



Impact of the River Plume on Physicochemical Parameters of Near-Shore Water of Nilwala River Mouth, Sri Lanka

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Organic matter, nutrients and suspended particles from terrestrial sources are transported to near-shore waters through rivers, and at the river mouth water meets the Ocean forming a plume. River plumes play a major role in nutrient dynamics, maintaining the biodiversity and, productivity of near-shore waters strongly influence the distribution of phytoplankton, zooplankton, pelagic & benthic fishes. The objective of this study was to determine the influence of river plume on the near-shore water quality of Nilwala river mouth. Sampling was carried out on monthly basis at eleven random sampling points within 1.5 km² of study area covering four monsoon periods (from May 2016 to April 2017). Temperature, pH, salinity, conductivity, and dissolved oxygen (DO) were measured onsite whereas total suspended solids (TSS), nitrate and phosphate concentrations were measured in the laboratory. River discharge varied from 6.82 to 25.18 m³s⁻¹ and direction and distribution of the river plume were interpreted using the variation of surface water salinity. Salinity values of the study site varied between 4.30 and 33.05 ppt during the study period. The mean temperature and mean DO were within the range of 26.48-29.30°C and 5.86-6.18 ppm respectively whereas mean pH values were varied from 7.8 to 8.78. Nitrate and phosphate concentrations were fluctuated between 0.28 to 2.23 mg/L and 0.00 to 0.04 mg/L respectively. Temperature ($r = 0.517$; $p < 0.01$) and TSS ($r = 0.710$; $p < 0.01$) showed significant positive correlation whereas phosphate ($r = -0.318$; $p < 0.05$) showed a negative correlation with river discharge within the study site. However, no significant relationship was recorded between DO and the river discharge. The TSS value positively correlated to the sediment load carried by river water. Further, negative correlation between salinity and phosphate concentration suggests that most of the phosphorus in the river waters are adsorbed by suspended solids and mixing process of both sea water and freshwater masses at the river mouth caused abrupt changes to the chemical composition of near shore waters.

Keywords: Nutrients, Nilwala River, Physicochemical parameters, River Plume