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## A Study of Dredging Impacts on Water Quality in Bomuruella Reservoir, Nuwara Eliya

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### Abstract

Bomburuella is one of the reservoirs situated in Nuwara Eliya district in Sri Lanka which covered an area of more than 30 ha. The reservoir is mostly used for drinking, agriculture and fishery activities and is popular due to its aesthetic beauty and other uses of the reservoir. Since the reservoir water was used as a drinking water source, the main objective of this study was to assess the quality of the reservoir waters. In addition, the dredging impacts on water quality due to dredging operations carried out during June to September 2014 were also monitored and compared with before dredging operations. Water sampling was carried out from February to December during 2014 on monthly basis and ten sampling locations was selected randomly. Dissolved oxygen (DO), pH, turbidity, electrical conductivity (EC), total dissolved solids (TDS) and salinity were determined *in situ* and collected water samples were analyzed in accordance with the Standard Methods for Examination of Water and Waste Water (APHA), 21<sup>st</sup> edition. Water quality data was compared before and after dredging period. All the statistical analysis was done using MINITAB 14 statistical software. Average water quality of the before and after dredging period respectively are as follows; EC (241.29±134.25; 277.40±83.97  $\mu\text{S}/\text{cm}$ ), DO (6.67±1.40; 8.70±1.29 mg/L), Turbidity (7.39±2.82; 8.52±1.20 NTU), Total suspended Solids (TSS) (9.01±4.23; 11.70±3.37 mg/L), ammonical-nitrogen (0.19±0.23; 0.73±0.35 mg/L), nitrate-nitrogen (0.178±0.091; 0.403±0.173 mg/L), total hardness (33.55±8.24; 66.60±8.02 mg/L), Ca hardness (7.83±2.08; 18.95±7.77 mg/L), ortho-phosphate (0.006±0.004; 0.004±0.002 mg/L), nitrite-nitrogen (0.064±0.064; 0.044±0.026 mg/L), alkalinity (34.00±7.46; 25.88±1.68 mg/L) and chloride (109.72±113.43; 28.36±11.70 mg/L). Also, the average total discharge of ammonical-nitrogen, nitrate-nitrogen, nitrite-nitrogen and ortho-phosphate in before and after dredging period were 4,031.10 m<sup>3</sup>/day; 7,986.60 m<sup>3</sup>/day, 2,747.40 m<sup>3</sup>/day; 208.90 m<sup>3</sup>/day and 388,469.4 m<sup>3</sup>/day, 309,479.8 m<sup>3</sup>/day; 29,324.49 m<sup>3</sup>/day, 2,157.67 m<sup>3</sup>/day respectively. Results revealed that, average EC, DO, Turbidity, TSS, ammonical-nitrogen, nitrate-nitrogen, total hardness and Ca hardness, total discharge of nutrients increased while ortho-phosphate, nitrite-nitrogen, alkalinity and chloride decreased in after dredging operation. There is a significant differences ( $p>0.05$ ) between all the average water quality parameters measured except for EC and nitrite-nitrogen as a results of dredging. There is a minimum impact on water quality in the reservoir due to the dredging operation. The reservoir is suitable for fishing community and recreational activities.

**Keywords:** Dredging, Inland, Water quality, Sustainable, Discharge