

# Quantifying Sediment Movement Downslope from Upland Forest Road Systems

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**Issue:** Forest road systems are frequently cited as one of the major sources of sediment that reaches stream channels on forestlands. Research has shown adverse impacts on the nation's water quality from soil erosion and stream sedimentation. Design and maintenance of forest road systems that are environmentally sensitive hinges on a better understanding of factors and relationships involved in sediment travel distances and delivery to downslope streams. Historically, the filter strips have been recommended and implemented to minimize sediment delivery to stream systems. However, little consideration has been made about the longevity of reductions realized through the implementation filter strips in sediment control. Over time, sediment transport distances may increase as the forest floor retains more sediment from the upslope road. Therefore the effective filter strip width becomes narrower with time with an increased potential to deliver sediment directly to stream systems. Reduction in risks associated with forest stream impairment as a result of forest roads requires a deeper understanding of processes and factors involved in sediment travel distances across the forest floor.



**Study Description:** The study will be conducted on roads in the National Forests of Alabama and Chattahoochee National Forest in Georgia. The experiment will use replications of the site characteristics hypothesized to influence downslope sediment transport distances. A total of 216 sites will be selected based on replications of three downslope gradients (low, moderate, and high), two soil textures (fine and coarse), three road ages (5-10, 11-20, and 21+ years), two forest floor indices (low and high) and two drainage structure types (culvert and turn-out). The study will be conducted in three phases. The first phase will establish the population to be sampled and refine field procedures. The second phase involves collecting enough data across the sample population to develop improved estimates of sample sizes needed for treatment combinations. The third phase involves completing data collection using the improved sample sizes for treatment combinations and estimating coefficients for the regression model.

**Status:** Phases 1 and 2 were completed by the QSMD Team (consisting of John Grace, Preston Steele, and 3 student interns) during the Summer of 2003. Nearly 250 sites have been sampled and recorded. Preliminary data analysis is underway and is expected to be completed by early Spring 2004. The first report is expected by the end of FY 04.

## Benefits:

- *The primary objective of this effort is to quantify sediment transport distances downslope of fillslopes, culverts, and turnouts based on site-specific characteristics.*
- *Valuable data to be used in construction and validation of road scenarios for water prediction models.*
- *Modeling with WEPP (X-DRAIN) to evaluate applicability as a planning tool in forest road management on upland forest systems.*

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