RESEARCH ACTIVITIES IN SUPPORT OF HIGH-RESOLUTION LAND COVER MAPPING IN THE NORTH CENTRAL UNITED STATES

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Abstract—The USDA Agroforestry Strategic Framework and the 2014 Farm Bill call for inventory and monitoring of agroforestry practices; however, collecting such data over very large non-forested areas is costly. The Forest Inventory and Analysis (FIA) program at the Northern Research Station has addressed this challenge by forming a targeted task team whose primary purpose is to conduct an image-based inventory of tree cover in the heavily agricultural north central United States. The team conducts applied research and performs operational mapping of treed lands and other land cover using high-resolution imagery from the National Agriculture Imagery Program (NAIP). The imagery is available at no cost to the user and acquired at a spatial resolution capable of locating individual trees. Spatial pattern analysis is then applied to the resulting high-resolution maps to discern forest from other wooded lands, including agroforestry practices. We present a variety of applied research activities that have supported this effort including, 1) advancements in object-based image analysis, 2) implementation of shape-based thematic classification to distinguish other wooded lands from traditional forest land, and 3) the creation of value-added geospatial products describing functions provided by nonforest trees. We discuss challenges associated with mapping over large areas including imagery, software, and hardware considerations. Finally, we present high-resolution maps of tree cover and their functions, examples of summary statistics derived from those maps, and a proposal for reporting tree resources in these expansive landscapes.

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