Factors affecting the exposure of large carnivores to health threats along an urbanization gradient

Human activities have significantly altered ecosystems, resulting in decreased biodiversity and threatening numerous wildlife populations. This disruption increases mortality rates and reduces the reproductive success of these species. Additionally, humans have introduced various new threats to wildlife survival, such as chemical pollution and a heightened risk of diseases. To identify the conservation needs of wild species, it is essential to understand how different human activities impact them and how changes in landscapes affect wildlife health.

Human activities that modify landscapes can disrupt interactions between hosts and parasites, contributing to the rise of infectious diseases in wildlife. It is crucial to understand how these human-made environments influence disease rates. Increased interactions among people, livestock, pets, and wildlife due to landscape fragmentation can facilitate the transmission of diseases from domestic animals to wild species. This movement of pathogens can lead to "pathogen pollution," where various wildlife diseases spread among both domestic and non-native species.

Wildlife is often drawn to human neighborhoods due to the availability of human-made resources, such as food, shelter, and breeding sites. The abundance of human-sourced food—including animal carcasses, waste, injured game, and leftover parts from hunted animals—can significantly decrease predatory behavior in wild carnivores, even in the presence of ample natural prey. However, this food is often of low quality and may contain harmful substances, such as antibiotics, chemicals, heavy metals, and metalloids. Close interactions with people can stress wild animals, altering their gut microbiome and potentially affecting their health, making them more susceptible to diseases.

Carnivores are particularly vulnerable to pollution and diseases due to the bioaccumulation of toxic substances. This vulnerability makes them effective early warning indicators of changes in ecosystems. In Europe, large carnivore populations are increasing. Once confined to vast forest areas, these animals are now frequently seen in highly fragmented landscapes, leading to more interactions with domestic animals, increased reliance on human food sources, and greater exposure to chemical pollution and diseases.

In this project, I will examine how urbanization, landscape fragmentation, and increased interactions with livestock, dogs, and cats—along with human-made chemical pollution—affect the health of two charismatic large carnivores: grey wolves (*Canis lupus*) and Eurasian lynxes (*Lynx lynx*) in Central Europe. Information from these key species can help environmental and veterinary agencies make more informed decisions regarding nature conservation and disease prevention.