

PROPOSAL FOR NEW ESTUARINE ECOSYSTEM MANAGEMENT BY DISCHARGE CONTROL OF DAMS

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In many countries, a large number of dams have been constructed on rivers for various purposes, including water supply, irrigation, and electricity. However, it is now evident that the impoundment of river water by dams reduces the nutrient level and changes the nutrient composition of the discharge water due to specific trapping processes that occur due to the blooming of phytoplankton and the resulting sedimentation of organic matter in the reservoir. As has been reported in the literature, the possibility of changing the downstream estuarine ecosystem through changes in the phytoplankton species composition is very high. The most typical change in the phytoplankton composition is expected to be the change of the dominant group from diatoms to dinoflagellates, which often cause harmful algal blooms (HAB). In this paper, we demonstrate, using a newly developed numerical model, the change in phytoplankton species composition responding to the amount and mode of nutrient supply. The present results can be applied to the discharge water control of dams and to predicting the effects of new dam construction. Historical changes in phytoplankton species composition and nutrient loading in the Seto Inland Sea, the largest estuary in Japan, are also presented in the discussion, contained in this paper, on the feasibility of proposing new ideas for managing estuarine ecosystems.