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Hurdles for implementation of constructed wetlands as Nature-based Solutions in Sweden

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Eutrophication in the Baltic Sea has been one of the major environmental issues during the last century partly due to extensive land-use change, loss of natural retention systems, and insufficient management. European legislation such as the Water Framework Directive (WFD) attempts to guide the recovery of good ecological status from freshwater to the sea, and suggests wetlands as ecosystems that can potentially contribute to achieving this goal. Wetlands are considered remarkable Nature-based Solutions (NbS) for improving water quality by diminishing the nutrient loads. This study aims to set a background context of the WFD implementation in Sweden, determine the status of constructed wetlands, and evaluate the stakeholders' perspectives to identify the main administrative hurdles of wetland implementation in Sweden. For this purpose, we conducted a narrative review, database analysis, and semi-structured interviews with members of the institutions involved in water management. Our results show that it is essential to find synergies among the WFD and other directives to expand cross-sectoral cooperation, implement adjustments on the funding scheme that includes restoration and maintenance of natural wetlands, and increase compensation periods and cost ceiling. Likewise, it is crucial to perform significant improvements in the monitoring system, including more frequent data collection, as well as exploring new strategies to capture landowners' interest in the implementation of NbS, such as the Catchment Officers program. Finally, we suggest paludiculture as a promising farming practice to increase proprietors' attention on novel market alternatives, and in turn, to provide benefits for climate, water, and biodiversity.

Keywords Wetlands management · Water Framework Directive · Nature-based Solutions · Eutrophication · Semi-structured interviews · Sweden