Abstract

The topic of thesis deals with a hydrological model SWAT used for impact assessment of landscape structure on surface water pollution in Krivoklatsko protected area. For this purpose using ArcSWAT in the ArcGIS environment there were built hydrological models of three watersheds of various landscape structure located in the area of interest. The measured data of nitrate were used for these models. Concentration of nitrates in the surface waters were simulated by using these models in the period from 2003 until mid-2014. The statistical evaluation of the models including actual landscape structure did not show satisfactory match of the simulated values with the measured values. Due to the uncertainties of the model, including insufficient quantity of measured nitrates, it was not possible to expect exact results.

After validation of basic models, it was important to create new models that would include various scenarios of landscape structure organization. New versions represented changes in the use of land classified as arable land in pasture or mixed forests, in the area around the stream to 250 m and 500 m. Modelling of the impact of individual scenarios on the structure of the landscape structure on nitrate concentrations there was displayed a positive effect of grassing and afforestation of land used as arable land in all river watersheds. Models of Rakovnik stream and Zbiroh stream basins confirmed the assumption that the impact of changes in the landscape structure is greater by replacing arable land with a mixed forest than a pasture and confirmed that the most effective option for nitrate reduction in surface waters is a scenario involving the afforestation of arable lands near the stream to a distance of 500 m, even up to the average of 39 %. In case of Tytersky basin model there was found a similar change in the landscape structure including the conversion of arable land to grassland and mixed forests on average by 57 %.