

NUTRIENT RETENTION VIA VEGETATIVE UPTAKE AND SEDIMENTATION IN CREATED WETLANDS IN SUBTROPICAL FLORIDA

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Nutrient removal by a 4.6-ha urban stormwater treatment wetland system in a 20-ha water/nature park in southwest Florida has been investigated for several years, suggesting that the wetlands are significant sinks of both phosphorus and nitrogen. More than two years of water quality studies have indicated a slightly decreasing ability for total phosphorus reduction to 55%, whereas nitrogen retention has remained consistent at about 26% reduction compared to studies done directly after the wetlands' creation. This study investigates the importance of vegetative and sedimentation intra-system processes in affecting nutrient concentrations and fluxes through these wetlands. Vegetation samples are collected every six months in the dry and wet seasons to estimate net primary productivity, biomass, and nutrient storage/retention in the vegetative tissues. Additionally, sedimentation measurements along with sediment nutrient analyses every six months allowed us to estimate gross sedimentation rates of 0.26 ± 0.03 mm day⁻¹ and nutrient retention rates of approximately 81.7 g-N m⁻² yr⁻¹ and 7.8 g-P m⁻² yr⁻¹. Using horizon marker methods to back-calculate net sedimentation rates, we theorize that resuspension may be responsible for up to 73.5% of the gross sedimentation within the system and nutrient retention may be closer to 1.96 g-P m⁻² yr⁻¹ and 20.3 g-N m⁻² yr⁻¹. The role of vegetation species and communities on nutrient cycling is also investigated with results pointing to the important role of what wetland managers often view as "undesirable species" in the overall reduction of nitrogen and phosphorus concentrations in the water column. Ongoing research focuses on the extent to which resuspension plays a role in net nutrient retention and the role of vegetation community shifts on nutrient cycling and wetland lifespan.

PRESENTER BIO: Lauren Griffiths is pursuing a Geology Ph.D. in the School of Geosciences at the University of South Florida and is a graduate assistant and courtesy faculty at FGCU's Everglades Wetland Research Park in Naples, Florida. Current research focuses on carbon sequestration in mangroves and water quality and nutrient cycling in freshwater wetlands.