WATER QUALITY ANALYSIS OF RIVER TUNGABHADRA NEAR HARIHAR

T M VINAY[1]

[1] *Assistant professor, CIVIL department, MCET, Telangana, India*

ABSTRACT

River Tungabhadra flowing near Harihar taluk in Karnataka (India), receives waste water discharges from villages located on the bank of River and waste water discharged from industries located in Harihar. The present study involves the implementation of QUAL2KW model to determine the water quality status of this polluted our selected stretch of River. The River samples are collected for pre monsoon and lab results are used for calibrating the model. We observed that predicted values of the model are approximately in match with the observed values. Model results for pre-monsoon indicate decreasing quality of water from upstream to downstream for the selected segment. . This is because of discharge of domestic waste water from Rajanahalli, Halasabalu and Nalawagal into River and due to release of waste water from industries located on banks of River in Harihar. Since many of the selected water quality parameters are exceeding their limits, water in the selected segment is not fit for drinking or it is not portable.

Keyword: - *Water quality, QUAL2KW, River pollution, River Tungabhadra*.

1. INTRODUCTION

Water pollution caused by increased industrialization and urbanization is considered to be the major problem which is faced by the mankind in India. The increase of water pollution in rivers results in decrease of DO concentration and increase of toxic chemicals concentration which ends up in death of aquatic animals like fishes which are further consumed by humans, affects their health [8]. Hence it becomes important to determine the status of Rivers water quality before actual utilization for different purposes. River Tungabhadra is tributary of River Krishna which is second largest River in southern peninsular India. During its flow through Harihar Taluk in Karnataka, receives waste water discharges from villages on the bank of River and also waste water discharges from industries located in Harihar causing deterioration of its water quality [12]. It is important to maintain the quality of this River since it is major source of drinking water to villages on its banks, also to protect aquatic species present in the River. Chapra and Pelletier developed QUAL2KW model which is the modified version of QUAL2K developed by Chapra et al. QUAL2KW is the major River and stream water quality model, also it is observed that model represents the field data quite well and used for river quality options in future. Main aim of the present study is to determine the water quality of River Tungabhadra near Harihar using QUAL2KW model

2. MATERIALS AND METHODS

2.1 Study area

River Tungabhadra is one of the major tributaries of River Krishna. The river is formed by the confluence of Tunga River and Bhadra River which flows down the eastern slope of the Western Ghats in Karnataka [12]. River Tungabadra flows through Harihara, its elevation from sea level is 525 m and the coordinates are 75.75 degree longitude and 14.51 degree latitude [12].

2.2 Data and Sampling Sites

The present study area is 16km stretch of River Tungabhadra near Harihar. In the entire stretch 9 sampling points are selected on the basis of point source of pollution which mainly includes domestic and industrial waste water. The first point is selected mainly to establish the existing condition of the River, next sampling points are initial condition point, Rajanahalli, Halasabalu, Kumara Pattinum, Haralapur, Harihareshwara Temple, Nalawagal, Dheetur and Airani. Fig 1 represents the sampling sites selected River stretch

2.3 Sampling and analysis

Water samples from different sampling points were collected for post monsoon season of 2015. Water samples are collected at 15 cm depth in the mid-width of River [4]. Using grab sampling method in pre-cleaned polythene bottles. The velocity of River flow is also measured by dropping ping pong ball. All the laboratory analysis are done using standard methods.

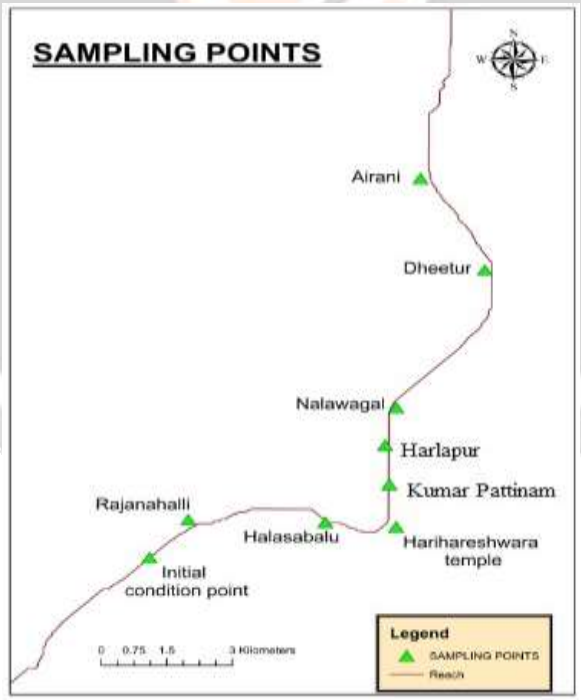

Fig- 1: Location of Tungabhadra River segment selected for present study

Table- 1: Water Quality parameters values for different sampling points during post monsoon season

Distance from U/S boundary in km	Sampling points	pH	DO in mg/l	BOD in mg/l	Conductivity in µmhos	NH_4-N in mg/l	NO_3-N in mg/l
0	S1	7.61	4.02	3.38	203.6	0.13	2.17
0.6	S2	7.88	6.33	3.97	251.7	0.37	3.72
4	S3	7.73	5.08	22.26	303.5	0.89	7.69
5.5	S4	8.83	5.37	26.4	378	14.7	11.2
6.5	S5	8.11	4.27	17.33	457	17.39	16.68
7.5	S6	8.24	3.07	23.2	503	13.7	18.9
8.5	S7	6.97	3.26	27.82	517	12.3	14.41
13	S8	8.96	2.03	44.2	410	23.4	13.3
16	S9	8.31	5.74	39.14	343.9	13.6	8.52

3. RESULTS AND DISCUSION

The model output showed that values of BOD, NH_4-N and NO_3-N are exceeding their permissible limits. According to CPCB specifications water edible for drinking must be at least of class C standards (i.e., BOD<3 mg/l, NH_4-N<5 mg/l). The results showed that the selected River stretch water after Rajanahalli is not fit for drinking since BOD value is more than 3 mg/l. BOD value increased from Halasabalu to Airani due to release of domestic waster from villages and industrial water into the River. NH_4-N, NO_3-N also shows the maximum values of 23.4 and 18.9 mg/l which is due to less dilution rate during pre-monsoon season. Water quality index values also showed that River water quality goes on decreasing from upstream point Rajanahalli to downstream point Airani as shown in table.

4. CONCLUSION

For the present study QUAL2KW model was used for establishing water quality status of River. The River samples are collected for pre monsoon season and lab results are used for calibrating the model. Predicted values of the model are approximately in matche with the observed values. Model results indicate degrading quality of water from upstream to downstream during pre-monsoon season. This is because of discharge of domestic waste water from Rajanahalli, Halasabalu and Nalawagal into River and due to release of waste water from industries located on banks of River in Harihar. Since many of the selected water quality parameters are exceeding their standard water quality limits, water in selected segment of study is not ideal for drinking purpose.

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