Phosphorus retention and particle resuspension in constructed wetlands - a method comparison

Pia Kynkänniemi¹, K. Johannesson², B. Ulén¹ & K.S. Tonderski²

¹ Swedish University of Agricultural Sciences  ² Linköping University
pia.kynkaanniemi@slu.se

Material and Methods

Three wetlands constructed in agricultural catchments in central Sweden were investigated for their function as particle and phosphorus (P) traps for Aug 2009 - Aug 2012.

Inflow-outflow balance
Water flow was measured and water samples collected fortnightly either as flow proportional (FP) or grab (G) samples.

Sediment studies
Accumulated sediment was sampled ( Å ) as gross (traps) or net (plates) accumulation.

Aims

I. Estimate net retention of particles and P
II. Compare two methods of estimating particle and P retention:
   - inflow-outflow balances
   - accumulated sediment and P
III. Investigating resuspension of accreted sediment

Preliminary Results

Inflow-outflow balance
The annual P retention varied from a net release of -12% to trapping 46% of the P losses (0.04-1.22 kg P ha⁻¹ yr⁻¹) from the upstream agricultural fields.

Sediment studies
Bergaholm wetland had largest net and gross sedimentation.
Between 70 and 89% of the sediment was resuspended in these small wetlands.

Conclusion

I. Bergaholm that was designed for P retention had largest sedimentation.
II. Sedimentation plates is a cheaper alternative for estimating P retention in wetlands instead of water sampling at inlet & outlet.
III. Resuspension was large in these small wetlands.