

EXAMINING HYDROLOGIC VARIABLES AND EXTERNAL FACTORS ON NUTRIENT RETENTION IN WETLAND MESOCOSMS IN SOUTHWEST FLORIDA

Andrew Wilson^{1,2}, Li Zhang², and William Mitsch^{2,1}

¹*School of Geosciences, University of South Florida, Tampa, FL, USA*

²*Everglades Wetlands Research Park Florida Gulf Coast University, Naples, FL, USA*

Wetland mesocosm studies are an effective method of investigating wetland nutrient dynamics. They represent physical model simulations of wetland ecosystems that allow experimental control of specific variables in replication. An experimental wetland mesocosm compound was started in Naples, FL in 2018. Wetland mesocosms generally act as a “sink” for nutrients. However, it can take time for a newly constructed wetland to develop into a fully functional ecosystem. The Naples, FL experimental wetland mesocosms were constructed in soils that are currently undergoing this process of transformation from dry to hydric soils. Therefore, it is not unexpected that these mesocosms have nutrient concentrations higher in the outflows than the inflows. It is the magnitude of these concentrations that is surprising, as total phosphorus removal rates are -202% (n=280) and total nitrogen removal rates are -17.56% (n=252). We hypothesize that long-term application of wastewater recycled water applied with sprinkler systems to these soils for up to 10 years before we constructed the mesocosms has saturated the landscape with nutrients. Nutrient concentrations (TP, TN, Soluble reactive phosphorus) in sprinkler water are higher on average than in the city of Naples stormwater runoff that is used as a nutrient source for the mesocosm study. Further investigation will be conducted to test this hypothesis, but it is possible that the use of recycled wastewater for watering lawns and parks across the state is ultimately harmful to downstream freshwater and coastal aquatic ecosystems and potentially contributes to harmful algal blooms.

PRESENTER BIO: Andrew Wilson is a graduate student at the University of South Florida pursuing a Ph.D. in Geography, Environmental Science and Policy. He has two years of experience as an environmental consultant in New Jersey, and received his B.S. in Environmental Science from the University of Notre Dame in 2014.