

MANAGEMENT OF HOUSEBOAT SANITATION IN DAL LAKE KASHMIR INDIA

Er. Qazi Tanveer¹, Er. Kshipra Kapoor², Dr. MRD Kundangar³

¹M.Tech Scholar, ²Assistant Prof. & Head,

^{1,2}Department of Civil Engineering, Universal Institutions of Engineering and Technology, Lalru,
Chandigarh-140501

³Professor Department of Water Management civil Engg. Deptt. SSM College of Engineering
Parihaspora Kashmir- 191111

Abstract: *The presence of Houseboats in world famous Dal lake is one of the unique features which attracts thousands of tourists all over the world and has made this lake one of the attractive Tourist Destinations. However tremendous load of tourist inflow & craze for living in the houseboats besides signs of deterioration in water quality of the lake & increasing bacterial population; serious weed infestation in & around the houseboat areas, over a period of time, has not only posed a threat to the lake only but to the tourists also as all the waste waters including grey waters from these house boats are directly discharged into the lake body including the garbage generated by the dwellers. The present paper deals with the assessment of impact of effluents on the Ecology and health of the lake including to evolve a satisfactory technology for the House boat sanitation in the interest of Tourist Industry of Kashmir Valley.*

Key words: (Houseboats in Dal lake Kashmir, Sanitation problems, impact on Tourism)

I. INTRODUCTION

According to the world Health Organisation the Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal. Sanitation includes all four of these engineering infrastructure items (even though often only the first one is strongly associated with the term "sanitation"): Excreta management systems, wastewater management systems, solid waste management systems, drainage systems for rainwater are too included in Sanitation.

The presence of a Houseboat in World famous Dal Lake Kashmir is unique and many of the visitors avail themselves of this unique opportunity of staying on house boat in Dal Lake. There are other locations with houseboats, principally Nigeen Lake, the Jehlum river and the Chinar Bagh, but the main area with over three hundred good quality house boats is Dal Lake and Nigeen Lake. These boats are located in area adjacent to boulevard road from Dalgate to Nehru Park.

The use of boats for tourism purposes initiated when India was under British rule. The tourism department grades the houseboats for control purposes from deluxe, A to D grades. Deluxe, A and B grade boats are considered to be good quality.

The modern better quality houseboats usually consist of two to five bedrooms (each with separate bathroom including W.C. toilet), a dining room, small kitchen-cum-server, and a lounge.

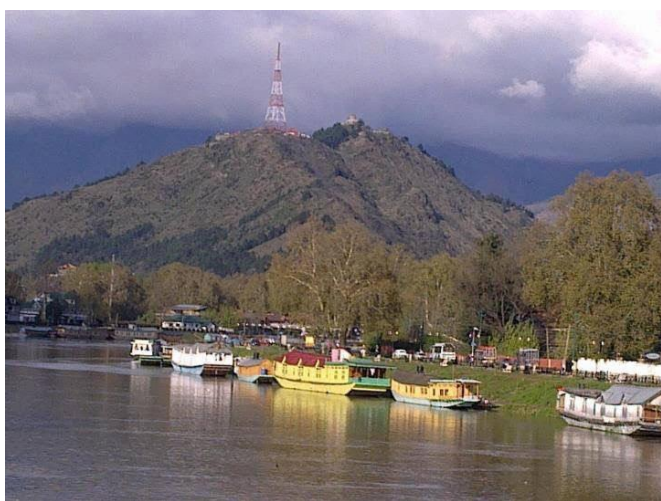
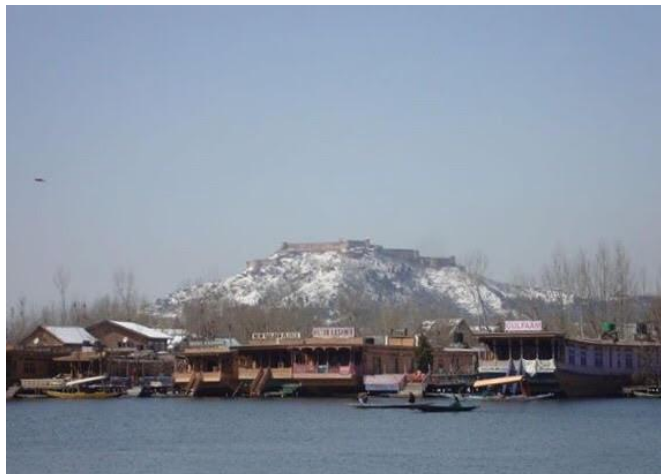
All the houseboats have a small 'balcony' at their front and many are moored adjacent to a small wooden decking over the lake and/or a small garden comprising of reclaimed land between the boats (Deluxe and A grade).

Since Houseboats are luxury mobile hotels on the serene waters most of the times they remain with full occupancy particularly during the Tourist season when most of the tropical places in India are under scorching heat. Eventually the generation of Solid wastes, Garbage and the disposal of the waste waters including the grey waters are posing a threat to the lake and its dwellers.

Sanitary conditions of these Houseboats being poor because of their discharge of all effluents including the Sewage and Toilet waste directly into the lake, which has seriously effected the water quality of the lake besides weed infestation and loss of biodiversity.

The progressive deterioration in the water quality around the Houseboat areas, a high bacterial population growth besides serious weed infestations can result in high risk of infection especially among the foreign Visitors. Since there is no protection against the spread of Cholera, Typhoid, Hepatitis which all are water borne diseases. The effect on the Tourism Industry would be catastrophic and tourism would suffer long term damage.

The tremendous load of tourist inflow & craze for living in the houseboats besides signs of deterioration in water quality of the lake & increasing bacterial population; serious weed infestation in & around the houseboat areas, over a period of time, the present studies aims to assess the impact of houseboat sanitation on the ecology of the lake ecosystem besides devising an effective Mechanism of Wastewater treatment technology and management to solve the problem of Houseboat Sanitation.



II. LITERATURE REVIEW

LWDA, (Lakes and Waterways Development Authority) in their series of Technical Reports from 1998, 1999 and 2000 revealed the progressive changes in Physico-chemical characteristics of the Dal Lake waters besides changes in Biodiversity, effluent characteristics including Quantification of waste waters entering the Lake body from point and non point sources of pollution.

Sameera et al in 2003 studied the impact of floating gardens in the water Quality and Cladocera population in Nigeen lake basin of Dal Lake. The authors reported more enrichment of waters near Floating gardens as indicated by high levels of Chloride, Phosphorus, Nitrogen and Electric Conductivity.

Kundangar and Adnan (2004) while reviewing the ecological work carried over during last three decades on Dal Lake and comparing the same with present one recorded progressive increase in water Quality parameters. The authors observed drastic changes in the lake hydrology, nutrient load and biodiversity.

Adnan and Kundangar (2005) while studying the Bacterial Dynamics of Dal Lake correlating the Bacterial population density with physico-chemical parameters recorded high population density of Fecal coliforms and Total Coliforms around Houseboat areas of both Dal Lake Nigeen Lake.

Kundangar and Adnan (2006) in their research study entitled, "Comparative limnology of Himalayan Dal Lake Kashmir" compared the morphometry, Hydrochemistry, ionic balance, Plankton flora and macrophytic vegetation of various basins of Dal Lake and the authors drew the comparison besides evaluating the trophic status of each basin.

Adnan and Kundangar (2009) in a research paper entitled, "Three Decades of Dal Lake Pollution-restoration" recorded the changes in hydro-chemistry and biodiversity of Dal Lake during the last three decades besides giving the current ecological status of the Lake. The authors revealed that FAB based Sewage Treatment for effluents entering the lake at Hazratbal Habak are a total failure particularly during winter months.

J& K State Pollution Board (PCB)(2009) in a status report on Dal Lake described the ecological situation of Dal and Nigeen visibly bad with intense overgrowth of weeds and algal patches. The water Quality at many places recorded septic in nature with high content of P, N and suggested tertiary treatment measures.

Murtaza, (2010) while studying the impact of pollutants on Physico-chemical parameters of the Dal Lake reported increase in Specific Conductivity, total alkalinity and Nitrate-nitrogen besides decrease in dissolved oxygen, silicates and Phosphorous.

Shariqa (2011) while studying the water quality changes in Nigeen basin of Dal Lake reported marked changes in morphometry of the lake basin besides chemical enrichment over a period of time.

Basharat et al. (2012) while studying the impact of Mechanical Dewatering on Macrozoobenthic community in Dal Lake reported loss of benthic fauna as a result of Mechanical Dewatering and abundance of most of the benthic taxa prior to dewatering.

Shabina Masoodi et al. (2014) While assessing the causes of pollution of Dal lake and remedial measures reported the House boat areas in the lake are the most polluted ones and there is a high risk of infection especially for foreign tourists. The effect on the Tourism would be catastrophic if the Houseboat pollution is not addressed at priority.





III. CONCLUSION

From the above review of literature it is vivid that Dal lake Kashmir being one of the attractive tourist destination is under great stress in terms of ingress of raw sewage from the immediate catchment, Hotels around and within the lake besides the Houseboat pollution. Despite the fact the sewerage Treatment plants have been set up but the Technology adopted is not giving the satisfactory results and thus need tertiary Treatment. The House boat sanitation has remained an unaccomplished job which has not only effected the ecology and health of the lake but has posed a serious threat to the Tourism industry.

REFERENCES

- [1] LWDA, (1998, 1999, 2000) Technical reports on Dal lake Kashmir.
- [2] Kundangar, MRD & Adnan Abubakr, (2003). Thirty years of Ecological research on Dal Lake Kashmir. Jr. of Research & Development vol.4 University of Kashmir.
- [3] Sameera Siraj. AR Yousf and Muni Parveen (2003). Impact of Floating gardens on the water Quality and Cladocera population in Dal lake. Jr. Res. & Dev. Vol. 14, University of Kashmir.
- [4] Adnan Abubakr and M.R.D. Kundangar (2005). Bacterial dynamics of Dal Lake, a Himalayan temperate lake. Nat. Env. Poll. Tech. Vol. 14 pp. 291-298.
- [5] Kundangar. MRD and Adnan Abubakr, (2006). Comparative Limnology of Himalayan Dal lake Kashmir in A. Wanganeo, Langer, RK. Ed. Trends of Biodiversity and Aqua Culture, Dya Publication, New Delhi.
- [6] PCB, (2009). Monitoring of Dal lake-Nigeen Lake and other water bodies of Kashmir. A Status Report for May-July, 2009, J& K Pollution Control Board.
- [7] Adnan Abubakr and MRD Kundangar (2009). Three decades of Dal Lake Pollution-Restoration. Eco. Env and Cons. 15 (4) pp.825-833.
- [8] Murtaza et al. (2010). Physico-Chemical characteristics of Dal Lake water, temperate conditions of Kashmir. Forestry Nepal. org.
- [9] Shariqa Maryam, (2011). water Quality changes in Nigeen Lake Kashmir. M.Sc. dissertation , University of Kashmir (unpublished).
- [10] Shabina Masoodi, Sanjay Kumar and MRD Kundangar (2014). Assessment of causes of pollution and remedial measures in Dal Lake Kashmir.
- [11] National Conference Sustainable infrastructure Development(NCSIDS) 13-14 March, 2014 ed. Sanjay Kumar et al. Civil Engineering Deptt. Chitkara University, HP India.