Phosphorus Issues and Protocol Development for Risk Assessment in Florida Watersheds

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Phosphorus issues in Florida's major watersheds, the Suwannee River (SRB) and Lake Okeechobee (LOB) Basins are of a different nature. The karst-dominated Lower SRB spans several Florida counties where agricultural activities have the potential to affect the groundwater, springs and estuary via vertical movement of nutrients. Hence, the P retention capacity of the soil with depth is a relevant factor in determining the safe lifespan of an application site. Previous research has indicated that there is a delay between soil P loading from an agricultural source and the movement of P to a water body. This delay is the result of soil retention of P and may be mistakenly attributed to P retention in the limestone aquifer. However, the degree of P interaction with karst solution channels is uncertain. A common threshold value set for environmentally-critical P concentration in water is 0.1 mg P L^{-1}. Ground- and spring water P data at some locations within SRB show concentrations > 0.1 mg P kg^{-1}. In contrast to the SRB, movement of P applied to LOB soils is primarily via shallow base flow (subsurface leaching) or surface runoff to streams, with ultimately transport to the lake. Soil test phosphorus (STP), used as a measure of P risk, does not capture risk in Spodosols typical of the LOB, even if the STP is low, due to low P sorption capacities. A new site specific and practical protocol that is applicable to both basins, the "safe" soil P storage capacity (SPSC) recently developed for sandy soils, captures risk arising from low P sorption capacity as well as previous P loading and can be used to estimate the lifespan of a manure application site under a given loading regime.

Keywords: Lake Okeechobee Basin, "safe" soil P storage capacity, soil test P, Suwannee River Basin