



Impact of Ganesh Idol Immersion Activities on the Water Quality of Govathane Lake, Uran (Maharashtra) India

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ABSTRACT

In this paper the impact of Ganesh idol immersion on water quality of Govathane lake (Uran) is discussed. Water samples were collected during pre-immersion and post immersion at interval of 5 days and 10 days periods of Ganesh idols immersion. The changes in physico-chemical properties of Lake were observed. The pH and Dissolved Oxygen with minor changes while CO₂, BOD, COD, total alkalinity, turbidity, sulphate, ammonia and oil & grease were observed with major changes during and after immersion period. On the basis of these changes it is concluded that level of water pollution increases in Govathane lake due to these religious activities. It may cause the adverse effect on the aquatic ecosystem. No one can stop these religious activities but awareness among the people and society can reduce the pollution.

INTRODUCTION

Lakes are inland bodies of water that lack any direct exchange with an ocean. Lake ecosystems are made up of physical, chemical and biological properties contained within these water bodies. Lakes may contain fresh or salt water (in arid regions). They may be shallow or deep, permanent or temporary. Lakes of all types share many ecological and biogeochemical processes and their study falls within the discipline of 'limnology'. Lakes are superb habitats for the study of ecosystem dynamics: interactions among biological, chemical and physical processes are frequently either quantitatively or qualitatively distinct from those on land or in air. Although lakes contain 50.01 % of all the water on the Earth's surface, they hold 49.8 % of the liquid surface freshwater. Many organisms depend on freshwater for survival and humans frequently depend on lakes for a great many 'goods

and services' such as drinking water, waste removal, fisheries, agricultural irrigation, industrial activity and recreation. For these reasons lakes are important ecosystems.

But since water pollution is major threat to environment, lakes and other freshwater resources are not exceptional to them, Water pollution is a major global problem. It occurs when pollutants are discharged directly or indirectly into water bodies without adequate treatment to remove harmful compounds. Water pollution occurs due to the city sewage and industrial waste discharge into the river in addition to many religious activities and now become a threat to the ecosystem (Bajpai et al, 2002; Variya, 2009 and Varsani, 2009).

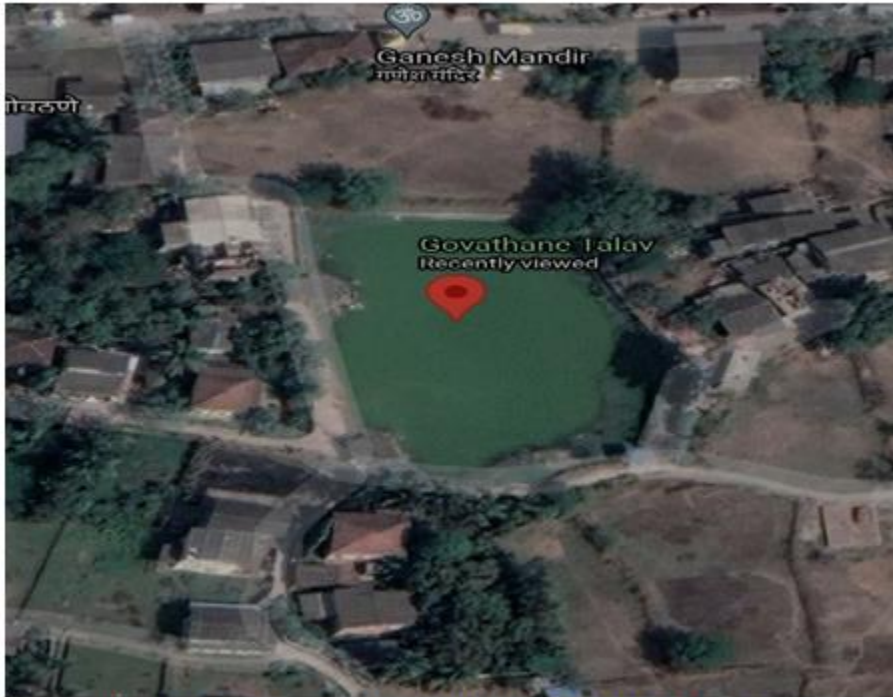
In India, lot of religious activities take place all round the year. Most of the temples and ritual places are located near the aquatic resources like pond, lakes, rivers etc. The people of Maharashtra are always excited for celebration of festivals. Ganesh Chaturathi is one of the important festival of them. In this festival number of Ganesh idols in different sizes are immersed in rivers , lakes , oceans after worship of 5- 10 days. When the idols are immersed, their colors, chemicals and other components that are used for idol preparation get dissolved and lead to significant changes in the water quality (Dhote et al, 2001). Reddy et al (2001) observed that Ganesh idol increases pollution. The input of biodegradable and non-biodegradable substances deteriorates the river water quality and enhances silt loaded in the river. The floating materials released through idol in the river and lake after decomposition result in eutrophication of the river, lake etc. (Leland et al, 1991).

A number of studies have been conducted in India on water quality assessment of water bodies like Halai, Koloroi, Kalyani, Salim Ali, Dahi-Khura, Ramgarh, Kalakho and Dalvoy Lake (Jain, Sharma and Thakur 1996; Sreenivasan Venkatanarasimha and Franklin 1997; Srinivasa and Kotaiah 2000; Thorat and Masaraat 2000; Shastri and Pendse, 2001; Moundiotiya, Sisodia et al 2004; Sisodia and Moundiotiya 2006; Mahesha and Balasubramanian 2010). Padmanabha and Belagali (2005) monitored the water quality of four lakes in Mysore city during November 2004 to April 2005. Based on pH, total alkalinity, total hardness, chloride, calcium, magnesium, total dissolved solids, dissolved oxygen and BOD, it was found that the water of these lakes was severely polluted and unfit for human consumption.

Mahesha and Balasubramanian (2010) found the Dalvoy Lake of Mysore city as having poor water quality. Sisodia and Moundiotiya (2006) found that the Kalakho Lake of Rajasthan has poor water quality due to lack of proper sanitation, flow of untreated municipal sewage and agricultural runoffs. In both cases, the lake water was found unfit for drinking and propagation of wild life and fish culture. Further, Moundiotiya, Sisodia et al (2004) studied the physicochemical parameters of the Jamwa Ramgarh wetland and advocated habitat conservation and ecological restoration as the measures to prevent the wetland from becoming ecologically inactive.

The present work is carried out on water quality assessment of the Govathane Lake of Uran City of India and its pollution status before and after Ganpati idol immersion. This Lake has the potential of providing tangible and intangible benefits to the people of this region. This lake is artificially created to solve the problem of water scarcity in village, when there was no source of water for domestic use including drinking. During these days the people from this area travelled for miles to fetch drinkable water. But after construction of this lake, the

people starts using it for festive seasons along with along domestic purpose. Although the lake is on way of pollution, still its water is very essential for most of the people living in that village. Hence it is important to analysis the water quality parameter to aware the people of its consequences. There is no any scientific study has yet been done on this lake. Therefore purposely the various hydrological parameters and water quality of Govathna were investigated before and after Ganpati visarjan.



Location of Govathane Lake (Google Map)

GOVATHANE LAKE

MATERIALS AND METHODS

The water samples were collected during morning hours from immerses point during pre-immersed, immersed and post-immersed periods of idols immersion. The measurement of temperature and fixation of dissolved oxygen was completed in situ and for analysis the various parameter samples were collected in well rinsed and pre-cleaned 5 liters capacity plastic cans without entrapping any air bubbles. The containers were adequately labeled with the name, date, time of collection of water sample and immediately brought to the research laboratory of Veer Wajekar A.S.C. College, Phunde. For analysis of the water samples, standard methods of Trivedi and Goyal (1986) and APHA (2005) were followed for the analysis.

ANALYSIS OF WATER SAMPLE

Analysis of water were carried out for various water quality parameters such as pH , DO, BOD, COD, CO₂, TDS, Nitrate , Chlorides , Sulphates , alkalinity , acidity , total hardness etc. using standard methods. All the reagents used for the analysis were prepared in AR grade and double distilled water.

DESIGNATED BEST USE OF WATER BY (CPCB):

Each water use has specific quality need. Therefore, to set the standard for the desire quality of a water body, it is essential to identify the uses of water in that water body. In India, the Central Pollution Control Board (CPCB) has developed a concept of *designated best use*. According to this, out of the several uses of water of a particular body, the use which demands highest quality is termed its *designated best use*. Five *designated best uses* have been identified. This classification helps the water quality managers and planners to set water quality targets and design suitable restoration programs for various water bodies.

Designated Best Use	Class	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	1.Total Coliforms Organism MPN/100ml shall be 50 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6mg/l or more 4. Biochemical Oxygen Demand 5 days 20 °C, 2mg/l or less
Outdoor bathing (Organised)	B	1.Total Coliforms Organism MPN/100ml shall be 500 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 5mg/l or more 4. Biochemical Oxygen Demand 5 days 20 °C, 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	1. Total Coliforms Organism MPN/100ml shall be 5000 or less 2. pH between 6 and 9 3. Dissolved Oxygen 4mg/l or more 4. Biochemical Oxygen Demand 5 days 20 °C, 3mg/l or less
Propagation of Wild life and Fisheries	D	1. pH between 6.5 and 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 4. Biochemical Oxygen Demand 5 days 20 °C, 2mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	1. pH between 6.0 and 8.5 2. Electrical Conductivity at 25 °C micro mhos/cm, maximum 2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2mg/l
	Below-E	Not meeting any of the A, B, C, D & E criteria

Table 1: Parameters were analyzed using methods as per APHA (1985)

Sr. No	Parameter Analyzed	Method
1	Ph	Systronic pH meter
2	TDS	Evaporation /Oven
3	DO mg/L	Wrinkler's iodometric
4	BOD mg/L	Wrinkler's iodometric
5	COD mg/L	Potassium dichromate
6	Total Hardness mg/L	EDTA Titrimetric method
7	Acidity mg/L	Titration method
8	Alkalinity mg/L	Titration method
9	Sulphate mg/L	Turbidimetric method
10	Chloride mg/L	Argentometric method
11	Nitrate mg/L	Colorimetric method
12	Ammonia mg/L	Titration method
13	Turbidity	Secchi disk
14	Oil and Grease mg/L	Partition gravimetric method

Table 2: The parameters of water of the above mention site are calculated and describe as follows:

Sr. No.	Parameters	Pre-immersion	Post immersion (5 days)	Post immersion (10 days)
1	pH	8	8.5	10
2	TDS mg/L	279	684	804
3	DO mg/L	11.66	11	10.80
4	BOD mg/L	7.5	8.1	9.6
5	COD mg/L	23.04	23.12	31.02
6	Total Hardness mg/L	18	20	20.3
7	Acidity mg/L	80	80	75
8	Alkalinity mg/L	120	145	200
9	Sulphate mg/L	0.651	0.512	0.727
10	Chloride mg/L	10	10	10
11	Nitrate mg/L	0.68	1.20	1.35
12	Ammonia mg/L	19.6	20	25.3
13	Turbidity	26	18	15
14	Oil and Grease mg/L	0.231	0.433	0.684

RESULT AND DISCUSSION:

The pH of water is important because it governs solubility of nutrients. The pH ranged from 8 to 10. The minimum pH 8 was observed at pre immersion while pH 10 during immersion period of idols.

The values of DO, BOD and COD were found to vary from 11.6 mg/L to 10.8 mg/L; 7.5 mg/L to 9.6 mg/L and 23.04 mg/L to 31.02 mg/L respectively. The dissolved oxygen play important role in survival of aquatic organisms. There were little changes observed in DO during the study period while the value of BOD and COD were observed high during the idol immersion period. The higher values of BOD may have direct correlation with the increase of nutrient level in the water body due to the immersion activity (McCoy et al, 1986). These components (BOD) and COD) are helpful to know the toxic conditions and presence of biologically resistant organic substances in water. Similar results were reported by Rajkumar et al (2003).

The total hardness, total alkalinity, sulphate and ammonia varied from 18 to 20.3 mg/L; 120 to 200 mg/L, 0.651 to 0.727 and 19.6 to 25.3 mg/L respectively. Hardness may increase due to mixing of domestic waste similarly the alkalinity may increase due to various religious activities, domestic waste and especially due to soaps and detergents. The same results were reported by Patil (2003). It was observed that the high concentration of ammonia in this lake water. It may affect the aquatic living organisms of lake.

The TDS was observed high (804 mg/L) during post-immersion period. Similarly the turbidity was also found increasing during pre-immersion and post-immersion of idols,

The oil and grease content was found in the range of 0.231 mg/L to 0.684 mg/L. Their presence in water of Govathane Lake revealed that discharge of paint and oil color and devotees offer oil to the god. These data revealed that water of Govathane Lake is deteriorated due to the immersion of Ganesh idols.

Effects of Ganesh idol immersion on water quality of different water bodies have been reported earlier by various Scientists from different parts of country e.g. Dhamijia and Jain (1955) on Hanuman Taal, Jabalpur, Madhya Pradesh, Kalita et al (2006) in Assam, Devi and Belgali (2005), Jadhav and Dongre (2009) in Karnataka, Gupta et al (2011) in Varanasi, Uttar Pradesh, Shirbhate et al (2012) in Amrawati, Maharashtra.

Low dissolved oxygen and high temperature during various religious activities were observed by Malik et al (2010). Jadhav and Dongre (2009) and Shirbhate et al (2012) also reported low dissolved oxygen during immersion period in water bodies of Karnataka. Vyas and Bajpai (2008) and Gupta et al (2011) and Malik et al (2012) reported increase in total hardness due to idol immersion. Dhamijia and Jain (1995) reported hardness 94.0 to 167.3 mg/L in Hanuman Taal, Jabalpur. Ujjania and Azahar (2011) and Malik et al (2012) reported total alkalinity 310 mg/L and 129 mg/L respectively in Tapi river during immersion activity.

CONCLUSION

From the mythological point of view, the some water bodies are related to religious sentiments but from the scientific point of view, such water bodies like ponds, lakes and rivers are not suitable for human uses. The main reason of the deterioration of water quality of Govathane Lake is various religious activities. Ganesh idol immersion also plays an important role because the plaster of paris, clothes, iron rods, chemical colors, varnish

and paints used for making the idols deteriorate water quality. Need much creating awareness among the people to minimize such types of deterioration of water for religious purposes.

People should use idol made of baked clay or ecofriendly idols made up of shadu clay, paper pulp, natural gum, and eco-friendly colors which pollute less water in comparison to PoP.

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