

Development of a Land-based Pollution Load Model in Northwest Pacific

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Research Trends & Results

1. Introduction

In countries adjacent to Japan, recent rapid population growth and industrial development have been accompanied by an increasingly serious river and ocean water pollution problem. To propose water quality environment conservation measures for Northwest Pacific (Bohai Sea, Yellow Sea, East China Sea, and Sea of Japan) by reducing land-based pollution loads mainly through sewerage systems, our Division is conducting a research in collaboration with researchers from the concerned countries (China, Japan, Korea, and Russia).

2. Development of a land-based pollution load model

To clarify the future pollution load reduction effectiveness of providing sewerage systems, our Division adopted a method of verifying the effectiveness of pollution load reduction measures by developing a land-based pollution load model and setting future scenarios. In 2009, our Division started by developing a land-based pollution load model for China.

To develop the model, our Division referenced the framework of Comprehensive Basin-wide Planning of Sewerage Systems in Japan, and adopted a model where pollution loads are calculated by totaling pollution loads (COD, T-N, and T-P) discharged from sources of each category such as residential and industrial in each drainage basin block, then totaling pollution loads from the upstream to the downstream of rivers to obtain pollution loads reaching coasts. The basic land unit for land-based pollution load calculation is an administrative unit (prefecture or

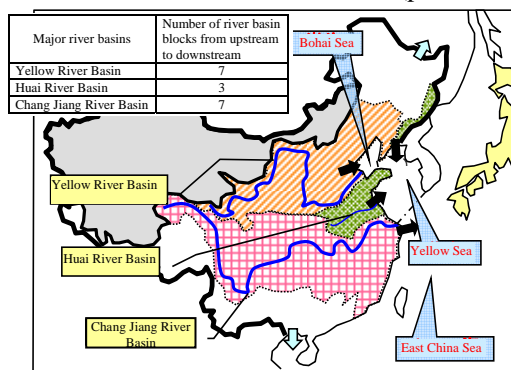


Figure 1. Major River Basin Blocks in China

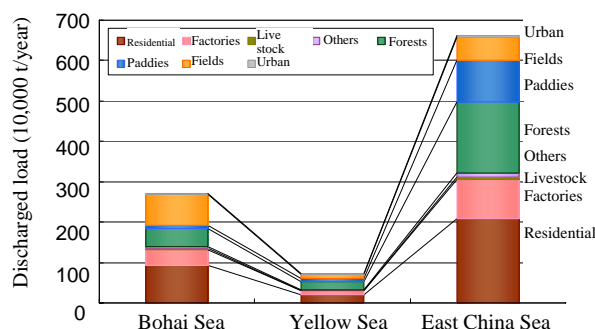


Figure 2. Results of Approximate Calculation of Annual Discharged Load (COD_{Mn}) in 2005

city), and river basin block divisions for each water quality monitoring points (where both water quality and water quantity are measured) are set in major rivers.

Figure 2 shows the results of applying the land-based pollution load model to approximately calculate the annual discharged COD loads in each drainage basin in 2005. The modeling included uncertain elements, but it can clarify trends in the annual total discharged loads and the percentages of total discharged pollution loads of each category. More accurate results for the discharged loads will be obtained in 2010.

3. Cooperation with Overseas Researchers

Our Division is working cooperatively with researchers from China, Japan, Korea, and Russia to confirm the appropriateness of the land-based pollution load model and to promote concerted efforts by the countries. Fruitful discussions have been conducted at an international symposium at Kyoto University in January 2009 and at an international conference in Tokyo in February 2010.

4. Future Works

Based on past research results, our Division conducts improvement of the land-based pollution load model, setting of future scenarios and clarification of future pollutant loads, prediction of the marine water quality through marine simulations, and also the preparation of proposals for marine water quality environment conservation for Northwest Pacific.

<http://www.nilim.go.jp/lab/ebg/kinkai1.pdf.pdf>
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