Identifying Mineral Lick Locations from Movement Data

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ABSTRACT: The spatial distribution of mountain ungulates is driven by trade-offs between inter- and intraspecific competition for resources, predation risk, and access to mates. Mineral licks are important landscape elements that are known to influence the movements of ungulate species and are used regularly during spring and summer months. While there is no definitive consensus on why animals utilize mineral licks, there is no doubt that they are frequently and repeatedly visited by alpine ungulates during spring and summer. The temporal and spatial concentration of ungulate activity at mineral licks suggests that they may play a role in pathogen transmission. The mountains and foothills of southwest Alberta, Canada are home to a large population of bighorn sheep that have experienced historic disease outbreaks associated with exposure to domestic livestock. Using temporally explicit spatial data from GPS-collared bighorn sheep (n=67), representing 89 summer seasons, we identified patterns of movement associated with the use of known mineral licks to predict locations of previously unknown lick sites. The resulting model allows prioritisation of site investigations for the identification of high probability mineral lick locations used by bighorn sheep. Identifying the location of these important landscape features will help us understand disease transmission risk and design effective outbreak response plans, as well as assist in species management in multi-use landscapes.

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