

**GIS aided VULNERABILITY
STUDIES IN THE NATURA 2000 -
KARSTIC AREA OF BIHOR
COUNTY**

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Content

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- Assessment strategy
- Materials and methods
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- Actions in karst environment significantly influences the condition and quality above and underground environment
- the evaluation must be made in full, taking into account environmental influences on the underground overground.

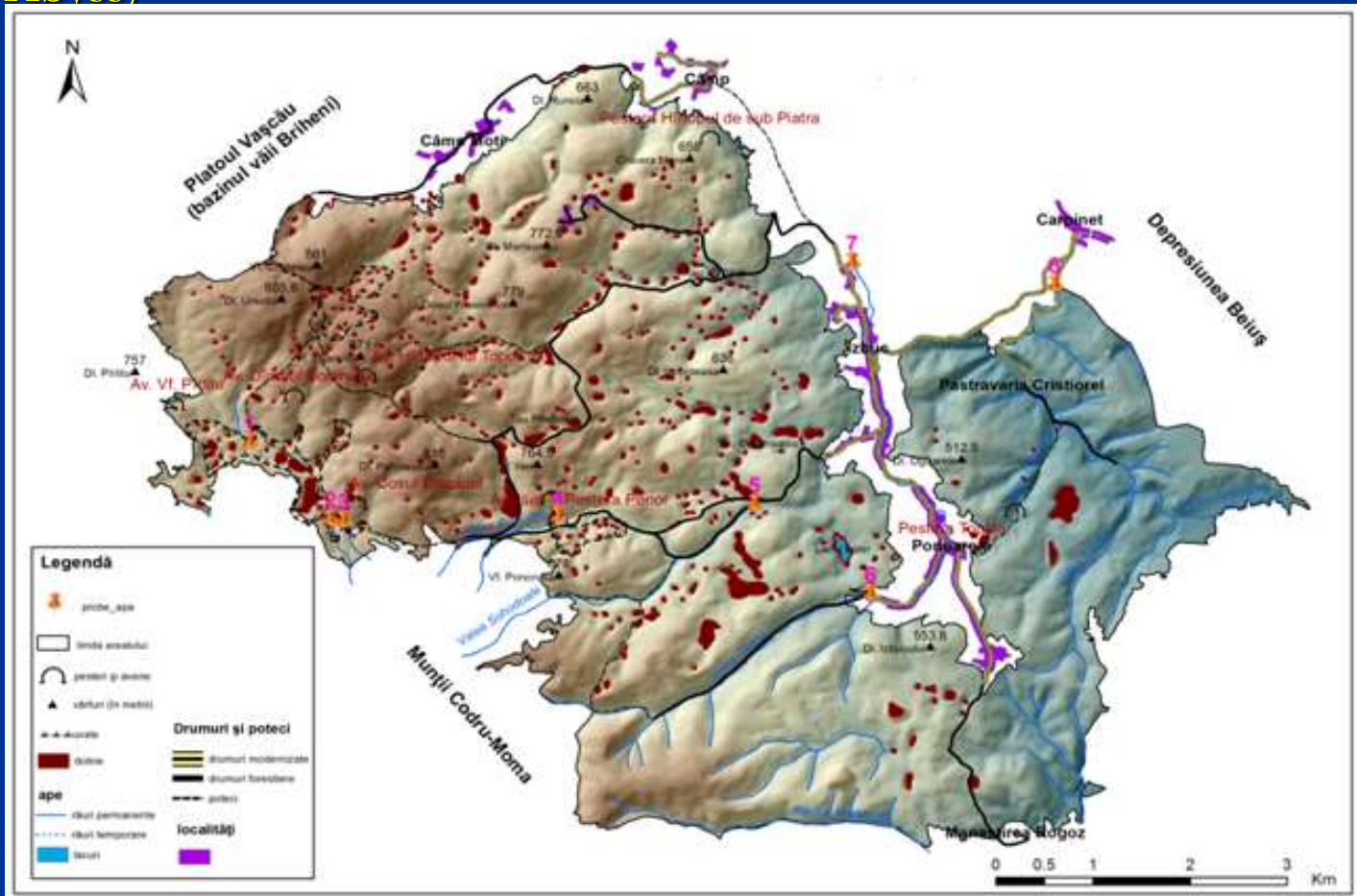
Methods

In this study the following steps were:

- Field study (identify and locate the impact of anthropogenic and natural threats ,
- detailed field observations, mapping
- Identify sources of impact, anthropogenic and natural threats of the karst habitats
- impact assessment methodology by RIAM
- SWOT analysis of environmental issues

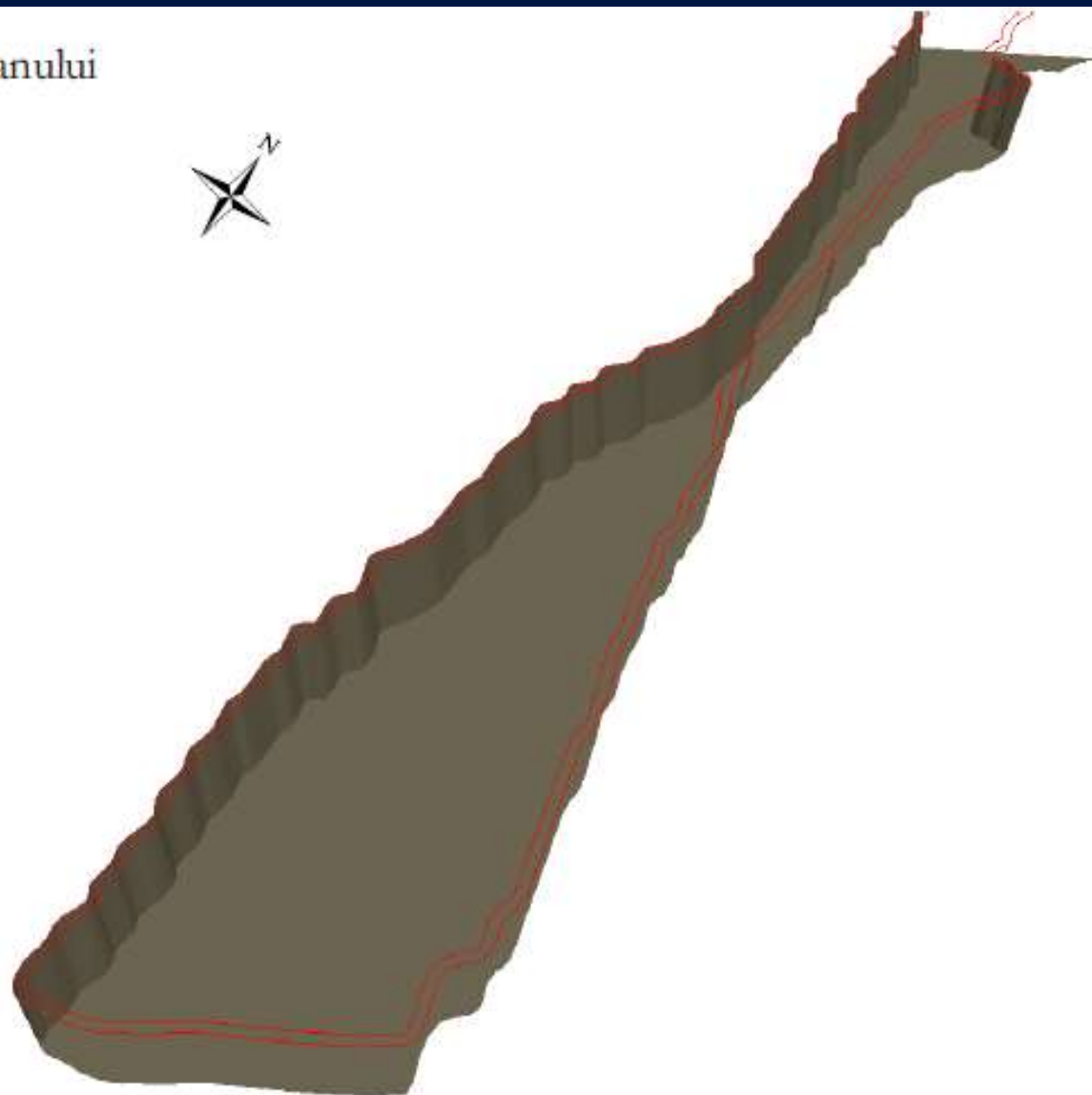
- The matrix evaluation of the conservation state of the underground karstic habitats was done using a fast evaluation matrix - *Rapid Impact Assessment Matrix/RIAM*
- The matrix was filled in with environment elements that came from Leopold's matrix and the detailed observations made on the field.

- In the matrix analysis there were the eight karstic caves in the community interest site
- (Ponor Cave, Toplita Cave, Hârtopul de sub Piatră Cave, Fața Iliei Abyss, Coșul Dracului Abyss, Hârtopul lui Topor Abyss, Vf. Pârlitu Abyss, The Dâmbul Boianului Abyss)

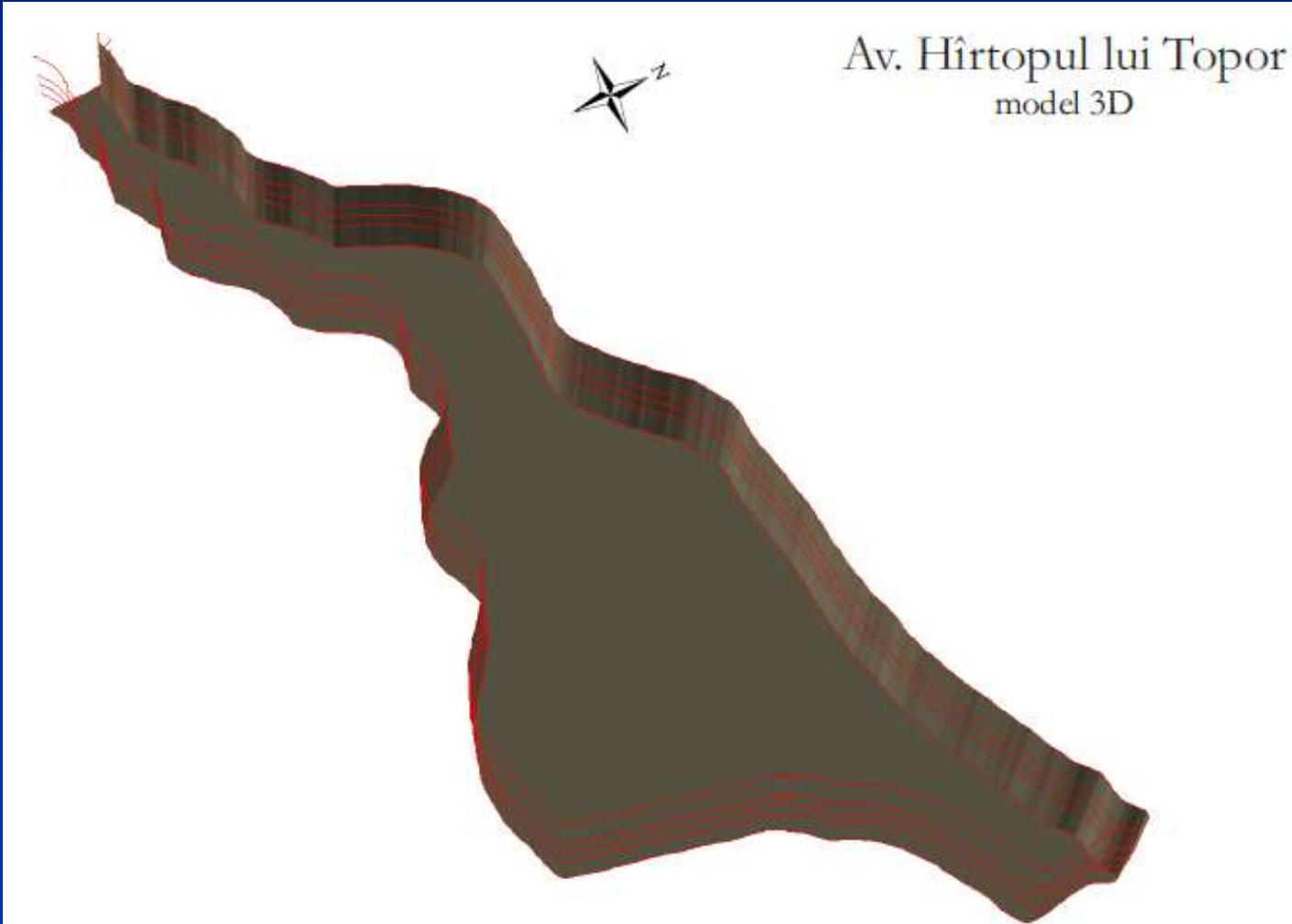




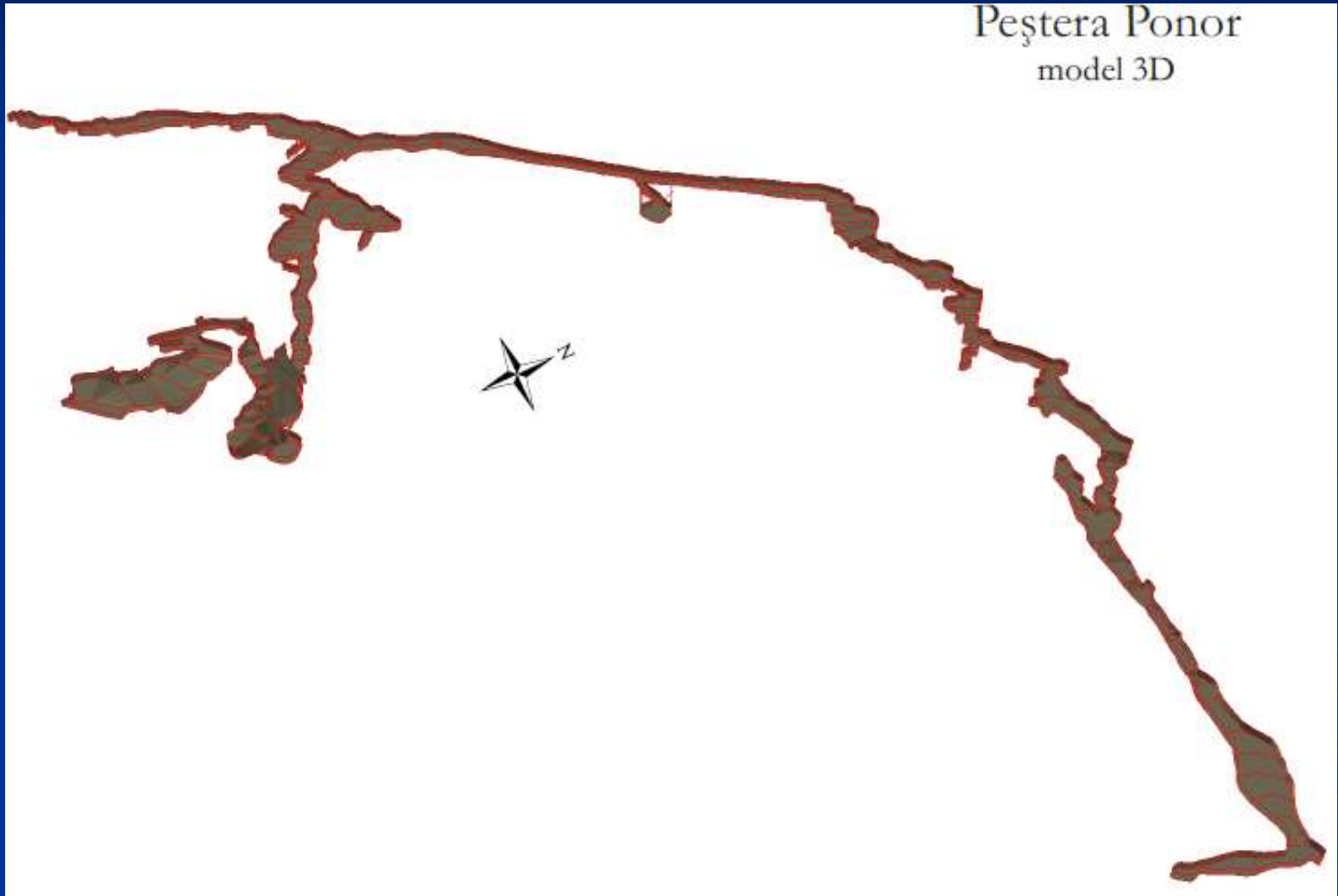
Av. Dîmbul Boianului
model 3D



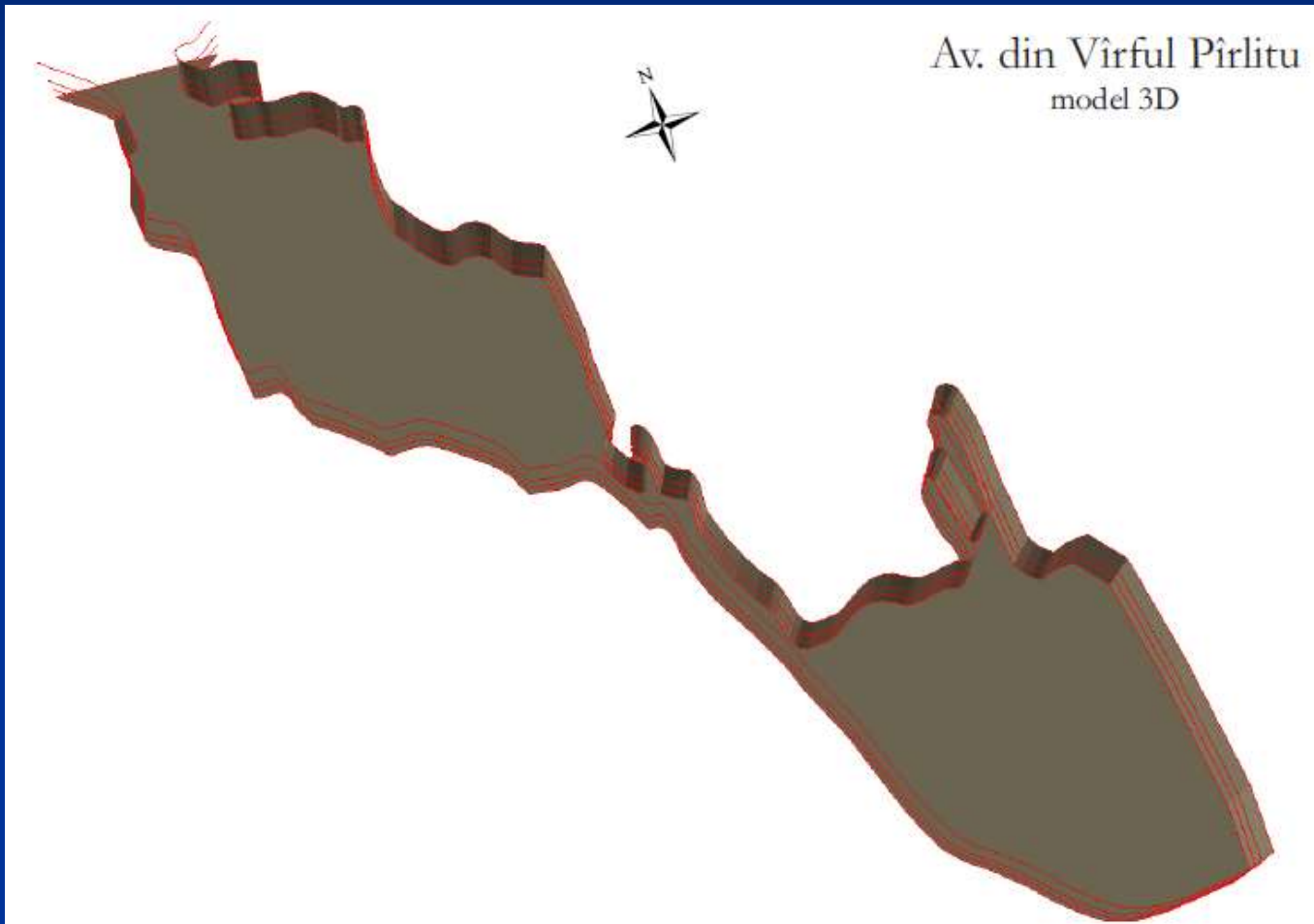
Av. Hîrtopul lui Topor
model 3D



Peștera Ponor
model 3D



Av. din Vîrful Pîrlitu
model 3D



The carstic cave chart

The name of the karstic cave	Type	Place	Development (m)	Dishevelment (m)	Climate	Hydrological regime	Fauna	Natural processes
<u>Ponor Cave</u>	cave	The water catchment area of the <u>Ponor Valley</u> beneath the <u>Chicera peak</u>	703	-127.6	Variable in vestibule, 6 ⁰ -7 ⁰ C in the profound area	Permanent <u>waterflow</u>	<u>Microfauna</u> that lives in caves	clogging

The name of the cave	Type	Place	Development (m)	Dishevelment (m)	Water quality	Air quality	Pollution sources	Other degradation sources /forms
<u>Ponor Cave</u>	cave	The water catchment area of under the <u>Chicera peak</u>	703	-127.6	Classes I and II	good	Refuse, vegetal and animal residues	Hydrocarbons pollution

The elements evaluated with the RIAM

Cr. No.	The vestibular <u>karstic</u> segment	The depth <u>karstic</u> segment
1	Cave sediments	Cave sediments
2	<u>Karstic morphology</u>	<u>Karstic morphology</u>
3	Water quality	<u>Water quality</u>
4	Air quality	Air quality
5	Microclimate	Microclimate
6	Floods and overflows	Floods and overflows
7	Rainfall erosion	Rainfall erosion
8	Deposition and clogging	Deposition and clogging
9	Area erosion (surface overflow)	Area erosion (surface overflow)
10	Cave <u>microfauna</u>	Cave <u>microfauna</u>
11	Important species of flora and fauna (<u>Rana ridibunda</u> , <u>Felis silvestris</u> , <u>Meles meles</u>)	The stability of the <u>karstic</u> caves (fallings, treading, <u>crumblings</u>)
12	Mammal species enumerated in Annex II of the Council's Directive 92/43/CEE (Chiroptera)	Mammal species enumerated in Annex II of the Council's Directive 92/43/CEE (<u>Chiroptera</u>)

The calculation and the grading

- $(A_1) \times (A_2) = (A_t)$ (1)
- $(B_1) + (B_2) + (B_3) + (B_4) = (B_t)$ (2)
- $(A_t) \times (B_t) = (SE)$ (3)

- A_1 – The importance of changing the environment
- A_2 – The magnitude of changing the environment
- B_1 – The permanence
- B_2 – The reversibility
- B_3 – The cumulatively
- B_4 – The susceptibility

Conversion of the environment score (SE) into impact categories (CI)

The environment score	Categories	The description of the impact category (CI)
over + 150	+D	Major positive changes/impacts
+101 to +150	+C	Significant positive changes/impacts
+51 to +100	+B	Moderate positive changes/impacts
+1 to +50	+A	Slightly positive changes/impacts
0	N	Lack of change in status quo changes
-1 to -50	-A	Slightly negative changes/impacts
-51 to -100	-B	Moderate negative changes/impacts
-101 to -150	-C	Significant negative changes/impacts
below - 150	-D	Major negative changes/impacts

Results

Environment elements	RIAM Evaluation score							
	Toplița Cave	Ponor Cave	Fața Iliei Abyss	Hârtopul cu Piatră Abyss	Coșul Dracului Abyss	Hârtopul lui Topor Abyss	Vf. Pârlitu Abyss	Dâmbul Boianului Abyss
The vestibular segment (the entrance one)	-85	-97	-56	-97	-53	-46	36	-40
The depth segment	-64	-77	-40	-90	-45	-49	32	-40
Total evaluation score	-74,5	-87	-48	-93,5	-49	-47,5	34	-40
The degree to which it is affected (%)	50	40	15	50	10	10		10
The appreciated conservation state of the underground habitats	II	II	I	II	I	I		I
	Fragile	Fragile	Good	Fragile	Good	Good	Good	Good

Conclusion

- The observations made on the field confirm this score under the circumstances in which the impact sources are diminished in terms of number and spatial distribution

- In the other analysed karstic caves (Toplița Cave, Hârtopul cu Piatră Cave and Ponor Cave) a state of preserving the habitat, dominated by fragility can be noticed, determined and influenced by the presence and the higher number of impact sources and anthropic pressure that came from the surface

- Thank you for your attention!

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