MODELING HISTORIC, CURRENT, AND AVAILABLE ABOVEGROUND FOREST BIOMASS ALONG THE MISSOURI RIVER CORRIDOR

Christopher William Bobryk
Hong S. He and Shibu Jose: Dissertation Supervisors

ABSTRACT

This research presents the culmination of statistical, landscape, and geospatial analyses that examine the geographic dynamics of aboveground forest biomass (AFB) within the Missouri River corridor, Missouri USA. The Missouri River corridor is a region specifically within Missouri that encompasses 106,000 km², and is regarded as a processing region for improving the viability of Missouri’s biomass/biofuel industry. Current and historic forest inventory data coupled with remote sensing, edaphic, physiographic, and climate variables were integrated into an ensemble regression tree method, Random Forest (RF), to estimate AFB, determine external driving forces of AFB, and visualize geographic locations where the greatest deviations exist between current and historic AFB values. Results from these investigations indicated that 1) the greatest potential for increasing AFB may be along the floodplains of the Missouri and Mississippi Rivers, 2) areas that have the greatest potential to reach historic baseline levels of AFB also occur along the Missouri and Mississippi Rivers alluvial plains, 3) climate variables were the most important factors for estimating AFB, and 4) a coarse-scale decision process using multi-criteria, fuzzy logic exemplified the Mississippi and Missouri River floodplains, and associated Missouri River Alluvial Plains, as the most suitable locations for AFB production.