

Characterization and parameterization of P-sorption across the sediment-water interface of Utah Lake, a shallow hypereutrophic lake

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Internal sediment phosphorus (P) recycling may regulate harmful algal blooms (HABs) in hypereutrophic shallow lakes. Utah Lake is one such lake and frequently experiences HABs, defying current conventions regarding P-sorption given the lake's high alkalinity and P affable sediment. The efflux of diagenetic P from lake sediments is dependent upon P-sorption with organic matter (OM) and mineral species. P-sorption varies with substrate availability, OM grade, ionic strength/competition, turbidity, temperature, redox (Eh), pH, and microbial community. A full biogeochemical analysis on the water and sediment across 7 sites in Utah Lake will characterize the variables and constituents of P-sorption. This information will inform batch sorption, stir-flow, and microcosm experiments. These experiments will help define P-sorption maximums, chemical/kinetic P-sorption rates, and parameterize sediment P retention in response to seasonality, oxygenation, and external P reductions. Results could indicate that significant reduction of external P-pollution into Utah Lake may not prevent diagenetic P recycling and HABs when conditions are anoxic-favorable.