

AN INTEGRATED APPROACH FOR REHABILITATING THE HYDROLOGIC CYCLE IN AN URBAN WATERSHED, KOREA

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Worldwide, many urbanized watersheds suffer from streamflow depletion, which often negatively affects related factors such as water quality and in-stream and near-stream ecologic integrity. Such distortions in the hydrologic cycle mainly result from increases of impermeable areas due to urbanization, decreases of baseflow runoff due to groundwater pumping, and stormwater loss through combined sewer systems. Korea is not an exception. Shim et al. (2004) reported 543 drying, second-graded streams in Korea out of 3773 total, a frequency of occurrence greater than 14%. This research presents a case study of an integrated watershed management approach designed to rehabilitate the distorted hydrologic cycle in the urbanized Anyangcheon watershed of Korea.

Heathcote (1998) identified a systematic, seven-step approach to general watershed planning and management. It consists of 1) understanding watershed components and processes, 2) identifying and ranking problems to be solved, 3) setting clear and specific goals, 4) developing a list of management options, 5) eliminating infeasible options 6) testing the effectiveness of remaining feasible options, and 7) developing the final options. This study applied the first five steps of that process to the Anyangcheon watershed in Korea, which experiences streamflow depletion, frequent flood damages, and poor water quality typical of highly urbanized watersheds. This study employed three indices: Potential Flood Damage (PFD), Streamflow Depletion Index (SDI), and Impervious Area Ratio (IAR) to identify and quantify problems within the Anyangcheon watershed. The primary goal of this study is to secure instream flows in the Anyangcheon watershed during dry seasons; target flows are equivalent to those observed in 1975. Secondary management goals of flood damage mitigation and water quality enhancement are also identified and investigated. Management options include not only technological or structural measures to change existing conditions, but also nonstructural measures that rely on changes in human behavior or management practices (Step 4). Certain management options which are not technically, economically, or environmentally feasible, or are not mutually exclusive, are eliminated (Step 5). This report addresses a pre-feasibility study, which established a master plan (figure 1) using Steps 1 through 5.

A future study, based on steps 6 & 7 of Heathcote's general integrated watershed management approach (1998), will use simulation models to quantitatively evaluate the alternatives identified in this pre-feasibility study.

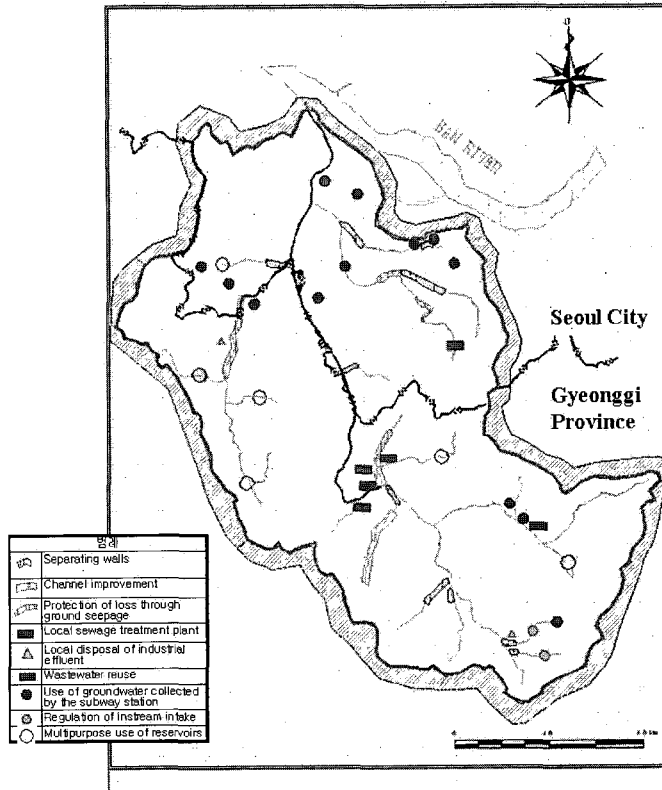


Fig. 1 A master plan draft of the integrated watershed management of the Anyangcheon

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