ISSN 2278-7763

Study on Trophic status of "Moghat Reservoir Khandwa" (M.P.)

***Keshre Vivek** ****L. K. Mudgal**

***Govt. Girls P.G. College, Khandwa (M.P.)**
****Govt. Girls P.G.College, Motitabela Indore (M.P.)**

Abstract

Khandwa *is one of the districts of the state M.P. The Moghat reservoir is situated three Kilometers away in the Northwest area of Khandwa town on 21^0 49` 36`` N latitude and 76$^0$ 20`56`` E longitudes. It is a man made reservoir built in 1897. The present study aims to know the present trophic status of the reservoir and to give some suggestion to Municipal Corporation for the conservation of this historical and useful water body.*

INTRODUCTION:- Water is a prime natural resource, a basic human need and a precious national asset. The planning, developing, conserving and managing of which should be on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of our State. Realizing the importance and scarcity of fresh water, it has to be treated as an essential environment for existence of life. It is one of the most crucial elements in developmental planning.

Since the early part of the 20th century, lakes have been classified according to their trophic state. Eutrophication is the process by which lakes are enriched with nutrients, increasing the production of rooted aquatic plants and algae. The extent to which this process has occurred is reflected in a lake\'s trophic classification or state: oligotrophic (nutrient poor), mesotrophic (moderately productive), and eutrophic (very productive and fertile). Shallow lakes tend to be more productive than deep lakes, in part because they do not stratify, thereby allowing nutrients to remain in circulation and accessible to plants. They also tend to have a smaller lake volume, so nutrient loading from their watershed has a larger impact. There are undoubtedly exceptions to this typical

ISSN 2278-7763

progression from oligotrophy to eutrophy, " Natural eutrophication is a slow process of enrichment and is a part of ageing phenomenon. In nature eutrophication is a beneficial process in that it produces enhanced productivity in the water mass. However man made accelerated eutrophication of inland waters has been viewed as an environmental degradation by many workers Lund (1972), Vollenweider (1984). This invariably results in deterioration of water quality, which in many ways causes significant economic loss. Eutrophication in streams, lakes, reservoirs and the ocean, especially in protected areas like bays and lagoons, could adversely affect their aquatic life and use for recreation. .

Paper presents the results of the physico-chemical and plankton characteristics of Moghat reservoir Khandwa (M.P.). The data indicate that the reservoir has a pH in the alkaline range between 7.3 and 8.9. The phytoplankton is dominated mainly by the species of Cyanophyceae, Chlorophyceae and diatoms, which belong to the tolerant species.

MATERIAL AND METHOD:- **:-** Khandwa is one of the district of Madhya Pradesh which is famous for its historical and holly place Omkareshwar where one of the jyotirlinga of lord shiva is situated on the bank of river Narmada.On the other hand the Indirasagar dam is also situated on the same river in Khandwa district.

The Moghat reservoir of Khandwa is situated 3 kilometer away in the North West area of the city on 21^0 49' 36" N latitude, 76^0 20' 56" E longitude and 324.4 meter above from mean sea level. It is a man made reservoir built in 1897 which receives rainwater through two main sources one is called Ajanti canal and other is a local nalaha called barud nalla, from its 23.30 sq. kilometers catchment's area. The storage area of Moghat reservoir is 2.02 sq. k. m., which has 5.36kilometers shore line surrounded by hills with some large trees shrubs and agricultural land.

Moghat reservoir was initially prepaired to sort the water problem of local people of Khandwa but later on this water body is also used for fish production/culture. So far limited knowledge has been available on the physico chemical and plankton production condition of reservoir water .

The water sample were collected monthly from four sampling stations for physico chemical analysis through out the study period of one year (oct. 06 to sept. 07) The samples are well mixed and stored in two litter plastic cane . Sample collection was usually completed during morning hours between 7.00 to 9.00am. The water temperature, PH and dissolved oxygen were estimated on the spot at the time of sampling while other parameters were estimated in the

ISSN 2278-7763

laboratory. standard methods as given by Trivedi and Goel (1986) Saxena (1990) and APHA (1992) were followed for estimation of various physicochemical parameters of water.

Results and discussion : the mean value of various parameters of four sampling sites are given in table :- (October 06 – September 07)

Month	Temp.	PH	D.O.	B.O.D.	C.O.D.	Chloride	Sulphate	Silicate	Tot.Hardness
Oct.6	29.2	8.26	6.47	3.27	9.47	18.85	22.65	7.37	122.45
Nov.6	21.2	8.23	8.42	3.12	8.72	17.15	22.60	6.75	118.27
Dec.6	18.1	8.23	8.90	2.92	8.97	17.12	16.02	7.22	120.47
Jan.7	19.1	8.2	8.25	3.17	8.82	19.05	16.77	7.82	121.5
Feb.7	22.7	8.22	7.70	3.45	10.42	21.30	16.67	9.57	122.35
Mar.7	25.6	8.32	6.62	3.72	10.90	23.57	19.27	10.30	127.10
Apr.7	27.9	8.36	5.55	4.05	11.17	25.63	20.77	11.20	134.85
May.7	29.7	8.33	4.97	4.27	11.40	28.25	27.32	10.82	145.32
Jun.7	29.7	8.28	5.12	4.72	11.72	32.30	31.62	10.60	153.65
Jul.7	29.8	8.83	5.50	4.45	11.47	28.95	33.65	9.87	104.45
Aug.7	26.8	8.72	5.70	4.17	10.65	23.32	30.10	9.10	96.37
Sep.7	28.2	8.11	6.42	3.85	10.17	22.05	25.45	8.32	92.82

ISSN 2278-7763

Mean Values Of Soil Parameters /kg. Of Sample and Phytoplankton's / Liter of Water Sample of four stations

Soil Parameters / Kg. Of Soil

Month	PO4	Nitrate	Nitrite
Oct.6	.64	.81	.66
Nov.6	.56	.27	.23
Dec.6	.44	.21	.18
Jan.7	.46	.19	.30
Feb.7	.42	.17	.29
Mar.7	.43	.21	.35
Apr.7	.40	.26	.36
May.7	.42	.29	.41
Jun.7	.38	.37	.45
Jul.7	.60	.42	.46
Aug.7	.66	.44	.42
Sep.7	.71	.34	.47

Phytoplankton's / Liter of Water

Month	Diatoms	Green Algae	Blue green Algae
Oct.6	2241	366	105
Nov.6	2286	225	73
Dec.6	2404	241	60
Jan.7	1888	187	73
Feb.7	1480	111	32
Mar.7	926	99	15
Apr.7	665	48	07
May.7	734	45	06
Jun.7	827	108	25
Jul.7	863	145	38
Aug.7	951	226	13
Sep.7	1746	267	66

Nitrogen and phosphorus can come from many sources, including animal manures, organic fertilizers, and commercial fertilizers. Nutrient pollutants can also move from various locations, including cropped fields, pastures, and lawns in urban settings. Nitrogen in the nitrate form is highly soluble in water. Water moving through the root zone may wash nitrate downward, reaching tiles or drainage channels and potentially reaching groundwater or surface waters like river, pond, canal and reservoirs. However, during the construction of any reservoir no full proof methods have been advocated to prevent the eutrophication and siltation of the reservoir, it is only minimized up to a certain limit.

Effects of eutrophication include increased biomass of phytoplankton, shifts in phytoplankton to bloom-forming species which may be toxic or inedible, increased in blooms of

ISSN 2278-7763

gelatinous zooplankton, increased biomass of benthic and epiphytic algae, changes in macrophyte species composition and biomass, decreases in water transparency, taste, odor, and water treatment problems, oxygen depletion, increased incident of fish kills, loss of desirable fish species, reductions in harvestable fish and shellfish, decrease in perceived esthetic value of the water body (Carpenter *et al.* 1928).

On the basis of limnological characteristics of Moghat reservoir, the trophic status of this water body can be discussed as follows:-

According to Edmonson (1961) and Nalewazko *et al., (*1981), DO is one of the important parameter to analyze the health of water body in respect to trophic status. Due to various limitations in the present study we cannot consider DO values for determining trophic status of Moghat reservoir, because to determine trophic status on the basis of DO it is necessary to analyze DO depth wise but in the present study only surface samples have been considered. But high values of DO and low value of BOD in Moghat reservoir clearly indicates the clean nature of water. Another important parameter is chloride content which depicts the pollution level of organic origin; Rao (1987) reported average chloride content of Ranga Sagar lake as 83.73 mg/l and designated water body as eutrophic. In the present study the chloride value are found maximum of 34.4 mg/l. The TDS values are also found low during course of study. The presence of nutrients like nitrates, phosphates, silicates and calcium are indicative of trophic status of water body.

Besides physico-chemical parameters, biological parameters in water body are equally significant in assesing water quality. Nygaard (1949) observed that heavy occurrence of Volvocals is indicative of eutrophic lake and accordingly Volvocales are almost absent in oligotrophic lakes and rare in mesotrophic ones.

However the present study of Moghat reservoir indicates low transparency, lower chloride content, moderate DO, low BOD rare number of Volvocales and low values of nutrient, which do not support rich productivity of water body. Hence, considering all the above mentioned factors Moghat reservoir seems to stand between oligotrophic and eutrophic states. Therefore on the basis of above finding Moghat reservoir can be considered as mesotrophic

ISSN 2278-7763

The reservoir water parameters have crossed the desirable drinking water criteria with respect to pH, TDS, total hardness, magnesium hardness etc. and hence it should be used with almost care by treating it to minimize the excess values of the above parameters, and to bring them below the desirable limits of drinking water standards.

REFERENCE

Adoni, A.D.(1985) Eutrophication and production studies of some lentic ecosystem around Sagar (M.P.) Ann.Rept.MBA Proj.100-108.

APHA, AWWA, (1998) Standard methods for the examination of water and waste water, 20th ed. Washington D.C. Newyork.

Carlson, R.E. (1977) A Trophic state index for lakes. Limnology and Oceanography 22:361-369.6-2

Das S.M. (1989) hand book of Limnology and water pollution , South Asian publisher New Delhi1-174

Goldman, C.R. and Wetzel, R.G. (1963): A study of primary productivity of clear Lake, Lake County, California. Ecology, 44: 283-294.

Govind, B.V. (1963): Preliminary studies on plankton of the Tungabhadra reservoir. Indian J. Fish. 10(1) : 148-158.

Joshi B.D,Bist,R.C.S. and Joshi Namita (1996) Planktonic population in relation to certain physic-chemical factors of ganga canal jwalapur (Hardwar) Him.J. Env.Zool.Vol.10: 75-77

Khan M.A. and Zutshi, D.P. (1980) Primary productivity and trophic status of a Kashmir Himalaya lakes. Hydrobiologia,68 (1) 3-8.

Khanna D.R. and Bhutiani R (2003) Limnological status of Satikund Pond at Hardwar ,Indian J. Env. Sci. vol.7 (2): 131-136

Khanna, D.R. and Bhutiani, R. (2003): Limnological status of Satikund pond at Hardwar (U.A.), *Indian J. Env. Sc*., Vol.7 (2): 131-136

Lund, J.W.G. (1972): Eutrophication. Poc. R. Soc. London Ser. B.,180: 371-382.

Needham, J.G. and Needham, P.K., 1962. A guide to the study of fresh water Biology Holden-Day Inc. Sanfrancisco 108.

Odum, E.P. 1971: Fundamental of ecology 3ded Saunders. Philadalphia. 574 pp.

Rao, N.G. (1987): Synecology of the lake Rangasagar in relation to the limnology and eutrophication. Ph.D. Thesis Sukhadia Univ. Udaipur

ISSN 2278-7763