
Modelling of the effects of phosphorus load in Iisalmi Route

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The effect of changing external load the phosphorus (P) content in lake waters is poorly understood. Basic mass balance models have been used since 1970s to predict the concentrations as a function of external load. However, the retention of P in the lake chains, typical in most parts of Finland, is poorly understood. The aim of this study was to develop a model that can be used to predict the P content of lakes in Iisalmi Route caused by external loads of P. The model can also be used in the decision-making process of water protection.

The model involved two different steady-state models and was created with the Microsoft Excel program. In the model the Iisalmi Route up to the Lake North-Kallavesi were divided to 11 subdistricts. The data for the model was collected from the Hertta system and VEPS system which are maintained by the Finnish Environment Institute. After the model had been created it was calibrated and tested. The testing showed that the model was reliable.

The model was used to simulate the targets presented in the water protection guidelines to year 2015 and to change external P load and flow rate when predicting the changes of P content in lakes. Using the targets of the guidelines the P contents were decreased 10-22 % in different subdistricts. Results indicated that model works better with lakes that have lower level of eutrophication. In future the model will be developed to include the actions of the water protection for different loading sectors, especially for agriculture.