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Physiochemical Properties Of Ground Water In Blue Bird Wetland Hisar, Haryana (India) With Special Reference To Higher Education

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Abstract: ***Wetland ecosystems have been disappearing and degrading at an alarming rate, but restoration efforts are underway all around the globe to counteract this trend. The effects of wetland restoration and management initiatives on avian populations have been the subject of much study. Many studies have focused on wetland areas in the country's centre or coastal regions, although wetlands in more distant regions of the interior have received very less attention. We looked specifically at how migratory birds were affected by the re-creation of wetland habitats. Ours is the first research to look at changes in species composition before and after wetland restoration efforts were initiated for Blue Bird Lake, and to do so over the course of a full year. Our research found that various species of waterbirds had varying habitat preferences, indicating that alternative approaches to restoration and management are needed. Water, fish, fodder, fuel, animal habitat, urban runoff rate control, coastline erosion buffer, and recreational opportunities are just some of the many benefits that wetland ecosystems provide to humankind. They've been falling at an alarming pace because of human interference and urbanisation.***

Key Words: Wetland, habitats, urbanization, Blue, bird, fodder, animal habitat, urban runofferosion.

INTRODUCTION- The ecological services provided by wetlands are vast, including water purification, flood control, and temperature adjustment, and they are home to a wide variety of animal and plant species. But they are often damaged or ruined. During half of the world's wetlands may have disappeared over the last century. Wetland birds in particular are sensitive indicators of wetland conditions, and their reductions have been some of the largest ever documented because of this. Additional environmental and social demands are met by wetlands in urban contexts, such as the retention of storm water runoff from impermeable surfaces and the treatment of wastewater. Increased scenic value and recreational opportunity are two more benefits of urban wetlands. The capacity to operate as storm-water retention zones is one economic benefit that might lower infrastructure expenditures. Pressures from urbanisation have a much greater impact on urban wetland ecosystems than on their rural counterparts, leading to widespread deterioration, loss, and destruction.

The water table is often at or near the surface, and the land is covered by shallow water, making wetlands a transitional habitat between terrestrial and aquatic environments. The term "wetland" is used to describe any region that is flooded at some point throughout the year, whether temporarily or permanently. This includes tidal flats as well as locations near rivers, rice fields, swamps, and lakes, among other places. Water, fish, fodder, fuel, animal habitat, urban runoff rate control, coastline erosion buffer, and recreational opportunities are just some of the many benefits that wetland ecosystems provide to humankind. They have adaptations for both aquatic and terrestrial life yet defy easy categorization. The long-term presence of water is the determining factor, since it alters the soils, microbes, plant and animal populations, and the land's function in ways that are distinct from those of wet or dry ecosystems. There seems to be an attempt at realism, in light of the importance of wetland ecosystems. By joining the Ramsar Convention on Wetlands of International Importance, around one hundred nations have agreed on a common concept. When deciding what kinds of areas qualify as "wetlands," the Convention takes a very wide view.

LITERATURE REVIEW- Choden, Yeshi. Et. al. (2022)read Renuka Lake Ecological Health Assessment (Himalayas, India). Results showed that "the ecological health index (EHI) of Renuka lake, Himachal Pradesh of India, was studied based on the National Sanitation Foundation Water Quality Index (NSFWQI), Carlson's Trophic State Index (TSI), Simpson Diversity Index (SDI), and Shannon-Weiner index" (SWI). The NSFWQI and CTSI

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findings, which fall between the ranges of 40 and 59 and 49 and 58.9, respectively, indicate that the water quality is low to medium and unfit for human consumption, however it may be utilised for other, non-drinking uses. The lake's total EHI is 1.812.47, which places it in the eutrophic range and indicates a somewhat low trophic condition. Cultural siltation/nutrient loading, religious practises, land tenure difficulties, and unchecked tourist pressure followed by recreational activities on water bodies and in the vicinity of the lake are all contributing factors to the lake's EH category changing from mesotrophic to eutrophic. As a result, it is recommended that the lake undergo source-control, desilting/dredging, and lake aquatic planting in order to regain its ecological health and return to a mesotrophic or oligotrophic condition

ArunaDhamija (2020)Management's Investigative Study of Indian Water Bodies. The present investigation sheds light on the root causes of water body pollution. The results of this first investigation suggest that, although there is considerable variety in the clustering of major metals in the water test at different inspection sites, they nevertheless remain above maximum as defined by various strategy-making organisations. So, it's crucial to maintain the biological system and set up a mechanism for cleaning the lakes and rivers. A Wastewater Management Strategy (WMS) is analysed as a potential tool for determining the most effective wastewater treatment strategy.

S. Adarsh., Manasa. M P. and Shesha Prakash. (2019)analysed the results of a case study titled "Water Quality of Lakes in Mysuru, India." Several water bodies, in and around Mysuru, have been subjected to different sorts of environmental degradations as a result of the fast rise in population, exponential growth of industry and urbanisation, etc. Phytoplankton, macroalgae, and even colourless heterotrophic protists may clump together in response to this, discolouring the water and generating foam. This causes a decrease in dissolved oxygen (DO), which in turn disrupts the lake's natural balance and causes eutrophication. Three lakes in Mysuru, Karnataka, India were chosen as case studies for this paper, and their physico-chemical water quality characteristics were analysed. These lakes are Kukkarahalli Lake, Karanji Lake, and Dalvoy Lake. Results demonstrate that values fluctuate. The present water quality state of the aforementioned three lakes is revealed, and environmental remediation procedures are proposed to enhance the lakes' water quality.

O, Erina et. al. (2018)Lake Glubokoe's ecological status in the Moscow area was analysed. The purpose of this research is to evaluate the trophic status of a small lake under current climatic circumstances using the one-dimensional MyLake model from the Norwegian Institute of Water Research. Lake Glubokoe, a temperate body of water in the western section of the Moscow area in Russia, is the focus of this investigation. Publications describe it as a mesotrophic, tiny, dimictic lake. Fewer observations of hydrology and water quality have been made since the middle of the twentieth century. In-depth hydrological observation data from the 2017 growing season is used to calibrate the model. With observational data from 1991–2015, it has been verified. After being automatically optimised, the model can adequately depict the temperature regime and dynamics of the parameters necessary for the trophic status assessment, including the mineral phosphorus and chlorophyll concentrations in the lake. Model simulation of Lake Glubokoe's hydro-ecological regime from 1991-2015 is examined in terms of the dynamics of its trophic status, as determined by the average summer surface chlorophyll concentration. The average trophic level over this time period is considered to be mesotrophic, and it reaches eutrophic levels at times of rapid algae development. These estimations are consistent with what has been seen about lake zooplankton dynamics.

Saluja, R., Garg, J. K. (2017)A report on the trophic status of Bhindawas Lake in Haryana, India. This investigation of Bhindawas Lake, India, aims to identify the factors that may have contributed to the lake's trophic divergence and explain the regional and temporal fluctuations in its trophic condition. Throughout the observational window, the lake's trophic status fluctuated between eutrophic and hyper-eutrophic. The increased phosphorus levels within the lake environment are the primary cause of its eutrophic condition. Spearman's correlation has also been used to examine the impact of other water quality measures. The lake is mostly phosphorus constrained, and its

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trophic status is heavily impacted by non-algal turbidity, as shown by the discrepancies between the trophic state index (TSI) and chlorophyll a (Chl-a), total phosphorus (TP), and Secchi depth (SD). Geographic information system (GIS) spatial study of trophic levels aided in the identification of pollution sources and chemical variables influencing the lake's trophic condition. Further research into nutrient and sediment input into the lake system, as well as a sustainable management and conservation plan that identifies appropriate metrics for verifying ecosystem integrity, are all justified by the results of this study.

RESEARCH METHODOLOGY- At each sampling interval, samples of ground water and wetland were taken from the same location. As part of the research, three samples of ground water (SG 1, SG 2, and SG 3) were taken to determine how marsh water affected the aquifer. Table 1 gives the specifics of the surface water sampling sites, while Table 1 displays the ground water sampling sites from SG 1 to SG 3. Table 2 provides information on where ground water samples were taken at S1, S2, and S3 depths. From July 2021 forward, water was tested every two months, and its physicochemical properties were monitored so that seasonal and diurnal change could be evaluated.

Statistical Techniques- Microsoft Excel and the Statistical Package for the Social Sciences (SPSS) were used for the statistical analysis. The Mean and Standard Deviation over each month were computed for each sample location. SPSS was used to determine statistically significant correlations between water parameters and their respective means. We also used one-way analysis of variance to look for signs of substantial seasonal and other types of out-of-the-ordinary variation.

DATA ANALYSIS- One-way analysis of variance allows for comparisons between samples. The study's analysis found statistically significant (p0.05) differences across locations for several physico-chemical parameters based on monthly mean values. Cl and E.C. revealed substantial variance (p0.01), while dissolved oxygen showed extremely significant variation (p0.001), from one location to the next. In addition, certain parameters showed variances that were not statistically significant.

Table 1

One-way ANOVA data on mean of different month at different sites of Blue Bird Lake wetland

S. No.	Parameter	P value	sig./ns	MS value	F Value
1	pH	0.821	Ns	0.110	0.5385
2	Temperature	1.274	Ns	0.527	0.013
3	E.C.	0.006	S	201927	2.032
4	Turbidity	0.281	Ns	143.2	0.923
5	T.S.S.	1.197	Ns	140.5	0.241
6	T.D.S.	0.077	Ns	57646	1.368
7	Cl	0.007	S	4073	2.021
8	Alkalinity	0.253	Ns	7492	0.952
9	HCO3	0.231	Ns	11447	0.987
10	Hardness	0.098	Ns	11356	1.248
11	Ca	0.171	Ns	537.3	1.082
12	Mg	0.061	Ns	145.6	0.391
13	K	0.091	Ns	215.6	1.278
14	DO	0.0001	S	3.76	2.996
15	Acidity	0.529	Ns	3.42	0.692
16	SO4	0.221	Ns	1324	0.995
17	PO4	0.917	Ns	0.044	0.442
18	NH4	0.931	Ns	0.016	0.434
19	Nitrate	0.821	Ns	0.074	0.502
20	Na	0.153	Ns	601.6	0.081
21	Fe	0.234	Ns	35369	0.982
22	Zn	1.044	Ns	93.7	0.362

Many physical and chemical characteristics were found to change significantly over time. The average value from several locations and times was used to determine the variance. Changes in pH, EC, and turbidity over time were not statistically significant. The average values of sites exhibited very significant change throughout time

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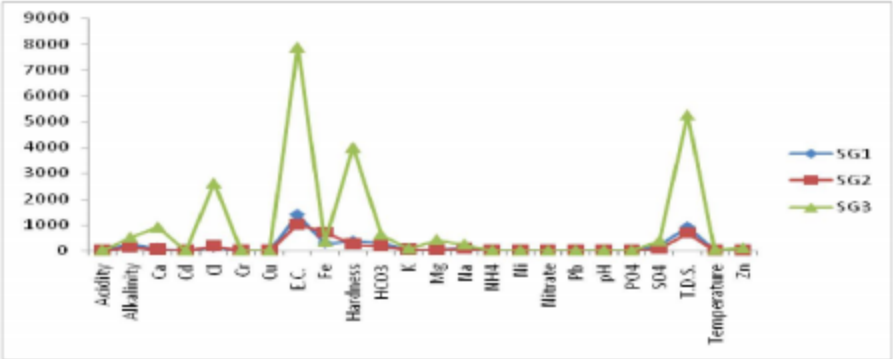
and for temperature, calcium, alkalinity, acidity, potassium, ammonia, iron, phosphate, and zinc.

Bicarbonate, magnesium, total hardness, and dissolved oxygen all showed highly significant variation, as did dissolved oxygen. Both Cl and nitrate showed highly significant variation, while TSS, Sulphate, and Sodium showed moderately significant variation.



CONCLUSION- Our findings suggest that blue bird Lake is a significant breeding, stopping, and wintering destination for wild birds due to the large number of both migratory and resident birds we saw there. We propose that growing urbanization and reclamation in recent decades have pushed away vulnerable species while quickly increasing synanthropic species. Restoration efforts for wetlands have helped a wide variety of bird life, particularly waterfowl. The many species of waterbirds are extremely reliant on human activities for their distribution. Because various species of waterbirds have distinct habitat needs, it is important to apply a variety of restoration management strategies in order to restore the whole range of ecosystem services provided by the wetlands around Blue Bird Lake. No matter if they are elected or appointed, members of a volunteer committee, or paid employees, all local decision makers must grapple with the challenge of balancing the needs of their communities for housing, public infrastructure, and economic development with the need to safeguard vulnerable natural resources. Science and land management have come a long way in understanding the natural processes and public benefits of wetlands, which were formerly seen as wastelands but are now widely recognized as essential. There has been a dramatic rise in public support for wetland preservation in the last several decades, and both state and federal laws now provide particular safeguards for wetlands. The Ramsar Convention entered into effect in 1975, and its 100 Contracting Parties are now obligated to carry out four primary goals.

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