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River Water Quality Status of Ayer Hitam Forest Selangor, Peninsular Malaysia

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EXTENDED ABSTRACT

Water is a vital element in human life and it is a renewable resource. According to Wan Ruslan (1994), water is essential for physiological existence, very much the same as every other living organism does and for many other purposes such as agricultural, recreational, industrial, hydroelectric power, navigational, propagation of fish and other aquatic life, irrigation, etc.

Generally, water quality means the standards of water body especially river for any beneficial uses. Water quality with a better index value indicates cleaner water body. High water quality is suitable for man and animals consumption compared to the low water quality. Water quality refers to the characteristics of a water supply that will influence its suitability for a specific use, i.e. how well the water quality meets the needs of the consumer. Water quality status indicates the level of pollutant composition and thus relates to human activities (Anhar *et al.*1998; Mohd Kamil *et al.* 1997a; 1997b). Water quality for various types of water body varies with input loads, flow rate and quantity of water (Mohd Kamil 1991; Wan Nor Azmin *et al.*1997). River is one of the important water sources and is classified polluted when there are changes in their chemical and physical characteristics that make it unsuitable for any objective and function (Azizi *et al.* 1997). Pollution standards for each water body usually evaluated by measuring the value of selected water quality parameters. These parameters can be categorized as physical, chemical and biological.

For the purpose of river water quality status assessment, four river water samples were collected from the upstream to the downstream of Sg. Rasau in Ayer Hitam Forest in May 1998. The first location (S1) located in the most upstream area; the second location (S2) located just after the recreational area within the forest; the third location (S3) located just after the small community area outside the forest reserve; and the last location (S4), located at the downstream most of the forest reserve area (*Fig. 1*). There were two categories of water quality parameters measured; in-situ parameters (Dissolved oxygen (DO), Electrical conductivity (Ec), Temperature, and pH) and laboratory parameters (Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammoniacal-Nitrogen (NH_3-N), and Suspended Solids (SS)). The grab sampling method was adopted in sampling the river water and the analysis procedures were based on APHA (1995).

All the data obtained through analysis were used to calculate the water quality index. The sub-index for each parameter was calculated using a series of equations, derived from the rating curve and the following equation as follows (Norhayati 1981):-

WQI= 0.22*SIDO + 0.19*SIBOD + 0.16*SICOD
+ 0.15*SIAN + 0.16*SISS + 0.12*SIPH
SI=Sub- index

Table 1 shows the result of analysis for the selected water quality parameters used in the assessment. Based on the results obtained , the value of the water quality index based on the DOE-WQI was in the range of 89.60 - 99.80 and thus indicates that the water quality status within the vicinity fall under Class I and II where as all the sampling sites fall under Class 1 except for S4 falls under Class II.

The study shows clearly that as the river flows from undisturbed (upstream) to the dis-

TABLE 1
Water quality data

Parameter	S1	S2	S3	S4
DO (mg/l)	7.0	6.0	6.8	7.4
EC (*mS/cm*)	0.03	0.03	0.03	0.04
Temperature (°C)	28.3	27.2	27.3	28.3
pH	5.93	5.51	5.33	6.03
BOD (mg/l)	0.71	0.65	0.84	5.22
COD (mg/l)	13.0	11.0	6.0	17.0
NH_3-N (mg/l)	0.0	0.0	0.16	0.12
Turbidity (NTU)	1	12	14	19
SS (mg/l)	2.0	11.0	14.0	28.0
E. coli (no./100 ml)	0	8	30	200
WQI	99.80	98.11	97.35	89.60
Class	I	I	I	II

turbed environment, the physico-chemical characteristics change and thus degrade the water quality status (*Fig. 2*). The results also reveals that the water body is very sensitive to any changes within the catchment area either through natural processes or anthropogenic sources.

In summary, it reveals that there is a close relationship between the river water quality and the landuse pattern within the vicinity of the sampling stations. Besides development activities, natural factors such as organic matter decomposition may also contribute and hence influence the river water quality in the study area. Efficient water quality management is the first

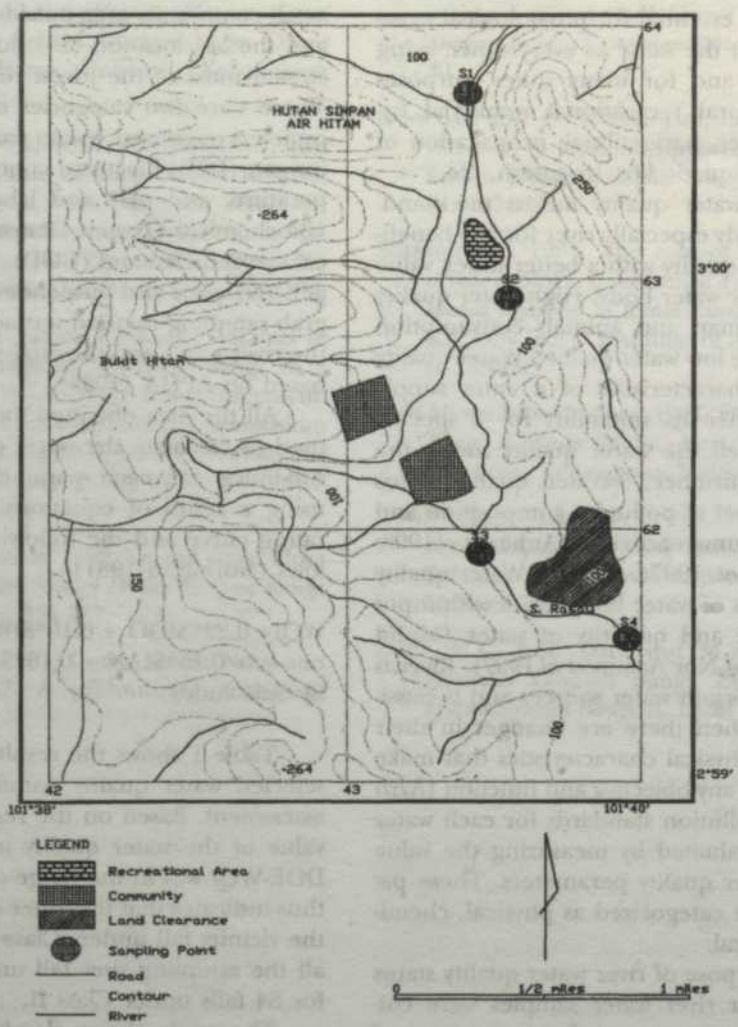

Fig. 1 . Location of sampling sites

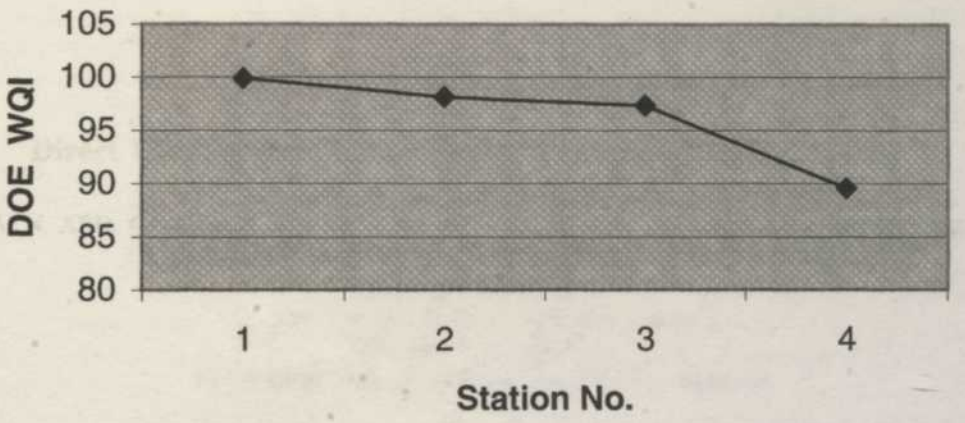

Fig. 2. Water quality profile of the sampling stations

step in ensuring an adequate supply of safe drinking water. While sanitary surveys, monitoring, watershed control, stormwater management and emergency response procedures are some of the essential towards a better and comprehensive water quality management plan.

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