
Using Phoslock® to control cyanobacteria in a shallow eutrophic Scottish reservoir - assessing its impact on sediment phosphorus pools

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Clatto Reservoir (Dundee, Scotland) is a shallow man-made water-body with a history of cyanobacteria blooms. It receives limited surface run-off from the catchment, being predominately rain water fed, so sediments are the main source of phosphorus (P). In March 2009, 24 tonnes of Phoslock® were applied to the reservoir to reduce internal P loading and, accordingly, cyanobacteria standing stock.

P in sediments is present in various pools. Seasonal changes in physicochemical and biological processes can trigger the release of P from such pools (i.e. anoxia, pH changes or microbial mineralisation); consequently P is either exchanged into unsaturated pools or released to the overlaying water-column. Individual water-body characteristics, for example, bathymetry and fetch, cause those processes also to vary spatially. Understanding these temporal as well as spatial dynamics in sediment P fluxes and drivers of P release is important to efficiently manage internal loading.

In order to evaluate the role of Phoslock® in internal load management three key questions were addressed: i) what is the spatial distribution of Phoslock® following a common application, ii) how does Phoslock® affect P pools, and iii) when does Phoslock® alter P pools? To answer these questions four sediment cores were taken before (2 days) and after (28 days) the application. The top ten centimetres of each core were sectioned into two centimetre slices and P pools and elemental composition of each slice were determined. Initial results show that Phoslock® is not competing with existing P pools and that a commonly conducted application leads to an increase in Phoslock® concentrations up to a sediment depth of 10cm. Application timing will be discussed in order to enhance the efficacy of Phoslock® in internal load management.