

An Integrated Catchment Approach to Management of Sediment Pollution in the Coastal Shallow Lakes

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Aim of the study: The purposes of this study were to assess the sediment quality and to determine levels of sediment pollution, and also to discuss significantly headlines for suggested management strategies of the coastal shallow lakes in the Kızılırmak Delta, located in the central Black Sea region of Turkey. Lake management projects, offer a real opportunity to increase understanding of lake ecology through associated research and monitoring work. The catchment managers might aim to reduce nutrient export at source for assessment of the impact of nutrient loading on the receiving waters through a number of measures. However, it is important that the selection of a suitable management model is determined of present increases in nutrient loading on shallow waters and also nutrient transport pathways linking the point and non-point sources in the catchment.

Material and Methods: Declining water quality, drainage, eutrophication and catchment disturbances such as development, loss of natural vegetation and poor agricultural practices have changed the fundamental ecology much of shallow lakes in the Delta. In the study, monitoring of sediment quality parameters was conducted for the coastal shallow lakes. It is known that the sediment can directly influence the nutrient level in standing inland waters such as lakes and ponds by way of internal nutrient loading. Sediments may act as both nutrient and contaminant sources or sinks, potentially affecting the nutrient dynamics of entire shallow water bodies. In some watersheds, particularly those that are heavily fertilized, sediments taken from lakes showed that yield large quantities of phosphates and nitrates to the coastal water body.

Results: A range of potential catchment management options have been evaluated here for the shallow lakes in the Delta of Kızılırmak. Along with development activities, population growth, the lake water quality deteriorated and reached at its peak in the last years. Also, the impacts of land use changes throughout the catchment were observed in terms of higher sedimentation rates. According to sustained works in the wetland, it was found that the sediments from Cernek Lake have P release rates ranging from 2.63 to 4.10 mg P/m²/d whereas Balık Lake exhibits lower P release rates (average 3,10 mg P/m²/d). However both lake sediment types had relatively low P release rates compared with published values for eutrophic systems. Nutrient and organic matter content were high, with higher concentrations in lakes with prevalence of fine particles. Importantly, the nutrient release from the lake sediment was contributing to the water bodies as equal as from the inflowing river and drainage canals. Finally, activities needed in all segments and the participation of all stakeholders is levelly important for sustainable conservation of the shallow lakes in the catchment. The approach is informed by an understanding of the following: Physical, chemical and biological control measures are to be implemented in an integrated way without harming the ecosystem of the lake, eco- friendly farming practices in the catchment areas, modification of land use and discharge consents, and for this reason, a further in-depth research is required to implement the water and sediment pollution control measures.

Keywords: Sediment, Catchment Management, Nutrients, Shallow Lakes, Kızılırmak Delta