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Abstract

The management of water quality in the estuarine ecosystems in the coastal region is now a major challenge to protect the environment. The water quality management has multiple variables that affect the environment in both direct and indirect way. The effects of these variables depend on time as well as space. Some are visible within a short time whereas others affect the ecosystem individually or synergistically in a significant magnitude after a certain period of time. Water quality in an inter-tidal environment depends upon many indicators such as hydrological regime, microbiological community, climatic conditions, and the exchanges at basin level. In this context this present study has tried to find out the indicators responsible to draw substantial effects to the referred ecosystem in a cumulative manner with the emphasis of examining the reasons critically on the basis of water quality analysis. The study further substantiated by pollution mapping along coastal region of the study area by using both GIS (ArcView 3.3) mapping and a water quality model; i.e. QUAL2K. The hydrodynamic of the ecosystem was studied by using the model and it was concluded that mud-flats has changed the hydrology to a greater extent and thus has influenced the transportation of the pollutants. On the other hand the study also evaluated the assimilation capacity of mangroves for mitigating the cumulative effects, incurred in the system. While the pollution mapping through GIS techniques generally showed the distribution of pollutants in the estuarine system, it also showed the change in mangrove population in the region. It could be concluded that the natural assimilation of the stream and the interference of mangrove ecosystems were helping the system to recover from the stress caused by the pollutants. The accumulation of pollutant has affected detrimentally on the benthic community and on aquatic biodiversity and a decrease of aquatic production observed both temporally and in spatially within the estuary system. Though industrial pollution in the Chao Phraya estuary was high as observed, the water quality seemed to be close to the standard. It was noted that a patch of the mudflat region and surrounding water body was not preferred by the fishes, strengthening the idea of sediment pollution. However, a sediment level examination of the pollution traces was avoided due to the limitation of the study. This study also tried to find out the correlation between cause and effect of different valued ecosystem components established by selecting different responsible indicators and thus established that there is a potential threat of cumulative actions of some of the pollutants though the Chao Phraya estuarine ecosystem is otherwise healthy. Lastly the study further brings the need of broad level examination of dynamics of water quality indicators and a parallel verification of mangrove sediments which can bring micro level composition of the available community and the effect of the pollutants on them.

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