

## USING DIGITAL PHOTOGRAPHS AND OBJECT- BASED IMAGE ANALYSIS TO ESTIMATE PERCENT GROUND COVER IN VEGETATION PLOTS

J. D. Luscier <sup>a</sup>, W. L. Thompson <sup>b</sup>, J. M. Wilson <sup>c</sup>, B. E. Gorham <sup>c</sup>, L. D. Dragut <sup>d</sup>

<sup>a</sup> Arkansas Cooperative Fish and Wildlife Research Unit, University of Arkansas, Fayetteville, Arkansas 72701

<sup>b</sup> USGS Arkansas Cooperative Fish and Wildlife Research Unit, University of Arkansas, Fayetteville, Arkansas 72701

<sup>c</sup> Center for Advanced Spatial Technologies, University of Arkansas, Fayetteville, Arkansas 72701

<sup>d</sup> Centre for Geoinformatics, University of Salzburg, 5020 Salzburg, Austria

Amount and composition of ground vegetation affect animal distribution and abundance by influencing habitat selection and providing critical resources for survival and reproduction. Researchers often employ visual methods to estimate ground cover, but these approaches are prone to unknown levels of observer bias. Therefore, we evaluated a rapid assessment method using digital photographs of vegetation in conjunction with a grassland bird study to objectively quantify percent ground cover of grasses, forbs, shrubs, litter, and bare ground within 2-m<sup>2</sup> plots. We used the object-based image analysis approach in eCognition© to segment photographs into different vegetation classes based on similarities among neighboring pixels to estimate percent ground cover of each category. We used the Kappa Index of Agreement (KIA) to quantify percent of correctly classified, randomly selected, segments from all images. Our KIA values indicated strong agreement (>80%) of all vegetation categories (shrub, litter, forbs, and grass). We also created artificial plots with known percentages of each vegetation category to evaluate accuracy of software predictions. Observed differences between true cover and eCognition© estimates for each category ranged from 1 to 4%. This technique provided a quick, repeatable, and reliable way to estimate percent ground cover that allowed quantification of classification accuracy.