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Ecosystem Response of a Semi-Enclosed Saline Bay to Damming and Sluice-Management: Case of Lake Grevelingen in the Netherlands

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Abstract : The delta works in the Southwest Netherlands drastically changed the estuarine nature of this area. The Grevelingen estuary was dammed off and became a lake in 1971. Since 1978 a connection with the North Sea exists to keep the lake saline but management of the sluices varied over time. Our research of several decades of monitoring data shows that water management practices lead to drastic changes in water quality and consequent ecological shifts in benthic fauna, fish, and bird species. Benthic biomass, dominated by molluscs, showed major changes with an important role for invasive species. Fish migration and, therefore, fish stock in the lake changed with recently smaller fish species and lower biomass values, with consequences for fish eating birds. Implications are made towards future management to re-introduce micro-tide in connection with the North Sea to improve water quality and the ecological status of the lake, as well as consequences for the bordering Natura 2000 terrestrial habitats, including rare dune vegetations, are discussed.

Keywords : ecosystem study, Grevelingen, Natura 2000, water management, water quality
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