
Phosphorus dynamics and retention in non-point source wetlands in southern Sweden

Karin M. Johannesson*, Karin S. Tonderski, Bengt Wedding, Stefan E.B. Weisner

Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-581 83 Linköping, Sweden, *kajoh@ifm.liu.se

Data from seven constructed wetlands receiving runoff from agricultural catchments in the south of Sweden are investigated with respect to water quality in general and phosphorus (P) dynamics in particular. The seven wetlands differ in size (0.23–2 ha), design, land use and catchment characteristics. Wetland to catchment area varies between 0.06% and 2%, and the soil types in the catchments range from mixed sand to heavy clay with various proportion of agricultural land use (35–100%). The hydraulic load varies between 7 and 684 m year⁻¹, which reflect the different geographical and hydrological conditions.

The data series cover 2–9 years in the respective wetlands with continuous flow measurements and time or flow-proportional water samples for the time period covered. The aim of the study is to quantify wetland retention of P from agricultural catchments, and to identify factors that can explain differences in specific and relative P retention in the wetlands.

The relationship between water flow and seasonal variations of P concentrations in wetland inflows and outflows are analyzed for both dissolved and total P. Furthermore, differences in P concentrations are related to catchment characteristics, e.g. area, land use, soil types, amount of rural wastewater discharges, to identify possible landscape factors that affect stream transport of P and P retention in constructed wetlands.

This investigation will provide a better understanding of factors affecting P retention in created wetlands, with further implications for wetland research and monitoring. Furthermore, the results can assist when formulating models for P removal in wetlands receiving non-point source runoff.