

Evaluation of the effectiveness of the eutrophication mitigation measures with optical sensors

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This project evaluates the effectiveness of mitigation measures for reducing phosphorus (P) and sediment losses, using high-temporal resolution sampling and modelling. We evaluate the following measures:

- Improved drainage and structure liming on fields throughout the catchment,
- Lime-backfill (LF) in selected field drains,
- Two-stage ditch (SD) along the main reach of the open stream, and
- Two-stage sedimentation pond (SP) to capture sediments and sediment-bound P.

The evaluation is conducted by high-temporal resolution (<hourly) P and sediment measurements at the catchment outlet and sediment measurements upstream and downstream of each measure (LF, SD, SP). Evaluation of the effects of these measures on water quality is difficult, both due to their cumulative effects observed in the stream and the importance of seasonally-changing precipitation and flow conditions on P and sediment transfers. However, recent developments in high-temporal resolution P and sediment sampling provide improved understanding of P and sediment sources in relation to flow when compared with conventional grab and flow-proportional sampling. Our initial results show that there is a significant difference in stream P and sediment concentrations between before and after introduction of the measures both at the catchment outlet and at the location of the individual measures (LF, SD, SP). The effectiveness of each measure varies on a seasonal basis. This project is the first comprehensive evaluation of the effectiveness of the chain of P and sediment mitigation measures at reach and catchment scale in Sweden. Through this, we aim to increase the awareness and use of the mitigation measures by Swedish farmers and move a step closer towards environmentally friendly Swedish agriculture in the long-term.

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