

BIOSOLIDS APPLICATIONS AND NUTRIENT EXPORT IN TRIBUTARY WATERSHEDS OF THE UPPER ST. JOHNS RIVER

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Biosolids are beneficially used to supplement or replace fertilizer in agricultural production throughout the world. Approximately two-thirds of the biosolids generated in Florida are Class B, the majority of which are applied to pastureland. In 2013, new rules governing Class B biosolids disposal within the Okeechobee, St. Lucie, and Caloosahatchee watersheds led to a migration of applications into the Upper St. Johns River Basin (USJRB), resulting in the USJRB receiving approximately 70–80% of all Class B biosolids in the state. In order to evaluate the potential impact of this shift in applications, the timing and magnitude of Class B biosolids land applications and fluxes of total phosphorus (TP) and total nitrogen (TN) in seven USJRB tributaries were examined using the Weighted Regressions on Time, Discharge, and Season (WRTDS) approach. Increases in TP fluxes were observed during periods of intensified Class B biosolids applications; however, TN fluxes were stable across all tributaries over the period of analysis. The estimated total increase in mean annual TP flux for the seven USJRB tributaries in the present study was estimated to be 36 metric tons. Annual mass losses between 0.4–3.4 % of biosolids TP would be required to produce to observed trends in TP flux in each watershed. Although biosolids applications were within regulatory requirements, applications based on crop N requirements rather than P and the focusing of the majority of the state's Class B biosolids into one basin likely led to the observed increases in TP flux. In addition to new rules implemented by the Florida Department of Environmental Protection (FDEP) to limit excess P application, the St. Johns River Water Management District has begun a multi-year, FDEP-funded project to examine in-field P fate and transport, remediation of legacy P, and modification of wastewater treatment processes to better manage biosolids P.

PRESENTER BIO: Dr. Canion is a supervising environmental scientist with 15 years of experience in water quality analysis, biogeochemistry, and phytoplankton ecology. In his present position, he leads a team whose projects include lake and wetland restoration and water quality improvements.