Public Abstract
First Name: Amod
Middle Name: Kumar
Last Name: Koirala
Degree: Ph.D.
Department: Civil and Environmental Engineering
Advisor's first Name: John
Advisor's last Name: Bowders
Graduation Term: Fall 2009
Title: An evaluation of pre-and post-timber harvest water quality in the streams in the Missouri Ozarks.

In response to the Environmental Protection Agency's (EPA) heightened monitoring and enforcement of surface water quality, Missouri Department of Conservation's (MDC) best management practice (BMPs) on Regenerative Oak Clear Cutting (ROCC) practice was evaluated on effectiveness to preserve downstream water quality. Water quality was monitored for three years before the timber harvest and then three years after the harvest. Fifteen sites spread over 500 square miles were observed, and fifteen hundred water samples were collected. Twelve parameters were used to determine water quality, including suspended solids, minerals, nutrients, and water quality indexes. These parameters were measured in pre-harvest and post-harvest samples, and their concentrations were compared to indicate the change in water quality resulting from the harvesting and BMPs. In the comparison of pre- and post-harvest concentrations, variation in the climate and precipitation were taken into account.

The concentrations were compared using probability of exceedance (PoE), which indicates the likelihood that post-harvest concentrations are greater than pre-harvest concentrations. In a natural system, like the Ozark highlands in this study, a PoE less than 15% may be insignificant. Though six of the parameters (TSS, TVSS, Ca, K, NO_3^-, and SRP) showed post-harvest concentrations that exceeded pre-harvest concentrations, the PoE were less than 15%, indicating in water quality after timber harvest was minimal. The highest PoE, 13%, was found for TVSS. TSS, the most telling indicator of water quality, showed a 4% PoE, which is negligible. The US EPA only sets parameter limits for impaired or threatened streams. However, the PoE were calculated following a typical total maximum daily load (TMDL) process, the common method of setting limits on regulated stream pollution parameters. Owners, contractors and monitoring organizations can now use a similar procedure to compare the exceedance probability with the acceptable level once the regulatory agencies establish such limits.