

RESULTS OF A DECADE OF MONITORING GROUNDWATER NITROGEN CONCENTRATIONS IN FLORIDA'S SANTA FE BASIN

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Background nitrate concentrations in the Upper Floridan aquifer (UFA) are less than 0.05 mg/L (Upchurch et al., 2019). The authors mentioned that by the early 2000s, concentrations in aquifers underlying the karst areas of Florida became elevated, relative to background. The increases are linked to nuisance algae and turbidity changes in spring runs. In the early 2000s the Florida Department of Environmental Protection (FDEP) initiated basin management action plans (BMAPs) to establish a framework to restore the water quality in Florida's impaired water bodies. During the same period, many organizations across the state began increasing their monitoring activities. The activities were not necessarily related to the BMAP efforts, but often took place within the targeted BMAP water bodies, such as the Santa Fe River basin in north-central Florida. One such effort occurred within the basin. In 2014, AquiferWatch, a volunteer groundwater monitoring organization, and Florida LAKEWATCH, a citizen science organization affiliated with the University of Florida, began monitoring groundwater in residential wells tapping the UFA for nitrate. Recent analyses indicate that between 2013-2022, nitrate concentrations have not increased or decreased. Nitrate data from residential wells were also obtained from FDEP and the Alachua County Environmental Protection Department. Data were from the same period, tapped the UFA, and from the Santa Fe River basin. Again, analyses revealed no statistically significant changes. The simplest explanation for the leveling of nitrate concentrations is an increase in precipitation and subsequent recharge. However, other potential drivers include: (1) complex relationships among pH, dissolved oxygen, the ratio of nitrate to ammonium, water temperature, and biological activities, (2) changes in land use practices and (3) BMAP implementation.

PRESENTER BIO: Dr. Rick Copeland is the Director of AquiferWatch Inc. He has worked for over 45 years as a hydrogeologist in Florida. He has established numerous quality monitoring networks, administered Florida's statewide groundwater and surface water monitoring networks, and has authored many papers regarding the analyses of water quality changes.