OBSERVATION OF WATER QUALITY PARAMETERS OF THE SELECTED LAKES IN BIRULIA

Submitted By:

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A Thesis submitted to the Department of Civil Engineering, Daffodil International University in partial Fulfilment of the requirements for the Degree of **Bachelor of Science in Civil Engineering.**

Department of Civil Engineering
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February-2024

DECLARATION

The dissertation entitled **"OBSERVATION OF WATER QUALITY PARAMETERS OF SELECTED LAKES IN BIRULIA"** has been performed under the supervisor of **AHAD ULLAH** (Senior LECTURER), Department of Civil Engineering, Daffodil International University, Ashulia, Dhaka, Bangladesh, and this work has been carried out by them in the laboratories of the department of civil engineering under the faculty of engineering in partial fulfillment of the requirement for the Degree Bachelor of Science in Civil Engineering.

Signature of the student

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LETTER OF APPROVAL

The project and thesis "**OBSERVATION OF WATER QUALITY PARAMETERS OF SELECTED LAKES IN BIRULIA**" presented by **Md. Nasir Uddin, Student ID: 203-47-430**, has been approved as satisfactory in partial fulfillment of the requirement for the degree of Bachelor of Science in Civil Engineering.

Signature of the Supervisor

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The dissertation entitled "**OBSERVATION OF WATER QUALITY PARAMETERS OF SELECTED LAKES IN BIRULIA**" has been performed under the supervisor of **AHAD ULLAH** (Senior LECTURER), Department of Civil Engineering, Daffodil International University, Ashulia, Dhaka, Bangladesh, and this work has been carried out by them in the laboratories of the department of civil engineering under the faculty of engineering in partial fulfillment of the requirement for the Degree Bachelor of Science in Civil Engineering.

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ACKNOWLEDGEMENT

First and foremost, I would want to express my gratitude to Allah, the Almighty, for all of his blessings, approval, protection, mental fortitude, and knowledge in all spheres of our existence. I wish to congratulate ALLAH for completing this thesis.

I am grateful for the guidance and leadership my distinguished supervisor, Mr. Ahad Ullah, Senior Lecturer, Department of Civil Engineering, Faculty of Engineering, Daffodil International University, provided to me during the thesis period. His unwavering tolerance, intellectual foresight, unceasing encouragement, active oversight, constructive criticism, helpful direction, and reading many poor manuscripts and improving them at every level made this project possible.

Finally, I'd want to express my gratitude to the Daffodil International University department of civil engineering staff and all of the department's teachers for their crucial assistance in helping me finish my thesis. I must sincerely and politely express my gratitude to my family and friends for their constant support and their patience in helping me through my program.

ABSTRACT

Lakes are one of, if not the most important part of an ecosystem. Lakes are generally formed as a consequence of the tectonic or glacial activity in a typical region. Many people still use lake water as a source for drinking water and bathing. This study focuses on the water quality of the lakes in birulia. This study is important as it will provide the current water quality of these lakes and to see if the water of these lakes is still edible. The purpose of this inquiry was to evaluate the Birulia Lakes' water quality. Twelve water samples were collected from DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake, which are all separate lakes. Three different sampling points are present at each sampling site. Odor, temperature, pH, total suspended particles, turbidity, iron, dissolved oxygen (DO), oil and grease, and biological oxygen demand (BOD) were the samples' physicochemical characteristics. To determine the overall water quality state of the study region, all the evaluated features were compared to national and international water quality criteria. Water has been shown to have a pH range of 6.5 to 8.5. Data that came within this range were obtained from our research at the three points of DSC Lake and Eastern Lake, as well as at the two points of Model Town Lake and Boroitola Lake. However, the results for Model Town Lake and Boroitola Lake are not within this range. Here, we can see that the water's pH values are rather close to the national norm. Additionally, several of the BOD readings from all points of our tests were within the acceptable range. BOD_5 concentrations were higher than expected in a couple distinct samples. The water quality is also satisfied by the following parameters: EC, Turbidity, Iron, Temperature, DO, TSS, Oil & Grease, and Odor. In short, this study will help us determine the water quality of the lakes by comparing the parameters we get from the lake water to the standard parameter provided by the DPHE (Department of Public Heath Engineering).

DEDICATION

To my parents and our beloved teacher, I dedicate this effort.

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CHAPTER ONE

INTRODUCTION

1.1 General

The most crucial component of the environment, water quality, has a big effect on both human health and the health of aquatic ecosystems. The deteriorating water quality of the lakes in Birulia poses a major threat to the environmental health of the chosen area. The problem is significantly worsened by the city's rapid urbanization, industrialization, and population increase. The lakes are Birulia's primary sources of freshwater, recreation, and wildlife. Unfortunately, the lakes' water quality has significantly worsened as a result of pollution from multiple sources, including residential sewage, industrial effluent, and municipal solid waste dumping, which has had a negative impact on human health and caused the extinction of aquatic life. We are aware that natural lakes are frequently found in mountainous terrain, cleft zones, and towns and cities where glaciation is still occurring. Other lakes could be found in the courses of historic rivers, where a river channel has widened into a basin. Many lakes are man-made and are built for many goals, including aesthetic, recreational, or industrial uses, as well as for the production of renewable energy or the supply of water. Approximately 75% of people living in rural areas and 20% of people living in cities worldwide lack easy access to clean water. The unrelenting increase in water demand to support industries, cultivate food, and maintain both urban and rural populations has resulted in an increasing shortage of freshwater in numerous global locations. From this we can examine the sources of pollution chemical, physical, and biological that are causing the water quality in these urban water bodies to decline.

In this study, (DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake) were chosen as the three lakes in Birulia where we wanted to observe the water quality. Additionally, make an effort to identify the issues affecting these three selected lakes and provide possible remedies.

1.2 Background Study

We conducted this study to analyze the quality of the lakes in Birulia because we haven’t found any information regarding the quality of the water of the lake. Because these lakes are being used daily for multiple tasks, we decided to check the parameters of these lakes to check if the water is safe to use or not.

1.3 Objective of this Study

- To observe the water quality parameters of the selected lakes in Birulia.

1.4 Scope of the Study

- We can observe the present situation of our selected lakes.
- We can determine the water quality of this selected lakes.

1.5 Structure of the Thesis

Chapter One: Basic idea of the work that has been done under this research. Birulia's lakes are becoming increasingly polluted from several sources, endangering both human and environmental health. In order to pinpoint problems and suggest solutions, this study intends to evaluate the water quality characteristics of DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake.

Chapter Two: Literature Review and Water Standard Guide Line. Review of the literature indicates problems with Bangladeshi lakes' water quality, and sampling and analysis of DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake determine pollution levels in accordance with accepted standards.

Chapter Three: Water samples from DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake are collected as part of the methodology. Various instruments are used in the laboratory to test for pH, EC, turbidity, iron, temperature, DO, TSS, odor, and BOD, as well as other water quality indicators.

Chapter Four: Water quality parameters, including turbidity, iron concentration, total suspended particles, and odor, vary amongst DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake according to laboratory studies, which highlights deviations from conventional guidance.

Chapter Five: Results of the All Areas and Variation of The Water Quality Parameters. Analyses of the water quality parameters in DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake show variations from recommended values, especially in the areas of temperature, dissolved oxygen, total suspended solids, turbidity, iron levels, and biological oxygen demand. These variations may indicate possible contamination problems.

Chapter Six: Conclusion and Recommendation for Future Study. Due to turbidity, elevated iron levels, problems, Lakes DSC, Eastern, Model Town, and Boroitola do not meet water quality standards; these findings point to possible sources of contamination; further research should broaden the scope and include more test stations.

CHAPTER TWO
LITERATURE REVIEW

2.1 General

To research of the available literature has been done to undertake research on the lake region. The lake and its ecosystem have been observed in order to appreciate the current circumstances and look into the reasons behind the problems and contamination of the lakes.

2.2 Literature Review

The water quality of the river Buriganga is being investigated in this study by this organization. Examining how this wastewater affects river water is the study's main objective. The water samples were collected in 2008–2009 from several points along the river during both the dry and wet seasons, and their physiochemical quality parameters were studied. The results of data analysis indicate that the Buriganga River's water quality is unacceptable from the perspective of aquatic ecosystems for metrics such as DO, BOD_5, COD, NH_3-N, and Cr during the dry and wet seasons, as well as for EC during the dry season (Ashiqur & Dhia, 2010). [1]

Delving into Md. Shahrior Alam's exploration of Hatirjheel Lake's water quality in Dhaka City, we see that he has included the vital importance of water quality assessment. It discusses challenges arising from unplanned urbanization and industrialization, with the study aiming to evaluate various water quality parameters and unveil notable variations and deviations from established standards. [2]

This reviews goal is to assess the water quality in Gulshan lake, Dhaka using neutron activation analysis. The physico-chemical characteristics of water, such as temperature, pH, TDS, turbidity, EC, DO, and BOD, were examined as soon as the sample was transferred to the lab using standard operating procedures (APHA, 1998). We reduced the field to just 4 randomly selected water samples for chromium detection out of a total of 19 samples with almost comparable characteristics after evaluating the physical and chemical features shown in Table 1. After that, these samples were chilled and acidified (with HNO3, 4 milliliters per liter). Fifty grams of sediments were dried and processed into a powder in order to make target pellets. [3]

The study conducted by Md. Jan-E-Alam and colleagues from the European University of Bangladesh assesses the water quality of Dhanmondi Lake in Dhaka City. Sampling from five locations during the wet season in 2016, the study examines parameters such as pH, turbidity, BOD_5, COD and DO. Results indicate that while pH levels meet standards, turbidity, BOD_5, and COD values exceed permissible limits, highlighting pollution concerns. The lake's elevated levels also suggest contamination. The study emphasizes the urgent need for proper sewage treatment, public awareness, and coordinated efforts to preserve Dhanmondi Lake and ensure a safe water environment for future generations. [4]

Due to industrial and human activity, the groundwater is contaminated. The main problem right now is this. In order to preserve and enhance the natural ecosystem, it is

important to conduct a water quality analysis. In accordance with the water quality index, the current endeavor attempts to assess the groundwater quality in Indore City and its industrial region. Groundwater samples were collected from all of the wards' selected stations for a physiochemical study. According to an analysis of the water quality, most parameters were marginally more favorable during the wet season than during the dry season (Dohare, et al., 2014). [5]

This study focuses on the water quality of lakes in Bangladesh, specifically Ramna in Dhaka city. The main water sources in Bangladesh are surface waters, including rivers, reservoirs, lakes, canals, and ponds, as well as groundwater. However, water quality is deteriorating due to municipal, domestic, industrial, and agricultural waste decomposition. The lakes studied face pollution from tannery and industrial wastes, sewage, medical waste, and toxic materials. The research analyzes various water quality parameters, including temperature, pH, dissolved oxygen, and pollutants. Hatirjheel Lake exhibits severe pollution, emphasizing the need for preventive measures and public awareness to protect aquatic ecosystems. [6]

The urbanization has effected the water quality of Bhishma Lake in Gadag City. pH, turbidity, alkalinity, hardness, total dissolved solids, nitrate, phosphate, chloride, potassium, sodium, dissolved oxygen, BOD, and COD were measured on a monthly basis in samples that were collected from January to April. The results showed high levels of total dissolved solids, turbidity, alkalinity, and hardness, indicating poor water quality that is unsafe to drink. Urbanization and sewage discharge were found to be two of the main sources of pollution. The report highlights how urgent it is to take mitigation steps in order to protect Bhishma Lake's declining water quality. [7]

2.3 Methods of collecting Water samples.

- I collected 12 water samples from Dsc Lake, Eastern Lake, Model Town Lake and Boroitola Lake.
- I went to the lab to analyze the water samples I had collected.
- I’ve tested pH, EC, Temperature, Turbidity, Iron, Do, TSS, Oil and Grease, Odor, and BOD of water.
- Finally, i have determined the average values of 12 different water sample types from Dsc Lake, Eastern Lake, Model Town Lake, and Boroitola Lake for the following variables: pH, EC, Temperature, Turbidity, Iron, Do, TSS, Oil and Grease, Odor, and BOD.

2.4 Sampling:

Three points were selected for each location's water sampling on September 21, 2023. Four lakes each contain twelve water samples drawn from different points. Prior to the collection of the samples, the jars were meticulously cleaned with water from a specific area and labeled with the necessary information.

Fig 2.1: Water Sample Collection

Fig 2.2: Collected Water Sample

2.5 Water standard chart

Table 2.1: Water Standard Guide Line

No	Water Quality Parameters	Bangladesh Standard	WHO Guide Line Standard
01	pH	6.5-8.5	6.5-8.5
02	Electric Conductivity	μs/cm	-
03	Turbidity	10 NTU	5 NTU
04	Iron	0.3-1.0 mg/l	0.3 mg/l
05	Temperature	20-30C	20-30C
06	Dissolved Oxygen	6 mg/l	-
07	Total Suspended Solids	10 mg/l	-
08	Odor	Odorless	-
09	Biological Oxygen Demand	0.2 mg/l	-

CHAPTER THREE
METHODOLOGY

3.1 General

Water samples from DSC Lake, Eastern Lake, Model Town Lake, and Boroitola Lake were collected for laboratory testing in order to establish the quality of the water in the selected locations. It is decided to use the following parameters: pH, Electric Conductivity (EC), Turbidity, Iron Test, Temperature, Dissolved Oxygen (DO), Total Suspended Solids, Oil and Grease, Odor, and Biological Oxygen Demand (BOD). The laboratory test was conducted at the Daffodil International University Lab.

3.2 Water Sample collection

DSC Lake:

Table 3.1: DSC Lake Water Collection Points

Sample No	Latitude	Longitude
01	23°52'45"N	90°19'13"E
02	23°52'45"N	90°19'18"E
03	23°52'44"N	90°19'22"E

Fig 3.1: DSC Lake Water Collection Area

DSC lake is located at the center of our Daffodil Smart City. Many come to see the beauty of the lake and sometimes they even use the water of the lake to wash their hands. That's why we collected the samples from this lake to determine the water quality.

Eastern Lake:

Table 3.2: Eastern Lake Water Collection Points

Sample No	Latitude	Longitude
01	23°52'04"N	90°18'44"E
02	23°52'06"N	90°18'45"E
03	23°52'08"N	90°18'43"E

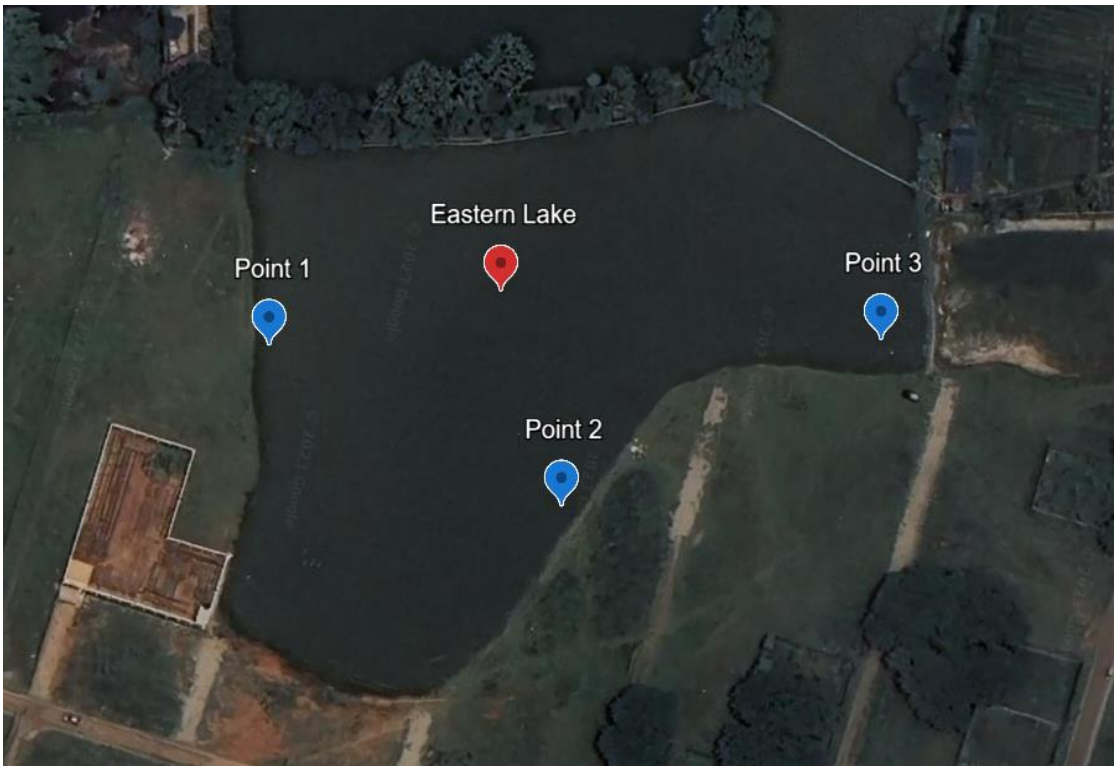

Fig 3.2: Eastern Lake Water Collection Area

This lake is located near the Eastern University. People often bath in this lake and use the water to wash clothes and dishes. It is also used for fisheries. That's why we selected this lake for testing.

Model Town Lake:

Table 3.3: Model Town Lake Water Collection Points

Sample No	Latitude	Longitude
01	23°52'21"N	90°18'40"E
02	23°52'22"N	90°18'41"E
03	23°52'21"N	90°18'42"E

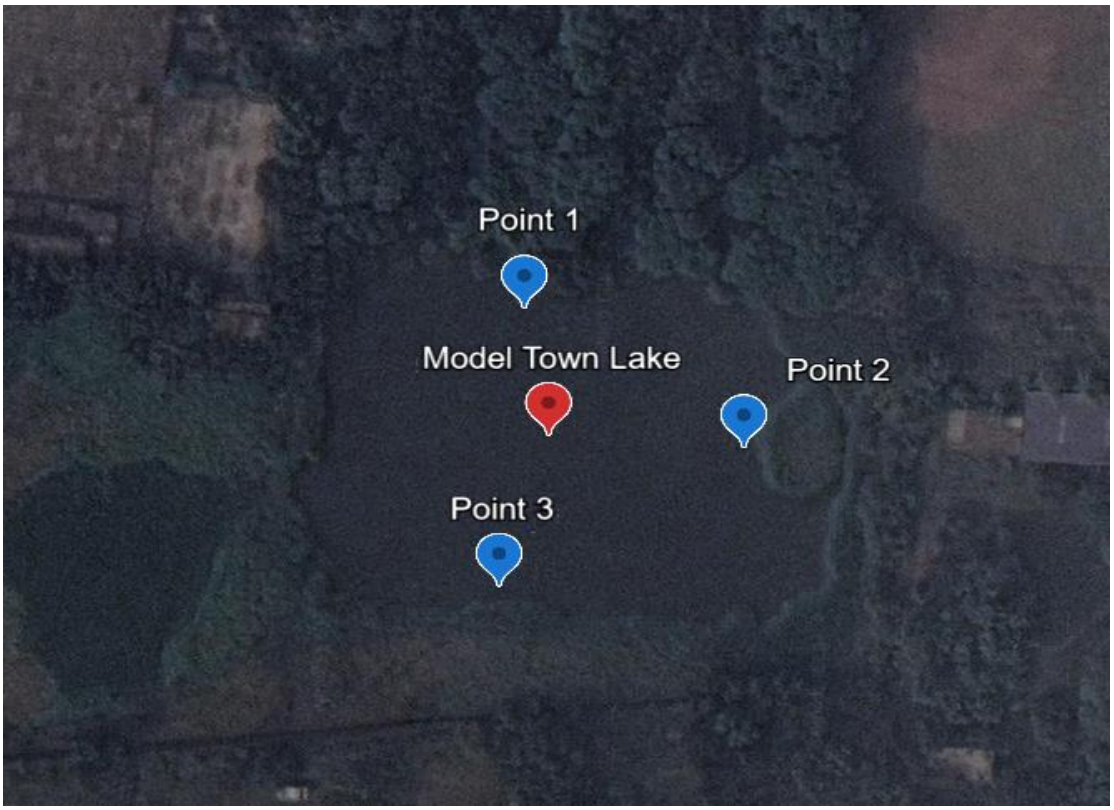

Fig 3.3: Model Town Lake Water Collection Area

This lake is mostly used for fisheries. Almost nobody uses the water of this lake for household uses let alone bath. We saw visible thrash when we went there to collect the samples.

Boroitola Lake:

Table 3.4: Boroitola Lake Water Collection Points

Sample No	Latitude	Longitude
01	23°52'00"N	90°19'40"E
02	23°51'56"N	90°19'45"E
03	23°51'52"N	90°19'50"E

Fig 3.4: Boroitola Lake Water Collection Area

This lake is a very popular place to visit and is mainly popular among youngsters. We selected this lake because we have found that this lake has a bad odor and it also looks a bit turbid. So we wanted to see if this lake really was as bad as it looked.

3.3 Workflow

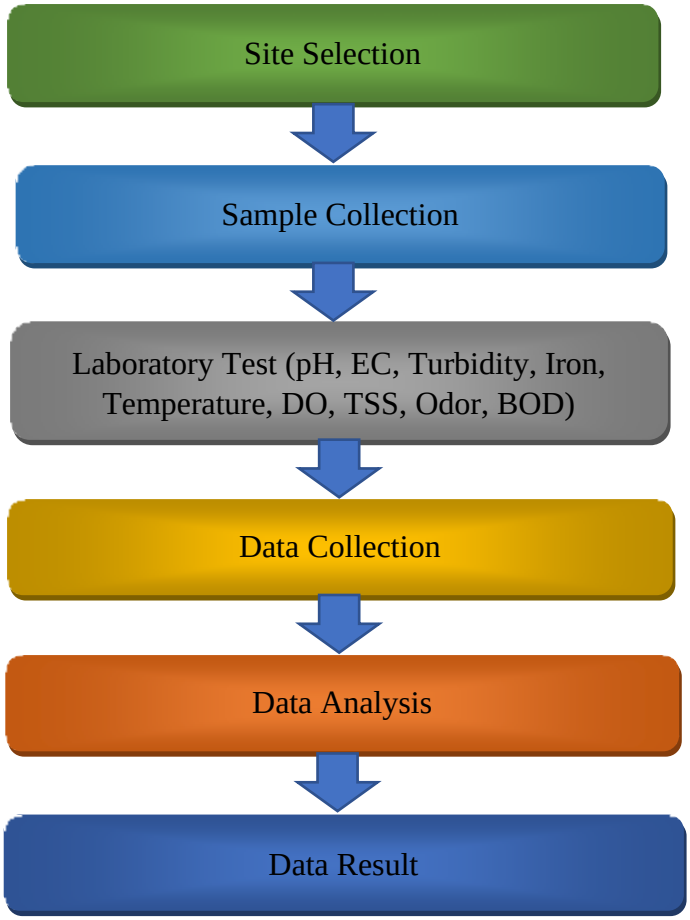

Fig 3.5: Diagram of the workflow

3.4 Water Quality Parameter Test

Table 3.5: Water Quality Parameter

NO	Parameters	Instruments
1	pH	pH meter(Hanna Romania)
2	Electrical Conductivity	Multimeter (Hanna Romania)
3	Turbidity	Turbidity meter (TV-2016, Lutiron Taiwan)
4	Iron	Iron Test Kit
5	Temperature	Thermometer
6	Dissolved Oxygen	Lution, DO, 5509
7	Total Suspended Solids	Spectrophotometer (dr6000)
8	Odor	Threshold Method
9	Biological Oxygen Demand	5 days Incubation

3.5 Water Quality Parameters

3.5.1 pH (Potential of Hydrogen)

PH is an important part of the water quality characteristic that determines how acidic or alkaline a liquid is. The pH scale has a range of 0 to 14, with 7 being neutral (water often has a pH range 6.5-8.5). When the PH value is less than 7, the liquid is acidic, and when it is greater than 7, it is alkaline. Alkalinity varies from 11 to 14, while the acidity scale runs from 0 to 3.

Fig 3.6 Testing pH in the lab

3.5.2 Electrical Conductivity (EC)

Electric conductivity is a quality that governs how well electricity can move through water. Pure water cannot conduct electricity. Usually, the cause of this is the dissolved metal and salt in the water.

Fig 3.7: Testing Electrical Conductivity in the lab

3.5.3 Turbidity

The term "turbidity" describes how cloudy or hazy water is. Usually, it relies on the amount of total dissolved solids and the chemical make-up of the water sample. The appearance of higher turbidity water samples is unpleasant and indicates poor water quality.

Fig 3.8: Testing Turbidity in the lab

3.5.4 Iron

Iron is a critical parameter that is routinely tested while assessing the quality of water. High iron water has a metallic flavor. The range of standard iron is 0.3 to 1.

Fig 3.9: Testing Iron in the lab

3.5.5 Temperature

Water temperature, a vital indicator of water quality, affects the physical, chemical, and biological characteristics of aquatic ecosystems. Monitoring and controlling water temperature is essential for the maintenance of aquatic life, sustaining standards for water quality, and ensuring that water is suitable for a variety of applications. The ideal water temperature is 20 to 30 c.

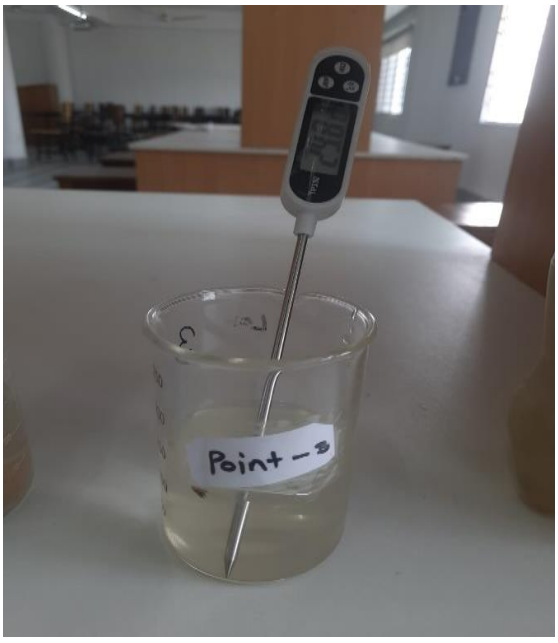

Fig 3.10: Testing Temperature in the lab

3.5.6 Dissolved Oxygen (DO)

Dissolved oxygen is one of the most important elements of the natural water system. The amount of oxygen that has been dissolved in the water sample is known as "dissolved oxygen," or DO. Microorganisms, aquatic plants, and aquatic animals all

need enough dissolved oxygen to thrive. Low dissolved oxygen readings signify poor water quality. The ideal level of dissolved oxygen is 14.6 mg/l.

Fig 3.11: Testing DO in the lab

3.5.7 Total Suspended Solids (TSS)

How many solid particles are suspended in the liquid is an essential indicator of the water's quality. TSS monitoring is important for a number of reasons, including controlling water treatment processes, examining how human activity affects the environment, and gauging water quality.

Fig 3.12: Testing TSS in the lab

3.5.8 Odor

The subjective water quality indicator known as odor is connected to the presence of undesirable or unpleasant odors in water. Although odor cannot be used to directly forecast the quality of water, it can be an important indicator of potential issues or pollution.

3.5.9 Biological Oxygen Demand (BOD)

The biological oxygen demand (BOD), a key indicator of water quality, measures the amount of dissolved oxygen that bacteria in water take up during the decomposition of organic waste. BOD is an important indicator of how much organic pollution is present in a body of water and provides details on how effectively the water can support aquatic life.

CHAPTER FOUR
DATA ANALYSIS

4.1 General

All of the laboratory test results for a few ground water quality indicators in the area we selected are included in this chapter.

4.2 Data

DSC Lake:

Table 4.1: Test Result of DSC Lake

Parameters	Sample 1	Sample 2	Sample 3	Ban. Stan/ WHO Guideline
pH	6.5	6.8	6.7	6.5-8.5
Electrical Conductivity(μs/cm)	0.10	0.10	0.10	μs/cm
Turbidity (NTU)	18.20	21.11	10.98	10
Iron (mg/L)	1.7	1.2	1.4	0.3-1
Temperature (C°)	29.7	29.7	29.4	20-30
Dissolved Oxygen (mg/L)	0.5	1.2	0.4	6
Total Suspended Solids (mg/L)	2	22	7	10
Odor (mg/L)	Odorless	Odorless	Odorless	Odorless
Biological Oxygen Demand (mg/L)	0.2	0.3	0.1	0.2

After testing the samples from DSC lake, we can see, value of all parameters were within the standard range, except for turbidity, iron, total suspended solid (for sample 2) and BOD (sample 2).

Eastern Lake:

Table 4.2: Test Result of Eastern Lake

Parameters	Sample 1	Sample 2	Sample 3	Ban. Stan/ WHO Guideline
pH	6.7	6.6	6.7	6.5-8.5
Electrical Conductivity(μs/cm)	0.07	0.06	0.07	μs/cm
Turbidity (NTU)	15.65	27.73	20.89	10
Iron (mg/L)	0.8	1.0	1.0	0.3-1
Temperature (C°)	29.6	29.6	29.6	20-30
Dissolved Oxygen (mg/L)	0.5	0.5	0.6	6
Total Suspended Solids (mg/L)	11	18	15	10
Odor (mg/L)	Odorless	Odorless	Odorless	Odorless
Biological Oxygen Demand (mg/L)	0.3	0.2	0.3	0.2

After testing the samples from Eastern lake, we can see, value of all parameters were within the standard range, except for turbidity, total suspended solid and BOD (sample 3).

Model Town Lake:

Table 4.3: Test Result of Model Town Lake

Parameters	Sample 1	Sample 2	Sample 3	Ban. Stan/ WHO Guideline
pH	6.6	6.5	6.4	6.5-8.5
Electrical Conductivity(μs/cm)	0.04	0.04	0.03	μs/cm
Turbidity (NTU)	5.51	6.20	22.45	10
Iron (mg/L)	1.5	1.6	2.4	0.3-1
Temperature (C°)	29.8	29.7	29.7	20-30
Dissolved Oxygen (mg/L)	0.4	0.4	0.3	6
Total Suspended Solids (mg/L)	2	3	17	10
Odor (mg/L)	Odor	Odor	Odor	Odorless
Biological Oxygen Demand (mg/L)	0.2	0.3	0.1	0.2

After testing the samples from Model Town lake, we can see, value of all parameters were within the standard range, except for turbidity (sample 3), iron, total suspended solid (for sample 3) and BOD (sample 2). This water had really bad odor.

Boroitola Lake:

Table 4.4: Test Result of Boroitola Lake

Parameters	Sample 1	Sample 2	Sample 3	Ban. Stan/ WHO Guideline
pH	6.5	6.4	6.5	6.5-8.5
Electrical Conductivity(μs/cm)	0.11	0.13	0.15	μs/cm
Turbidity (NTU)	17.83	16.89	16.60	10
Iron (mg/L)	3	3.9	3.8	0.3-1
Temperature (C°)	29.6	29.5	29.6	20-30
Dissolved Oxygen	0.3	0.3	0.3	6
Total Suspended Solids (mg/L)	17	18	20	10
Odor (mg/L)	Odor	Odor	Odor	Odorless
Biological Oxygen Demand (mg/L)	0.2	0.1	0.1	0.2

After testing the samples from Boroitola lake, we can see, value of all parameters were within the standard range, except for turbidity, iron and total suspended solid. This water had really bad odor.

4.3 Analysis

Water quality criteria have changed in several locations. The laboratory test yielded accurate data for each station's selection of all parameters.

Averaging is done over the three points in each lake for all the parameters, including pH, BOD, EC, turbidity, iron, temperature, DO, TSS and Odor. These average values were produced using the Bangladeshi water standard values (ECR 1997). This has provided a picture of the water quality.

CHAPTER FIVE

RESULT AND DISCUSSION

5.1 Introduction

This chapter contains all of the laboratory test results for some indicators of water quality in the area I selected.

5.2 Result

Table 5.1: The Result of all area sample

Water Quality Parameters	Average Value				Ban. Stan/ WHO Guideline
	DSC lake	Eastern lake	Model town Lake	Boroitola Lake	
pH	6.67	6.67	6.5	6.47	6.5-8.5
Electrical Conductivity(μs/cm)	0.10	0.07	0.04	0.13	-
Turbidity (NTU)	16.73	21.42	11.39	17.11	10
Iron (mg/L)	1.43	0.93	1.83	3.57	0.3-1
Temperature (C°)	29.6	29.6	29.7	29.57	20-30
Dissolved Oxygen (mg/L)	0.7	0.53	0.4	0.3	6
Total Suspended Solids (mg/L)	10.33	14.67	7.33	18.33	10
Odor (mg/L)	odorless	odorless	odor	odor	Odorless
Biological Oxygen Demand (mg/L)	0.2	0.27	0.2	0.13	0.2

5.3 Variation of the Water Quality Parameters

pH (Potential of Hydrogen)

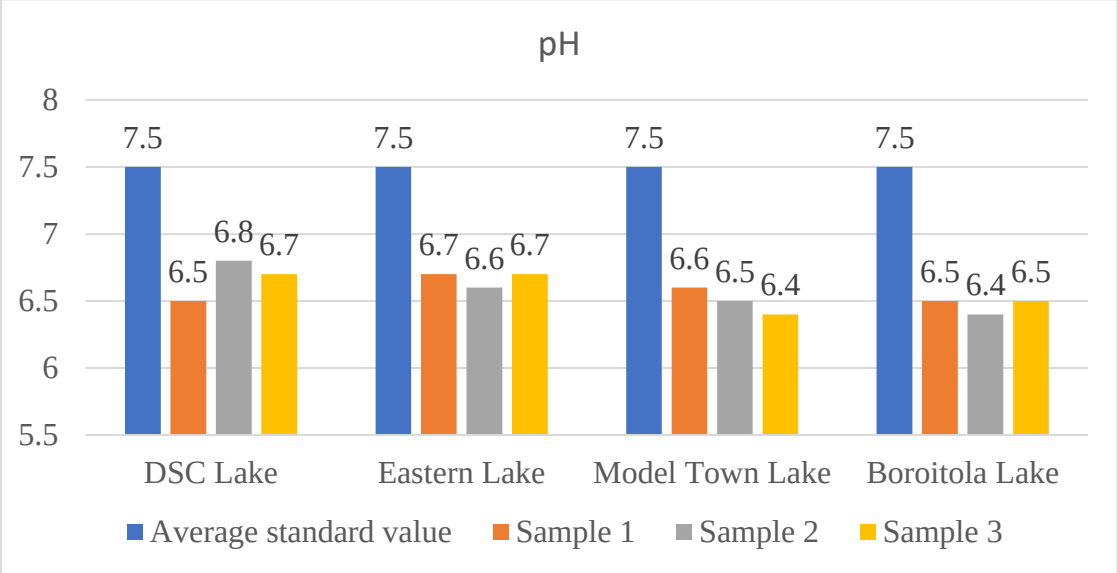

Fig 5.1: pH level at different locations

Fig 5.1 provides the pH value for the lakes located in DSC, Eastern, Model Town and Boroitola in which some values are outside of the standard range, and the rest of the values are found within the standard range.

Electric Conductivity**:**

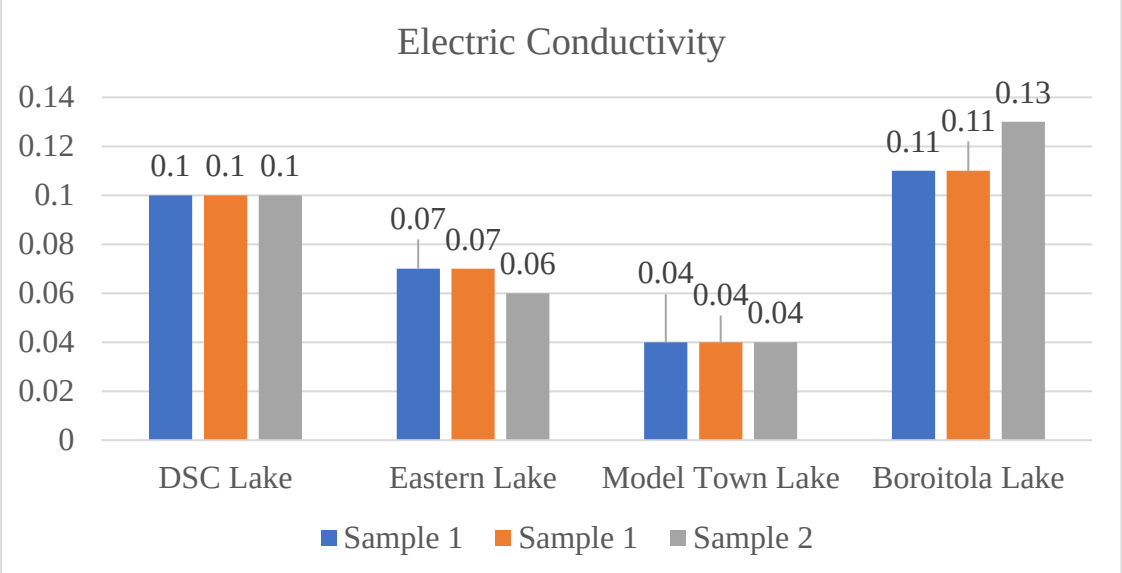

Fig 5.2: EC level at different locations

Fig 5.2 provides the Electric Conductivity value for lakes located in DSC, Eastern, Model Town and Boroitola. All of the points are found within the standard range.

Turbidity:

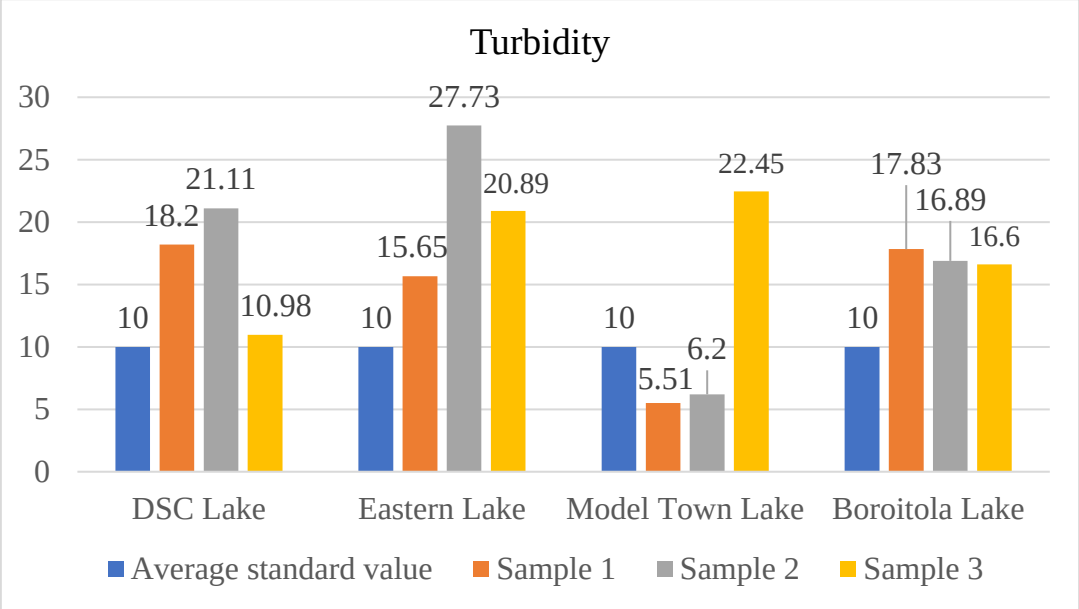

Fig 5.3: Turbidity level at different locations

Fig 5.3 provides the Turbidity value for lakes located in DSC, Eastern, Model Town and Boroitola. Most of the values are found outside of the standard range. (Bangladesh standard 10 NTU).

Iron:

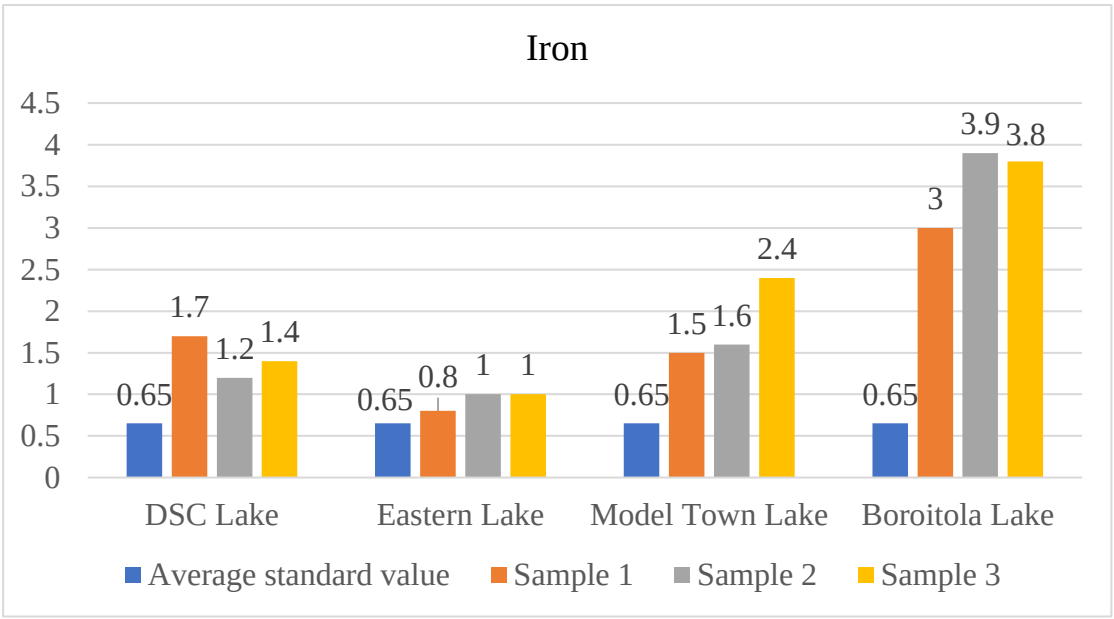

Fig 5.4: Iron level at different locations

Fig 5.4 provides the Iron value for lakes located in DSC, Eastern, Model Town and Boroitola. Most of the values are found outside of the standard range. (Bangladesh standard 0.3-1.0).

Temperature:

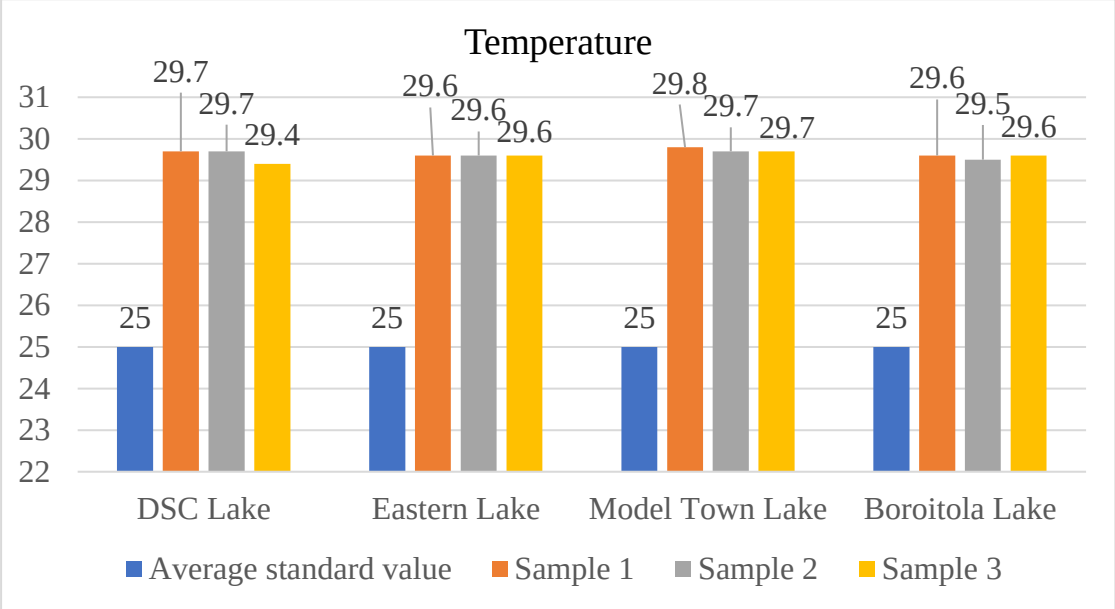

Fig 5.5: Temperature level at different locations

Fig 5.5 provides the Temperature value for lakes located in DSC, Eastern, Model Town and Boroitola. All of the values are found outside the average standard range. (Bangladesh standard 20-30C).

Dissolved Oxygen (DO):

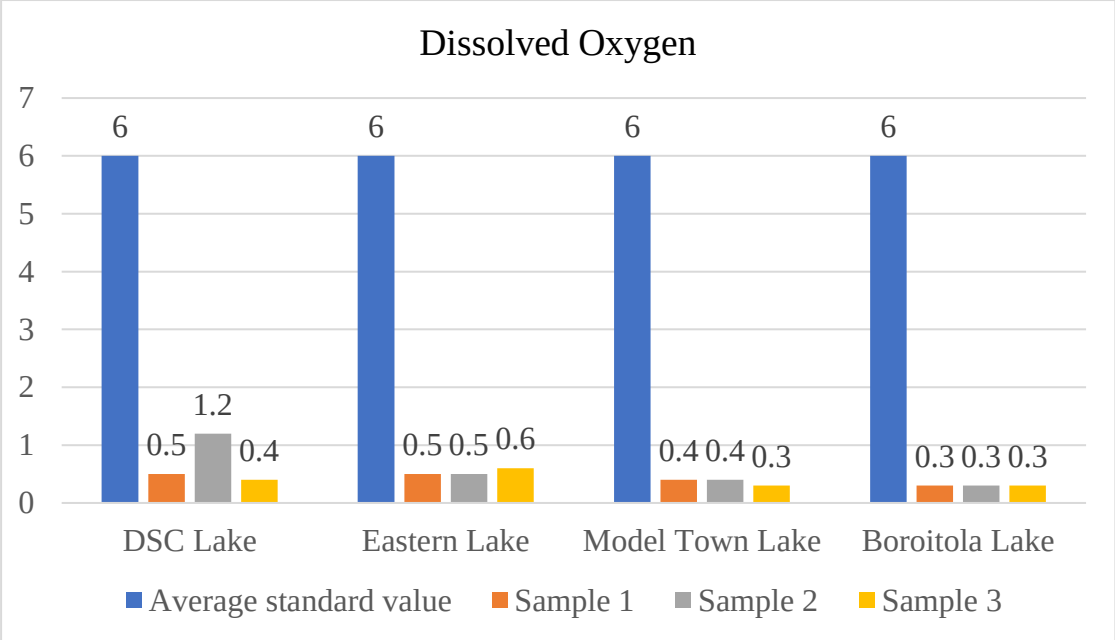

Fig 5.6: DO level at different locations

Fig 5.6 provides the Dissolved Oxygen value for lakes located in DSC, Eastern, Model Town and Boroitola. All of the values are found below the standard range. (Bangladesh standard 6 mg/l).

Total Suspended Solids:

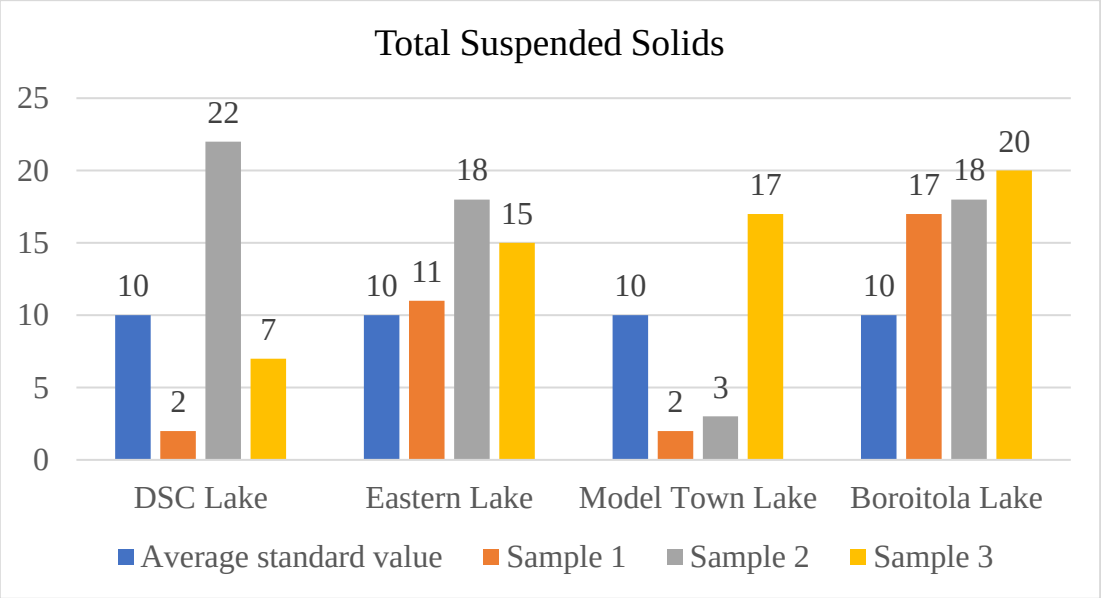

Fig 5.7: TSS level at different locations

Fig 5.7 provides the Total Suspended Solids value. Most of the TSS levels were higher than average in all of the tested places.

Biological Oxygen Demand (BOD):

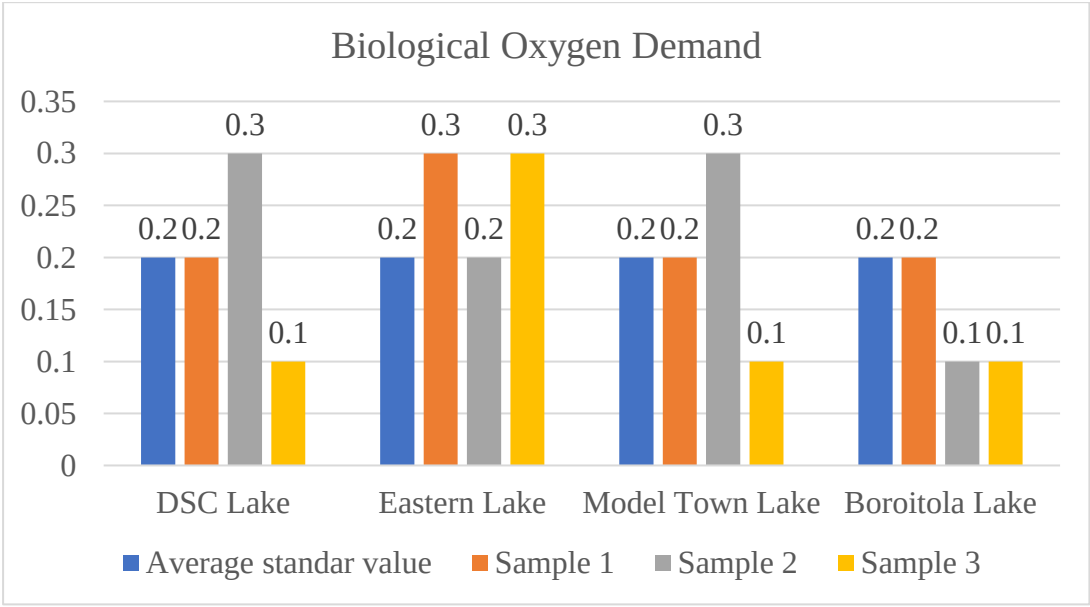

Fig 5.8: BOD level at different locations

Fig 5.8 provides the Dissolved Oxygen value for lakes located in DSC, Eastern, Model Town and Boroitola. Some of its points complied with the standards. Some other samples had BOD values that were greater or smaller than the average.

CHAPTER SIX

CONCLUSION & RECOMMENDATIONS

6.1 General

In this study, we have found out that DSC Lake, Eastern Lake, Model Town Lake and Boroitola Lake does not meet the standard requirement given by the Department of Public Health Engineering, Bangladesh. This could be due to a number of factors, such as industrial waste, sewage discharge, agriculture runoff. It's critical to keep an eye on these lakes' water quality and take action against any sources of contamination that are found.

6.2 Conclusion

- The typical pH range for water is 6.5 to 8.5. We obtained results within this range from our research in lakes located in DSC, Eastern, Model Town and Boroitola. However, the results for the lakes located in DSC, Eastern, Model Town and Boroitola are some value outside of this range. In this instance, we can see that the pH values of the all area water are fairly close to the norm. We are therefore able to safely use this water.

- The Electro Conductivity of the tested water is lower than 1. That means all the lakes had low amounts of metal. Which means the water we tested is safe to use.

- The standard Turbidity for water is less than 10NTU. In our research, we got more than 10NTU in all of our testing sites. Which means the water we tested is cloudy.

- The recommended iron concentration for water is 0.3–1 mg/L. We found that the iron levels in every place were higher than the normal range after testing.

- The standard temperature for water is 20°C to 30°C. The temperature we got from our collected water is within the standard value.

- The DO (Dissolved Oxygen) level of standard water is 6 mg/l. We found all our DO values within this range.

- Less than 10 mg/l of total suspended solids should be present in water. Suspended solids were found during our research in lakes located in DSC, Eastern, Model Town and Boroitola. The values were mostly over the standard value.

- The water should be odorless. None of our tested samples had any type of odor in it.

- Drinkable water has a standard BOD (Biochemical Oxygen Demand) of 0.2 mg/L. According to our testing, most of our values are close to the standard value.

6.3 Recommendation for Future Study

Value of various locales Several important recommendations are provided below for future research on this area's water quality assessment.

- Additional parameters such as Chemical Oxygen Demand (COD), Chloride, Nitrate, Lead, Sulfate, Arsenic, Coli form, and other relevant factors can be incorporated for comprehensive water quality assessment.
- Increasing the sampling point will enhance the precision of our water quality data, facilitating more accurate comparisons across different locations.

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