Temporal and spatial variability of some physico-chemical and biological parameters in Weligama Bay

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During recent decades, coastal water quality of the globe has altered negatively with the overloaded anthropogenic activities. In the Sri Lankan context, Weligama Bay is such a potentially affected coastal ecosystem with limited information on its water quality. Therefore, this study was focused on revealing spatial and temporal variations in micronutrients (nitrate, nitrite, phosphate and ammonia) and other physicochemical parameters (temperature, salinity, total dissolved solids and pH) and their relationships with biological parameters (chlorophyll and blue green algae) in the bay and two connected streams (Polwatta River and Kapparathota stream). Predetermined 12 samplings points were monitored monthly during October-December, 2018. The presence of significant temporal variations in each nutrient can be linked to the changes in rainfall patterns prior to sampling. The highest nitrate (52.70 μmol/L) and nitrite (0.48 μmol/L) concentrations in Polwatta River coincide with the daily highest rainfall (37.3±16.6 mm/day) in November, which prevailed seven days prior to the sampling day. The significant negative correlation between salinity and micronutrients showed that polluted freshwater discharges from streams, convey high amounts of nutrients into the adjacent bay waters. Chlorophyll-a in Kapparathota stream (22.11 μg/L) was higher than acceptable limits (1-10 μg/L) indicating it as a eutrophicated stream. Further, its ammonia concentration (2.981 μmol/L) doubled compared to the values reported in 2013. Although, nitrate concentration of the entire bay was well over the productivity limiting level (<0.7 μmol/L), lower chlorophyll-a concentrations in the eastern side of the bay where the phosphate concentration was lower than the required level (<0.3 μmol/L), shows that phosphorous as the limiting nutrient in the system.

Keywords: Weligama Bay, micronutrients, physico-chemical parameters, biological parameters, anthropogenic input

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