

Methods on load estimation for the implementation assessment in the management of total maximum daily loads

Jae Hong Park*, Seung Young Oh, Jichul Ryu, Jae Kwan Lee, Dong Seok Shin

*Water Environmental Research Department, National Institute of Environmental Research (NIER),
Gyeongseo-dong Seo-gu Incheon, Korea, email: jhong02@korea.kr (J.H. Park)*

Received 13 August 2020; Accepted 4 December 2020

ABSTRACT

The annual amount of water pollution discharge load is utilized to assess its implementation of the load allotment on each unit watershed in the management of total maximum daily loads (TMDLs). The amount of the discharge load might be changed as the rainfall changes in the area with the combined sewer system. In order to evaluate the implementation properly, the effects of rainfall changes should be considered in the estimation of the discharge load. It is necessary to standardize the annual discharge load to be calculated at the same rainfall condition as that of the reference year. But the calculation process is very difficult and might have some limitations. This study investigated and developed two methods in order to estimate the discharge load in a relatively simple way. The load conversion method (LCM) is designed to calculate the differences in discharge due to rainfall changes and to convert the discharge load of the current rainfall condition into that of the reference rainfall condition. The multi-regression equation method (MREM) is to predict the discharge load directly on reference rainfall conditions using a multi-regression equation. These methods were applied to examine the calculation results. LCM showed a more precise result with an error of -0.06% , while MREM -0.18% . Judging from the application results of this study LCM may be useful as a tool for estimating the discharge load for evaluation preferably in the TMDL process.

Keywords: Water pollution discharge load; Unit watershed; Total maximum daily loads; Combined sewer system; Rainfall changes; Load evaluation

* Corresponding author.