Assessment of Environmental Impact on Bathi Lake. Davanagere

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Abstract- Lakes are important part of urban ecosystem and play a important role in maintaining ecological balance. Lake water is used for many purposes such as drinking, irrigation, domestic purposes and industrial. Ever increasing population, urbanization and modernization are posing problem of sewage disposal and contamination of surface water like lakes. Bathi Lake water is no more exception. In the present study reveals that how the domestic wastewater is polluting the Bathi lake, located in Davanagere, and also to know how it is effecting physical, chemical parameters and eutrophication of lake. They include pH, EC, Turbidity,, TH, Calcium Hardness, Magnesium Hardness, Chlorides, Alkalinity, TDS, DO, BOD, COD, Sulphat., The work was carried out during January 2019 to April 2019 for four months. Twelve have chosen in the lake to get representative sample, the lake water is taken. The results were compared with BIS standards and some of the parameters were crossing the desired limits. Hence the work concluded that the quality of lake is poor and is unsuitable for human consumption.

Keywords- Eutrophication, Bathi Lake, BOD, COD,Sewage.

I. INTRODUCTION

Water is one of the most important natural resources in the world for human, animals and plant survival. Water covers about 70%of Earth's surface. Water can be seen in oceans, rivers, reservoirs, streams and lakes etc. Water makes upto 70% of total body mass, and is essential for all lives. Such water may be contaminated by discharging domestic, industrial wastes, agricultural activities, rainfall-runoff and erosion etc. They may pollute the water bodies by physical, chemical and biological means and finally become unfit for human consumption and drinking purpose and adversely affects the natural environment.

1.1 Lake

Lake is naturally formed water source with variable sizes surrounded by land. Lakes are deeper than ponds. They are found in mountain areas, rift zones and areas ongoing glaciations. Globe is covered with about 70% water and this water is saline.Less than 5% is fresh waterand is available in the icecaps, glaciers and groundwater. Water is present in abundant quantities and under surface but less than 1% of it is liquid fresh water. Lakes are a valuable sources of water for drinking, domestic use,agriculture and industries etc. Lakes are used for recreation, swimming, boating and fishing etc. Lakes support and regulate the services of soil formation, groundwater recharge, biodiversity and flood protection. Lakes were preserved and protected to help the man kind during water crisis.

Due to developing population, urbanization, agricultural activities and industrialization etchave made surface water pollution to a greater extent, thereby reducing the quality of water bodies and availability of drinking water and hence it makes unfit for human consumption. The objectives of the study is to analyse the physico-chemical characteristics of the Bathi. To determine the water quality.

1.2 Study Area

Davanagere is the district head quarter, it is located in the middle part of Karnataka state and covers an area about 15645 sq.km. Bathi Lake is the one of the major water tank situated towards north of Davanagere city. It is perennial and fresh water body, Rain water and Badhra dam canal water is the source for Bathi lake. It lies in between $75^030'$ to $76^030'$ of east longitude and $14^014'$ to $14^031'$ of north latitude. Full supply depth is 6.5ft and total bund length is 880metres. This lake has been encouraged mainly for agricultural practices.

II. MATERIALS AND METHODOLOGY

In the present work various materials have been used like Polyethylene cans for sample collection, Glass wares and chemicals for analysis of physicochemical parameters, Incubator for sample storage, Distilled water for dilution and washing of glass wares.

Sample collection: Surface water samples were collected for analysis from 12 different stations of Bathi lake during January- April 2019. Sampling stations were

choosentso as o cover the whole region of the lake and to get representative samples. Collected samples were immediately delivered to the laboratory for analysis of following physicochemical parameters like pH, EC, TDS, Turbidity, Total Hardness, Calcium Hardness, Magnesium Hardness, Alkalinity, Sulphate, Chlorides, DO, BOD, COD.
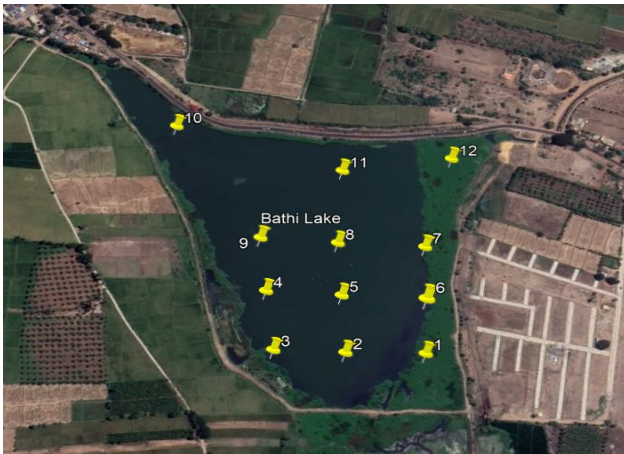

Fig 2.1: Image showing Twelve Lake Water Sampling Station in Bathi Lake

Table 1: BIS Standards of Drinking Water for Physical and Chemical Parameters [IS 10500-2012]

Sl.No	Parameters	IS Limits	Units
1	pH	6.5-8.5	-
2	Conductivity	50-1500	µS/cm
3	TDS	500-2000	mg/l
4	Turbidity	1-5	NTU
5	Total7Hardness	200-600	mg/l
6	Sulphate	200-400	mg/l
7	DO	5.00	mg/l
8	Alkalinity	200-600	mg/l
9	Ca Hardness	75-200	mg/l
10	Mg Hardness	30-100	mg/l
11	Chlorides	250-1000	mg/l
12	BOD	30	mg/l
13	COD	250	mg/l

III. ANALYSIS AND RESULTS

The average results of four months at every station have taken and expressed in graphical way.

pH: It is a negative logarithm of concentration of H^+ ion concentration. It measures alkalinity and acidity of the solution. pH mean values of all 12 stations comes in permissible limit. Maximum value and minimum value observed are 8.17 and 7.33respectively. They almost neutral and slightly alkaline in nature.
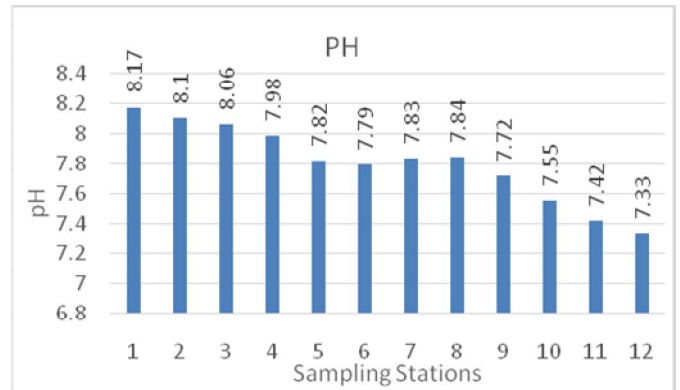

Fig 3.1: Variation of pH at Different Locations

Electrical Conductivity: It provides concentration of ions in water. It is the ability of water conduct an electric current. Higher values at stations 1to 6 indicates water contains increased number of ions. Lower values indicates lake undergoing dilution and natural turbulence.
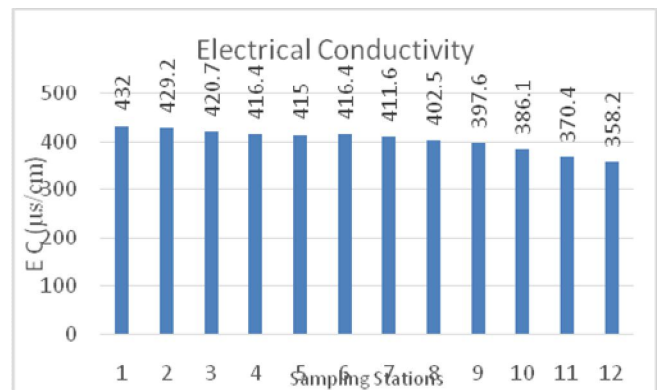

Fig 3.2: Variations of EC at Different Locations

Total Dissolved Solids: It indicates the presence of dissolved mineral (inorganic salts and minor amounts of organic matter) content present in water. During this study maximum recorded was 279.9mg/l and minimum recorded was 235.7 mg/l.
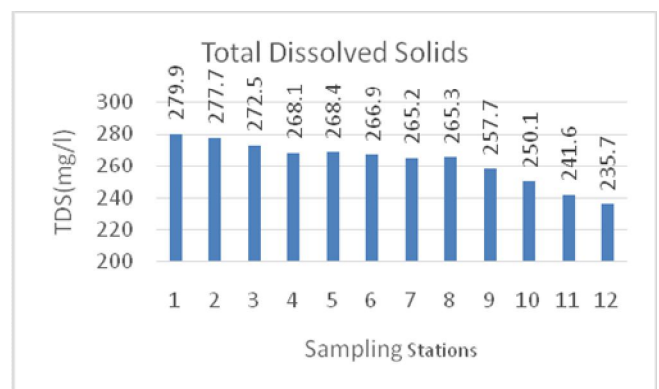

Fig 3.3: Variations of TDS at Different Locations

Turbidity: It is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. More the suspended solids higher the turbidity. In the preset study max recorded was 21.7NTU and min recorded was 14.8 NTU.
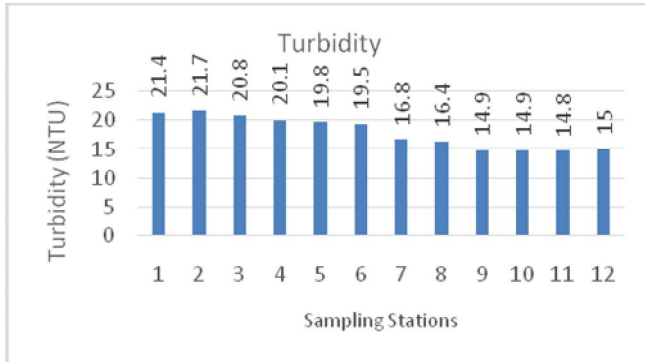

Fig 3.4: Variations of Turbidity at Different Locations

TotalHardness: It is the capacity of water to produce lathering of soap. It includes complex mixture of anions and cations. It is normally expressed as milligrams of $CaCO_3$. In this study max value observed is 232 mg/l $CaCO_3$ of and min was 200.2 mg/l of $CaCO_3$.
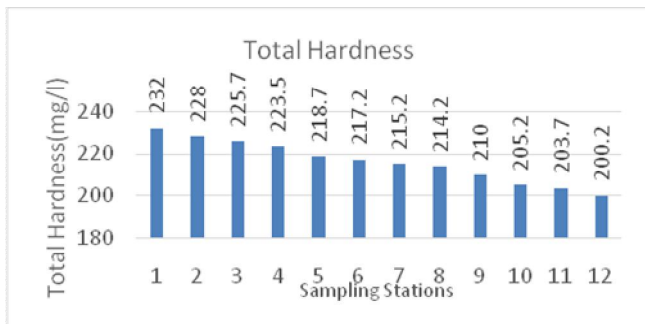
Fig 3.5: Variations of Total Hardness at Different Locations

Calcium Hardness: Calcium as $CaCo_3$ is found in all water abundantly. Calcium causes both non-carbonate and carbonate hardness of water. 138 mg/l and 117.7 mg/l are max and min values observed at station 1 and station 12.Calium is caused by the greater portion of hardness occurring in nature.
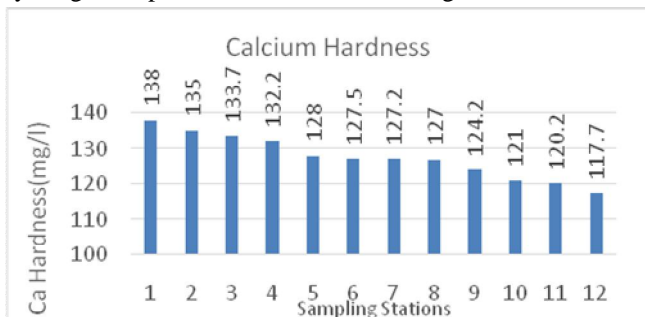

Fig 3.6: Variations of Calcium Hardness at Different Locations

Magnesium Hardness: Mg is washed from rocks subsequently ends up in water, It also end up in the environment from fertilizer application and cattle feed. In this study max value observed is 94 mg/l at station 1. Min value observed is 81.5mg/l at station 12.
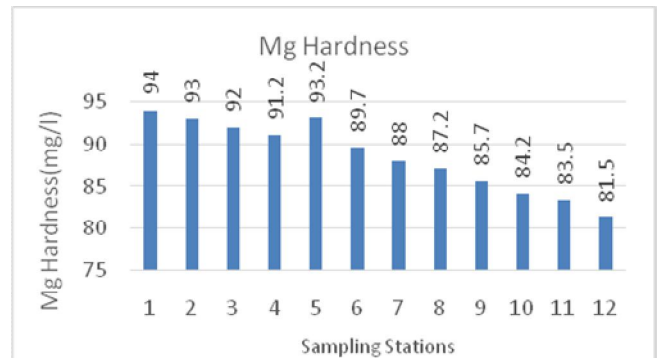

Fig 3.7: Variations of Mg Hardness at Different Locations

Alkalinity: Alkalinity indicates the neutralization of hydrogen ion. High alkalinity is good to have in our drinking water since it keeps the water non-violent for us to drink. In the present study maximum of 177.5 mg/l at station 1 and minimum of 126 mg/l at station 12 were observed.
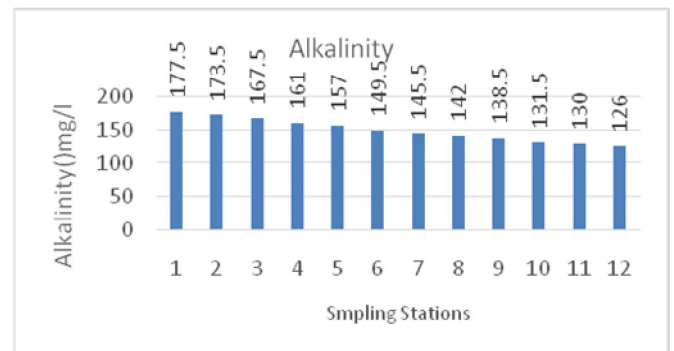

Fig 3.8: Variations of Alkalinity at Different Locations

Chlorides: It is an anion and this can be seen in all type of natural water. Chlorides promotes the electrical conductivity and thus increases its corrosivity. Chlorides reaches water by weathering of rocks. These ions are highly mobile and is transported to closed basins.
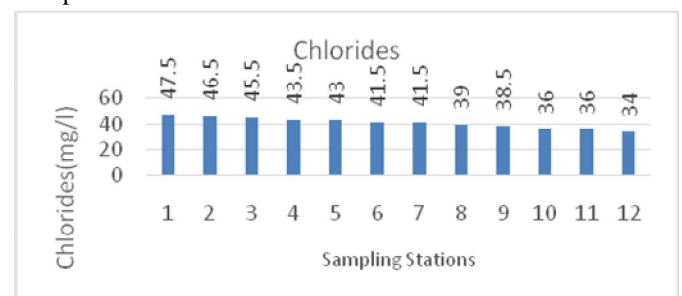

Fig 3.9: Variations of Chlorides at Different Locations

Sulfate: Sulfate is one of the major dissolved components of rain. High concentrations of sulfate in the water we drink can have a laxative effect when combined with calcium and magnesium. The max value of 5.58mg/l and min value of 4.43mg/l were observed in this study.
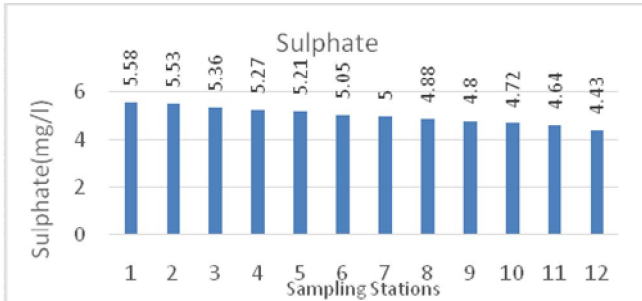

Fig 3.10: Variations of Sulfate at Different Locations

Dissolved Oxygen: Adequate dissolved oxygen is required for noble water quality. As DO levels in water drops below 4.0 mg/l, aquatic life is put under stress. The lower the concentration the greater the stress. In the present study DO values comes bellow 4mg/l at stations one to six.
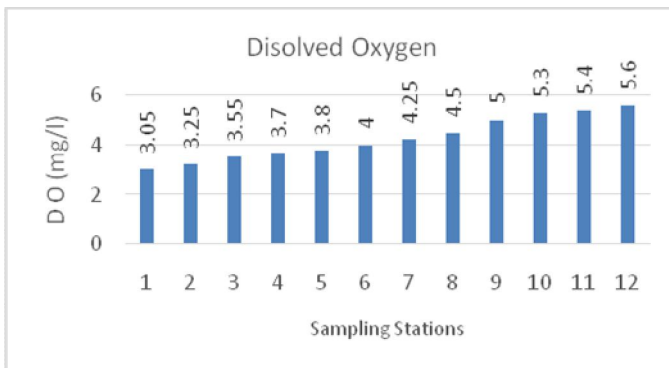

Fig 3.11: Variations of DO at Different Locations

Biochemical Oxygen Demand: The amount of oxygen required by the microorganisms to decompose the organic matter present in water. In the present study highest value of 11.12 mg/l and 7.75 mg/l observed at the stations 1and 10 respectively. More BOD, the more rapidly oxygen is depleted in the lake.
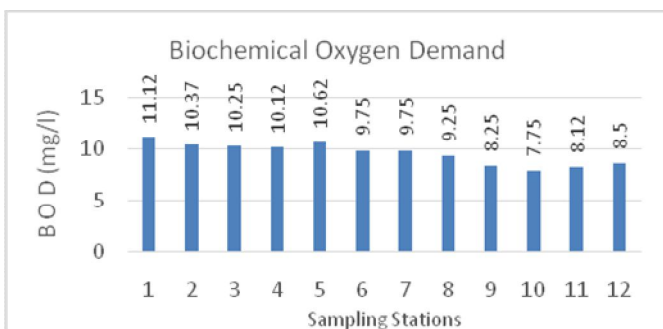

Fig 3.12: Variations of BOD at Different Locations

Chemical Oxygen Demand: It regulates the overall quality of the lake. It is due to natural or induced organic matter. It is the amount oxygen equivalent to the biological substance in presence of strong oxidizing agent under acidic condition. In this present study all the results come in the permission limit.
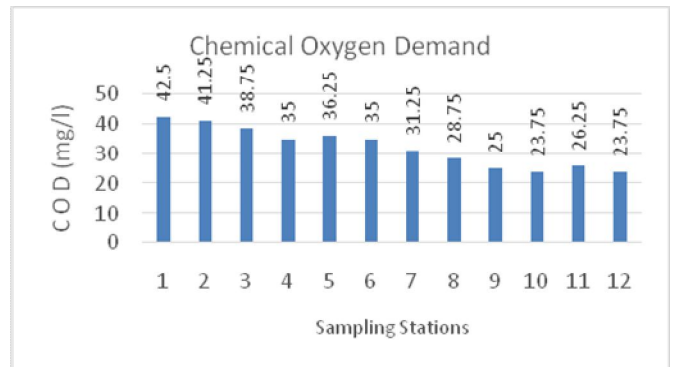

Fig 3.13: Variations of Chlorides at Different Locations

IV.CONCLUSION

In the present work, study reveals about physic chemical parameters of Bathi lake. The lake is polluted due to entry of sewage into lake and due to agriculture activity around the lake The results from study reveals that the station from 1 to 6 are more polluted and nearly no aquatic animals observed in these stations.

Foul smell, variation in flora and founa are caused due to impurities in sewage which is entering to lake. Hence study concluded that lake water is unsuitable for human consumption and connot be used without proper treatment.

V. ACKNOWLEDGEMENT

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