

# ECOLOGICAL CONNECTIVITY IN AND AROUND THE ALPS: MAIN BARRIERS

## The Alps: Surrounded by an Important Infrastructure and Activity Belt Isolating Alpine Nature and Species

Some forms of land use and their intensity have negative effects on ecological connectivity. This map highlights important barriers for the Alps concerning ecological connectivity due to high impact land use, important infrastructure and human activities. The barriers have been identified based on an exhaustive analysis of data and on expert knowledge.

The most important barriers are located around the Alps mainly in the transition zone between the Alps and the EUSALP territory (Alpine Macro-Region). They are characterized by an important concentration of urban and economic infrastructure generating high transport end energy flows. These peri-Alpine barriers are situated in upper Italy (Po flat plane); in the southern French Rhône valley up to lake Geneva by following some intensively used pre-Alpine valleys (e.g. Isère valley – “Gresivaudan”); the Swiss middle land between the Jura and the Alps; the urban belt in the South of Munich (D) with a very high transport flow and a large discontinuous sector of agglomerations, infrastructure and intensive traffic between Vienna (A) in the North and Maribor (SI) in the South continued by a barrier of transport infrastructure between Ljubljana (SI) and Trieste (I).

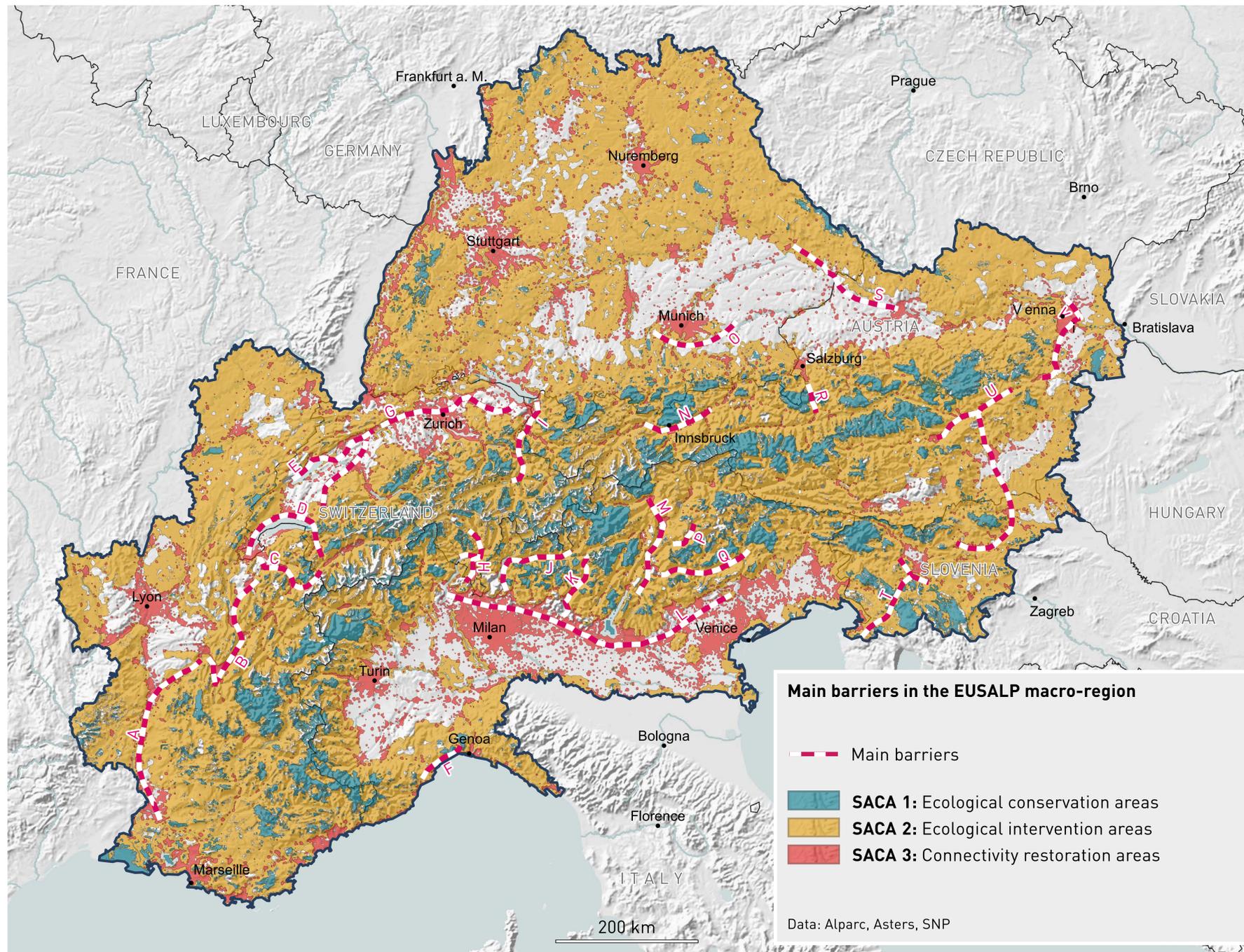
A series of inner-Alpine valleys have been identified as inner Alpine barriers due to a combination of different factors such as high traffic of persons and merchandises, important settlements linking all economic activities, intensive agriculture, canalization of riverine systems, monocultures, and heavy infrastructure such as highways and railways protected by fences and energy lines concentrated in some important valley bottoms. Such inner-Alpine valleys include: the Isère valley between Grenoble and Albertville (F); parts of the Arve Valley (F) between Annemasse and Sallanches; the lower Rhône Valley (Valais, CH); the Rhine Valley between Chur and Bregenz (CH, A); parts of the Inn valley (A); the area around the Como lake, parts of the Adige, Adda, Camonica, Brenta and Fiemme valleys (I); the northern Salzach valley and parts of the Mürtzal (A).

Most of the barriers still have hybrid areas allowing some species migration. It is essential that those areas are conserved to avoid isolating even more Alpine nature and species. Those areas have been identified as “Super Connectivity areas”. Adapted measures need to be taken in these areas.

**SACA1: Ecological conservation areas**  
Areas where ecological connectivity works quite well  
Recommendation: conservation of the status quo

**SACA2: Ecological intervention areas**  
Important links between SACA1s; connectivity is (partly) working  
Recommendation: improvement / restoration measurements

**SACA3: Connectivity restoration areas**  
Important barriers between SACA1s  
Recommendation: remove barriers/mitigate negative impacts



**Main barriers in the EUSALP macro-region**

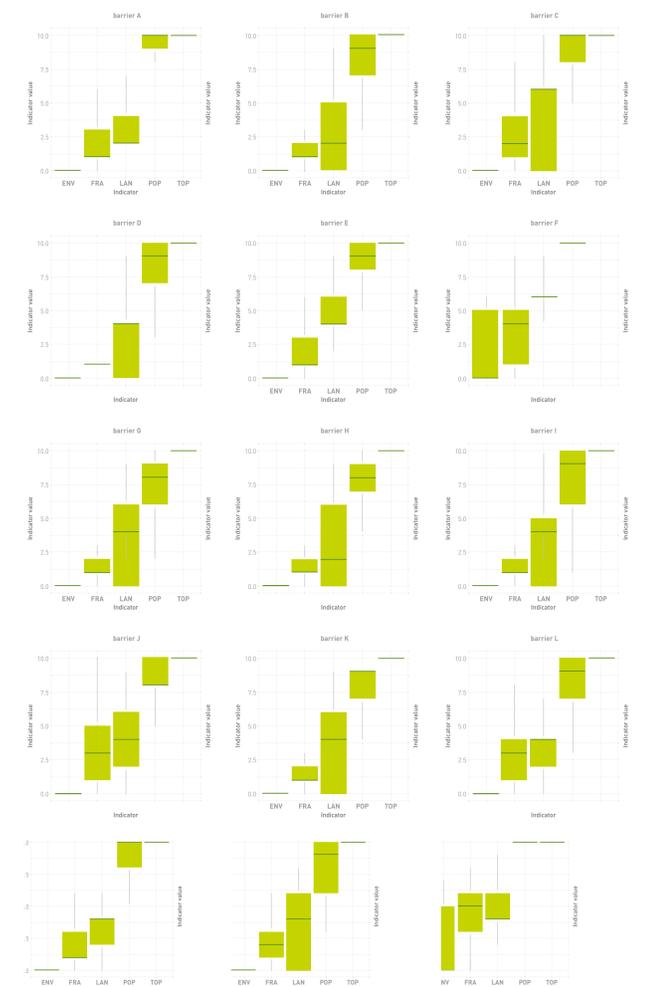
- Main barriers
- SACA 1: Ecological conservation areas
- SACA 2: Ecological intervention areas
- SACA 3: Connectivity restoration areas

Data: Alparc, Asters, SNP

Each boxplot shows the distribution of the CSI values of the corresponding region. The continuum suitability indices (CSI) are defined as a set of spatially explicit indicators that determine ecological connectivity. They are:

- Environmental protection (ENV)
- Fragmentation by transportation infrastructure (FRA)
- Land use (LAN)
- Population pressure (POP)
- Altitude and topography (TOP)

The CSI were defined based on the collation of scientific literature and the results of expert workshops. The individual indicators complement each other by not including different influencing factors more than once. Each indicator is described in a spatially explicit manner using a GIS. The spatial analysis results are then valued from 0 to 10 depending on the suitability as an ecological continuum. In the valuation process, 0 means poor suitability as an ecological continuum and 10 indicates high suitability. For the regions presented, identification of aspects with potential for improvement can be inferred.



## Major barriers

A Rhône valley	E Jura Alps	Q Trento-Belluno transit corridor
B French Northern pre-alpine valleys	F Western Sea Alps	R Tauern Highway north-south transit axis
C Arve valley	G Northern Swiss Plateau	S Danube valley transit axis
D Lake Geneva region	H Lago di Como agglomeration	T Central Slovenian transit axis
I Rhine valley agglomeration	M Adige valley	U Leoben - Grazer Becken - Klagenfurt - Slovenian Border
J Como-Adda agglomeration	N Inn valley	V Alps - Carpathians traffic corridors
K Val Camonica	O Southern Munich Area	
L Central southern Alps - Upper Italy	P Fiemme valley	

