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Water Quality Studies of Lake Nainital and Surroundings

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ABSTRACT

The water quality aspects of Lake Nainital were investigated during the period 1994-1996. The investigations were conducted as part of the project "Hydrological studies of Lake Nainital, Uttar Pradesh" sponsored by Department of Environment, Government of Uttar Pradesh. Although quite a few water quality investigations have already been conducted by other researchers, they were more focused on the biological aspects and did not include hydrological aspects. Further, not all of the earlier studies on Nainital included the quality aspects of the surrounding groundwater. The later information is very much essential to establish the background values that can be ascribed to the geology of the region. Only after establishing the background values, the pollution levels can be assessed.

During the investigations, the major ions namely calcium, magnesium, sodium. Potassium, bicarbonate, sulfate and chloride were analysed in addition to the in-situ phyico-chemical parameters such as temperature, pH and electrical conductivity. To assess the pollution levels during different seasons. the dissolved oxygen content of the lake water was monitored regularly at different depths and at different locations of the lake. Trace elements such as iron, manganese, lead, boron, zinc and copper were also analysed.

The results indicate that the lake water is hard in nature, and the hardness exceeds the desirable limit prescribed in the IS:10500 standards of BIS. However, all the springs and groundwater drawn through wells located within the lake basin are also hard and therefore the hardness is due to the local geology that is characterised mainly by calcareous rocks, such as calcareous slates, limestones and dolomites. Lead content in lake as well as surrounding springs also exceed the IS: 10500 standards. The source of the lead could also be ascribed to the local geology. This report presents complete details of the investigations carried out, the sampling strategy adopted and the analytical procedures followed including the accuracy of measurements/analyses. The

report also discusses the possible sources of different ions in aquatic environment, the temporal variation in the concentrations of different ions in the lake water, surrounding springs as well as inflow nalahs. The eutrophication level of the lake has reached an advanced stage and the lake has been classified as hypereutrophic. The Nainital is the most eutrophic among all the lakes of the Kumaun region. The limiting factor in the eutrophication of the Lake Nainital is phosphorous. The external load of soluble reactive phosphorous can be reduced substantially if the inflow through the nalahs are diverted during non-monsoon season. In this report possible methods that can be adopted for amelioration of Lake Water quality have also been suggested.

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