

619/E2

Designing of a water quality index for weras ganga

A K L A Wijenayaka and S Hewage*

Center for Analytical Research and Development, Department of Chemistry, University of Colombo

A Water Quality Index (WQI) is defined as a rating system reflecting the composite influence of a number of individual water quality determinants on the overall quality of a given water body. The composite influence is obtained via an indexing model; an assortment of equations specifying necessary mathematical treatment. Such a model would inescapably have to cater for the unique consequences within the site of concern, whereas no exact Water Quality Indexing Model had been developed directly concerning the context of Sri Lanka. Thus, the focus of this research was to specifically design a WQI within the perspective of Sri Lanka.

With due reasoning, Weras Ganga; a unique ecosystem within the Bolgoda Wetlands, was selected for the study. After extensive analysis of general variables, nutrients, organic matter, major ions, trace elements and microbiological indicators pertaining to water quality at site, efforts were made to produce a WQI for Weras Ganga via a mathematical model accomplished by performing apt modifications on a Water Quality Indexing Model previously adopted by the Canadian Council of Ministers of the Environment (CCME).

The model principally focused on three factors in respect to water quality; which are,

- (1) The number of variables whose objectives are not met (Scope) [F_1]
- (2) The frequency with which the objectives are not met (Frequency) [F_2] and
- (3) The amount by which the objectives are not met (Amplitude) [F_3].

Finally, the ultimate WQI was calculated via above factors using the formula given below.

$$WQI = 100 - \left(\frac{\sqrt{F_1^2 + F_2^2 + F_3^2}}{1.732} \right)$$

Eventually, the General WQI for Weras Ganga was found to be 27.01, which inferred that the Weras Ganga waters are at a plight of high deterioration. In conclusion, a precise interpretation was sought, with the ultimate objective; "to attain an insight concerning the prevailing plight of the quality of Weras Ganga waters and to provide or at least recommend measures acceptable to all parties, who entail the waters of Weras Ganga to be of consumable quality".

*sujatha@chem.cmb.ac.lk

Tel: 011-2503367