



Ecological and spatial characterisation of "Mediterranean temporary ponds" (habitat 3170*) in the Lazio Region (Italy)

Virginia Chiara Cuccaro,^{1*} Giuliano Fanelli,² Dario La Montagna,³ Vito Emanuele Cambria,⁴ Fabio Attorre⁵

Botanic Garden of Rome, Department of Environmental Biology, La Sapienza Università di Roma

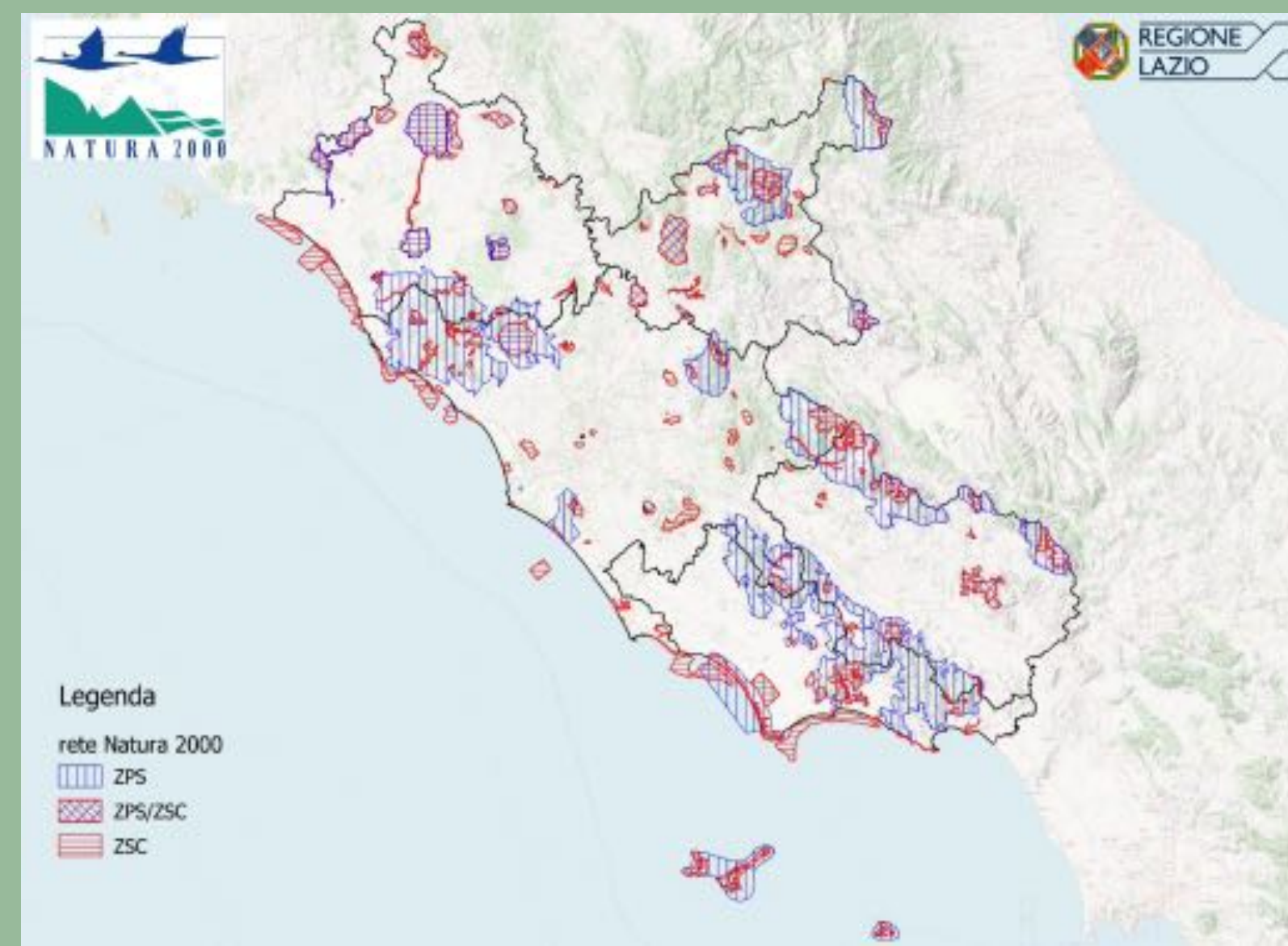


BACKGROUND

- Mediterranean temporary ponds are among the most degraded and threatened habitats in Europe, with an "unfavorable" conservation status
- Habitat misinterpretation
- Inadequate conservation restoration actions



RESEARCH OBJECTIVES

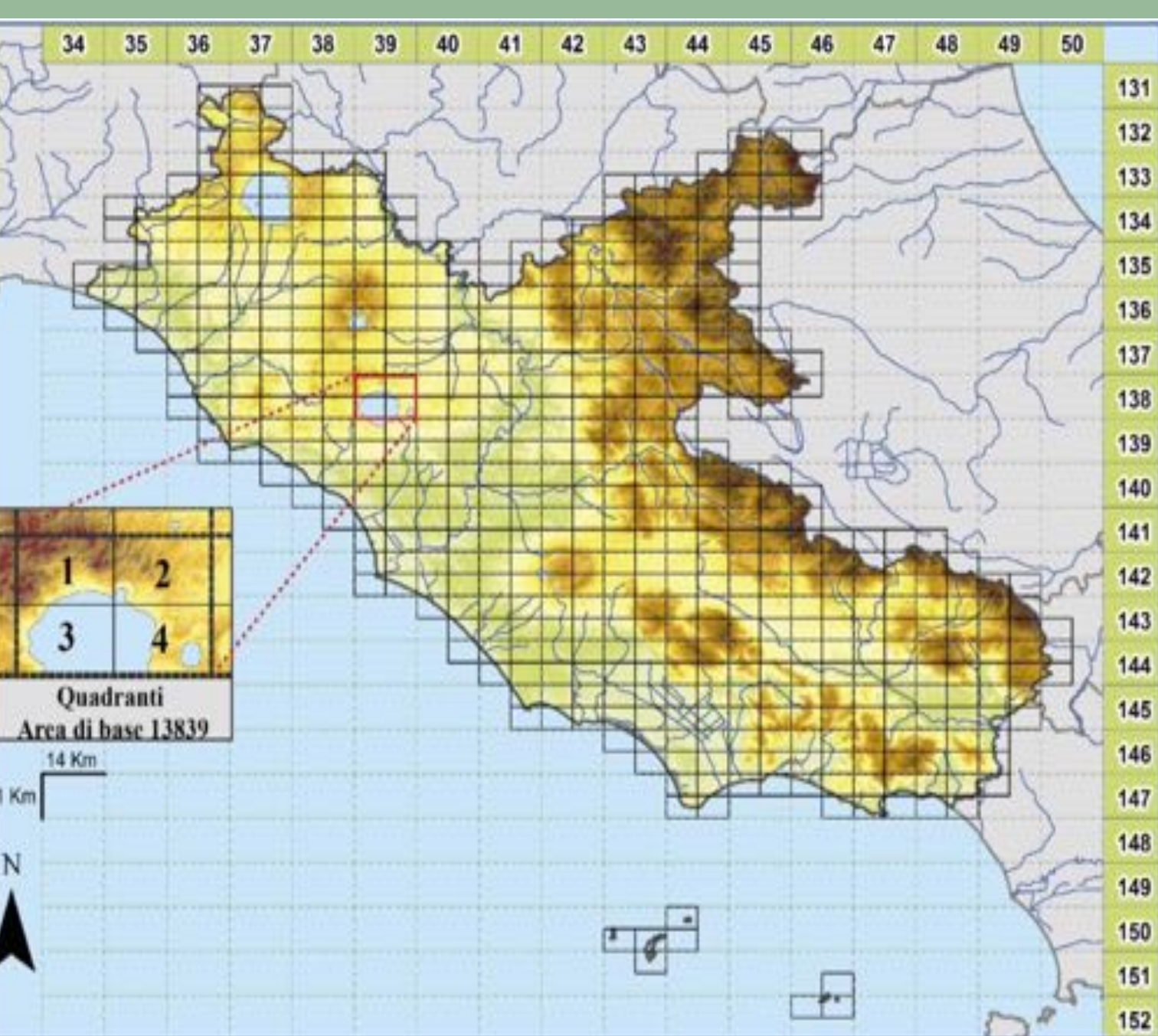


- Verify the comprehensiveness of the current regional network of Natura 2000 for the habitat;
- Identifying the environmental factors influencing the distribution of keystone species



- Predicting the potential distribution of habitat communities within the whole Lazio region

METHODS

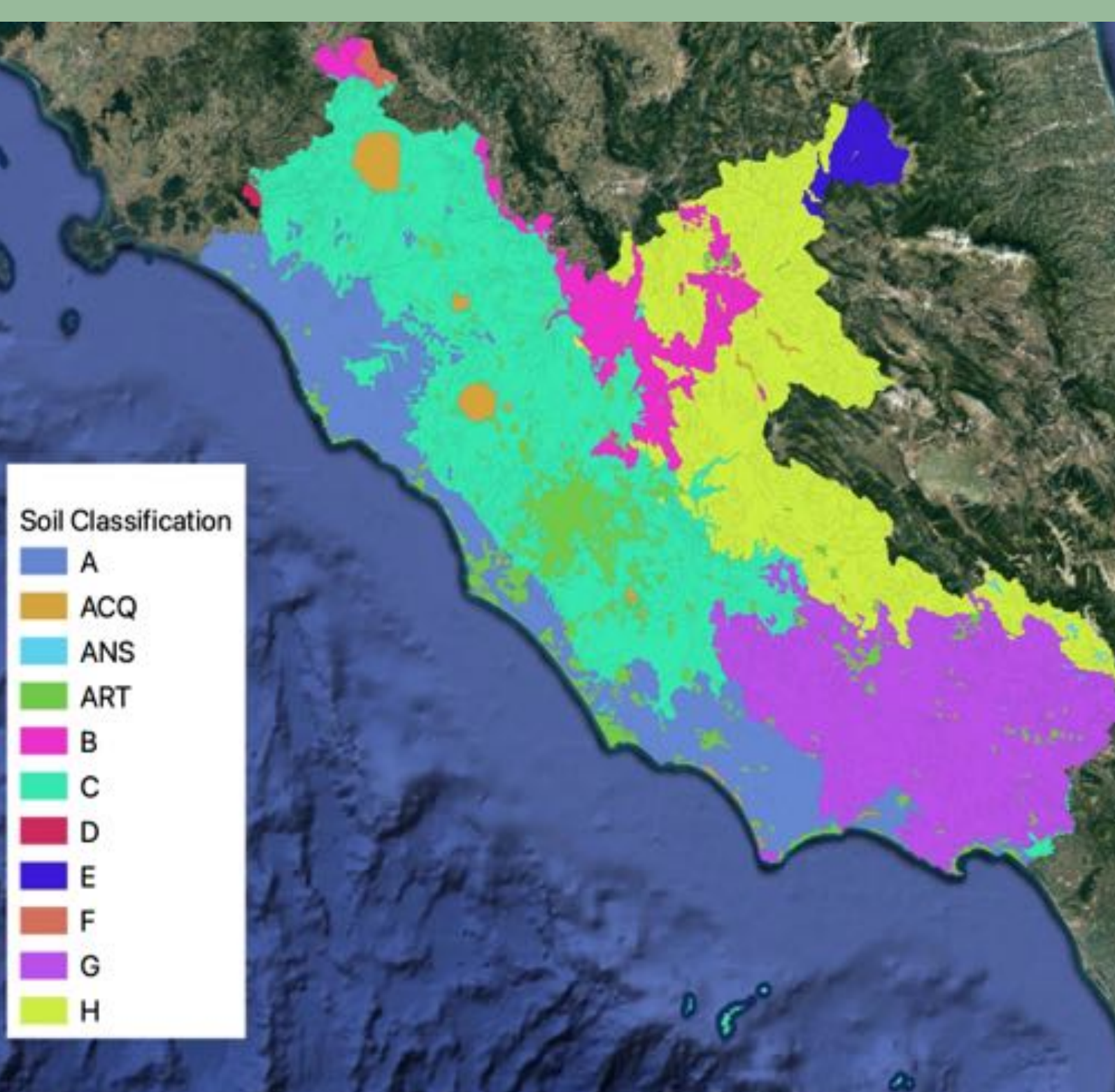


1. Distribution data collection on keystone species of habitat 3170* from the «Atlas of Vascular Flora of Lazio»



2. Definition of four groups according to species ecological relevance

3. Selection and data banking of climatic and soil-related variables to model the frequency and distribution of each group



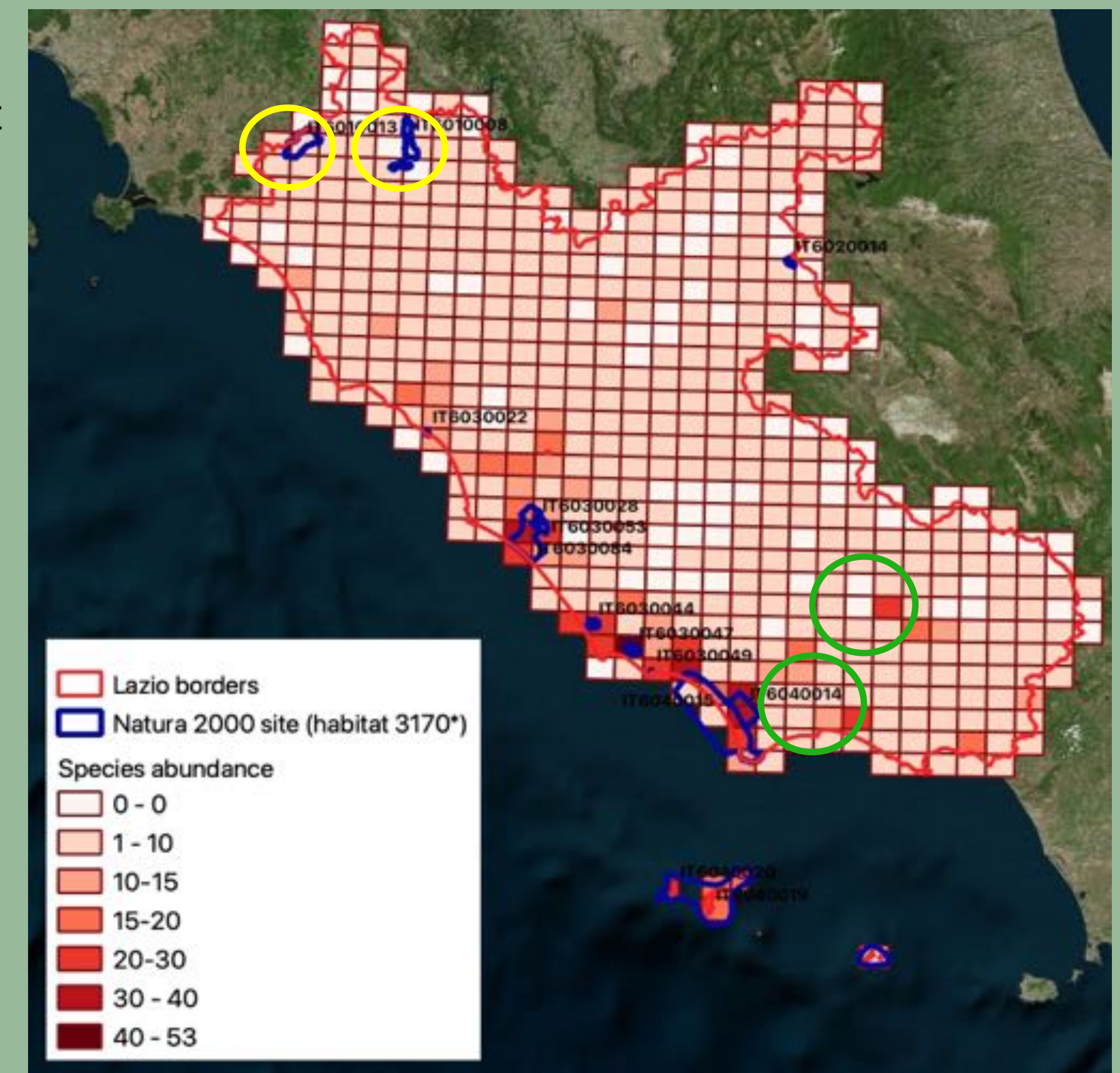
4. Thematic mapping on group abundance over the Lazio region and the Natura 2000 network
5. Habitat suitability modeling for the potential distribution of the four groups

RESULTS AND DISCUSSION

1. Natura 2000 network is partially congruent with habitat designation for 3170* in Lazio territory

Low number of species in Natura 2000 areas (e.g. Selva del Lamone e Monti di Castro)

High number of species in areas not included in the Natura 2000 network (e.g. Selva di Pofi)



2. Four distinguishable groups:

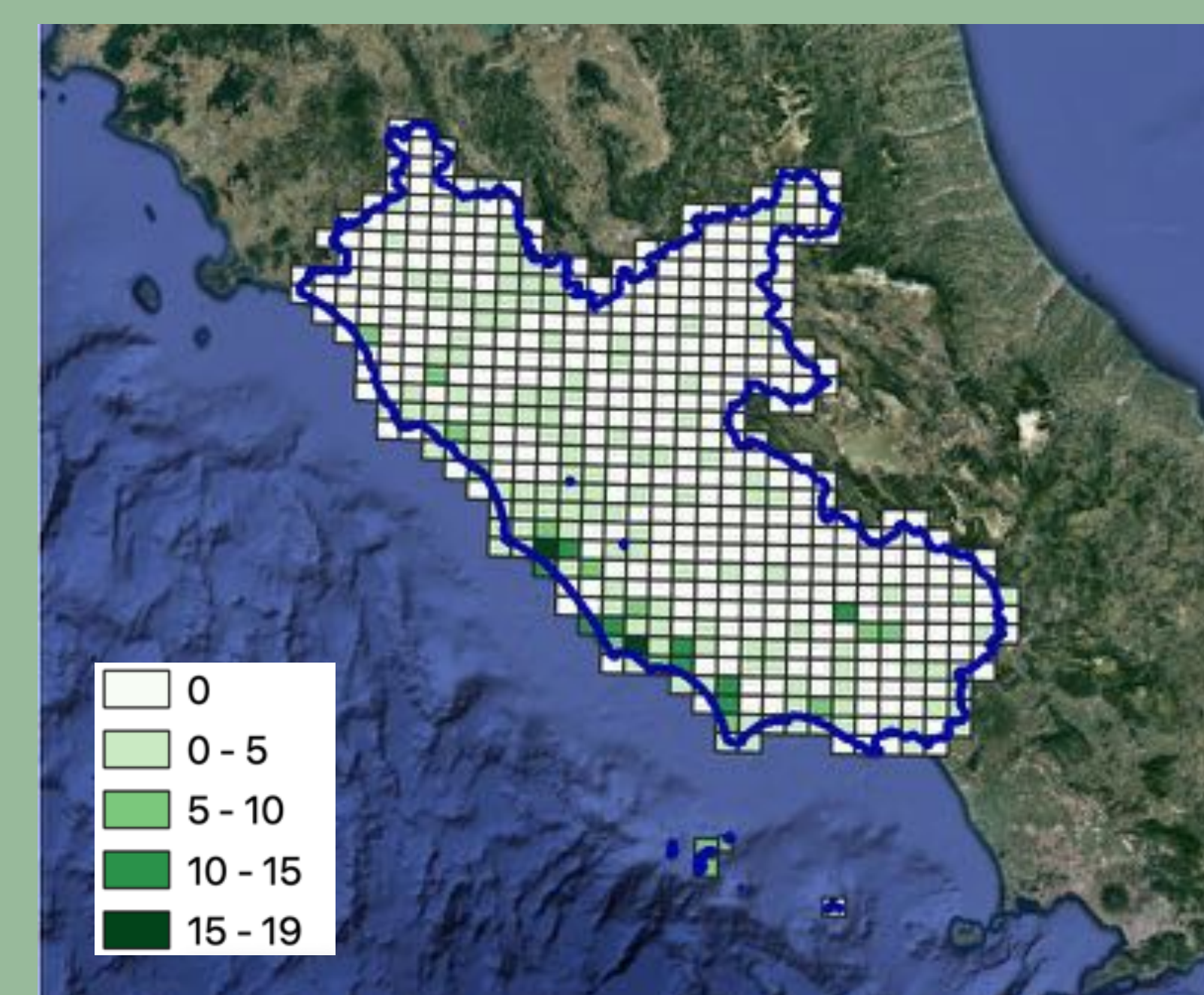
- A. Isoëto-Nanojuncetea sensu stricto** (22 species) (e.g. *Isoëtes duriei*, *I. histrix*)
- B. Cyperetalia flavescens** (6 species) (e.g. *Cyperus flavescens* L., *Cyperus fuscus* L.)
- C. Temporary ponds with prolonged flooding** (7 species) (e.g. *Isoëtes longissima*, *Callitriche brutia*)
- D. Generalist species** (18 species) (e.g. *Trifolium micranthum*, *Centaurium maritimum*)

3. Selection and data banking of climatic and soil-related variables

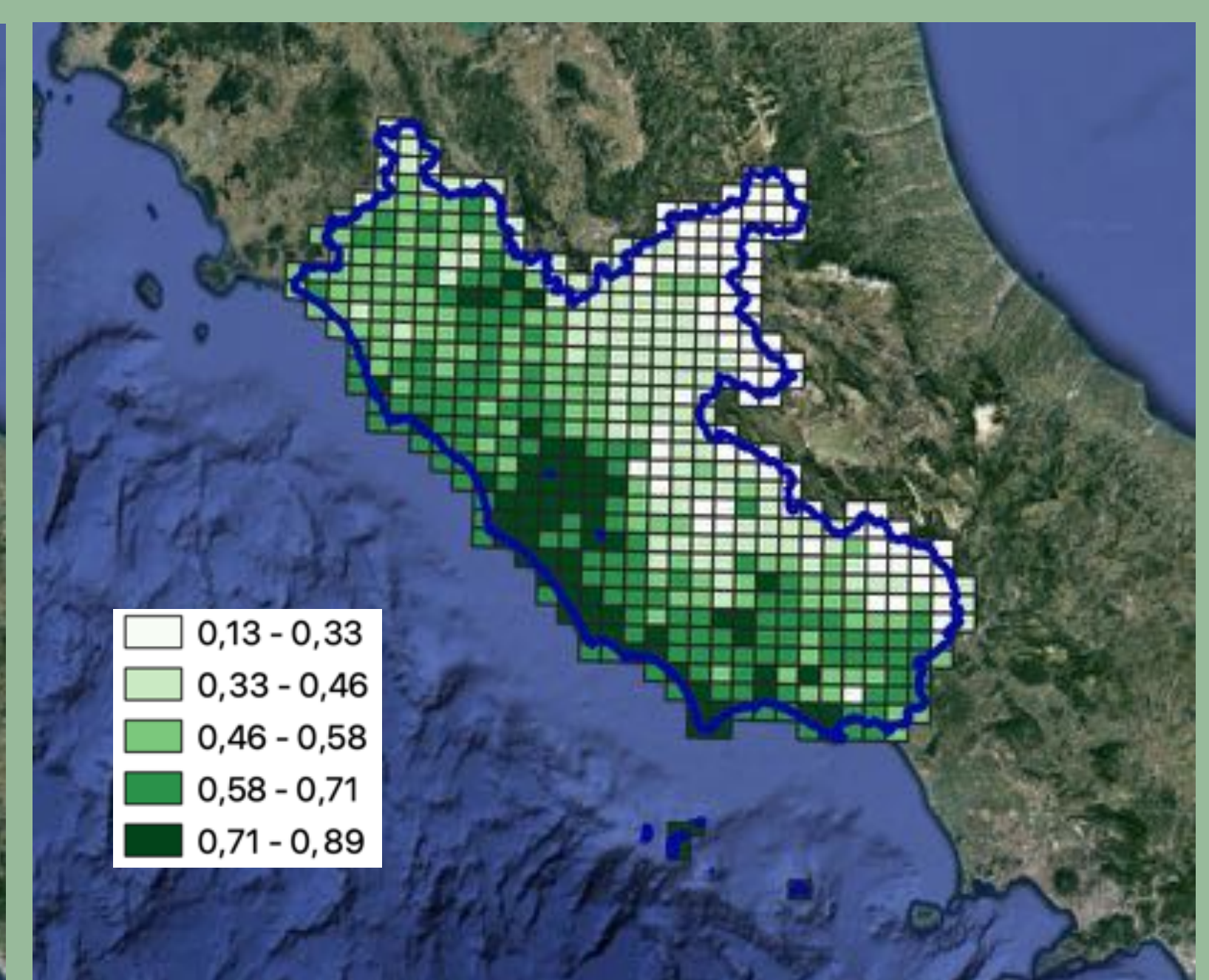
	Estimate	Std. Error	t value	P-value
(Intercept)	23.571025	3.68025	6.405	3.33E-10 ***
Bio4	-0.022914	0.005403	-4.241	2.63E-05 ***
Bio8	0.302683	0.069568	4.351	1.63E-05 ***
Bio13	0.014604	0.003788	3.856	1.30E-04 ***
Bio14	-0.02627	0.011791	-2.228	2.63E-02 *
A	0.019717	0.003877	5.086	5.09E-07 ***
ART	0.03125	0.008114	3.851	1.32E-04 ***
pH	-0.181006	0.044924	-4.029	6.42E-05 ***

Group A (Isoëto-Nanojuncetea sensu stricto) appears correlated with: seasonality and temperature of warmest period (Bio4, Bio8), precipitation of the wettest period (Bio13), coastal plain soils ("A"), artificial soils ("ART"), and pH

4. Abundance and actual distribution of «Isoëto-Nanojuncetea sensu stricto» group



5. Habitat suitability of «Isoëto-Nanojuncetea sensu stricto» group



CONCLUSION

- The methodological approach tested at the regional scale has proven to be a novel technique with promising implications capable for conservation and management.
- The use of squared grid-based flora atlas can be further exploited to verify the presence of habitat in other regions or at a broader scale.
- Additional source of data can be integrated to empower the methodological approach.

