

You are invited to attend the presentation of the Final MSc Defense of Kelsey Gritter

Date January 25, 2022
Time 1:00 p.m.
Location Virtual

"Individual-based movement model of mule deer (*Odocoileus hemionus*) contacts and application to artificial attractants"

Abstract: Chronic wasting disease (CWD) is an emerging prion disease in Canada that infects mule deer, white-tail deer, elk, and moose by direct and environmental transmission and is invariably fatal. CWD spread can be promoted at "hotspots" that attract deer, such as attractants that are created in fields by hay bales and grain bags, and attractants such as grain bins and agricultural storage at farm sites. An individual-based model was created to investigate the effects of different densities and arrangements of hotspots on contact rates between- and within-groups. The model tracks contacts (when two individuals come within five meters of one another), which are defined as between- or within-group depending on the group membership of the two individuals. Simulations are run in Netlogo on a heterogeneous landscape and include behaviours such as grouping and home ranges. Deer are moved across the landscape model at a two-hour time step based on step-selection movement rules relative to resources and group behaviours. The integrated step-selection function utilizes GIS layers for environmental weights and GPS-collar movement data for calculating step-selection coefficients, and step length distributions. Sensitivity analysis was performed on the model and revealed a greater sensitivity of within-group contacts to changes in model parameters, particularly group cohesion. Following model analysis simulations were run to assess the effect of attractant density and configuration using two strategies to initially place attractants on the landscape, random and clustered around farms, and two strategies for removing them, random and by proximity to woody cover. Simulations revealed that reducing the number of attractants on the landscape increases between-group contacts as well as unique contacts between deer. Additionally reducing AA density generally increased overall unique visits per site indicating potentially greater environmental contamination at remaining sites. While having no attractants produced the lowest contact rates management must take into consideration the feasibility of eliminating all attractants and the potentially negative impacts if sufficient reduction of AA is not achieved. Additionally, removal strategy must be taken into account as while removal by proximity to woody cover and randomly showed similar patterns, for field attractants removing by proximity to woody cover caused a greater increase in contacts. For removal at clusters around farms, removing individual attractants versus all attractants in a cluster resulted in different trends as removing individually had a limited effect on contacts.