

Spatial and Temporal Variation of Physico-chemical Parameters of Water in Badulu-oya Upper Catchment Area

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Upper catchment area of Badulu-oya, is one of the natural lotic systems, where its pristine status is getting ruined as a result of excessive pressure exerted due to various anthropogenic activities. The present study was planned to study the spatial and temporal variation of physico-chemical parameters of water in the Badulu-oya upper catchment. Covering a 20 km distance, 12 study locations were selected, which included 4 tributaries that confluenced to the main river and possessed different land use patterns as well as urbanized and relatively less disturbed locations. Thirteen physico-chemical parameters were analysed for one year period, monthly. General Linear Model was used to identify the significance differences of spatial and temporal variations of water quality. Correlations of water quality parameters with respect to their spatial and temporal variations were analysed by Principle Component Analysis using PRIMER 7 software. Throughout the study period, water temperature, turbidity, EC, TDS, apparent colour, pH, DO, BOD₅, total alkalinity, total hardness, nitrate, nitrite and orthophosphate contents fluctuated between 20.9 – 30.4 °C, 2.27 – 159 NTU, 40.2 – 198.5 µS/cm, 20.1 – 99.5 ppm, 4 – 454 PtCo., 5.6 - 8.64, 8.4 – 13.4 mg/L, 0.28 – 6.32 mg/L, 34 – 136 mg/L CaCO₃, 34 – 134 mg/L CaCO₃, 0.5 – 17.5 mg/L, 0.001 – 0.045 mg/L and 0.11 – 0.95 mg/L respectively. Five principle components (PC) were obtained with Eigenvalues >1 summing almost 76% of the total variance in the data set. The PC1 represented 24% while PC2 represented 20 % of the data variability. Water temperature, pH, EC, TDS, total alkalinity and total hardness negatively correlated with PC1, while BOD and NO₃⁻, EC, TDS, alkalinity and hardness negatively correlated with both PC1 and 2. Study revealed that water quality of Badulu-oya upper catchment is still under the recommended surface water quality standards which support healthy aquatic life.

Keywords: Catchment, Water quality, Spatial, Temporal

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