

Public Abstract

James R. Lootens

M.S.

Forestry

Estimation of total height, growth, and mortality of forest trees in Missouri

Advisors: Dr. David Larsen and Dr. Stephen Shifley

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A model for predicting total tree height as a function of tree diameter was calibrated for twelve tree species common to the Missouri Ozarks. Model coefficients were derived from nearly 10,000 observed trees. The calibrated model did a good job predicting the mean height-diameter trend for each species (pseudo- R^2 values ranged from 0.56 to 0.88), but for a given tree diameter observed tree heights were highly variable. We also present a technique for incorporating the observed variation in tree heights in the predicted values.

In addition, an evaluation of the Central States variant of the Forest Vegetation Simulator (CS-FVS), a distance-independent, single-tree growth model was performed on forest inventory data from a managed, uneven-aged forest in the Missouri Ozark Highlands. Simulations were run for ten and forty year time periods, and evaluated diameter growth, number of trees per acre, and basal area. The model was also evaluated with and without providing diameter increment calibration information. CS-FVS performed reasonably well in predicting diameter growth, as compared to other evaluations of similar models. The model consistently overpredicted the number of trees per acre and basal area for all simulations. Simulations indicate that the model underpredicts mortality, especially for black and scarlet oak. CS-FVS performed best in ten-year simulations when diameter increment information was provided. Forty-year simulations showed similar results to the ten-year results, but with larger mean errors, and smaller improvements with the inclusion of diameter increment information.