LiDAR and wildlife-habitat applications

Wesley E. Newton

USGS Northern Prairie Wildlife Research Center, 8711 37th Street Southeast, Jamestown, North Dakota, 58401, USA. wnewton@usgs.gov

Abstract

Vegetative composition (e.g., conifer and deciduous trees) and structure (e.g., over- and under-story tree densities and heights) are among the most important factors affecting habitat selection by wildlife, particularly breeding birds in forest ecosystems. Estimating the composition of vegetation can be done using high resolution digital imagery for each mapping unit (e.g., forest stands) across the entire landscape. However, current imaging systems do not provide a mechanism for estimating vegetation structure for each mapping unit. Such information has to be collected by intensive and extensive ground surveys, which are impractical for large landscapes, especially where a complete census is required. Therefore, the challenge is to estimate vegetation structure in a spatially explicit manner at every mapping unit across the entire landscape that can then be used to assess and predict habitat for wildlife. LiDAR offers an opportunity to capture and model vegetation structure across entire landscapes. These estimated structural metrics, which are typically the same metrics of interest to foresters, can then be used as explanatory variables in various empirical models for predicting wildlife species occurrences, or other demographic metrics (e.g., densities, nest survival). Here we describe the utility of LiDAR, combined with imagery, in predicting wildlife demographics and discuss many applications, not in only forest ecosystems but also in riparian, shrubland, and urban (i.e., urban forestry) ecosystems.