ARE DETENTION PONDS PROTECTING URBAN DEPRESSIONAL WETLANDS?

Kayla M Hess[1]*, AJ Reisinger*[2]*, Basil Iannone*[1]

[1]School for Forest Resources and Conservation, University of Florida, Gainesville, FL, USA

[2]Soil and Water Sciences Department, University of Florida, Gainesville, FL, USA

Urbanization is increasing rapidly causing habitat fragmentation and loss, impairing the ecosystem services these habitats provide. Aquatic ecosystems are particularly susceptible due to hydrological and nutrient alterations, such as decreased subsurface flow and increased pollutants entering aquatic ecosystems through surface runoff. Stormwater detention ponds are constructed to lessen these impacts. However, the degree to which these common BMPs protect natural water bodies is unclear. We investigated the ability of detention ponds to protect aquatic ecosystems by assessing the plant communities, water and soil chemistry, and water level fluctuations in depressional wetlands with and without detention ponds draining into them and nonurban reference depressional wetlands. We predicted that if detention ponds are protecting wetlands into which they drain then the plant communities, water and soil chemistry, and hydrological dynamics of these wetlands will be more similar to those of nonurban wetlands than urban wetlands not receiving stormwater drainage.

We found that wetlands protected by detention ponds had greater cover and species richness of facultative, exotic, native and obligatory species of lower conservation value, and greater pH and inorganic nutrient levels in their soils and water. These characteristics, along with hydrological dynamics, more closely resembled characteristics of urban wetlands not protected by detention ponds than non-urban reference wetlands. Furthermore, differences between urban and non-urban plant communities were more strongly related to changes in the water and soil chemistry (increased pH, nitrate-N, TotalP, ortho-P) than hydrological dynamics. These findings suggest that strategies to enhance the ability of detention ponds to protect receiving water bodies need to focus on limiting changes to soil and water chemistry caused by urbanization than on hydrological alterations. Our findings reveal that BMPs and regulation policies need to be critically evaluated to confirm their efficacy in protecting urban aquatic ecosystems.

PRESENTER BIO: Kayla Hess is a master's student in the School for Forest Resources and Conservation at the University of Florida. She works in the Residential Landscape Ecology Lab studying urban depressional wetlands. Kayla plans to pursue a career in extension and wetland restoration