



An approach to assess the diffuse pollution vulnerability using multi-criteria analysis

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The aim of the present study was to evaluate and prioritize the watersheds of Korea in the terms of diffuse pollution management. The Ministry of Environment (MOE) of Korea has made various attempts for the diffuse pollution management under the Water Quality and Ecosystem Conservation Act, but there is a lack of discussion on the decision making system for the efficient management. We employed a multi-criteria analysis in order to evaluate the vulnerability of diffuse pollution influenced by a variety of factors. The analysis is practical to treat many decision problems in environmental management which involve multiple conflicting evaluation criteria as well as a large number of spatial units. It helps us to describe the diversity and complexity of diffuse pollution. The study procedure constructed 3 steps as (1) determining criteria and their weights, (2) assessing vulnerability for diffuse pollution, (3) ranking watersheds to need diffuse pollution management. The evaluation subjects were the 814 watersheds of Korea. An evaluation framework consists of three groups of diffuse source pollution, hydrologic process, and the status of receiving water and significant factors for each group was selected as criteria and sub-criteria. The pollution source group were assessed using the results of pollution source survey, agricultural data, land use provided by central and local governments; the hydrologic process group using data of rainfall, land cover, soil and so on; the receiving water group using data of river flow, water quality and aquatic ecosystems. Then, the weighted scores of all criteria were aggregated for a watershed unit and the watersheds were ranked in order of the evaluation scores. The results indicated that the watersheds such as the Mangyounggang midstream, the Dongjisan watermark, the Jeongeupcheon and so on were vulnerable to diffuse pollution. The present study suggested the list of watersheds preferentially considered in the diffuse pollution management of central and local governments in Korea.