ABSTRACT

Watershed Modeling and Nutrient Loadings in Han River of RO Korea

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To effectively decrease the pollution loads to the Yellow Sea, it is critical to understand the spatio-temporal distributions of pollution loads. In South Korea, there are four major river systems that flow to the Yellow Sea: the Han River, Geum River, Mankyoung-Dongjin River, and Youngsan River. The pollution loads from each of these river systems need to be evaluated using a best available science-based methodology.

This study aims: (1) to set up a watershed model for the Han River Watershed; (2) to estimate the spatio-temporal distributions of pollution loads from the Han River Watershed to the Yellow Sea. The Han River Watershed covers an area of 34,401.9 km^2 that accounts for 34.3% of the total area of South Korea. REDPOLL was selected as the watershed model to use. REDPOLL was set up for the Han River Watershed using grid cells of 100 m by 100 m and daily time steps for the year 2016. Flows and pollution loads to the Yellow Sea from the Han River Watershed were evaluated for the year 2016 based on the simulation results of REDPOLL. For the year 2016, the annual total river flow from the Han River Watershed to the Yellow Sea is 21.3 x 109 m^3/year and the pollution loads are SS 836.5 x 103 ton/year, BOD 56.1 x 103 ton/year, TN 82.5 x 103 ton/year and TP 3.8 x 103 ton/year. River flows and pollution loads have a very wide range of daily and monthly variation. As affected by the monsoon weather system, the monthly volume of river flows in July reaches 7,484 x 106 m^3/month accounting for 35.2% of the annual discharge. Likewise, the monthly pollution loads in July comprise more than a quarter of the annual loads: SS 49.4%, BOD 40.0%, TN 30.9% and TP 41.6%. In the Han River Watershed, the majority of pollution loads come from the diffuse sources: SS 99.8%, BOD 86.8%, TN 75.2%, and TP 92.7%.