

Identifying relationships between multi-scale social-ecological factors to explore ungulate health in a Western Kazakhstan rangeland.

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Rangelands are areas where wildlife and livestock share space. Nearly 40% of all land on Earth is rangelands, and rangelands are important for the survival of both wild and domestic species. As wild and domestic life share space in rangelands there is a chance that disease might transmit between them. We show various social and ecological factors act together for disease transmission to occur, which in turn can affect the health of wild and domestic species.

We worked in a Kazakhstan rangeland called Ural. Ural is home to wild saiga antelopes and livestock – primarily sheep and goat. While many diseases can transmit between saigas and domestic livestock, we focused on Gastro-Intestinal Nematodes (GINs). These are parasites found in the stomach of these species. GINs are important to consider as they are transmitted between species that share pasture, like saigas and livestock do in Ural. We used various methods to understand what factors affect both saiga and livestock health in Ural. We conducted parasite egg count in the freshly dropped feces of saigas and livestock to understand how many parasites they each had. We also conducted interviews and had discussions with livestock owners and herders (collectively: farmers) and also used online data.

We found that in Ural, people kept livestock in two ways. Livestock were either kept close to villages or on farms out in the grasslands away from villages. The grassland is where saigas roam. Village-based livestock had a lot more parasite eggs in their feces than livestock out in the grassland. The latter had similar amount of parasite eggs as saigas. We also found that various factors increase the chances of GIN transmission between saiga and livestock. These include veterinary services being limited, both saiga and livestock numbers are increasing and changing climate is increasing farmers'

dependence on shared pastures for hay.

To conserve saigas while ensuring people's livelihoods aren't negatively affected requires conservationists to engage in various interventions that work together. Overall, threats from disease transmission and plans to develop interventions in rangelands are best considered from an interdisciplinary perspective.



A new-born saiga calf in the Ural steppe

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