

TROPHIC STATUS

OF

MANSAR LAKE

A

(TECHNICAL REPORT)

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1. Introduction:

The State of Jammu and Kashmir has a rich natural heritage of lakes and wetlands. Although wetlands and lakes constitute an important land use, yet these continue to be the most neglected areas. Due to continued biotic and a-biotic interference most of these are dying at an alarming rate. The vast network of these lakes and wetlands provide home or at least a fly away refuge to thousands of migratory birds. The increasing pressure as a result of biotic and a-biotic interference within and around these lakes and wetlands have considerably changed the land use patterns of these complex ecological systems.

The beautiful lakes of Jammu and Kashmir which are of tourist importance are endangered as a result of rapid urbanization, siltation, pollution, unplanned de-weeding etc. Most of these lakes are biologically sick and their aerial extent is shrinking at the alarming rate.

2. Study Area:

Mansar lake is a semi oval shaped water body with no distinct regular inlet or outlet. The lake is situated towards east of Jammu in Udhampur district and lies between the geographical coordinates- $32^{\circ} 45' N$ $75^{\circ} 23' E$. The lake has an area of 379.4 hac., with an average depth of 37.8 mtrs. in the centre. The lake has a fault basin and is of the non drainage type, fed primarily by surface runoff and partly by mineralized water through paddy fields which create an inlet to the lake during the rainy season.

3. **Catchment:**

The lake's catchment area has elevated forests with fairly rich vegetation. A considerable area of the catchment is agricultural land.

There is not much habitation in the catchment but the 200 families living there, are putting lake water to a great strain by adding kitchen refuse, animal excreta and detergents. The cultivation of the steep lands with the fertilization of these lands add large amounts of organic matter. On the western side of the lake body are Paddy fields. A mini zoo has been established on the western bank of the lake and a number of huts are also present. There is a temple on the lake bank.

4. **Regulation of Water:**

The lake derives its water mainly from precipitation supplemented by many subterranean springs within the basin of the lake. Excessive water is used for irrigation.

5. **Climatic Conditions:**

The region has a sub-tropical monsoonic climate with distinct Summer and Winter months. The monsoon rains extend from July to September and the weathers are usually dry with occasional rains in January., the summers are hot.

6. **Land Texture:**

Forest and Wastelands are owned by the State Government and other areas are privately owned. Part of the land is owned by the Dharmath trust, which looks after the Shrines on the lake embankment. The Wildlife Department of Jammu and Kashmir has made a small Zoo on the Western bank of the lake. Many tourist huts and complexes have spring upon the bank of the lake during the past decade.

The Jammu and Kashmir Tourism Department has also constructed a shopping complex near the lake and an annual mela is organized on the bank of the lake. Which is spoiling its pristine waters with all types of solid waste, sewage and Plastic bags. The tourism department has also deployed Paddle boats in the lake which disturb the ecology and breeding habitats of aquatic fauna.

7. Socio Economic Values:

Aquatic vegetation is used as fodder for livestock and the lake water is used for irrigation. The lake has religious significance besides being used for tourism and recreation.

8. Water Quality:

The water quality of the lake is heading towards the eutrophication. It has the excessive weed growth (*Typha angustata* *Cyperus* Sps., *Polygonum barbatum* and *Phragmites karka*). The high nutrient levels (particularly NO_3 and PO_4) are observed. The pH of the lake varies between 6.4 and 7.6 units/lit. The thermal stratification is clearly discernible in the lake between 5 to 15 mtrs. depth. The waters are turbid. The Oxygen level is very low. The Phytoplankton population was dominated by *Chlorophyceae* followed by *Bacillariophyceae*. A total no. of 86 algal genera were reported.

The common and dominant Phytoplankton species in the lake are *Cosnarium sp.*, *Staurastrum sp.*, *Scenedesmus sp.*, *Anistrodesmus sp.*, *Merismopedia sp.*, *Ceratium sp.*, *Peridinium sp.*, *Tetradon sp.*, *Euastrum sp.*, *Fragillaria sp.*, *Synedra sp.*, *Nitzschia sp* and *Cymbella sp.*.

9. Macrophytic Vegetation:

The lake body supports a rich growth of macrophytes both emergent as well as floating. The common forms of emergent macrophytes were. *Typha*

12. Disturbance and Threats:

Degraded vegetation and expanded recreational facilities in the surroundings areas is causing soil erosion. Animal excreta from the Zoo finds its way into the lake water increasing the organic load of waters. Untreated domestic wastes are dumped into the lake. The use of Pesticides and Fertilizers used in agricultural fields near the lake find its way into the lake waters. Although a walk way boards the lake periphery, yet the people wash their clothes and utensils in it.

13. Trophic Status:

The most beautiful lake of the Jammu region, which is of religious significance and is a source of tourist attraction is heading towards the higher trophic levels. The presence of abnoxious weed growth, algal blooms, high turbidity values and high nutrient levels are the signs of eutrophication of the lake. The establishment of zoo on the western bank of the lake, construction of tourist huts, shopping complex and the **mela** organised annually on the lake bank is spoiling its pristine waters with all types of solid waste, sewage and plastic bags. The deployment of paddle boats in the lake has disturbed the ecology and breeding habitat of aquatic fauna. This condition of the lake has affected the socio-economic as well as the aesthetic value of the lake.

14. Lake Restoration:

Although the problems of the lake and its significance have been recognized yet no conservation measures have been taken so far for the restoration of the lake. Some of the recommendations are:

a. Reduction of Nutrients entering the lake from its catchment area:

By catchment improvement including controlling erosion and grazing and to stop further constructions in the area.

b. Harvesting of Weeds:

The abnoxious weed growth especially ipomia sp., should be removed manually keeping in view that wildlife habitat is not disturbed.

c. Sewage Treatment:

The raw sewage entering the lake should be treated before disposal. An integrated sewage disposal system should be constructed to check the inflow of agricultural and domestic wastes. Low cost latrines should be constructed for the population and the tourists.

d. Upgrading the fish potential:

The fisheries potential in the lake should be enhanced.

e. Enforcement of Legislation:

Suitable legislation to stop the establishment of human settlement on the lake shore should be enforced.

f. Proper disposal of animal excreta:

The animal excreta from the mini zoo should be disposed properly and not in the lake body.

g. Water quality Monitoring:

Regular monitoring of water quality is necessary to keep the lake in healthy condition. The rate of eutrophication and trophic status must be regularly studied.

h. Environment Awareness:

A mass campaign for general awareness has to be launched to educate the people about the benefits of the lake, health problems caused by its pollution, ecological balance of the lake and the sanitation of the area.