

Despite decades of clean-up attempts, world's lakes still suffer from phosphorus pollution

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Leading scientists warn that phosphorus pollution is a major concern. Accelerated recovery treatments of lakes are required to improve and preserve freshwater quality. In a series of studies published in a special issue of the journal *Water Research*, leading scientists assess how to control phosphorus pollution in lakes.

"In 40 percent of Europe's lakes, the water quality does not meet the demands of EU's Water Framework Directive, mainly due to phosphorus pollution. That is a huge problem for biodiversity and society and we need to put an effort into developing effective approaches to restore these lakes," says Associate Professor Kasper Reitzel, Department of Biology, University of Southern Denmark.

Together with colleagues Sara Egemose and Henning S. Jensen, Reitzel is co-author of several contributions in a special issue of the journal *Water Research*. Kasper Reitzel is also co-editor. They are experts in lake restoration and are associated with the Villum Kann Rasmussen Centre of Excellence, Centre for Lake Restoration, (CLEAR).

The special issue of *Water Research* brings together 60 authors from 12 countries. In a press release, the journal writes, "Phosphorus is the biggest cause of water quality degradation worldwide, causing 'dead zones,' toxic algal blooms, loss of biodiversity and increased health risks for the plants, animals and humans that come in contact with polluted waters.

"After decades with run-off from agriculture, human sewage and industrial practices, phosphorus has been stockpiled at an alarming rate in lake bed sediments. The scale of the problem is daunting, and despite major attempts to reduce the runoff, human activities are still pumping 10 million tonnes of extra phosphorus into freshwater sources every year.

"Long-term monitoring activities following the fate of phosphorus in lakes show that plants and animals don't recover for many years, even if the phosphorus load is decreased. This is because phosphorus stored in bed sediments is released back to the [water](#) column and recycled in the lake."

So-called geo-engineering in lakes is widely used to clean [phosphorus pollution](#). Frequently used methods include addition of aluminum salts or modified clays into the lake to lock excess [phosphorus](#) stored in the sediments.

"However, results have not always been good. Often, [lake](#) managers use geo-engineering uncritically in lakes where the reductions in external loading of phosphorous are insufficient, or have applied too low dosage because of cost," says Sara Egemose, Department of Biology, University of Southern Denmark.

The special issue brings a scientific update on geo-engineering of lakes which Danish researchers in CLEAR have translated into guidelines for restoration of Danish lakes in cooperation with the Danish Nature Agency.

Provided by University of Southern Denmark

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