

Drivers of Elk Aggregation on The National Elk Refuge, Wy

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In North America, diseases in ungulates have elicited increased attention due to direct impact on populations and indirect effects on outdoor recreational industries. Chronic wasting disease (CWD) has been found in 21 US states and 2 Canadian provinces over the last 40 years and is rapidly spreading in Montana. Degree of sociality and aggregation can drive disease spread and transmission. In Wyoming, supplemental feeding of elk during winter occurs on 22 feedgrounds, including the National Elk Refuge (NER), and concern that feeding increases elk aggregation and thus disease spread has been rising. However, the comparison of feeding to other factors, including abiotic drivers of aggregation, such as snow levels has been underexplored. The winter of 2017-2018 had relatively high forage and little snow, which led to a rare non-feeding year on the NER, providing a unique opportunity to evaluate the role of feeding in aggregation relative to other conditions. We examined data from 2016 to 2019 for 68 elk fitted with GPS collars resulting in 223,526 elk relocations. We used a proximity index to assess daily joint space use of elk and modeled proximity using beta regression as a function of 13 variables including abiotic weather-related effects, biotic effects such as supplemental feeding and hunting pressure, and aggregation from the prior day. This approach may be useful for assessing management implemented with the intent of reducing aggregation. Mean daily elk aggregation was 1.7 times larger during winters with feeding but was also strongly regulated by snow cover and hunting pressure.