

## PRESENT SCENARIO OF LONAR CRATER M.S. INDIA

Dr. Milind V. Gaikwad Dr. Vikas B. Kalyankar  
Head of Zoology Department,  
Late Ku. Durga K. Banmeru Science College,  
Lonar, Dist. Buldhana-443302  
Maharashtra-INDIA

### **Abstract:**

Surely Lonar Crater- Lake is a world's wonderful house of knowledge not only for researcher but visitors and tourists. Lonar Crater-Lake is the third largest high velocity meteorite impact salt-water crater- lake of the world. It is world known soda water lake. Lonar Crater-lake also gives perception as a wetland which provides niche for different form of life resides in it. This study supports that yes life exists in this Crater-lake it was found that typical Macro and microbial flora and fauna which was investigated by workers earlier. Present work deals with analysis of parameters that aim to investigate the pollution level status of Lonar Crater Lake; hydrological status reveals variation of salinity during rainy season and summer while the lake is evaporating. During this investigation different water parameters were studied such as temperature, PH, Total Dissolved Solid, Electrical conductivity, Dissolved oxygen, Free CO<sub>2</sub>, carbonates and bicarbonates, hardness, chlorides, salinity, calcium and magnesium hardness. Transparency was estimated with the help of Sacchi disc. In this unique ecosystem life is present as other crater doesn't have such. Its unique climatic variation shows the ecosystem is with unique ecological importance from rest of the Crater. Anthropological and mythological importance of this Lonar Crater was also the prime aim of this work.

**KEY WORDS:-**Lonar Crater-lake wetland Water-Parameters, Life, anthropology, Mythological Importance, micro and macro fauna.

### **INTRODUCTION**

Lonar Crater- Lake is a wonderful house of knowledge. It is believed that, Lonar Crater Lake had cratered by nature due to meteoritic high velocity impact and is the third largest crater -lake of the world (DePater, et.al.,(2001) Hagerty, et al.,(2001). Lonar crater-lake is the only crater in basaltic rock of Deccan Plateau of India. The uniqueness about shape, size of crater-lake being saline-soda has paid attention of Biologist (Malu, 2002), geologist, ecologists, archaeologists, naturalists and astronomers, and has been studies on various aspects of crater unique ecosystem. Lonar meteorite Lake appear to be a unique aquatic ecosystem characterized by hyper saline,

hyper alkaline, poor range in DO but all physico-chemical parameters in this region was beyond the permissible limit in different season only according to WHO and ISI standards. This inland lake and also make us to feel like unique wetland. The crater has many sub-ecosystems, combination of floral and faunal species (Kodarkar, 2008), due to localized variations in the conditions of soil, water and humidity and terrestrial habitat. Lonar Crater Lake is a unique meteoritic crater in basaltic rock. It lies in a nearly circular depression surrounding on all sides by steeply rising escarpments. The lake basin is closed on all sides and therefore has no outlet. The lake is known for its high salinity and alkalinity, micro-ecosystem, a wide range of plant and animal life. Lonar Crater Lake is a unique meteoritic crater in basaltic rock. It lies in a nearly circular depression surrounding on all sides by steeply rising escarpments. The lake basin is closed on all sides and therefore has no outlet. The lake is known for its high salinity and alkalinity, micro-ecosystem, a wide range of plant and animal life. The Lonar ecosystem has the uniqueness unusual geohydrological and climatic conditions where oxygen deficiency can be experienced occasionally. Due to such condition it is not sometime possible to render there, However, the same conditions have made it extremely sensitive and subject of thinking to researcher because human interventions. Therefore, the biotic zones resulting from such isolation need immediate protection and more research (Pedge *et al.*, 2013).The Lonar crater-lake has attracted the attention of world's geologists for investigation of its origin (Shown Wight ,2010) and the source of salinity of lake water and it is unique ecological wonder (Malu *et al.*, 2007). The positive correlation has indicated that the *B. plicatilis* abundance has significantly positive correlation with regards to temperature as increase in all water parameters such as water temperature, pH, TS, TDS, Cl, Salinity in the Lonar lake water (Pedge *et al.*, 2013). Lonar Crater Lake consist of various life forms inhabited a wide range of plant and animals life. The cultural vaporizations ad eutrophication of this lake has taken place due to the untreated domestic sewage and garbage coming out from Lonar town that reaches into the lake. But certain sewage controlling plants have been implanted by Local authorities at the bank of Crater where the exact entry point is present.. Inside the crater, some farmers were downing farming but now it is banned and hence the use of inorganic fertilizers, insecticides and pesticides like toxic compounds inters in lake and hampering Micro fauna. Simultaneously, Antropogenic introductions by the local people in the fresh water springs and used waste water enters in lake

(Yannawar *et al.*, 2013).The lake water was observed to be blue green in colour due to dominance of algal blooms and to some part of Crater Lake red algae also reported. It was observed that water is having strong, intolerance rottene odor. The algal bloom like spirulina and others in Lonar Lake water is responsible for absorption of light and heat from sunlight due to its color pigments leading to higher temperature of lake water and heat trapping. The Lonar Crater Lake water appears to be saline soda due to high concentration of dissolved solids and total suspended solids and foam (Verma *et.al.*, 2013). The correlation coefficient indicates significant positive and negative correlation of parameters with each other. The positive correlation means one parameter increase with other parameters also increase (Pedge *et.al.*, 2013). The saline lake, marshy areas around it, freshwater streams, natural and manmade plantations, crop fields and the remnants of the original forest and scrub referred to above, all provide special niches for plants and animals. Lonar Lake has a localized temperature system (Dabhade *et.al.*, 2006).

#### **MATERIAL AND METHODS:**

Samplings were investigated for different sampling period of average six years. Water Temperature analyzed by simple thermometer, Total Hardness, Free CO<sub>2</sub>, Carbonates Bicarbonates, Chloride, Salinity, Calcium, Calcium Hardness, and Magnesium Hardness analyzed by Titrations-Titrometric method with the help of APHA (2006) standard method for water analysis. PH measured by Digital PH- meter AI-101. Transparency was estimated with the help of Sacchi disc.Plankton collected by net. Mythological survey study and anthropological survey study. NGO's Survey.

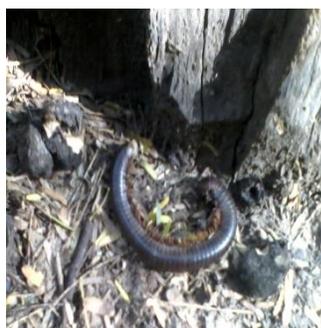
#### **RESULTS AND DISCUSSION:**

Photo 1: Geographic location of Lonar Cater Lake-(19°5and 76°31'E).



Photo:2 shows present scenario of water.

Photo:3 Shows animals of the Lonar crater



Giant Melipedes



Grazing Cow



Kokila- Mainna



Giant snail



Fly



Chironomus Larva

TABLE 1: Shows water parameters of Lonar Crater-Lake.(2014-2020) Years (Average pooled values)

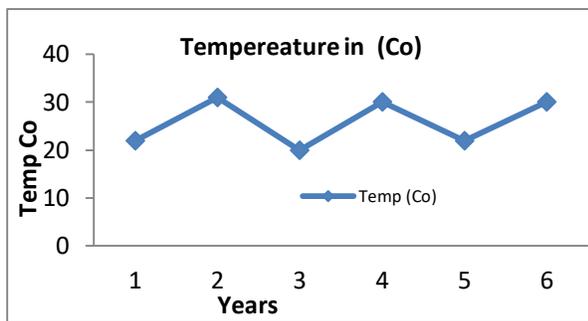
| Sr. No | Parameter<br>s               | 2014-15 |      | 15-16 |      | 16-17 |      | 17-18 |      | 18-19 |      | 19-20 |      |
|--------|------------------------------|---------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
|        |                              | Min     | Max  | Min   | Max  | Min   | Max  | Min   | Max  | Min   | Max  | Min   | Max  |
| 1      | Temp (C°)                    | 22      | 31   | 20    | 30   | 22    | 30   | 22    | 31   | 21    | 31   | 22    | 32   |
| 2      | PH                           | 10      | 12   | 10    | 12   | 10    | 12   | 10    | 12   | 10    | 12   | 10.5  | 12   |
| 3      | TDS ppt.                     | 5.5     | 8.4  | 5.8   | 8.8  | 5.5   | 8.8  | 5.8   | 8.5  | 5.8   | 8.9  | 5.5   | 8.5  |
| 4      | DO mg/L                      | 0.4     | 11.2 | 0.7   | 9.4  | 0.8   | 8.0  | 0.7   | 9.5  | 0.4   | 11.2 | 0.8   | 10   |
| 5      | Free CO <sub>2</sub><br>mg/L | ***     | ***  | ***   | ***  | ***   | ***  | ***   | ***  | ***   | ***  | ***   | ***  |
| 6      | Total<br>Hardness<br>mg/L    | 76      | 60   | 80    | 90   | 68    | 40   | 76    | 60   | 80    | 90   | 68    | 40   |
| 7      | Chloride<br>mg/L             | 482     | 5104 | 3970  | 3545 | 4006  | 482  | 5104  | 3970 | 3545  | 3970 | 482   | 5104 |
| 8      | HCO <sub>3</sub>             | 9       | 2222 | 8.5   | 2100 | 9     | 2192 | 36    | 2375 | 9     | 2001 | 8     | 2150 |

|    |                     |       |       |      |      |      |      |       |      |      |      |       |       |
|----|---------------------|-------|-------|------|------|------|------|-------|------|------|------|-------|-------|
| 9  | Transpare ncy. (cm) | 02    | 03    | 02   | 02   | 02   | 01   | 02    | 03   | 02   | 02   | 02    | 01    |
| 10 | Mg. Hardness mg/L   | 17.11 | 12.79 | 17.7 | 14.9 | 7.09 | 17.1 | 12.79 | 20.3 | 14.9 | 7.09 | 17.11 | 12.79 |

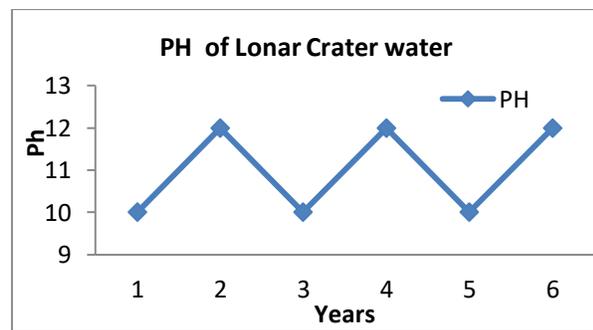
\*\*\* Free CO<sub>2</sub> was absent in during study period due less or negligible microorganism activity or their availability.

**Graph-1 to 8 :** Shows various water parameters along with their fluctuations during last six years (average pooled values)

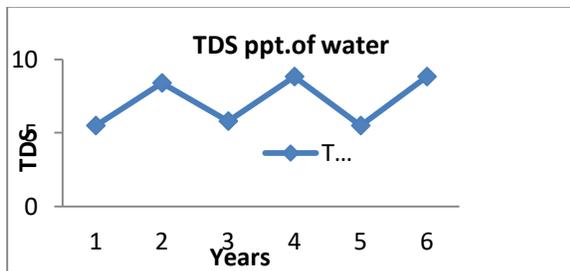
(1)



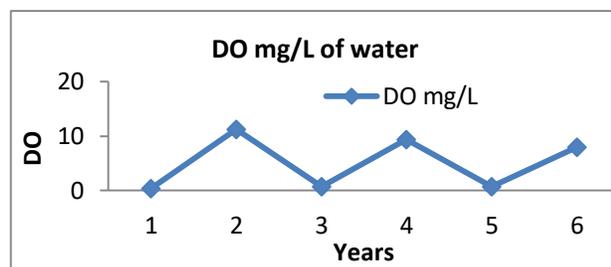
(2)



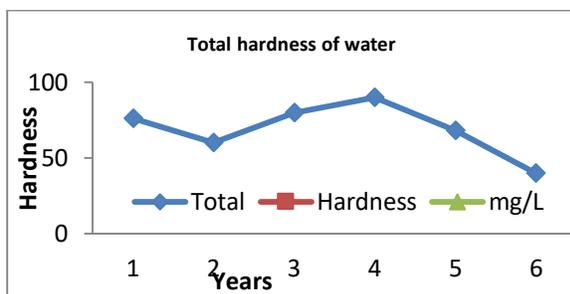
(3)



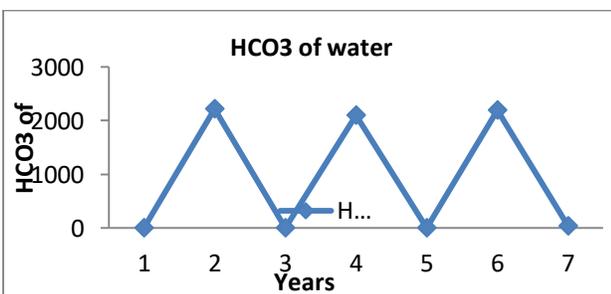
(4)



(5)

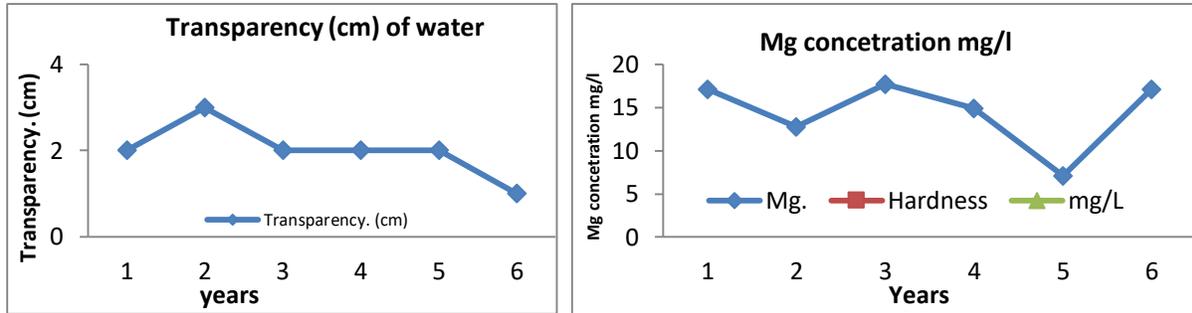


(6)



(7)

(8)



**Photo: 4** shows planktons available at Lonar Crater Lake



*Bryocantus haemalis*



*Alana karua*



*Chlamydotheca speciosa*



*Keratela tropica*



*Brachionus falcatus*



*Brachionus calyciflorus*



*Brachionus diversicornis*



*Brachionus falcatus*



*Paradoctylopodia brexicornis*



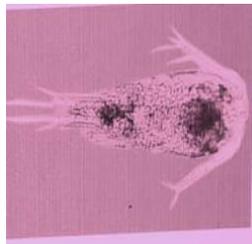
*Mmararia species*



*Nauplius cyclopes*



*Cyclopes brachycercus*



*Eucyclopes agilis*



*Diatomus minutus*



*Paracondona euplectela*



*Cyclocypris forbesi*

The most important physical parameter temperature during study period average values were measured and temperature ranges from 22C° and maximum to 31C°. during 2014.

Minimum temperature 20C° and maximum was 30 C° during 2015. During 2016 average value it was 22C° to 30C°. Temperature was gradually increases during year 2017. During 2018 minimum 22C° and maximum 31 C°. During 2019 minimum temperature was recorded 21C° and maximum was 32C°. In this year 2020 average values, minimum temperature was 22C° and maximum 32C° (Table No.1). Slight fluctuation was there due to changing time of sampling. During the study period Ph of 6 years (average) was recorded which is alkaline. The average pH values of the Crater Lake water are generally higher than 10.5 and occasionally reaching 12 so due to which this particular water is also known as magic water (Shinde et. al., 2013), (Table No.1) Average total dissolved solid-TDS during the study period-2014 minimum TDS was found to 5.5 ppt. and maximum was 8.4 ppt. during (2015) minimum was 5.8 ppt. and maximum was 8.8 ppt. During (2016) minimum was 5.5 ppt. and maximum was 8.8 ppt. During (2017) minimum TDS was recorded 5.8 ppt. and maximum was 8.5ppt. During (2018) minimum TDS was 5.8 ppt. and maximum 8.9 ppt. 2019 minimum TDS was 5.5 ppt. and maximum 8.5 ppt. minimum TDS was 5.5ppt. and maximum 8.5 ppt. 2020 , (Table No.1). During month wise observation it was found that during the month July to October it was decreases during each study year where as during month March to June the values were increased form. Pawar, (2010) and other workers have reported as TDS is in the increased range. Dissolved oxygen (DO) during study period (2014) minimum was 0.4 mg/L and maximum was 11.2mg/L little fluctuation was observed. during study period (2015) minimum DO was 0.7mg/Land maximum was 9.4 mg/L. during study period (2016) minimum was 0.8 mg/L and maximum was 8.0 mg/L. during study period (2017)-0.7 mg/L and maximum was 9.5 mg/L. during study period (2018) minimum DO was 0.4 mg/L and maximum was 11.2 mg/L. during study period (2019 ) minimum DO was 0.8 mg/L and maximum was 10 mg/L. during study period (2020 ) minimum DO was 0.8 mg/L and maximum was 10 mg/L,(Table No.1). Free CO<sub>2</sub> was absent in during study period (2014) due les or negligible microorganism activity or their availability. Other parameter that is Bicarbonates (HCO<sub>3</sub>) during the study periods 2014, minimum value of Bicarbonates was 9 mg/L and maximum was 2222 mg/L. during 2015, minimum was 8.5 mg/L and maximum was 2100 mg/L. During 2016, minimum was 9 mg/L and maximum was 2192 mg/L. During 2017, minimum value was 36 mg/L and maximum was 2379 mg/L. During 2018, minimum value was 9 mg/L and maximum was 2001 mg/L. During 2019, minimum value was 8 mg/L and maximum was

2150 mg/L. During 2020, minimum value was 7 mg/L and maximum was 1900 mg/L, (Table No.1). Bicarbonates value was increases from month of July to February and little fluctuation in month of April and then it can again increases from month of June every year. Total hardness (mg/L) as 494, 571, 592, 364.75 and 480.08 successively in average values during 2014-15, 15-16, 16-17, 17-18, 18-19 and 19-20 successively (Table No.1). Total hardness 76, 60, 80, 90, 68, and 40 respectively during 2014-15, 15-16, 16-17, 17-18, 18-19 and 19-20 successively (Table No.1). Chloride mg/L as 482, 5104, 3970, 3545, 4006 and 3970 respectively during 2014-15, 15-16, 16-17, 17-18, 18-19 and 19-20 successively (Table No.1). Mg. hardness mg/L as 17.11, 12.79, 17.7, 20.3, 14.9, and 7.09. respectively during 2014-15, 15-16, 16-17, 17-18, 18-19 and 19-20 successively (Table No.1). Transparency (cm) 02, 03, 02, 02, 02, 01, respectively during 2014-15, 15-16, 16-17, 17-18, 18-19 and 19-20 (Table No.1). Waterfowls, ducks, cranes, and many other migratory birds and microscopic organisms. The hydrological study confirms availability of flora and fauna as *Eucyclopes agilis*, *Diatomus minutes*, *Paracondona euplectela*, *Cyclocypris forbesi*, *Paradoctylopodia brexncornis*, *Mmararia* species, *Nauplius cyclopes*, *Cyclopes brachycercus*, *Brachionus falcatus*, *Brachionus calyciflorus*, *Brachionus diversicornis*, *Brachionus falcatus*, *Bryocantus haemalis*, *Alana karua*, *Chlamydotheca speciosa*, *Keratella tropica*. (Photo:4). Giant snail, Fly, *Chironomus* Larva, Giant *Melipedes*, Grazing Cow. (Photo:3) such type of animals can found in Lonar Crater.

## CONCLUSION

Lonar Crater Lake is a now a day's known as wetland due to its fluctuation and behavior like wetland appearance. This Crater –lake is of important and rich biodiversity hotspot. It is extremely important for waterfowls, ducks, cranes, and many other migratory birds and microscopic organisms. The hydrological study shows changes tending towards vaporization and Eutrophication reducing of flora fauna during 2020 and water parameters (Gaikwad, *et.al.*, 2013). It is necessary to compile the available data together, so that the remedy for the conservation of the Crater will be possible only through comprehensive conservative controlling measures which will be conceived research work and recommendations. This work supports typical microbial flora and fauna need to be investigated more and agree with earlier workers contribution. Aquatic Fauna in Lonar Lake did not show occurrence of fish species in its water body due to

low dissolved oxygen and high salinity but due to occurrence of micro-fauna is also shows there fishes may survive in it.

### **RECOMONDATIONS:**

Well equipped Research Laboratory sanction. For more comprehensive and quality work on Lonar Crater Lake because Our Department is nearer to Lonar Crater Lake just by walking distance.

### **AKNOWLEDGEMENTS**

We are thankful to Principal Dr. P.K.Banmeru Late Ku. Durga K. Banmeru Science College Lonar, (MS) for encouraging research and providing facilities. This research paper is an outcome of major expectations and thrust towards world famous Lonar Crater Lake and life form in it.

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