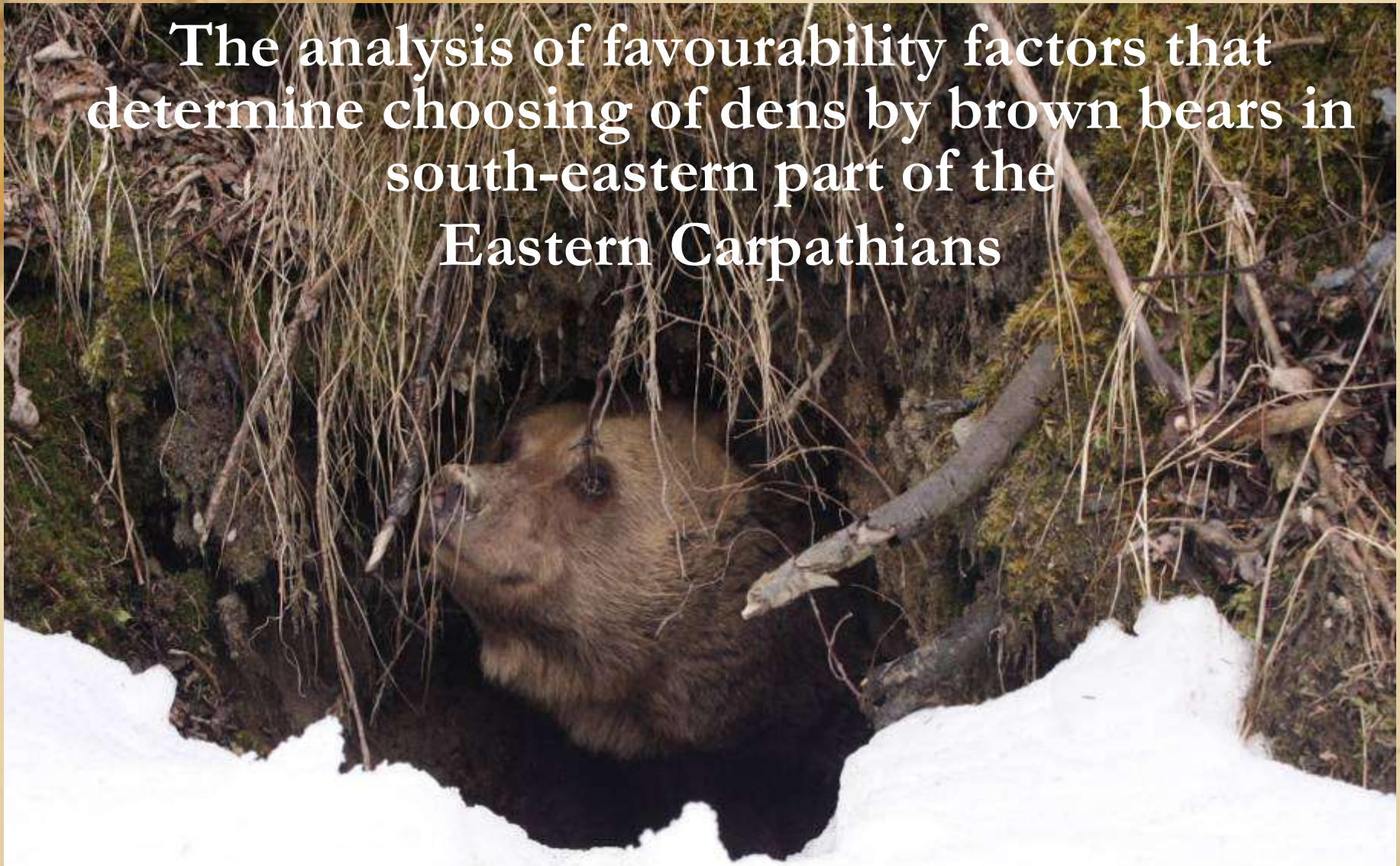


The analysis of favourability factors that determine choosing of dens by brown bears in south-eastern part of the Eastern Carpathians



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Brown bear – the winter sleep

One of the most important adaptations of the brown bear (*Ursus arctos*) at conditions imposed by ambient is winter sleep.

Superimposed on about a third part of the time of a calendar year, this stage of bear life is very important in terms of influence on survival and especially of natural growth dynamics, knowing the fact that bear females born in dens in during the winter.

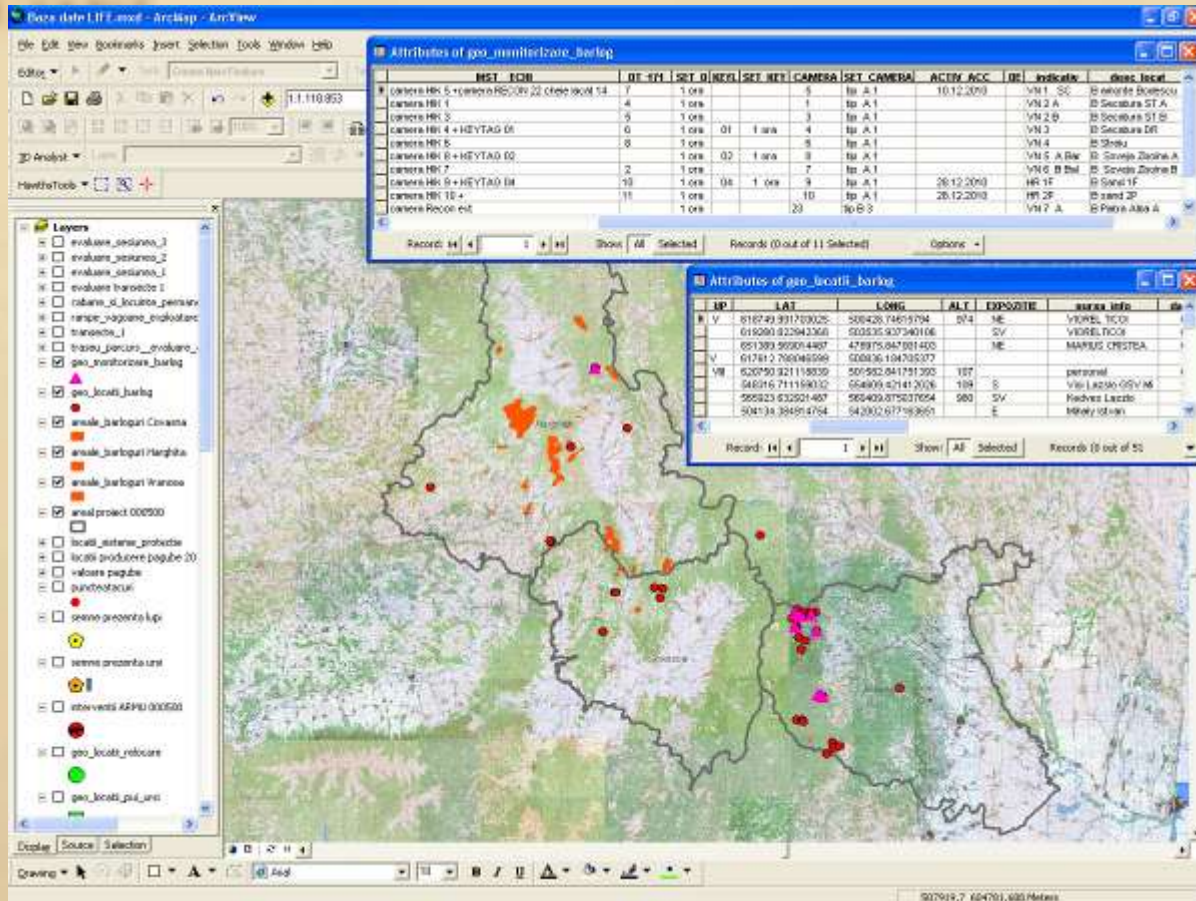


Brown bear – the winter sleep

- The brown bears from Carpathian Mountains, are using the dens to cross over the winter, without hibernating.
- The winter sleep last approx. 3 months.
- The den is dugged in the soil or the bear use the existing cavity between existing rocks.
- Some bears are active during the winter if the food resources is available.
- The winter sleep length is in direct rapport with the fat quantity accumulated during the autumn and in reverse rapport with the available food during the winter period



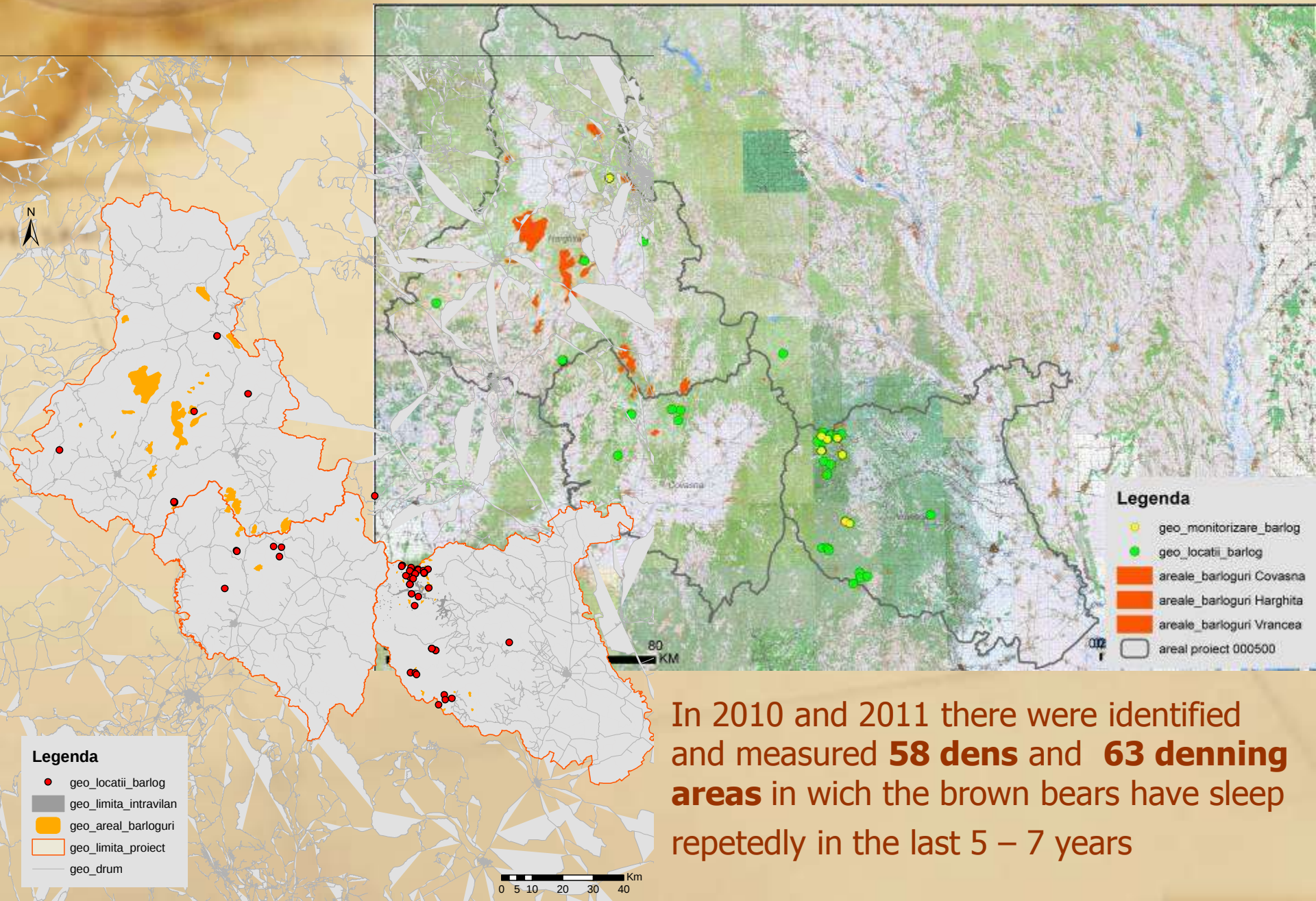
In a Life Nature project dedicated conservation of bears in Vrancea, Covasna and Harghita counties, there were identified, measured and monitored during 2010-2011, 58 dens used by bears during winter sleep.



For each den it was filled a paper sheet containing:

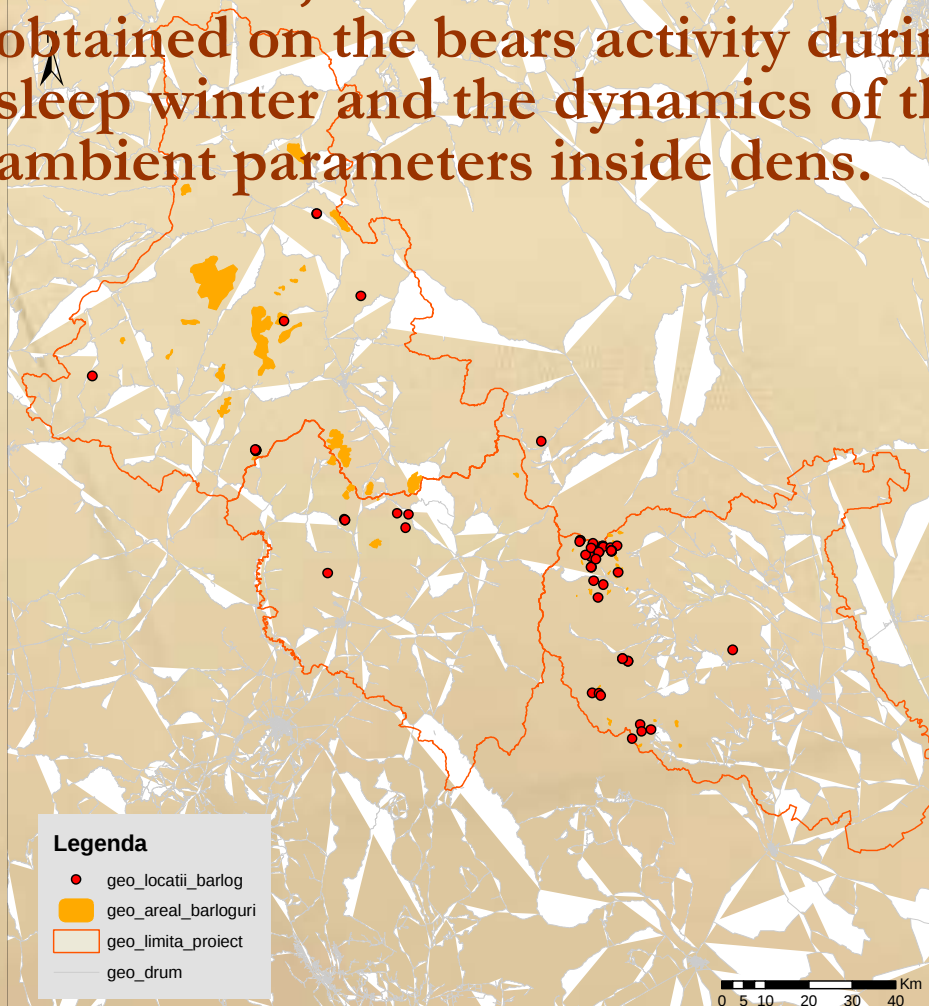
- coordinates of the location;
- type of cavity (dug in the ground, cave, hollow, tree felled;
- physical characteristics (slope, exposition) of slopes;
- direction of orientation of the cavity axis;
- vegetation in proximity
- distance from water sources and to the ways of communication;

Brown bear dens distribution identified in 2010 and 2011



In 2010 and 2011 there were identified and measured **58 dens** and **63 denning areas** in which the brown bears have sleep repeatedly in the last 5 – 7 years

Fifteen active dens in winter season 2010-2011 were monitored using video cameras with motion sensors and some recording equipment for temperature and relative humidity mounted inside the cavities, so that information were obtained on the bears activity during sleep winter and the dynamics of the ambient parameters inside dens.



Systems configured for each den location are:

- *camera* - network IP HIK VISION, model: DS – 2 CD 802PF, sensor: 1/3" Sony CCD; interface: 1 RJ 45 10M/ 100M UTP; *lens* - CCTV LENS, AUTO IRIS LENS 3,5 - 9mm. RV 03509D F1.2 1/3" CS; *stocking environment* - card SDHC 16 GB class 6;
- unidirectional microphone;
- spot led 12V;
- Sensor/recorder - for temperature, humidity
SYN DT - 171
- Sensor/recorder - for temperature, humidity
Trix 8;
- Photo trapping camera - Talon Extreme 3.0MP *Digital Scouting Camera, Recon*, with Removable Compact Flash™ Memory Card 128 KP si 6 bateries R20, Invisible Infrared Illuminator, Passive Infrared Motion Detector (Triggers the camera based on heat and movement).



The internal and external monitoring gear were located in the field from the last half of the September 2010 until the first half of May 2011.

The data collected with the monitoring gear are just partially analyzed. The information collected in this period contains:

- A total time of approx. 200 days of monitoring with video/photo cameras for each monitored den;
- Approx 6 hours of movies taken inside the occupied dens during the winter sleep;
- Approx. 63.000 records (approx. 4200 records for temperature, air humidity for each 15 locations);
- Direct observation on tracks, signs and den marking made at each 15 days
- over 300 photos with details of the dens morphology and of dens areas



Den types

- Digged in to the land or
- at the tree roots



- into the old trees



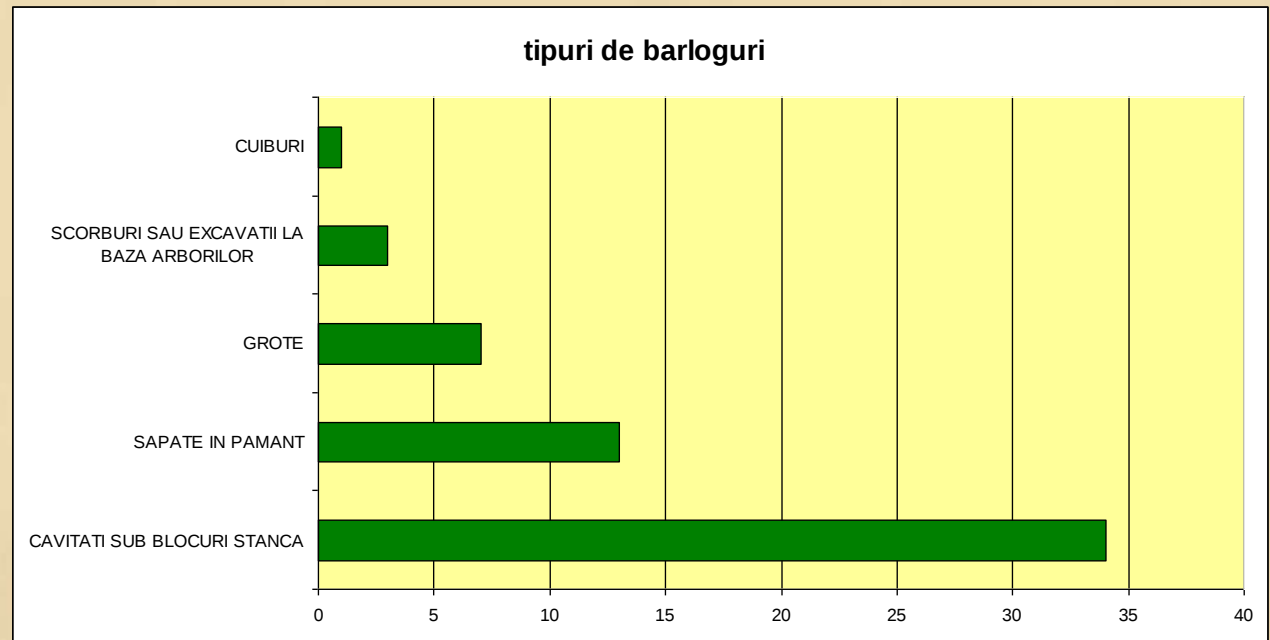
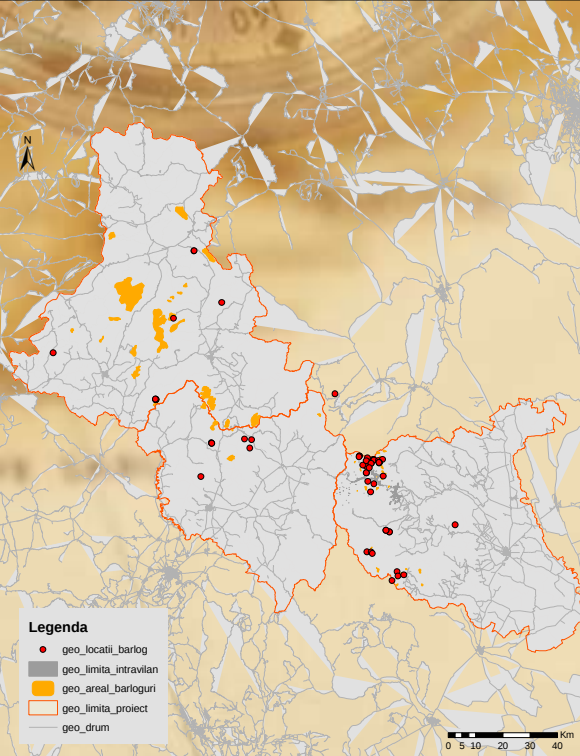
- Caves or cavities between rocks



- “Nest” on soil

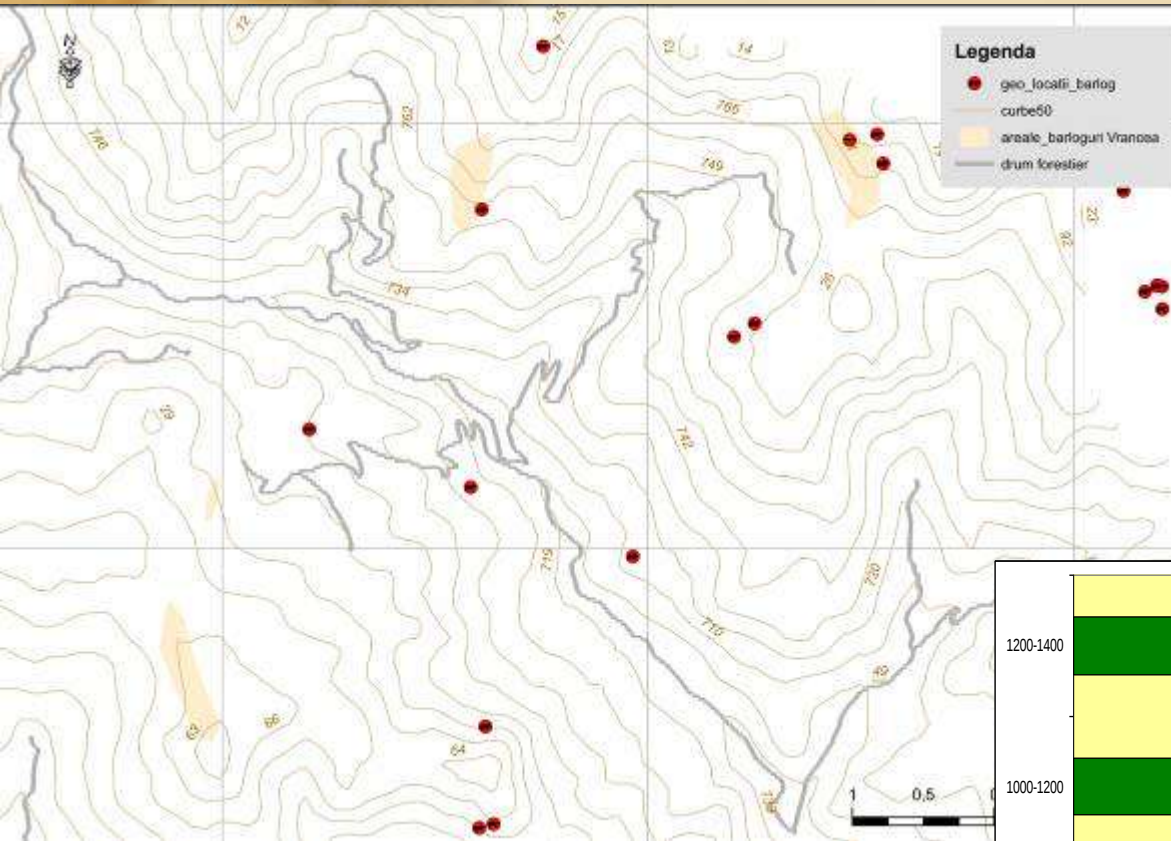


Favourable factors for selecting different types of dens

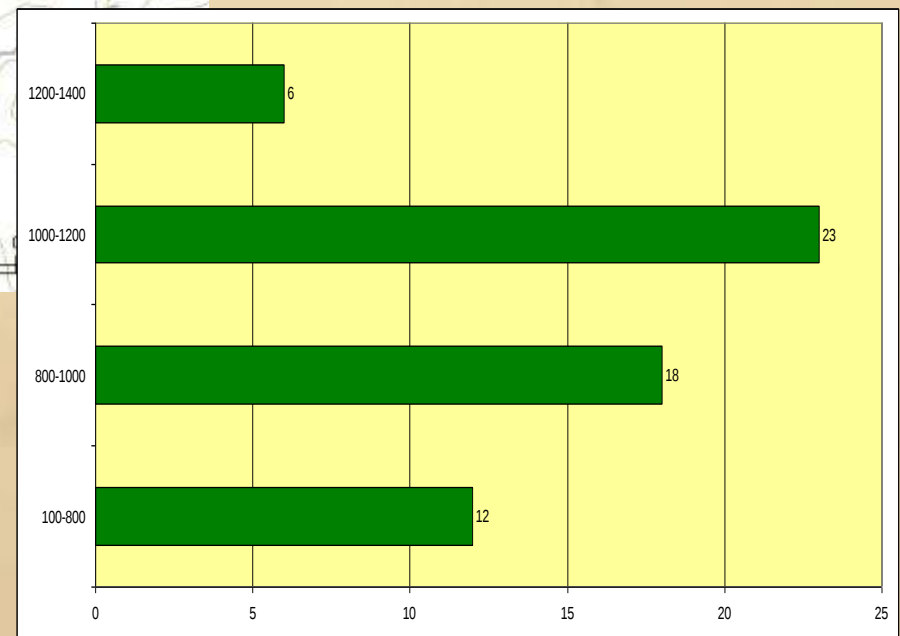


- Geological structure favorable for appearance of natural cavities;
- Presence of geomorphologic processes favorable for soil and stones erosion;
- Old growth trees, with diameter over 120;
- Closed young forest, inaccessible, especially with coniferous species on;

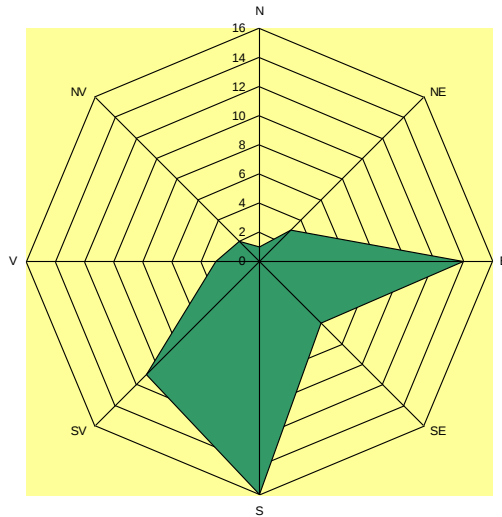
Dens distribution based on altitude



Altitude interval	Den number	%
100-800	12	20,34
800-1000	18	30,51
1000-1200	23	38,98
1200-1400	6	10,17



Dens distribution based on slope orientation and slope



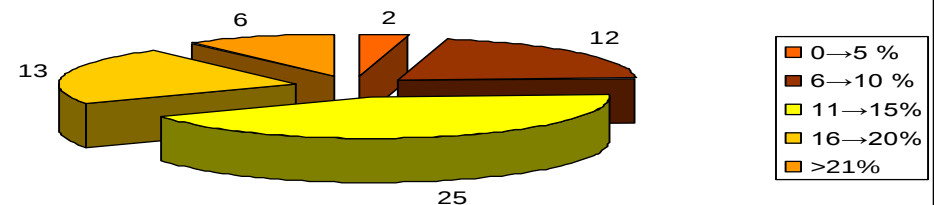
Slope expozition

Number of dens

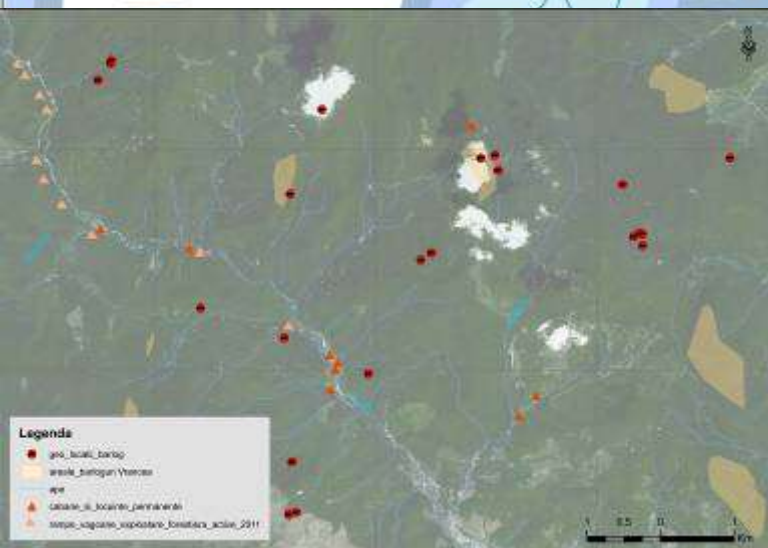
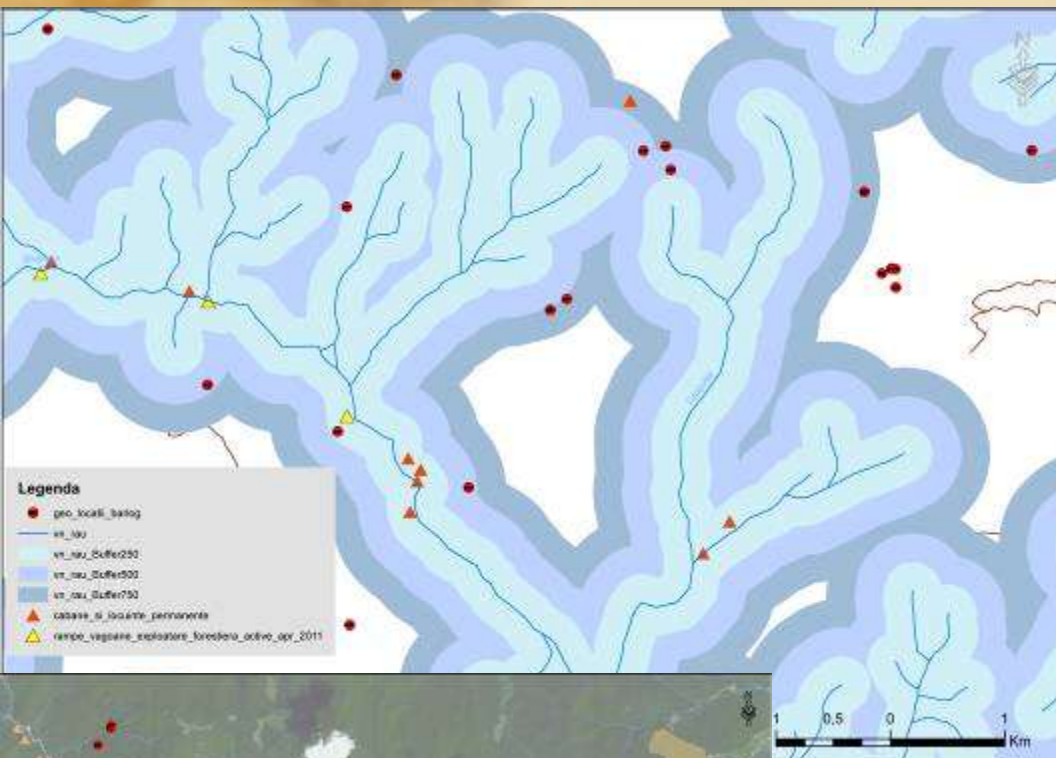
N	1
NE	3
<u>E</u>	<u>14</u>
SE	6
<u>S</u>	<u>16</u>
SV	11
V	3
NV	2

Slope	Number of dens
0→5 %	2
6→10 %	12
<u>11→15%</u>	<u>25</u>
16→20%	13
>21%	6

Declivitatea terenului



Dens distribution based on distances to the water sources



Distances

Number of dens

0-250 m

31

250-500 m

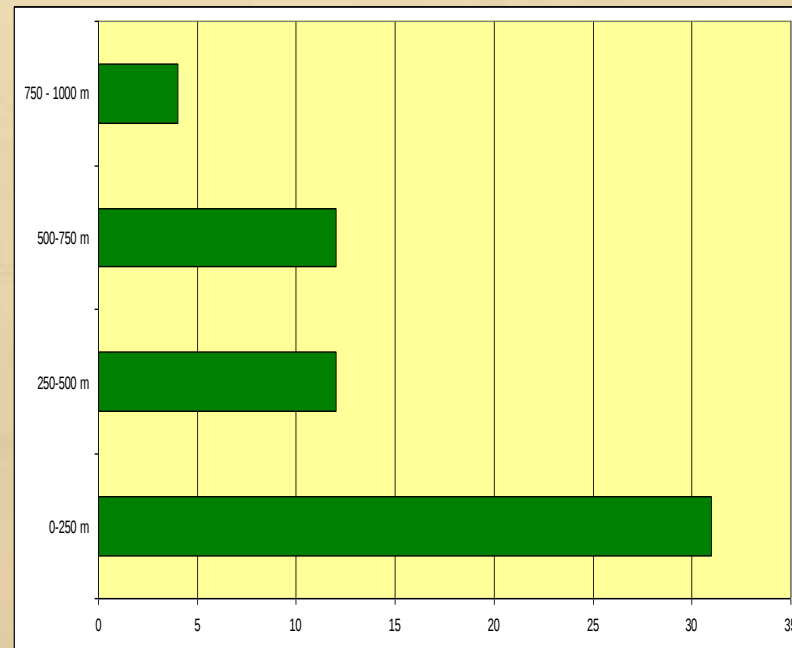
12

500-750 m

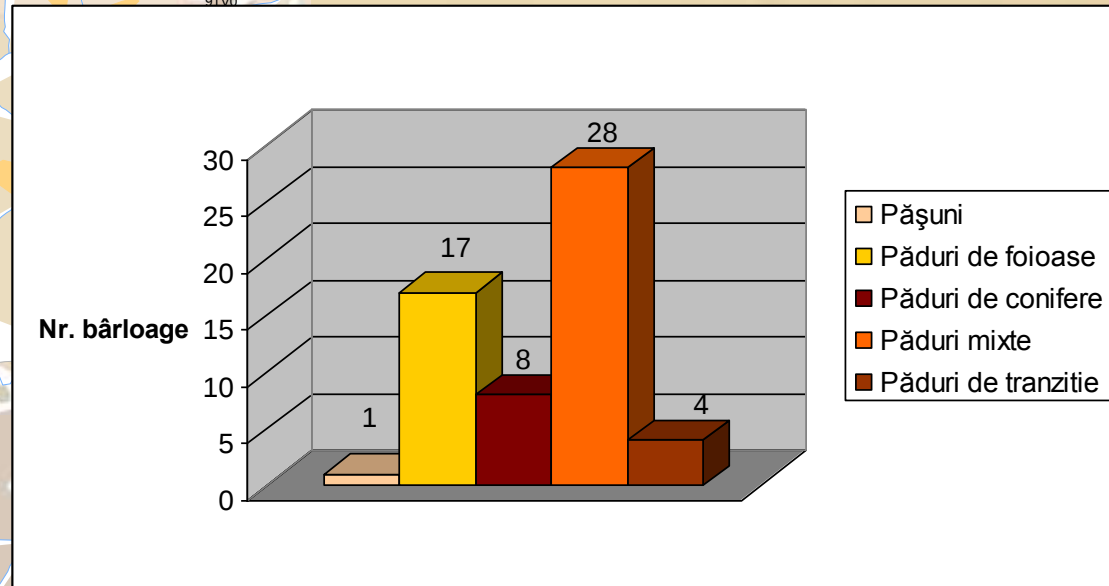
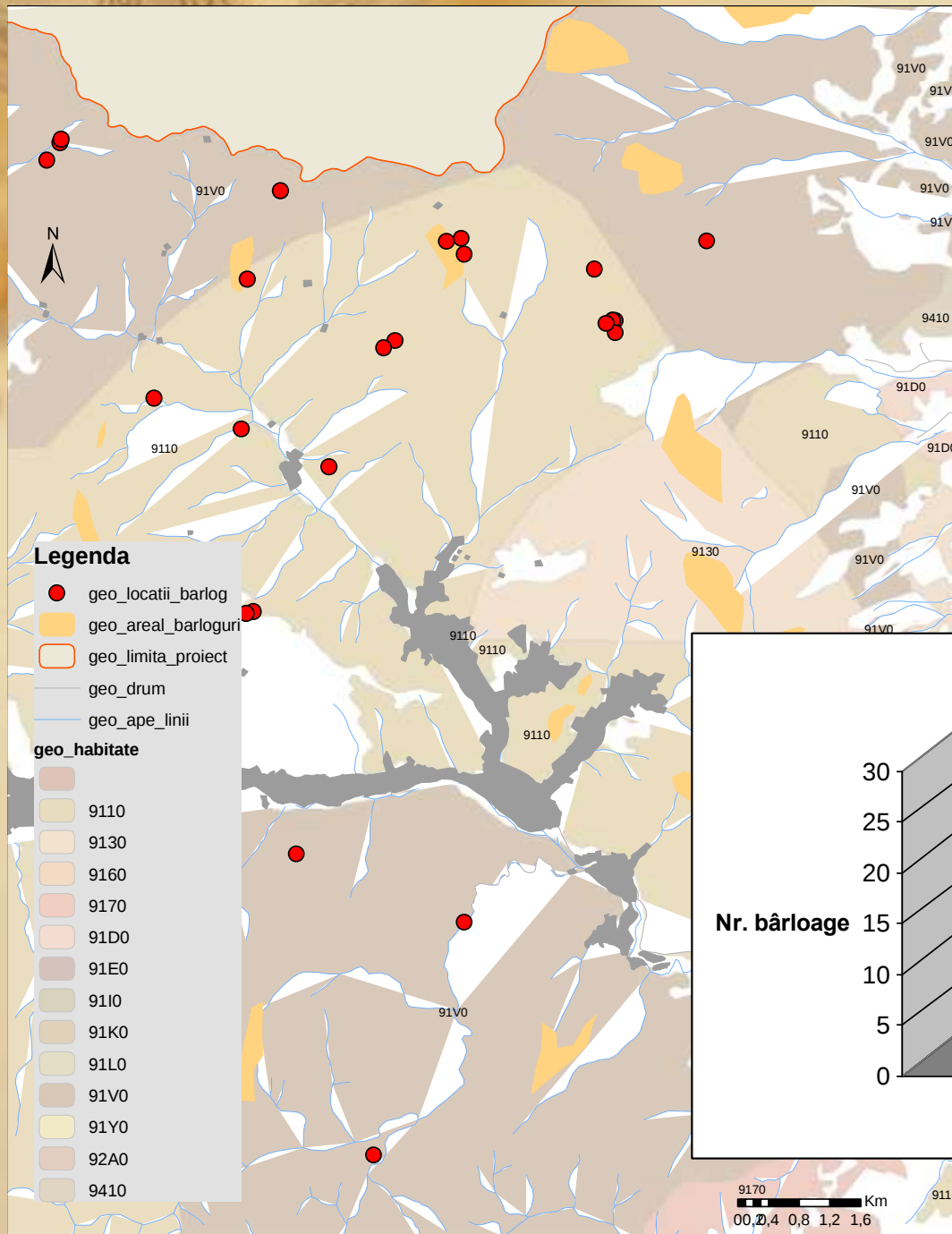
12

750 - 1000 m

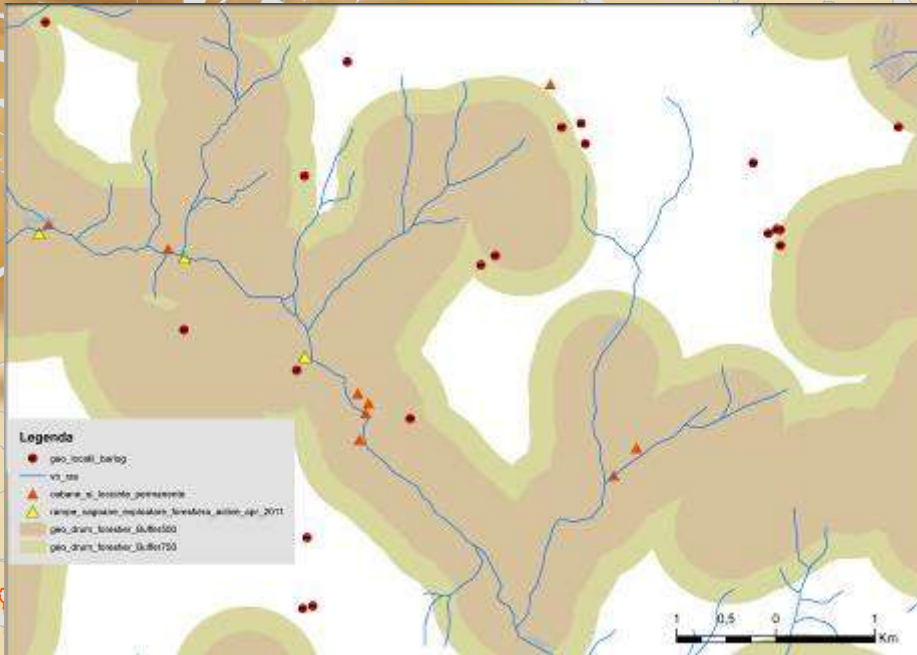
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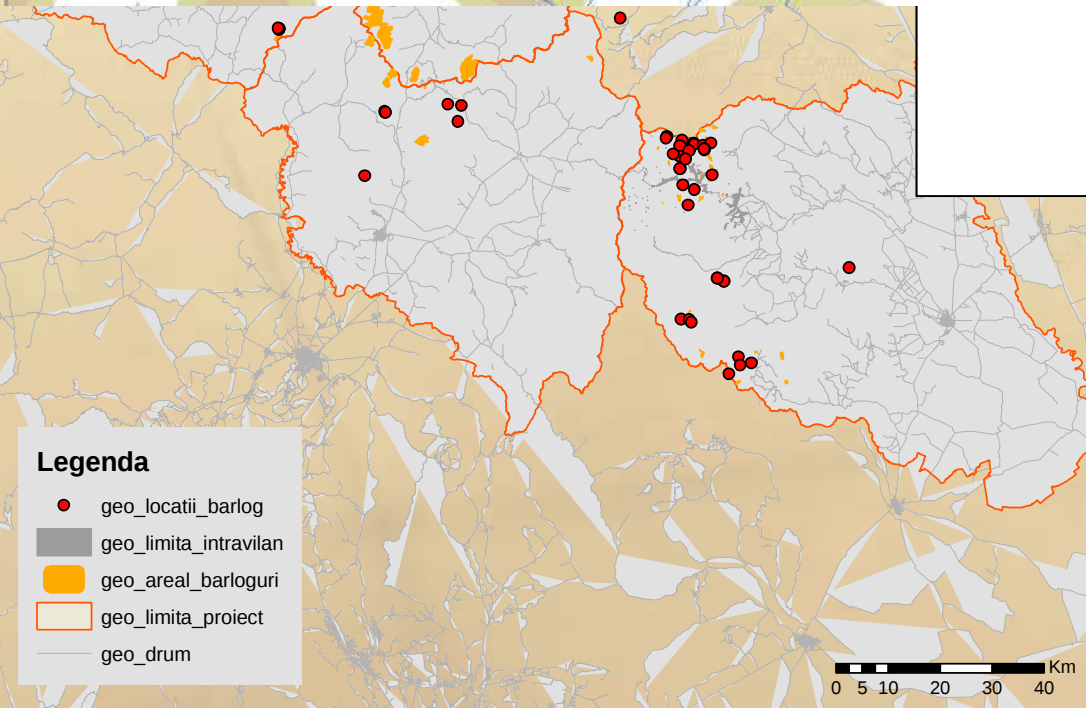
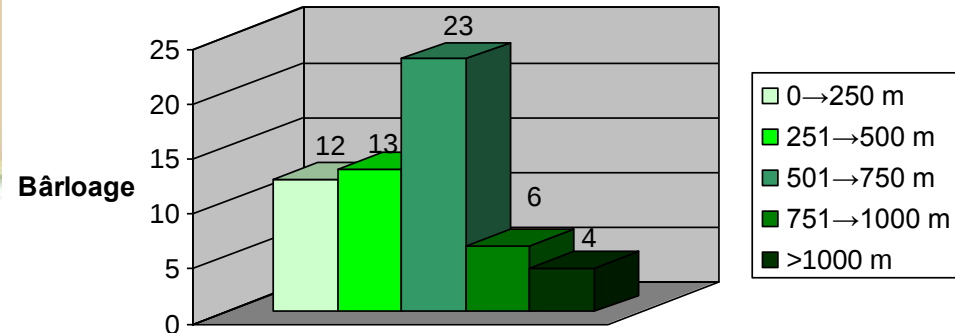
Dens distribution based on vegetation type and habitats



Dens distribution based on the distances to roads



Distanță (m) drum



Distance to road

0→250 m	12
251→500 m	13
<u>501→750 m</u>	<u>23</u>
751→1000 m	6
>1000 m	4

Favourable factors with influence on selection of the den or den area

- **Geological structure:** depozite care permit formarea de cavitati saai grote
- **Altitude:** areas between 800-1200 m
- **Orientation and slope:** South and Est orientation of the hill slope; 10-15% slope
- **Water source:** distances up to 250 m from water source;
- **Vegetation:** mixed forests;
- **Human activities/infrastructure:** over 500 m from roads

Thank you for your attention!

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