Ecohydrological Studies for the conservation of a Major drinking water Reservoir in Hyderabad City - an Indian Case Study

SS.VUTUKURU[1] and Y.ANJANEYULU[1]

[1]*Centre for Environment Institute of Science and Technology Jawaharlal Nehru Technological University*

Freshwater, an essential element for all forms of life is a critical resource for any developing nation. Many developmental projects, industrial / urbanization programs in vogue or lopsided policies are likely to have both qualitative and quantitative effects directly effecting the native faunal or floral species in any aquatic ecosystems**.** Even though a water body is pristine, minimum environmental flows are necessary to maintain the native biodiversity of an ecosystem. The minimum flows, however, are dependent on the inflows a water body receives from its catchment. Insufficient rainfall coupled with unauthorized and illegal impediments / impoundments that interfere with the natural hydrology further complicate the problem. **Osman Sagar Lake** is a major source of drinking water supply to the twin cities of Hyderabad and Secunderabad since many decades. One of the major issues related to this lake in particular, is that it got dried up for the first time since 80 years and later filled up with the onset of monsoons. The crux of the problem lies in the fact that the dried lakebed is presently used for agricultural activities that pose a serious threat to this precious ecosystem. Consequently, it is of extreme importance and interest to investigate the ecological changes that have occurred in this major lake that supply drinking water to the twin cities.

Ecohydrological studies include physico-chemical, heavy metal and biological characteristics of a habitat. In practice, phytoplankton, zooplankton, fishes and macrophytes are employed as bioindicators of aquatic pollution. Organisms continually respond to the ambient water quality, integrating its varying state of pollution so that the community observed is the one able to tolerate the most recent (weeks/months) episodes of water quality change. Any attempt to monitor by physical and chemical analysis alone would be excessively difficult or expensive. Conservation of existing major drinking water reservoirs is of utmost concern, which can only be achieved by continuous, accurate and reliable data assemblages generated on sound scientific basis.

The results indicate that the lake is still fresh with first signs of organic contamination at some points (Samples 7 to 10). However, though within the acceptable range, the COD and BOD of Samples 7 – 10 showed slightly higher values (13.6 – 26.3 mg/l), which can be attributed to the agricultural activity taken up in the dried lakebed suggesting first signs of pollution. Fluorides are just below the recommended levels (WHO) (0.03 – 0.321) mg/l), which need to be taken care before pumping these waters for domestic consumption. Biological studies show that the biodiversity of the lake is decreased with respect to earlier studies. *Euglena, Chlamydomonas,Phacus* species were observed in S7 to S10 suggesting organic contamination. Palmer's algal index (< 19) suggests probable evidence of organic contamination. Microbiological analysis revealed no fecal contamination and the bacterial density is also within the permissible limits except in S 7 to S 10. There is an urgent need to conserve this precious drinking water resource and prevent the agricultural activities within the lake, which might lead to future environmental problems.