

CHANGES IN SELECTED SOIL QUALITY INDICATORS IN FORESTED SOILS  
FOLLOWING SAWLOG HARVEST

Kathleen Hatch

Keith Goynes, Thesis Supervisor

ABSTRACT

The highly weathered and nutrient-poor soils of the Missouri Ozarks are vulnerable to degradation, necessitating improved understanding of forest harvest impacts on soil quality. The objective of this study was to investigate changes in selected soil quality indicators (SQI) following sawlog harvests. The research was conducted at the Missouri Ozark Forest Ecosystem Project (MOFEP) sites, of southeast Missouri. Pre- and post-harvest soil samples were collected at 0-10 cm and 10-20 cm from sites harvested using clearcutting (CC) and single-tree selection (STS), as well as no harvest (NH) management sites. Samples were collected from low ( $\leq 20$  % base saturation in diagnostic subsoil horizon) and medium (20-50 % base saturation) soil nutrient status (SNS) soils. The SQI examined included total organic carbon (TOC), total nitrogen (TN),  $\text{KMnO}_4$  oxidizable carbon, water extractable organic C and water extractable N (WEOC and WEN), soil pH,  $\beta$ -glucosidase and  $\beta$ -glucosaminidase activities, and water stable aggregate content (WSA). Few differences in soil quality parameters were observed in the  $\sim 1.5$  years after harvest. However,  $\beta$ -glucosaminidase activity and WEN, showed significant depletion after harvest. In CC treatments  $\beta$ -glucosaminidase activity decreased significantly at the 0-10 cm depth in low SNS soils in January 2013 post-harvest collections when compared to NH treatment values and pre-harvest NH and CC treatment values collected January 2011. The CC treatment

values in low SNS soils collected January 2013 post-harvest were significantly lower in WEN than NH treatment values from January 2013 and pre-harvest (January 2011) NH values. In medium SNS soils, WEN values decreased shortly after harvest at 0-10 cm in depth but then rebounded in later samplings. Soil quality changes after harvest, were most pronounced in CC harvested sites, though CC and STS sites were rarely significantly different from each other.