



RESEARCH BRIEF

Evaluating the mechanisms of landscape change on white-tailed deer populations

The research outlined in this brief is not affiliated with the ARCKP and the content below provides a high-level summary of some of the key findings and discussion points. For full details, please view the full research report.

Summary:

The distribution of white-tailed deer populations is expanding in Alberta and across Canada. This can lead to an increase in wolf populations and a subsequently higher predation rate on woodland caribou, a threatened species. Both climate change and human caused changes to the landscape are believed to contribute to white-tailed deer expansion, but it's difficult to isolate and evaluate the impact each of these factors. This study sought to gain a deeper understanding of the effects of both climate change and anthropogenic changes to the landscape on the presence and density of white-tailed deer. It evaluated the relative influence of snow conditions and human modified habitat on deer populations across large areas in Alberta. Understanding the mechanisms or causes of white-tailed deer abundance and distribution is important to managing predator species and other prey species like woodland caribou.

Key findings and implications to management

Findings from this study suggest white-tailed deer presence in winter is influenced by both snow depth and habitat alteration. Regardless of latitude, deer presence decreased as snow depth increased, especially at depths greater than 23 cm in the north, and 65 cm in the south. In spring, the previous winter's snow depth influenced the presence of deer, suggesting severe winters have the potential to reduce deer populations. Areas with higher levels of habitat alteration increased the likelihood and density of white-tailed deer in northern areas, but not in southern areas. The presence of deer was significantly higher in the winter when habitat alteration was greater than 50%, whereas in the spring, the greatest variation occurred when habitat alteration was below 50%. These results indicate white-tailed deer populations may already be established in the more northern areas of the province, but intensive restoration or protection of caribou habitat may help suppress deer populations and lead to reduced predator populations and therefore, lower predation on caribou.

Methods

Researchers used motion-sensitive cameras between 2015 and 2019 to obtain over 195,000 images of white-tailed deer. Presence and density of deer was calculated for each month to assess how deer were impacted by changes in snow depth. ArcGIS data was used to gather average snow depth and to measure the percent area with habitat alteration within a 1 km² radius of each camera. Habitat alterations included linear features, harvested forests and agriculture to assess the cumulative effects of all land-use types. Differences in the dominant land-uses were separated by latitude classes (e.g., agriculture in the south and oil and gas and forestry in the north) and the number of camera days was used to calculate differences in monitoring effort between sites.

Limitations or remaining uncertainties

Motion-sensitive cameras may not detect all deer presence or contribute to behavioral responses (e.g., attraction or avoidance). Additional monitoring is needed to understand how variations in winter severity influences white-tailed deer distribution and abundance over time and to differentiate between seasonal movement patterns and long-term range shifts.

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Research Theme

Impact of snow conditions and human-modified habitat on white-tailed deer populations and implications for managing woodland caribou.

Study Area

Between latitudes of 49.06° and 60.01° N in Alberta, Canada. A total of 2842 motion sensitive cameras were used across 767 sites between 2015 and 2019.

Link to Full Article

[Read the full article](#)

Additional Resources

[ARCKP webinar presentation](#) (first presentation in the webinar recording)