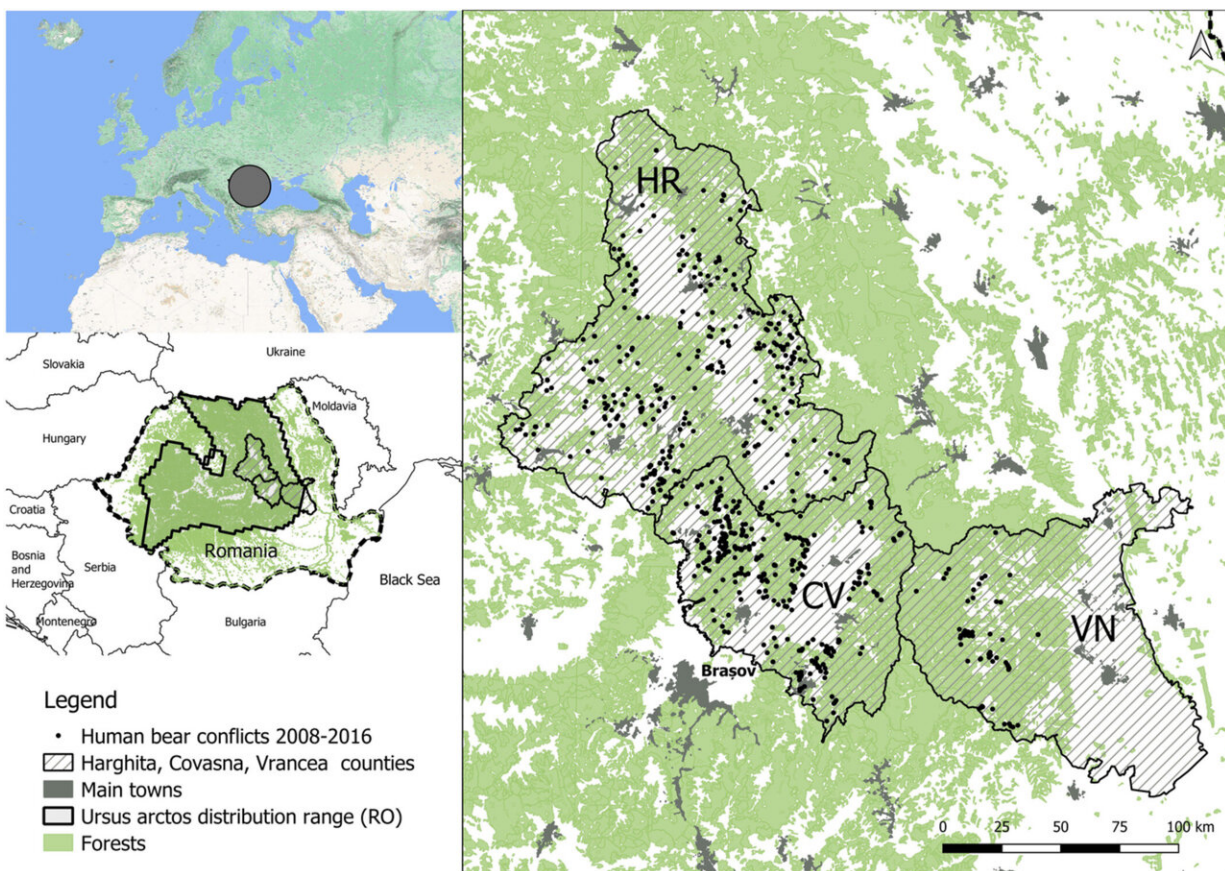


First assessment of livestock predation risk from brown bears in Romania

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Distribution of recorded bear predation events in Eastern Carpathians, Romania, 2008–2016. Credit: *Conservation Science and Practice* (2023). DOI: [10.1111/csp2.12884](https://doi.org/10.1111/csp2.12884)

Brown bear management and conservation are the core of heated debates

in Romania. As the country harboring the largest population of brown bears in Europe, coexistence between bears and people has always been at the forefront of brown bear management and conservation. Livestock predation is the main source of conflict in rural communities in the Romanian Carpathians, as domestic animals are the foundation, and often the main source of income for local economies.

While this topic is prominent in the ongoing discourse around brown bear management in Romania, the drivers determining predation risk to [livestock](#) have not been well understood.

Assessing livestock predation risk and mapping risk—and potential human-bear conflict areas—is what a team of researchers from the University of Bucharest, Ohio University and several management agencies and environmental NGO's, led by Dr. Mihai Pop (University of Bucharest) and Marissa Dyck (Ph.D. student at Ohio University, Conservation Biology Lab), sought to investigate and have recently published in *Conservation Science and Practice*.

This study is the culmination of a large collaborative data collection effort spearheaded by three local Environmental Protection Agencies. For nine years, between 2008 and 2016, teams of wildlife managers, veterinarians and local authorities responded to bear livestock predation incidents, documenting the type of livestock, number of animals killed, location of events and other relevant data.

"Overall, we found that three different types of livestock: cows, sheep and other animals, such as pigs, chickens or horses, differed in their exposure and risk to bear predation, and that predation risk was driven by both environmental and social factors, such as grazing regime," said Dyck.

"In particular, the risk of predation for cows is higher near villages and

[forest edges](#), as well as in areas with traditional land use, such as pastures intermixed with small forest patches, or orchards. Sheep had high risk of predation from bears near forest edges and in areas with large continuous pastures, such as those situated at [higher elevations](#)."

The researchers found that, in general, livestock damage was more prevalent near villages, suggesting that bears make use of food resources associated with human habitation, visiting dumps, but also gardens and orchards. In addition, there were no trends through time in the number or type of livestock predation events throughout the study period.

The authors believe that the differences between sheep and cows predation risk is likely due to their different grazing regimes. Cows are often less well guarded, even when grazed away from settlements, with minimal human supervision. Thus, grazing cows near villages and farther from forest edges would lessen the risk of predation.

Traditional sheep grazing management involves migration or short transhumance between higher altitude meadows during summer and lowland villages during winter. This makes sheep more prone to predation near forest edges in remote areas. In contrast to cows, sheep are well guarded when in [remote areas](#), with constant supervision from shepherders and guard dogs, who sometimes are present during nighttime in the same corral with sheep and guard dogs.

One important finding of this study was that the brown bear abundance was positively associated with predation risk for all livestock species.

"This finding was expected, as many studies of bear predation on livestock have shown a similar pattern. However, it is important to note that the bear abundances used in this study were not validated scientifically and may not reflect the actual abundance; they are only useful in relative terms, for example if one game management unit had

double the abundance of a neighboring unit," Pop added.

In a study published in the *Journal of Applied Ecology* in 2016, Pop and colleagues found that the official abundance estimates were not reliable and frequently overestimated the number of bears in two of the counties used in the current study. Therefore, they argue that while bear abundance is indeed influencing predation risk for livestock, this study cannot provide definite cutoffs or thresholds of bear abundance that would eliminate risk. Two other factors add complexity to this issue.

First, areas with highest brown bear densities correspond to high food subsidies, either intentional via supplemental feeding of wildlife by managers or unintentional via suboptimal trash management. Second, some [predation](#) instances analyzed here were likely done by "repeat offenders," bears which are habituated to humans, frequently come near villages and predate repeatedly on livestock.

This is important from a bear population management perspective. After the 2016 ban on trophy hunting, a management system that can only use lethal methods in cases of conflictual bears has been implemented. Therefore, removing animals that repeatedly prey on livestock could be a feasible strategy to alleviate and minimize livestock losses.

Dr. Cristian Ioja, professor at the University of Bucharest, Department of Geography and co-author on the study, added that mapping the livestock [predation risk](#) at the landscape level provides a critical piece of information towards human-bear coexistence.

"Highlighting high risk areas informs both local communities and management agencies on targeting management solutions," Ioja said. "These could involve shifting grazing patterns away from high-risk areas, improved livestock defense or decreasing food subsidies that attract bears close to human habitation, both via improved trash [management](#) or

less supplemental feeding of wildlife."

Overall, this study sets the baseline for understanding the landscape of human-bear conflict and opens many other questions about human-bear coexistence.

The authors plan to collate data on livestock depredation after the hunting ban (2017 onwards) to understand potential changes in the spatial patterns and frequency of depredation events. In addition, the authors plan to collaborate with social scientists to understand the attitudes of local communities affected by livestock depredation towards brown bears and the best solutions to alleviate conflict.

More information: Mihai I. Pop et al, Predictors of brown bear predation events on livestock in the Romanian Carpathians, *Conservation Science and Practice* (2023). [DOI: 10.1111/csp2.12884](https://doi.org/10.1111/csp2.12884)

Viorel D. Popescu et al, Assessing biological realism of wildlife population estimates in data-poor systems, *Journal of Applied Ecology* (2016). [DOI: 10.1111/1365-2664.12660](https://doi.org/10.1111/1365-2664.12660)

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