

# AN EVALUATION OF PRE- AND POST-TIMBER HARVEST WATER QUALITY IN LOW-ORDER STREAMS IN THE MISSOURI OZARKS

Amod K. Koirala

Dr. John J. Bowders, P.E., Dissertation Supervisor

## ABSTRACT

Missouri Department of Conservation's (MDC) best management practices (BMPs) for Regenerative Oak Clear Cutting (ROCC) practice was evaluated on effectiveness to preserve downstream water quality. Fifteen sites, located on MDC lands in Shannon and Reynolds counties in Missouri Ozarks, ranging from 5-50 acres were instrumented with in-stream and hill-slope water samplers. Samples were collected for approximately three years prior to harvest and two to three years after harvest.

The comparison of pre-and post-harvest samples showed that six of the twelve water quality parameters (TSS, TVSS, Ca, K,  $\text{NO}_3^-$  and SRP) had probabilities that the post-harvest concentration would exceed the pre-harvest concentration, after taking climatic factors into account. However, the probability of exceedance (PoE) were less than 15 percent. Total Suspended Solids (TSS) showed a 4% PoE which was deemed low in a natural system, whereas the maximum PoE, found for TVSS, was about 13%.

Overall, the impact of timber harvest on water quality in the Ozarks was minimal comparing using PoE or discrete analysis of histograms. The US EPA only sets parameter limits for impaired or threatened streams, so there was no regulatory limit in effect for the ephemeral streams. However, the method of determining PoE closely followed USEPA's total maximum daily load (TMDL) method. Owners, contractors and monitoring organizations can use this procedure to compare the PoE of various water quality parameters with regulatory agency limits should they be established.