Seasonal Variations in Physico-Chemical Parameters of Rishi Lake, Karanja Lad, Dist. Wahim, Maharashtra

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Abstract
The present paper deals with the seasonal variations in some important Physico-chemical parameters of historical Rishi Lake, district Washim, Maharashtra. Choose only some 14 parameters were recorded during the study period Oct.2011-Sep.2012.Whereas Rishi lake were partially desilted during 2007-08. Most of the parameters viz. temperature, transparency, Free CO_2, DO, Chloride, Carbonate, T. alkalinity, T. hardness, Calcium, Magnesium, and TDS were badly affected while only pH and nitrate were found within range. It was also observed that the pollutant receiving water body appears due to domestic waste, cattle grassing, agricultural waste, and its result into unpotability of Rishi lake water

Keywords: Rishi Lake, Physico chemical parameters

1. Introduction
Water is the basic and primary need of all vital life process. It is not only essential life but is predominant organic constituent of living organic matter, forming in general nearly ¾" of weight of the living cell. In fact, it is now well established that the life first arose in aquatic environment. A fundamental feature of the earth is an abundance of water, which covers 71 percent of its surface to an average depth of 3800 meters. Over 99 percent of which is deposited in ocean depression. The 4/5" of this are immobilized as ice and thus practically useless. More than 97 percent occurs in the form of sea water, where salinity makes it useless. While fresh water makes up only 2.6 percent. Hardly 1 percent of global water is reserve than lies in the form of inland fresh water is available for direct use to the infrastructure associated with life. Approximately 97 percent water of the earth is in Ocean, 2 percent is in glaciers and polar ice, 0.009 percent in lake and 0.00009 percent in rivers and the residue in ground water. It is the most vital abiotic component is unique in many respects; it occurs in all the three states solid, liquid and gaseous on the earth and acts as a solvent for a variety of inorganic, organic and gaseous substances.
Water is vital resources used for various activities such as drinking, irrigation, fish production, industrial cooling. Power generation and many others. They have important social and economic benefits as a result of tourism and recreation and are culturally and aesthetically important for people throughout the world [1]. Water is a necessary element for endurance of living on earth, which contains minerals essential for human as well as earth and aquatic life. The life in aquatic ecosystem directly or indirectly depends on water quality status. Rapid industrialization and indiscriminate use of chemical fertilizers and pesticides in agriculture are causing heavy and varied pollution in aquatic environment leading to deterioration of water quality and depletion of aquatic biota, due to use of contaminated water. In India, now it becomes much more necessary to investigate water quality due to rushing of urbanization and agricultural waste. Concern to Rishi lake it is quite historical so for conservation of heritage present study is carried out.
Several studies have been made on the limnology of fresh water bodies in India. Angadi *et al.* [2] carried out limnological studies of Papnash pond Bidar (Karnataka). Basavaraja *et al.* [3] analysed of water quality using physico-chemical parameters of Hosahalli Tank in Shimoga District, Karnataka, India. Mahesh *et al.* [4] assessed the physico-chemical characteristics of Bhamka Pond, Hanumana, Rewa Dist.

2. Material and Methods
The Lake selected for the present study is situated on the East of the Karanja town, which was desilted in the year 2007-2008. It is situated at about 1318 feet above the sea level. It is at $77^0$29' E Longitude and $20^0$29' N Latitude. The lake is filled to its maximum capacity in the rainy season and the excess water goes though outlets located across the bunds. Lake is surrounded by rock hillocks towards north-east side and east and west boundaries are sealed by bunds. The Rishi Lake comes under the jurisdiction of Karanja Municipal Corporation.

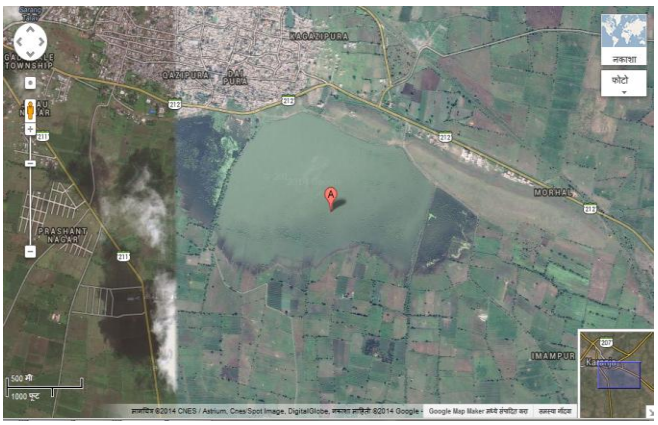

Fig. 1: Satellite map of Rishi Lake

Ten sampling spots are selected and from which water samples are to collected month wise basis for a period of Oct 2011-sep 2012 12 months. The water sample collected for the depth of 1 meter in the morning hours between 8.00 am-10.00 am. The water samples brought in suitable containers in the research laboratory for further investigation. Parameters like Humidity, Air temperature, Water Temperature, Transparency and pH were analyzed at the lake site, while the other parameters like Total Dissolved Solids (TDS), Total

Dissolved Oxygen (DO), Carbon Dioxide (CO_2), Alkalinity, Hardness, Sulphates, Chlorides, Nitrate, were analyzed in the laboratory on the same days.The various physico-chemical parameters were determined by using the methods given by APHA [5].

3. Result and Discussion

3.1 pH: The range of pH suitable for fisheries is considered to be 5.0-9.0, though 6.5-8.5 is preferable. The average pH values depends upon the alkalinity during the month of April 2012 it 7.10 while during the month October 2011 it was 8.4 maximum in range. Koli and Ranga [6] found the pH values alkaline (6.7 to 10.2) throughout the study period, except July 2008.

3.2 Dissolved oxygen: D.O. showed inverse relationship with water temperature Generally dissolved oxygen is directly related to photosynthesis, which is generally high when the sky is clear and the day are long and an inverse relation between D.O.in present study dissolve oxygen range occurs in between 7.22mg/L to 9.6mg/L during the month July 2012 and Dec 2011 respectively. Input into the lake from sewage and manure can reduce D.O. levels due to the decomposition process and the demand of oxygen.

3.3 Air Temperature: It is a measurement of the intensity of heat stored in a volume of water. High water Temperature increases the metabolic oxygen demand which in conjunction with reduced oxygen solubility impact many species. The average air temperature range between 25.8^0C -35.4^0C and average water temperature range between 20.17^0C-$30.^0$C. Temperature strongly influenced D.O. as oxygen solubility decreases with increasing water Temperature. In general during the month of winter air temperature value is low while during summer its raise.

3.4 Turbidity/transparency: Water cloudiness is caused by material, such as dirt and residue from leaves that is suspended (floating) in the water. High transparency of fresh water ecosystem coincided with the period of dry season. The average transparency values ranged minimum 8 cm during July 2012 and maximum during February 2012 that is 28.70cm in the present investigation. However Harney *et al.* [7] recorded Sacchi disc transparency at 18.60 cm to 34.00 cm in Pindavani pond. During rainy season silt, clay and other suspended particles contribute to the turbidity values, while during winter and summer seasons settlement of silt, clay results low turbidity [8].

3.5 Carbondioxide (free): Carbon dioxide is present in water in the form of a dissolved gas. Surface waters normally contain less than 10 ppm free carbon dioxide, free CO_2 was absent at all the spot throughout the period of investigation, which might be because of its utilization in photosynthetic activity by the phytoplanktons.

3.6 Total Solid: The average total solids range between 160.00 mg/L -375 mg/L. Minimum value was recorded month of August 2012 and maximum during month of July 2012.

3.7 Total Alkanity: The average range throughout the year total alkalinity observed minimum 60.00 mg/L during the month of Dec 2011 while maximum value observed 188.00mg/L during the month May 2012.

3.8 Chloride: It is generally observed that the higher concentration of chloride in the summer period may be due to increased temperature, low level of water and sewage mixing. During the present investigation, the maximum value 40.6mg/L during the starting of rainy season while it was minimum during the September 2012 that is 18.19 mg/L.

3.9 Total Hardness: The average total hardness value ranged between 96.5mg/L – 130.00 mg/L. Minimum value was recorded month of July 2012 while minimum value was recorded September 2012. Sivalingam *et al* [9] noted total hardness of water fluctuates from 71 mg/lit to 148 mg/lit. in Kajjarla Lake, Adilabad District of Andhra Pradesh.

3.10 Calcium Hardness as $CaCO_3$: The Average value was ranged between 26.00 mg/L to 72.20 mg/l. Minimum value observed during month of August 2012, and maximum value observed May 2012. The maximum level of hardness during the summer season may be due to evaporation of water, addition of calcium and magnesium salts and sewage inflow [10].

3.11 Calcium Hardness as Ca^{++}: The average calcium value fluctuated between 15.3mg/L -50.60 mg/L minimum values observed during the month of July 2012, maximum value showed during summer May 2012 respectively.

3.12 Magnesium Content Mg (mg/L): The average magnesium content was estimated between 5.78 during summer season, maximum 25.0 during the month Aug.2012.

3.13 Sulphates (mg/L): The average sulphate value was found minimum between 0.03mg/L during winter season December 2011.while maximum 1.47 mg/L observed during summer season May 2012.

4. Conclusion

From the above findings it can be concluded that water of the Rishi Lake which is located near the residential area and due to use of domestic sewage as well as agricultural waste, various human and cattle activities water becomes unpotable. Now a day it becomes needed to be checked to improve water quality. Whether it is partially desilted so rain water occupying capacity is increased but it is yet not sufficient. Further it is suggested to enhance the economic growth of fisherman, by introducing the fingerlings of major carps and exotic carps to make the historical Rishi Lake as a healthy, beauty and vital ecosystem.

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