Species-specific measures to mitigate impacts of linear transportation infrastructure in Romania

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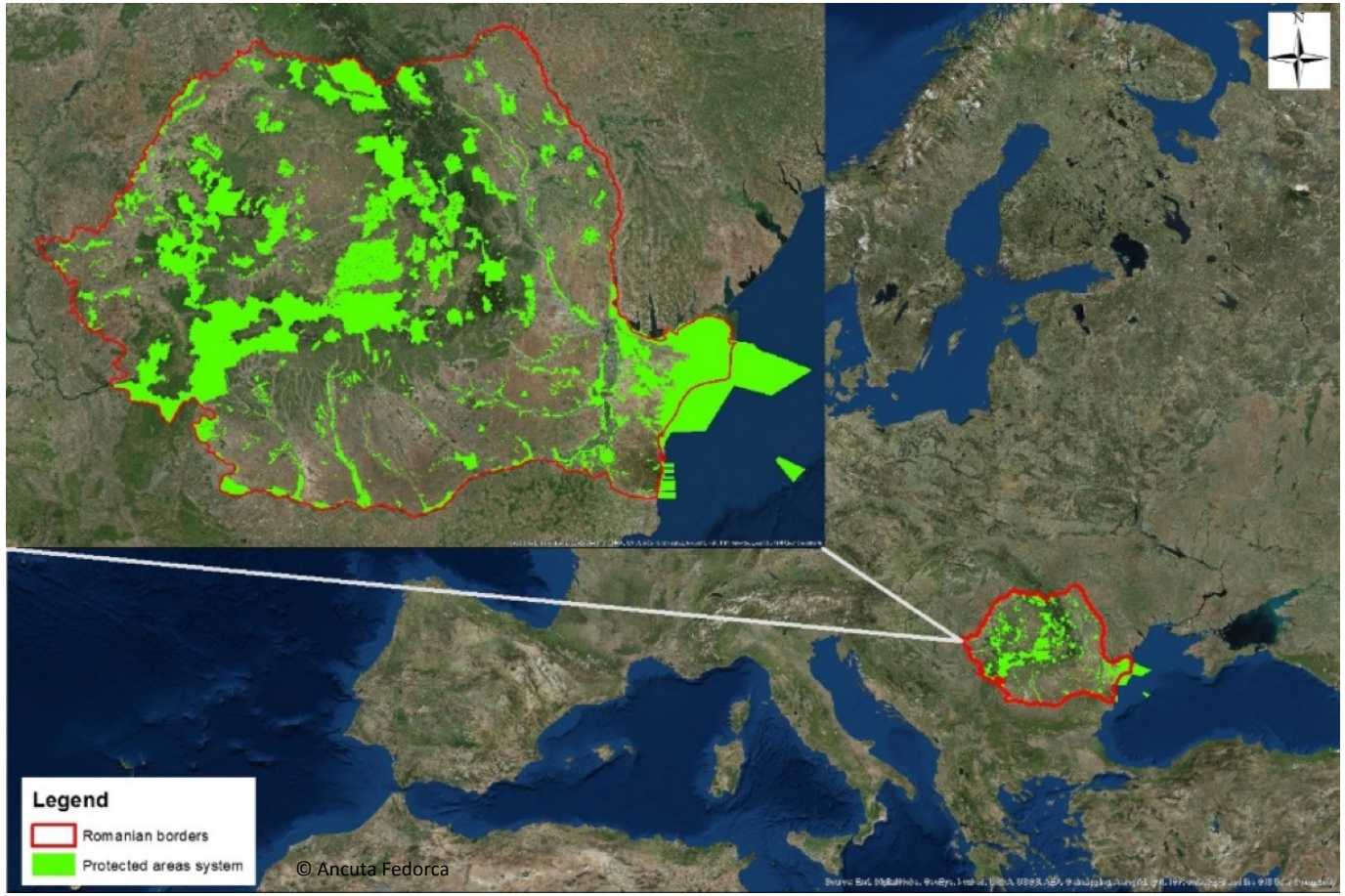
Context and challenge

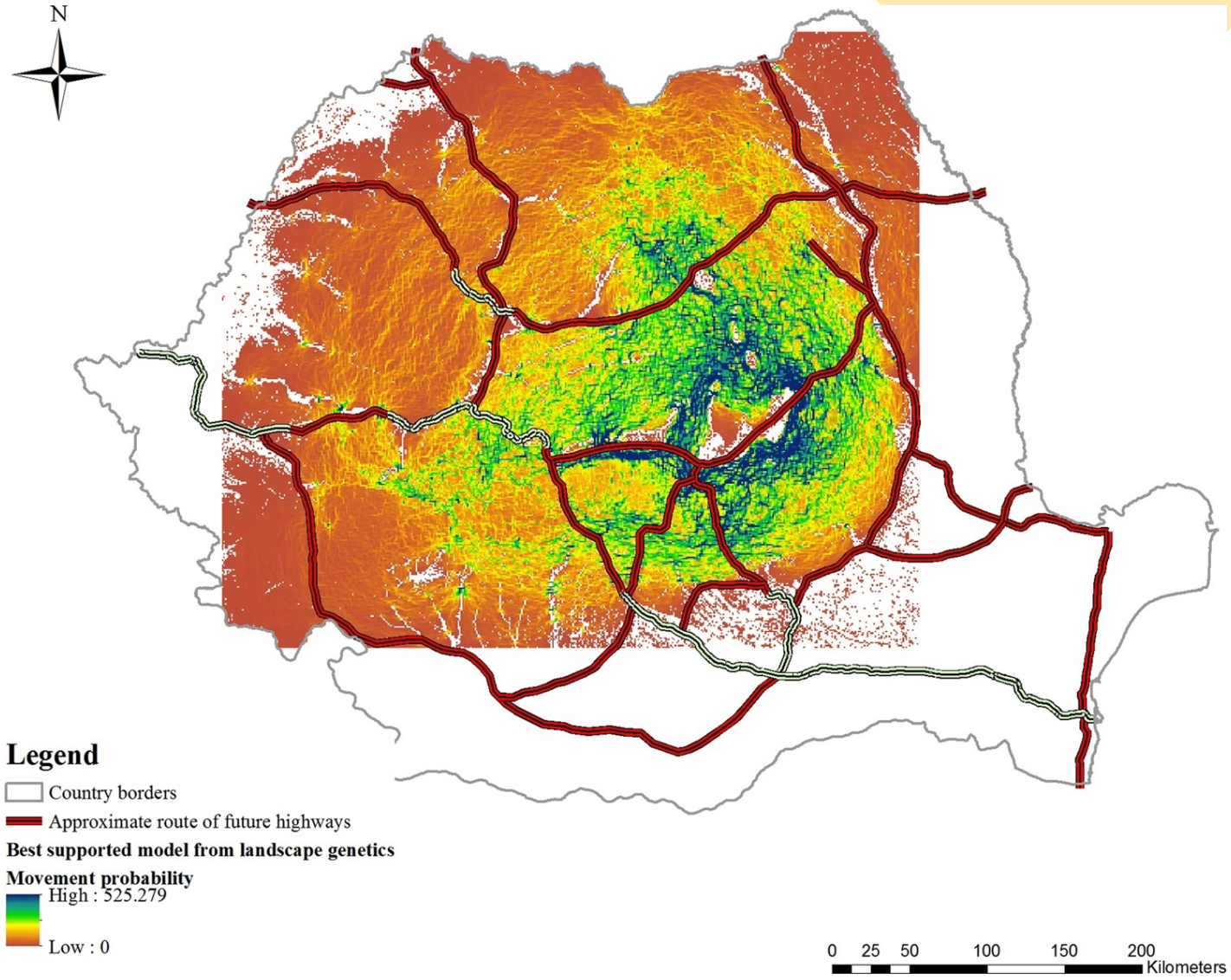
- Romania's Carpathian Mountains: largest continuous forest ecosystems in Europe; well-preserved natural habitats; large herbivores and carnivores (brown bear, wolf, lynx)
- Biodiversity hotspot at the crossroads of important biogeographic regions
- 30% of Romania is forest (including virgin forests)
- 24% of the country is included in Natura 2000 network; *however, sites are spatially disconnected*
- Threats: changes in land ownership & infrastructure development
- A case study in *IUCN Guidelines for Conserving Connectivity through Ecological Networks and Corridors*



What is the real situation ?

The example of the brown bear landscape genetics analyses….

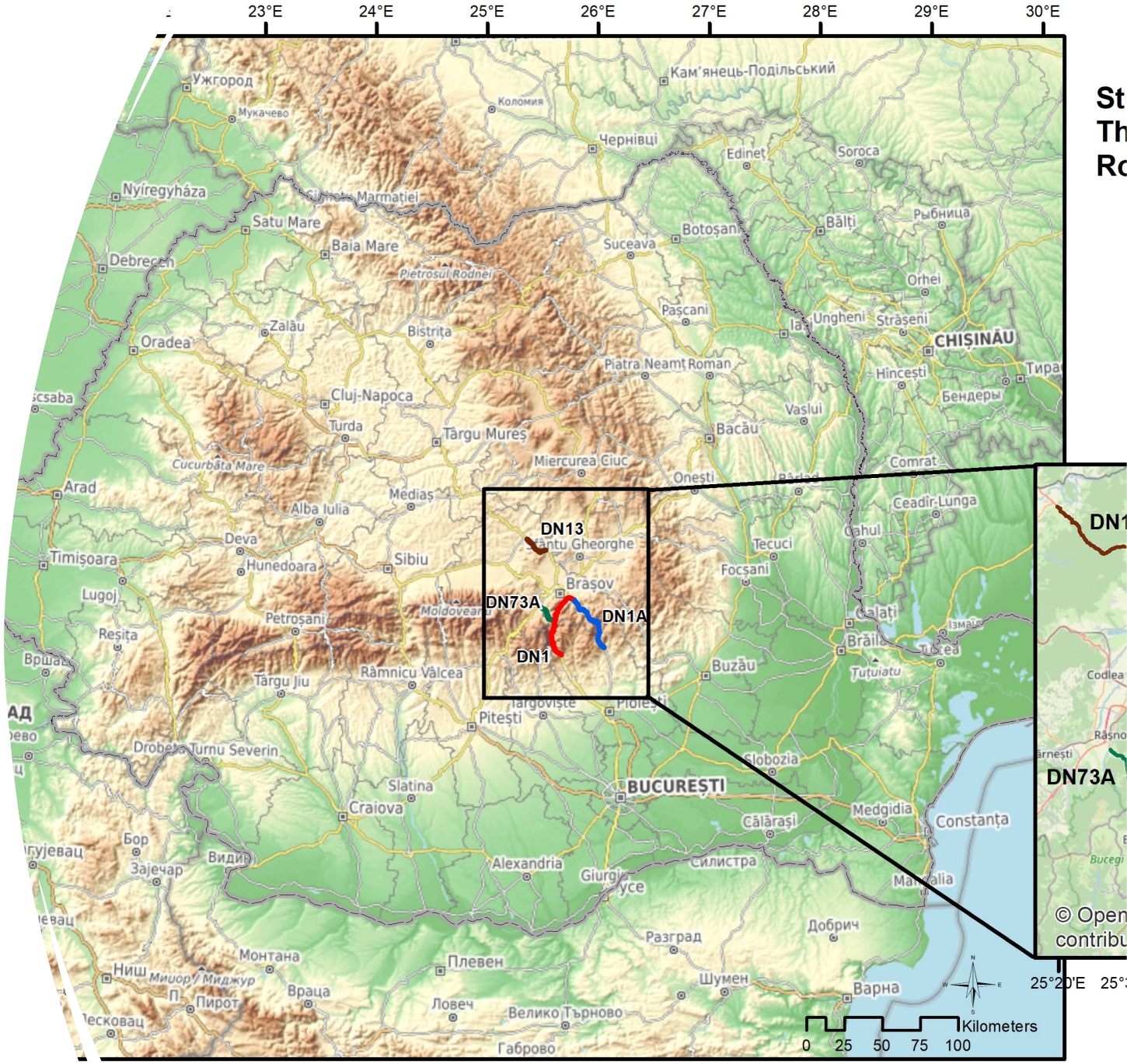
….and future development plans



Fedorca et. al 2019 Scientific Reports

I. Wildlife vehicle collisions on existing infrastructure

- Southeastern Romanian Carpathians
- Four case studies, selected on the most crowded roads:
- Prahova Valley (DN1);
- Predeal - Rasnov (DN73A);
- Sacele – Maneciu (DN1A);
- Bogatii Valley (DN13).



Aim of the study

- first model-based estimation of Wildlife Vehicle Collision hotspots in Southeastern Romanian Carpathians
- to inform the development of effective road mitigation strategies for landscape planning, ecological corridor documentation and traffic safety

Dataset

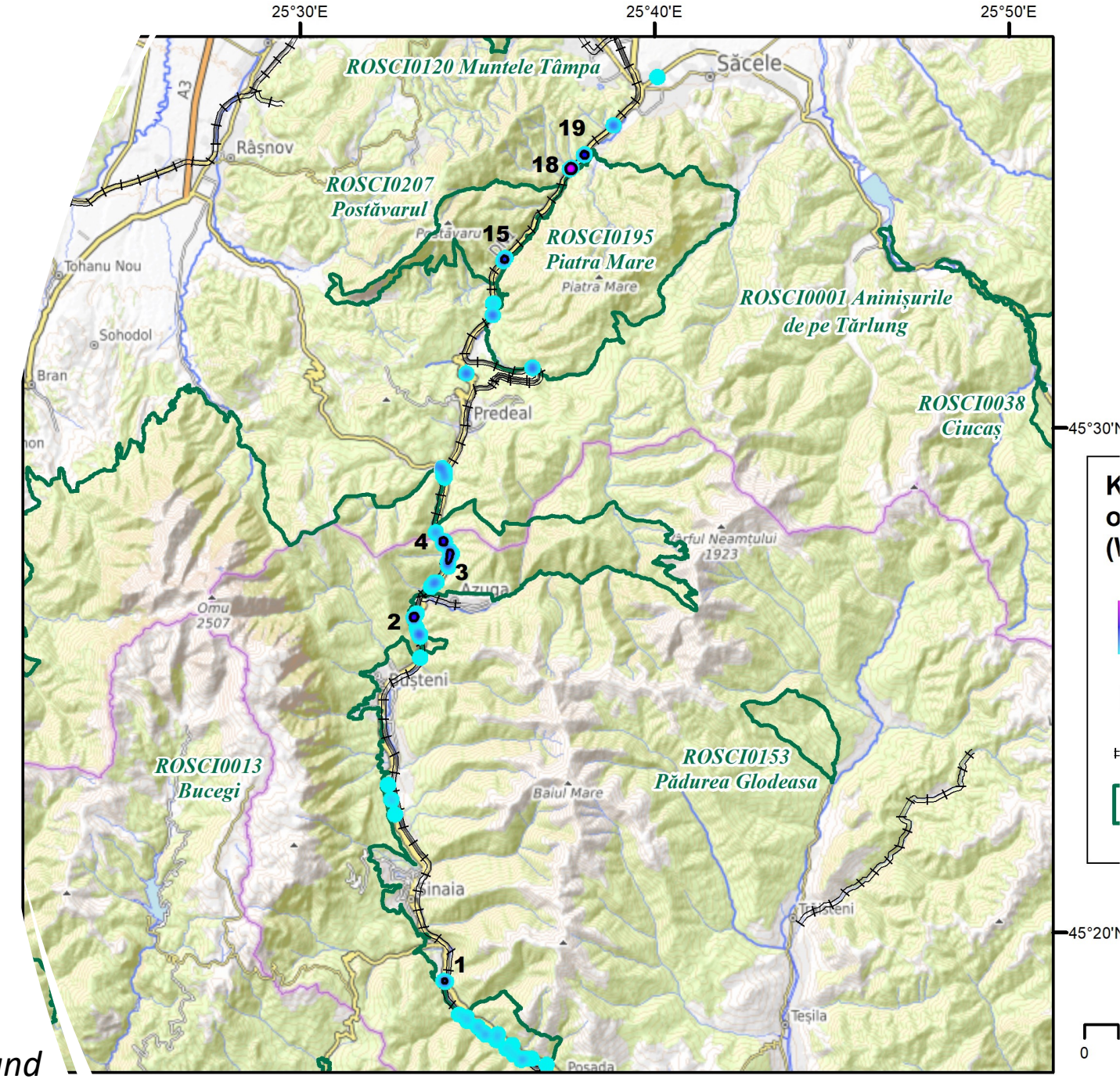
- 712 crossing's locations and wildlife–vehicle collisions (WVCs) along road/train mortalities

Data analysis

- To analyze the risk of a WVC, we had to apply weighted factors to each collision hotspot
- Furthermore, to estimate high-density accident zones, we used a kernel density estimate (KDE) analysis of the hotspots

Results

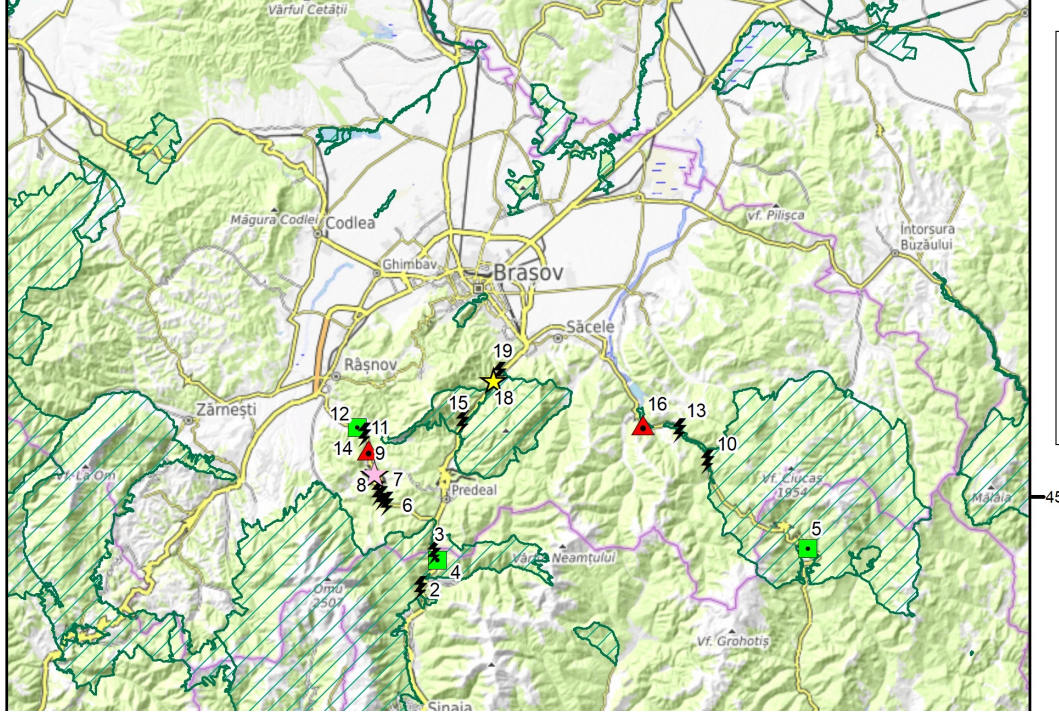
- We located 25 WVC hotspots that involved multiple species, including large mammals in just 2 counties
- 7 hotspots with high risks for animal-vehicle collisions were identified in the just one case study (Prahova Valley)
- The cumulative effect of roads, railways, and, in some areas, rivers, were registered.

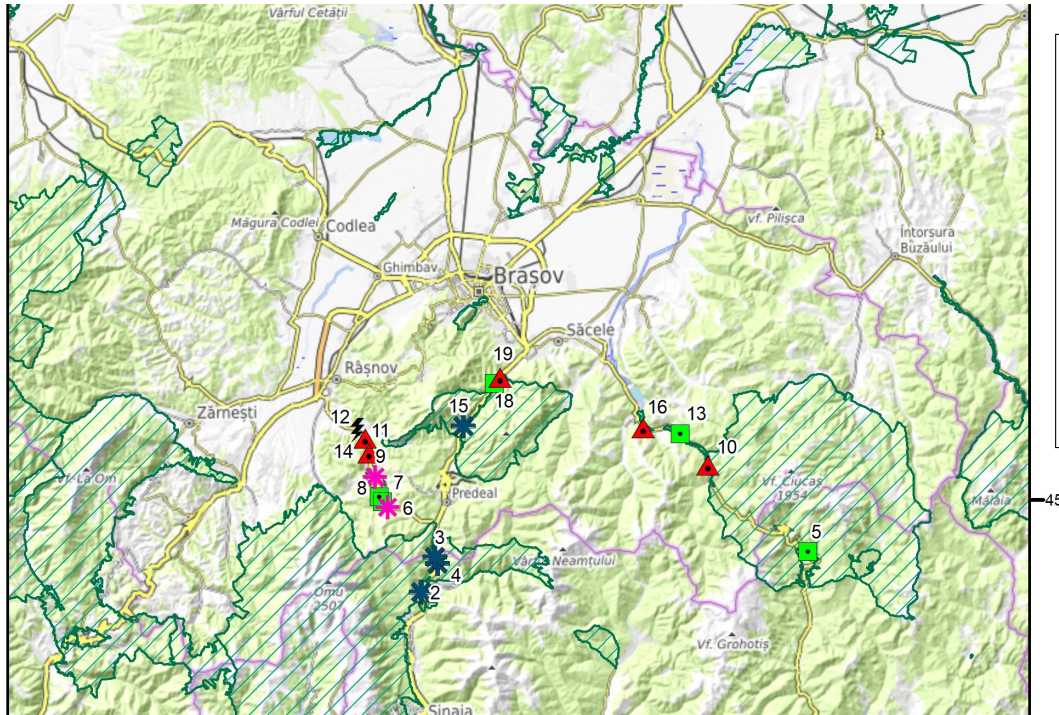


- *Fedorca et. Al 2021 Land*

Results

- A mitigation plan for road agencies has been built as well as installing mitigation measures
- WVC locations on a landscape scale encourages mitigation investment to focus on areas where it could be most effective
- WVC to be considered in an Environmental Impact Assessment and included in any ecological corridor designation
  - *Fedorca et. Al 2021 Land*





Practical results

- Recently the first two virtual fences were installed and comprises 5 WVC (https://life.safe-crossing.eu) reducing wildlife mortalities on roads from *30 individuals to 0 individuals in just 1 year*

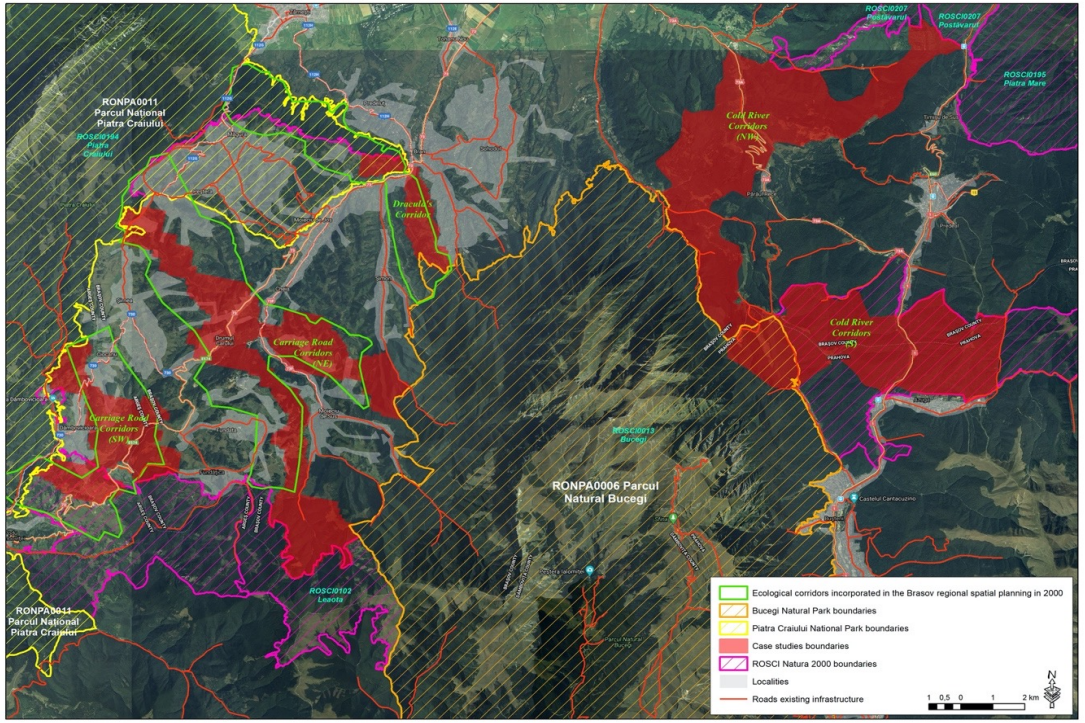
II. Measures for mitigating the impact of future infrastructure

Together with the Center for Large Landscape Conservation we implemented **the first ground testing of the** *IUCN Guidelines for Conserving Connectivity through Ecological Networks and Corridors* in Romania (Poiana Brasov) to contribute to more effective ecological connectivity conservation[1], an innovative exercise using field data, results from spatial, genetic and ecological analyses.

Workshop participants*: over 50 scientists, conservation experts, natural resource managers, and policymakers from 13 countries.*

The area of focus: the ecological network of protected areas defined as the "**GREEN CIRCULATORY SYSTEM OF THE CARPATHIANS**" that ensures ecological connectivity among the core areas in Central Romania.

Ecological network – The green circulatory system of the Carpathians
Case study 1: Cold river corridors (S) and (NW), Case study 2 Dracula's corridor, Case study 3 Carriage road corridors (SW) and (NE)



Green Circulatory System of the Carpathians

1 "Ecological Connectivity is the unimpeded movement of species and the flow of natural processes that sustain life on Earth" (Definition adopted by the Convention on Migratory Species in Resolution 12.26 (REV. COP13) in February 2020).

- ***An example of a case study Cold River Corridor validated both structural and functional during workshop***

- Large enough and wide enough to ensure multispecies ecological connectivity;

- A matrix of uses, including Protected Areas, Natura 2000 Areas, and other areas without formal designation;

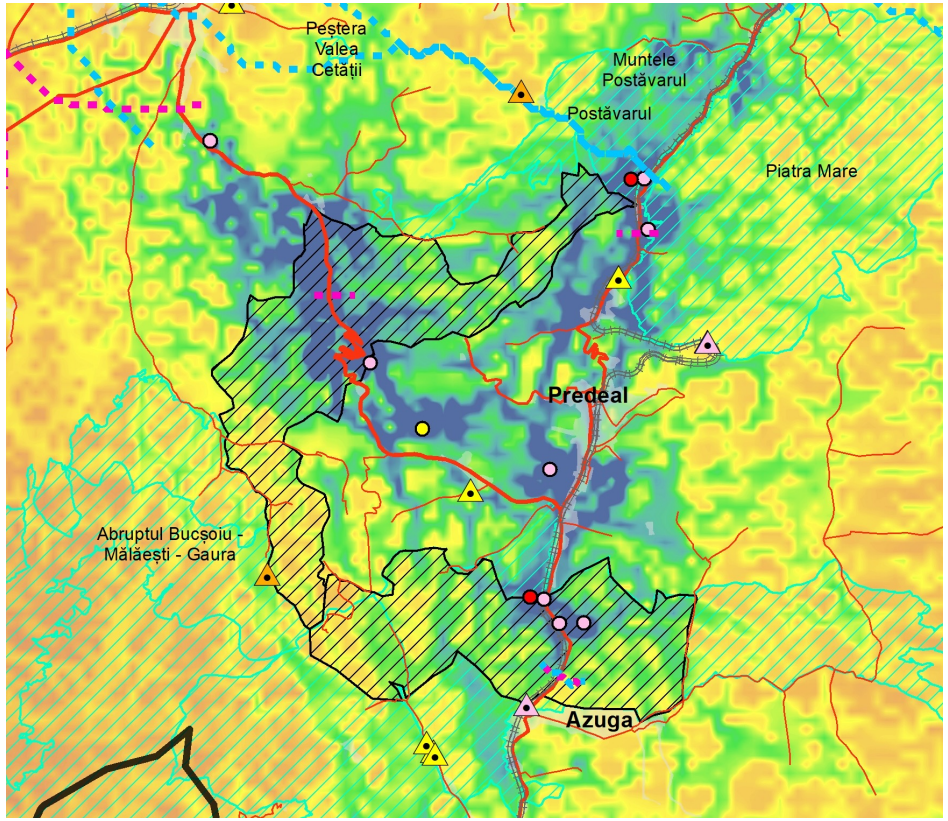
- Highly intact, and should remain so to ensure maximum quality; and

- Existing human-bear conflict zones should be considered.

- We have included the existing forest and hunting legislation

- The ecological corridor is now included as part of the updated County Master Plan;

- There is a need to inform, support, and enable decisions that would allow the resort ministry to include the ecological corridor in national ecological connectivity legislation.



Case study Cold River corridor (Fedorca et al. 2021)

- ***Case study example: Cold River Corridor validated both structural and functional***

- **Lessons learned**
  - Devise engagement and coordination mechanisms, including municipalities and counties, national and natural parks, hunting and forest administrations, etc.;
  - Improve upon the current and available data sets;
  - Consider the number and type of data sets required, such as for multiple species movement, human-wildlife conflict, various threats to structural and functional ecological connectivity, etc.;
  - Carefully identify all necessary stakeholders and undertake outreach early and often;

- **Next steps**
  - The conclusions are provided to motivate action beyond national borders

- The partners look forward to continuing collaboration conducting further workshops to apply and ground-truth the IUCN Guidelines that ensure delivery of consistent connectivity practices effectively tailored to specific contexts around the world.

IUCN WCPA World Commission on Protected Areas Connectivity Conservation Specialist Group Center for Large Landscape Conservation Yellowstone to Yukon Conservation Initiative

CONCLUSIONS

- WE NEED ECOLOGICALY DESIGNED ROADS AND MITIGATION MEASSURES FOR THE EXISTING NETWORK

- TO INCORPORATE SCIENTIFIC FINDINGS INTO ROAD DESIGN
- WHERE POSSIBLE AVOID CONSTRUCTION MEASURES THAT MAY FURTHER FRAGMENT SPECIES POPULATION
- INCLUDE MITIGATION MEASURES WHERE ALTERNATIVE ROUTES ARE NOT FEASIBLE

- THE DESIGNATION OF ECOLOGICAL CORRIDORS AND NETWORKS IS URGENTLY NEEDED BY USING *IUCN Guidelines for Conserving Connectivity through Ecological Networks and Corridors*

Thank you for your attention!

On behalf of all the co-authors, workshop participants and other contributors

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