

Session III – Connecting People and the Ecosystems That Support Them
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Impacts on Carbon Sequestration and Water Availability at the Continental Scale

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Abstract

The continuous supply of potable water is an important ecosystem service provided by forests. Population increases suggest that the demand for water for residential, commercial and agricultural purposes will only increase in the future. However, many factors including land use clearing and climate change are stressing water resources. To assess the potential for future water shortages, USDA Forest Service scientists have developed a Water Supply Stress Index (i.e. WaSSI) model for examining water supply and demand for 2,100 USGS 8 digit Hydrologic Unit Code (HUC) watersheds across the lower 48 U.S. states. This research has been very useful for examining how land conversion, population and climate change can impact regional and local water availability. While there has been interest in water resources for decades, interest in forest carbon sequestration is a relatively new area of study. As part of a climate change mitigation strategy, governments are examining alternative management options to maximize forest carbon sequestration potential. Water use by forests is closely linked to forest productivity. As forest evapotranspiration increases, water yield decreases, and forest productivity and carbon sequestration increase. The existing WaSSI model has been modified to predict how land use, population and climate change can impact forest carbon sequestration. The model has been applied to the Mississippi River basin, and could be applied to other large basins such as the Amazon or the Mekong Delta. The expanded model would be very useful for examining regional scale water and carbon relationships in these areas. This paper will present the model results and options for collaboration.