IDENTIFYING THE EFFECTS OF CHRONIC SALTWATER INTRUSION ON COASTAL FLOODPLAIN SWAMPS USING REMOTE SENSING

Elliott White Jr *and David Kaplan*
University of Florida, Gainesville, FL, USA

Sea level rise (SLR) and saltwater intrusion (SWI) are important drivers of change in coastal floodplain swamps (CFS) worldwide. Studying SWI impacts on CFS over large spatiotemporal scales is challenging and resource intensive, however, and remote sensing (RS) techniques offer an alternate approach to traditional field methods that can be used to answer a broad array ecological questions. In this study, a suite of hypotheses about expected changes resulting from chronic, low-level SWI were developed based on CFS phenology and vegetation characteristics. CFS sites were selected across the northern Gulf of Mexico from our existing network of monitored locations (6), a state monitoring program (1), and the literature (1). Water quality data were used to partition sites into upstream and downstream with downstream sites currently experiencing chronic, low-level SWI. Enhanced vegetation index (EVI) data were calculated at each site using surface reflectance data from the MODIS Terra satellite over the period from 2000 to 2018. The suite of nine hypotheses were supported only 53% of the time, however a subset of four hypotheses were supported ≥ 75% of the time. The best-performing hypotheses compared differences in average EVI, EVI distribution, average growing-season EVI, and the ratio of growing to dormant season EVI values for sites experiencing chronic, low-level SWI relative to unimpacted sites. The hypotheses that worked best were centered around descriptive statistics of mean and distribution, whereas the other five hypotheses relied on change over time as a central component. The inherent intra- and interannual variation in CFS EVI can mask any long-term trends that maybe occurring at a given site. The ecologically based approach developed here offers future researchers a low cost way to monitor and investigate CFS that are suspected of chronic, low-level SWI.

PRESENTER BIO: Elliott White Jr. is a doctoral candidate at the University of Florida. He studies the effect of chronic, low-level saltwater intrusion into coastal floodplain swamps across the northern Gulf of Mexico. His interdisciplinary research includes biogeochemistry, hydrology, ecology, and remote sensing.