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LONAR SALINE LAKE, INDIA- A CASE STUDY

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Abstract:
Lonar Crater (19o58'N and 76o31'E) is the third largest natural salt-water lake in the world. The lake lies in a circular depression surrounded by deep escarpment rise above the plateau due to ejecta blanket. The only inlet without any outlet result in its unusual and climatic isolation is the special feature of lake. The fascinating flora surrounds lake basin in the bottom is an ecological wonder of Lonar (Dabhade et al., 1999) . This wet land is well known for its biodiversity. The lake brine supports typical microbial flora and fauna need to be investigated to access its value of wet-land to be recognized as Ramsar Site of India. Lake brine have high alkalinity and salinity so exhibits different type of flora and fauna. Phytoplankton contain different type of blue green algae, green algae, Diatoms, Chlorophyceae and Bacillariophyceae species. During study period 2013-2015 observations revels few forms of Rotifers while Cladocera, Copepoda and Ostracoda were found rarely.
Keywords: *Lonar Crater, Saline Lake, Wet-land*

Introduction:

Lonar Lake is a pride of place in Vidarbha region of Maharashtra. It has great significance for planners, scientists, international organizations like 'The Wetlands International' and 'Asian Wetland Bureau' and Ramsar treaty so that it may get recognition as one of the Ramsar site (Wetland of International importance) of India. The lake brine supports typical microbial flora and fauna need to be investigated to access its value of wet-land may be recognized as **Ramsar Site of India** (**Tandale et., al. 2014**).

Origin: A severe meteor collision left a massive crater which is 170 meter deep and 1800 meter in diameter. Lonar crater has an almost perfectly circular shape (circularity index exceeding 0.9) with five clearly distinguishable zones, viz.- i) The Ejecta Blanket, ii) The Rim of the crater iii) The slopes from rim to the lake basin iv) The lake basin at the bottom of crater. v) The crater lake.

Ejecta Blanket: A continuous Ejecta Blanket has very gentle slopes away from the crater which eventually merges into the surrounding country side.

The Rim : Rim of the crater is 30 M high with a diameter of about 1830 m at the rim crest.

Slopes of the Crater : The slopes of the crater are quite steep and descend to an average depth of 450 feet as measured from the crest of the rim. **Crater Basin or Floor:** The flat floor comprises mainly of three areas - i) smooth inclined plains with gentle slopes between and lake shores; ii) The alluvial fan forming the shoreline of the basin; and iii) the lake water. The alluvium is covered with forests in some parts, while some parts are barren. There is a 21.26 hectare patch of cultivated land at the base of the ravine which is fed by the perennial spring Dhara. The basin is intervened by a number of seasonal streams running down the rim slopes, ultimately joining the lake. The shoreline of the lake is subject to a considerable seasonal variation.

Crater lake: The lake basin is extremely important from ecological point of view in the form of its uniqueness regarding its striking feature of salinity and high alkalinity and its pH ranges 10 to 10.5. The alkaline water of the Lake exhibits few salt tollerent flora and microbial fauna.

Morphometry :

The lake lies in a circular depression surrounded by all sides by a steeply rising escarpment to an even height of about 130 M. above the lake level. In this direction the plateau slopes down through steeper slopes towards the valley of a river Katepurna. Towards the south and South-West the hilly rim descend down about by 30 M. to a series of low mounds that run as arcuate ridges parallel to the outer contours of the circular hollow that contains the lake. Towards the North-West also, the outer ridge of low hills is recognizable but less defined than the southern one. Towards the north east the scarp slope has been breached to a great extent by a deep gully. Easy accessibility to the lake side is mainly along the course of this gully. The village Lonar is located at the head of this gully on the outward slope of the plateau.

Economic geological importance :

The lake was a source of salt in this part of Deccan. It contains the essential material for the manufacture of glass and soap. In ancient times, there was a local demand for the alkaline lake products as well as for the salt.

Sources of Water: 1. Dhara: the bigger one spouts at the top of the Ghat and is called the main Dhara (literally 'the stream'). The yield of

this spring is quite substantial in monsoon and winter months (nearly 45 cm thick jet of sweet water).2. Sita Nanini: The second stream originates about 200 feet lower down from the top of the Ghat and is called as Sita-Nahani. The water of this stream is also potable. However, its water is reported to be saline during summer months. 3. Ramgaya Stream: Originate at the bottom of the escarpment at the depth of 130M near Ramgaya Temple.

MACROINVERTEBRATE AND PLANKTON OF LONAR CRATER LAKE:

Diatoms, Blue green algae and bacteria are the most striking features of this saline lake. Lonar lake exhibits abundant scum of *Spirulina* Algae. Such luxuriant growth of Spirulina seldom found in any other water body.

The rotifers comprise an integral link in the aquatic food chain. The Cladocera are found in all sorts of fresh water area of lake along with copepods the Calanoida, the Cyclopoida, and the Herpactipoida and The Ostracoda species occur in the lake ephemeral ponds with low salinity.

Phytoplanktons:

Other than *Spirulina*, *Chlorophyceae* (Green algae): *Dunalliela salina Toed, Chlamydomonas sp.,Oedogonium sp., Mycanthococcus sp, Oocystis sp., Rhizoclonium sp., Cyanophyceae (*Blue green algae*):Anabaena fertilissima, Anabaena laxa, Anabaenopsis arnoldii,Anabaenopsis circularis, Oscillatoria species, Bacillariophyceae (Diatoms):Like Navicula, Navicula sp., Nitzschia, Nitzschia sp., Stauroneis, Stephanodiscus, Surirella, Synedra, Synedra sp., Euglena sp.found frequently*.

Thus, the blue green algae constitute the major among phytoplankton community and particularly Spirulina is the dominant..

The zooplankton community is dominated by Rotifera, while Cladocera and Copepoda were not observed in the lake except the ephemeral ponds and ditches in the periphery of the lake basin. From the groups of zooplankton organisms in lake, a total of 28 taxons viz., Copepode 3 genera, Cladocera 5 genera and Rotifera 20 species) were determined. *Anuaeropsis fissa, Brachionus plicatilis, B. caudatus, B. pala, Keratella quadreta, Hexarthra fenica, Polyarthra vulgaris, Lecane lamellate, L. luna, L. lunaris, Cephalodella catellina, C. gibba, Colurella adriatica, Philodina, Colotheca sp., Asplachna sp., Notholca acuminate, Notholca squamla, Testudinella patella, Euclanisdialatata*

In present study, species belonging to (*Cephalodella catellina, C. gibba, Colerella adriatica, Lecane lamellata, Keratella guadrata, Synchaeta oblonga, Polyarthra vulgaris*), in the ephimeral ponds (Salinity 2 ppt.) around the lake basin different zooplankton communities were observed among which Cladocera (*Diaphanosoma brachyurum, D. magna, D. longiceps, Allona sp.*) Copepoda (Cyplope sp. and Harpacticoid Copepod Canthocmpus sp.) have been reported first time and are new records for this lake.

Macroinvertebrates

The littoral zone of the lake were mostly eutrophic where high allochthonous inputs caused predominantly eutrophic conditions. Benthos reported includes *Oligochaetes, Chironomus* species. These fairly large varieties of organisms living on the sediments of the lake silt, feeding on algae, bacteria and particulate detritus (Organic matter). Among the organisms occurring at this level are *Eristalis ,Liriope, Cranefly larvae, Dragonfly larvae, May-fly larvae, Chironomids ,and mosquito larvae, Nematode worms*, were observed.

Avian diversity in an around Lonar Crater and Sanctuary:

Avian diversity is a vital indicator of vitality of any ecosystem, Lonar lake comprises 108 species of birds, among which 61 are resident, 21 are partial migrants and 26 are migratory birds are reported.

The Birds of Lonar includes almost migratory, partial migrants and local resident birds of Maharashtra State. The avian fauna is rich in water fowls especially the moor hens. Various species of aquatic birds including Ducks, geese, have been recorded from the lake and its surroundings. The specially remarkable European shelduck *Tadorna ferruginea* (Ruddy shelduck) or Brahmani ducks (Marathi- Sarza or Chakrawak) were the regular visitors for several decades in thousands of population have been observed in winter (particularly during December-January, 2000). Ruddy shelducks are European migrants.

The lake has given shelter to many migratory birds and residents throughout the year. Those who stay in the wetland and around it are enlisted excluding common terrestrial avian fauna.

Conclusion:

Lonar lake with same level of salinity, species richness is far lower than that of other types of saline lakes **(Dabhade et.al., 2005).** The salt tolerances of aquatic plants and fish are lower than those of algae and invertebrates and in course of alkalization, there species

numbers are seen to decrease fast. The same conditions have made it extremely fragile and vulnerable to anthropogenic stress **(Malu et. al., 2008).** Unfortunately, biodiversity has faced serious threat due to over exploitation and habitat destruction and now it has became a major challange to us. There is a great need of conservation of Lonar crater biodiversity due to its unusual concept of origin, and uniqueness of the wonderland which harbours oasis in its womb, amidst the vast and monotonous terrain of Marathwada and Viderbha. The interest in conservation of biodiversity is not sentimental one but the rediscovery of the truth well known to our sages.

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