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An index of biotic integrity based on fish to assess the water quality of Bolgoda North Lake and its feeding canal

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A modified fish based Index of Biological Integrity (IBI) was developed for the assessment of water quality in some selected sites of Bolgoda estuarine system (6" 40'-49' N: 70" 54'-58' E) in the Western Province of Sri Lanka. The efficiency of fish based IBI as a water quality assessment tool was compared with the Water Quality Index (WQI), another common water quality assessment tool, determined for the same sites.

Three sites namely, Thuduwa, Borupana and Attidiya in the Bolgoda estuarine system were sampled once a month for over a period of 6 months in 2012. Sampling of fish and selected water quality parameters were carried out during the study period.

The IBI was developed using 12 metrics that reflected fish species richness and composition, number and abundance of indicator species, trophic organization and function, reproductive behavior, fish abundance, and condition of individual fish. The WQI were determined for the same sites using selected water quality parameters, i.e.: temperature, pH, conductivity, salinity, Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), Primary Productivity (PP), alkalinity, nitrate ion concentration, orthophosphate ion concentration, and sulphide ion concentration.

The water quality of the three sites based on the calculated fish based IBI concluded that the water quality at Thuduwa site was “good”; at Borupana “poor” while at Attidiya site “very poor”. The calculated WQI values for Thuduwa site qualify it as a site having “good” water quality, Borupana site having “medium” water quality and Attidiya site having “bad” water quality. Both these indices reflected similar results for the assessment of water quality. Of the two, fish based IBI reflects long term effects of habitat degradation through acquired / altered characters of fish assemblage over time whereas the WQI reflect the condition of the water at any given time. In addition, obtaining reliable data on fish is easier compared with water quality data, thus a fish based IBI becomes an ideal tool for the assessment and comparison of water quality of estuarine / lagoon systems of Sri Lanka.

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