

Water quality analysis of Chiklod wetland with reference to Pollution

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Received : 11.10.2021; **Accepted** : 08.11.2021

ABSTRACT

The present study was conducted to evaluate the water quality of Chiklod Wetland, which is one of the most pristine wetlands in Madhya Pradesh situated about 45km towards south direction from the capital Bhopal. Analysis of various indicative parameters show that the water of Chiklod wetland is suitable for drinking and irrigation purposes.

Figures : 12

References : 04

Table : 01

KEY WORDS : Anthropogenic activities, Pollution, Wetland

Introduction

Water is essential for the survival of any form of life. Today water resources have been the most exploited natural system. Pollution of water bodies is increasing tremendously due to rapid population growth, industrial proliferation, urbanization, increasing living standards and wide spheres of human activities. Time is perhaps not too far when pure and clean waters particularly in densely populated and industrialized area may be inadequate for maintaining the normal living standers.

The deterioration of aesthetic and life supporting quantities of natural lakes and estuaries is caused by excessive fertilization due to effluents rich in N, P, and K. Thus, water contains several dissolved mineral salts (Na, Ca, Mg, K, Fe, Mn, Co), suspended matters (sand, clay, silt) and microbes.

Pollution of water bodies has become a universal phenomenon in the present day world³. The sign of water pollution are obvious to all such indicators as bad taste of drinking water, offensive odour from water bodies, unchecked growth of aquatic weeds in water, decrease in number of fishes in fresh water among others. Such factors disturb the normal uses of water for public water supply, recreation and aesthetic, aquatic organisms and wild life, agriculture and industry².

Hence the control of water pollution necessitates qualitative and quantitative measurements of water pollution. The analysis of water is extremely important as it contains a large number of impurities which are

necessary to be checked before the water is used for any specific purpose.

Keeping this in mind, the water samples of Chiklod wetland were analyzed to understand the suitability of the water body for various uses of stakeholders.

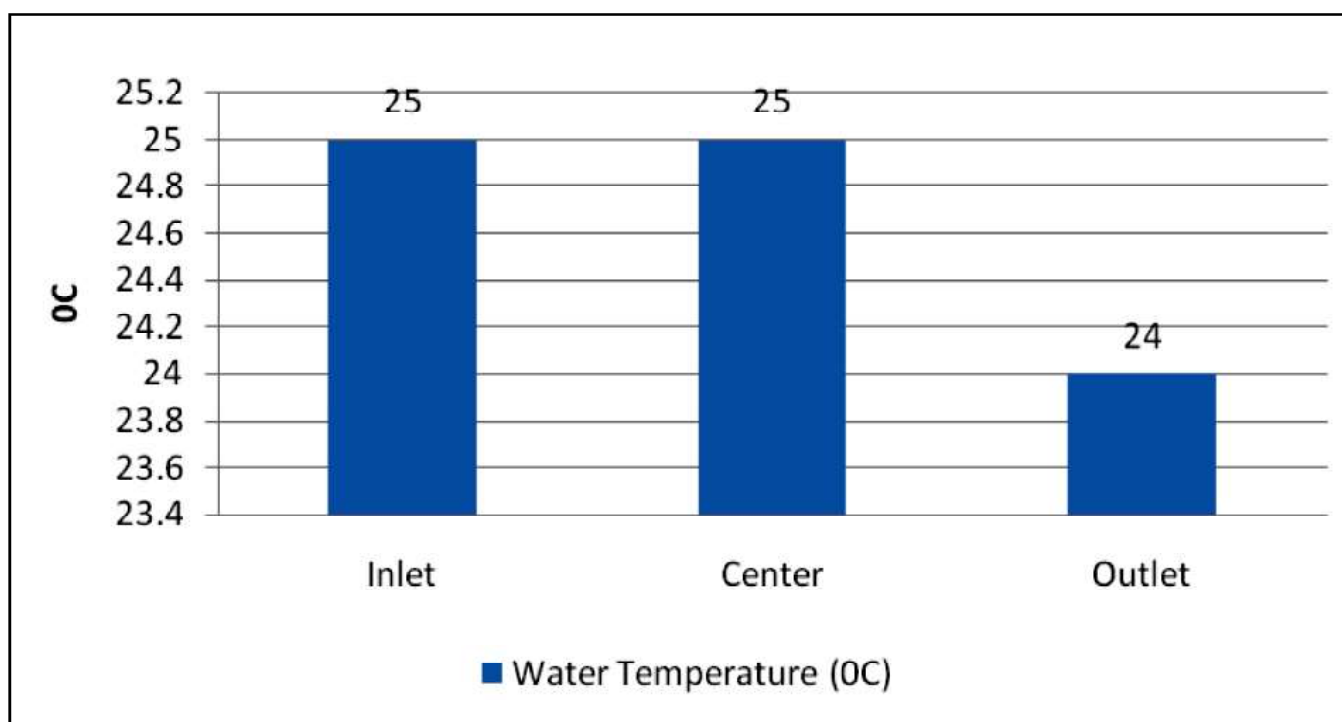
In the water body, three spots were selected for the collection of water samples. The wetland is located in "11 mile" village of Raisen district of Madhya Pradesh. It is about 45km towards south direction from the capital Bhopal. It is located besides the Raisen-Jabalpur Road. The wetland is about 50-60 m in length and 20-30m in width. The depth of the wetland is approximately 6 m.

Materials and Methods

To assess the water quality of "Chiklod wetland" water samples were collected during the period 2010 to 2011. Three samples were collected viz. one from inlet, one from centre of the wetland and third one from outlet of the wetland. Water samples were collected in sterile glass bottles, jerry cans from each station following the standard method. After collection of the samples the bottles were tightly capped and transported immediately to the laboratory to avoid any unpredictable changes in the physico-chemical characteristics. Suitable preservation techniques were adopted as per the standard methods. The parameters like temperature, conductivity dissolved oxygen, Free CO₂, TDS were analyzed in the field while rest of the parameters were analyzed in the laboratory following the standard methods.

TABLE-1 : Variation in physicochemical parameters at different stations of Chiklod Wetland

| S No | Parameter | Inlet | Center | Outlet |
|------|---------------------------------------|-------|--------|--------|
| 1 | Water Temperature (0C) | 25 | 25 | 24 |
| 2 | pH | 8.5 | 7.5 | 8.5 |
| 3 | Total dissolved Solids (mg/l) | 85.4 | 79.3 | 85.4 |
| 4 | Conductivity (Ms/cm ²) | 0.14 | 0.13 | 0.14 |
| 5 | Dissolved Oxygen (mg/l) | 10 | 7.6 | 8.4 |
| 6 | Free CO ₂ (mg/l) | 4 | 2 | 4 |
| 7 | Total Alkalinity (mg/l) | 78 | 72 | 72 |
| 8 | Chloride (mg/l) | 13.99 | 23.98 | 14.99 |
| 9 | Total hardness (mg/l) | 74 | 66 | 82 |
| 10 | Calcium hardness(mg/l) | 50.4 | 44.1 | 52.5 |
| 11 | Biological Oxygen Demand (BOD) (mg/l) | 4 | 0 | 2 |
| 12 | Chemical oxygen Demand (COD) (mg/l) | 28 | 12 | 20 |

**Fig. 1 : Variation in Water Temperature (0C) at different stations in Chiklod Wetland**

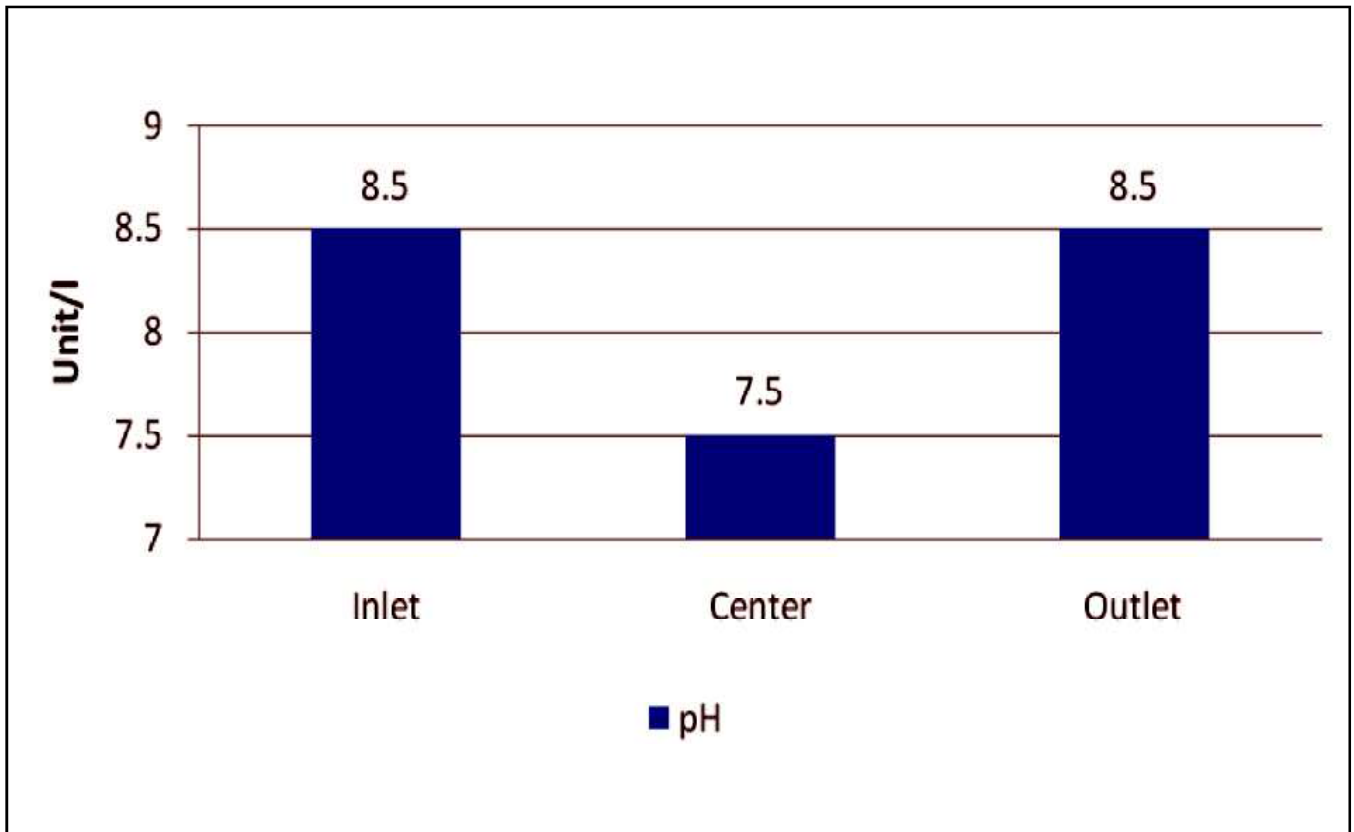


Fig. 2 : Variation in pH at different stations in Chiklod Wetland

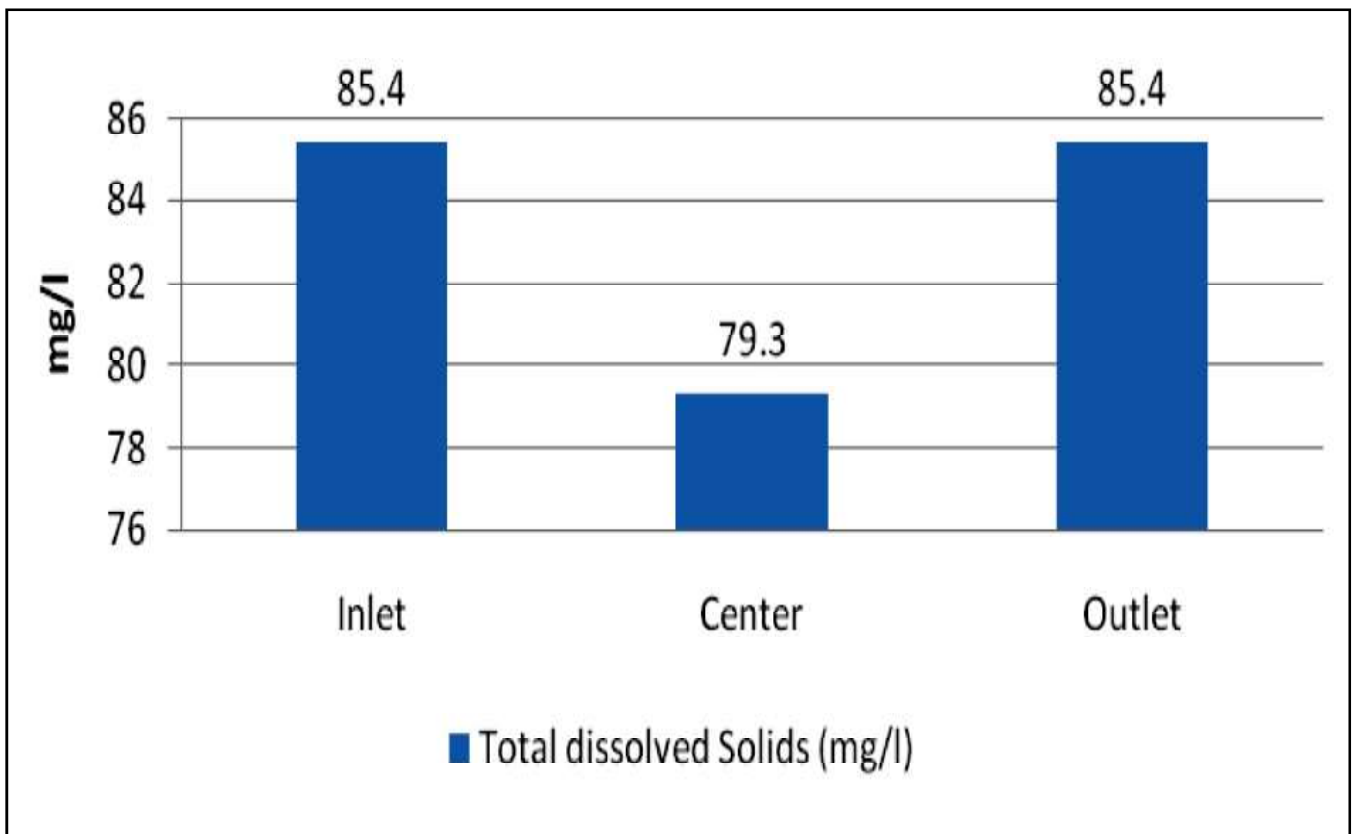


Fig. 3 : Variation in Total Dissolved Solids (mg/l) at different stations in Chiklod Wetland

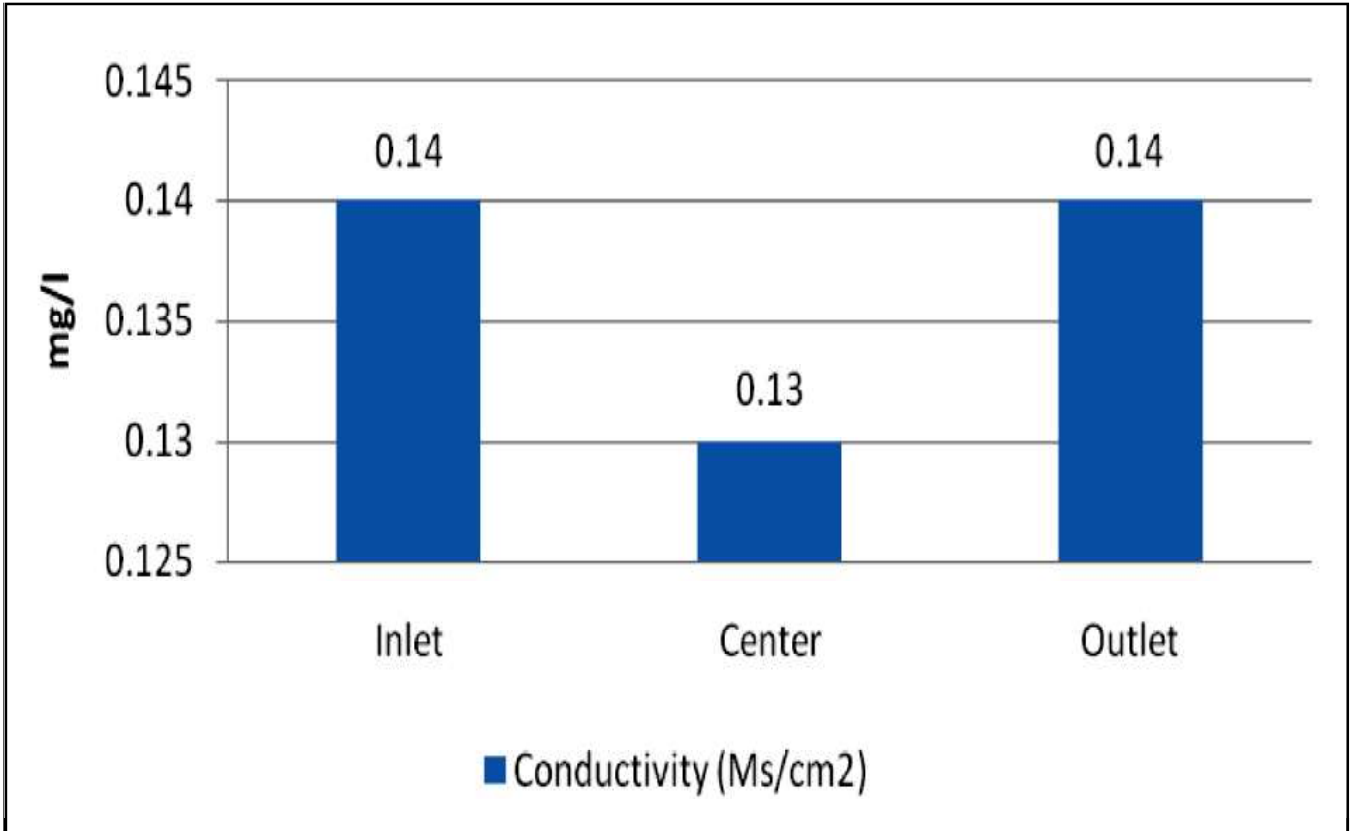


Fig. 4 : Variation in Conductivity (mg/l) at different stations in Chiklod Wetland

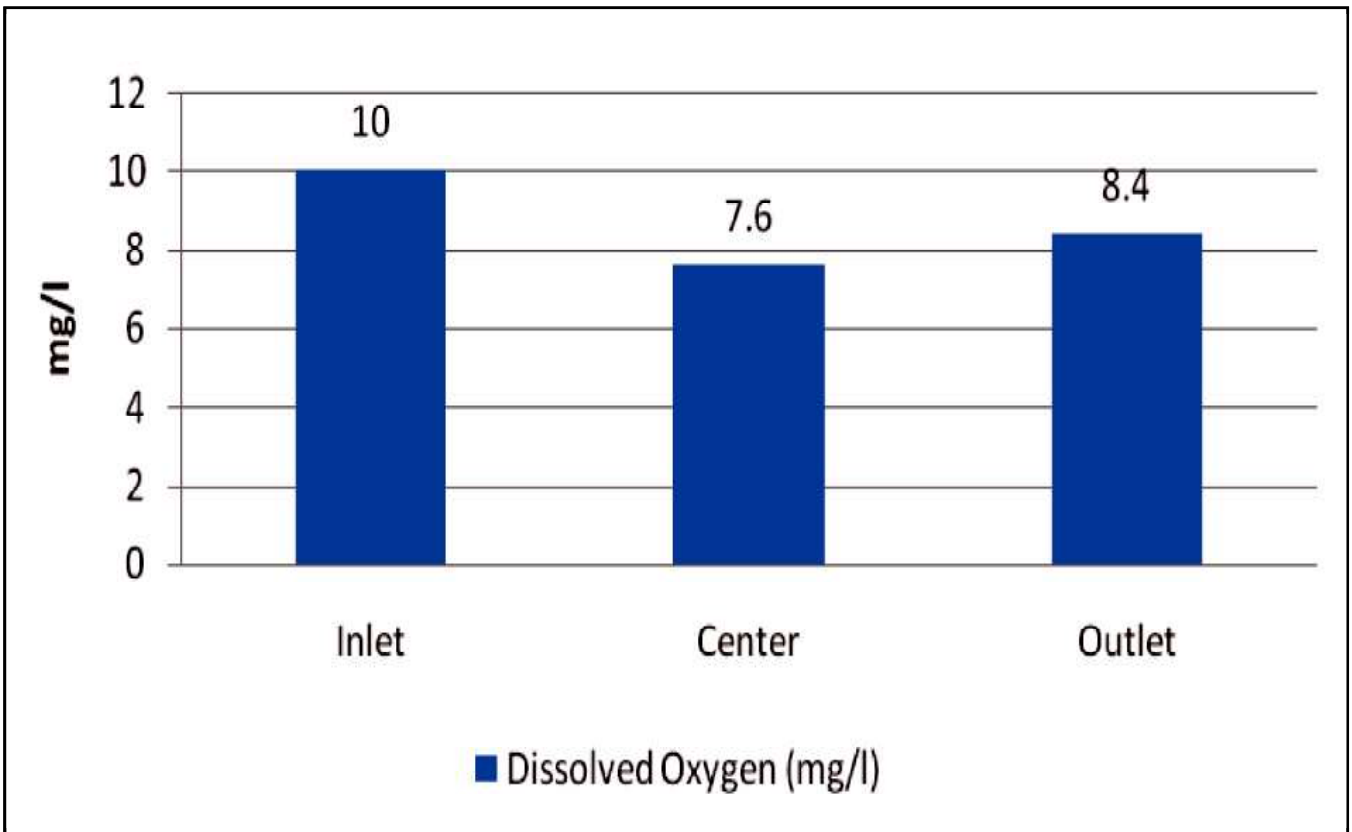


Fig. 5 : Variation in Dissolved Oxygen (mg/l) at different stations in Chiklod Wetland

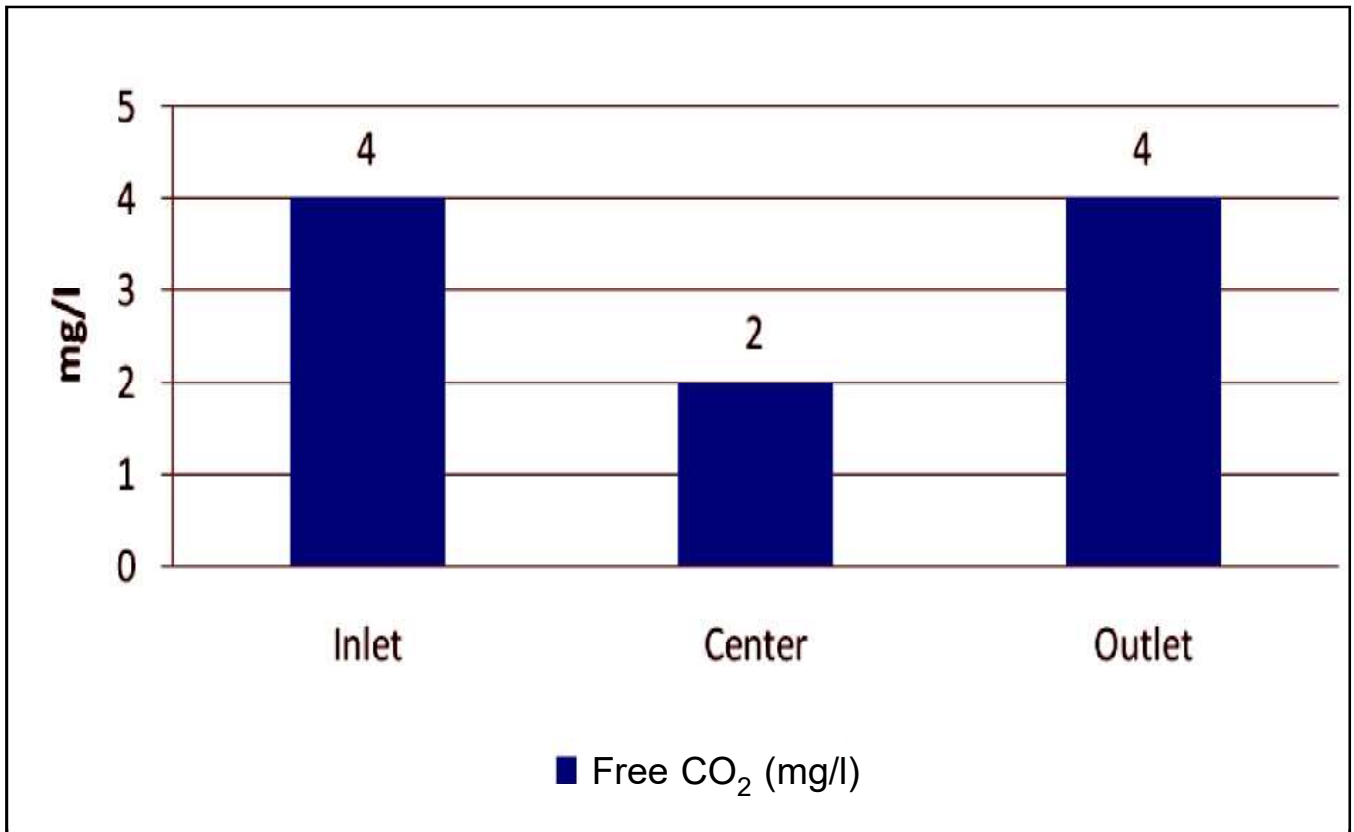


Fig. 6 : Variation in Free CO₂ (mg/l) at different stations in Chiklod Wetland

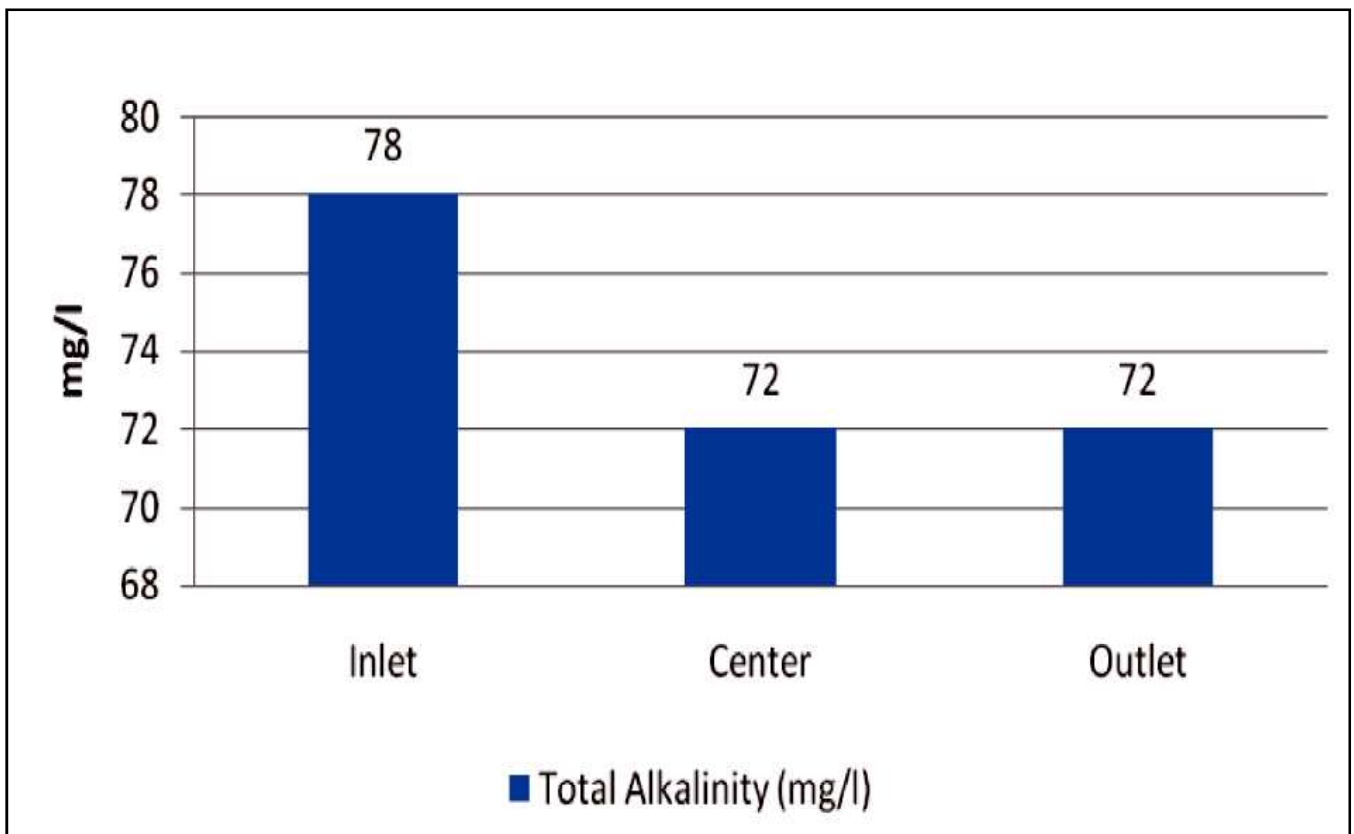


Fig. 7: Variation in Total Alkalinity (mg/l) at different stations in Chiklod Wetland

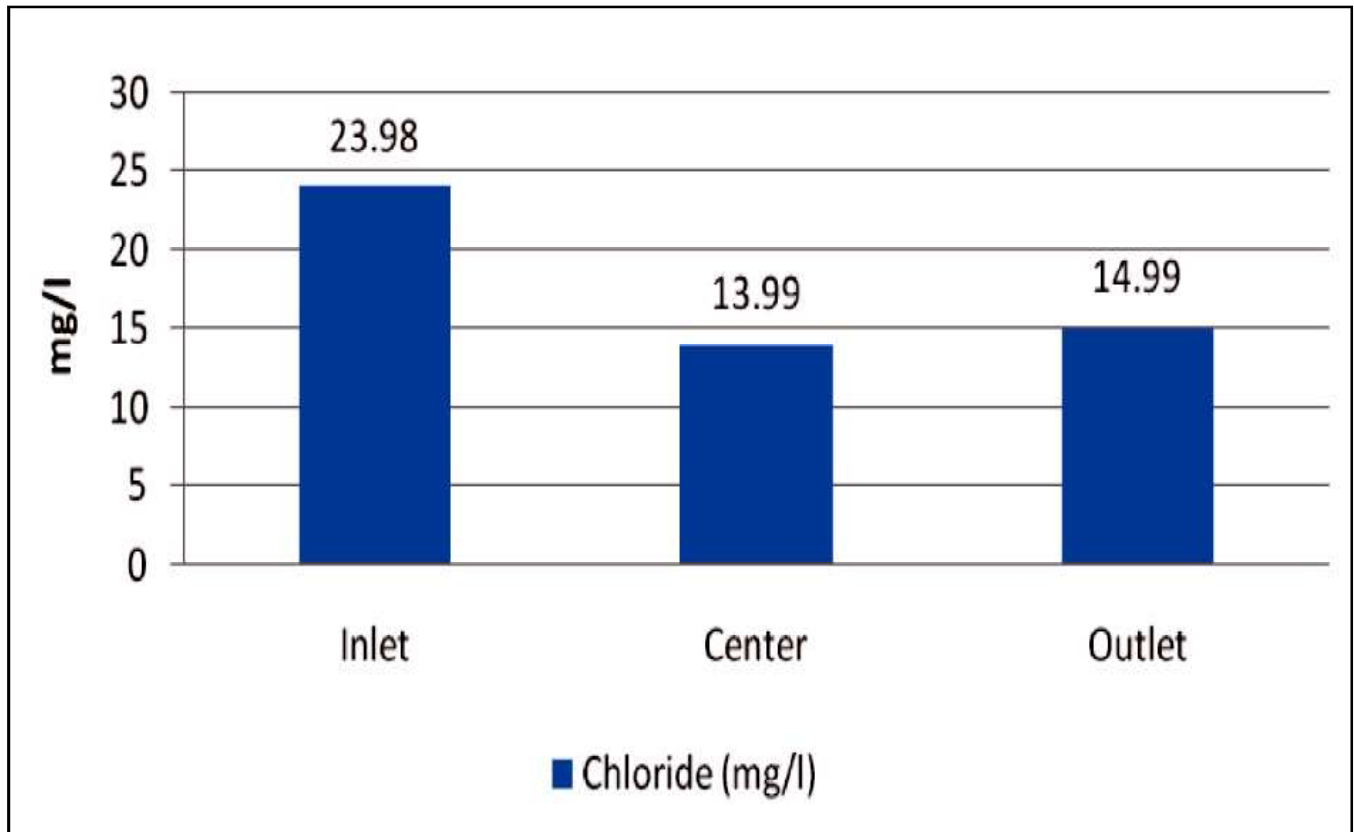


Fig. 8 : Variation in Chloride (mg/l) at different stations in Chiklod Wetland

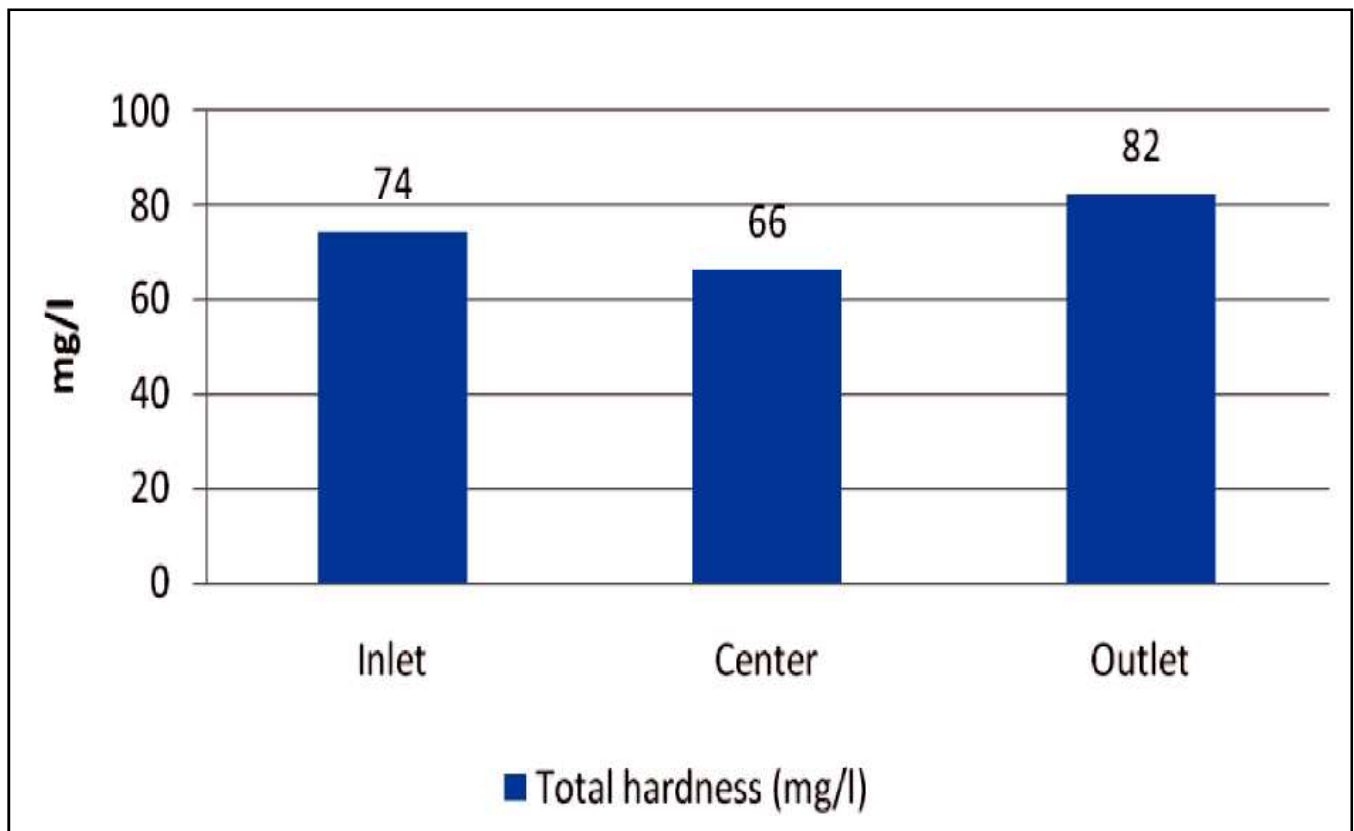


Fig. 9 : Variation in Total hardness (mg/l) at different stations in Chiklod Wetland

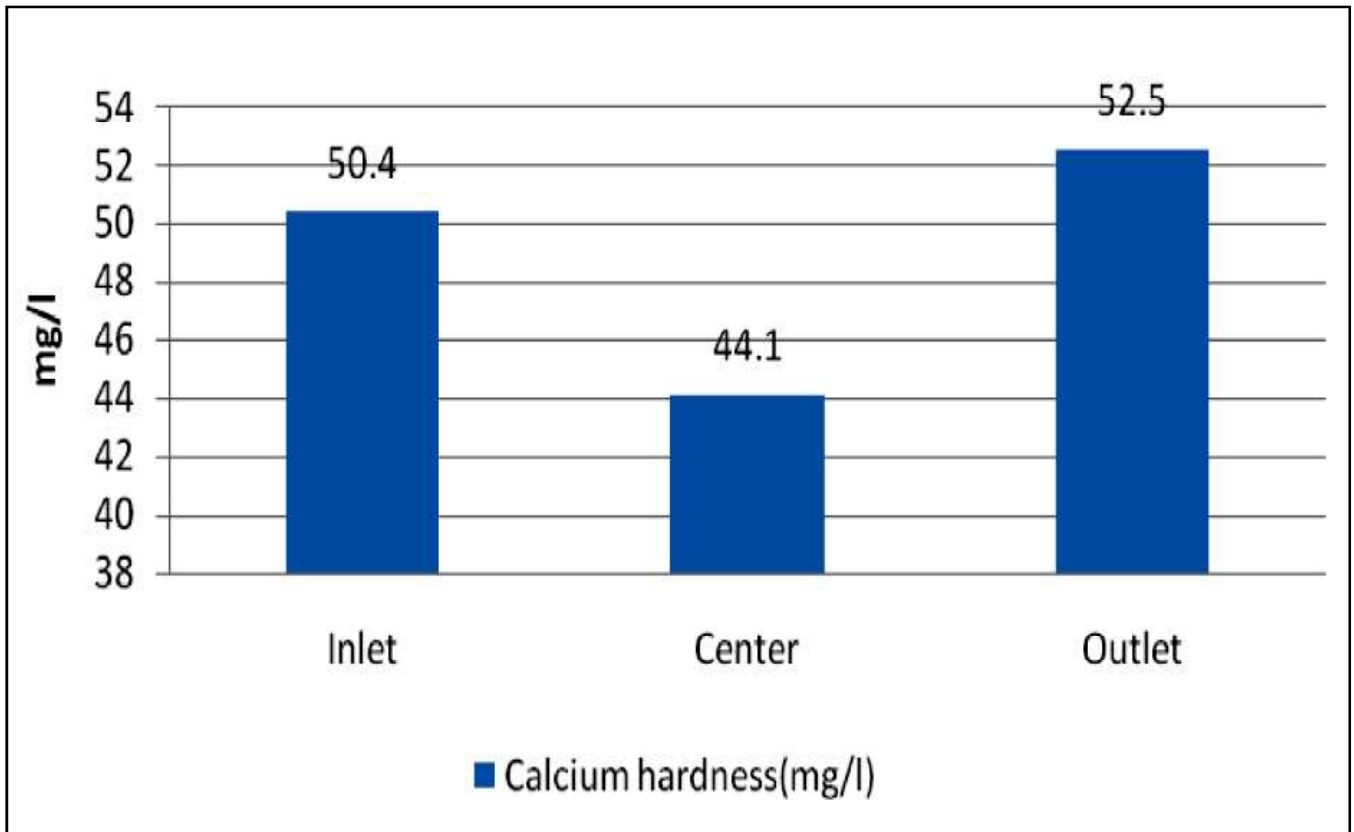


Fig. 10 : Variation in Calcium hardness (mg/l) at different stations in Chiklod Wetland

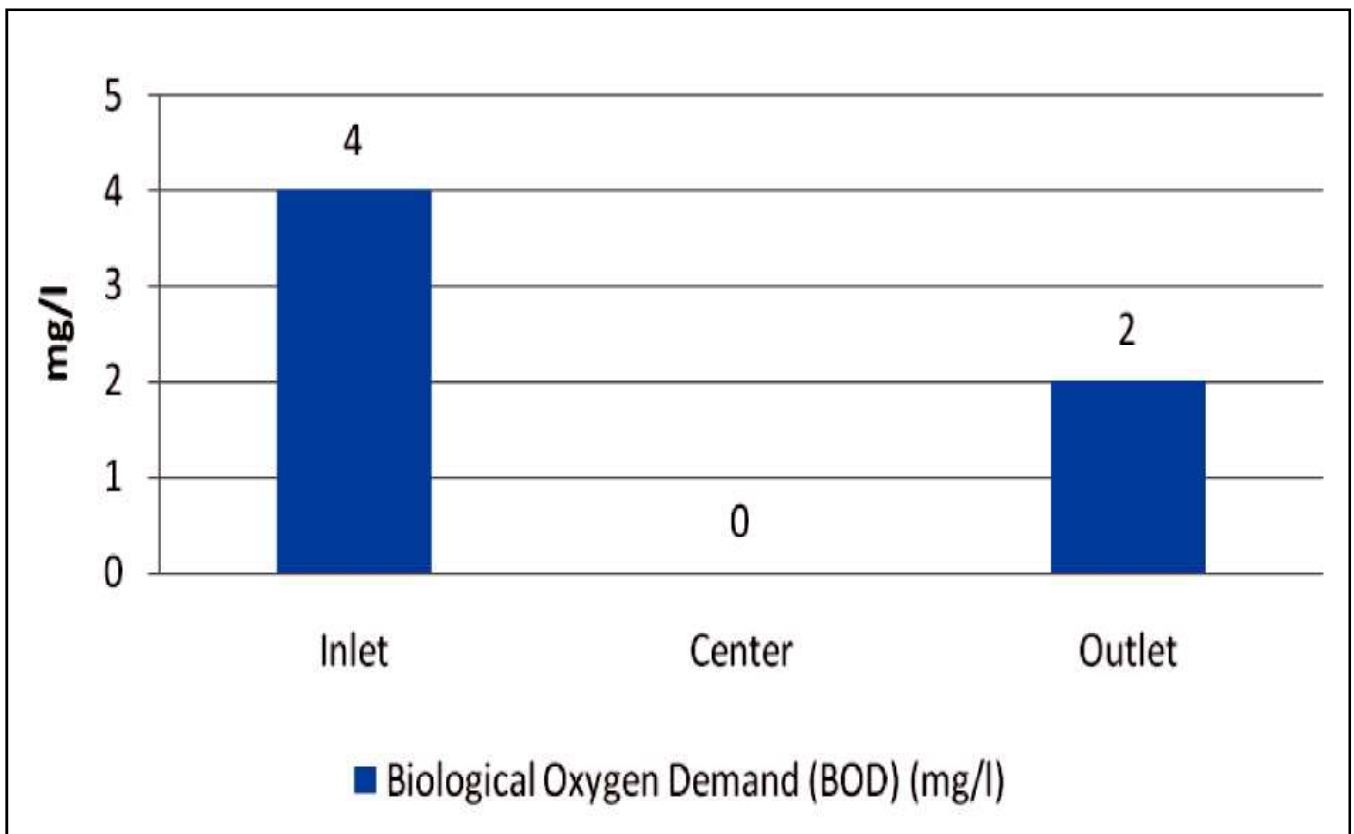


Fig. 11 : Variation in Bio-chemical oxygen Demand (BOD) (mg/l) at different stations in Chiklod Wetland

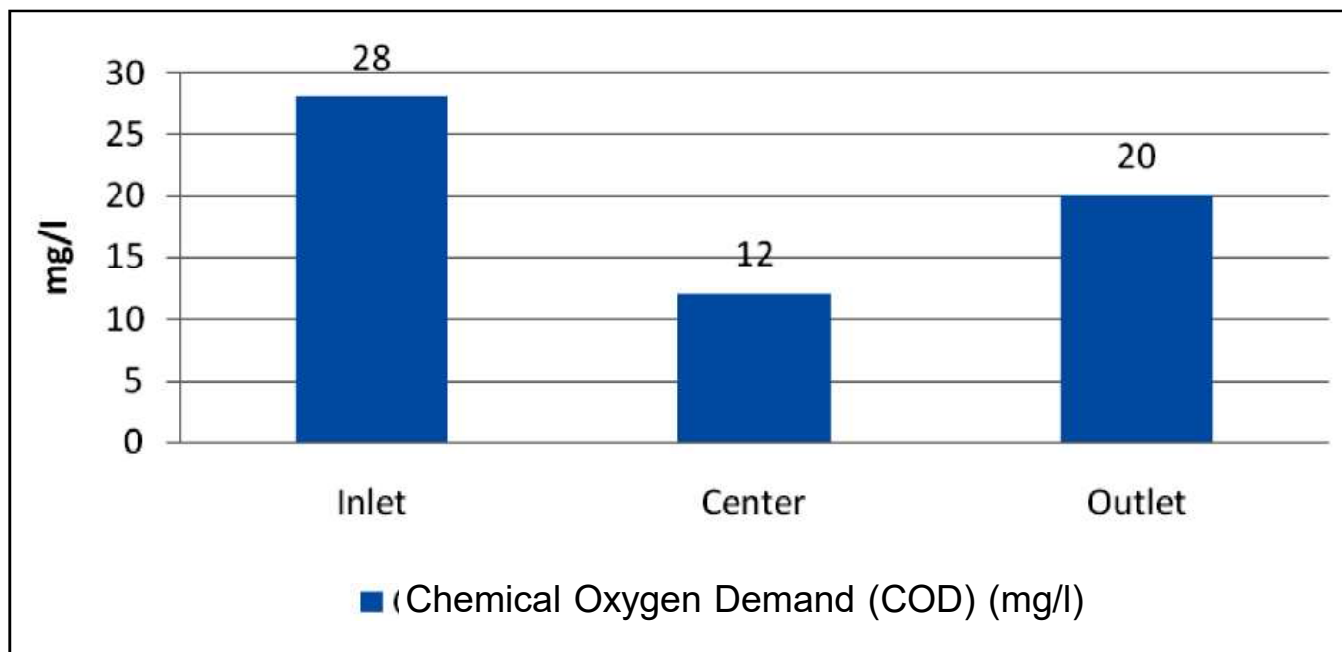


Fig. 12 : Variation in Chemical oxygen Demand (COD) (mg/l) at different stations in Chiklod Wetland

Result and Discussion

The results of average values of various parameters for the water samples collected during the period from three stations of Chiklod wetland is depicted in Table-1.

Water Temperature

Water Temperature was found in a range of 24°C to 25°C. Minimum value was observed at outlet water while maximum value was recorded at inlet water (Fig-1).

pH

pH was found in a range of 7.5 to 8.5. Minimum value was observed at center while maximum value was recorded both at inlet and outlet water (Fig-2).

Total Dissolved Solids

Total Dissolved Solids were found in a range of 79.3mg/l to 85.4 mg/l. Minimum value was observed at center while maximum value was recorded both at inlet and outlet water (Fig-3).

Conductivity

Conductivity was found in a range of 0.13 Ms/Cm² to 0.14 Ms/Cm². Minimum value was observed at center while maximum value was recorded both at inlet and outlet water (Fig-4).

Dissolved oxygen

Dissolved oxygen was found in a range of 7.6 mg/l to 10.0 mg/l. Minimum value was observed at center while maximum value was recorded at inlet water. In general the water quantity of Chiklod wetland is suitable for the drinking purpose. The water quality analysis at

three different spots of the wetland reveals that it is not polluted (Fig-5).

Free CO₂ (mg/l)

Free CO₂ was found in a range of 2mg/liter to 4 mg /liter. Minimum value of was observed in center of the water body while maximum value was recorded at both inlet & outlet water (Fig-6).

Total Alkalinity (mg/l)

Total Alkalinity was found in a range of 72 mg/l to 78 mg/l. Minimum value was observed at center while maximum value was recorded both at inlet water (Fig-7).

Chloride (mg/l)

Chloride was found in a range of 13.99 mg/l to 23.98 mg/l. Minimum value was observed at center while maximum value was recorded at inlet water (Fig-8).

Total hardness

Total hardness was found in a range of 66.0 mg/l to 82.0mg/l. Minimum value was observed at center while maximum value was recorded at outlet water (Fig-9).

Calcium hardness

Calcium hardness was found in a range of 44.1 mg/l to 52.5 mg/l. Minimum value was observed at center while maximum value was recorded at outlet water (Fig-10).

Biochemical Oxygen Demand (BOD)

BOD was found in a range of nil mg/l to 4.0 mg/l. Minimum value was observed at center while maximum

value was recorded both at inlet & outlet waters (Fig-11).

Chemical Oxygen Demand (COD)

BOD was found in a range of 12.0 mg/l to 28.0 mg/l. Minimum value was observed at center while maximum value was recorded both at inlet & outlet waters (Fig-12).

Conclusion

By performing different tests on the given water samples collected from different spots of Chiklod wetland located in the Raisen district of Madhya-Pradesh, it is

concluded that the water of Chiklod wetland is suitable for all the activities of the living being. The results of all the tests like, TDS, total hardness, calcium hardness, chloride is below the desirable limit when compared with the CPCB standards. However the dissolved oxygen of the Chiklod wetland water is above the desirable limit, this is due to increase in temperature of samples above 20°C the dissolved oxygen fluctuates due to changes in temperature.

The water of Chiklod wetland is thus suitable for drinking and irrigation purpose.

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