## Soil Amendments to Reduce Phosphorus Leaching from Biosolids-Impacted Soils in the St. Johns River Basin

***Jonathan D. Judy***[1]*, Nevaeh Renwick*[1]*, Vimala Nair*[1]*, Yang Lin*[1] *and Todd Osborne*[2]

[1]University of Florida, Gainesville, FL, USA

[2]University of Florida, Whitney Laboratory for Marine Bioscience, St. Augustine, FL, USA

Any biosolids that can be diverted from landfill/incineration and beneficially-reused via land application is a net benefit to society. However, preserving surface and groundwater quality is of paramount importance. In the case of many contaminants and contaminated environments, soil amendments can be applied to reduce the mobility and bioavailability of the contaminant. Recent work has reported an increase in downstream phosphorus (P) correlated in time with increasing biosolids additions within the upper St. Johns River basin. Here, we investigate the ability of a suite of potential soil amendments to reduce P leaching from high-P, high-Ca "legacy" soil with a history of biosolids application from a rangeland within the St. Johns River basin. Candidate sorbents, including aluminum (Al), calcium (Ca), and iron (Fe) DWTRs (Drinking Water Treatment Residuals), pine biochar and a commercial reference product (CRP; a blend of several different chemical components), were selected based on preliminary research and a review of performance and practical concerns related to the usage of these materials. This investigation includes consideration of two potential methods of amendment application: permeable reactive barrier (PRB), where the amendment is applied in a layer beneath the soil to be treated and "Add/Mix", where the amendment is mixed into the soil. Results to be reported include those from two different column studies. In Column Study 1, P leaching is examined in high-P, high Ca soil amended with a fresh biosolids addition but also with sorbents in both PRB and Add/Mix configurations. In Column Study 2, P leaching is again examined in high-P, high Ca soil but without fresh biosolids addition, using a larger volume of leachate intended to remove more P from soil columns, and with unimpacted (relatively low-P, low-Ca) soil treatments for comparison.