Morphometric features and nutrient status of Kadal water body, India

Ashvin Godghate,

Assistant Professor, Department of Chemistry,

Dr. Ghali College, Gadhinglaj 416502, India

Abstract: The present work described the Morphometric features and nutrient status of Kadal fresh water body of Gadhinglaj Tahsil of Kolhapur district. The seasonal parameters were analyzed for a period of 2018-2019. The water body is manmade perennial with submergence area 2.41 ha determined by GPS. The nutrients parameters like Sodium, Potassium, Calcium, Magnesium, Nitrates, Sulphate, Phosphates and Total solids were analyzed by using standard methods.

During the investigation, higher values were observed in summer season for all nutrients. All the values of nutrients parameters are within the permissible limit, so this water body is suitable for agriculture, domestic and drinking purpose.

Keywords: Freshwater body, Morphometry, Nutrient parameters, Suitability.

INTRODUCTION:

Due to overexploitation water resources have becomes polluted and chocked with excessive growth of algae. The environmental pollution affects the general quality of our surrounding and posses risk to our health and wellbeing (Parimalam et.al, 1994 and Sawant et.al 2010).

Fresh water plays an important role in climate regulation like weathering process, biochemical reactions in cells of living organism and in the nutrients cycling between biotic and abiotic components of ecosystem. The whole water reservoir under pressure and must be managed for human survival it is therefore, necessary to have most relevant information for arriving at national decision that will result in the maximum benefit to the most people. The water reservoirs are most important water resources for the local people, mainly for the drinking and domestic purpose. Hence, the environmental monitoring and conservation of fresh water bodies is of prime importance (Sawant and Chavan, 2015). The present attempt has been made to study the nutrient status and Morphometric features of fresh water body of Kadal.

MATERIAL AND METHODS:

Collection of samples: Water samples were collected seasonally during 2018-2019 from Kadal reservoir in plastic container from Gadhinglaj Tahsil of Kolhapur district, Maharashtra State.

Analysis of Physico-chemical Parameters:

The nutrients parameters were analyzed by using standard methods of Trivedi and Goel (1984).

Morphometric Measurements: Actual submergence area was evaluated by walking around the water reservoir through selection of two coordinates with the help of hand held Global Positioning System (GARMIN Etrex vista HCx and Software: Mapsource) (Sawant et.al 2014).

RESULTS AND DISCUSSION:

Morphometric Feature:

The Morphometric features were recorded in table 1. Kadal water reservoir is located in Gadhinglaj Tahsil with latitude $16^0$07’873” and longitude $74^0$23’422”. This reservoir is east south side to Gadhinglaj city. It is a manmade and perennial small water body. The catchment area of this reservoir is 0.86 sq.km. Length and height of this reservoir is 260 m and 14.96 m. The actual present investigated submergence area by GPS is 2.41 ha.

The seasonal variations of nutrient parameters are presented in table 2.

1. **Calcium:** Calcium is an important micronutrient for development of aquatic organism (Meshram, 2005). The values were fluctuated from 22 to 32 mg/L. Lower values were found during winter season while higher values were in summer

season. Due to oxidation and decomposition of organic matter, Calcium is increase during summer season. Similar findings were given by Billore, (1981) and Sawant and Chavan, (2013).

2. **Magnesium**: Due to leaching and weathering of rocks produce Magnesium nutrients in water body. It concentration remains always less than that of Calcium (Venkatsubrami and Meenambal, 2007). The values were noted from 10 to 17 mg/L. Maximum values were observed during summer season due to high temperature and higher evaporation of water. Minimum values were recorded in Rainy season might be due to dilution by rain water.
3. **Sodium**: The main source of Sodium in fresh water body is due to the presence of rock salts, precipitation runoff, soapy solution and detergents. The values were varied from 12 to 18 mg/L. Rise in Sodium was observed in summer season due to evaporation of water (Solankhi, 2001).
4. **Potassium:** It is an essential for growth of blue green algae (Wetzel, 2001). The values lie between 01 to 2 mg/L. Lower values of Potassium might due to sedimentation and utilization of Potassium by biota (Garg, et.al 2006).
5. **Sulphates**: The values were fluctuated from 14 to 20 mg/L. High amount of Sulphate causes toxicity to aquatic life in fresh water body.
6. **Nitrate**: The nitrate concentration depends upon the geochemical conditions of organic load. The values recorded 0.0031 to 0.0088 mg/L. The increased amount of nitrogen during rainy season due to anthropological activities and agriculture runoff (Krishna, 2007). It brings animal excreta and decomposition of litter from surrounding area.
7. **Phosphates**: It plays a dynamic role in water bodies as it is readily taken up by phytoplankton (Heron, 1961). Higher amount of Phosphates was observed in summer and rainy season and causes eutrophication in water reservoir leading to algal bloom (Shinde, et.al 2011). The amount of Phosphate was nil in winter season whereas it was found 0.009 mg/L in remaining season.
8. **Total solids:** Total solids are due to Carbonates, Bicarbonates, Sulphates, Chloride, Calcium and Magnesium in fresh water (Esmaili and Johal, 2005). The values of Total solids fluctuated between 116 to 160 mg/L.

CONCLUSION:

The results of this investigation, the nutrient parameters values were within the permissible limit. So the water of this Kadal body is suitable for agriculture, domestic and drinking purpose.

References:

[1] Parimalam, S., Jaganathan, R., Geetha, S. and Subramaniam, S. 1994. Statistical correlation between dissolved Oxygen levels and environmental factors in a tropical lake. *J.Ecobiol*., 6(4): 265-270.

[2] Sawant, R.S. , Telve, A.B, Desai, P.B. and Desai J.S. 2010. Variations in hydrobiological characteristics of Atyal pond in Gadhinglaj Tahsil district Kolhapur, Maharashtra .*Nat. Envi. And Poll. Tech* 9(2): 273-278.

[3] Sawant, R.S. and Chavan, N.S. 2015. Morphometric features and Hydrology of Kadgaon fresh water reservoir (MS), India. *European Academic Research*, 3(4): 3726-3739.

[4] Sawant, R.S., Chavan, N.S. and Patil, S.R 2014. Survey and Mapping of Freshwater Bodies from Gadhinglaj Tahsil of Maharashtra (India) by using GPS. IOSR, *J.Environ. Sci., Toxicol. And Food Tech*, 8(8): 17-22.

[5] Trivedi, R. K.& Goel, P. K. 1984. Chemical and Biological methods for water pollution status. Environmental publication, Karad (India).

[6] Meshram, C.B.2005. Zooplankton biodiversity in relation to pollution of Lake Waladi, Amravati.*J.Ecotoxicol. Environ. Monit*. 15: 55-59.

[7] Billore, B. K. 1981. Ecological studies of Pichhola Lake, Ph. D. Thesis, University of Udaipur.

[8] Sawant, Rajaram and Chavan, Niranjana 2013.Water quality status of Mahagaon reservoir from Gadhinglaj Tahsil from Maharashtra .*Int.J.Sci. Envi, Tech* 2(6): 1196-1204.

[9] Venkatsubramani, R. and Meenambal, T. 2007. Study of subsurface water quality of Mathupalayan Taluka of Coimbatore District, Tamil Nadu. *Nat. Envi. Poll. Tech.* 6: 307-310.

[10] Solanki, H. A. 2001. Study on pollution of soils and water water reservoirs near industrial areas of Baroda. Ph. D. Thesis. Submitted to Bhavnagar University Bhavnagar.

[11] Wetzel, R.G. 2001. Limnology: Lake and River ecosystems. Academic Press, San Diago, California.PP1006.

[12] Garg, R. K., Saksena, D. N .and Rao, R. J. 2006. Assessment of Physico-chemical water quality of Harsi water reservoir, District Gwalior, Madhya Pradesh. *J. Ecophysiol. Occup. Hlth.* 6: 33-40.

[13] Krishna, R. H., Ramachandramohan, H. and Vishalakshi, Y. 2007. Limnological studies on Kolaramma lake, Kolar, Karnataka. *Environ Ecol.* 25: 364-367.

[14] Heron, J.1961. Phosphorous adsorption in Lake Sediments. *Limnology and Oceanogr*. 6:338

[15] Shinde, S. E., Pathan, T. S., Raut, K. S. and Sonawane, D. L. 2011. Studies on the physico-chemical parameters and correlation coefficient of Harsool- Savangi Dam, district Aurangabad, India. *Middle-east J. Sci. Res.* 8 (3): 544-554.

[16] Esmaeili, H. R. and Johal, M. S. 2005. Study of physico-chemical parameters of water of Gohindsagar water reservoir, India *Proc. Nat. in India* (EDd. M. S. Johal), Punjab University, Chandigarh, 173-177.

Plate: GPS map of Kadal water Reservoir

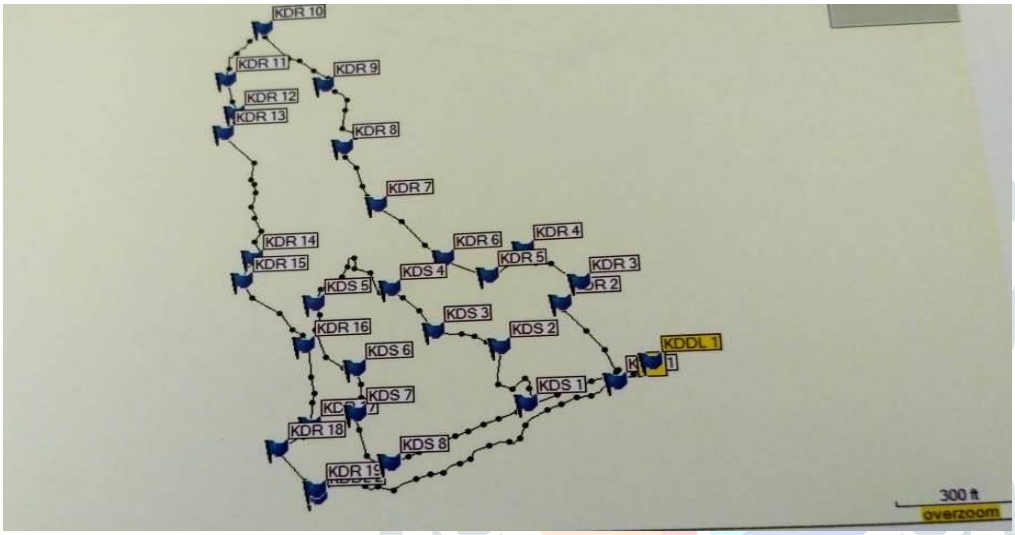

Table 1: Morphometric features of Kadal water Reservoir

Latitude	16^0 07' 873"
Longitude	74^0 23' 422"
Height of dam (m)	14.96
Length of dam (m)	260
Catchment area (sq. km)	0.86
Present investigation area by GPS (ha)	2.41
Ecological status Parameters	Perennial

Table 2: Nutrients status of Kadal water Reservoir

Parameters	Monsoon	Winter	Summer
Na	12	16	18
K	02	01	02
Ca	29	22	32
Mg	10	13	17
NO_3	0.0031	0.0088	0.006
SO_4	14	16	20
PO_4	0.009	BDL	0.009
Total Solids	116	132	160

All values are in Mg/L