

## Influence of flooding on spatial patterns of carbon content in fine sediment on the Wisconsin River floodplains and uplands

K.I. Predick and M.G. Turner

Sediment deposition and transport in floodplains vary over fine spatial scales, creating heterogeneous patterns of nutrient cycling and decomposition. These soil characteristics, coupled with flood frequency, influence species composition. We investigated spatial patterns of organic carbon quantity in fine sediment by addressing the question: How is the spatial variation of fine particulate organic matter influenced by flooding in the Wisconsin River floodplain and uplands? Spatial variability in the organic matter content of fine particulate sediment was assessed on 80 m transects using a cyclic sampling design. Three transects were sampled in each of four locations: frequently flooded forest, periodically flooded forest, leveed floodplain and upland forest. Soil was sifted into size classes corresponding to sand, silt and clay particle sizes and analyzed for organic matter content. The mean organic matter content was significantly lowest in periodically flooded forest ( $p < 0.001$ ). Semivariograms of organic matter content in each sediment size class revealed floodplain forests had high nugget variances whereas leveed and upland sites had low nugget variances. The range, or average distance in which samples remain spatially correlated, was less than 5 meters for each sediment size class in periodically flooded forest. In frequently flooded forest, ranges varied from 9 to 12 meters. Ranges on unflooded sites varied between 15 and 27 meters. Flooding increases decomposition rates, but only deposits sediment near the river, which suggests the low observed organic matter content on periodically flooded sites. Microtopographic differences influence floodplain soil and are likely driving the semivariogram range and high nugget variance. High tree species diversity and evenness may cause a smaller range in the periodically flooded forest. Flooding influences carbon content of fine soil, and even infrequent floods can increase the spatial variability of soil carbon in forests.