

RESOURCE SELECTION AND SPATIAL RELATIONSHIPS OF  
ELK (*CERVUS ELAPHUS NELSONI*) AND WOLVES (*CANIS LUPUS*)  
IN NORTHERN WISCONSIN

by

Felicia K. Fawcett

A Thesis

submitted in partial fulfillment of the

requirements of the degree

MASTER OF SCIENCE

IN

NATURAL RESOURCES (WILDLIFE)

College of Natural Resources

UNIVERSITY OF WISCONSIN

Stevens Point, Wisconsin

May 2004

## ABSTRACT

Elk were reintroduced into the Chequamegon-Nicolet National Forest (CNNF) in northern Wisconsin in 1995 after their extirpation in the mid-1860's. After being extirpated by 1960, gray wolves are now re-colonizing Wisconsin via natural immigration and population growth. I studied spatial relationships of elk and wolves in this re-created predator-prey system.

I used logistic regression to create resource selection probability functions (RSPFs) for both elk and wolves cohabiting the CNNF using data collected by the Wisconsin Department of Natural Resources (WDNR) between May 1999 and April 2003. The WDNR maintains a large number of radio-collared elk and attempts to maintain one radio-collared wolf in each known pack. The logistic regression models were based on a collection of known animal locations derived from radiotelemetry and a set of random locations that represented resource availability. Habitat variables included the area of six different land cover types within a 600 m diameter buffer surrounding each animal and random location. Other variables included distance to nearest roads, trails, and water bodies. One RSPF was developed for wolves in the study area for use as a variable describing predation risk in four seasonal RSPFs for elk, along with the distance of each elk location and random point to the center of the nearest wolf pack territory.

Wolf locations were positively associated with forested wetlands, wetlands, mixed forests, and proximity to water. Elk used forested wetlands during winter and summer, and avoided these areas during spring and fall. Both species avoided open water and certain roads throughout the year. Elk avoided recreation trails during each season. Despite the fact that elk and wolves seemed to use similar habitat types, they were still spatially separated because elk avoided the centers of pack territories year round and areas with high wolf selection probabilities during the winter and spring.

This study provides a mathematical basis for decisions regarding elk habitat management and groundwork for future research. In areas where elk management is a priority, wetlands (forested and non-forested) should be protected from logging and mixed forests containing aspen should be promoted. Certain roads and trails should be experimentally closed where elk are sheltering during periods of high stress such as calving and winter to investigate possible increases in survival and decreases in movements.