Strategic Approach to Restore the Water Quality of Three Brackish Lagoons of East Coast in Korea

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Lagoons of East coast in Korea such as Whajinpo, Youngrang, Songji are brackish lakes unlike inland lake. These lagoons have particular ecosystems coexisting with freshwater, seawater, brackish water biota. As most of brackish water areas in Korea are disappeared owing to the construction of estuary bank and land reclamation, brackish lakes are of great value to conserve.

This investigation was done to set up the strategy to restore the water quality of three major Korean brackish lagoons on the basis of the results from the analysis of the relationship between the loads discharge from watershed and the water quality of lagoon. A water quality survey was done at June 2000 which algae growth rate is high. COD, TN, TP, Chl-a of the Lake Whajinpo were 9.4 mg/L, 2.31 mg/L, 0.032 mg/L and 80.5 μg/L, respectively. COD, TN, TP, Chl-a of the Lake Youngrang were 6.7 mg/L, 1.31 mg/L, 0.063 mg/L, 20.9 μg/L, respectively. And those of the Lake Songji were 6.9 mg/L, 0.53 mg/L, 0.038 mg/L, 5.35 μg/L, respectively. In Lake Whajinpo, algal bloom has been severe at warm season, main sources of pollution are livestock and population. Deterioration of water quality is expected because of tourist resort development plan in the catchment. In Lake Youngrang catchment, condominiums and golf courses have been doing business, and untreated wastewater of residential areas had been flowing into the lake. Therefore water quality of the Lake Youngrang is bad and eutrophication problem has been occurred. As the catchment of the Lake Songji is undeveloped and population is small, water quality of it is better than that of other lagoons of the east coast. But deterioration of water quality is expected because the catchment area is appointed as a tourist resort. The effect of water quality improvement through the management of the point and nonpoint sources for the lagoons is estimated. WASP model is calibrated and validated by the water quality and flow measurement results surveyed in 1999 and 2000. Water quality predictions are made on condition of early summer that water temperature is high and flow from the catchment is small. Because both water quality and quantity of runoff are strongly dependent on land use & land cover (LULC) criteria, model input data in terms of LULC was determined using remote sensing (RS) and artificial intelligence (AI). Landsat TM multi-band (7bands) and KOMPSAT panchromatic (KOrea Multi-Purpose SATellite) data were selected for input data processing. In particularly, RBF-NN (radial-basis-function neural network), that is one of artificial intelligence (AI) techniques, was applied to classify LULC of the study area. And then those results were used to estimate pollution loads discharged from each catchment.