

**Evaluating the interdependency between white-tailed deer and northern hardwood habitat; increasing our understanding of forest management and white-tailed deer health.**

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## **Project Summary**

The 2012 Deer Trustee report identified the need to develop multiple metrics that relate deer density to impacts on forest regeneration, vegetative and wildlife diversity and overall ecosystem sustainability. These metrics could be used in a deer management program to detect early signs of ecosystem degradation at a local level and ultimately help in the management of a healthy white-tailed deer herd. To develop and calibrate a series of metrics that would provide information regarding deer density impacts, a replicated experiment with captive deer ranging in density would be created. The Wisconsin DNR Bureau of Science Services, in proactive fashion, seeks to build such a deer enclosure experiment with four levels of deer density: no deer, low deer density (16/11 deer/mi<sup>2</sup>); moderate density (28/21 deer/mi<sup>2</sup>); and high deer density (40/32 deer/mi<sup>2</sup>). Each level of deer density would have a higher spring-summer density and a lower autumn-winter density, accounting for the typical reduction in deer density created through hunter harvest. Each fenced deer enclosure would range between 80-120 acres in size depending upon the specific treatment, while the no-deer enclosure would be 40 acres in size. Each of the deer density treatments would be replicated three times to ensure a statistically robust experimental design.

The proposed experiment would identify the direct relationship between deer density and browse intensity by plant species, helping to calibrate a woody stem browse index specifically for northern Wisconsin's hardwood forests. Herbaceous vegetative metrics would also be calibrated to provide further information to landowners and managers to help identify seasonal deer density impacts. Having a replicated captive deer herd in a large area will also provide a study site to help forest managers identify viable silviculture methods to ensure forest regeneration in spite of high deer density. In addition to forest impact and indices, feedbacks from the forest to the white-tailed deer are also a main focus of this experiment. It has been shown that hormone levels in fecal samples are related to animal stress, which can be a function of animal density, diet quality or social rank. Our experiment will identify whether fecal hormone analysis is a credible tool that could be considered when setting deer population goals. Body mass index and body condition class of deer are also strong indicators of deer health. Understanding the relationship between deer density, diet quality and body mass index/body condition will further help Wisconsin's deer management program. Finally, given the prevalent use of trail cameras amongst outdoorsmen and wildlife scientists, we intend to develop a series of deer abundance, browse intensity and deer health metrics that could be quantified through the use of trail cameras. **The overall goal of this experiment will be to develop metrics recommended by the 2012 Deer Trustee report. These metrics will provide Wisconsin with the necessary data to maximize a healthy white-tailed deer herd, while maintaining a viable forest industry and sufficient ecosystem biodiversity.**