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**Shifts from P- to N-limited growth conditions as indicators of nuisance blue-green bloom formation, Eagle Creek Reservoir, IN, USA.**

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**Run-off and tile drainage versus internal recycling: three year mass balance approach to understand phosphorous loading and productivity in a small, urban reservoir, Eagle Creek Reservoir, IN, USA.**

Eagle Creek Reservoir (ECR) is a shallow, eutrophic drinking water reservoir that experiences periods of stability with hypolimnetic anoxia punctuated by water column mixing. 2003 and 2004 studies on ECR have shown that blooms of nuisance blue-green algae occur when N-to-P ratios decreased to less than 30N:1P, suggesting that a shift from P- to N-limited growth conditions drives bloom formation. To test this hypothesis nutrient limitation bioassays were conducted during the summer of 2005. Daily samples were collected from two reservoir stations over a 5-7 day period approximately every two weeks from June through September. Bioassays were performed on samples collected on the first day of each sampling period. Treatments were spiked with N, P, Si, and C to determine which nutrient limited phytoplankton growth as measured by *in-vivo* chlorophyll *a* fluorescence. Nitrate, ammonia, ortho-P, silica, alkalinity, and pH were measured at the start and end of each bioassay. Field samples were analyzed for the same nutrients as well as *in-vitro* chlorophyll *a* and nuisance algae metabolites (MIB & geosmin). Analyses of bioassay data showed a shift from P- to N-limitation at both stations as the summer progressed. Field data showed that nutrient and physical conditions within the reservoir remained stable over the 5-7 day period of the bioassay. Shifts from P- to N-limited growth conditions occurred concomitant with increased reservoir concentrations of chlorophyll *a* and MIB and geosmin. Data showed that nutrient limitation and reservoir stability are important factors in nuisance algal bloom formation in shallow, eutrophic Midwest reservoirs.