CHANGES IN SEDIMENT YIELD AND STREAM MORPHOLOGY IN AN ACTIVELY MANAGED FORESTED WATERSHED DUE TO UPSTREAM DISTURBANCES

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Attaining high quality water has always been a big concern for humankind. Forested watersheds are known to provide the cleanest form of water. However, conversion of forested lands to agricultural and/or urban use, as well as disturbances created in forested watersheds lead to degradation and deterioration of our water resources. To minimize the disturbance impacts on water quality various best management practices (BMPs) such as streamside management zones (SMZs) are implemented in managed forested watersheds. On the contrary, any upstream urban and agricultural activities where BMPs are not present or are inadequate can negatively impact downstream water quality regardless of the presence of downstream BMPs. In a recent study two small paired watersheds located near Auburn, Alabama were examined for streamflow and sediment yield in 2009 and 2010 to evaluate the efficacy of SMZs at trapping sediment yield from a clearcut area. Recent urban activities upstream of the study watersheds and poorly designed BMPs around these activities provided us an opportunity to observe and document the impacts of upstream disturbances on downstream stream water quality and morphology. Six monitoring stations were established to observe flow and sediment yield. Sediment data collection began in January 2014, and will proceed until June 2015. In addition to sediment concentration measurements, cross-sections of the channels have also being surveyed at several locations across the streams, following each significant storm events in order to assess the effects on channel morphology. Although a full spectrum of data are not ready to reach to an overarching conclusion, data collected so far show substantial increase in sediment load. Sediment concentrations are up to two orders of magnitude higher compared to the levels from the previous study where sediment concentrations were monitored following a clearcutting. Furthermore, channel morphology is altered visibly following almost every significant rain event (>1 inch). Preliminary data suggest that assessment of watersheds as a whole is needed in order to define the origin of problems and mitigate them more effectively.

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