

Spatial Pattern of Korean Major 38 Estuaries and Their Relationship with Land-based Activities

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Coastal areas serve as a base of socio-economic activities of Korea. As of 2006, around 35% of the land was considered as coastal areas which accommodated 47% of the population and most industrial parks. However, the water quality of coast is being deteriorated, especially in estuarine environment.

Pollution loads from land-based sources are believed as the main cause of the degradation of the coastal environment. Around 62% of wastewater-discharging-facilities are located in the coastal areas of Korea. They emit about 190,000 tons of waste water every day. Worse still, 113 domestic sewage treatment plants, that is 39% of the nation's total, are located in coastal watershed releasing one billion tons of treated waste water.

Cluster Analysis (CA) was used to group the 38 major estuaries by using the data set of coastal water quality parameters from 38 estuaries included: dissolved oxygen, total phosphorus, total nitrogen, dissolved inorganic phosphorus, dissolved inorganic nitrogen, ammonia, nitrates, nitrites, etc. Based on the analysis, 38 estuaries were divided into three different groups.

For each group, Principal Component Analysis was employed to extract the spatial characteristics of the watershed in each group from the watershed characteristics data such as river input, land use (urban, forest, agriculture, and the others), mean slope, imperviousness, population density, livestock, etc. Group one out of three was mainly influenced by river input; another group with high TP and TN concentration was affected by population density, livestock and imperviousness; and the other is dependent on forest and mean slope of watershed, respectively.

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