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WATER QUALITY ASSESSMENT OF SON RIVER AT GHARIYAL SANCTUARY (SIDHI) USING NSF-WQI

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ABSTRACT: - Water is the most abundant substance covering more than 70 percent of the earth's surface and existing in many places and forms. It is found in oceans, polar ice caps, rain water, rivers, ponds, tanks, reservoirs, clouds, freshwater aquifers and sea ice. Running and Standing water bodies have great importance as they are recharging resources for drinking, domestic and agricultural use before the civilization. Water quality of Son River is important for health and economy of people. The present study is going to centralize on the Son River at Ghariyal Sanctuary Sidhi district in Madhya Pradesh. Physico-chemical analysis of the water does not provide the direct conclusions on the quality of water. Water quality index calculates all the parameters and gives an easy decision making output to analyze the quality of water. A Simple but useful index is the National Sanitation Foundation-Water Quality Index (NSF-WQI). This index can be calculated by determining only selected physicochemical parameters. Change in water temperature, pH, dissolved oxygen, biochemical oxygen demand, total phosphorus, nitrates, and turbidity were used for the calculation of the index. From the listed data the quality of water was concluded.

KEYWORDS: Son River, physico-chemical characteristics, NSF-WQI and Water quality

INTRODUCTION

Fresh water is a critical, finite, vulnerable, renewable natural resource on the earth, and plays an important role in our living environment, without it, life is impossible. Since the beginning of the industrial revolution, increasing human population, economic activities as well as shortcomings in their management have resulted in more pollutants being introduced into watercourses. An increasing number of surface water bodies have come under serious threat of degradation. The global freshwater resources are under increasing pressure (GWP Technical Advisory Committee, 2000). The anthropogenic impact on aquatic ecosystems has become a crucial topic of increasing concern. These problems have led to the adoption of an integrated approach to the management of water resources, which is called Integrated Water Resources Management (IWRM).

The water quality in ponds, rivers and streams may vary depending on the geological morphology, vegetation and land use (modification by human activities such as agriculture, industrialization and urbanization) in the catchment. Industries, agriculture and urban settlements produce nutrients (sewage effluent and fertilizers) and toxic substances, such as organic and inorganic pollutants, and other chemicals including heavy metals. Water pollution occurs when these substances, which degrade the water quality of river, enter the waterway and alter their natural function (Water and Rivers Commission, 1997). Where ponds and lakes have been profoundly altered and have lost much of their value, the scientific understanding of these water bodies is being used in prescribing restoration methods.

WQI is widely used tool in different parts of the world to solve the problems of data management and to evaluate success and failures in management strategies for improving water quality. The index is a numeric expression used to transform large quantizes of water characterization data into a single number, which represents the water quality level (Abbasi 2002). A number of indices have been developed to summarize water quality data for communication to the general public in an effective way. In general water quality indices incorporate data from multiple water quality parameters into mathematical equation that rates the health of water body with a single number. That number is placed on a relative scale to justify the water quality in categories ranging from very bad to excellent. This number can be easily interpreted and understood by political decision markers, non-technical water manager and the general public.

The water quality index (WQI) has been considered as one criteria for drinking water classification based on the use of standard parameters for water characterization. A commonly used WQI was developed by the National Sanitation Foundation (NSF) in 1970 (Brown et. al. 1970). The WQI is one of the most widely used of all existing water quality procedures. WQI was the intent of providing data (Liou et al., 2003). The index ranges from 0 to 100, where 100 represent an excellent water quality condition.

The present investigation Son River at Ghariyal Sanctuary Sidhi district in Madhya Pradesh aims to

weigh up the suitability of water for various human activities and for the protection of aquatic life based on NSF-WQI.

METHODOLOGY

Study Area- The present investigation is going to centralize on Son River at Ghariyal Sanctuary Sidhi district in Madhya Pradesh. In this study only Son river sanctuary have been selected for the study in which Muggar and Ghariyal both are present and conservated. Son river sanctuary drives its name from the masculine river Son. The river has been originated from Amarkantak, but comes in picture from Son Bacharwar a marshy and watery place. The tributaries of Son River are Gopad, Banas and Johila. The river Banas confluences in to Sone river are in Shikarganj in thjis sanctuary and known as Bhramersen gate at 24^0 17'N and 81^0 37'E. The Gopad confluences into Son river at Bardi Khairpur village located at 24^0 33'N and 82^0 23'E.The general drainage direction of river Son in North east. The Son Confluences into Ganga River near the Danapur Patna Bihar.

Son River at Ghariyal Sanctuary Sidhi (M.P.)

Sampling and Analysis- Composite surface water sampling methods was followed for the collection of samples between 9 to 11 am on first week of every month throughout the year (August 2015 to July 2016). Black plastic carbouys of one liter capacity were used for collecting the samples. Temperature and pH were analysed on the spot and winkelerization was done in separate 300 ml bottles for the estimation of Biochemical Oxygen Demand. For transportation of samples to laboratory dark coloured ice box was used in order to avoid the exposure of samples to sunlight variations in temperature. Samples were analysed for physic-chemical variables following methods APHA, 1998).

RESULT AND DISCUSSION-:

There are several reports on standing water body water quality assessment using physico-chemical parameters (Hosmani et. al., 1980 Ravikumar et. al., 2011, Giriyappanavar et. al. 2013). The water quality index (WQI) integrates complex analytical raw data and generates a single number that expresses subjectively the water quality. Such a rating scale allows for simplicity and consumer comprehensibility. The water quality index approach has many variant in the literature, and comparative evaluations have been under taken (Dunnette 1979, Miller et. al., 1986). A water quality index can be of different types depending on its final intended purpose. It can highly specific for different water bodies or could be a general one for all types of waters meant for human consumption. A WQI can also be used not just on readings at a single point of time but also on data collected over a period of time. The water quality index was calculated using NSF information software (Ramakrishnaiah 2009) and compared with standard water quality rating (table no.1).

Table No. 1- Water Quality Index Rating of the Running water.

WATER QUALITY INDEX (WQI)	RATING
90-100	Excellent(E)
70-90	Good (G)
50-70	Medium
25-50	Bad (B0
0-25	Very Bad (VB)

Table No.2. Monthly variations in Physico-Chemical parameters and WQI of the on River at Ghariyal Sanctuary Sidhi (M.P.).

Parameters	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July
pH	7.4	8.4	7.8	7.5	8.3	8.5	8.2	7.9	7.4	7.8	7.9	8.0
Temp (0^0C)	26.5	26.8	25.2	24.5	21.5	20.8	22.4	23.4	26.0	29.5	32.0	29.8
DO mg/L	4.9	4.1	6.3	3.4	6.2	6.0	7.7	4.12	4.2	2.8	2.5	5.5
BOD mg/l	4.1	3.7	6.4	3.4	6.2	5.5	7.2	4.1	4.2	2.8	4.2	5.5
Turbidity(NTU)	16.8	12.0	8.3	9.6	3.5	4.5	6.2	5.0	6.5	4.0	12.2	15.5
Phosphate mg/l	2.54	0.25	0.19	0.40	0.57	0.16	0.18	0.20	0.24	0.22	0.17	2.13
Nitrate mg/l	0.52	0.45	0.25	0.21	0.18	0.28	0.15	0.14	0.19	0.14	0.11	0.12
WQI	55.5	60.12	59.65	66.75	59.20	59.4	58.55	59.70	62.80	64.25	61.56	55.25
Rating	M	M	M	M	M	M	M	M	M	M	M	M

The index values ranged from a minimum of 55.25 during the month of July and reached a maximum of 66.75 during November. The water quality of on River at Ghariyal Sanctuary Sidhi district in Madhya Pradesh is rated medium during the all the month of study (table no.2). The conditions in it often stray from the normal levels. It is evident from the results that water quality in the river under study is degraded considerably due to contamination of water by sewage from the village, Orient Paper effluent and diverse anthropogenic activities. Zaheeruddin and Khurshid (1998), Manish and Pawan (1998) have attributed industrial growth, urbanization and agricultural activities as the major source of water contamination. However in the present study, it is observed that the stress of the pond under study is largely due to entry of domestic sewage.

REFERENCES:

1. Abbasi, S.A. (2002). Water Quality Indices, state of the Art Report. Scientifiec Contribution Published by INCOH, National Institute of Hydrology, Roorkee, 73p.
2. APHA (1998) – Standards methods for the examination of water and wastewater. American Public Health Asociation, Washington, D.C.
3. Brown W L Jr, Eisner T and Whittaker R H (1970) Allomones and kairomones: Transpecific chemical messengers; BioScience 20 21–22
4. Giriyappanavar, B.S. and Patil, R.R. (2013) – Monitoring water quality of two lake of Belgaum district (Karnataka) with special reference to phytoplankton's.
5. Hosmani, S.P. and Bharti, S.G. (1980)- Limnological studies on pond, lakes of Dharwad-comparative phytoplankton ecology of four water bodies phytos. 19(1), 27-43.
6. Liou, S.M., Lo, S.L. and Hu, C.Y. (2003)- Application of two state fuzzy set theory to river quantity evaluation in Taiwan. Water Res., 37, 1406-1416.
7. Manish, C.V. and Pawan, K.T. (1998)- Assessment of drinking water quality of an industrial township of south Bihar. Jour. of Env. And poll., 5(1), 17-21.
8. Miller, W.W., Joung, H.M. Mahannah, C.N. and Garret, J.K. (1986)- Identification of water quality differences in Navada through index application, J. Environ.Qual., 15,265-272.
9. Zaheeruddin and S. Khurshid (1998)- Dispersion of heavy metals and its toxic effect on water quality in parts of Faridabad, Haryana. Ecotoxical Env. Mon., 1, 9-14.