

Estimation of nutrient and TSS loads of Ergene river and its potential risk on ecosystem

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Abstract

Ergene River Basin with an 11,325 km² drainage area is located in Thrace region of Turkey. The annual average flow is 28.73 m³/sec and the total length of Ergene River is 264 km.

Approximately 70% of people in the region earn their living by agricultural activities.

Industries, which came to the Thrace region from İstanbul since 1970's, concentrated on certain places that the ecosystem all over the region effected by these developments.

In this study, potential risks on Ergene river basin ecosystem depending on both nutrient and suspended solid loads between the years 1992 and 2010 were evaluated. There are many studies done for the purpose of determination of Ergene River water quality by the different institutions in Turkey (State Hydraulic Works, the Provincial Directorate of Environment and Forestry, Trakya University, etc.). Data collected from 12 stations over Ergene River and Çorlu Creek (spatially Uzunköprü Station) were used to estimate annual loads of nutrient and total suspended solids.

Data evaluation confirmed that point sources take an important role of pollution in the region. Organic load as BOD₅ (62%) was originated from domestic sources; nitrogen load (70%) was originated from use of fertilizers in the fields of agriculture, as expected. In the mean time, phosphorus load from domestic resources had a percentage of 58% due to agricultural activities. In the 8-year period (1992-2000), BOD₅, COD and TSS loads related to the industrial activities in the river basin environment increased with the rates of 461%, 551% and 992% respectively.

Population projections for the region also showed that the picture is getting worse depending on the rapid increase of pollutant loads in the river basin. By the year 2020, BOD₅, TSS, total N and total P loads in Ergene Basin are calculated to be approximately 38300 tons BOD₅/year, 40430 tons TSS/year and 61500 tons N/year and 1370 tons P/year. If untreated domestic wastewater will be discharged to Ergene River until 2020, each of these pollutant loads are expected to increase by 119% compared to 2000. Nutrients, which play a critical role in the protection and improvement of water quality, need to be reduced at its source.

Key words: Ergene River, nutrient and TSS load, domestic, agriculture, industry

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