International Journal of Applied and Universal Research **E-ISSN No: 2395-0269**
Volume IX, Issue VI, Nov – December 2022 **Available online at: www.ijaur.com**
Impact Factor- 5.908

ASSESSMENT OF POLLUTION IN COKA DAM PAPARA SATNA (M.P.)

Krishna Saraya[1] and Dr. Suman Singh[2]
1. **Research Scholar Department of Zoology Govt. Science College , Rewa (M.P.)**
2. **Prof. Department of Zoology Govt. Science College , Rewa (M.P.)**

ABSTRACT:- In the present study is going to centralize on Coka Dam of Papara, Satna district in central India. Coka Dam is situated in municipal area of Satna town, located on south west part of Madhya Pradesh. The dam water use is domestic purposes, irrigation, aquaculture etc. Study on Pollution status of Coka Dam water was made to assess the portability of water from January 2020 to December 2020. Some physico-chemical parameters were considered such as surface water temperature, turbidity, pH, dissolved oxygen, hardness, and alkalinity, phosphate and nitrate contents. The unmanaged and unwanted activities of surrounding population of the area are deteriorating the dam water quality continuously.

***KEYWORDS*:-** Physico-chemical parameters, Pollution, Coka Dam

INTRODUCTION:-

Fresh water is a critical, finite, vulnerable, renewable natural resource on the earth, and plays an important role in our living environment, without it, life is impossible. Since the beginning of the industrial revolution, increasing human population, economic activities as well as shortcomings in their management have resulted in more pollutants being introduced into watercourses. An increasing number of surface water bodies have come under serious threat of degradation. The global freshwater resources are under increasing pressure (GWP Technical Advisory Committee, 2000). The anthropogenic impact on aquatic ecosystems has become a crucial topic of increasing concern. These problems have led to the adoption of an integrated approach to the management of water resources, which is called Integrated Water Resources Management (IWRM). "We the human being have been generously gifted with the brilliance of natural diversity and we do possess the distinguished capacity of intellectual expression. Hence we must come together to join hands of begin the big endeavour" to save our ecosystems.

During the recent time, mismanagement of surrounding areas of water body has resulted into unprecedented nutrient enrichment of water bodies causing cultural eutrophication, the nature of eutrophication is variable into lotic to lentic ecosystem, which is manifested by raised trophic status, increased rate of sedimentation, loss of water storage capacity, lowered retention period and deteriorated water quality.

The importance of fresh water bodies for human habitation is well known. Man's greed for luxury and comforts has resulted in rapid deterioration of environment. The water bodies from the immemorial had an aesthetic look, quenching the thirst of millions of people have today been loaded with toxic materials and chemical which have rendered them almost useless.

Utilization of chemical fertilizers, insecticides, pesticides, herbicides and other agricultural, domestic, industrialization, urbanization, deforestation are the factors to create the pollution in water bodies, therefore; eutrophication takes place in the water body, due to eutrophication the algal bloom are formed, which damage the organisms life.

Water eutrophication is one of the most challenging environmental problems in the world. The increasing severity of water eutrophication has been brought to the attention of both the governments and the public in recent years. The mechanisms of water eutrophication are not fully understood, but excessive nutrient loading into surface water system is considered to be one of the major factors (Fang *et al*., 2004; Tong *et al*., 2003). The nutrient level of many pond, lakes and rivers has

increased dramatically over the past 50 years in response to increased discharge of domestic wastes and non-point pollution from agricultural practices and urban development (Mainstone and Parr, 2002). For more than 30 years, nutrient enrichment, especially phosphorus (P) and nitrogen (N), has been considered as a major threat to the health of coastal marine waters (Andersen *et al.*, 2004). Once a water body is eutrophicated, it will lose its primary functions and subsequently influence sustainable development of economy and society. Therefore, nowadays the solution of water eutrophication and recovery of the multiple functions of the water system have become the key issues for environmental biologists.

During the study of earth watch program, the ecologists and hydro-biologist have observed that there are several natural and man engineered resources, which are still lacking of research studies therefore a gap have been formed (Williams & Feltmate,1992).

Today, the water, which is an essential components for all of the living beings for their metabolic activities. The main cause of surface water pollution are discharged of industrial, domestic, municipal wastes and agriculture water like irrigation return flow, animal wastes fertilizers, crop residue, dead animal, pesticides residues, disposal of municipal and industrial wastes, sewage leakage, septic tank ,cesspools and urbanization .

In the present study is going to centralize on Coka Dam of Papara, Satna district in central India. Coka Dam is situated in municipal area of Satna town, located on south west part of Madhya Pradesh. It is an important district of Ex- Vindhya Madhya Pradesh State and part of Baghelkhand region of Second century A.D. Satna district is a pilgrim and an industrial place, area rich in Limestone, Bauxite, White clay, Geru, Ramraj and Flagstones. It is also famous for its religious places of Chitrakoot. The district Satna is the central part of Vindhya region which is surrounded by the boundaries of Rewa and Satna on the North, Bilaspur district on the South and Jabalpur on the West side. The dam water use is domestic purposes, irrigation, aquaculture etc.

OBJECTIVES OF THE PRESENT STUDY-:
The objectives of the present study are following:

1. To evaluate the causes and status of water pollution.
2. To study the impact of water pollution on habitat of biotic community.
3. To recommend new techniques and scientific approaches for managing the water pollution, fisheries and aquatic biota.

REVIEW OF LITERATURE:-

Although much work has been done on the water quality and eutrophication of water body at national and international level, but there is vast potential for further research papers published so for would be beyond the scope of present research work. In the following pages important contributions on the water quality and eutrophication are reviewed here.

The water quality of Bichhiya river and Govindgarh lake in order to assess its production potential. The study provides sufficient data and also helps to understand water characteristics and indicate that water of Bichhiya river and Govindgarh lake can serve as a good habitat. All the parameters are quite suitable for the growth of fish (Tiwari A., Awasthi U.; 2016).

Water Quality Index (WQI) is one of most effective way to calculate the water quality of a lake or river which is used as an effective tool by any Scientist to evaluate the water status. An extensive study has been done on the glacial lakes of India (Sharma et. al. 2017), but very little has been done on the lakes of North India especially Haryana. Present work is trying to fill the existing gap to some extent.

Transparency is related to the depth to which light penetrates water. The transparency indicates the productive nature of the water. Transparency is dependent on turbidity which is directly proportional to the amount of suspended matter. Mitter (2018), recorded

water transparency varied between 73 to 95 cm in Powai lake, Mumbai.

Raghav et al., (2014) research work has been carried out to analyze the physico-chemical characteristics of Yamuna river water and to reduce the load BOD, COD, hardness, alkalinity, acidity, dissolved solids, suspended solids, total solids by the process of bioremediation using bacterial consortium. The bacterial consortium treated water sample showed a sharp reduction in BOD i.e. 89% and 84% in COD. The result of the study indicates that Effective bacterial consortium helps in the reduction of water impurities. The observation revealed that the inoculation of bacterial consortium in water may release the nutrients through biodegradation of the organic/inorganic matter of water sources, which promote the plant growth.

Tiwari A. K. and T. Deepika (2018) research work has been carried out to water quality assessment of Ghunghutta Dam Surguja (C.G.). The quality of water Ghunghutta dam is deteriorating day by day due to inflow of domestic sewage, municipal waste, agricultural runoff and effluents of organic waste of animal and human origin into the dam. Therefore it can be concluded through this study that the Ghunghutta dam with social and cultural importance is degrading at an alarming rate.

MATERIAL AND METHODS:-

Environmental pollutants from anthropogenic sources affect the aquatic ecosystem in a synergistic manner, which cannot be detected comprehensively be determination of selected physico-chemical parameters alone. Whereas, biological system can integrate all environmental variable over a long period of times terms of effects which can be easily measured and quantified. Coka Dam of Papara, Satna district in central India. Coka Dam is situated in municipal area of Satna town, located on south west part of Madhya Pradesh. Besides being a source of water for irrigation. The present study conducted from January 2017 to December 2017. Water samples were collected monthly in the morning at 8 am to 10 am from surface layer of the dam. Physico-chemical and biological analysis of water samples were made following standard methods suggested by APHA, AWWA, WPCI (2005).

RESULT AND DISCUSSION:-

Physiochemical parameters important a major role in the determination of quality of any water body. The activities of human beings upset the equilibrium between various biotic and abiotic factors exist within natural systems. So measurement of physio-chemical parameters is an appropriate effort to observe water quality for its legacy to the future.

The data on physic-chemical analysis of Coka dam has been given in table no. 1

Water temperature (^{0}C):- The temperature of water is one of the essential and important environmental factors. Temperature varies not only between climatic regions, but also in the temporal changes of all habitats. During the presents study period water temperature ranged from 19.50 ±0.16 ^{0}C to 32.64 ±0.11 ^{0}C *Jayabhaye et. al*; (2006), *Salve and Hiware* (2006), observed that during summer, water temperature was high due to low water level and clear atmosphere. Similar results were obtained in the present study.

pH:- pH stands for the "power of Hydrogen" and measures the concentration of hydrogen ions in a solution, such as water. Hydrogen ion is an atom of hydrogen that has lost its electron. In water, hydrogen automatically gives up its electron to form ions. The pH values ranges from 7.13±0.19 to 8.20±0.16. The maximum value was recorded from June and Minimum in the month of December. pH was alkaline throughout study period.

Dissolved Oxygen(mg/l):- Oxygen is one of several dissolved gases important to aquatic systems. Dissolved oxygen is necessary to maintain aerobic conditions in surface waters and is considered a primary indicator when assessing the suitability of surface waters to support aquatic life. The value of DO fluctuate from 5.58±0.25 mg/l to 7.76±0.11 mg/l. The maximum

values were recorded in the month of May (summer) and minimum value in the month of October (winter). The high DO in summer is attributed to increase in temperature and duration of bright sunlight. The long days and intense sunlight during summer seems to accelerate photosynthesis by phytoplankton's, utilizing CO_2 and giving off oxygen. This accounts for the greater quality of O2 recorded during summer. The quantity is slightly less during winter as reported by *Masood Ahmed and Krishnamurthy (1990).*

Hardness (mg/l):- Water hardness is of interest to aquarists for two reasons: to provide the proper environment for the fish and to help stabilize the pH in the aquarium. The value of hardness fluctuates from 164.±1.30 to 256±1.58 mg/l. The maximum value was recorded in the month of June (summer) and minimum in the month of January (winter).

Alkalinity (mg/l):- Alkalinity is the alkali concentration of water, the acid-neutralizing capacity. Chemically, alkalinity is measured as the sum of the negatively charged, or anionic, components in water and is most often expressed as parts per million (ppm) calcium carbonate. Total alkalinity ranges from 128 ±1.58 mg/l to 150 ±1.58 mg/l. The maximum value was recorded in the month of August (monsoon) and minimum value in the month of February (winter).

Phosphate (mg/l):- The phosphate in the natural fresh water in present mostly in inorganic forms such as H_2PO_4 and HPO_4 and PO_4. The presence of PO_4 stimulates the growth of photosynthesis of phytoplankton. The enrichment of this nutrient loads to the process of eutrophication. The most important sources of phosphates are the discharge of domestic sewage, detergents and agricultural runoff. The value of phosphate ranged from 0.13±0.02 mg/l to 1.27±0.01 mg/l. The maximum value was recorded in the month of October (winter) and minimum values in the month of April (summer). The high values of phosphate in August (monsoon) months are mainly due to rain, surface run-off, agricultural run-off; washing activities that contributed to the inorganic phosphate content. Similar results were reported by Arvind Kumar ((1995).

Nitrate (mg/l):- Nitrogen is found in fresh water in the form of dissolved molecular nitrogen in numerous forms. Nitrate is also one of the critical nutrients for the growth of phytoplankton's and helps accelerating the eutrophication. Domestic sewage, natural run off and agricultural wastes are the important sources of it. The determination of nitrate in drinking water is of prime importance because of the disease methamoglobinemia caused by its excessive presence. The value of nitrate ranges from 0.16 ±0.02 mg/l to 1.38 ±0.02 mg/l. The maximum value was recorded in the month of May (summer) and minimum in the month of August (Monsoon). *Swaranlatha and Narsingrao (1998)* reported that nitrates are in low concentration in summer and high during monsoon which might be due to surface run-off and rain. Similar results were obtained in the present study.

Table No. 1- Monthly Variation of Physico-chemical parameters of water samples of Coka dam of Satna (M.P.)

Months 2020	Temp °C	pH	Dissolved Oxygen(mg/l)	Hardness (mg/l)	Alkalinity (mg/l)	Phosphate (mg/l)	Nitrate (mg/l)
January	19.50±0.16	7.32±0.10	6.54±0.23	164±1.3	138±1.58	0.64±0.03	0.68±0.03
February	20.62±0.13	7.44±0.16	6.60±0.29	177±1.3	128.±1.92	0.36±0.03	0.65±0.04
March	26.78±0.13	7.68±0.21	6.50±0.43	168±1.58	139±1.58	0.28±0.03	0.85±0.03
April	29.64±0.11	7.86±0.2	7.40±0.27	254±1.58	142±1.92	0.13±0.02	1.35±0.02
May	30.86±0.17	7.94±0.2	7.76±0.11	248±1.58	144±1.92	0.21±0.02	1.38±0.02

June		32.64±0.11	8.20±0.08	6.90±0.22	256±1.58	134±1.58	0.27±0.06	0.93±0.04
July		28.56±0.11	7.72±0.11	6.50±0.21	251±1.34	145±2.17	0.35±0.03	0.42±0.08
August		27.58±0.16	7.62±0.17	6.14±0.51	224±2.77	150±1.58	0.46±0.02	0.16±0.02
September		26.46±0.11	7.44±0.08	6.60±0.25	200±1.14	136±1.58	0.65±0.03	0.27±0.02
October		25.34±0.16	7.24±0.12	5.58±0.25	172±3.16	130±1.92	1.27±0.03	0.44±0.02
November		22.56±0.16	7.16±0.11	6.12±0.34	167±3.16	133±1.79	1.15±0.02	0.46±0.04
December		20.64±0.11	7.13±0.06	6.86±0.18	165±2.39	132±1.92	0.95±0.04	0.55±0.03
Range	**Min**	19.50±0.16	7.13±0.19	5.58±0.25	164.±1.30	128.±1.92	0.13±0.02	0.16±0.02
	Max	32.64±0.11	8.20±0.16	7.76±0.11	256±1.58	150±1.58	1.27±0.03	1.38±0.02

CONCLUSIONS:-

The present study indicates that the Coka dam is not good. The unmanaged and unwanted activities of surrounding population of the area are deteriorating the dam water quality continuously. Due to the increase in environmental temperature and accumulation of sewage these are two main factors which are responsible for creation and problem of eutrophic condition of dam.

REFERENCES:-

1. Adhikari, S, Ghosh, L Rai SP and Ayyappan S (2009) Metal concentrations in water, sediment, and fish from sewage-fed aquaculture ponds of Kolkata, India, Environmental Monitoring and Assessment Volume 159, Numbers 1-4, 217-230.
2. APHA (1995) – Standards methods for the examination of water and wastewater. American Public Health Association, Washington, D.C.
3. APHA, AWWA and WPCF (2005)- Standard methods for examination of water and wastewater. 20th Edition, American Public Health Association. Washington, DC.
4. Arvind Kumar (1995) – Some limnological aspects of the fresh water tropical wetland of Santhal Pargana (Bihar) India. J. Environ. And Poll., 2(3):137-141.
5. Hutchinson, G.E., (1975): A treatise on Limnology. Chemistry of lakes. John Wiley and Sons, New York, USA., pp 1-2.
6. Islam, S.N. (2007) – Physico-chemical condition and occurrence of some zooplankton in a pond of Rajshahi University. Res. J. Fish and Hydrobiol.,2(2) ; 21-25.
7. Jayabhaye, U.M.; Pentewar, M.S. and Hiware C.J. (2006) – A study on physic-chemical parameters of minor reservoir, Sawana, Hingoli district, Maharashtra.
8. Kadam S.D. (1990) – Environmental study of lake Rankala, Jyanthi Nala and lake Kotitirth from Kolapur City. Environ. & Ecology 8(1) : 95-97.
9. Mackie (1998) – The building of dams imposes a lentic habitat with in a lotic system, the aquatic communities must adjust to the change in physico-chemical and biological attributes of riverine system to those of locustrine system.
10. Masood Ahmed and Krishnamurthy R. (1990) – Hydrobiological studies of Wohar reservoir Aurangabad (Maharashtra state) India. J. Environ. Biol. 11(3),335-343.
11. Mitter C. (2018) - Status of water quality of Powai lake, Maharashtra, India. Int. J Sci. Res. 1(7):1623-1625.
12. Odum E.P. (1961): Effect of stress on trajectory of ecosystem succession. Pages 43-47 in G. Barrett and

R. Rosenberg, editors. Stressed ecosystem. John Wiley and Sons, New York.

13. Pani, S., Misra, S.M., (2000): Impact of hydraulic detention on the water quality characteristics of a tropical wetland (Lower Lake). *Environmental pollution and its management* (ed. Pankaj Srivastava)., pp18-28.
14. Raghav N, Shrivastava J.N (2014) Remediation of Yamuna River water in city of Taj by Bacterial Consortium. Int. J. Pure App. Biosci. 2 (2): 249-253
15. Sagar T. P., Singh Sanjay, Singh Vibha Singh, Baghel S.R. and Dwivedi Ajendra Kumar, (2012)-"Effect of water pH on growth and production of fish in the Coka Dam Papara Distt. Satna (M.P.)" Int. J. of Pharm. & Life Sci. (IJPLS), Vol. 3, Issue 9: September, pp-1979-1981.
16. Saxena, R., (1990): Limnological and water quality status of the Lower Lake of Bhopal with special reference to certain phytoplankton, micro-invertebrates and microbiological component, Ph.D. Thesis, Barkatullah University, Bhopal.
17. Sharma RC, Kumar R. (2017) Water quality assessment of sacred glacial Lake Satopanth of Garhwal Himalaya, India. Applied Water Science. Dec 1;7(8):4757-64.
18. Shrinivasan A. (1964) – A hydrobiological study of tropical impoundment. Bhawani Sagar reservoir, Madras State, India (1956-61) Hydrobiological Journal. 24:514-539.
19. Singh, S. P., Deepa, P., and Rashmi, S., (2002): Hydrobiological Studies of two ponds of Satna (M.P.), India, *Eco. Environ. Cons.*,8(3):289-292.
20. Sunkad, B. N. and Patil H. S. (2004) – Water quality assessment of fort lake of Belgaum (Karnataka) with special reference to zooplankton, J. Environ. Biol. 25(1), 99-102.
21. Swarnalatha. P. and Rao, A.N. (1998) – Ecological studies of Banjara lake with reference to water pollution Hyderabad. J. Environ. Biol., 19(2): 179-186.
22. Tiwari A. K. & T. Deepika (2018). Water Quality Assessment of Ghunghutta Dam Surguja (C.G.). Review of Research International Journal Volume - 8 | Issue - 3 | December – 2018.
23. Tiwari A., Awasthi U.(2016) "Study of physical parameters in Bichhiya river and Govindgarh lake of district Rewa M.P. India", International Journal of Scientific and Research Publications, Volume 6, Issue 11.
24. Varughese B., Dhote S., Pani S. and Mishra S. M., (2004): Impact of artificial aeration and ozonization on pathogenic bacteria of a tropical sewage fed lake, *Poll. Res*., 23(1):199 – 203.
25. Vashist, H.S. (1968) – Limnological studies of Sakhana lake Chandigarh, India. Proc. Symp. Recent advances of Tropical & Ecology, 316-325.
26. Welch, P.S. 1951. Limonology, 2nd Ed., McGraw Hill Book Co., N.Y.pp: 536. West, W. and West, G.S. 1911. The British freshwater plankton and the distribution of desmids. Proc. Roy Soc. 81: 165-206.
27. Wetzel, R.G. (1975) Limnology. W. B. Saunders Co., Philadelphia, U.S.A. pp. 743.
28. Williams and Feltmate (1992) and Mackie (1998) – Studies oculus artificial impound meals in U.S.A.
29. World Health Organization (WHO). 1971. International standards for drinking water. 3rd ed. Geneva. pp: 48-49.