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# Long term modeling of phosphorus transport in the eutrophic northern Everglades, USA

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Over the past several decades, agricultural drainage waters discharged into the northern Everglades have been enriched in phosphorus (P) relative to the historic rainfall-driven inputs. Phosphorus enrichment has occurred in these soils, and the open water sloughs have become colonized by monospecific stands of cattails, Typha domingensis. While methods of reducing total P concentrations in the discharge water have been actively pursued, the effects of low-P water moving over the enriched soils have not been fully addressed. A fully coupled hydrodynamic and P biogeochemical cycling model was used to predict phosphorus mobility and transport. Model results suggest that if the proposed input concentration limit of 10 ppb total P is met, the soil-P will be released such that the impacted region will expand spatially. Although P movement through the marsh is slow due to biological sequestration, eventually all of the load over the past several decades will become mobilized through diffusion into the low-P water column. The release of soil P is expected to result in water column concentrations of greater than 10 ppb for over 100 years after inflow targets are met. These results have implications for resource managers who may consider restoration alternatives such as physically isolating the impacted region to retain the accrued P in the soil.