

Soil Erosion

Soil in forest ecosystems provides mechanical support to plant roots, supplies roots with water, nutrients and air, and helps store carbon. The soil environment also serves as habitat for many species of fauna. The physical and chemical characteristics of the soil at a given forest location are key factors in overall site quality and influence the composition of the residing plant communities and their productivity.

Soil types and properties vary greatly across the Northeast and reflect differences in parent geology and cumulative influences of climate and vegetation histories. Soils also vary within small distances due to local differences in topography and drainage. For example, soils positioned on ridge tops tend to be less deep, less fertile, and more rapidly drained than soils down slope with the same parent geology and local climate history. Local variations in soil properties are also related to historical differences in land use. Much of the land in the region that has forest cover was once cleared, burned, and plowed for agricultural purposes.

Several forest soil properties are measured on FIA plots to determine if changes are occurring as related to management practices and environmental influences (USDA Forest Service 2003f). Forthcoming data will help determine potential problems with soil erosion, compaction, nutrient levels, carbon reservoirs, acidity, and toxic heavy metals. For this report, available FIA plot measurements of forest age, topographic slope, and percentage of bare soil (USDA Forest Service 2003e) were used to estimate soil erosion using the Watershed Erosion Prediction Project (WEPP) Model (Hall and Elliott 2001). Estimates for sampled locations in the Northeast show that most locations have rates of erosion less than 0.1 ton per acre per year (Figure 14). These results are not surprising considering that the vast majority of sampled forest stands were more than 5 years old with little bare soil (i.e., factors that greatly determine low estimates of soil erosion in the WEPP Model).

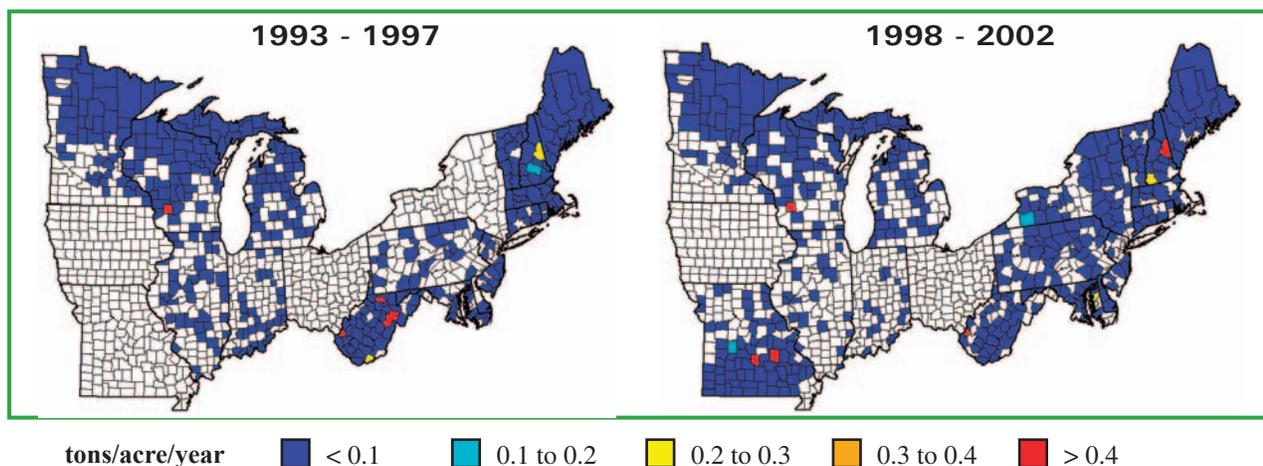


Figure 14. Soil erosion rates during 1993-1997 and 1998-2002. (Source: USDA Forest Service 2003e).