Reforestation of Surface Mined Lands in the Appalachian Coal Fields, USA

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Since the implementation of the Federal Surface Mining Control and Reclamation Act of 1997 (Public Law 95-87), many opportunities have been lost for the reforestation of surface mines in the eastern United States. Excessive compaction of spoil material, which occurs in the backfilling and grading process, is the biggest impediment to the establishment of productive forests as a post-mining land use. Cultural barriers that existed within the mining industry and the Federal and State regulatory authorities have also contributed to the failure of reforestation efforts under the federal law over the past 26 years. A mine land reforestation research project has been initiated in Kentucky in an effort to resolve these remaining cultural, technical and regulatory barriers to successful reforestation efforts. In this study, various methods are being employed to lessen both physical and chemical limitations of mined sites so that the establishment of forested species (hardwood and conifers) is possible. Metrics designated for the monitoring include: weather variables and site hydrology; vegetative biomass and growth parameters; plant tissue, litter and soil/spoil analysis; decomposition and CO_2 efflux; and chemical analysis of water from precipitation, runoff and infiltration. Initial planting of tree seedlings began in 1997. Over 600 ha (>1,000,000 seedlings) have been planted thus far with an additional 580 ha remaining for the project. Historically, the evaluation of reforestation efforts on mined lands has come from regional site indices (based on 50-year-old trees) and assessments of tree height and survival. Unfortunately, these methods fail to grasp the overall quality of the trees or site. With this in mind, a concurrent project is underway that will develop reference curves based on tree and soil variables measured on a chronosequence of sites for two species of trees: white oak (*Quercus alba)* and yellow poplar (*Liriodendron tulipifera)*. The goal of establishing the reference curves is to not only evaluate tree survival, but to also determine whether or not the stand is comparable to a naturally-regenerated forest on non-mined land. Through these extensive efforts we hope to restore the productivity potential of mined lands throughout the Appalachian Coal Fields for the purpose of re-establishing healthy and productive forests.