

IMPACT OF LAND USE CHANGE AND DIFFERENT MANAGEMENT PRACTICES ON NITRATE LOADING TO GROUNDWATER IN SANTA FE RIVER BASIN

Sagarika Rath, Dr. Wendy Graham and Dr. David Kaplan

University of Florida, Gainesville, FL, USA

The Santa Fe River basin (SFRB), encompassing 3584 square kilometers in north-central Florida, is dominated by forest and agricultural (primarily corn, peanut, hay, pasture) land uses. The Upper Floridan Aquifer (UFA) is the key water source that supports agricultural production, domestic supply and ecological sustainability in SFRB. In a significant portion of the SFRB, the UFA is unconfined, overlain by sandy soil and associated with high permeable fractured limestones which causes rapid recharge by rainfall and also makes it susceptible to NO₃-N infiltration from various point and non-point sources. Non-point sources such as N fertilizer and organic manure from pastures are of particular concern in SFRB. Basin Management Action Plans (BMAPs) that have been developed to meet the mandated numeric nutrient criterion (NNC) of 0.35 mg/l NO₃-N in springs and rivers in the SFRB estimated that a 35% reduction in NO₃-N leaching to UFA is needed.

A basin scale model was developed and calibrated to predict SFRB river flow and NO₃-N concentrations for the time period 2000-2010 using the USDA Soil and Water Assessment Tool (SWAT). The calibrated model was then used to assess NO₃-N leaching and NO₃-N river concentrations for a range of alternative land use and nutrient and water management practices. Preliminary results show that adoption of reduced nitrogen fertilizer rates and improved irrigation management for existing agricultural land uses and/or conversion from more intensive (row crops, grazed pasture) to less intensive (hay and forest) land uses, can significantly reduce NO₃-N leaching in the SFRB.

PRESENTER BIO: Sagarika Rath is a PhD candidate in Agriculture and Biological Engineering Department, in University of Florida.