

Master Thesis in the Department Lake Research at UFZ:

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Master Thesis Topic: Optimizing Phosphorus Dosing to Support Trophic State Reduction in a Drinking Water Reservoir

Project Summary: We are seeking a motivated Master's student to develop a simplified model to support phosphorus management in a eutrophic drinking water reservoir with two pre-dams. One of the pre-dams is currently dosed with a flocculant (ferric chloride - FeCl_3) to reduce phosphorus input. The long-term goal is to lower the trophic state of the main reservoir (hydraulic residence time ~ 1 year) toward mesotrophic conditions. We have high-quality monitoring data, including discharge, total phosphorus (TP), soluble reactive phosphorus (SRP), and other water chemistry parameters. Based on this, the thesis will focus on developing a mass-balance or simplified process model to simulate how different dosing strategies (timing, quantity, duration) affect long-term phosphorus dynamics and water quality in the reservoir.

Main Tasks:

- Review existing modeling approaches for phosphorus removal and reservoir dynamics.
- Develop a tailored mass-balance or process-based model using available monitoring and dosing data.
- Simulate various FeCl_3 dosing regimen to evaluate trade-offs between flocculant use and water quality improvements.
- Estimate the conditions under which the trophic state could shift toward mesotrophic or oligotrophic levels
- Document the findings, compile the final thesis, and present the results internally.

What you bring:

- You are a registered student in the field of engineering or natural sciences with a Bachelor's degree.
- You have experience or knowledge of limnology, data analyses, visualization and presentation.
- You are familiar with MS Office, and a programming language.
- You can express yourself confidently in both written and spoken English.
- You work independently and actively drive your tasks forward.