

Phosphorus Release from Bog Lake Muds¹

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ABSTRACT

The paper reports the results of some laboratory investigations concerning the mud-water phosphorus relationship of some Northern Wisconsin and Upper Michigan bog lake muds as influenced by lime, acid, and mechanical agitation.

Calcium carbonate added to the water phase of mud-water systems reduced the amount of soluble phosphorus from 8.0 to 0.8 parts per billion. The lime formed a thin crust at the mud-water interface, while the original pH of the bottom material prevailed at a depth of one-fourth inch below the mud surface. Agitation of the mud cores by stirring resulted in complete lime penetration throughout a three-inch core.

Experimental apparatus in which it is possible to obtain a 12°C temperature differential for stratifying water is described.

Radioactive ordinary superphosphate fertilizer was placed at various depths below the mud surface, and the percentage as well as the amount of phosphorus released to the water was indicated to be very small with virtually no phosphorus released from depths greater than one-fourth inch below the mud surface. Agitation by stirring of the muds resulted in approximately twice the concentrations of soluble phosphorus in the water phase of the agitated systems as compared to the undisturbed systems. The most effective means of releasing fertilizer phosphorus placed one-fourth inch below the mud surface was found to be the acidification of previously limed mud-water systems.

The mechanism of phosphorus suppression by the addition of calcium compounds to mud water systems is suggested to be adsorption of phosphate ions onto the surface of the calcium particles in a similar manner as that described by Boischoy *et al.*