

A hierarchical approach to regression analysis of wetland water treatment was conducted to determine which factors are the most appropriate for characterizing wetlands of differing structure and function. We used this approach in an effort to identify the types and characteristics of wetlands most effective in providing ecosystem services such as carbon sequestration and nutrient reduction. Removal performance of nitrogen, phosphorus and carbon by wetlands of diverse classifications and under varied conditions were initially lumped together and correlated to known treatment factors such as residence time and loading rate. Subsequent analysis categorized the data by factors such as hydrogeomorphic classification, flow regime, and pollutant source and re-analyzed. Initial results of this hierarchical approach indicate depressional wetlands have an inverse relationship between removals of total phosphorus and wetland age; while organic carbon positively correlates with wetland-to-watershed area ratio and nitrate removal positively correlates with inflow-volume-to-wetland-volume ratios regardless of wetland classification. This approach provides empirical, easy to use predictive tools which are applicable in planning exercises that assess the ecological services provided by protecting and restoring wetlands in watersheds. It also provides a way to estimate the impact of land use change on natural wetland function and potential habitat quality.