DECADAL CHANGES IN NITROGEN AND PHOSPHORUS SPECIES ALONG THE LAKE WORTH LAGOON IN SOUTH FLORIDA

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The West Palm Beach-C51 canal (WPB-C51) connects Lake Okeechobee to the Lake Worth Lagoon estuary (LWL) in South Florida, U.S. The WPB-C51 canal receives discharges containing nitrogen (N) and phosphorus (P) from Lake Okeechobee, as well as agricultural and urbanized areas of Palm Beach. The objectives of this research were to determine trends of N and P species along the canal system from 2009 to 2019, and to determine spatial differences of N and P species along the WPB-C51 canal and LWL. Water quality, rainfall and flow data were obtained from the DBHYDRO database of the South Florida Water Management District. Average total P (TP) concentrations for the studied area ranged between 55 to 183 µg L^{-1}, and average total N (TN) concentrations ranged between 0.61 and 2.62 mg L^{-1}. At the LWL inflow, concentrations were higher than the estuaries numeric criteria (49 µg P L^{-1}; 0.66 mg N L^{-1}) established by the state of Florida. Temporal trends were detected using the seasonal Mann-Kendall analysis and showed predominantly increasing trends for P species' concentrations, but N species trends varied by location. Both TP and TN loads increased during the studied period. Increasing trends in P concentration can be due to legacy P and urbanization, and increases in TP and TN loads were mostly due to larger discharge volumes from Lake Okeechobee into WPB-C51 canal. Spatial differences along the WPB-C51 canal were detected using Steel-Dwass pairwise comparison which showed a progressive decline in both TP and TN concentrations from Lake Okeechobee to LWL. This decline could be due to nutrient assimilation by plants, agricultural best management practices, and P precipitation in sediments along the WPB-C51 canal. Our findings emphasize the need to continue implementing strategies to minimize nutrient input into LWL to meet its sediment and water quality goals.

PRESENTER BIO: Dr. Tootoonchi is a Post-Doctoral research associate at the Everglades Research and Education Center in South Florida. He conducts research on water quality with a focus on agricultural drainage water and phosphorus chemistry. He has extensive experience with aquatic and wetland plants as well as saltwater intrusion in estuaries.