

LANDFIRE Product Application Summary

Title: Sensitivity of breeding birds to the “human footprint” in western Great Lakes forest landscapes

Citation: Gnass Giese, E. E., R. W. Howe, A. T. Wolf, N. A. Miller, and N. G. Walton. 2015. Sensitivity of breeding birds to the “human footprint” in western Great Lakes forest landscapes. *Ecosphere* 6(6):90. <http://dx.doi.org/10.1890/ES14-00414.1>

Authors: Erin E. Gnass Giese¹, Robert W. Howe^{1,2}, Amy T. Wolf², Nicholas A. Miller³, and Nicholas G. Walton¹

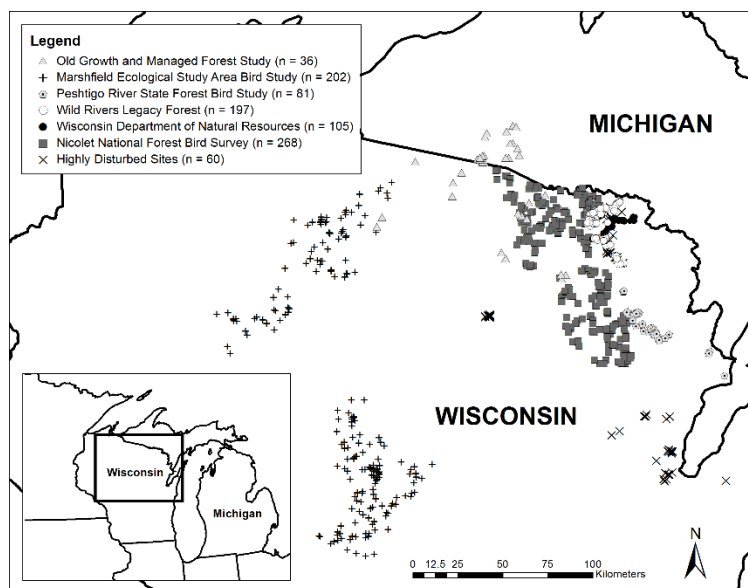
Affiliations:

1 – Cofrin Center for Biodiversity at the University of Wisconsin-Green Bay

2 – Department of Natural and Applied Sciences at the University of Wisconsin-Green Bay

3 – The Nature Conservancy in Madison, Wisconsin

Application Location



We used LANDFIRE data at all 949 data points (shown above) within 500-m and 1-km circular buffers around each point.

Objectives

The objective of our project was to create an ecological indicator tool (using the Index of Ecological Condition [IEC] method) that uses breeding birds to evaluate the health (or “ecological condition”) of northern mesic forests in the western Great Lakes region.

Project description

This project was a huge collaborative effort involving UW-Green Bay, The Nature Conservancy, and Timber Investment Management Organizations as well as many other contributors who shared their breeding bird data with us. This work also resulted from Erin Giese's master's thesis project at UW-Green Bay.

We constructed a simple, yet rigorous tool for assessing northern mesic forest health using breeding bird occurrences. This tool is based on the Index of Ecological Condition (IEC), a method originally developed by Howe et al. (2007) for Great Lakes coastal wetlands. Our forest IEC model uses an iterative computer algorithm (in MS Excel or R) to calculate the index ("IEC"), ranging from 0 (maximally degraded) to 10 (minimally degraded). The IEC method requires the modeling of individual species responses to a reference gradient of environmental condition. To construct this gradient, we calculated many GIS variables, including LANDFIRE for calculating proportions of land cover and fragmentation metrics. We successfully applied our forest IEC model to the Wild Rivers Legacy Forest (WRLF) in northeastern Wisconsin and found that the model can distinguish between different forest management strategies.

In addition to LANDFIRE, we considered using the Multi-Resolution Land Characteristics Consortium's National Land Cover Database (NLCD; 2001 or 2006) or the Wolter et al. (2006) land cover dataset for the U.S. Great Lakes basin. However, the NLCD (2001, 2006) and Wolter et al. (2006) land cover dataset were both outdated for the bird data we used in our study. Wolter et al. (2006) also did not cover our entire study area. Plus, LANDFIRE came highly recommended by The Nature Conservancy office in Madison, Wisconsin. Therefore, we chose to use LANDFIRE and were extremely pleased with it! Had LANDFIRE not been available, our only other option was the NLCD (2001, 2006).

LANDFIRE products used

We used LANDFIRE EVT 1.0.5 and EVT 1.1.0. Although we started with LANDFIRE's raw land cover categories, we reclassified LANDFIRE's detailed categories into four more general categories (cultivated agriculture, developed, natural habitat, and non-cultivated agriculture/silviculture) for use in the development of our reference gradient of environmental condition because they are more directly related to human disturbance.

Value of the work to the natural resource management/conservation community

Our forest IEC tool provides an objective, ecologically meaningful method for quantifying spatial and temporal variation in forest "health," guiding sustainable forest management and conservation practices, and identifying priority conservation areas.

Online resources

The Gness Giese et al. (2015) manuscript is available for free online:

<http://www.esajournals.org/doi/pdf/10.1890/ES14-00414.1>

We also have a website on the forest IEC tool:

<http://www.uwgb.edu/biodiversity/forest-index/index.asp>