Comparative analysis on reduction of agricultural non-point pollution by riparian buffer strips in the Paldang Watershed, Korea

Sang Joon Chung\textsuperscript{a,d,*}, Hong Kyu Ahn\textsuperscript{a}, Jong Min Oh\textsuperscript{b}, I. Song Choi\textsuperscript{b}, Seung Hoon Chun\textsuperscript{c}, Youn Kyoo Choung\textsuperscript{d}, In Sang Song\textsuperscript{d}, Kyoung Hak Hyun\textsuperscript{d}

\textsuperscript{a}River, Coastal and Harbor Research Division, Korea Institute of Construction Technology, 1190, Simindae-Ro, Ilsanseo-Gu, Goyang-Si, Gyeonggi-Do 411–712, Korea
Tel. +82 (31) 201 2125; Fax +82 (31) 203 4589; email: jsj@kict.re.kr
\textsuperscript{b}Department of Environmental Science and Engineering, Kyunghee University, Seocheon-Dong, Giheung-Gu, Yongin-Si, Gyeonggi-Do 446–701, Korea
\textsuperscript{c}Department of Landscape Architecture, Kyungwon University, B. Dong, SGu, S.Si, G. Do 461–701, Korea
\textsuperscript{d}Department of Civil & Environmental Engineering, College of Engineering, Yonsei University, Seoul 120–749, Korea

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\textbf{ABSTRACT}

A riparian buffer strip (RBS) that locates in boundaries between streams and lands efficiently and sustainably performs ecological functions and reduces non-point pollution as a multipurpose practice. The present paper investigates the feasibility of introducing a riparian buffering strip for protection of the Paldang Lake and the Han River in Korea from worsening ecological environment and water quality. For experiments, a pilot RBS (five types of plants) appropriate for the conditions of targeted watersheds was set up and tested according to the pollution loads and area precipitation. The measurements show that suspended solids (SS), total nitrogen (T-N), and total phosphorus (T-P) decrease by more than 50% within the 20 m width of the pilot RBS and, at the maximum, decline by up to 84%, 87%, and 98% respectively depending on a plant type in the pilot RBS. The catchment area per 1 ha in the pilot RBS was 12 ha. In case a 20-m wide RBS is set up in the watershed with the biggest agricultural area (72,049 ha) among the three unit-watersheds in the upper reaches of the Paldang Lake, the catchment area per the RBS of 1 ha can be estimated as 4 ha leading to reduction of agricultural non-point pollution loads by more than 79%. From the findings, the introduction of RBS is expected to be appropriate and versatile for reduction of agricultural non-point pollution and improvement of ecological conditions.

\textit{Keywords}: Riparian buffer strip; Ecological function; Non-point pollution; Sustainable multipurpose practice; Water quality; Agriculture; Suspended solids; Nitrogen; Phosphorus

\* Corresponding author.