ISSN-2230-7540

Study of Wet Land of Kanwar Lake in Respect of Pollution

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ABSTRACT

All life on earth relies upon water, new water is a basic, limited, powerless, inexhaustible characteristic asset on the earth and assumes as significant part in our living condition without it life is unimaginable. The current examination has been anticipated appraisal and observing of water nature of Kanwar Lake Begusaria, Bihar. Month to month variety of water nature of Kanwar Lake was examined during January to June 2017. The variety in physical and synthetic boundaries like pH, electrical conductivity, and turbidity, absolute broke up solids, alkalinity, and chloride, all out hardness, calcium hardness, organic oxygen request, broken up oxygen, substance oxygen request and iron were dissected. All boundaries aside from natural oxygen request and absolute broke up solids were found under as far as possible.

Keywords: Kanwar Lake, Pollution, Aquatic biological system, Human Health.

INTRODUCTION

After air, water can be expressed as the second most significant asset which is imperative to support life. Water is the most plentiful just as a basic asset which is found in nature and covers around 3/fourth of the world's surface. Despite the fact that being so plentiful numerous elements have contributed for its constraint to be really used for human use. 98 percent of the planet's water includes the seas which can't be utilized for drinking as the salt substance is extremely high. The staying 2 percent is new water out of which 1.6 percent is hidden away in the polar ice tops and icy masses. Springs and wells contain 0.36 percent of world's water; Lakes and Rivers involve just about 0.66 percent of the planet's complete water gracefully.

The rise of human progress and ensuing industrialization by man has made an extraordinary harm our biological system and upset the regular habitat. Squanders as strong, fluid and vaporous emanations are by and large persistently released. Contaminations come into lake from different sorts of sources like point sources (particularly releases of wastewater), non-focuses sources, and diffuse sources and furthermore from air affidavits. Lakes and lakes don't keep down as a large portion of the lakes in significant urban areas have been contaminated. Water pollution has represented a genuine test because of its impact on financial exercises. The issue of water pollution holds more noteworthy significance with regards to a creating nation like India. Kanwar Lake is arranged in the Begusaria region of Bihar, and many individuals attract their work from the lake terms of horticulture, fisheries, the travel industry, and so forth it associates many individuals through the different exercises and can be expressed as a wellspring of social legacy which holds a great deal of significance in itself. In any case, similar exercises that give income, business, habitation, food and amusement to the individuals become a danger to the Lake.

ISSN-2230-7540

Water is one of the most significant normal assets for continuing the life on this planet. Around, two - third of the earth is involved by waters, as icy masses, seas, streams and groundwater. Out of these water assets, just 2.4% of water is considered as new water. The surface water in waterways, lakes and lakes are effectively open for human utilization and other business exercises. Around 33% of the new water necessity of the world is provided by normally existing surface waters in waterway, streams, lakes and lakes. Yet, presently, surface water assets are generally helpless against pollution because of the informal removal of wastewaters. The nature of surface water is administered by the characteristic and anthropogenic cycles, including precipitation, disintegration, hydrologic highlights, mechanical and rural exercises. Over the most recent couple of decades, inescapable weakening in water nature of inland sea-going frameworks has been accounted for because of the fast advancement of businesses, agribusiness and never-ending suburbia .Urban spread is considered as one of the main explanations behind misuse and quick changes in the status of freshwater assets.

There is a developing freshwater emergency all through the world, as the freshwater assets are getting drained and dirtied in equivalent measures. India is blessed enough for having adequate new water assets as countless inland streams, lakes and lakes. However, in an overview of National Environmental Engineering Research Institute (NEERI, 2006), indicated that practically 70% of India's new water was dirtied . Nonetheless, there are so many water bodies and stores with great water quality, status, which should be taken consideration. The assessment and upkeep of good water quality are urgent to ensure the respectability of various surface water assets . During the most recent couple of years, various endeavors were made to assess the spatiotemporal water nature of various amphibian frameworks in India .Water quality observing is one of the key apparatuses, to recognize and keep a mind the pollution status, and guarantee about the effectiveness of the executives plans. Kanwar Lake is one of the biggest regular oxbow lakes of new water in Indian sub-landmass. It was made subsequent to moving of Budhi Gandak waterway course in the verifiable past. Yet, presently, it is arranged in the flood plain of the waterway Ganga and the stream Budhi Gandak.

It gets associated with these streams during serious flooding circumstances. It was proposed for Ramsar site in 1987, because of its rich biodiversity. Roy et al.and Ghosh et al. have revealed that in the previous not many years, the greatest territory of the lake has been brought under serious development. These days, this lake is under extreme danger of falling apart water quality as itsconnecting channels of streams are silted enough. It becomes occasional downpour taken care of the lake. Singh and Roy concentrated once supplement fixation in water of this lake. Another examination was made by Ramakrishna et al. to survey its Limnology in three distinct sections including a bay, mid-lake, and outlet on an occasional premise. From that point, no examination has been directed to screen the status of water nature of this lake. Along these lines, this investigation is completed to comprehend the water nature of this lake from December 2014 to November 2015. Information created during this examination can be utilized as a gauge information for future exploration on this lake.

STUDY AREA

The administration of Bihar set up the Kanwar Lake Bird Sanctuary in the year 1987 to ensure various types of relocating winged creatures in Bihar. The KLBS is geologically situated in the bogs and meadows spread around Kanwar Taal or Kabar Taal Lake, which is Asia's biggest freshwater oxbow lake in Begusarai District. It is of region 67.5 sq. km (26.06 sq. miles) in Bihar. It is roughly multiple times the size of the Bharatpur Sanctuary. This safe-haven is secured by various water bodies, swamps and wet fields and so forth. The lake is encircled by the stream Burigandak and spreads over 6000+ ha in area Begusarai (Bihar). It has high ebb and flow and round curve finished into snare - like association towards the waterway Burigandak. Kanwar lake is arranged at 25°35' N scope and 86 ° 10' E longitudes. It is one of the most significant wetlands of upper Indo-Gangetic plain.

The Kanwar Lake has been named wetland type 19 because of quality of environment (Scott, 1989). Customarily, the wetland has been utilized for water gracefully for water system and homegrown purposes, fishing, mesh of transitory waterfowl available to be purchased, collecting of wild rice, and assembling of the consumable mollusc, Pila globosa.It assumes a huge function in lives of neighborhood individuals. In excess of 41 types of financially significant fishes have been recorded (Anon, 2004).

OBJECTIVES OF THE STUDY

1. To investigate the kanwar lake in respect of pollution.

2. To examine for physic-substance boundaries pH, electrical conductivity, turbidity, all out broke down solids, alkalinity, chloride, and complete hardness, calcium hardness, broken up oxygen, biochemical oxygen request,

ISSN-2230-7540

compound oxygen request and iron.

METHODOLOGY

During the current exploration work ten spots of Kanwar Lake were chosen for assortment of test. Water tests were gathered at the month to month spans for a half year. One liter of water test was gathered in pre-treated plastic jugs and protected till all examination were finished. Water tests were examined for physic-substance boundaries pH, electrical conductivity, turbidity, all out broke down solids, alkalinity, chloride, complete hardness, calcium hardness, broken up oxygen, biochemical oxygen request, compound oxygen request and iron.

RESULTS AND DISCUSSION

The prerequisite of water in all lives, from microorganisms to people, is expanded step by step, presently days it is a significant issue to give a sheltered drinking water since all water assets have reached to a state of emergency because of impromptu urbanization and industrialization. pH is additionally a fundamental boundary of water quality which is administered by the carbon dioxide, bicarbonate balance. The pH of Kanwar lake water differed from 6.80 to 7.93. It was watched least pH 6.80 at spot 10 and greatest pH 7.93 at spot 1 in the period of June. The water was somewhat acidic to basic for the duration of the time-frame. All the examples were seen under as far as possible (6.5-8.5), recommended by BIS for surface water quality.

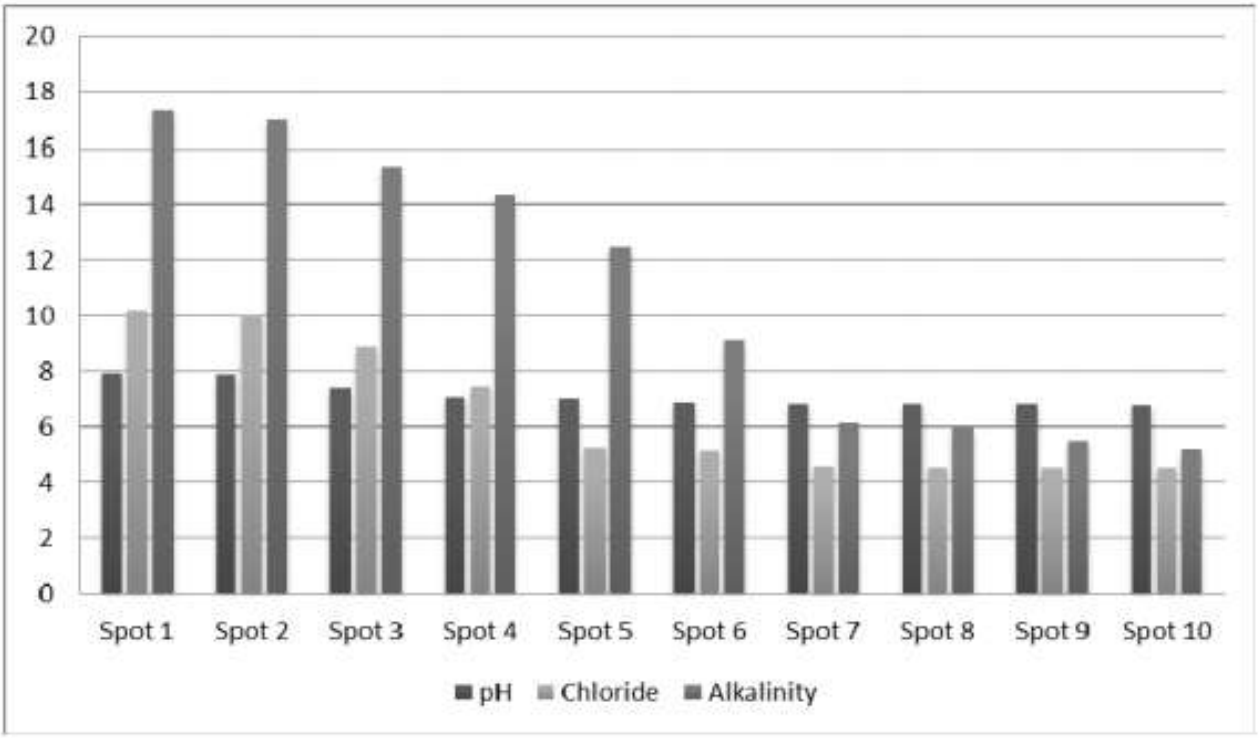

Figure 1: pH, Chloride and Alkalinity of Kanwar Lake during experiment.

Electrical conductivity is proportional to electrical obstruction. It is the mathematical articulation of the capacity of water test to convey electric ebb and flow (Kumar and Sinha, 2010) [8]. The electrical conductivity of Kanwar lake water ranges between 0.11 to 0.36mS/cm. It was watched least EC 0.11mS/cm at spot 10 in the long stretch of March and greatest EC 0.36mS/cm at spot 1 in the period of May. All the examples were seen under as far as possible (0.5-1.5mS/cm), proposed by BIS for surface water quality. The electrical conductivity of water is a measure to affirm the presence of various particles in it and furthermore about its virtue. It relies upon the convergence of various particles, supplements and broke down solutes.

ISSN-2230-7540

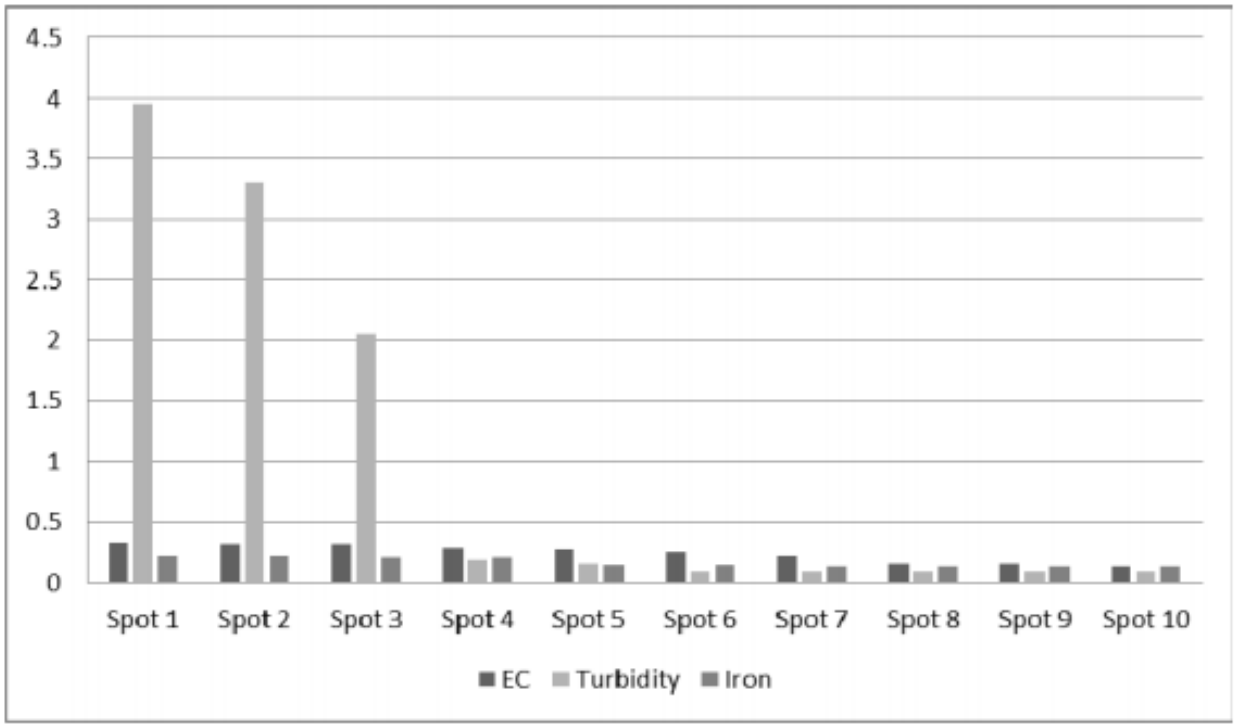

Fig 2: EC, Turbidity and Iron of Kanwar Lake during experiment

Turbidity is brought about by wide assortment of suspended and colloidal materials. Run-off from desolate territories during precipitation is the most regular giver of turbidity, especially sediment and earth. The release of untreated mechanical and homegrown effluents likewise includes extraordinary amounts of turbidity. The likelihood of quality of pathogenic living beings is likewise expanded in turbid water (Kumar and Chopra, 2012) [9]. The turbidity of Kanwar lake water ranges between 0.1 to 5.1NTU. It was watched least turbidity 0.1NTU at spot 5, 6, 7, 8, 9 and 10 in the long stretch of January to June and most extreme turbidity 5.1NTU at spot 1 in the period of June. But spot 1 in the period of June all the examples were seen under as far as possible (5NTU), recommended by BIS for surface water quality. The absolute broke up solids in water involves mostly of inorganic salts and modest quantity of natural issue, for example, carbonate, bicarbonate, chloride, sulfate, nitrate, sodium, potassium, calcium and magnesium.

The complete disintegrated solids in water begin from normal sources and rely on the spot, land nature of the Lake Basin, waste, precipitation, base store and inflowing water (Kaushik and Saksena, 1999) [7]. The complete broke down solids of Kanwar lake water ranges between 108 to 570 mg/l. It was watched least TDS 108 mg/l at spot 9 and most extreme TDS 570 mg/l at spot 1 in the long stretch of May. Spots 1 and 2 were watched higher as far as possible (500mg/l) all through the time of study as these focuses were profoundly influenced by human exercises like washing, washing, steers shower and so forth. During summer because of water lack at spot 1 and 2 the anthropogenic exercises expanded till spot 3 and consequently TDS of spot 3 was over as far as possible in the long stretch of May and June. Remaining spots 4, 5, 6, 7, 8, 9, and 10 were seen under as far as possible (500 mg/l), proposed by BIS for surface water quality.

ISSN-2230-7540

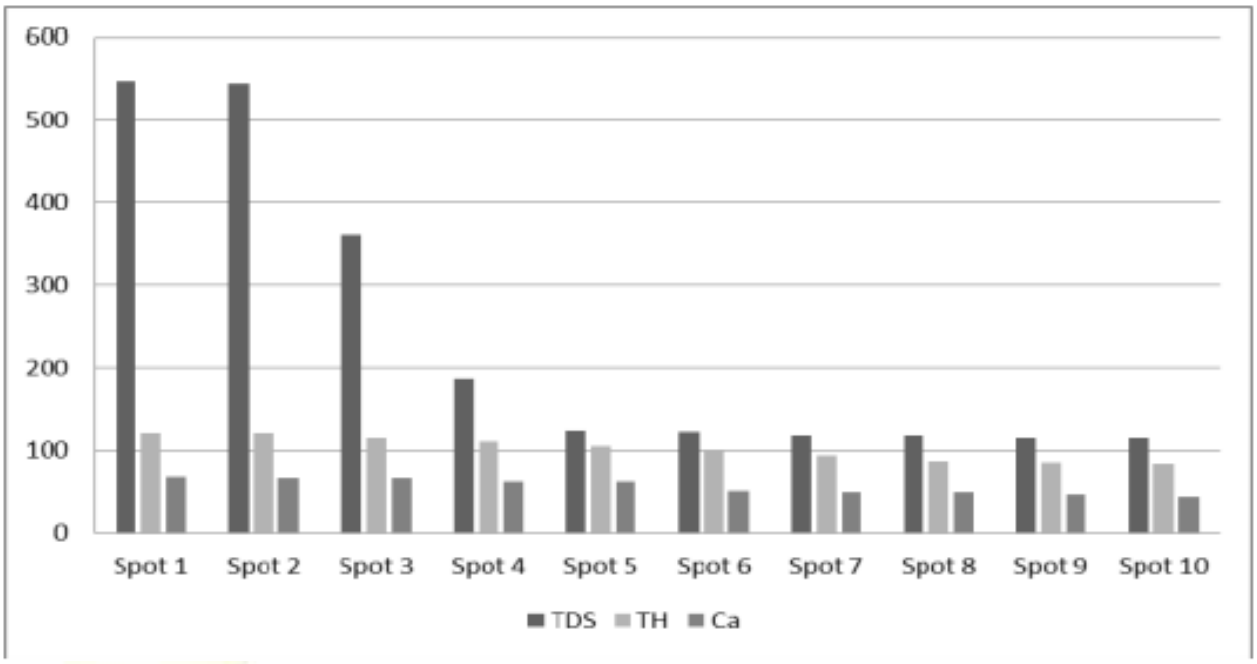

Fig 3: TDS, TH and Ca of Kanwar Lake during experiment.

Alkalinity of water is its ability to kill corrosive and is portrayed by the presence of hydroxyl (OH-) particles equipped for consolidating with hydrogen (H+) particles in arrangement (Kaushik and Saksena, 1999) [7]. All out alkalinity of Kanwar lake water was ranges between 5.0 to 20 mg/l. It was watched least alkalinity 5 mg/l at spot 10 in the month March and most extreme alkalinity 20 mg/l at spot 1 and 3 in the period of January and June. All the examples were seen under as far as possible (200mg/l), proposed by BIS for surface water quality. The chloride is available in all common waters, generally at low focuses. Chlorine as chloride particle (Cl-) is one of the significant anions in water. Presence of chloride in water could be because of different sources like, common enduring of rocks, homegrown waste and through counterfeit or regular substance responses. Pungent taste of water is created by Clions however the compound piece and the wealth of certain cations like Na+, Ca2+ and Mg2+ in water by and large oversee the taste (Dikio, 2010) [3].

Chloride of Kanwar lake water ranges between 4.2 to 10.4 mg/l. It was watched least chloride 4.2 mg/l at spot 7 and 10 in the period of June and greatest chloride 10.4 mg/l at spot 1 in the long stretch of May and June. All the examples were seen under as far as possible (250mg/l), proposed by BIS for surface water quality. It has determined the all-out hardness of water to be inside 300 mg/l of CaCO3. Absolute hardness of Kanwar lake water ranges between 81 to 125 mg/l. It was watched least hardness 81mg/l at spot 10 in the long stretch of June and most extreme hardness 125 mg/l at spot 1 in the period of May. All the examples were seen under as far as possible (300mg/l), proposed by BIS for surface water quality. Calcium Hardness of Kanwar lake water ranges between 41.8 to 69.1mg/l. It was watched least calcium 41.8 mg/l at spot 10 in the long stretch of May and greatest calcium 69.1 mg/l at spot 2 in the period of January. All the examples were seen under as far as possible (75mg/l), recommended by BIS for surface water quality. Calcium is one of the components which exist in divalent structure Ca2+ particle in water. It is the fundamental segment of various sea-going shells and bones of vertebrates (Jhingran, 1975) [6].

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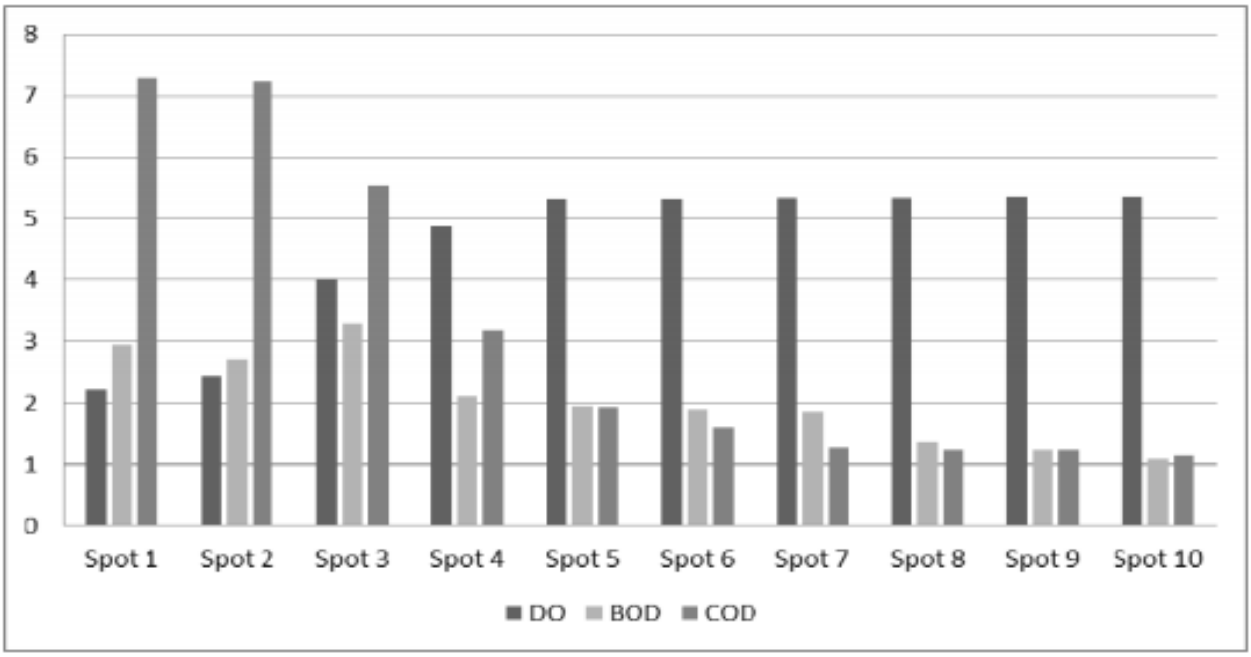

Fig 4: DO, BOD and COD of Kanwar Lake during experiment.

Broken up Oxygen of Kanwar lake water ranges between 2.2 to 5.6 mg/l. It was watched least DO 2.2 mg/l at spot 1 in the long stretch of January, February, April, May and June since it was influenced by individuals exercises. Greatest DO 5.6 mg/l was seen at spot 7 in the long stretch of January since it was not influenced by people exercises. All the examples were seen under as far as possible (>6.0 mg/l), proposed by BIS for surface water quality. Broken down oxygen is one of the significant boundaries of water which straightforwardly impacts the endurance and circulation of vegetation in a biological system. It is one of the most solid boundaries in surveying the trophic status and the size of eutrophication in sea-going biological system (Edmondson, 1966) [4].

Biochemical Oxygen Demand (BOD) is a pointer of natural pollution. The high estimation of BOD is a pointer of high toxin load depleted from metropolitan regions to the water bodies (Pathak et al., 2012) [11]. Reason of high estimations of BOD might be because of rural and homegrown release in the water (Mullar et al., 2012) [10]. Biochemical Oxygen Demand of Kanwar Lake ranges between 1 to 5.2 mg/l. It was watched least BOD 1 mg/l at spot 10 in the period of May and June since it was not influenced by individuals exercises. Most extreme BOD 5.2 mg/l was seen at spot 3 in the period of May in light of the fact that it was influenced by people exercises. Tests of spot 1, 2, 3 and 4 were seen over as far as possible (200 mg/l) of iron can cause hemochromatosis with indications, for example, constant weariness, joint pain, coronary illness, cirrhosis, thyroid malady. The iron focus in water causes conjunctivitis, choroiditis and retinitis if in contacts and stays in the tissues (Huang 2003; Kayode et al. 2006) [5]. The presence of high grouping of iron may likewise build the danger of pathogenic life forms; since the vast majority of them need Fe for their development (Tiwana et al. 2005) [13]. Iron of Kanwar lake water ranges between 0.12 to 0.23 mg/l. It was watched least Fe 0.12 mg/l at spot 10 in the period of May and June and most extreme Fe 0.23 mg/l at spot 1 in the long stretch of January, February and Mach. All the examples were seen under as far as possible (0.3mg/l) recommended by BIS for surface water quality.

CONCLUSION

The outcomes got during this investigation were contrasted and as far as possible given by Bureau of Indian Standards for surface water quality and recently distributed consequences of a similar lake. All the boundaries surpassed the recently distributed qualities, which unmistakably showed about upgraded level of pollution. It is additionally closed from this examination that mid-lake waters were not all that much influenced by various pollution sources, in correlations of the delta and outlet waters. A huge yearly increment in the convergence of phosphate and nitrate has obviously demonstrated about its eutrophication. So it very well may be prescribed for this examination to keep a mind the immediate release of various poisons. It is reasoned that water quality boundaries of ten chose spots of Kanwar Lake shows that pH, EC, Turbidity, Alkalinity, DO, COD, Fe, Chloride, Total Hardness and Calcium Hardness were found under as far as possible given by BIS. The BOD and TDS were over as far as possible.

ISSN-2230-7540

REFERENCES

1. Anon (2004). Management action plan for Kamwar Lake 2004- 2005 to 2008-2009, Department of Environment & Forest, Govt. of Bihar.
2. APHA (1991). Standard methods for the examination of water and waste water 14th edition., American Public Health Association, pp. 1189-1193.
3. Dikio ED (2010). Water quality evaluation of Vaal River, Sharpeville and Bedworth Lakes in the Vaal region of South Africa., Research Journal of Applied Sciences, Engineering and Technology. 2010; 2(6): pp. 574-579.
4. Edmondson WT (1966). Changes in the oxygen deficit of Lake Washington., Verh. Internat. Verein. Limnol; 16: pp. 153-158.
5. Huang X. (2003). Iron overload and its association with cancer risk in humans: evidence for iron as a carcinogenic metal., Mutation Research; 533: pp. 153-171.
6. Jhingran VG (1975). Fish and Fisheries of India. Publication corporation, India, pp. 954-1110.
7. Kaushik S, Saksena DN (1999). Physical and Chemical limnology of certain water bodies of central India., Daya Publication House, Delhi, pp. 1-58.
8. Kumar N, Singh DK (2010). Drinking water quality management through correlation studies among various physicochemical parameters. A case study, International Journal of Environmental Sciences; 1(2): pp. 253-259.
9. Kumar V & Chopra AK (2012). Monitoring of physicochemical and microbial characteristics of municipal wastewater at treatment plant, Haridwar city (Uttarakhand) India, Journal of Environmental Science and Technology; 5(2): pp. 109-118.
10. Mullar RM, Rajashekhar M, Vijaykumar K, Haliked SN (2012). Seasonal variation in physic chemical parameters of Hirahalla reservoir, Koppal district Karnataka, International Journal of Systems Biology; 22: pp. 16- 20.
11. Pathak H, Pathak D, Limaye SN (2012). Studies on the physicochemical status of two water bodies at Sagar city under anthropogenic influences. Advances in Applied Science Research; 3(1): pp. 31-44.
12. Singh RP & Mathur P. (2005). Investigation of variations in physicochemical characteristics of a freshwater reservoir of Ajmer city, Rajasthan, Indian Journal of Environmental Science, 2005, 57-61.
13. Tiwana NS, Jerath N, Singh G, Ravleen M. (2005). Heavy metal pollution in Punjab rivers., Environmental Information System; 3(1): pp. 3-7.
14. Trivedi SE, Goel PK (1984). Chemical and Biological methods for water pollution studies., Environ. Pub., Karad, India.

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