

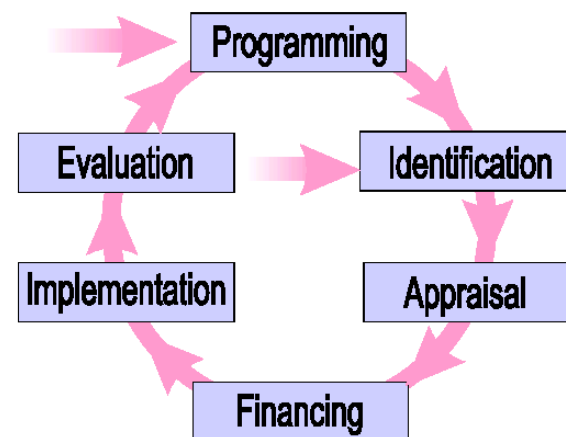


# Piano d'azione

Alleanza per la biodiversità, studio di fattibilità



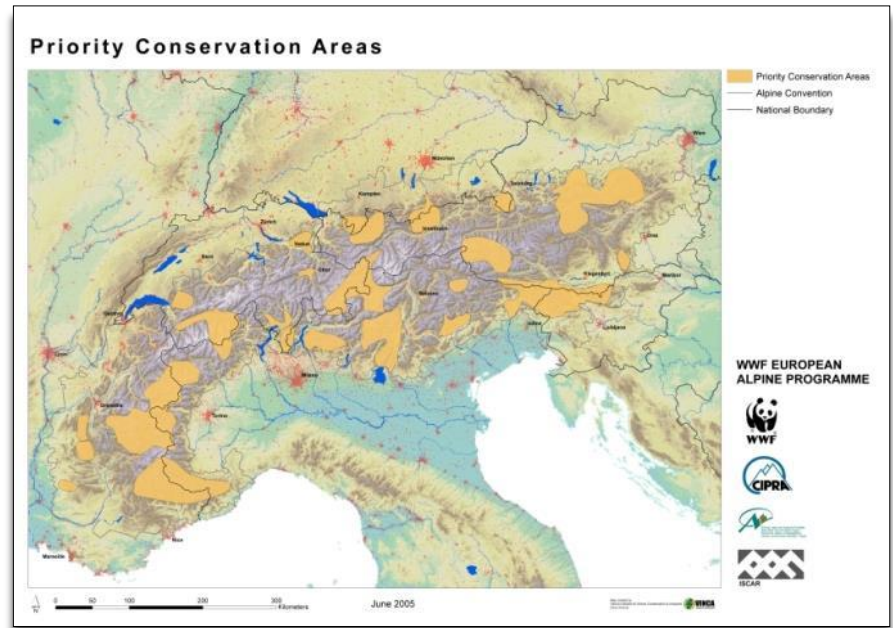
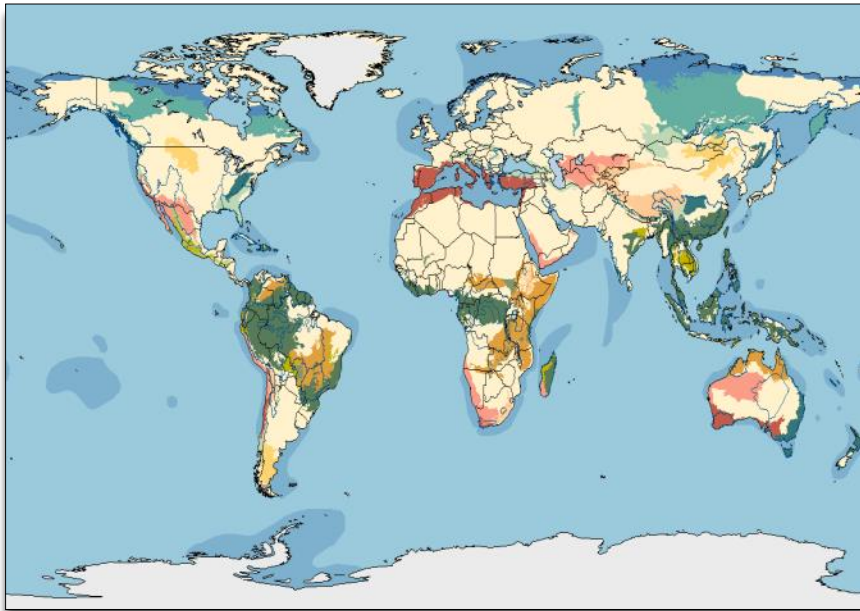
## Project Cycle Management



## Fase di Identificazione



- 24 aree prioritarie
- Un progetto pilota per l' ecoregione
- Analisi della biodiversità
- Elaborazione di piano d'azione, condivisione azioni e interventi



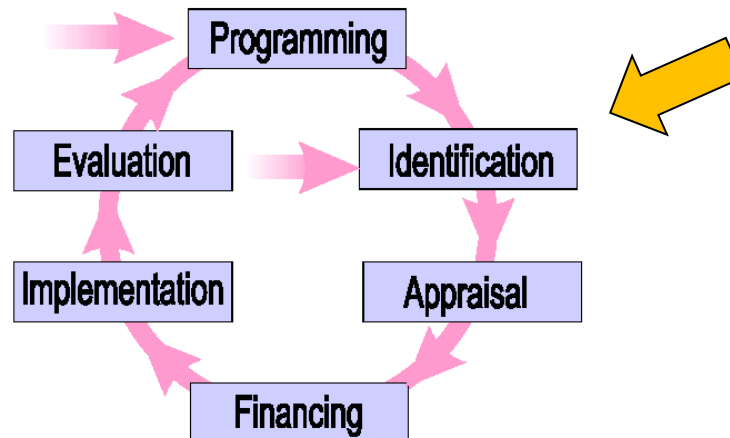


## *ESIGENZA DI UN DUPLICE APPROCCIO SU LATO ITALIANO E SVIZZERO*

---

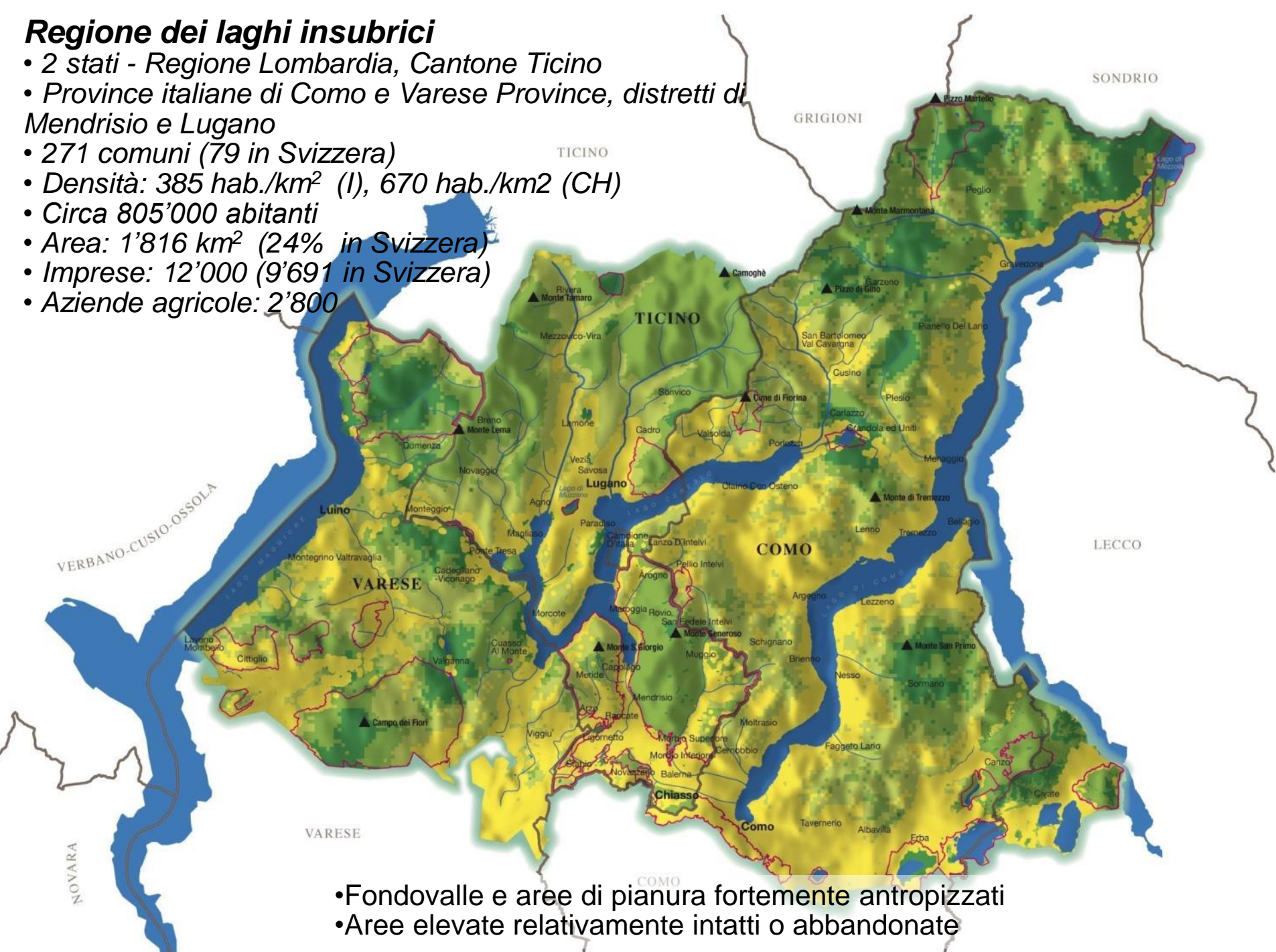
- Normativo
- Scientifico
- amministrativo

### **Project Cycle Management**



## Regione dei laghi insubrici

- 2 stati - Regione Lombardia, Cantone Ticino
- Province italiane di Como e Varese Province, distretti di Mendrisio e Lugano
- 271 comuni (79 in Svizzera)
- Densità: 385 hab./km<sup>2</sup> (I), 670 hab./km<sup>2</sup> (CH)
- Circa 805'000 abitanti
- Area: 1'816 km<sup>2</sup> (24% in Svizzera)
- Imprese: 12'000 (9'691 in Svizzera)
- Aziende agricole: 2'800



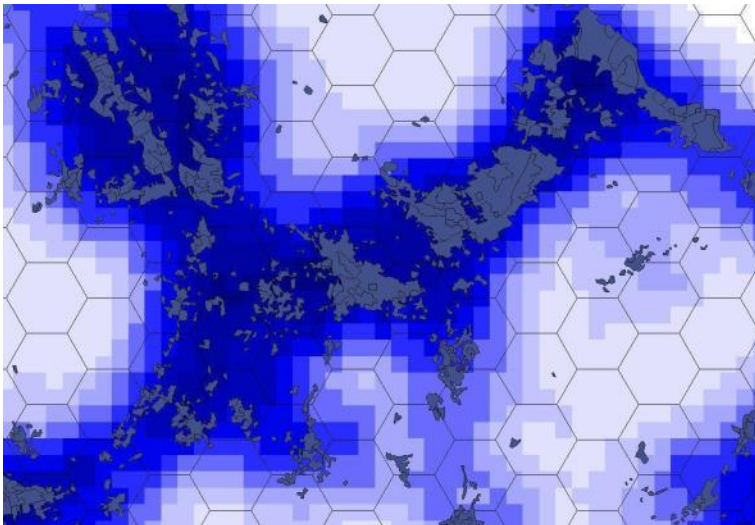
- Fondovalle e aree di pianura fortemente antropizzati
- Aree elevate relativamente intatti o abbandonate



## **Analisi della biodiversità: Un duplice approccio di indagine**

### **Italia: un modello ecologico predittivo**

Modello statistico predittivo atto ad identificare gli hotspot di ricchezza specifica potenziale




### **Svizzera: Approccio su base esperta**

Valorizzazione dei database cantonali, necessità minore di nuove analisi



# A quantitative approach to biodiversity analysis: an application to terrestrial vertebrates in the Alpine Ecoregion, H1 Priority Conservation Area



**Guido TRIVELLINI\***,  
**Damiano G. PREATONI\*\***,  
**Marco CANTINI#**,  
**Andrea AGAPITO LUDOVICI\***,  
**Guido TOSI\*\***

\* Programma Alpi, WWF Italia ONG - ONLUS

\*\*Unità di Analisi e Gestione delle Risorse Ambientali,  
Dipartimento Ambiente-Salute-Sicurezza, Università degli Studi  
dell'Insubria

#Servizio Aree Protette, Paesaggio e Reti Ecologiche, Provincia di  
Como



# Mapping diversity in H1 PCA

## Aims:

- evaluate biodiversity in H1 Area
- identify “Diversity hotspots”
- produce and test a repeatable methodology



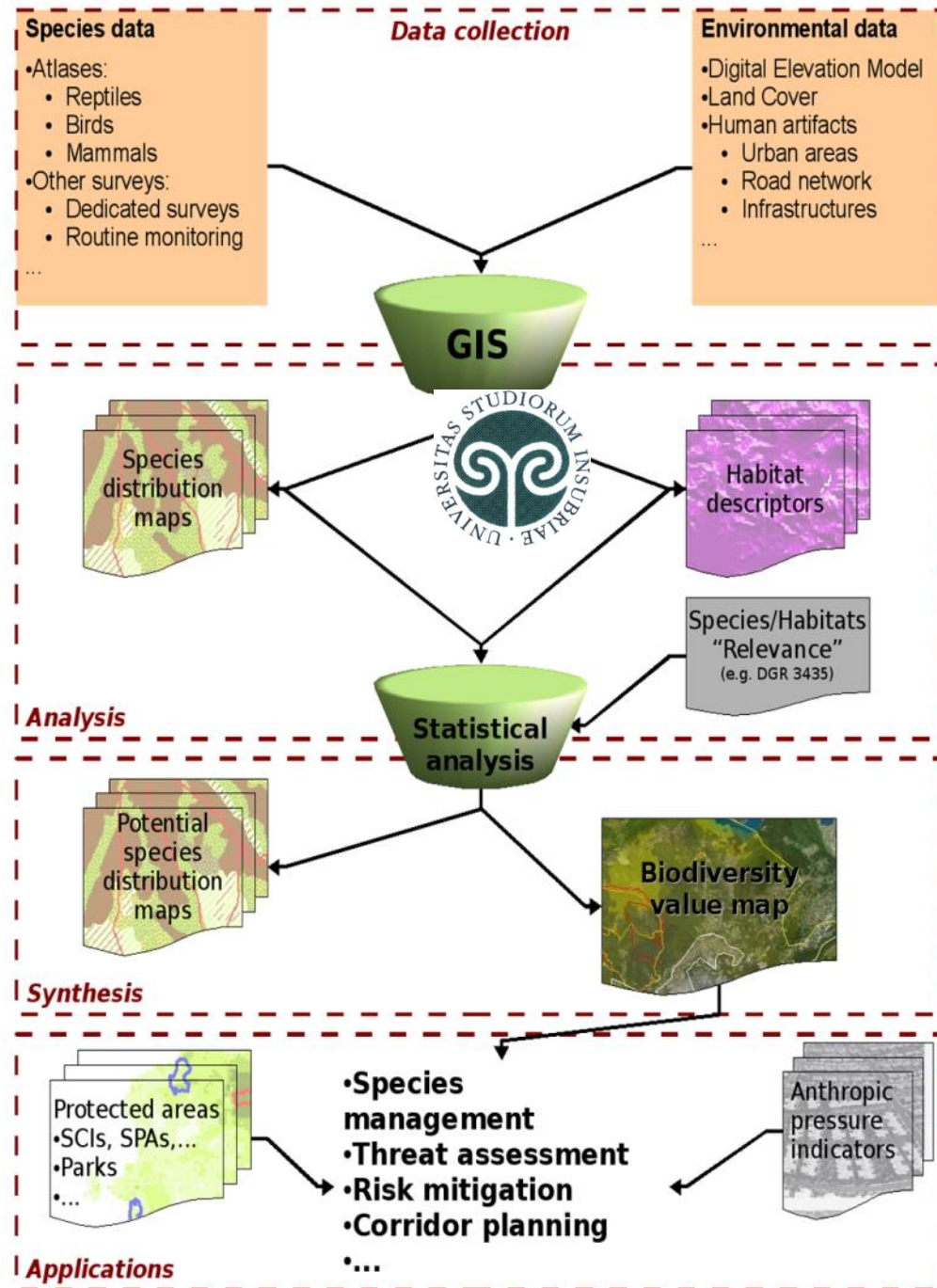
Transferrable to other geographical contexts/PCAs?





# Modelling process

- Calculate potential distribution for each species
- Score each species by its “Conservation priority”  $\rightarrow S_i$
- Calculate Vegetation type scores  $\rightarrow V_i$
- $\Sigma s_i$  = wildlife value
- $\Sigma s_i + \Sigma v_i$  = total (landscape) value







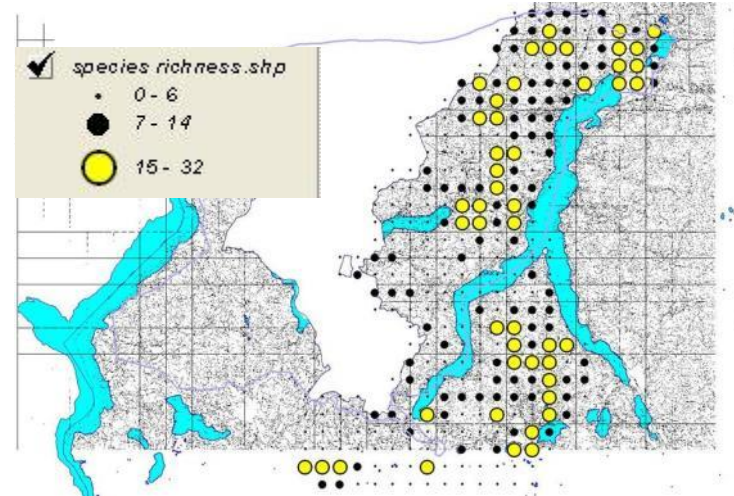
# Availability of data (Italian side)

Data available

## -Wildlife:

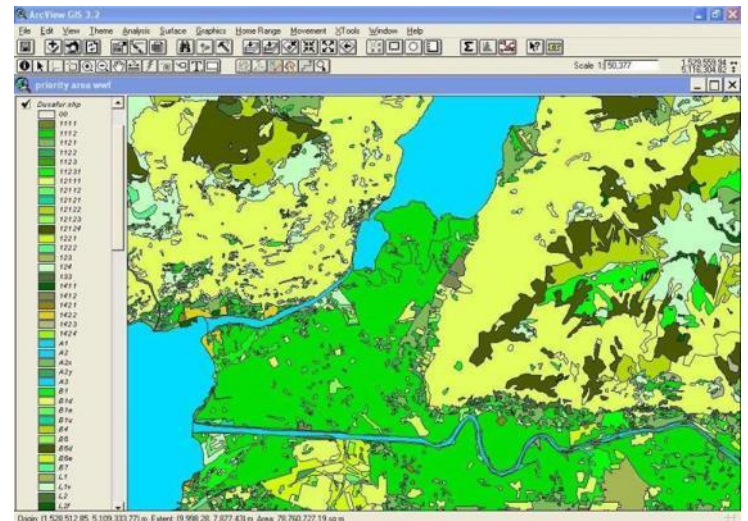
Provincial wildlife service  
database

*Species presence data (binary coded  
1/0) on 2 km square territorial units  
(grid cells)*



## -Land Use:

Regional service  
vector cartography  
(40 m precision)



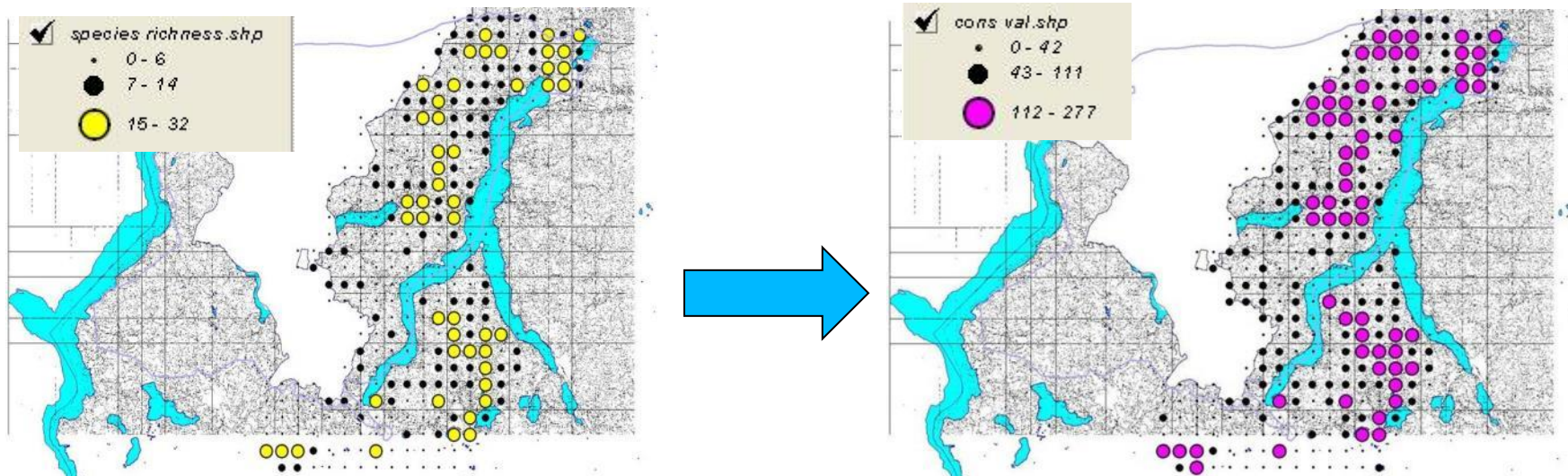


# Conservation Priority Score (legally binding)

*with partial scores based on:*

- **Rarity**
  - Corology
  - Fragility size
  - Habitat selectivity
  - conservation **Status**
- red lists (IUCN, WWF)*  
distribution size  
population trend, birth rate, population  
generalist or specialist species  
red lists (IUCN, WWF)

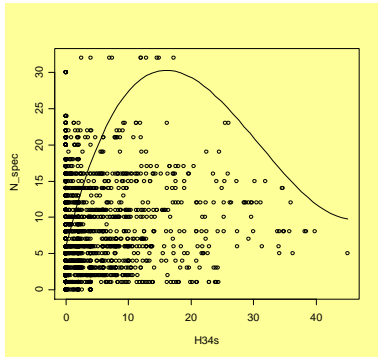
$$1 \leq \text{CPS} \leq 14\text{cal}$$



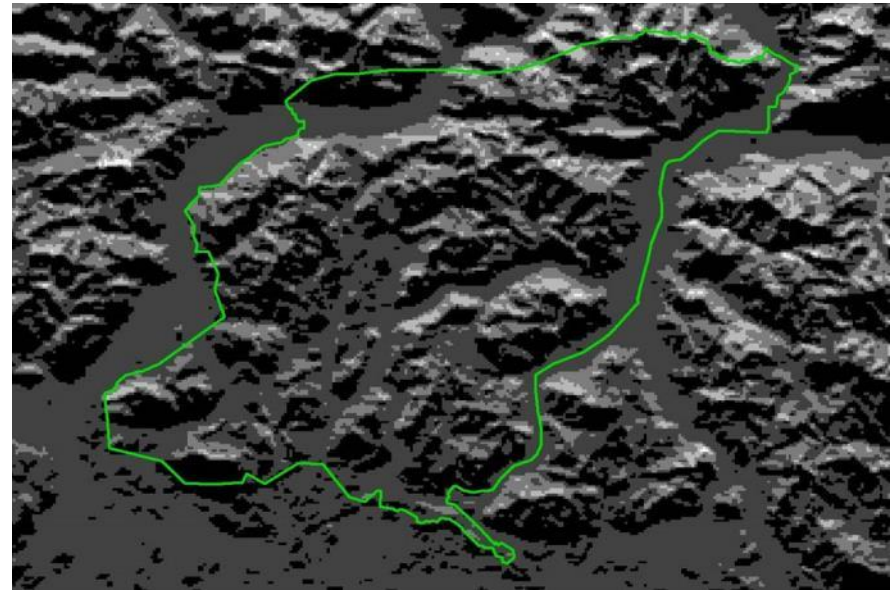


# Independent variables (I)

Functional distances from:



lakes  
rivers  
roads  
railroads  
urban areas  
power lines



Digital elevation model and indirect variables:

Elevation, slope, aspect

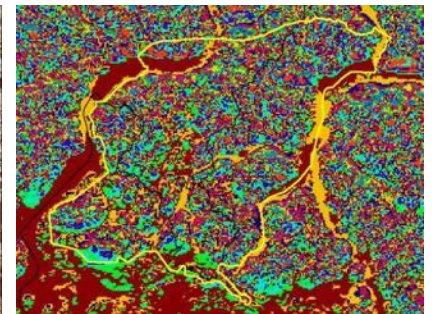
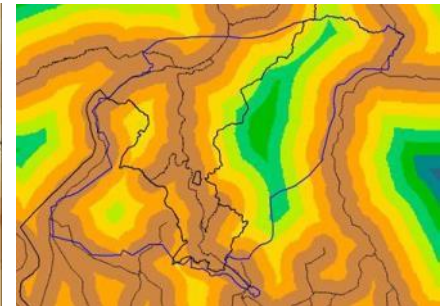
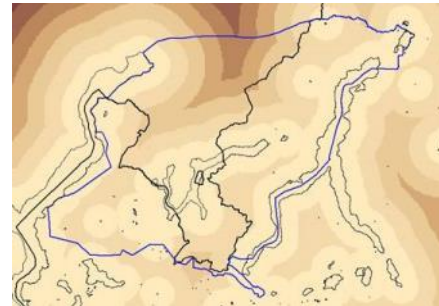
Ground roughness

Solar radiation (MJ/m<sup>2</sup>/day)

Landscape metrics (patch level):

fragmentation indexes

edge densities

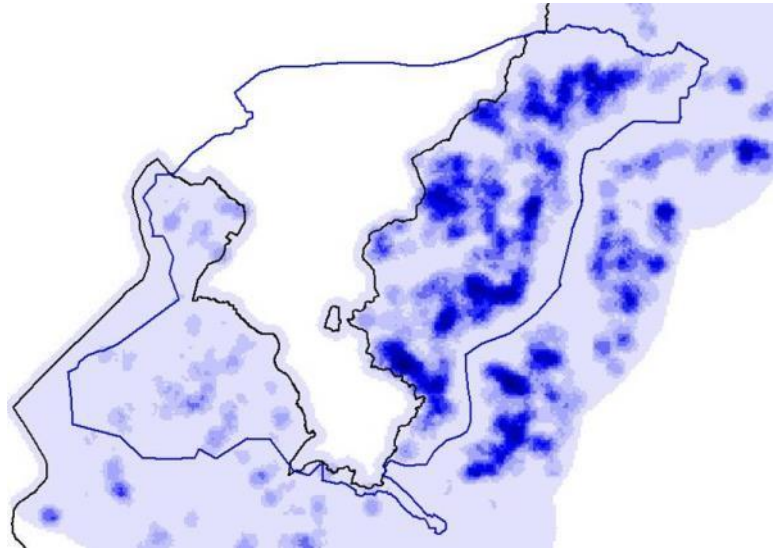
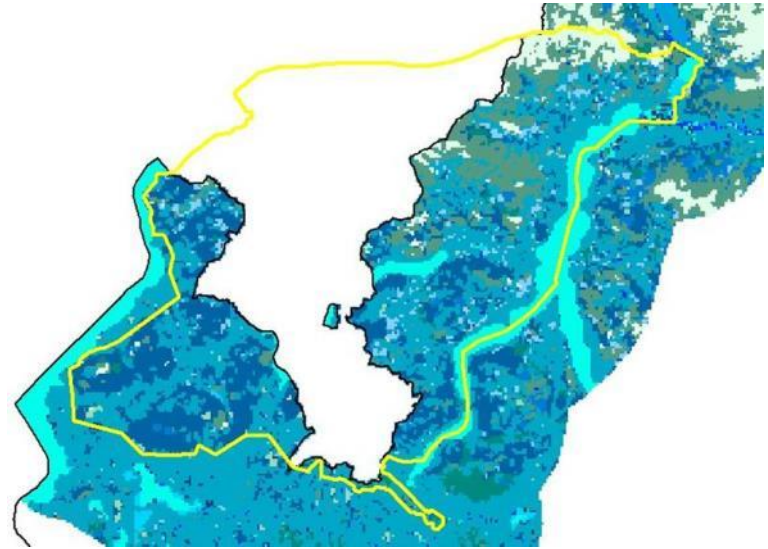




# Indipendent variables (II): habitat descriptors

## Percentage of land cover class:

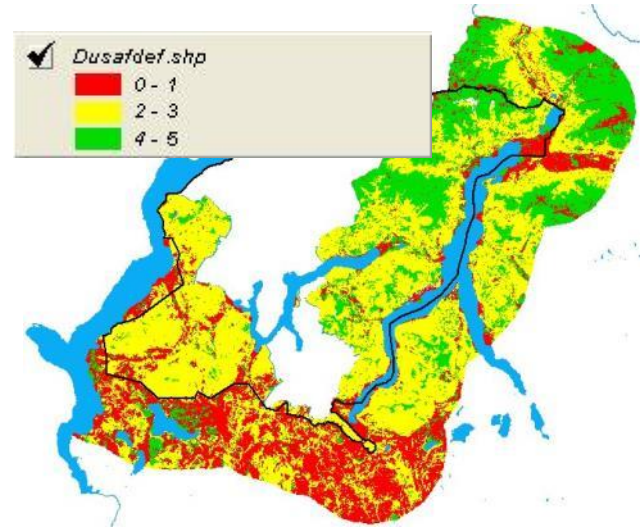
- Crop fields
- Rice crop fields
- Horticulture and complex agricultural systems
- Orchards and grapevines
- Wet pastures
- Livestock pastures
- Grasslands-crop fields mixed areas
- Coppice broadleaf forest
- Mature broadleaf forest (non-managed)
- Coniferous forest
- Mixed broadleaf and coniferous forest
- Shrubs
- Riverine vegetation
- Wetlands vegetation
- Sparse rock vegetation
- Shrubs – forest mixed areas
- Shrubs – abandoned agricultural land
- Quarries and other anthropic environments
- Dumps
- Glaciers
- Natural lakes
- Artificial lakes and canals
- Urbanised areas





# Vegetation Value

- Vegetation scored at habitat level (land use map classes)
- Factor-based, expert-based score
  - structure
  - distance from climax
  - floristic species richness
  - floristic species rarity
  - habitat peculiarity
  - wilderness level



$$V = (x_1 + x_2 + x_3 + x_4 + x_5 + x_6) / 6$$

$$1 < x_n < 5$$

*Vegetation scores were used as a thematic layer in the final overlay with wildlife database data (%)*

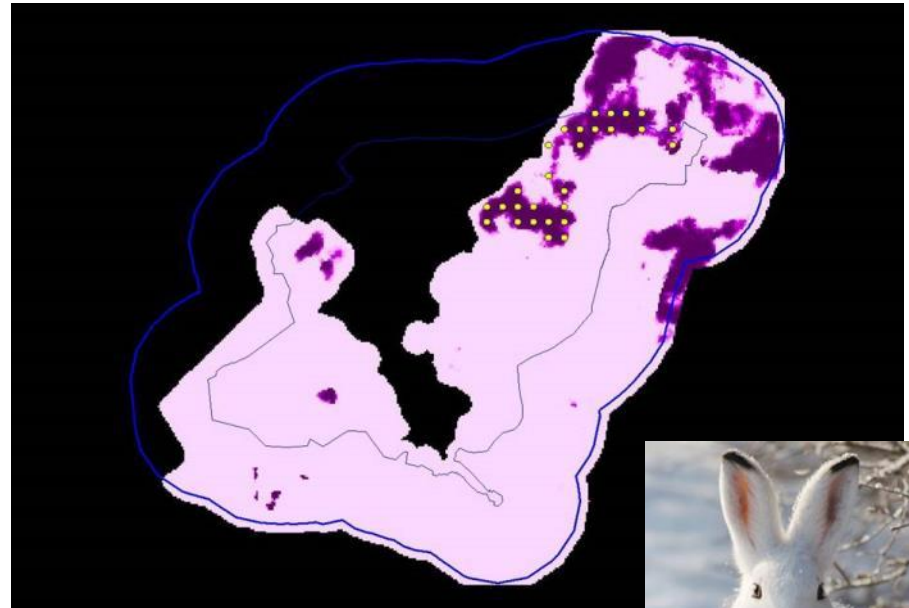


# Results

96 different single-species habitat suitability models  
(5 discarded): potential base for species-focused studies



*Alcedo atthis*  
(Kingfisher)



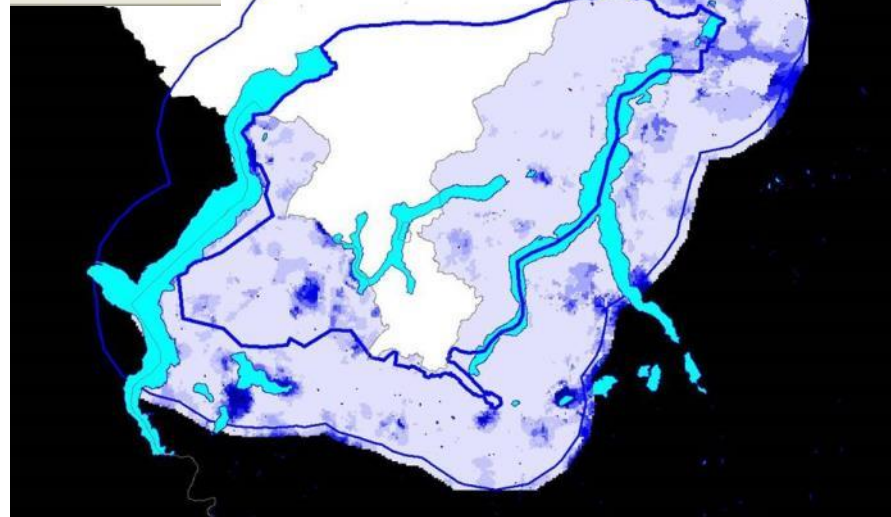
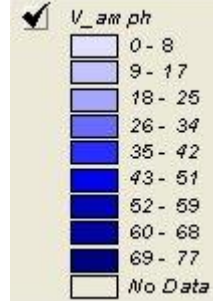
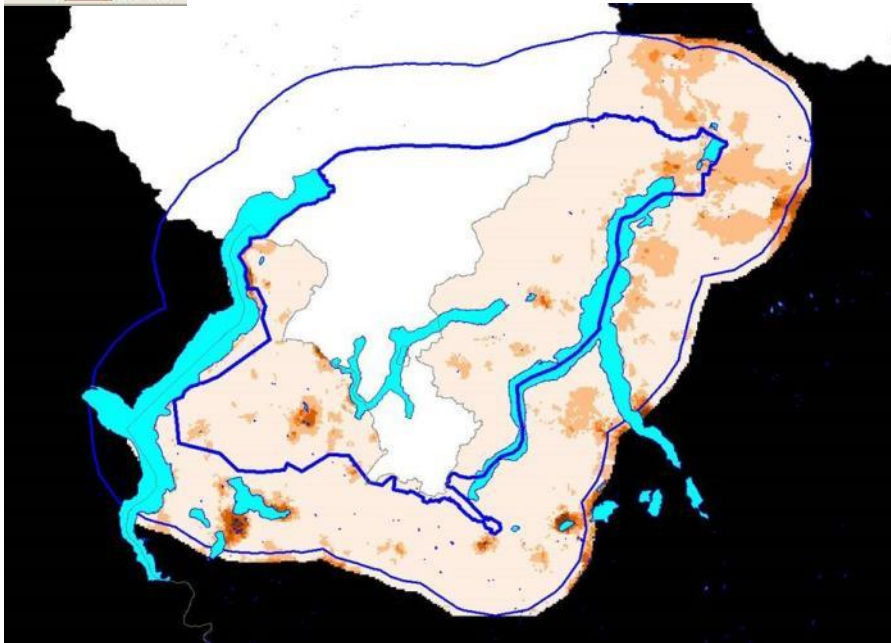
*Lepus timidus*  
(Mountain hare)





# Results

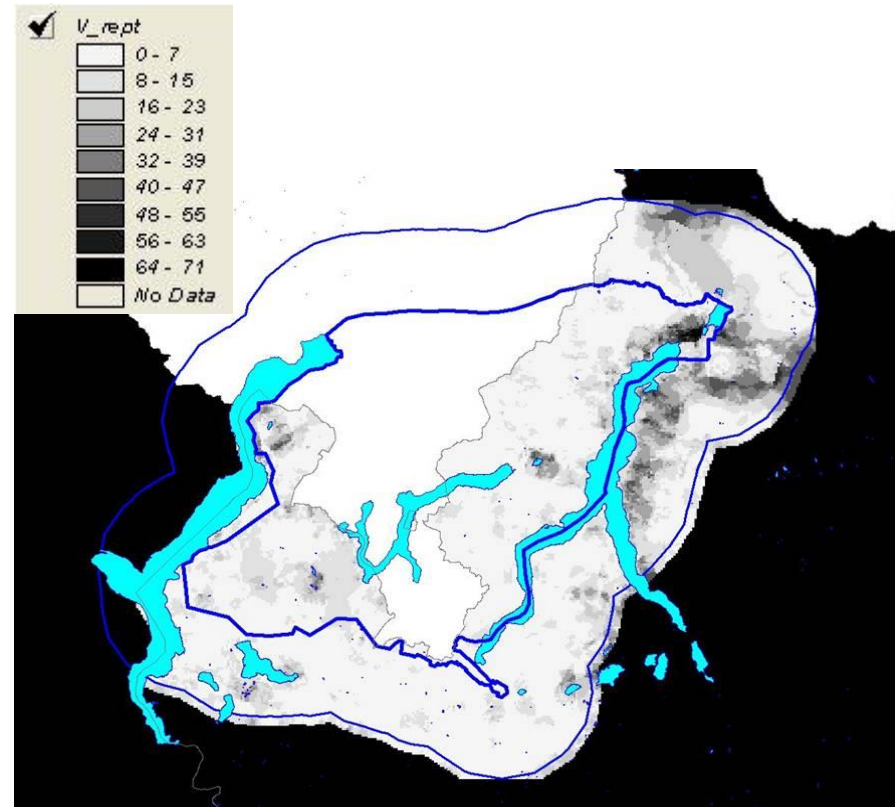
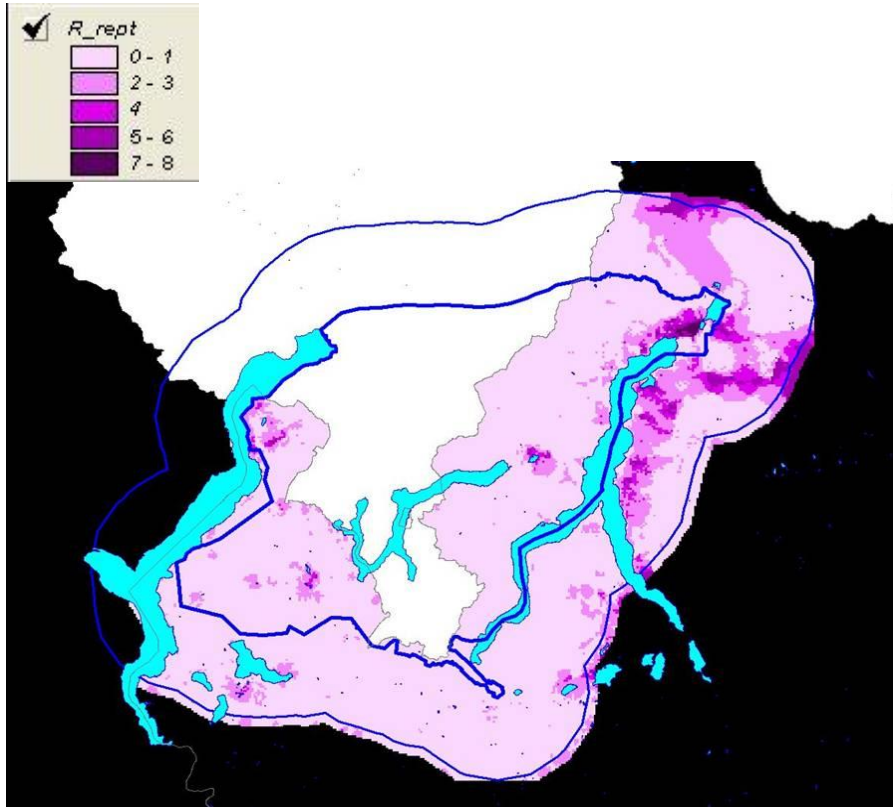
Class-level hotspots and potential distributions (Amphibia)





# Results

Class-level hotspots and potential distributions (Sauropsida)

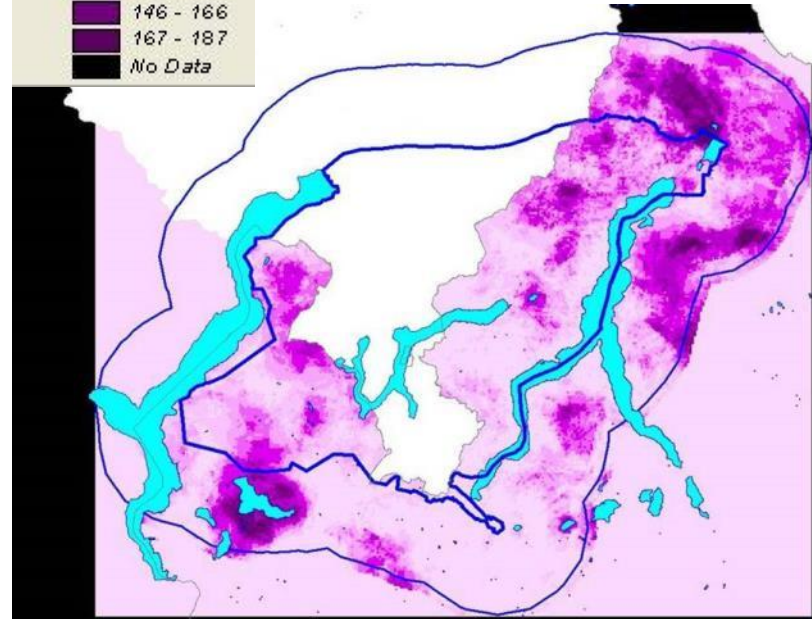
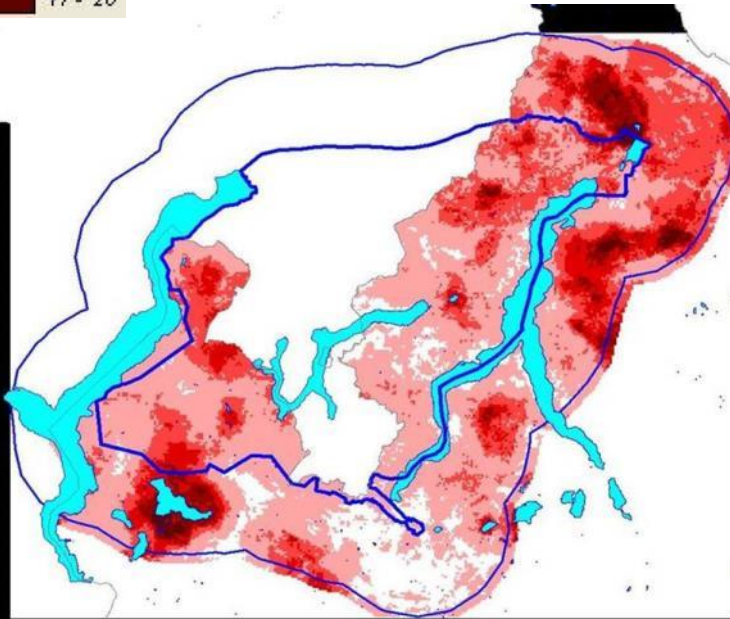
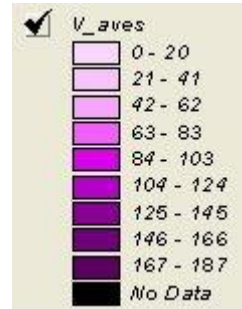
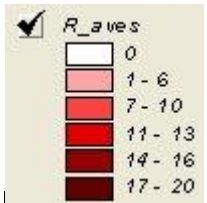






# Results

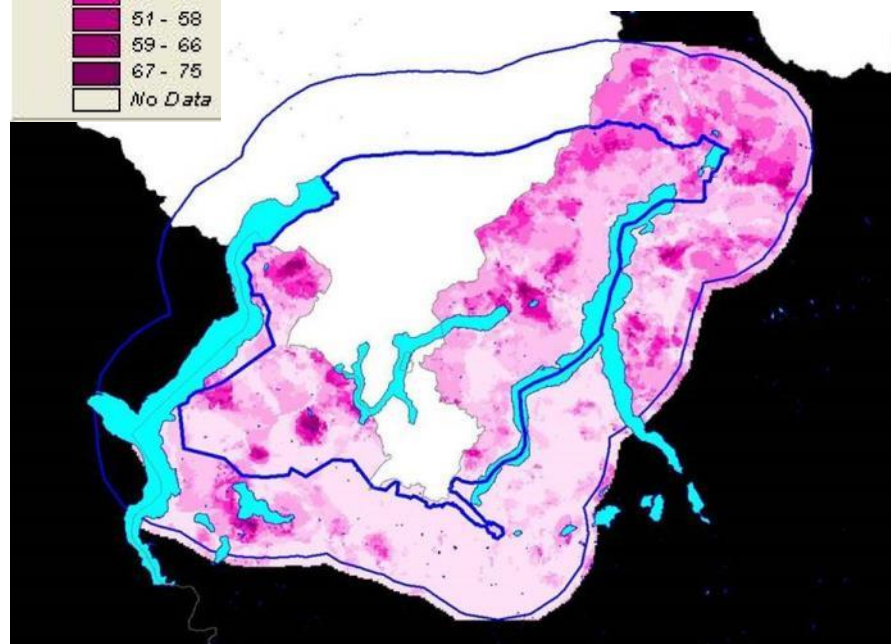
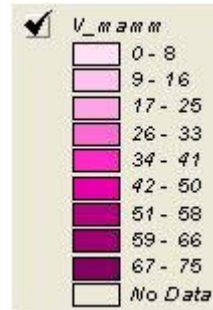
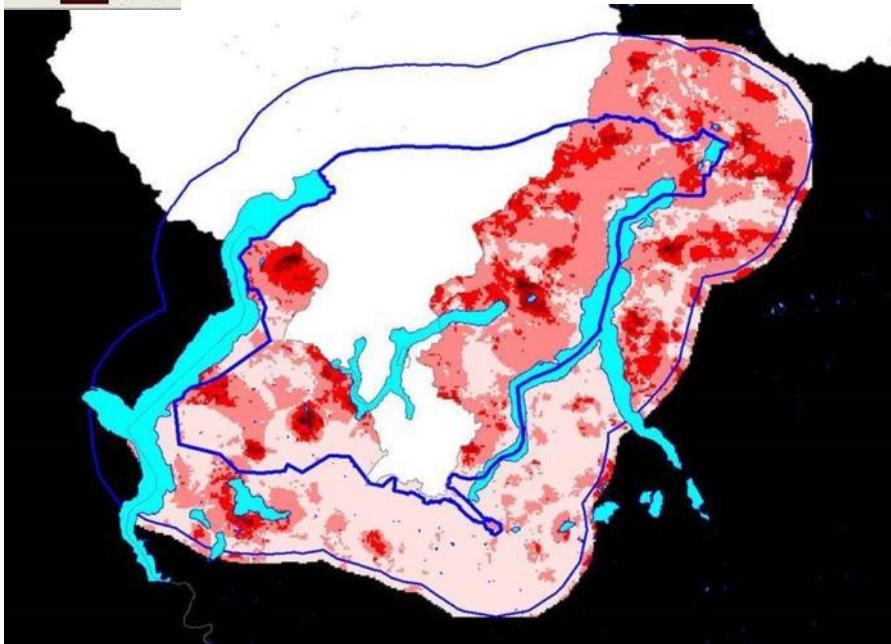
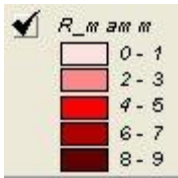
Class-level hotspots and potential distributions  
(Aves)





# Results

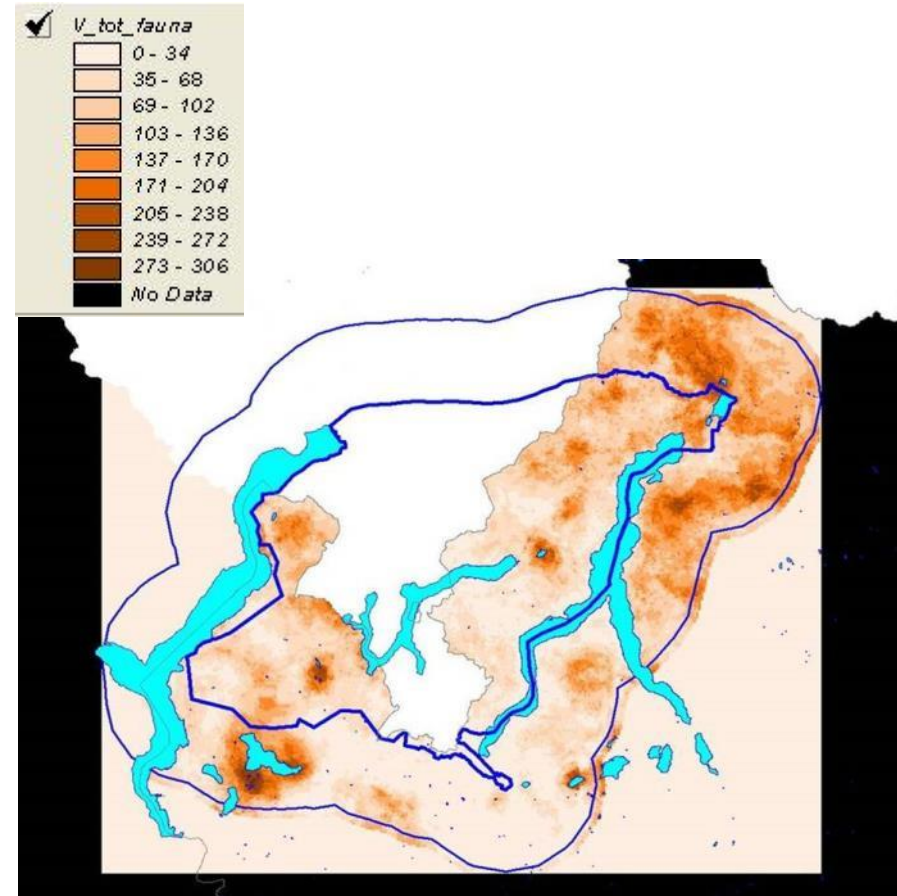
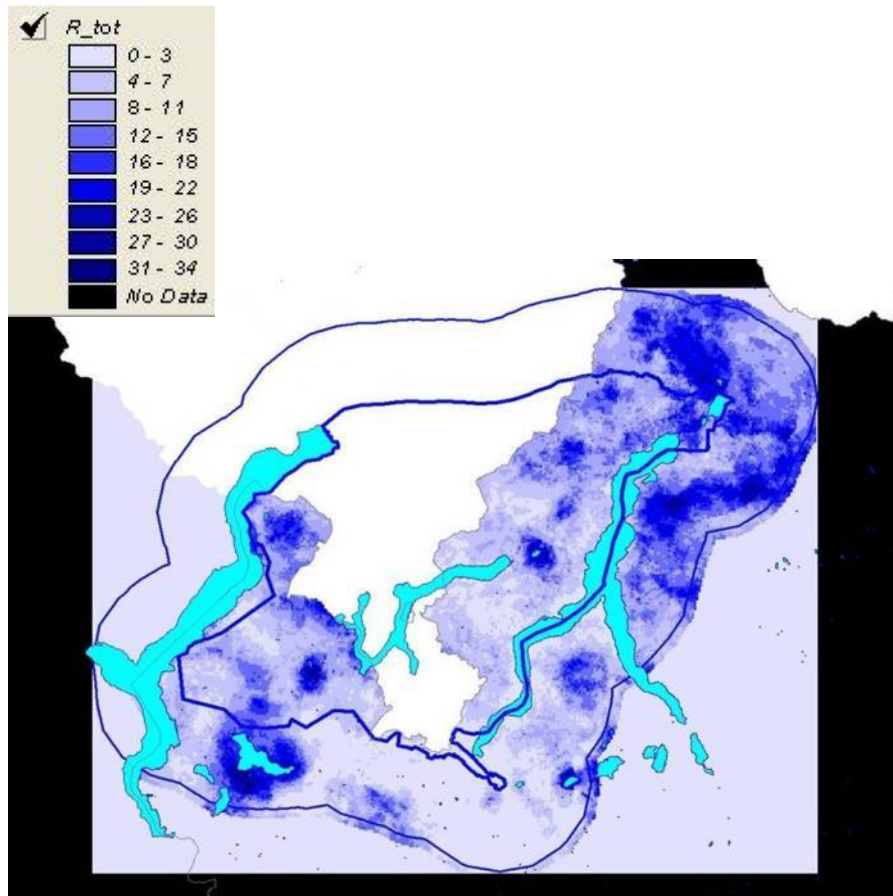
Class-level hotspots and potential distributions  
(Mammalia)





# Results

Total Wildlife Value (all vertebrate species)





# Is the model reliable?

| class of species richness | fauna_val | Surface of SICs in the study area (Km2) | Surface of SICs in the study area (%) | percentage on total study area surface |
|---------------------------|-----------|---|---------------------------------------|--|
| 0                         | lowest    | 2,375                                   | 0,85%                                 | 0,10%                                  |
| 1                         | low       | 19,5                                    | 6,98%                                 | 0,79%                                  |
| 2                         | medium    | 47,31                                   | 16,95%                                | 1,90%                                  |
| 3                         | high      | 84,75                                   | 30,36%                                | 3,41%                                  |
| 4                         | very high | 125,25                                  | 44,86%                                | 5,04%                                  |
| <b>TOTALE</b>             |           | <b>279,185</b>                          | <b>100,00%</b>                        | <b>11,24%</b>                          |

| class of species richness | fauna_val | surface of ZPS (km2) | surface of ZPS (%) | percentage on total study area surface |
|---------------------------|-----------|----------------------|--------------------|--|
| 0                         | lowest    | 0,125                | 0,13%              | 0,01%                                  |
| 1                         | low       | 3,44                 | 3,56%              | 0,14%                                  |
| 2                         | medium    | 18                   | 18,63%             | 0,72%                                  |
| 3                         | high      | 23,69                | 24,52%             | 0,95%                                  |
| 4                         | very high | 51,37                | 53,16%             | 2,07%                                  |
| <b>TOTALE</b>             |           | <b>96,625</b>        | <b>100,00%</b>     | <b>3,89%</b>                           |

| class of species richness | fauna_val | SIC + ZPS surface (Km2) | SIC + ZPS surface (Km2) (%) | percentage on total study area surface |
|---------------------------|-----------|-------------------------|-----------------------------|--|
| 0                         | lowest    | 48,5                    | 12,56%                      | 1,95%                                  |
| 1                         | low       | 22,44                   | 5,81%                       | 0,90%                                  |
| 2                         | medium    | 62,06                   | 16,07%                      | 2,50%                                  |
| 3                         | high      | 99,25                   | 25,70%                      | 4,00%                                  |
| 4                         | very high | 153,94                  | 39,86%                      | 6,20%                                  |
| <b>TOTALE</b>             |           | <b>386,19</b>           | <b>100,00%</b>              | <b>15,55%</b>                          |

Overlay with SICs (“Habitats” Directive Sites of Community Importance) and SPAs (“Birds” EU Directive)

SICs and SPAs should account for high diversity values

## Statistical “reliability”:

ROC analysis (average predictive power)

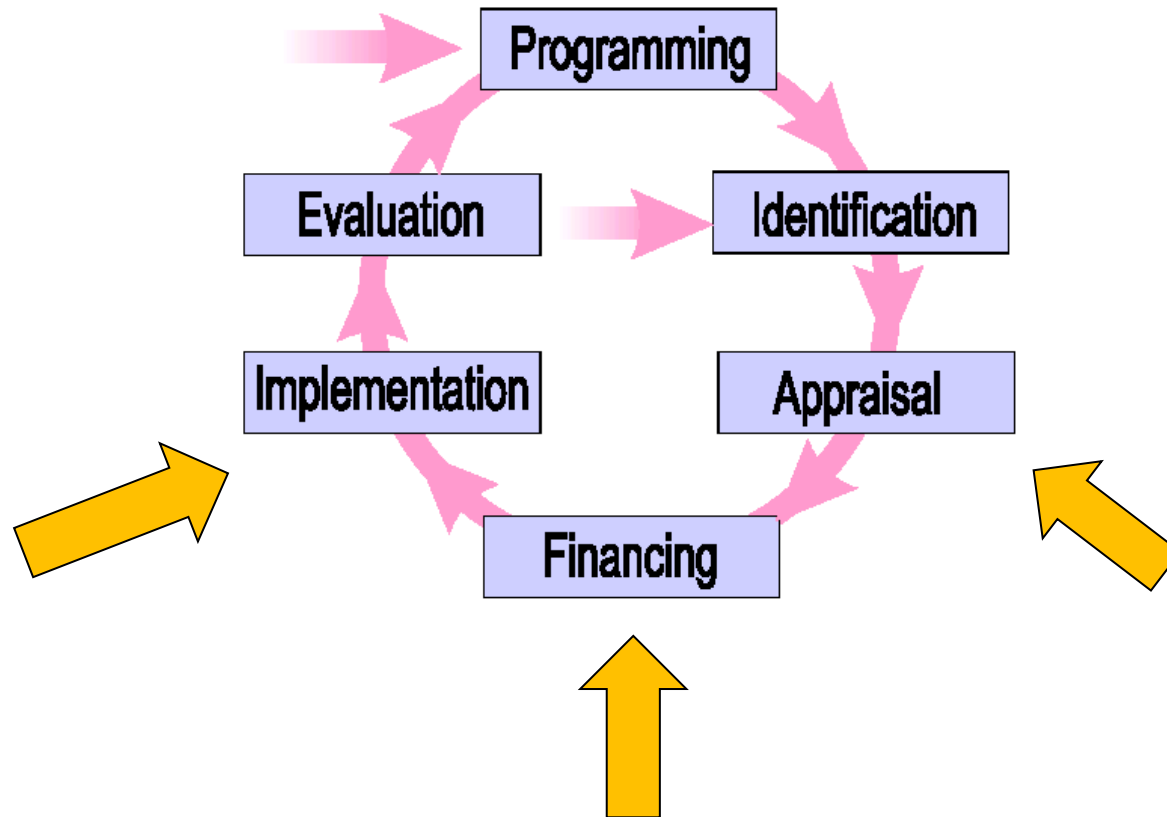
Minimum value: 77.8% (worse model)

Maximum accepted: 99.8% (best non-overfitting model)

**Average AUC 93.6 %**



# Project Cycle Management





# PIANO D'AZIONE SCHEMA



I  
RACCOLTA DATI E ANALISI DELLA SITUAZIONE



II  
SINTESI, VALUTAZIONE E DEFINIZIONE DEGLI OBIETTIVI

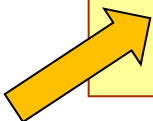
III  
AVVIO DEL PROCESSO DI CONCERTAZIONE CON GLI STAKEHOLDERS

IV  
COSTRUZIONE PARTECIPATA DEL PIANO D'AZIONE

V  
ATTIVAZIONE DI UNA STRUTTURA DI PILOTAGGIO E/O DEFINIZIONE DI PROTOCOLLI D'INTESA  
PER L'IMPLEMENTAZIONE DEL PIANO D'AZIONE

VI  
IMPLEMENTAZIONE DEL PIANO D'AZIONE

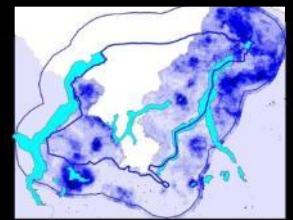
VII  
MONITORAGGIO E VALUTAZIONE

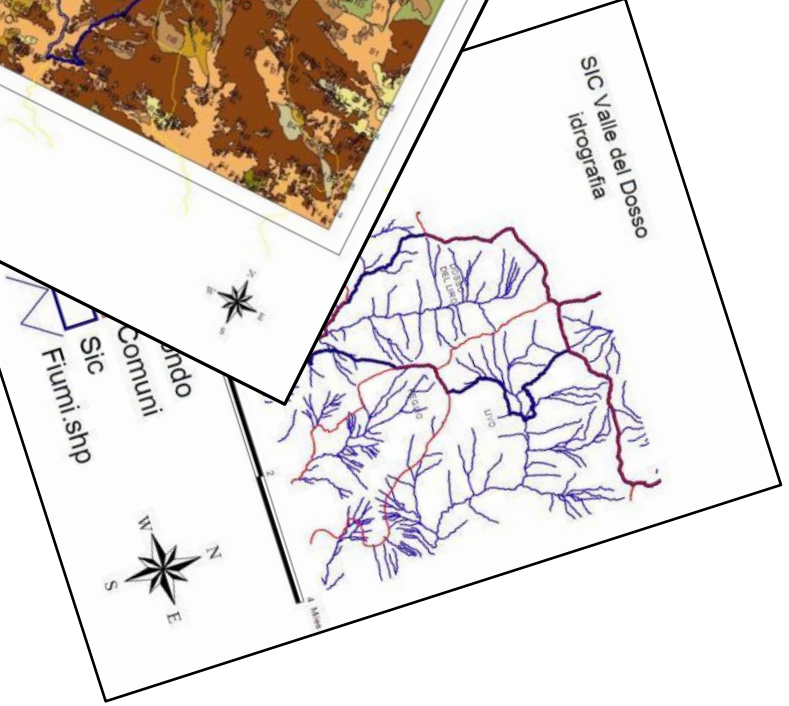
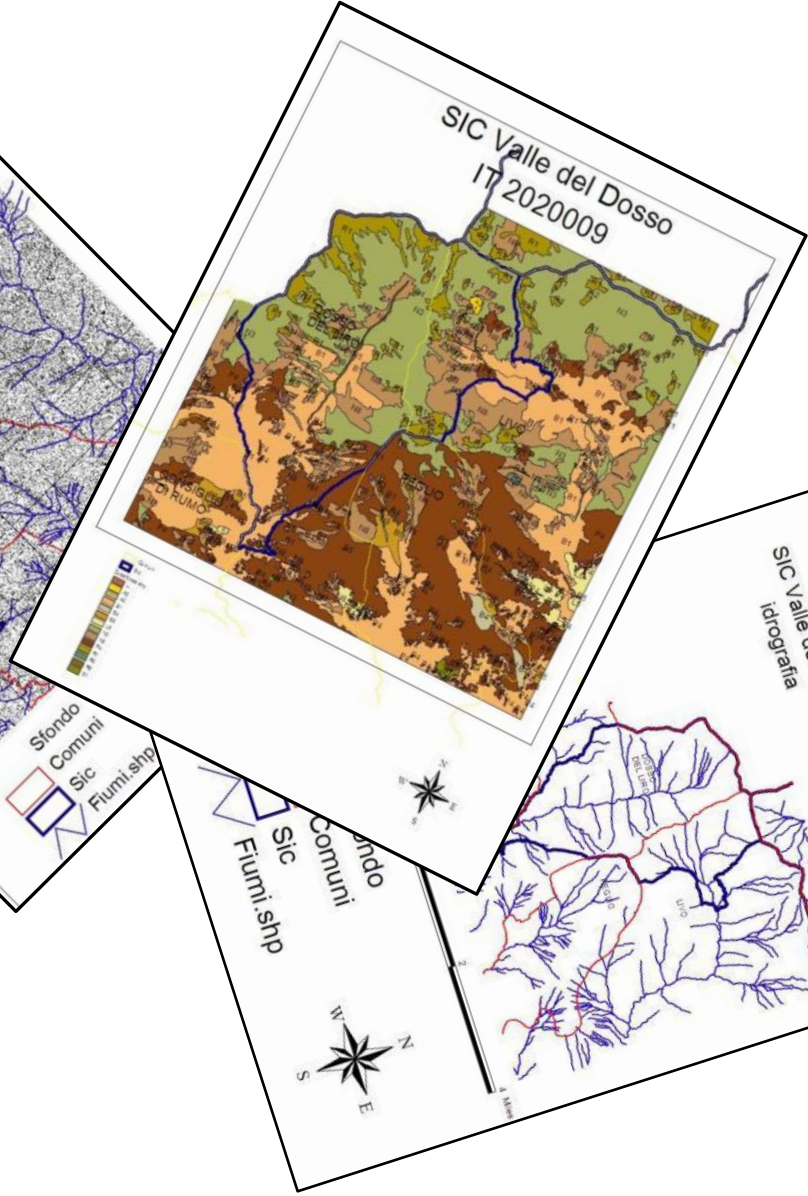
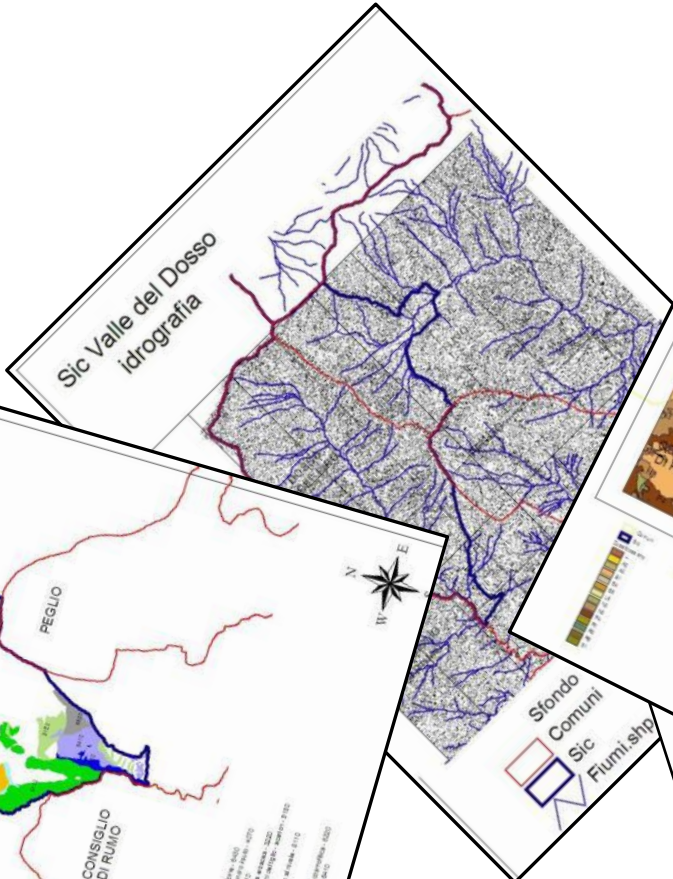
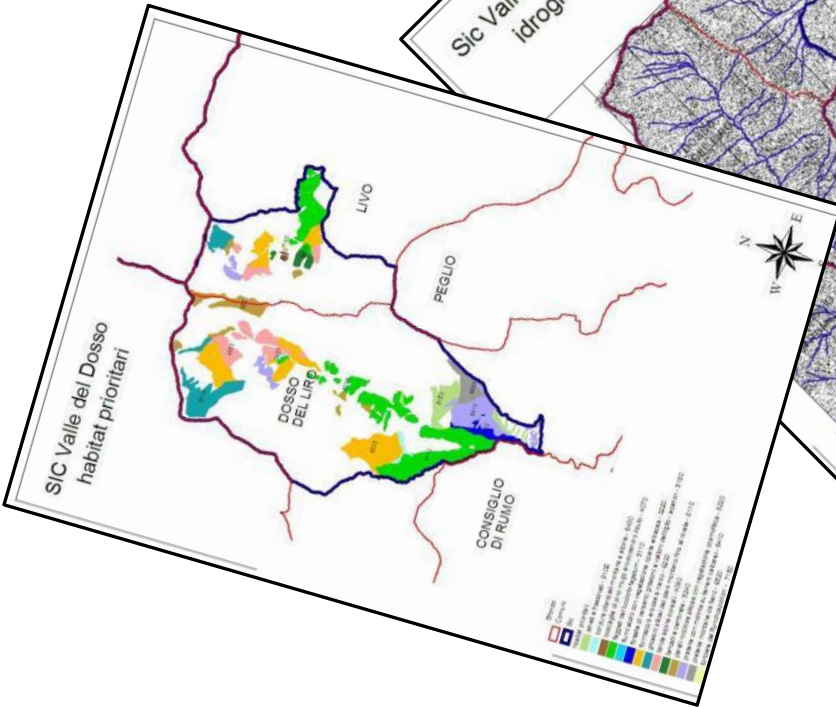




# Dall'analisi dei dati alle azioni di conservazione

Progetto finanziato da  
FONDAZIONE CARIPLO, 2007  
SIC IT2020009 "Valle del Dosso" Piano di gestione





# Piano di gestione del SIC Valle del Dosso (Co)





*Grazie*