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The Limnological Survey and Phosphorus Loading of Lake Hoengsung

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Limnological survey was conducted in a reservoir, Lake Hoengsung located in Kangwondo, Korea, from July 2000 to September 2001 on the monthly basis. Phosphorus loading from the watershed was estimated by measuring total phosphorus concentration in the main tributary. Secchi disc transparency, epilimnetic(0-5 m) turbidity, chlorophyll a (chl-a), total phosphorus (TP), total nitrogen (TN) and silica concentration were in the range of 0.9-3.5 m, 0.1-8.5 NTU, 0.3-32.4 mgChlm⁻³, 5-46 mgPm⁻³, 0.83-3.55 mgN L⁻¹ and 0.5-9.6 mgSiL⁻¹, respectively. Green algae and cyanobacteria dominated phytoplankton community in warm seasons, from July through October, 2000. In July a green alga (*Scenedesmus* sp.) was dominant with a maximum cell density of 10,480 cells mL⁻¹. Cyanobacteria (*Microcystis* sp.) dominated in August and September with cell density of 3,492 and 296 cells mL⁻¹, respectively. Species diversity of phytoplankton was highest (2.22) in July. The trophic state of the reservoir can be classified as eutrophic on the basis of TP, chl-a, and Secchi disc transparency. Because TP concentration was high in flood period, most of phosphorus loading was concentrated in rainy season. TP loading was calculated by multiplying TP and flow rate. The dam managing company measured inflow rate of the reservoir daily, while TP was measured by weekly surveys. TP of unmeasured days was estimated from the empirical relationship of TP and the flow rate of the main tributary; $TP=5.59Q^{0.45}$ ($R^2=0.47$). Annual TP loading was calculated to be 4.45 tPyr⁻¹, and the areal P loading was 0.77 gPm⁻²yr⁻¹ which is similar to the critical P loading for eutrophication by Vollenweider's phosphorus model, 0.72 gPm⁻²yr⁻¹.