

## **EVALUATION OF NUTRIENT SOURCES AND LOADING TO WATERBODIES IN THE UPPER ST. JOHNS RIVER BASIN**

*Joshua Papacek, Andy Canion, and Dean Dobberfuhr*

St. Johns River Water Management District, Palatka, FL, USA

The Upper St. Johns River Basin (USJRB) contains over 116,000 ha of floodplain, including 65,000 ha of natural and restored wetlands and shallow reservoirs managed by the St. Johns River Water Management District (SJRWMD) as part of the USJRB Project. Watershed sources of nutrients to the expansive headwater wetlands are the dominant drivers of water quality in the downstream river-lakes. In 2003, the SJRWMD established a Pollutant Load Reduction Goal (PLRG) for the USJRB river-lakes based on a  $0.09 \text{ mg L}^{-1}$  total phosphorus (TP) concentration limit to reduce the frequency of cyanobacteria blooms. The same target TP concentration was adopted for three total maximum daily loads set by the Florida Department of Environmental Protection (FDEP) within the USJRB in 2006. Since then, several additional waterbodies within the USJRB are currently not meeting the state's numeric nutrient criteria for TP, including the historically pristine Blue Cypress Lake. Leveraging available water quality and hydrologic data, the SJRWMD estimated TP loading within the USJRB watersheds contributing to the river-lakes. For these lakes, we observed a noticeable increase in TP flux over the last several years in exceedance of established reduction targets. This trend appears to be primarily driven by increases in TP loading from tributaries on the western side of the USJRB, corresponding with recent increases in the land application of Class B biosolids. Additional uncertainties in nutrient budgets also point to under-quantified sources like internal lake and wetland nutrient fluxes potentially driven by legacy loading. Overall, these trends in water quality are likely to have a significant impact to lake ecology, as recent monitoring of blooms by SJRWMD and FDEP shows frequent dominance of cyanobacteria taxa in multiple USJRB lakes, as well as concerns for increased export to downstream basins.

PRESENTER BIO: Dr. Joshua Papacek is an Environmental Scientist with the St. Johns River Water Management District where his work focuses on water quality in the Upper St. Johns River Basin, harmful algal blooms, and managing projects to address nutrient source identification and loading.