Effects of Surficial Mud Sediment Removal on Phosphorus Release into Lake Waters under Anaerobic and Aerobic Conditions. (S10-grace094508-Oral)

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Abstract:

Surficial mud was removed from intact lake sediment cores to depths of 0, 30, 45 and 55 cm to investigate the effects of dredging on internal phosphorus loading. Cores were collected from Lake Okeechobee, Florida, and incubated with filtered lake water under dark, oxygen-depleting conditions. Phosphorus release and oxygen consumption rates were calculated from changes in water column concentrations. Oxygen demand by the un-dredged surficial sediments (40+-4 mgO2m-2hr-1) was greater than that by dredge-exposed sediments (29+-7 mgO2m-2hr-1), likely due to the activity of aerobic microorganisms in the surface layers. After oxygen depletion (~5 days), sediment SRP release was greater from the un-dredged sediments (5.4+-1.0 mgPm-2day-1) than from all dredged treatments (1.1+-0.5 mgPm-2day-1). Sensitivity of sediment P flux to water column oxygen levels suggests that Fe3+ may control P diffusion from an aerobic surface layer, but Fe reduction causes elevated release rates during anoxia. Dredge removal of surficial sediments may eliminate large pulse-loadings during quiescent anaerobic periods, but could potentially increase overall P flux into the lake through continuous diffusion.

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