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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.**

As water resources dwindle, the quality and quantity of drinking water becomes a primary concern for municipalities. In Indianapolis, Eagle Creek Reservoir, a small, urban drinking water reservoir, is undergoing cultural eutrophication. The reservoir experiences high rates of nutrient input from watershed sources (e.g., agricultural and suburban fertilizer run-off, tile drainage, septic system leaching, waste water treatment plants, and improper feed lot practices). To determine the sources and loads of P that drive productivity in the reservoir, we completed a watershed mass balance and reservoir sediment sequential P analysis. From 2/2003 – 7/2005, Eagle Creek Reservoir's inflowing streams were sampled for Total P and measured for discharge. Outflows were also sampled with water volumes provided by dam outfall and drinking water intake operators. In November 2003, sediment cores were taken at two locations in the reservoir and analyzed for organic-P and Fe-P accumulation. Mass balance data show that in 2003, a year of extreme rainfall events, the reservoir accumulated 66 metric tons of P; in 2004, a year of drought conditions and extended periods of hypolimnetic anoxia, the reservoir accumulated only 27 metric tons of P. Sequential P extractions of the upper 20 cm show that 70-80% of sediment P is in the readily available Fe-P form. Data indicated that, while external sources drive productivity during years of ample rainfall (2003), internal P recycling can also sustain high rates of productivity (2004), showing that mitigating eutrophication in this reservoir will need to encompass managing both external and internal sources of P.