SUMMARY AND CONCLUSIONS

The lake Chhatri, Amravati (Maharashtra) was selected for the present study.

Monthly water samples were collected to study the physico-chemical and biological parameters from June 1997 to July 1998.

The water temperature ranged between 15.2 °C to 31.8 °C. Temperature exhibited significant negative correlation with DO and free CO₂ and significant positive correlation with silicates and phosphate content of the lake water.

TDS fluctuated between 450 mg/l in the months of December -97 and 100 mg/l during August -97. TDS showed moderately
significant positive correlation with nitrate contents.

Turbidity exhibited two peaks in a year one in the month of May -98 and other in August -97. Conductivity ranged between 127.67 μ mhos/l and 236.16 μ mhos/l. It showed positive correlation with silicates and sulphates.

The pH of water ranged between 8.2 and 9.2 i.e. it was alkaline throughout the year.

Maxima in DO was seen during the winter months and it exhibited moderately significant correlation with temperature.

Free CO₂ was found mainly during April, May and June only, which may be due to depletion of DO and its presence can also be due to anaerobic digestion of dead aquatic plants during the periods.

The water of lake Chhatri was alkaline and very land throughout the year.

The magnesium hardness was more. The high quantities of magnesium could interfere in the fish metabolism and hence it is suggested that the lake is not suitable for intensive fish culture.

Chloride, ranged between 21.65 mg/l to 77.11 mg/l with maximum chlorides during rainy season. It’s presence above 50 mg/l indicate pollution due to organic wastes of animals and also industries.
The quantities of phosphate varied throughout the period of studies which might be due to the death and decomposition of algal and other aquatic vegetation present in the lake. The phytoplankton increased in number and the changes that occurred in its composition over the course of study, indicated that eutrophication of lake is preceding very rapidly.

A sudden increase in sulphate was observed from January reaching to maximum in April. The higher values of sulphate during summer can be attributed to the evaporation of water while the higher values from rainy season could be due to the entry of sulphates from catchment area of the lake due to run off.

Rotifers dominated the zooplankton population (42.30 % followed by Cladocerans (22.73 %); copepods (17.22 %), protozoons (15.23%) an ostracods (2.86 %).62 different species of zooplankton were identified. Summer months exhibited higher population of zooplankton and during rainy season least population of zooplankton was noted.

However, during November, protozoons dominated the lake

All the zooplanktons showed a significant positive correlation with water temperature and the alkaline pH of lake.

The group rotifera was represented by 28 species. Higher temperature, less nutrients and low oxygen contents
favoured the rotifers to flourish.

Among the observed species of rotifers, *Rotararia*, *Monostyla*, *Lepadella*, *Cephalodella*, *Brachionus falcatus* were abundant and are pollution indicator species.

Cladocerans were represented by nine species. Members of chlorophyceae and myxophyceae were found to be favouring the abundance of cladocerans.

Copepods were represented by eight species. *Cyclops* and *Paracyclops* dominated the lake. The summer peak in copepods may be due to the abundance of diatoms and blue green algae.

Ostracods were represented by five species and they showed summer maxima.

Insects collected from Chhatri lake were found to be of six orders; Coleoptera, Diptera, Ephemeroptera, hemiptera, Odonata and Trichoptera. A total of 28 species observed includes 5 of Coleopter, 5 of Diptera, 4 of Ephemeroptera, 7 of hemiptera, 5 of Odonata and 2 of Trichoptera presence of ample chironomids also indicates eutrophication of lake Chhatri.

28 species of chlorophyceae, 18 of bacillariophyceae, 13 species of myxophyceae, 3 species of euglenophyceae were recorded
from the lake Chhatri.

From chlorophyceae, *Clamydomonas*, *Closterium*, *Chlorella*, *Pediasstrum*, *Scenedesmus*, *Spirogyra* and *Ulothrix* dominated the lake.

From bacillariophyceae, *Navicula*, *Cymbella* and *Rhopalodia* dominated the lake.

Among myxophyceae, *Raghiidiopsis*, *Anabaena*, *Oscillatoria* and *Merismopedia* dominated the lake. *Oscillatoria* and *Phormidium* increased considerably in number during rainy season.

The average GPP and average NPP were found to be 0.0417 mg/l/6hrs and 0.0263 mg/l/6hrs, respectively. The values of both GPP and NPP were found maximum in October and the minimum values were recorded during August. GPP showed a distinct biomodal pattern.

The decreased productivity in August is probably due to high turbidity. The GPP was found to be positively exponential with biomass.

The macrophytes observed in the lake might be responsible for the luxuriant growth of planktons in the lake by maintaining the ecological balance.

Macrophytes, especially the submerged species, *Ipomoea* observed in the lake Chhatri found to give support to large quantities of
epiphytic algae and also periphyton which might have formed the favourable environment for fishes and hence a large number of fishes were seen during the period of investigation. The macrophytes growing in the lake also constitute the principle source of food in the food chains of fishes.

The abundance of zooplankton, phytoplankton macrophytes and magnesium, chloride and high nitrate contents are indicative of organic pollution which in turn indicates that eutrophication of the Chhatri lake is proceeding very rapidly. Initially, though the lake was constructed for drinking water supply by the then British Government in 1880, but at present due to increasing population and uncontrolled animal activities, the lake water is not suitable for drinking.