Influence of Landscape-Scale Forest Structure on the Presence of Pileated Woodpeckers (*Dryocopus pileatus*) in Central Ontario Forests

Peter.G. Bush

Department of Geography, Brandon University
c/o Brian Naylor, 3301 Trout Lake Road
North Bay, ON. P1A 4L7

The goal of this research was to investigate the influence of landscape-scale forest structure on the presence of pileated woodpeckers (*Dryocopus pileatus)* in central Ontario forests. Study sites were located in Algonquin Provincial Park. The presence of pileated woodpeckers was recorded along five kilometre transect lines. The area around each transect line was used for landscape analysis and represented 5 km^2. Landscape-scale structure analysis was conducted on the composition and configuration of pileated woodpecker habitat. The habitat was classified based on several methods and focused on the variations of the Pileated Woodpecker Habitat Supply Model (PWPHSM) for central Ontario. To determine which of the classifications best predicted the presence of pileated woodpeckers, logistic regression was run on the variable "percent of land (%LAND)" for each classification. The landscape structure of the best classification was further examined to explain the presence of pileated woodpeckers by entering all landscape-level and class level (FRAGSTATS) variables into a logistic regression procedure.

The relative densities of pileated woodpeckers in Algonquin Park averaged 0.27 breeding pairs per km^2 (SD = 0.146, range = 0.2 – 0.8). The preferred habitat classification was the best predictor of the pileated woodpecker presence. Total, used, and feeding habitats were less able to predict the presence of pileated woodpeckers. Core Area Density (CAD), Number of Core Areas (NCA) and Largest Patch Index (LPI) predicted pileated woodpecker presence better than %LAND. The final logistic regression equation using the CAD variable was:

Probability (presence) = $1/(1+e^{-(Y)})$where Y = - 1.5204 + 1.1039 *(CAD)

The equation correctly classified 71.67% of the original data (X^2 = 10.4493, df = 1, p = 0.0012). The habitat supply model used to classify preferred nesting habitat was verified as an adequate tool for the management of pileated woodpeckers. The ability of the core area variable to predict pileated woodpecker presence supports consideration of the influence of edge effects on this species. Forest managers are also encouraged to continue to move toward spatial habitat analysis in management planning.