



Conservation of Ecology of Lakes and its Challenges

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Abstract:

A lake is the most beautiful and expressive feature of a landscape. It is often described as the "Eye of the Earth ". Urban lakes form vital ecosystems supporting livelihood with social, economic and aesthetic benefits that are essential for quality life.

The nutrientpoor, oligotrophic lake is oxygen saturated and has a low microbial population; whereas nutrient-rich, eutrophic lake has a bottom sediment layer and can have an anoxic hypolimnion. As microbial biomass increases with nutrient level, light penetration gets depleted. Thus the lower parts may receive poisonous gas like H₂S released by anaerobes.

Keywords: *Lake, Water, Ecology*

Introduction:

Lakes (natural / manmade) better called water bodies are reservoirs of water; serve as source of drinking water. Urban lakes play a pivotal role in maintenance of the homeostasis in the system. Most of the lakes, especially near urban or residential areas, are found to be polluted at different levels because of anthropogenic activities.

Some examples of such lakes from India are: Bada Talab near Bhopal city, Hussain Sagar Lake in the heart of Hyderabad city, Dal Lake in Srinagar, all affected by organic pollution. The

traditional uses of the lake have been disturbed due to deterioration of lake water. Today they are subjected to a great amount of ecological stress and strain in terms of pollution and ecocrisis.

The urban lakes are important in maintaining the surface and ground water balance, in maintaining urban ecosystem apart from its uses for different purposes namely recreational, water supply, fishing etc. The paper is on the changes at the interface of social and ecological system dynamics, more specifically between urban lake systems and the urbanization processes.

The sewage and agricultural waste may increase the percentage of Nitrogen and Phosphorous into the lake waters. This in turn can cause bloom of algae, bacteria and plants in the epilimnion zone. Cyanobacteria in oligotrophic fresh water can cause algal bloom. It has been noted that if both Nitrogen and Phosphorus are present, Cyanobacteria competes with algae. Toxic blooms, as well as bacterial contamination and heavy metal pollution, may significantly impair all the water uses and represent a health risk of the urban population.

Thus, in the last years, a growing public awareness has developed regarding the quality of urban lakes and special management plans in several urban areas have been augmented worldwide to restore the hygiene, maintain the recreational value and to avoid sanitary problems arising from the deterioration of their water quality.

The Lake Ecology

The Lake Ecology section is intended to provide a general background to Lake Access by introducing the basic concepts necessary to understand how lake ecosystems function. It is divided into three general sections shown above, which describe the fundamental physical, chemical, and biological characteristics of lakes. While there is a logical sequence to the chapters shown in the index, each chapter stands alone.

According to Krebs's (2011) definition, "Ecology is the scientific study of the interactions that determine the distribution and abundance of organisms . [03] Fecal contamination and toxic Cyanobacteria blooms may deteriorate the ecological value of these environments and transform them in a potential risk for human health, which may require costly management and restoration plans.

Most of our rivers are highly polluted as well as our lakes, ponds and other water bodies. Objective- Polluted water is a serious health hazard and it is desirable to clean up rivers, lakes and all water bodies from the water borne organic wastes generated from the pollutants and sewage so that waste is converted to wealth by producing more fish and thus increasing the per capita income of fishermen.

Challenges:

Throughout the world, lakes, both natural and manmade have suffered degradation because of urban, industrial, agricultural and other impacts. During the past 50 years or so, extensive research effort has gone into the approaches to control and reverse degradation of lakes worldwide. Many methods have been used and technologies developed for lake restoration. Restoration of lakes for improvement in H₂O quality requires interventions that address both the factors responsible for an increase in nutrient load and the accumulated nutrients.

Control of the nutrient inputs from the catchment into the lakes

Nutrients enter the lakes from point sources with the discharge of the sewage or storm water chains. Nutrients inputs from nonpoint sources can be reduced by, a) Afforestation or development of suitable plant covers in the catchments especially those prone to erosion. b) Development of vegetation buffer belts around the water bodies. c) Adopting agricultural practices that reduce the use of fertilizers and pesticides and/or their loss from the fields.

Besides various physical and chemical methods, several biological methods have also been tried for controlling/reversing eutrophication with variable changes of success in different countries. The use of vegetation and constructed wetlands for removing nutrients and various pollutants from the waste waters has already been mentioned earlier. The fish can help decrease the plankton by directly feeding on zooplankton that feed on phytoplankton. Biomanipulation is more effective if nutrient loads are reduced.

High organic matter content leads to oxygen depletion and production of toxic substances (H₂S, Ammonia) with consequent foul smell and fish kills. Aeration of the water column with the help

of a variety of aerators and diffusers using small amounts of oxygen as well, are generally used to reduce the organic content of the water column. In recent years, a combination of various micro-organisms has been developed for targeting the organic matter through a process referred to as bioremediation. It is also facilitated by the use of aeration in conjunction with the microbial formulations.

Significance of the study

Water, the elixir of life, is the most precious resource on the planet earth. Life originated and evolved in water before it appeared on the land. The unit of life whether on land or water is the living cell, the major bulk of which is water itself. Ultimately it is the delicate balance of chemicals within the cellular water that determines the quality of life and forms a fragile barrier between life and death itself. No wonder, water as an element and water bodies in general have been revered as holy by traditional human societies all over the world.

Recent times, sadly enough, have witnessed a drastic change in our attitude towards water and water-bodies, the reverence towards which is more becoming a matter of ritualism. Water is being used with gay abandon and water-bodies are being destroyed for alternative uses or have turned out to be receptacles of filth and pollutants including of life threatening chemicals and deadly pesticides. These pollutants through the process of bio-magnification have turned out to be major threats to the very fabric of life on the planet.

Conclusion

The study recommends that all the lakes be assessed for their chemical and physical properties. Moreover all the lakes should be conserved and protected from further degradation. It is also necessary to implement the laws that exist to protect the lakes. The municipal authorities will need to work towards cleaning up of the existing lakes and encourage the adjacent dwellers to use and manage the ecosystems sustainably.

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