QUALITY MODELING OF WATER RESOURCES

ALASEHIR STREAM SUB - BASIN WATER QUALITY

MODELING APPLICATION

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EXPERTISE THESIS ABSTRACT

The purpose of this study is to evaluate the appropriateness of the model by constructing a water quality model in the selected river basin with SImple Stream MODeling Program (SISMOD), which was developed in Turkey and applicable to streams.

Within the scope of this aim, the processes affecting water quality have been examined and the cases where these processes have come to the fore have been discussed by literature review. Furthermore, the models and features used in the literature search were examined and information about the aspects to be taken into consideration in the selection of the modeling program was given.

In order to evaluate the quality of the water bodies in the Alasehir Stream Sub Basin, an important branch of the Gediz Basin, water quality variables such as dissolved oxygen, biochemical oxygen demand, ammonium nitrate, nitrate nitrogen and organic nitrogen were modeled with SISMOD. The model established for November, February, May and August periods was calibrated for the May period and validated for the other periods.

Scenario model was created to improve water quality values. The scenario model was created with the assumption of 50% reduction in diffuse loads and with the planned wastewater treatment plants reduction in point loads. Scenario model was run for four periods. In the present situation and scenario situation, the water bodies in the basin are evaluated according

to the water criteria given in Table 1 of the Water Pollution Control Regulation, which was published in the Official Gazette dated 31.12.2004 and numbered 25687.

For the present situation, based on dissolved oxygen, water bodies remaining on the model boundary are IV. class with the rates of 64%. In the scenario model, IV. class rates decreased to rates of 43%. For the dry period, III. class water bodies ratio is 25% and with the scenario model, it increased to ratios of 45%. For the rain period, even though some levels of recovery occurs for the dissolved oxygen, 55% of water bodies still remain IV. class.

According to the general evaluation of the basin, 48% of the water bodies in the present case, according to the BOD parameter III. class. In the scenario model, 46% of the water bodies rises to II. Class water body. Based on the TKN parameter, 58% of the water bodies are IV. class. For the scenario situation, water bodies are III. Class with the ratio of 65% of water bodies.

In addition to this, the Good Model Practice Handbook developed by the Dutch was also examined in the scope of the study and it was aimed to prepare the model studies in accordance with this handbook and to ensure the reusability of the model.

With this study, it was concluded that SISMOD could be used in river quality modeling. In the application of Alaşehir Creek Sub Basin; since dissolved oxygen level did not improve sufficiently, it was concluded that new measures should be taken together with the planned measures