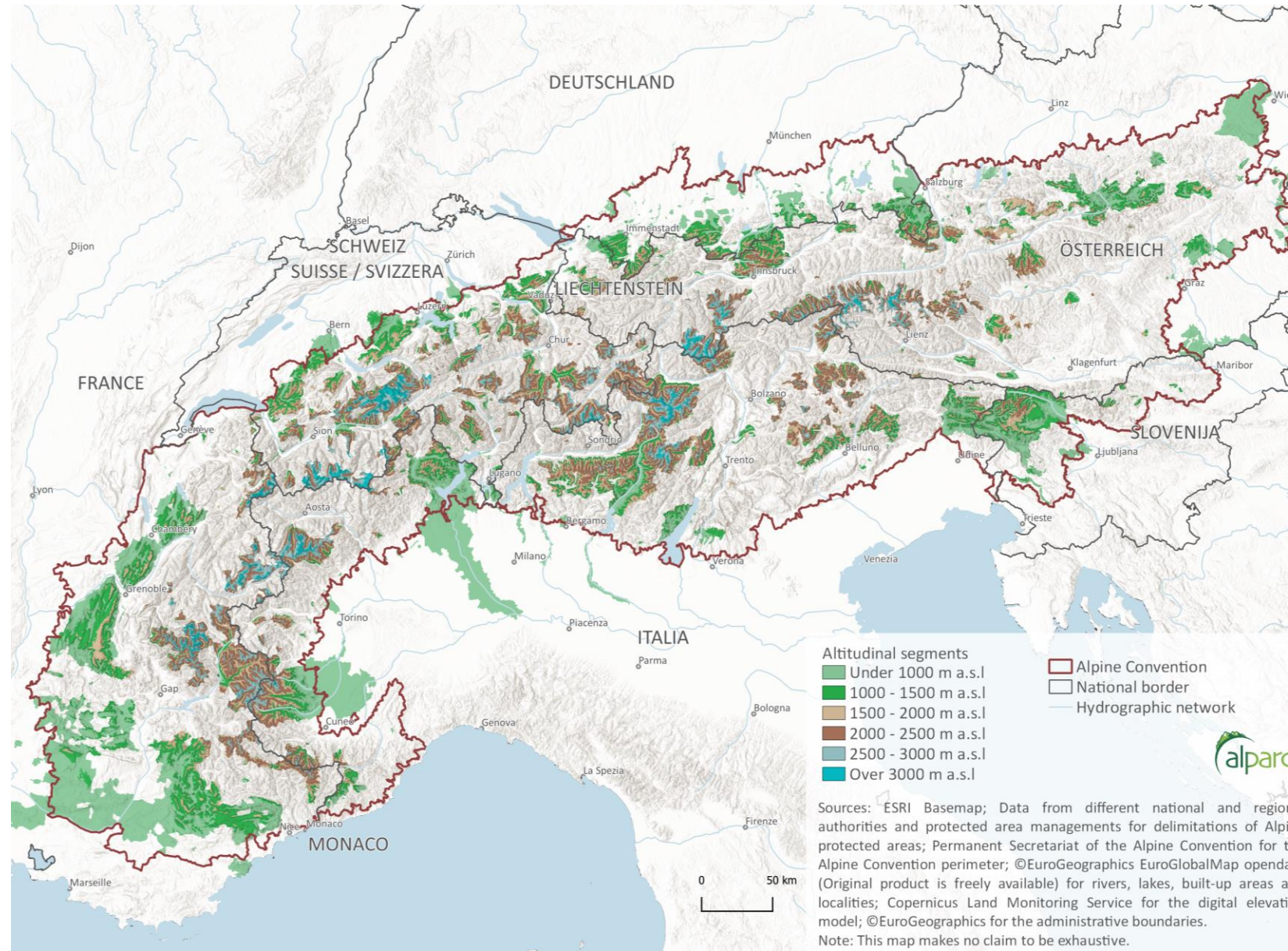
Altitudinal distribution

The altitude plays a special role for the habitats in the Alps as it has a fundamental influence on all ecological processes via the climatic gradient.

The representation of strongly protected areas in the lowlands is underdeveloped as there are land-use conflicts. We take as an example some figures:

- Two-thirds of the total surface of all 13 National Parks of the Alps are located over 2,000 m a.s.l.
- Half of the total surface of all nature reserves of the Alps are located over 1,500 m a.s.l.

➔ “Stronger the protection, higher are the protected areas”

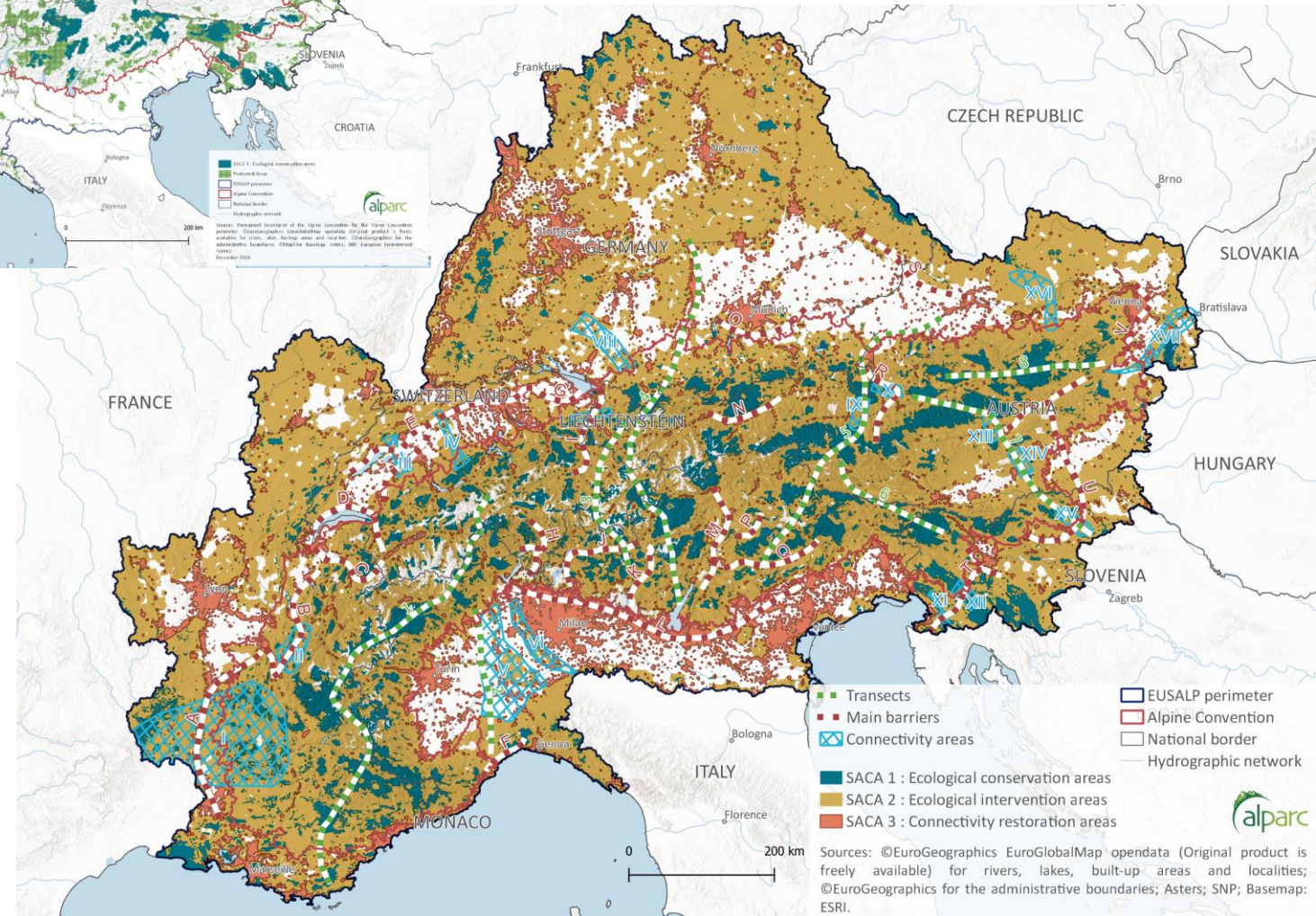
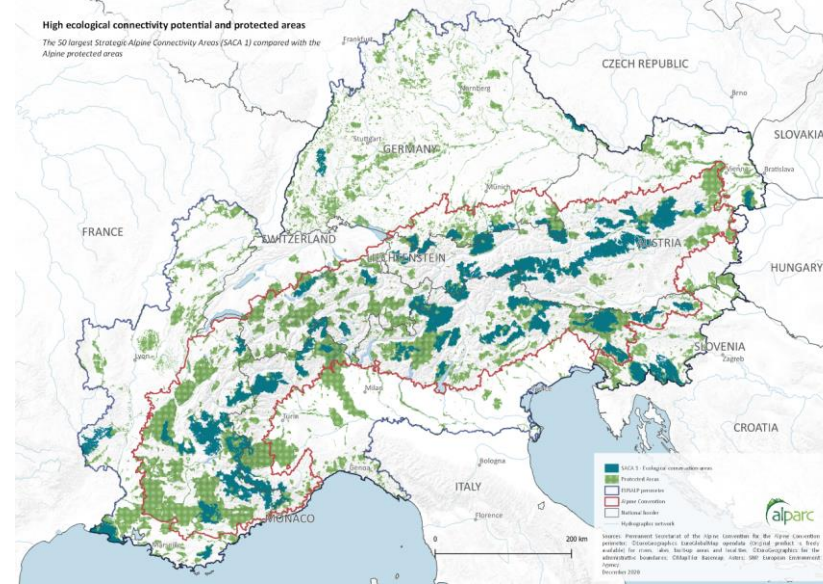




Connectivity potentiel- Strategic Alpine Connectivity Areas

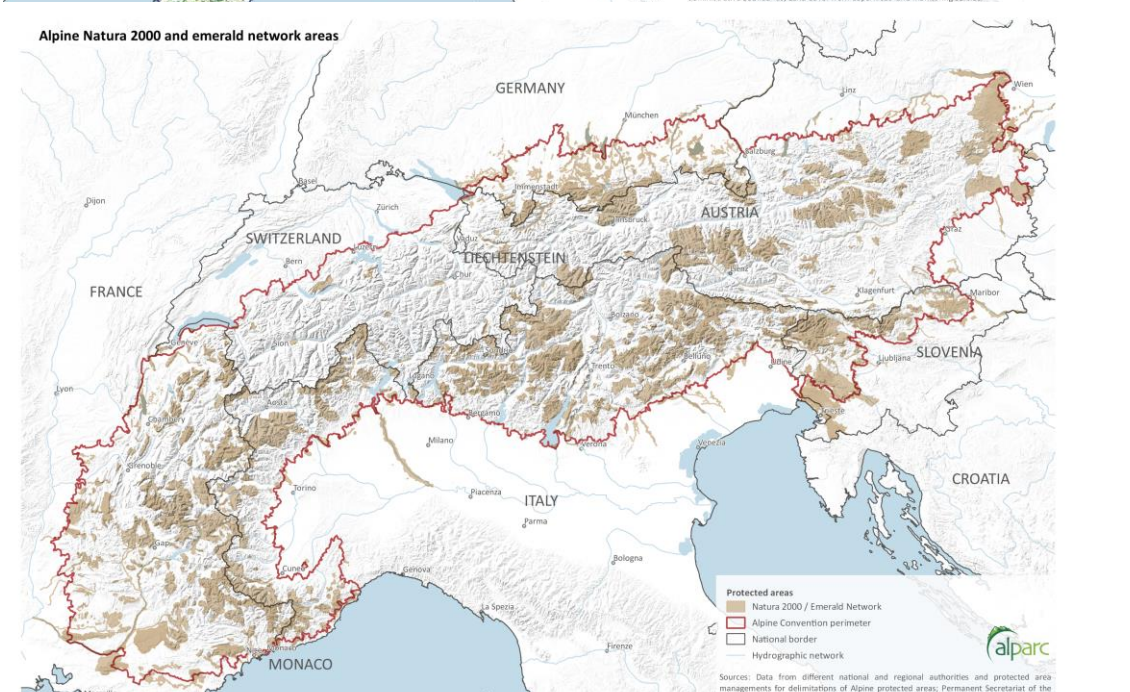
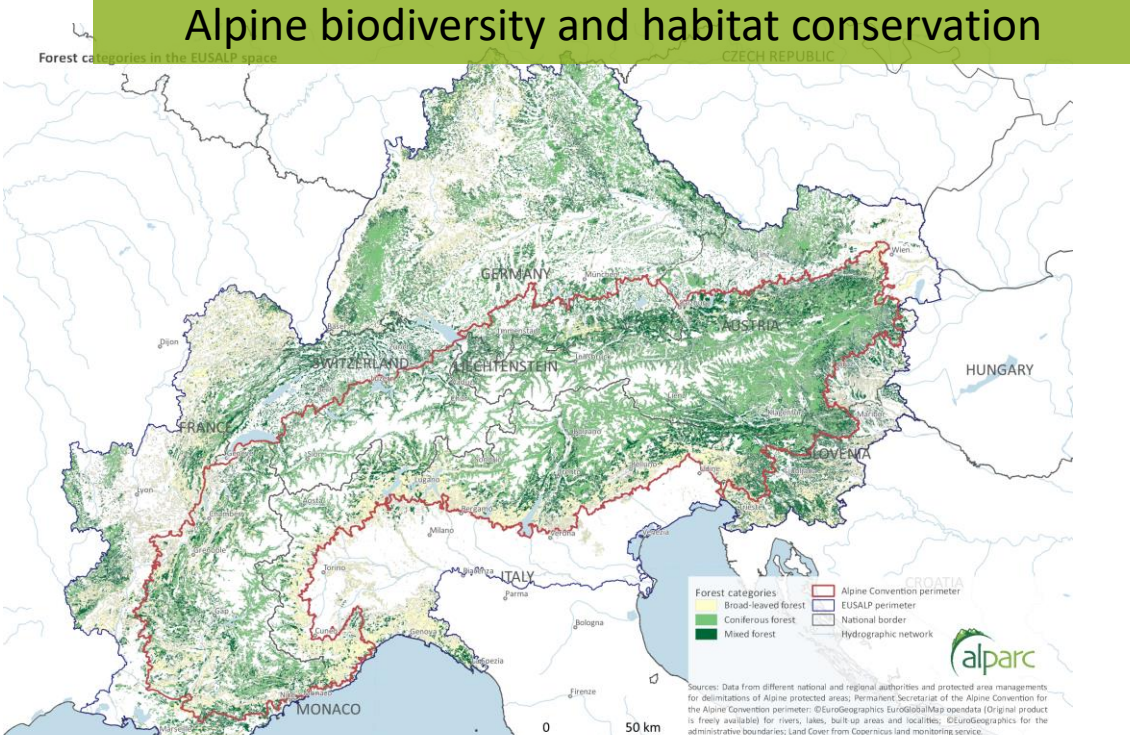
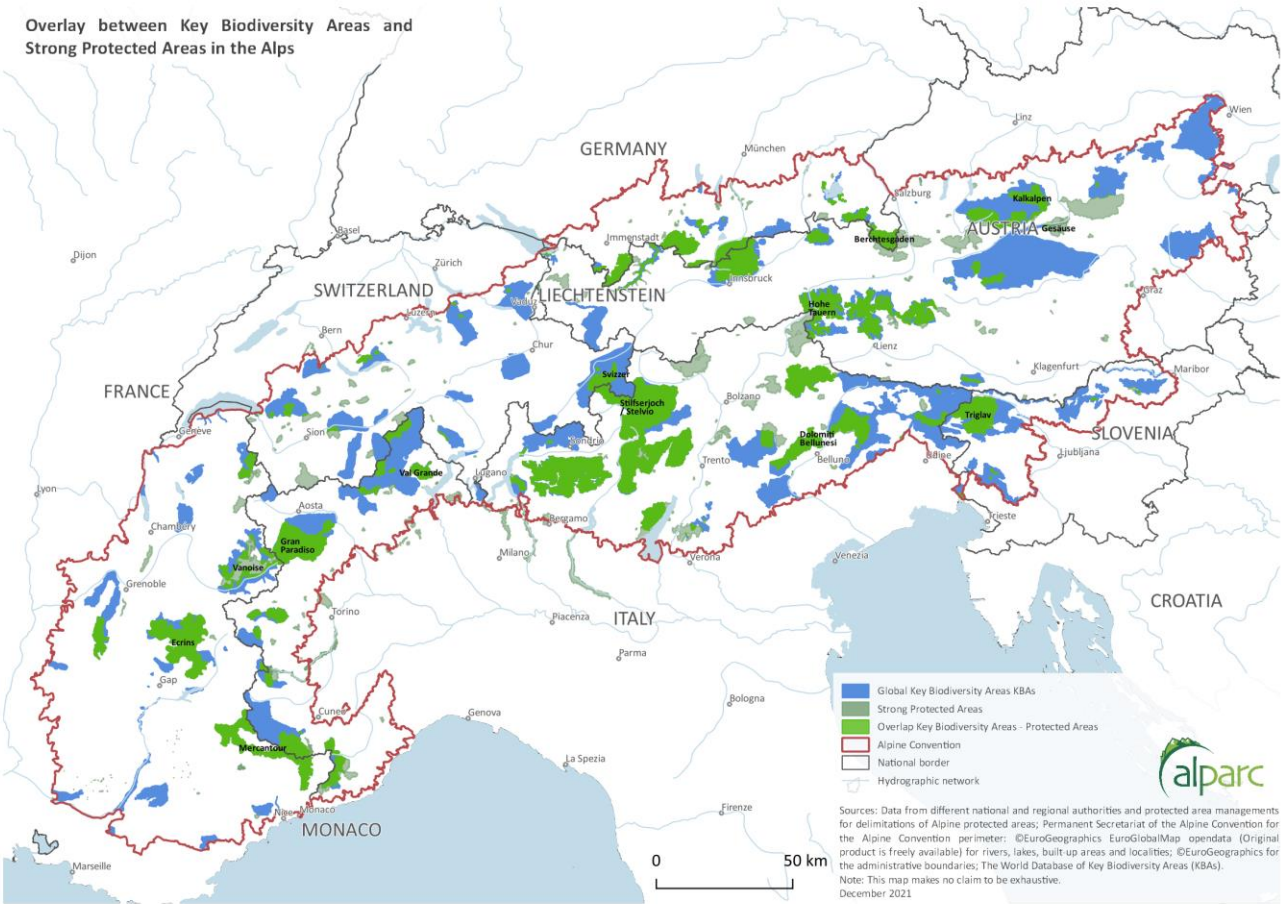
While large, functional, and well-managed protected areas are extremely important for conserving biodiversity, it is essential to recognise that vast amounts of biodiversity and ecosystem attributes exist in and depend on landscapes outside of the present-day protected area domain.

➔ A significative extension of the overall alpine protected areas surface will only be possible by connecting them creating larger non fragmented protected surfaces.





Biodiversity representation (Habitat Coverage)

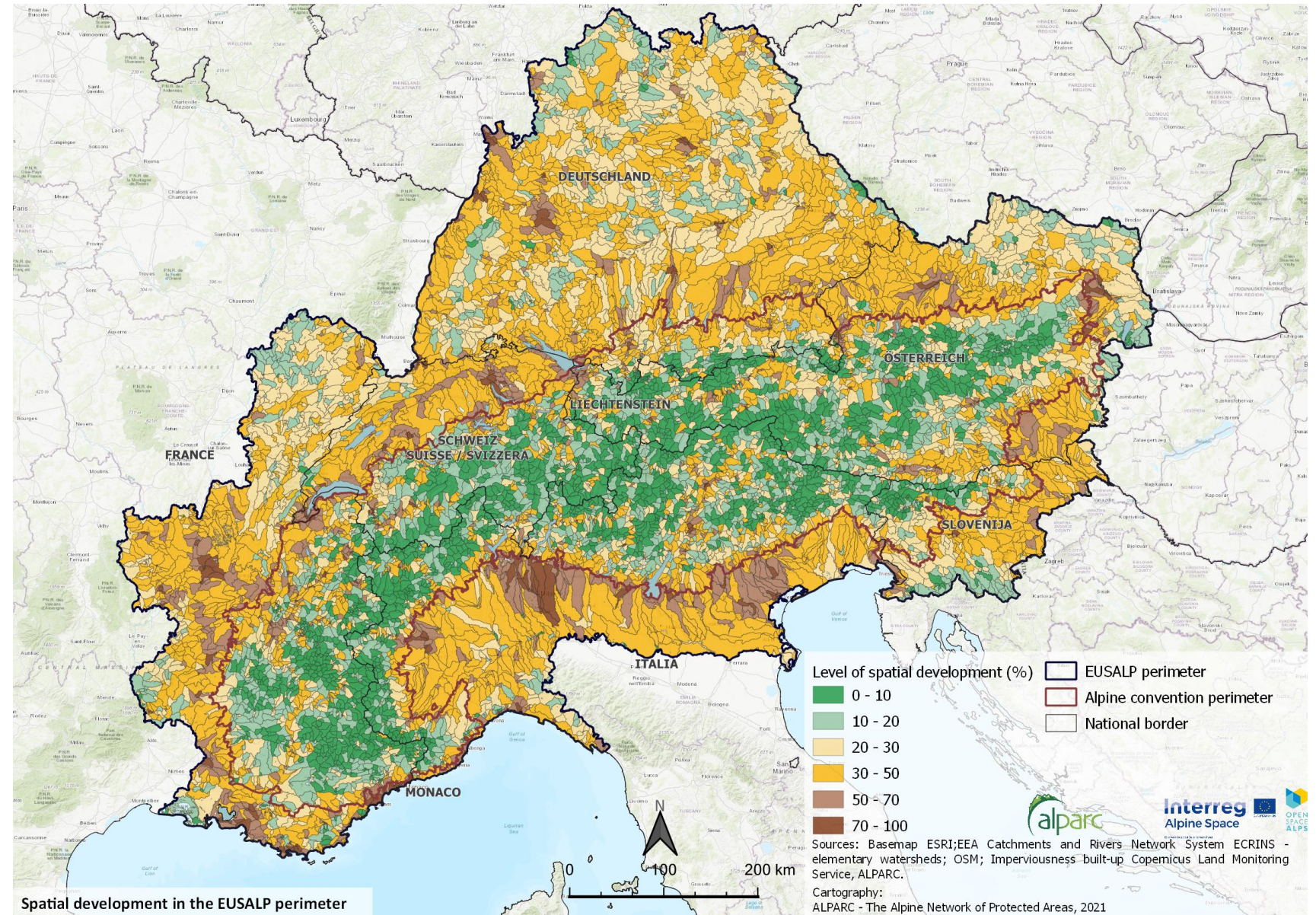




Spatial development

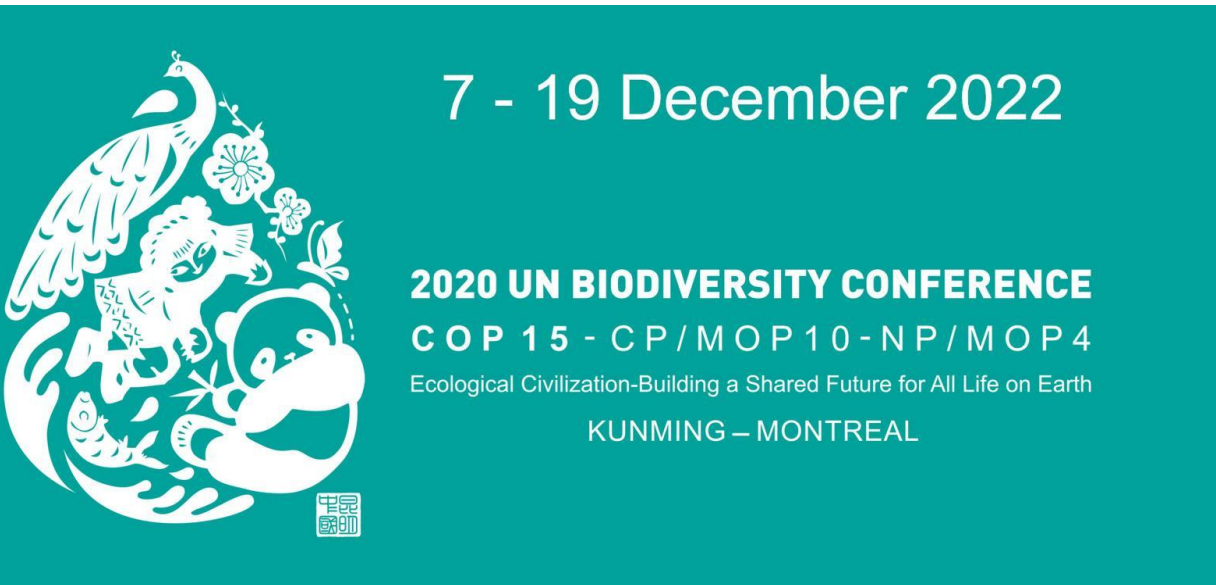
Approach: The level of spatial development is defined by the coverage of 11 infrastructure components inside a watershed

- Buildings
- Highways
- Secondary roads
- Residential
- Railways
- Ski lift facilities
- Airports
- Artificial recreational facilities
- Power lines
- Raw material extraction
- Landfills / dumps
- Power plants





Alpine Parks 2030 – Reaction on decision COP15



Goal of the COP 15

Effective conservation 30% of the land (and sea)

Alpine Parks 2030 identifies the current situation of the network of alpine protected areas, proposes improvements of the network and stronger cooperation between protected areas.

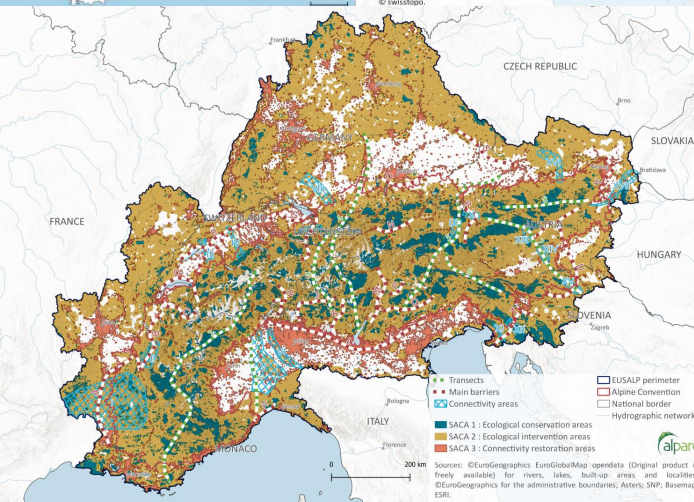
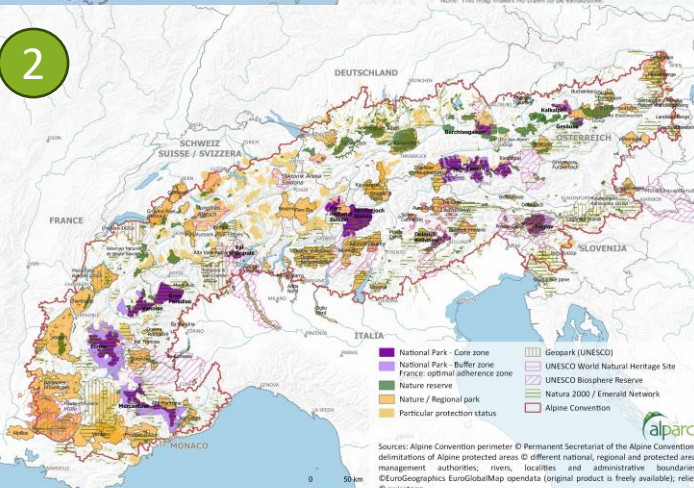
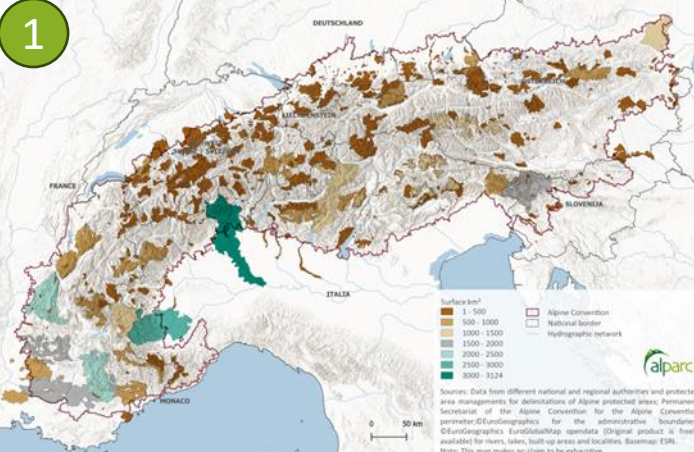
Strategic
implementation of
ecological connectivity



More coherent and
better coordinated
spatial planning within
the intensively used
Alpine spaces



Increased **cooperation**
between Alpine
protected areas – both
on the thematic and the
territorial level



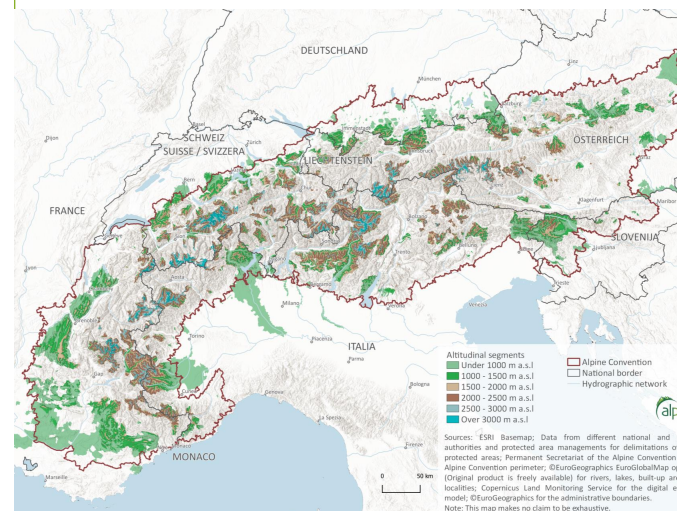
1
Surface +

2
Protection Level

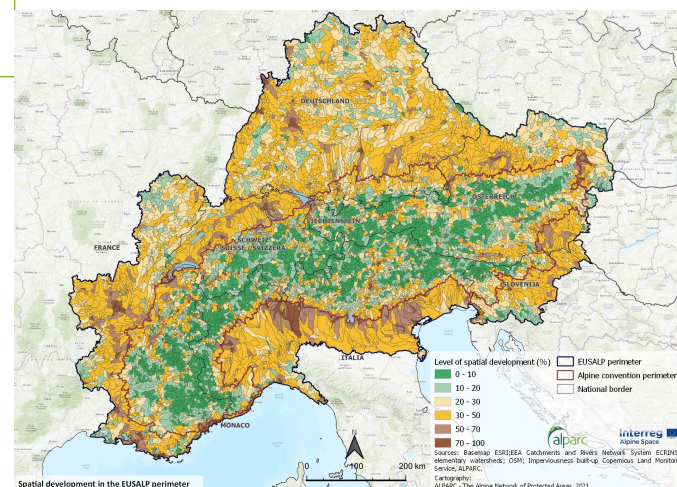
Protection scope

Connectivity potential

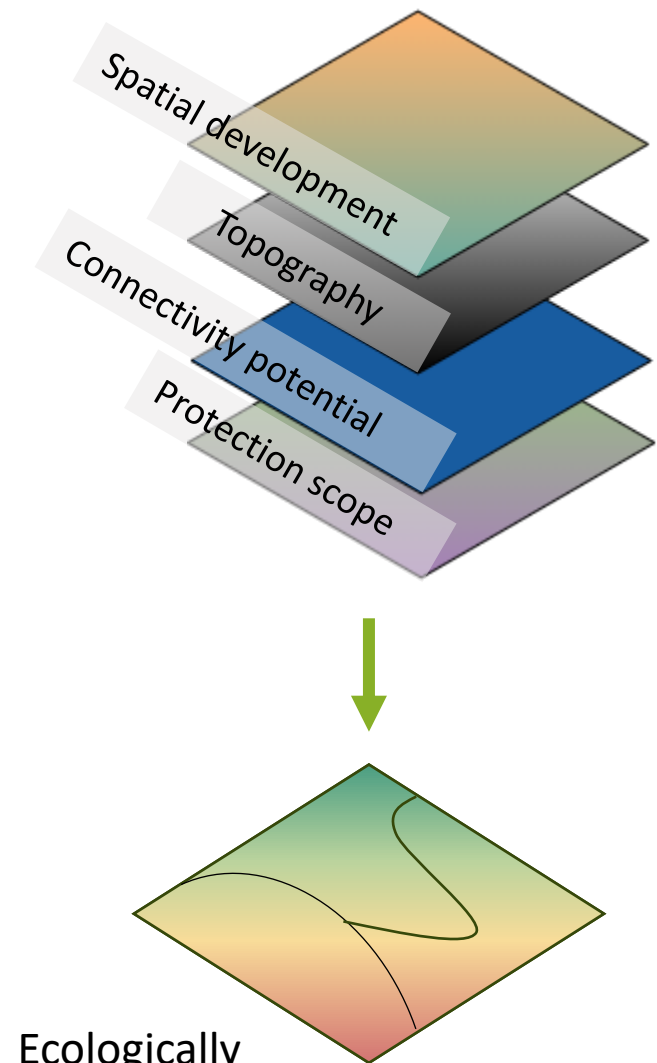
Topography



Spatial development



Ecologically Favourable Areas - EFA

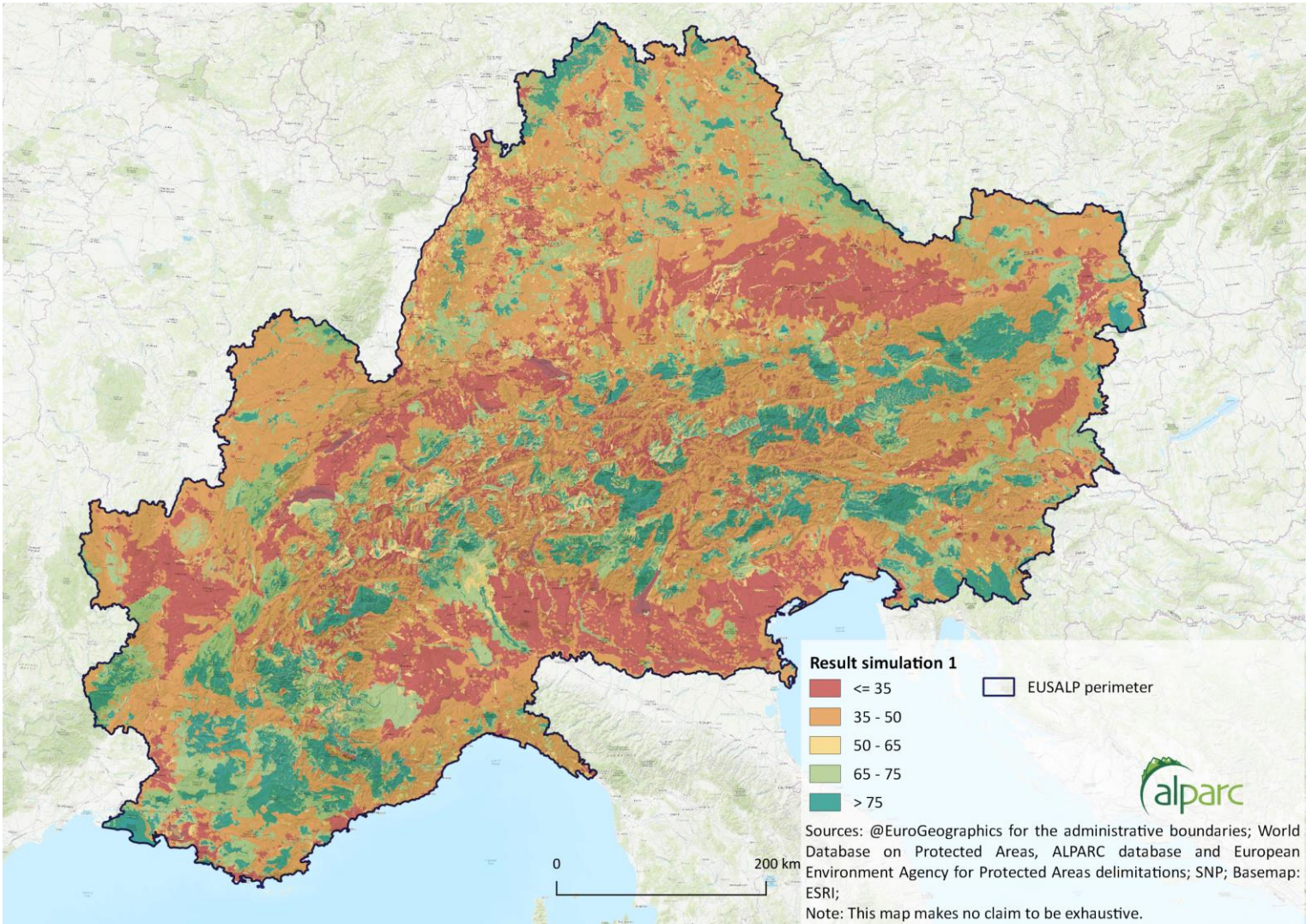




Step1 - Ecologically Favourable Areas (EFA)

The Ecological Favorable Areas (EFA) are the result of a multicriteria analysis that aggregates the performance regarding the defined criteria.

EFA	EFA surface km ²	% Distribution of EFA within the Alpine Convention surface
<=35	21,617	11.3%
35-50	85,316	44.7%
50-65	10,830	5.7%
65-75	35,551	18.6%
>75	37,675	19.7%





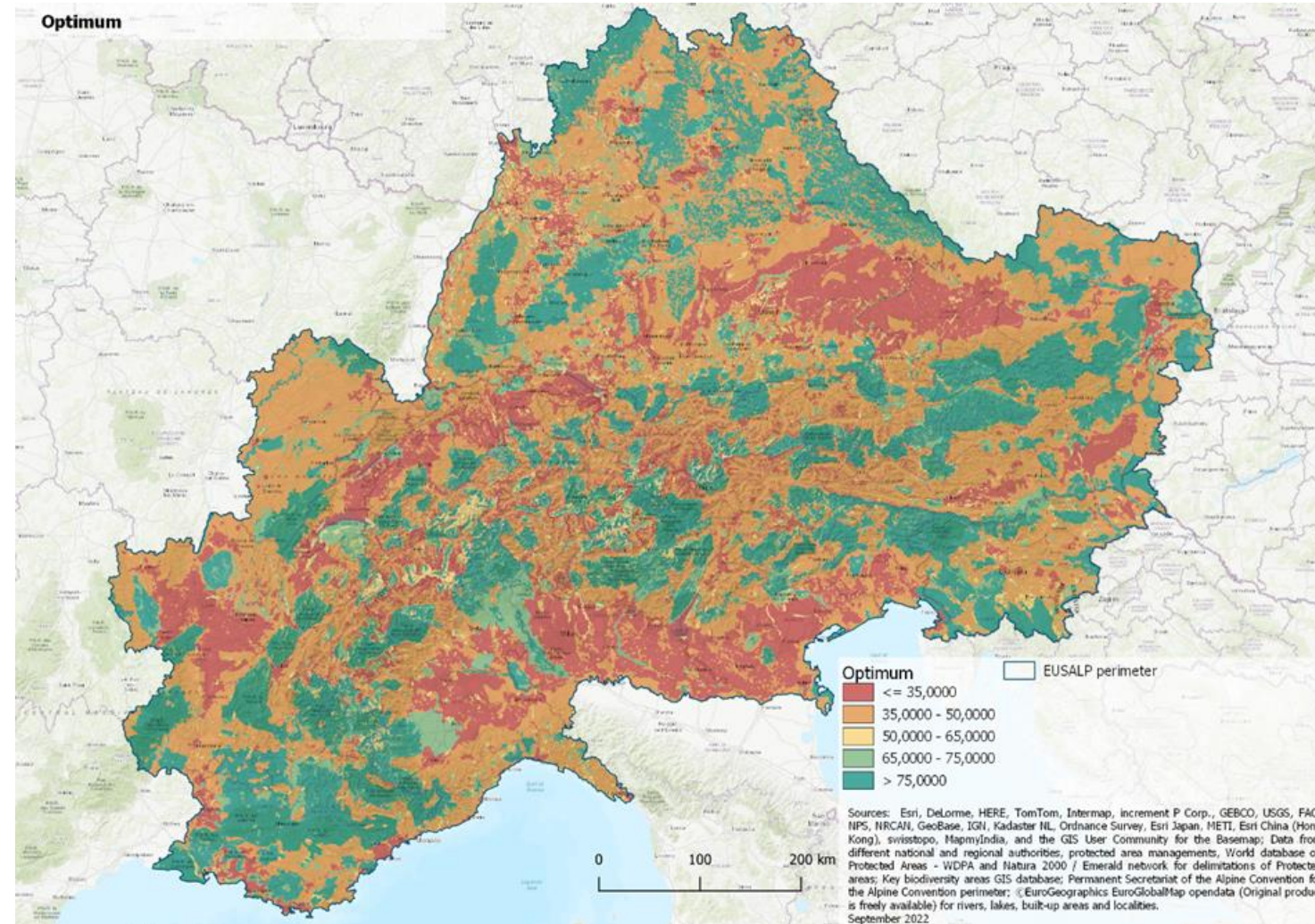
Step 2 – which improvements to achieve 30% of potential areas to protect by effective measures?

Major improvements on protection scope and connectivity (optimum scenario):

- Surface extension of all strong protected areas by 25%
- Providing a protection status comparable to IUCN cat III or IV to all KBA's
- Improving ecological connectivity by linking all SACA1 areas (=creating larger non fragmented areas)
- Providing a protection status to all weak protected areas comparable to IUCN cat. III or IV.

Value	% Distribution among AC surface
<=35	9,9%
35-50	39,3%
50-65	5,9%
65-75	9,3%
>75	35.6%

Scenario not realistic!!



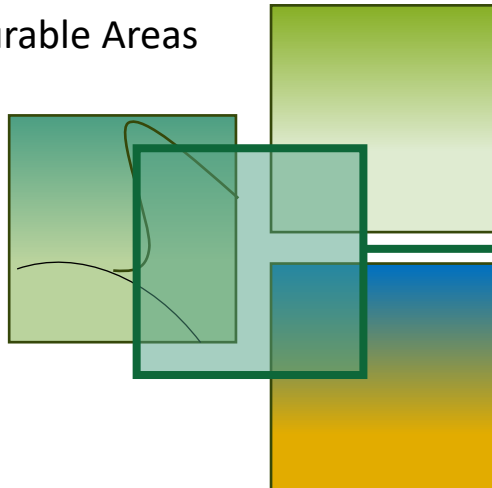


Step 3 - Potential Areas for Biodiversity Protection by an Alpine Spatial Planning Model

The analysis based on the Ecologically Favourable Areas intends to identify all relevant components- effectively conserved, ecologically representative, and well-connected areas reflecting the vision of the COP 15 decision.

Ecologically Favourable Areas

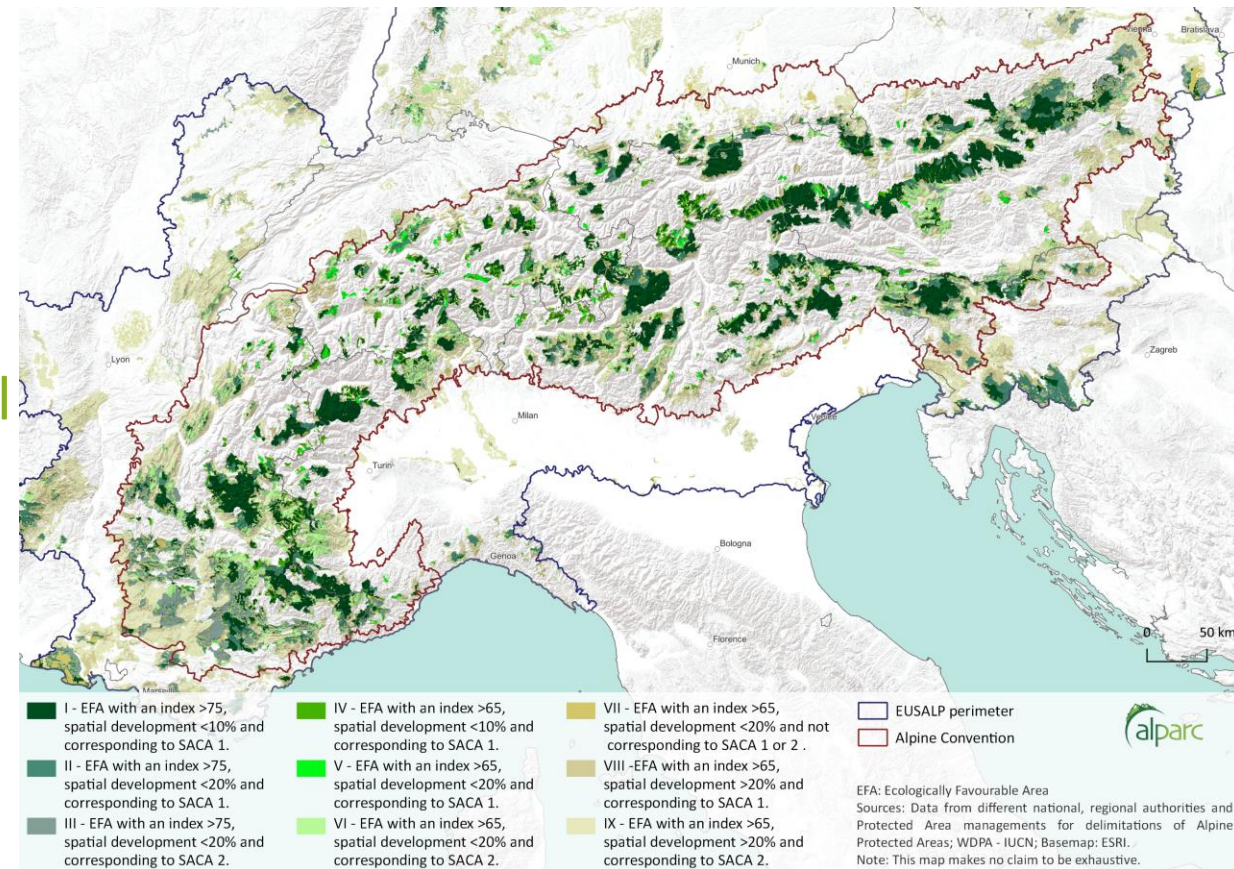
– EFA
>65 and >75



Spatial development
<20

Strategic Alpine Connectivity
Areas – SACA

- SACA 1
- SACA 2



9 Categories of potential areas for biodiversity protection
covering **37,72%** (72,043 km²) of the Alpine Convention surface.



Potential Areas for Biodiversity Protection

Biodiversity Value and Strong Protection

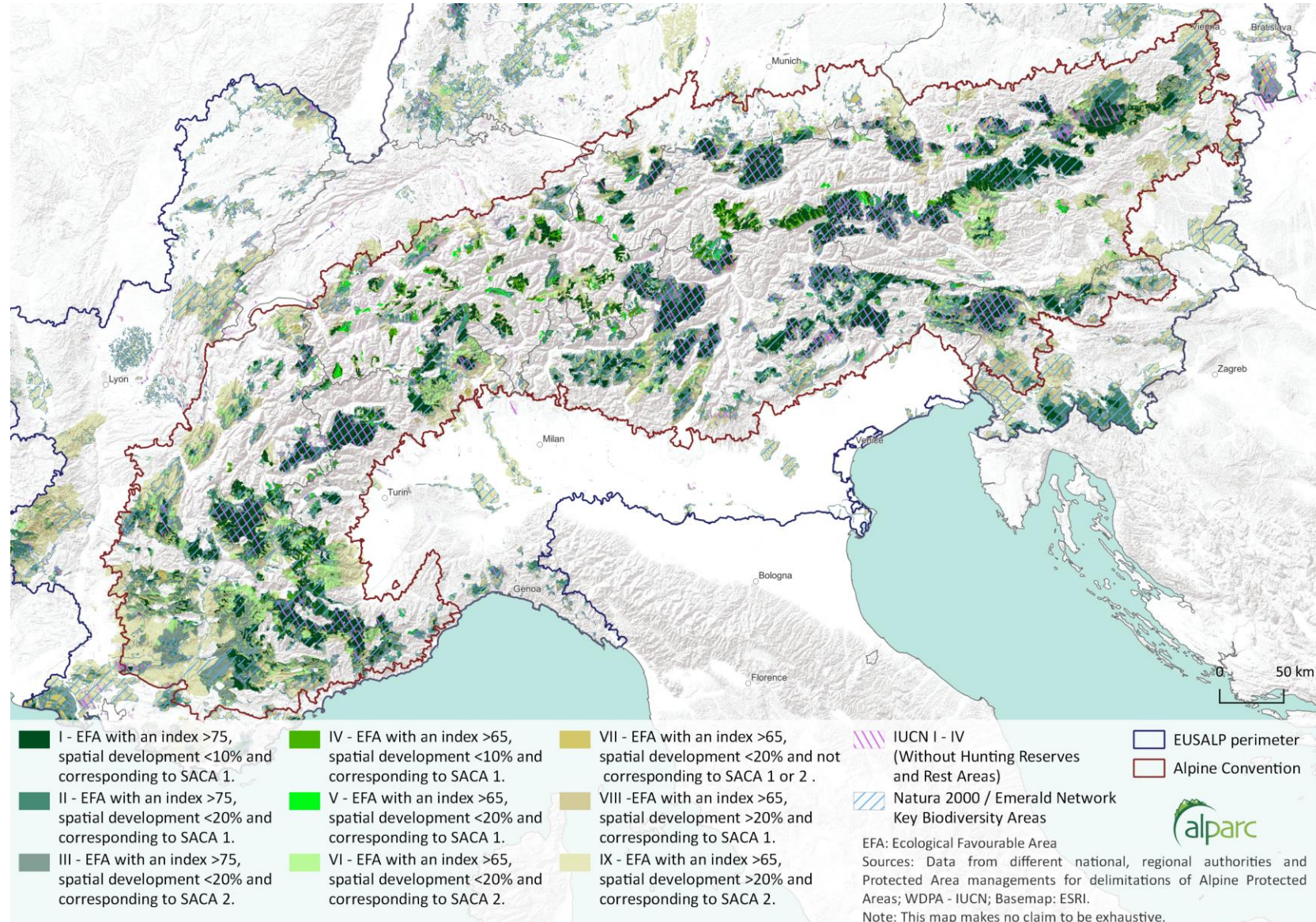
- 14,609 km²
- (7.3% distribution within the AC)

Only Biodiversity Value without Strong Protection

- 24,119 km²
- (12.6% distribution within the AC)

Only Strong Protection without Biodiversity Value

- 1,151 km²
- (0.6% distribution within the AC)





Categories of Potential Planning Areas for Biodiversity Protection

The Potential areas were classified into three groups taking into account their suitability for improvement accordingly to:

- Protection status
- Surface

Cat.	Description	Surface km ²	Distribution within the AC surface ¹	STATUS EVALUATION (RATING)	Biodiversity Value			Strong protection		
					Surface km ²	Distribution within category (%)	Distribution within AC surface	Surface km ²	Distribution within category (%)	Distribution within AC surface
I	EFA > 75 / OSA < 10% / SACA1	18,773	9.83%	AAA	14,998	79.89%	7.85%	10,028	53.42%	5.25%
II	EFA > 75 / OSA < 20% / SACA1	6,642	3.48%	ABA	4,710	70.91%	2.47%	1,888	28.43%	0.99%
III	EFA > 75 / OSA < 20% / SACA 2	7,913	4.14%	ABB	2,555	32.29%	1.34%	576	7.28%	0.30%
IV	EFA > 65/ OSA < 10% / SACA 1	4,792	2.51%	BAA	2,913	60.79%	1.53%	608	12.68%	0.32%
V	EFA > 65 / OSA < 20% / SACA 1	1,936	1.01%	BBA	1,165	60.18%	0.61%	329	17.01%	0.17%
VI	EFA > 65 / OSA < 20% / SACA 2	7,649	4.00%	BBB	2,331	30.47%	1.22%	269	3.52%	0.14%
VII	EFA > 65 / OSA < 20% / NO SACA 1 -2	3,087	1.62%	BBC	1,600	51.83%	0.84%	372	12.05%	0.19%
VIII	EFA > 65 / OSA > 20% / SACA 1	4,410	2.31%	BCA	3,162	71.70%	1.66%	1,051	23.84%	0.55%
IX	EFA > 65 / OSA > 20% / SACA 2	16,846	8.82%	BCB	5,295	31.43%	2.77%	638	3.79%	0.33%
TOTAL		72,048	37.72%		38,729	53.75%	20.28%	15,760	21.87%	8.25%

¹ Alpine Convention Perimeter 190,989 km² (GIS area).

² These areas and especially the category I have already an important surface protected but still a high surface potential for more efficient nature protection (between 47 – 76% of the overall surface of those categories)



EFA with high biodiversity value² and important surface (km²) for improvement of protection status

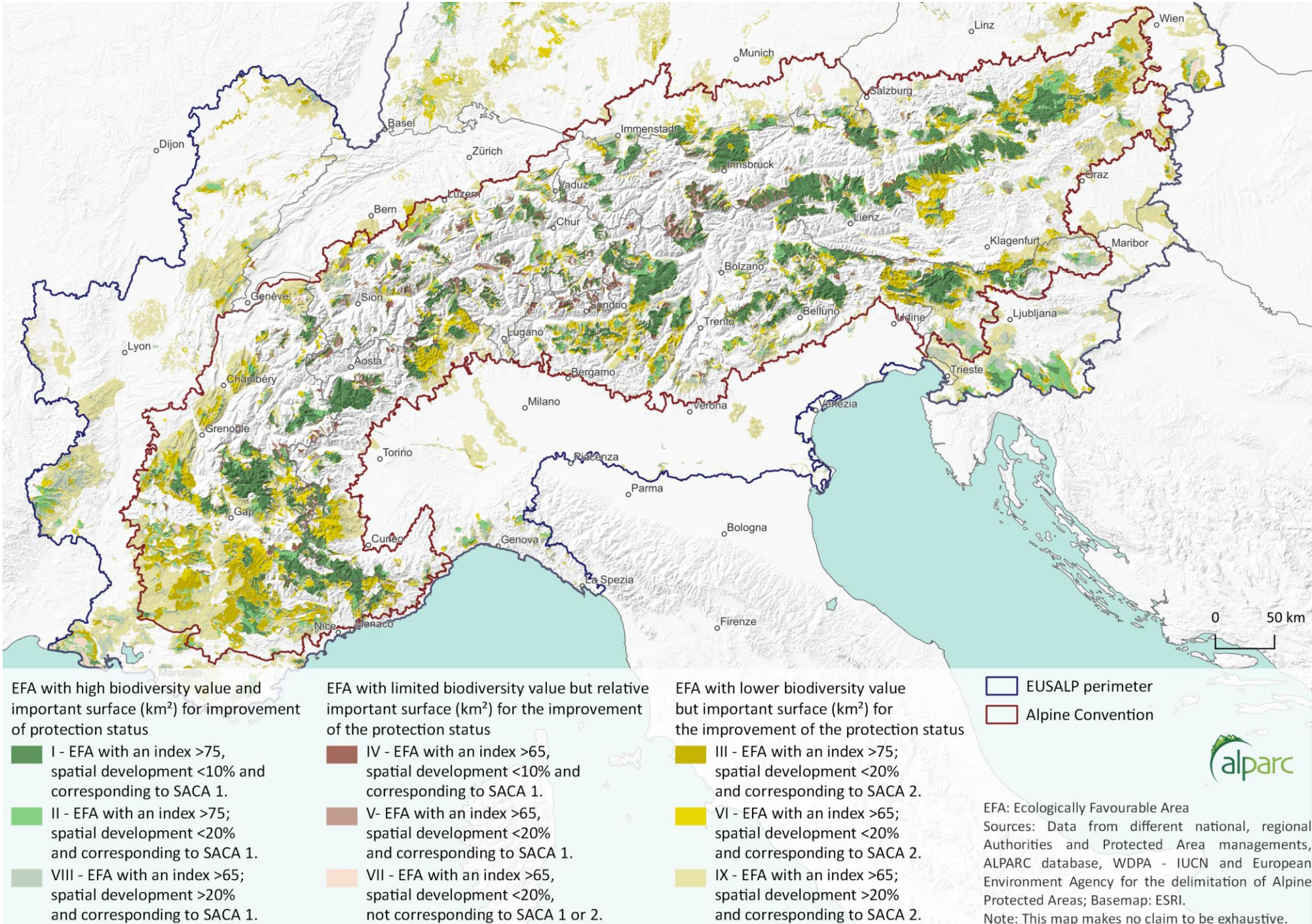


EFA with limited biodiversity value but relative important surface (km²) for the improvement of the protection status



EFA with lower biodiversity value but important surface (km²) for the improvement of the protection status

Potential Planning Areas for Biodiversity Protection



And the story of alpine ecological
connectivity goes on...

www.alparc.org