Title: Accretion and storage of phosphorus in recently accreted soils (RAS) in the stormwater treatment areas of the Everglades basin.

Abstract:

Stormwater Treatment Areas (STAs) are constructed to reduce phosphorus (P) loads to the Everglades Protection Area (EPA). Six STAs (18,000 ha) were strategically located to reduce P loads to the EPA. These STAs have been in operation for varying time periods and are differentiated into cells having emergent and submerged aquatic vegetation. Soil cores were collected from three STAs and sectioned at 2 cm depth interval. Physico-chemical properties – bulk density, total P, total nitrogen (N), total carbon (C) and isotopic ratios of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) were determined. Depth profiles were plotted using these variables to identify the change point as an indicator for boundary between recently accreted soils (RAS) and pre-STA soil. Average change point depths from different variables were used to calculate the mean depth of recently RAS.

The depth of RAS was found to be 15 ± 5 cm in STA-1W (16 years), 11 ± 3 cm in STA-2 (10 years) and 10 ± 5 cm in STA-3/4 (6 years). The soil accretion rates (cm/yr) were 1 ± 0.3, 1 ± 0.3 and 2 ± 0.8 for STA-1W, STA-2 and STA-3/4 respectively where as phosphorus accretion rates (g/m^2 /year) were 1.3 ± 0.6, 1.9 ± 0.9 and 3.3 ± 2.0 for STA-1W, STA-2 and STA-3/4 respectively. The comparison of soil accretion rates among the STAs with varying years of operation is aimed towards understanding the effects of age on operational efficiency of these constructed wetlands.

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