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## TURBIDITY OF BORI TANK DIST OSMANABAD 2015 -2016

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India.)**

### ABSTRACT

**W**ater in the nature is an essence of life, without it no life can sustain on the earth. No life can sustain without water. Though water is an essence of life it is also used for various purposes including industry, agriculture, washing, sailing, transportation, recreation etc. It is one of the abundantly available substances in nature. It exists in various forms in nature such as clouds, rain, ice, fog etc. It acts as a limiting factor and regulates the diversity and abundance of biotic community.

**KEYWORDS:** washing, sailing, transportation, recreation.

### INTRODUCTION

Global literature survey reveals that 70% of earth surface is covered by water. Although it is surprising but it is true that in spite of such abundance of water, there is shortage of soft pure fresh water in the world because more than 97.3% water is marine, which is unsuitable for human use. Only 2.7% of the total

water in the rivers, lakes swamps, dams, and tanks is fresh and soft water which is suitable for human consumption and other uses. It has been also estimated that out of total fresh water 77.2% is in the form of 'cold storage' frozen in ice caps and glaciers. Most of the remaining supplies of freshwater 22.4% are ground water and soil moisture.

The Indian fresh waters are under considerable threat owing to the fast pace of development, the country is going in the past one or two decades.

For the hydrobiological studies APHA (1989) provide the basic methodology for the analysis of different physico-chemical parameters of fresh water. Welch (1948,1952), Golterman (1978), Goldman et. al. (1983), has given various methods for sampling and analysis of different parameters.

### (a) Necessity of the work:-

Though water covers 70% of earth surface, now a day's world is facing to its scarcity. According to different surveys, 70 to 80 % of Indian water sources are polluted and millions of peoples affects by different enteric diseases every year. UNO (United Nations Organization) reports have indicated that majority of world population lack reliable sources of drinking water.

Developed countries have esteemed institutions like APHA ( American Public Health Association), EPA ( Environmental Protection Agency), FBA ( Fresh water Biological Association) etc..

### The main factors responsible for aquatic pollution are as follows:-

- I. Industrial liquid waste.
- II. Urban liquid waste i.e. sewage, storm drainage mixed with sewage, human, cattle and kitchen wastes carried by drains.
- III. Surface runoff areas on which solid waste is dumped.



IV. Surface runoff areas on which urban and industrial waste is dumped.

V. Surface runoff from the cultivated land on which fertilizers, pesticides and other types of chemicals applied for agriculture.

The physical and chemical pollution of water brings about changes in water with regard to its colour, odor, taste, hardness, acidity, alkalinity, turbidity, conductivity, transparency etc.

Fresh water ecosystems are highly diversified and marked by a wide range of physicochemical conditions, which greatly influences the life in water. Fluctuations in physicochemical condition adversely affects the aquatic organisms. Planktons are the basic biotic components of the ecosystem. These organisms play a vital role in aquatic environment. They form an important link in the food chain and are capable of affecting the entire aquatic life. Zooplanktons play an important role in transferring energy to consumers hence they form the next higher trophic level in the energy flow after phytoplankton.

### (i) Objectives of present study :

The assessment of water quality is necessary because of many reasons. The principal objectives are as follows :-

- i. To help for providing pure water to the public for drinking ,domestic and agricultural purposes.
- ii. To study the percentage of contaminants which are hazardous to human health and to agricultural production.
- iii. To study pollution status and proper utilization of natural resources.
- iv. This study will help to provide data bank for the hydro biological studies and will also play an important role in planning activation and strengthening biodiversity.

Environmental ministry of Govt. of India has also indicated the programme for conservation of lakes and reservoirs in 1995. With the help of world Bank financial assistance, Govt. of India also announced the Jalvigyan project (Hydrological project) recently in few states including Maharashtra state.

### 1) STUDY AREA:-

Considerable work has been done on physico-chemical and biological assessment and their functional dynamics in the aquatic environment.

The water body taken for hydrobiological investigations is located in Bhoom taluka of Osmanabad district. The morphometric details of these water bodies are summarised below.

Osmanabad district is one of the eight districts of Marathwada region of Maharashtra state on the Deccan plateau and demarcates boundaries between Solapur, Beed, Latur and Ahmednagar districts. It is located at Latitude-18- 570 to 19. 870 North & Longitude – 74. 390 to 76.540 East.

The climate of the district is dry and moderately extreme. The maximum temperature is of nearly 410 C during summer and it falls down up to 150C during winter season. The relative humidity averages 35 to 48% during summer and 80 to 85 % during monsoon. Average annual rain fall of district is about 765 mm.

World is facing an unique crisis in the form of environmental pollution now a days. Due to grow i n g o f urbanization, industrialization and development thrust of man pollution is became a global problem. Pollution of fresh water ecosystem is becoming more and more severe problem in the world. The study of physical, chemical and biological properties and features of fresh water lentic & lotic habits are referred as Limnology. A Swiss professor F. A. Forel (1841 – 1912 ) is considered as father of Limnology. The period of 20th century is considered as the classical area of Limnology, because most important Limnological investigation on its various aspects were now includes study of lotic and lentic habitats.

The notable contributions on Limnological aspects from various Indian fresh water made by Das and Shrivastava (1956), Gulati and Sarkar (1961), Arora (1962), Verma (1967, 1969), Moitra and Bhowmik (1968), Mathew (1975), Zutshi and Vass (1978), Adwant (1981), Nayak (1982), Goldman and Horne (1983), Khatri T. C. (1985), Hegade and Bharti (1985), Angadi (1986), Das (1988), Ahmed Masood (1990), Battish (1992) etc.

Recent Limnological information on tropical fresh water were contributed by Khan A.M. (1992), Ahmed S.H. and Singh A.K. (1993), Rao & Reddy (1995), Chandrashekhar (1996), Salaskar (1996), Arvind Kumar (1997), Trivedy (1998), Kodarkar (1998), Manivaskam (1998), Murugan (1998), Tiwari (1999), Dhanpathi (2000) , Singh (2002), Khare (2002), Prasad (2004) , Pandey et.al. (2004), Sharma et. al. (2004), Hegde et. al. (2005) Roy (2006).

Trivedy and Goel (1988), Subamma and Sharma (1992), Pandey et al. (1994) have studied recently on

hydrobiology of fresh water lentic habitats about its physicochemical characteristics and their productivity

Jhingran V.G. (1982) studied Fisheries in India in the context of aquatic pollution. Limnology of few fresh bodies in Southern Maharashtra were studied by Goel P.K., Trivedy R. K. et. al.(1985). Ecological studies on zooplankton of freshwater ponds in and around Bhubneshwar was studied by Sharma A.L.N and Pattnayak (1985).

Interrelationship of certain physicochemical factors were studied by Raka Swarnalatha (1997). Das (1996) and Sabu Thoamus et. al. (1999) were studied zooplankton community characteristics in different water bodies. Hiware C.J. and Adhav (1998) studied microzootic fauna of Salim Alisagar lake at Aurangabad, Maharashtra. Physicochemical properties of lake Pokharan were studied by Bharat Mani and Gaikwad (1998)..

Dhanapathi (2000, 2001) has given major contribution in the taxonomic and diversity studies on the rotifers of India. Bhalerao A. P. and Khan (2000) studied fluorine and sulphur content in lakes in tribal area of (MS). Physico-chemical analysis of Gopalpura tank of Guna district in M.P. have studied by Dushyant Sharma and Renu Jain in 2000.

Ichtyofauna of Jawalgaon reservoir in Solapur district of Maharashtra was studied by Sakhare V. B. (2001). Tamlurkar and Ambore (2006) studied correlation coefficients of some physicochemical characteristics of Alisagar dam water from district Nizamabad, A. P. (2006). The Rotifera diversity of lake Masoonda Thane district Maharashtra was studied by Somani Vaishali and Madhuri Pejaware (2003).

Surve P. R. et. al (2004) studied zooplanktonic population and their correlation with some physicochemical characteristics of Barul dam water district Nanded, Maharashtra. Jaybhaye U. M. and Madlapure U. R. (2004) studied on zooplankton diversity in Parola dam, Hingoli district, Maharashtra. Megha Rai and Srivastava (2004) studied the effect of fertilizer industry on surface and ground water quality, Raghogarh, (M.P.) Seasonal variations of biotic factors of Manjara project water reservoir in district Beed was studied by. Chavan R. J. Mohekar A.D. et. al. (2005). Pawar S. K. and Pulle J. S. (2005) studied the qualitative and quantitative study of zooplankton in Pethwadaj dam, Nanded district of Maharashtra. Zooplankton diversity in Jagtunga samudra reservoir Kandhar, Nanded district was studied by Ugale B. J., Hiware C. J and Jadhav B. V. (2005). Physico-chemical status of Yedshi lake (M. S. ) in relation to water pollution was studied by Yeole S. M. And Patil S. G. (2005). Kadam Mali and Ambhore (2005) have studied Ecology of Bhategaon dam district Parbhani M.S.

#### **TURBIDITY:-**

The Turbidity of Water was between 5 to 30 NTU in Year 2013 14 and 6 to 29 NTU in year 2011 15. The turbidity of lake water was minimum in summer and winter and maximum In rainy season. The water was more turbid in rainy season because of ram water along with other waste material makes the water more turbid. Turbidity showed positive correlation with Temperature, pH, TDS, conductivity, chloride. Hardness, Sulphates, BOD, and MPN and negative correlation with dissolved oxygen, free CO<sub>2</sub>, Transparency and Alkalinity.

#### **Total Dissolved solids (TDS):**

Total dissolved solid fluctuated between 72 mg/l in the month of June and 280 mg/l in the month of March in 2013 2014 The TDS was 69.2 mg/lit In the month of November and 170 mg/l it in the month of March .n 2014 15. The seasonal variations in TDS were also observed. In winter season the TDS of Bori Lake was lower as compare to TDS values in Rainy and summer at all four sites through out the two years. The seasonal average of TDS value in the year 2003-04 was 80.13 mg/lit in rainy season 89.50 mg/lit in winter season and 219.44 mg/lit in summer season. Similarly in 2014 15, it was 80.08 mg/lit in rainy season 83.58 mg/lit in winter and 141.81 mg/lit in summer season.

Total Dissolved solid showed positive correlation with Temperature, pH, transparency, turbidity, conductivity, alkalinity, hardness. Sulphate, BOD and MPN where as negative correlation with free CO<sub>2</sub>; and Chlorides Conductivity:

In present investigation Electric Conductivity ranging between 119.4 (u mho/cm) and 223 (u mho/cm) in the year 2013 14. Similarly the conductivity was ranging from 120 (u mho/cm) to 190 (u mho/cm) In year 2014 15 Similar trend was found at all four sites. It was observed that the conductivity remains more or less constant from June to December but constant rise in conductivity. was observed from January to May in both years. The conductivity showed positive correlation with Temperature, pH, Turbidity, TDS, Total Hardness, Sulphates, BOD,

MPN.

### Dissolved Oxygen: (DO)

In present investigation, the values of Dissolved Oxygen ranging between 7 mg/lit and 10.50 mg/lit in the year 2015-2016. Similarly it was ranging from 6.4 mg/lit to 11.3 mg/lit in year 2004-05. Similar trend was found at all four sites. The seasonal variations in the values of dissolved oxygen were also observed. In the year 2015-16, in rainy season average DO was 7.93 mg/lit, in winter average DO was 8.77 mg/lit and in summer the average DO was 7.59 mg/lit. In the year 2014-15, in rainy season average DO was 7.61 mg/lit. In winter average DO was 9.13 mg/lit and in summer the average DO was 7.74 mg/lit.

Dissolved oxygen exhibited negative correlation with turbidity, Chlorides, BOD and MPN where as positive correlation with pH, Transparency, free CO<sub>2</sub>, and alkalinity Free CO<sub>2</sub>;

In present investigation, the values of free CO<sub>2</sub>, ranging between 4 mg/lit and 7 mg/lit in the year 2003-04. Similarly it was ranging from 4.3 mg/lit to 6.9 mg/lit in year 2004-05. Similar trend was found at all four sites. The seasonal variations in the values of free CO<sub>2</sub>, were also observed. In the year 2015-16, in rainy season average free CO<sub>2</sub>\* was 4.90 mg/lit. In winter average free CO<sub>2</sub>\* was 5.42 mg/lit and in summer the average free CO<sub>2</sub>, was 5.54 mg/lit. In the year 2014-15, in rainy season average free CO<sub>2</sub> was 5.57 mg/lit, in winter average free CO<sub>2</sub>, was 5.99 mg/lit and in summer the average free CO<sub>2</sub>, was 5.61 mg/lit

Free CO<sub>2</sub>, exhibited negative correlation with TDS and sulphates where as positive correlation with Temperature, DO, Chlorides, Hardness and MPN.

### Alkalinity:

The lake water was moderately alkaline throughout the year. Total alkalinity was ranged between 34 mg/l to 72 mg/l in year 2015-16 and 38 mg/l to 75 mg/l in year 2014-15. There were two peaks one was in summer and other was in winter while it was minimum during rainy season up to 42.44 mg/l

Total alkalinity showed positive correlation with pH, transparency, TDS, DO, Hardness and sulphates where as negative correlation with Turbidity, chlorides, BOD and MPN.

### Chloride:

During the period of investigation chlorides in the lake water was ranged between 16.5 mg/L to 35 mg/l in year 2015-16 and it was ranged between 17 mg/L to 34 mg/l in year 2014-15. During rainy season higher values were recorded where as in winter and summer season less chloride content were detected.

Chloride exhibited Positive correlation with Turbidity, free CO<sub>2</sub>, BOD and MPN where as negative correlation with pH, Transparency, TDS, DO, Alkalinity and Sulphates.

### Total hardness:

The lake water was moderately hard throughout the period of investigation. The total hardness ranged between 98 mg/l to 215 mg/l in year 2015-16 and 100 mg/l to 200 mg/l in year 2014-15. The total hardness showed maximum values during April and minimum value during October. The values of total hardness were higher during summer months.

The total hardness showed a positive correlation with temperature, pH, turbidity, Total Dissolved solid, Conductivity, Free CO<sub>2</sub>, Alkalinity, Sulphates BOD, and MPN.

### Sulphates:

During the period of investigation Sulphates in the lake water was ranged between 1.4 mg/l to 14.20 mg/l in year 2015-16 and it was ranged between 2 mg/l to 17 mg/l in year 2004-05

During summer season higher values were recorded where as in winter and rainy season fewer sulphates content were detected.

Sulphate exhibited Positive correlation with Temperature, pH, Turbidity, TDS, Alkalinity, Conductivity, Hardness, BOD and MPN where as negative correlation with free CO<sub>2</sub>, and Chlorides. Biochemical oxygen Demand (BOD):

In present investigation BOD of lake water was ranged between 2 mg/l to 28 mg/l year 2003-04 and 1.2 mg/L to 30 mg/L in year 2015 16. The value of BOD was higher during summer and rainy months while lower during winter months.

BOD exhibited positive correlation with Temperature. Turbidity. TDS. Conductivity, Chlorides, Total Hardness, sulphates, and MPN where as negative correlation with Transparency, DO and Alkalinity.

#### **MPN of Coli form:**

In present investigation MPN of Coli form was detected. It was ranged between 10 to 72 and 10 to 77 per 100 ml of sample in 2013 14 and 2014-15 years respectively. It was detected maximum during month of May and minimum during month of January.

MPN of Coli form exhibited positive correlation with temperature, turbidity TDS, conductivity, free CO<sub>2</sub>, Chlorides, Hardness. Sulphates and BOO where as negative correlation with transparency, DO and alkalinity.

#### **Zooplankton Biodiversity of Lake Borl:**

Monthly water samples from lake were collected to study quantitative and qualitative data of various zooplanktons.

Among the total Zooplanktonic organisms rotifer come first.

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