

Public Abstract

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Title:Spatial Analysis of Organic Carbon and Nitrogen Sedimentation in Four Northern Missouri Reservoirs: Implications for Optimal Sampling

Small-sized (less than or equal to 1 km squared) reservoirs are increasing in number and have drawn attention in recent years for their potential to store organic carbon (OC) in their sediments. There is a possibility that these reservoirs may play a larger role in the global carbon budget than previously thought, and questions have arisen as to how their role and increasing numbers may impact global climate change. A key aim of the present study was to evaluate sample collection in this size-class reservoir to improve OC concentration measurements in individual water bodies, which will allow for more accurate global up-scaling and estimates. Using 30 to 40 sediment cores per reservoir, this study provided detailed data describing how sediment OC and nitrogen (N) settle throughout the reservoir basin. Based on kriged prediction maps, three of the four study reservoirs displayed increasing gradients of sediment OC and N concentration from in-flow towards dam. This study yielded two sampling methods which gave average overall reservoir sediment OC and N values with high accuracy for the surficial (0-5 cm) sediment data. The methods, the Center-point Approach and the Mean Water Depth Method, yielded values within 10% error of the actual median in 14 out of 16 cases. Single sampling methods cannot normally give accuracy estimates, but if estimates are needed, simple random sampling using 10 samples with a sampling density of around 0.8 samples per hectare showed reasonable accuracy. Ten samples are recommended because additional effort results in only marginal gains in accuracy.