

Research Article

Study of Water Quality of Sion Lake, Mumbai, Maharashtra

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Abstract: Sion Lake is present in Mumbai city of Maharashtra. Water quality of Sion Lake studied in present paper. Water from lake collected during Apr 2012 to July 2012 and analyzed for five parameters for seasonal variation. During study it was observed that water quality of Sion Lake is polluted by domestic sewage from the intensively urbanized catchments. Sion Lake is extensively used for washing, bathing activities, and for conducting religious rituals, idol immersion which shows eutrophication problem; hence the study was done to find out the quality of water for various physico-chemical parameters. Sion Lake is found to be more organically polluted and greater degree of eutrophication was observed. The present paper describes details of human impact on lake, and suggests some measures for restoration of this important resource.

Keywords: water quality, eutrophication, domestic sewage, restoration.

INTRODUCTION

The freshwater sources are facing pollution problem all over the world; Lakes are part of freshwater ecosystem, and useful to man. The survival of all life in and around lakes depends on the quantity & quality of water available. Lakes play a significant role in the ecological sustainability of the region. However, continuous inputs of various forms of chemical pollutants from a variety of human activities have seriously deteriorated the quality of many lake ecosystems in India. Lakes are under increasing threat due to point and nonpoint sources of pollution. Major degrading factors include excessive eutrophication due to nutrient and organic matter loading, construction and logging activities etc.

Mumbai city, the capital of Maharashtra and commercial capital of India is located along the western coast of India, Spreading over an area of 437.71sq.km. having population about 20.7 million [1]. Mumbai city has rich natural resources like lakes, coastal water forests, wetlands and mangroves. Mumbai city serve as a centre of employment which attract a large number of migrants from other places. This increasing population settled in nearby areas. Due to inadequate infrastructure, wastewater & solid waste are disposed into the nearby water sources like lakes and ponds,

which deplete the water quality of lake and make it unsuitable for use.

Sion Lake is natural lake having historical background, situated in Mumbai. Lake water is extensively used for dumping garbage by local people, for conducting religious rituals, idol immersion during festival which shows an eutrophication problem. This Lake is polluted by direct entry of domestic sewage from the intensively urbanized catchments. Therefore study was done to find out the water quality of Sion lake. Water sample was collected in the month of April 2012 to July 2012 and analyzed for five parameters.

Therefore present study describes details of human impact on Sion Lake and suggests some measures for restoration of this important resource.

MATERIALS AND METHODS

In present study water quality of Sion lake studied during April 2012 to July 2012. During study period the surface water sample were collected in clean plastic cans during the morning hours. Some of the physicochemical parameters of water were determined at the sampling sites (Water temperature and pH were recorded on the spot.) while others were analyzed in the laboratory within 4-8 hrs. as per the standard methods

[2, 3]. Observations were recorded and shown in table no.1.

RESULTS AND DISCUSSION

The temperature of water is found in between 27°C to 31°C in pre-monsoon and during monsoon respectively. pH of lake water was found between 7.4 to 8.42.

The turbidity ranges between 25 to 32 NTU during study period. The Turbidity of any water sample is the reduction of transparency due to the presence of particulate matter such as lay or slit, finely divided organic matter, plankton and other microscopic organisms [4]. It was observed that turbidity increases during monsoon season.

Total Solids found between 28.4 to 38.2 mg/l. The reason for such a high amount of total solid may be due to unforested land, therefore the adverse effects of surface runoff, dumping of waste material may cause increase in total solid levels.

Dissolved Oxygen was found between 2.6 to 4.4 mg/l. During summer as a result of high temperature and more oxygen utilization, Dissolved Oxygen was recorded less, may be due to higher rate of decomposition of organic matter. Effect of waste discharge in a water body is determined by the oxygen balance of the system, it is rapidly getting removed from the wastewaters by discharge of the oxygen demanding waste [5].

Chloride was observed between 172 to 210 mg/l. Chloride shows seasonal variation, lower chloride range was specifically observed during rainy season suggesting the dilution effect. The higher range recorded in summer months denote the effect of higher temperature and rapid reduction in water mass [6, 7]. The high concentration of Chloride in water is considered as an sign of contamination due to high organic waste of animal origin [8, 9].

Table 1: Obtained results during Apr.2012 to July 2012

Sr.No.	Parameter	Apr-2012	May-2012	June-2012	July-2012
1	Temperature	30 °C	31°C	27 °C	28°C
2	pH	7.4	7.96	8.26	8.42
3	Turbidity(NTU)	26	25	28	32
4	Total Solids (mg/lit)	38.2	32.8	29.4	28.4
5	Dissolved Oxygen (mg/lit)	3.2	2.6	3.8	4.4
6	Chloride (mg/lit)	210	198	172	180

CONCLUSION

Various physico-chemical parameters indicate variations during study period. Lake water quality parameters undergo seasonal changes and values are generally higher during summer season. Lake water is polluted in terms of various physico-chemical parameters such as Turbidity, Dissolved Oxygen and Chloride.

In the present study, it was found that water quality problems associated with Sion Lake includes depletion of dissolved oxygen, poor water clarity and high level of algae growth, nuisance blue green algae blooms. Lake is declined in aesthetic quality in present situation. The discharges of sewage directly in lake area, dumping of garbage, ritual activities and idol immersion during festival, surface runoff resulting from rainfall have contributed considerable pollution in lake area.

RECOMMENDATIONS

The following plans have been suggested for saving the Sion Lake.

1. Serious steps should be taken to remove pollution, proper waste management system is required in

- lake area, monitoring of human activities by local authorities in nearby lake area are required.
2. Along with other measures, strict implementation of central and state level legislation is required, environmental awareness programmes through different media, to educate the public of the city and make them aware of the harmful environmental effects. Proper management of lake is required to avoid further pollution problems.
3. People, particularly those living near to lake should realize that the lake is not a waste disposable site. People have to change their mind set with regard to lake. Any plan to control pollution can succeed only if the people feel initiated and involved in such working and are able to participate in implementation.
4. Public participation is needed towards awareness, experience sharing, domestic refuse, recycling, and waste bin for garbage disposal (special bins for collection of Nirmalya during festival season).

REFERENCES

1. Census of Maharashtra, 2011 Report.
2. American Public Health Association, Washington D.C., USA, 2012.

3. Trivedi RK, Goel PK. Chemical and Biological Methods for Water Pollution Studies, Environmental Publication, Karad, 1986.
4. Akuskar SK, Gaikwad AV. Physico-chemical analysis of Manjara dam back water of Manjara river, Dhanegoan, Maharashtra. India. *Ecol. Environ. and Conserve.* 2006; 12(1): 73-74.
5. Sirajudeen J, Mohidheen MK, Abdul VR. Physico-chemical contamination of groundwater in and around Tirunelveli district, Tamil Nadu, *Advances in Applied Science Research.* 2014;5(2):49-54.
6. Pejaver M, Raut N. Nutrient management from lakes in Thane city (Maharashtra) *Indian J. Environ. and Ecoplan.* 2002; 6(2): 349-354.
7. Mani B, Gaikwad SA. Physico-Chemical Characteristics of lake Pokharan. *Journal of Environment and Toxicology*, 1998; (2): 56-58.
8. Sisodia R, Moundiotiya C. Assessment of the water quality index of wetland kalakholake, Rajasthan, India. *Journal of Environmental Hydrology.* 2006;14 (23):1-11.
9. Tripathi S, Patel HM, Shrivastava PK, Bafna AM. Assessment of water quality index of bore well samples from some selected locations of south Gujarat, India. *Journal of Environment Science and Engineering.* 2013;55:456-465.