

Public Abstract

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Title:THE EFFECTS OF SILVICULTURAL TREATMENTS ON OAK HEIGHT AND BASAL DIAMETER GROWTH AND OAK REGENERATION ABUNDANCE FOLLOWING A WOODY BIOMASS REMOVAL DURING HARVEST IN THE MISSOURI OZARKS

ABSTRACT

Following a biomass harvest in the Missouri Ozarks, oak stump sprouts and seedling sprouts can significantly contribute to the presence of oaks in the future stand. It is important to understand how oak stump sprouts and seedling sprouts respond to a biomass harvest. A study to evaluate oak regeneration dynamics directly following a biomass harvest was initiated on the University Forest Conservation Area in Butler County, Missouri in the spring of 2009. Three hundred permanent subplots were established directly following the harvest to monitor 530 newly regenerated oak and hickory trees. The trees originated from either stump sprouts, seedling sprouts or in a rare event a seed. The height and basal diameter of the trees were monitored for 2 consecutive growing seasons. These measurements were used to produce a logistic regression model to determine the probability these trees would have of obtaining specific average annual height growth thresholds.

Results from a logistic regression analysis of the silvicultural study indicate that as over story density increases the probability of understory trees achieving a higher annual height growth threshold significantly decreases. When the over story basal area was reduced below 50 square feet per acre or less significant increases in height and basal diameter were observed. However, as over story basal area exceeded 50 square feet per acre especially once basal area surpassed 100 square feet per acre a significant decrease in height growth of understory trees was observed.

Results from the analysis of variance or ANOVA testing the differences between white oak, red oak and non-oak stump and seedling sprouts by treatment indicated that stump sprouts will readily out-compete advance regeneration as well as newly germinated seeds. However, both stump sprouts and advance regeneration responded well once the over story basal area was reduced to 50 square feet per acre or less. Oak and non-oak regeneration abundance was also affected by the removal of the over story. When basal area was reduced to or below 50 square feet per acre higher numbers of stems per acre of oak and non-oak regeneration was observed as well as decreased mortality of these species.