

Application of SWMM for evaluating NPS reduction performance of BMPs

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ABSTRACT

The nonpoint source (NPS) control facilities as best management practices (BMPs) were installed to manage NPS pollution in Korean and determining the pollutant reduction loads of BMPs is important to abide by the Korean total maximum daily load (TMDL). However, there are some inadequacies in the methodology to estimate the NPS reduction loads because of uncertainties in rainfall and runoff characteristics. For that reason, a Storm water management model (SWMM) model was used to eliminate uncertainties and to estimate more appropriate reduction loads. In this study, the annual total reduction load (ATRL) method was suggested to calculate annual reduction loads using a SWMM model for appropriate NPS pollution control in the TMDL. Also regression of EMCs (ROE) method was suggested to calculate the annual average removal efficiency (RE) compared to the four different methods, namely, the efficiency ratio (ER), summation of loads (SOL), regression of loads (ROL), and rainfall of frequency method (ROF). Therefore, the ROE method was suggested as the appropriate method to determine the average REs of the BMPs. Also the ATRL method was suggested as the appropriate method to determine the reduction load compared to the existing method in the Korean TMDL. This study provides a SWMM model to standardize BMPs data analysis. The SWMM model can be used to determine the RE and reduction loads of NPS pollution due to the implementation of BMPs and to complement their uncertainties in the TMDL.

Keywords: SWMM; Nonpoint sources; BMPs; Reduction loads; TMDL

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