

Email**Dr. P Niranjana****Report of the joint committee constituted by the Honourable National Green Tribunal in Original Application no: 174 of 2023 [earlier o.a. No. 541 of 2023(PB)] in the matter of "Fish Kill At Lingambudhi Lake In Mysuru" –reg****From :** Dr. P Niranjana <seomys@kspcb.gov.in>

Mon, Jan 08, 2024 01:18 PM

Subject : Report of the joint committee constituted by the Honourable National Green Tribunal in Original Application no: 174 of 2023 [earlier o.a. No. 541 of 2023(PB)] in the matter of "Fish Kill At Lingambudhi Lake In Mysuru" –reg

📎 1 attachment

To : Member Secretary KSPCB <ms@kspcb.gov.in>, 17 category Karnataka State Pollution Control Board <cat17@kspcb.gov.in>**Cc :** dcoffcemysuru <dcoffcemysuru@gmail.com>, Mysore KSPCB <mysore1@kspcb.gov.in>

No: PCB/ZOM/81/2023-24/

MOST URGENT – NGT MATTER

To:

**The Member Secretary,
KSPCB,
Bengaluru****//Attn: Senior Environment Officer – Infra Cell//**

Sir,

Re: Report of the joint committee constituted by the Hon'ble National Green Tribunal in Original Application no: 174 of 2023 [earlierOA. No. 541 of 2023(PB)] in the matter of "Fish Kill At Lingambudhi Lake In Mysuru" –reg

- Ref:**
- 1) Original Application No. 541 of 2023 before Hon'ble National Green Tribunal, Principle Bench, New Delhi Order dated 05-09-2023
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- 2) Original Application No. 174 of 2023 (Earlier OA No. 541 of 2023 (PB)) before Hon'ble National Green Tribunal, Southern Zone, Chennai Order dated 24-11-2023

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It is to be submitted that, the Original Application No. 541 of 2023 before Hon'ble National Green Tribunal, Principle Bench, New Delhi Order dated 05-09-2023, the Joint Committee comprising of the Senior Environment Officer, Mysuru Zone (On behalf of the Member Secretary, KSPCB, Bengaluru), The Regional Director, CPCB, Bengaluru (On behalf of the Member Secretary, CPCB, New Delhi) and the Deputy commissioner, Mysuru District has prepared report. In the said order, the District Magistrate Mysuru has been made as a Nodal Agency for coordination and compliance.

Further, the OA No. 541 of 2023 (PB) has been transferred Hon'ble National Green Tribunal, Southern Zone, Chennai and numbered as Original Application No. 174 of 2023. The next date of hearing is posted on 11-01-2024.

The report of the joint committee is enclosed to submit before Hon'ble National Green Tribunal, Southern Zone, Chennai immediately before 11-01-2024. This is for your kind information further needful action.

Yours faithfully,

**Encl:** As above

Sd/-  
**Senior Environment Officer**  
**ZO, KSPCB, Mysuru**

Copy to;

- 1) The Deputy Commissioner, Mysuru District, Mysuru for information and to file report before 11-01-2024.
- 2) The Environment Officer, RO-1, KSPCB, Mysuru (Urban) for information and to appraise office of the Deputy Commissioner, Mysuru.
- 3) Case file

**Senior Environment Officer**  
**ZO, KSPCB, Mysuru**

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 **Lingabudhi lake report \_compressed.pdf**  
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**REPORT OF THE JOINT COMMITTEE CONSTITUTED BY THE HONOURABLE NATIONAL GREEN TRIBUNAL IN ORIGINAL APPLICATION NO: 174 of 2023 [EARLIER O.A. No. 541 of 2023(PB)] IN THE MATTER OF "TRIBUNAL ON ITS OWN MOTION - SUO MOTU BASED ON THE NEWS ITEM IN THE HINDU DATED 29.08.2023, TITLED "FISH KILL AT LINGAMBUDHI LAKE IN MYSURU" IN COMPLIANCE TO HON'BLE NGT ORDERS DATED 05.09.2023 AND 24.11.2023**

**1. INTRODUCTION**

Hon'ble National Green Tribunal, Principal Bench, New Delhi registered a suo-moto complaint in OA No541 of 2023 dated05.09.2023, based on the News item published in "The Hindu" dated 29.08.2023 titled, "FISH KILL AT LINGAMBUDHI LAKE IN MYSURU". Hundreds of dead fish floating in the foreshore of the waterbody. Hon'ble NGT vide order dated 05.09.2023 formed a Joint Committee comprising of Member Secretary, Karnataka State Pollution Control Board (KSPCB), Member Secretary, Central Pollution Control Board (CPCB), Bengaluru Office and the District Magistrate, Mysuru. The District Magistrate, Mysuru will act as nodal agency for coordination and compliance. Vide order dated 05.09.2023, Hon'ble NGT also directed that " the Committee will visit the site, collect sample, collect the analysis reports of the sample, if any, already collected by the KSPCB and Fisheries Department of the State and ascertain the clear cause of fish kill and also take appropriate action against the defaulting parties as also remedial measures in accordance with law. The Committee will submit a report before the Tribunal within six weeks. Since the matter relates to the Southern Zone Bench of this Tribunal, therefore, it is transferred for listing on 01.12.2023. The Registry is

directed to transfer the records of this matter to the Southern Zone Bench, Chennai.

*A copy of Hon'ble NGT order dated 5.09.2023 is enclosed as Annexure-1.*

Meantime, Hon'ble National Green Tribunal Southern Bench Chennai renumbered the earlier O.A. No. 541 of 2023 (PB) as OA No. 174 of 2023 (SZ) and the directions of Hon'ble NGT (SZ) order dated 24.11.2023 is reproduced below:

1. This is a matter which was transferred from the Principal Bench after Suo Motu cognizance was taken by them.
2. Already the Joint Committee was constituted and directed to visit the place, collect sample, and get their analysis report to find out the cause of the mass mortality of fish at Lingambudhi Lake in Mysuru.
3. Let notice be issued to the respondents through the Tribunal.
4. The learned counsel Mr. Rajat Jonathan Shaw representing Mr. K.M. Darpan accepts notice on behalf of Respondents No. 2, 3 and 5.
5. Post the matter on 11.01.2024.

*A copy of Hon'ble NGT order dated 24.11.2023 is enclosed as Annexure-2.*

## **2. INITIATIVES OF THE JOINT COMMITTEE**

Initiatives taken by the Joint Committee constituted by Hon'ble NGT for ensuring compliance to Hon'ble NGT order dated 05.09.2023 is given in subsequent paras

## **2.1 First meeting of the Joint Committee held on 04.10.2023**

The Deputy Commissioner (DC), Mysuru constituted a Technical Committee vide office memorandum dated 29.09.2023. Dr.Basavaraja, IFS, Deputy Conservator of Forests, Mysuru Division, Mysuru as Member Convener of the Technical Committee with Superintendent Engineer, Mysuru Urban Development Authority (MUDA), Superintendent Engineer, Mysuru City Corporation (MCC) and Environmental Officer, Regional Office-1, Karnataka State Pollution Control Board (KSPCB), Mysuru as members, for preparing analysis report and for suggesting remedial measures in compliance to Hon'ble NGT order dated 5<sup>th</sup> September, 2023.

Dr.Basavaraja, IFS, Deputy Conservator of Forests, Mysuru Division, Mysuru, Member Convener convened a meeting on 04.10.2023 at AranyaBhawan, Ashokapuram, Mysuru with Superintendent Engineer, Mysuru Urban Development Authority (MUDA), Superintendent Engineer, Mysuru City Corporation (MCC) and Environmental Officer, Regional Office-1, Karnataka State Pollution Control Board, Mysuru as members **(Fig.1)**. The representatives of the Joint Committee members (representative of Central Pollution Control Board and Karnataka State Pollution Control Board) were also invited for the meeting on 04.10.2023. The representative of Joint Committee members from CPCB and KSPCB deliberated the issues associated with the Lingambudhi Lake and required remedial action to be taken for control of pollution in Lingambudhi Lake , initiatives taken subsequent to the fish kill at Lingambudhi Lake in

compliance to Hon'ble NGT order dated 05.09.2023 with the technical committee constituted by the Deputy Commissioner.



**Fig. 1: Meeting of the Committee held at Aranya Bhavan Mysore on 04/10/2023**

Salient features of the issues discussed in first meeting of the Committee held on 04.10.2024 is detailed in subsequent paras;

**a) About the Lingambudhi Lake and its pollution**

The lake was built by Maharaja Krishnaraja Wodeyar III in 1828 in memory of his fourth consort Maharani Lingajammani. Until the late 1980s, Lingambudhi Lake was a typical village lake in the rural surroundings of the city of Mysore. The Lingambudhi Lake is a perennial freshwater lake situated in the basin of River Cauvery. The lake was serving as a source of drinking water, irrigation, and fish produce; as a site for washing clothes

and cattle; and as a place of religious worship for the people of Lingambudhi Palya, a village in the vicinity of the lake. It has a catchment area of 45 Sq Km; with 5 islands it is harboring more than 236 species of birds including migratory species. As per Forest Department, the Chronology of Lingambudhi Lake Reserve Forest notification is detailed below;

- 1828: Extraction of lake by Maharaja
- 1994: Lingambudhi lake area of 216.23 Ac. handed over to RFO by RI of Revenue department
- 2003: Deputy commissioner Mysore handed over land to Forest Department officially for protection purpose
- 2011: Lingambudhi lake area was notified as forest under section 4 of Karnataka Forest act 1963
- 2016: About 40 Ha area of this forest is developed under 'Nagaravana Yojana' a Central Government Scheme
- 2019: The area is maintained under tree park scheme by the Forest Department till date.
- 2023: Forest settlement and final declaration as Reserve Forest (RF) as per Section 17 of Karnataka Forest Act 1963 is under process by Forest Settlement Officer (FSO) Mysore

During the meeting organized on 04.0.2023, Deputy Conservator of Forests, Mysuru Division, Mysuru informed that Lingambudhi lake is under the custody of the Forest Department, Government of Karnataka and is having total extent of 216 acres. 80-90% of the forest area is

submerged in water. Lingambudhi lake has polluted because of eutrophication of organic load, floating material in the lake, sewage flow to the lake & increased Bio-chemical Oxygen Demand (BOD) has made the aquatic life difficult to survive in the lake. Also, the Lingambudhilake has Tree Park surrounded by it, the foul odour eventually causing inconvenience to the daily visitors to the Park. There are totally three Rajakaluve having the catchment area of the lake. Major pollutant contributing to the pollution is the sewage flow from the surrounding residential areas of Mysuru town i.e. specially from Bogadi, Rajarajeshwari Nagar, Dattagalli, Kuvempunagar located on Northern side, Ramakrishnanagar located on Eastern side and over flow of Septic tank located at Western side of the lake through Storm water drains(Rajakaluve). The sewage and sullage from the surrounding locality through natural nalla / storm water drain are contributing to the pollution of the lake. The Tree Park is a very good lung space for public having walking path, giving shelter to around 346 bird species & there are 5 natural islands in the lake which helps birds for shelter & breeding. Presently, Lingambudhi lake acts as a recreational centre & urban lung space for Mysuru city dwellers. Scientific conservation can transform the Lake into a Bird Sanctuary in the future. A map depicting the details of Lingambudhi Lake, adjoining areas, natural drains, drains which are contributing sewage in to lake are shown in **Fig.2**.

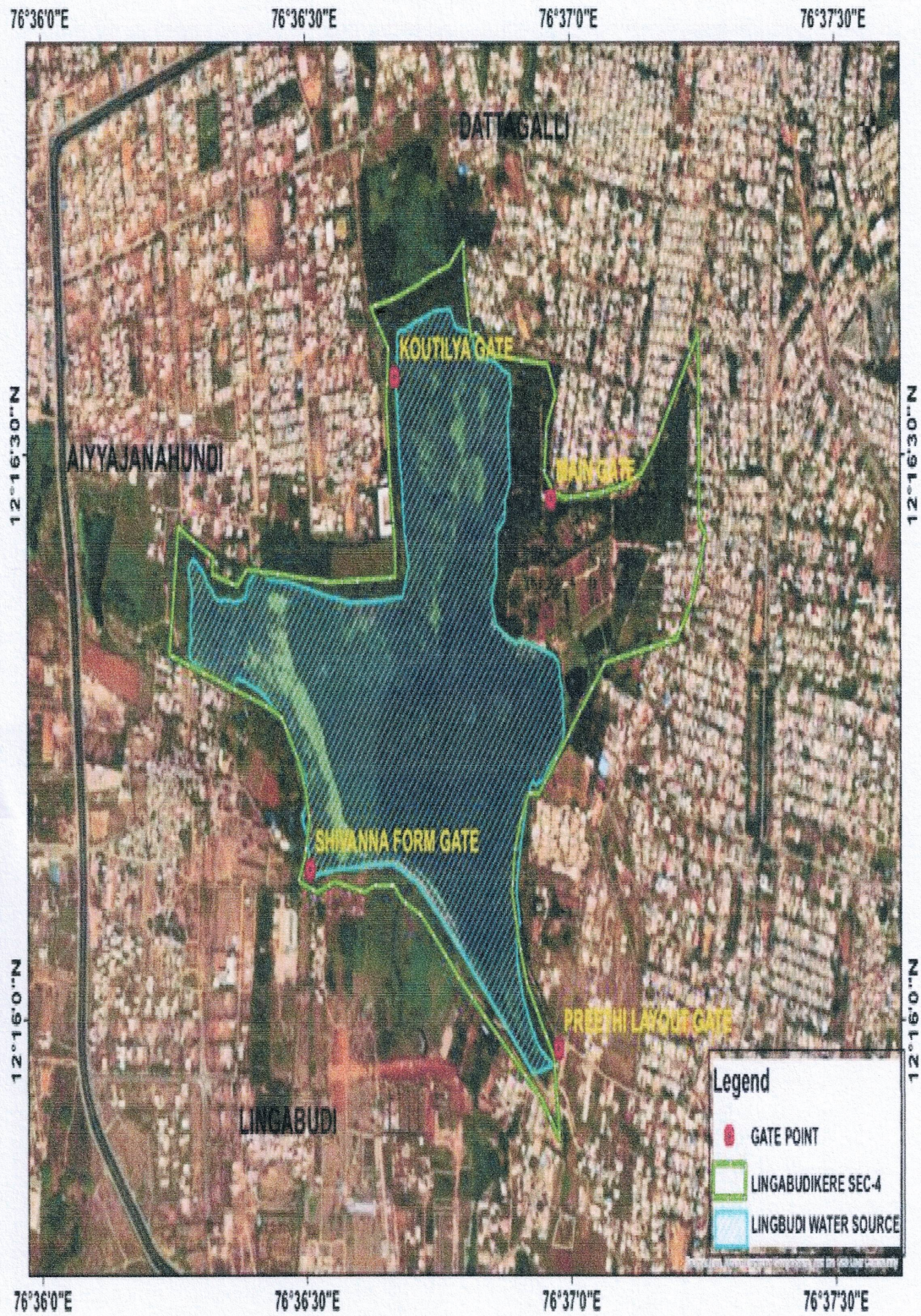


Fig.2 Lingambudhi Lake and adjoining area

**b) Fish Kill incident in Lingambudhi Lake on 28.08.2023: Initiatives of Forest Department**

Range Forest Officer (RFO), Greening Urban range, Mysuru informed that death of around 2 – 3 tonnes of fishes was noticed on 29.08.2023 at Lingambudhi lake. Fish kill was not confined to any specific portion of the Lingambudhi Lake and had affected the entire lake. *After the mass death of fishes, following actions were taken by the Forest Department;*

- All the dead fishes were taken out manually using Coracles by engaging around 25 labourers for 3 days.
- As per the guidance of Dept. of Fisheries, disposal of collected dead fish was carried out scientifically by deep burial by applying enough quantity of lime powder to ensure no carnivores, scavengers and birds feed on this and also no epidemics emerges.
- As per the suggestion of Department of Fisheries, de-stocking was attempted but there were very few fishes of harvestable size that could be captured.
- Samples of the viscera ( dead fish) have been collected and sent to Karnataka Veterinary, Animal and Fisheries Sciences University, Mangalore by the Department of Fisheries, Govt. of Karnataka so as to find the root cause of fish death in Lingambudhi Lake

Range Forest Officer (RFO), Greening Urban range, Mysuru also informed that the dead fishes were taken out of the lake & disposed scientifically by deep burial as per guidance from Fishery Department, Government of Karnataka by engaging around 25 labours for 3 days and photographs

taken during the period 29.08.2023 to 31.08.2023 given in **Fig.3 (a)**, and **Fig. 3 (b)**.



**Fig.3 (a). Carcasses of fishes at Lingambudhi Lake, Forest Department, Mysuru noticed on August 29, 2023.**





**Fig. 3 (b) Removal of dead fishes from the Lake and burial during 29/8/2023 to 31/08/2023**

**c) Water samples collection on 29.08.2023 from Lingambudhi Lake**

Soon after noticing fish kill in Lingambudhi lake on 29-08-2023, the officials of Regional Office, Karnataka State Pollution Control Board (KSPCB), Mysuru have collected 05 samples on 29-08-2023 from different locations of Lingambudhi lake for analysis of relevant parameters. Figure depicting the water sampling locations is indicated in Fig.4



**Fig.4 Sampling locations of water samples from Lingambudhi Lake**

**d) Sources of contribution of sewage in to the Lingambudhi Lake**

To the queries of the members of the Joint Committee (representative of CPCB and representative of Karnataka State Pollution Control Board), Executive Engineer, Mysuru City Corporation (MCC) clarified that at present there are 4 number of Sewage Treatment Plants (STP's) having capacity 180.6 MLD to the Mysuru city based on the drainage pattern namely "A-District", "B-District", "C-District," "D-District" and Hebbal valley. The drainage District "A-District" falls under the catchment area of Lingambudhi lake and the connected STP is having capacity of 60 MLD covering "A-District" and "D-District" including the 3 adjoining wards located around the Lingambudhi lake. However, Representative of Karnataka State Pollution Control Board i.e., Senior Environment Officer, Karnataka SPCB, ZO, Mysuru is of the view that the drainage overflow from the surrounding areas viz., Rajarajeshwari Nagar, Dattagalli, Bogadi,



The Committee decided that the time bound action plan can be finalized in the next meeting by the Committee after receipt of detailed information from the concerned departments with regard to the inflow wastewater quantities into the lake with GPS map showing all the natural drains, characteristics of waste water inflows, existing sewage treatment plant capacity, identification of illegal discharges, gaps in sewage treatment, analysis results of the samples collected by the Committee during the visit to Lingambudhi lake on 4.10.2023. Minutes of first meeting of the Committee is enclosed as **Annexure-3**

## **2.2 Visit to the Lingambudhi Lake and collection of water samples on 04.10.2023**

After the first meeting on 4.10.2023, the Joint Committee members comprising representatives of CPCB, KSPCB along with the Technical Committee constituted by The Deputy Commissioner (DC), Mysuru comprising ULB officials visited Lingambudhi lake on 04.10.2023(**Fig.6**)and collected three water samples for further analysis through Regional Office, Karnataka State Pollution Control Board Laboratory, Mysuru. Following observations are made by the members of the Joint Committee during the visit to Lingambudhi lake on 04.10.2023:

- a) Floating matter and Eutrophication of lake due to accumulation of organic load.
- b) Discharge of un treated sewage / sullage in to the lake which might be causing increased BOD.

- c) Septic conditions of the lake water mainly at Northern side which is due to untreated sewage inflow;
- d) Observed algae, invasive hydrophytes due to which no penetration of sun light (lack of photosynthesis) which may lead to anaerobic conditions in the Lingambudhi lake.
- e) Obnoxious odor in the ambient air due to unhygienic conditions of the lake.



**Fig.6. Visit to Lingambudhi Lake by the Committee on 4.10.2023**

### **2.3 Second meeting of the Joint Committee held on 27.12.2023**

Second meeting of the Joint Committee was organized by the Deputy Conservator of Forests, Mysuru Division, Mysuru on 27-12-2023 which was attended by the representative of CPCB i.e., J. Chandra Babu, Regional Director, CPCB Regional Directorate, Bengaluru and the representative of Karnataka State Pollution Control Board i.e., Dr. B.M. Prakash, Senior Environment Officer, Karnataka State Pollution Control Board, ZO, Mysuru. The Joint Committee members have discussed with the Technical Committee members as well as officials of Mysuru City Corporation (MCC) and Mysuru Urban Development Authority (MUDA) Officials regarding the action taken as per decisions taken in first meeting of the Committee held on 04.10.2023. The committee deliberated the gap analysis with regard to the root cause for pollution, on-going activities of MCC and MUDA for sewage management, gaps in sewage management and actions required to be taken by the MUDA and MCC authorities to curb the pollution in Lingambudhi lake.

### **3. Water quality of Lingambudhi Lake, storm water drains, Bogadhi & Ajjayayana Hundi Lakes as well as the dead fish samples.**

The analysis results of the water samples (i) collected by the officials of the KSPCB soon after the incidence of fish kill at Lingambudhi Lake on 29.08.2023, (ii) Team comprising the Joint Committee members i.e., representatives of CPCB and KSPCB along with the Forest Department and other officials of the MCC and MUDA collected samples from drains leading to Lingambudhi lake, on 04<sup>th</sup> October 2023 at 03 locations, (iii)

Team comprising KSPCB along with the Forest Department and officials of MCC and MUDA collected samples on 10<sup>th</sup> October 2023 from Lingambudhi Lake at 04 locations, (iv) KSPCB officials also collected the water samples from Bogadi Lake (located Upstream on Northern side of the lake) and Ajjayayana Hundi lake (located Upstream on Western side of the lake) on 27.11.2023, is given in the **Table 1** below.

The Karnataka State Pollution Control Board is regularly (once in a month) monitoring the Lingambudhi lake under National Water Quality Monitoring Programme (NWMP). The analysis results of the Lingambudhi lake for the period January 2023 to November 2023 is given in **Table 2** below.

Also, samples of the viscera have been collected and sent to Karnataka Veterinary, Animal and Fisheries Sciences University, Mangalore for further analysis by the Department of Fisheries, Government of Karnataka so as to find the root cause of fish death in Lingambudhi Lake on 28.08.2023 and the analysis results is given in the **Table-3** below.

**Table 1. The water quality analysis results of the samples collected on 29.08.2023, 04.10.2023, 10.10.2023 and 27.11.2023**

| Sl. No. | Parameters                            | Units*     | Sample No. & Analysis Results of the samples collected on 29.08.2023 |      |       |      |       | Sample No. & Analysis Results of the samples collected from storm water drains leading to Lingambudhi Lake on 04.10.2023 |       |       | Sample No. & Analysis Results of the samples collected from Lingambudhi Lake on 10.10.2023 |      |       |       | Analysis Results of the samples collected from upstream lakes of Lingambudhi Lake on 27.11.2023 |      |
|---------|---------------------------------------|------------|----------------------------------------------------------------------|------|-------|------|-------|--------------------------------------------------------------------------------------------------------------------------|-------|-------|--------------------------------------------------------------------------------------------|------|-------|-------|-------------------------------------------------------------------------------------------------|------|
|         |                                       |            | 718                                                                  | 719  | 720   | 721  | 722   | 1102                                                                                                                     | 1103  | 1104  | 1107                                                                                       | 1108 | 1109  | 1110  | 1739                                                                                            | 1740 |
| 1       | Temperature                           | °C         | -                                                                    | -    | -     | -    | -     | -                                                                                                                        | -     | -     | 18                                                                                         | 18   | 18    | 18    | -                                                                                               | -    |
| 2       | pH                                    | pH unit    | 8.4                                                                  | 8.3  | 8.0   | 8.7  | 8.0   | 8.1                                                                                                                      | 7.4   | 7.7   | 8.3                                                                                        | 7.8  | 8.6   | 8.6   | 8.1                                                                                             | 8.0  |
| 3       | Electrical Conductivity               | µmho/cm    | 981                                                                  | 965  | 929   | 975  | 1030  | 930                                                                                                                      | 766   | 1001  | 984                                                                                        | 926  | 973   | 997   | 1460                                                                                            | 572  |
| 4       | Total Dissolved Solids                | mg/L       | 680                                                                  | 660  | 640   | 670  | 700   | 630                                                                                                                      | 520   | 660   | 690                                                                                        | 630  | 680   | 680   | -                                                                                               | -    |
| 5       | Total Fixed Solids                    | mg/L       | 540                                                                  | 520  | 500   | 520  | 560   | 440                                                                                                                      | 360   | 450   | 420                                                                                        | 420  | 450   | 440   | -                                                                                               | -    |
| 6       | Total Suspended Solids                | mg/L       | 40                                                                   | 50   | 60    | 40   | 80    | 40                                                                                                                       | 30    | 40    | 80                                                                                         | 80   | 60    | 60    | -                                                                                               | -    |
| 7       | Turbidity                             | NTU        | 11.8                                                                 | 12.6 | 11.4  | 10.2 | 15.6  | 5.6                                                                                                                      | 7.2   | 5.4   | 25.4                                                                                       | 27.2 | 22.4  | 25.4  | -                                                                                               | -    |
| 8       | Dissolved Oxygen                      | mg/L       | 6.2                                                                  | 6.4  | 0.9   | 6.4  | 1.0   | 1.8                                                                                                                      | 1.5   | 1     | 12.2                                                                                       | 12   | 12.7  | 13    | 5.0                                                                                             | 5.8  |
| 9       | BOD                                   | mg/L       | 5.8                                                                  | 5.0  | 19.0  | 5.0  | 24.0  | 24                                                                                                                       | 28    | 28    | 4                                                                                          | 4.8  | 3     | 3     | 4.8                                                                                             | 4.0  |
| 10      | COD                                   | mg/L       | 184                                                                  | 76   | 168   | 128  | 376   | 216                                                                                                                      | 244   | 268   | 68                                                                                         | 84   | 56    | 64    | -                                                                                               | -    |
| 11      | Total Hardness as CaCO <sub>3</sub>   | mg/L       | 320                                                                  | 312  | 288   | 304  | 320   | 248                                                                                                                      | 196   | 300   | 324                                                                                        | 280  | 280   | 292   | -                                                                                               | -    |
| 12      | Calcium as CaCO <sub>3</sub>          | mg/L       | 108                                                                  | 100  | 128   | 120  | 100   | 140                                                                                                                      | 80    | 144   | 152                                                                                        | 132  | 136   | 136   | -                                                                                               | -    |
| 13      | Magnesium as CaCO <sub>3</sub>        | mg/L       | 212                                                                  | 212  | 160   | 184  | 220   | 108                                                                                                                      | 116   | 156   | 172                                                                                        | 148  | 144   | 156   | -                                                                                               | -    |
| 14      | Total Alkalinity as CaCO <sub>3</sub> | mg/L       | 136                                                                  | 152  | 160   | 168  | 160   | 172                                                                                                                      | 124   | 216   | 220                                                                                        | 184  | 200   | 196   | -                                                                                               | -    |
| 15      | Alkalinity-P as CaCO <sub>3</sub>     | mg/L       | 28                                                                   | 24   | 20    | 28   | 20    | Nil                                                                                                                      | Nil   | Nil   | 16                                                                                         | Nil  | 24    | 24    | -                                                                                               | -    |
| 16      | Chloride as Cl                        | mg/L       | 132                                                                  | 128  | 88    | 132  | 116   | 156                                                                                                                      | 116   | 168   | 168                                                                                        | 144  | 168   | 164   | -                                                                                               | -    |
| 17      | Sulphate as SO <sub>4</sub>           | mg/L       | 17                                                                   | 18   | 19    | 20   | 15    | 32                                                                                                                       | 21    | 15    | 21                                                                                         | 25   | 26    | 21    | -                                                                                               | -    |
| 18      | Fluoride                              | mg/L       | 0.86                                                                 | 0.80 | 0.85  | 0.82 | 0.84  | 0.34                                                                                                                     | 0.18  | 0.65  | 0.16                                                                                       | 0.18 | 0.34  | 0.28  | -                                                                                               | -    |
| 19      | Phosphate                             | mg/L       | 0.7                                                                  | 0.6  | 3.1   | 1.2  | 1.4   | 0.78                                                                                                                     | 0.65  | 0.54  | 0.88                                                                                       | 1.4  | 1.1   | 0.93  | -                                                                                               | -    |
| 20      | Sodium                                | mg/L       | 83                                                                   | 82   | 102   | 101  | 102   | 48                                                                                                                       | 41    | 48    | 48                                                                                         | 51   | 71    | 61    | -                                                                                               | -    |
| 21      | Potassium                             | mg/L       | 11.4                                                                 | 11.4 | 11.2  | 11.3 | 11.4  | 17.4                                                                                                                     | 6.8   | 11.2  | 16.8                                                                                       | 24.2 | 21.3  | 17.8  | -                                                                                               | -    |
| 22      | SAR                                   | -          | 2.0                                                                  | 2.0  | 2.6   | 2.5  | 2.5   | -                                                                                                                        | -     | -     | -                                                                                          | -    | -     | -     | 0.98                                                                                            | 0.52 |
| 23      | Nitrate as N                          | mg/L       | 4.2                                                                  | 2.1  | 1.2   | 1.6  | 1.7   | 4.3                                                                                                                      | 2.8   | 5.1   | 7.8                                                                                        | 6.5  | 9.2   | 5.4   | -                                                                                               | -    |
| 24      | Ammonia as N                          | mg/L       | 6.0                                                                  | 6.2  | 8.4   | 5.6  | 7.3   | 13.4                                                                                                                     | 15.1  | 10.64 | 7.3                                                                                        | 6.2  | 8.96  | 9.52  | -                                                                                               | -    |
| 25      | Total Kjeldahl Nitrogen as N          | mg/L       | 10.1                                                                 | 11.2 | 14.6  | 8.4  | 13.4  | 24.6                                                                                                                     | 20.2  | 14    | 10.64                                                                                      | 9.52 | 15.68 | 15.12 | -                                                                                               | -    |
| 26      | Free Ammonia                          | -          | 0.32                                                                 | 0.33 | 0.45  | 0.85 | 0.39  | -                                                                                                                        | -     | -     | -                                                                                          | -    | -     | -     | 0.25                                                                                            | 0.15 |
| 27      | Boron as B                            | mg/L       | 0.11                                                                 | 0.15 | 0.15  | 0.10 | 0.18  | BDL                                                                                                                      | BDL   | BDL   | BDL                                                                                        | BDL  | BDL   | BDL   | BDL                                                                                             | BDL  |
| 28      | Total Coliform Count                  | MPN/100 ml | 6300                                                                 | 5800 | 24000 | 6300 | 21000 | 21000                                                                                                                    | 28000 | 17000 | 7000                                                                                       | 6300 | 6300  | 5800  | 6300                                                                                            | 5800 |
| 29      | Faecal Coliform Count                 | MPN/100 ml | 910                                                                  | 910  | 3400  | 920  | 3300  | 4900                                                                                                                     | 4000  | 3400  | 1700                                                                                       | 1400 | 1100  | 1100  | -                                                                                               | -    |

|    |           |      |       |       |      |      |      |       |       |       |       |       |       |       |   |   |
|----|-----------|------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|---|---|
| 30 | Iron      | mg/L | 2.85  | 4.81  | 3.23 | 0.94 | 0.29 | 0.521 | 0.641 | 0.248 | 0.081 | 0.046 | 0.28  | 0.014 | - | - |
| 31 | Copper    | mg/L | 0.06  | 0.08  | 0.08 | 0.12 | BDL  | 0.124 | 0.158 | 0.241 | BDL   | BDL   | BDL   | BDL   | - | - |
| 32 | Zinc      | mg/L | 0.19  | 0.19  | 0.29 | 0.22 | BDL  | 0.148 | 0.214 | 0.216 | BDL   | BDL   | BDL   | BDL   | - | - |
| 33 | Lead      | mg/L | BDL   | BDL   | BDL  | BDL  | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   | BDL   | BDL   | - | - |
| 34 | Nickel    | mg/L | BDL   | BDL   | BDL  | BDL  | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   | BDL   | BDL   | - | - |
| 35 | Chromium  | mg/L | 0.041 | 0.051 | 0.04 | 0.04 | 0.03 | BDL   | 0.056 | BDL   | BDL   | BDL   | BDL   | BDL   | - | - |
| 36 | Cadmium   | mg/L | BDL   | BDL   | BDL  | BDL  | BDL  | BDL   | BDL   | BDL   | BDL   | BDL   | BDL   | BDL   | - | - |
| 37 | Manganese | mg/L | 0.21  | 0.17  | 0.18 | 0.13 | 0.11 | 0.03  | 0.028 | 0.056 | 0.451 | 0.289 | 0.341 | 0.421 | - | - |
| 38 | Arsenic   | mg/L | BDL   | BDL   | BDL  | BDL  | BDL  | -     | -     | -     | -     | -     | -     | -     | - | - |
| 39 | Mercury   | mg/L | BDL   | BDL   | BDL  | BDL  | BDL  | -     | -     | -     | -     | -     | -     | -     | - | - |
| 40 | Aluminium | mg/L | 0.43  | 0.26  | 0.35 | 0.45 | 0.15 | -     | -     | -     | -     | -     | -     | -     | - | - |
| 41 | Barium    | mg/L | 0.08  | 0.09  | 0.08 | 0.06 | 0.07 | -     | -     | -     | -     | -     | -     | -     | - | - |
| 42 | Silver    | mg/L | BDL   | BDL   | BDL  | BDL  | BDL  | -     | -     | -     | -     | -     | -     | -     | - | - |

Note: • µmho/ cm-Micro mho / centimetre, MPN/100ml-Most Probable Number / 100ml , NS: Standards Not Stipulated , BDL : Below Detectable Limit, mg/L-milligram / litre

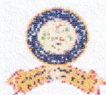
| Sample No. | Location details of the collected water samples on 29.08.2023 by Officials of RO, KSPCB, Mysuru and Forest Department, Mysru      | Sample No. | Location details of the collected water samples on 10.10.2023 (Technical Committee)        |
|------------|-----------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------|
| 718        | lake near watch tower                                                                                                             | 1107       | D/s of the lake towards south eastern side near Mantapa (weir)                             |
| 719        | lake near horticulture park                                                                                                       | 1108       | Lake sample collected from near watch tower                                                |
| 720        | lake near preethi layout                                                                                                          | 1109       | D/s of the lake towards side near temple                                                   |
| 721        | lake near Inland                                                                                                                  | 1110       | U/s of the lake towards near Lingambudhi palya                                             |
| 722        | lake near kautilya school (drainage)                                                                                              |            |                                                                                            |
| Sample No. | Location details of the collected water samples on 04.10.2023 ( collected by the Technical Committee and Joint Committee members) | Sample No. | Location details of the collected water samples on 27.11.2023 (Technical Committee)        |
| 1102       | Strom water drain sample collected from near MangalysSangamChoultry Raja Kaluve Rama Krishna Nagar                                | 1739       | Lake water sample near Ajjayanahundi layout side from Ajjayanhundi Lake , Ring road Mysore |
| 1103       | Strom water drain sample collected from near Horticulture Department Lotus Park                                                   | 1740       | Lake water sample from Bogadi Lake Mysore                                                  |
| 1104       | Storm water drain sample collected from near Ajjayana Pura Hundi                                                                  |            |                                                                                            |

**Table 2. Water Quality Monitoring Results of Lingambudhi lake monitored under National Water Quality Monitoring Programme (NWMP) during the period January 2023 to November 2023**

| PARTICULARS                     | UNITS     | JANUARY    | FEBRUARY   | MARCH      | MAY        | JUNE       | JULY       | AUGUST     | SEPTEMBER  | OCTOBER    | NOVEMBER   |
|---------------------------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                                 |           | 2023       | 2023       | 2023       | 2023       | 2023       | 2023       | 2023       | 2023       | 2023       | 2023       |
| SAMPLING DATE                   | --        | 12.01.2023 | 08.02.2023 | 17.03.2023 | 24.05.2023 | 22-06-2023 | 20.07.2023 | 16.08.2023 | 12.09.2023 | 10.10.2023 | 18.11.2023 |
| TIME OF COLLECTION              | --        | 13.10 Hrs  | 12.30 Hrs  | 15.45 Hrs  | 16.00HRS   | 13.30 HRS  | 13.00Hrs   | 11.35Hrs   | 13.45 Hrs  | 10.25 Hrs  | 12.45 Hrs  |
| WEATHER                         | --        | Clear      | Clear      | Clear      | Clear      | Cloudy     | Cloudy     | Clear      | Clear      | Clear      | Clear      |
| APPROX DEPTH OF MAIN STREAM     | --        | 50-100 cm  | >100 cm    | <50 cm     | <50 cm     | 50-100 cm  | 50-100 cm  | 50-100 cm  | <50 cm     | 50-100 cm  | > 100 cm   |
| COLOUR INTESITY                 | --        | Colourless | Colourless | Colourless | Colourless | Colourless | Colourless | Colourless | Colourless | Colourless | Colourless |
| ODOUR                           | -         | Odourless  | Odourless  | Odourless  | Odourless  | Odourless  | Odourless  | Odourless  | Odourless  | Odourless  | Odourless  |
| VISIBLE EFFLUENT DISCHARGE      | --        | None       | None       | None       | None       | None       | None       | None       | None       | None       | None       |
| HUMAN ACTIVITIES AROUND STATION | --        | None       | None       | None       | None       | None       | None       | None       | None       | None       | None       |
| TEMPERATURE                     | ° C       | 26         | 30         | 24         | 25         | 22         | 19         | 24         | 26         | 18         | 28         |
| pH                              | --        | 8.8        | 8.4        | 7.6        | 8.0        | 8.1        | 8.9        | 8.9        | 8.8        | 8.3        | 9          |
| DISSOLVED OXYGEN                | mg/L      | 6.3        | 4.1        | 3.4        | 3.5        | 4.9        | 5.3        | 6.2        | 9.8        | 12.2       | 6.9        |
| BOD                             | mg/L      | 4.0        | 8.0        | 9.4        | 14.0       | 8.0        | 7.5        | 4.5        | 3          | 4          | 3.5        |
| CONDUCTIVITY                    | µs/cm     | 1040       | 1132       | 1288       | 1145       | 1009       | 984        | 956        | 767        | 984        | 730        |
| NITRATE AS N                    | mg/L      | 2.9        | 7.2        | 11.2       | 5.9        | 5.3        | 5.1        | 5.3        | 3.1        | 7.8        | 6.8        |
| AMMONIA AS N                    | mg/L      | 5.6        | 6.2        | 6.20       | 7.30       | 6.20       | 6.20       | 5.60       | 9.5        | 7.3        | 5.6        |
| FEACAL COLIFORM                 | MPN/100mL | 780        | 1700       | 1300       | 1300       | 1100       | 920        | 910        | 1100       | 1700       | 450        |
| TOTAL COLIFORM                  | MPN/100mL | 5800       | 7000       | 8400       | 8400       | 6300       | 6300       | 5800       | 7900       | 7000       | 5800       |
| COD                             | mg/L      | 60         | 96         | 112        | 154        | 96         | 108        | 64         | 56         | 68         | 56         |
| TURBIDITY                       | NTU       | 6.0        | 4.6        | 8.6        | 9.2        | 6.3        | 11.3       | 4.5        | 21         | 25.4       | 11.2       |
| HARDNESS as                     | mg/L      | 300        | 304        | 380        | 340        | 300        | 304        | 316        | 228        | 324        | 208        |

|                                                 |      |      |      |      |      |      |      |      |      |       |      |  |
|-------------------------------------------------|------|------|------|------|------|------|------|------|------|-------|------|--|
| CaCO <sub>3</sub>                               |      |      |      |      |      |      |      |      |      |       |      |  |
| CALCIUM as CaCO <sub>3</sub>                    | mg/L | 140  | 140  | 188  | 168  | 152  | 132  | 148  | 96   | 152   | 92   |  |
| MAGNESIUM as CaCO <sub>3</sub>                  | mg/L | 160  | 164  | 192  | 172  | 148  | 172  | 168  | 132  | 172   | 116  |  |
| CHLORIDES                                       | mg/L | 120  | 144  | 172  | 176  | 124  | 156  | 132  | 116  | 168   | 112  |  |
| SODIUM                                          | mg/L | 45   | 54   | 71.0 | 88.0 | 62.0 | 61.0 | 35.0 | 37   | 48    | 35   |  |
| POTASSIUM                                       | mg/L | 11.2 | 5.8  | 11.2 | 21.0 | 15.4 | 12.8 | 6.5  | 30   | 16.8  | 11.4 |  |
| SULPHATE                                        | mg/L | 41   | 50   | 40   | 60   | 51   | 44   | 27   | 12   | 21    | 16   |  |
| PHENOLPHTHELENE ALKALINITY as CaCO <sub>3</sub> | mg/L | 40   | 20   | Nil  | NIL  | NIL  | 28   | 16   | 20   | 16    | 20   |  |
| TOTAL ALKALINITY as CaCO <sub>3</sub>           | mg/L | 212  | 200  | 272  | 288  | 248  | 192  | 196  | 132  | 220   | 128  |  |
| TOTAL KJELDAL Nitrogen as N                     | mg/L | 10.0 | 10.6 | 10.1 | 12.3 | 10.1 | 11.2 | 9.5  | 16.2 | 10.64 | 7.84 |  |
| AMMONICAL NITROGEN AS N                         | mg/L | 5.6  | 6.2  | 6.20 | 7.30 | 6.20 | 6.20 | 5.60 | 9.5  | 7.3   | 5.6  |  |
| TOTAL SUSPENDED SOLIDS                          | mg/L | 30   | 30   | 50   | 40   | 30   | 40   | 30   | 70   | 80    | 50   |  |
| TOTAL DISSOLVED SOLIDS                          | mg/L | 640  | 700  | 800  | 770  | 650  | 670  | 620  | 530  | 690   | 480  |  |
| TOTAL FIXED SOLIDS                              | mg/L | 500  | 560  | 640  | 610  | 520  | 530  | 500  | 360  | 420   | 320  |  |
| PHOSPHATE                                       | mg/L | 0.44 | 0.44 | 0.84 | 0.88 | 0.64 | 0.44 | 0.54 | 1.12 | 0.88  | 1.48 |  |
| FLUORIDE                                        | mg/L | 0.16 | 0.2  | 0.24 | 0.38 | 0.24 | 0.56 | 0.32 | 0.44 | 0.16  | 0.24 |  |
| BORON                                           | mg/L | 0.12 | 0.12 | 0.14 | 0.14 | 0.11 | 0.13 | 0.16 | BDL  | BDL   | BDL  |  |

**Table 3. Analysis results of the viscera of dead fish collected from Lingambudhi Lake**



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Head of the Department

No. FCM/AAHM/Rev. Fund/Analysis/2023-24/

Date: 16.09.2023

|                          |                                                                                 |                   |            |
|--------------------------|---------------------------------------------------------------------------------|-------------------|------------|
| Sample submitted by      | RANGE FOREST OFFICER, GREENING URBAN RANGE<br>ARANYABHAVAN, ASHOKAPURAM, MYSORE |                   |            |
| Type of sample           | TILAPIA FISH ( <i>Oreochromis niloticus</i> ) and water                         |                   |            |
| Analysis required        | Determining the cause of fish death                                             |                   |            |
| Sample given by Customer | Condition of the sample                                                         | Not satisfactory  |            |
| Sample Received on       | 31.08.2023                                                                      | Test completed on | 13.09.2023 |

**TEST REPORT**

**Detection of Fish Pathogens**

| Analysis     | Pathogen                                            | Result  |
|--------------|-----------------------------------------------------|---------|
| Virology     | Tilapia lake virus (TiLV)                           | Absent  |
|              | Infectious spleen and kidney necrosis virus (ISKNV) | Absent  |
|              | Scale drop disease virus (SDDV)                     | Absent  |
|              | Viral nervous necrosis (VNN)                        | Absent  |
| Bacteriology | <i>Aeromonas</i> sp.                                | Present |
|              | <i>Streptococcus</i> sp.                            | Absent  |

**Analysis of water quality parameters in the water sample**

| Sl. No | Water            | Units     | Result |
|--------|------------------|-----------|--------|
| 1.     | Total coliforms  | MPN/100ml | >1600  |
| 2.     | Faecal coliforms | MPN/100ml | 240    |
| 3.     | BOD              | mg/l      | 200    |

**Inference:**

1. The condition of the fish at the time of receive was undesirable for disease diagnosis.
2. The mere presence of *Aeromonas* sp. in the dead fish doesn't provide enough evidence to conclude the cause of the death.
3. Presence of coliforms indicates the fecal contamination (sewage) in the given water sample.
4. High Biological oxygen demand (BOD) indicates high organic load in the water which may cause low dissolved oxygen
5. The college doesn't have the facility to analyze organic phosphate toxins/ heavy metals.
6. The cause of death of fishes may be due to poor water quality parameters

For (Professor and Head)

Note: This report of analysis is for your information and guidance only and not valid for commercial or legal purposes.

Designated Best Use Water Quality Criteria under various Classes 'A-E' is given in **Table.4.**

**Table.4. Designated Best Use Water Quality Criteria**

| Designated Best Use Water Quality Criteria Prescribed by CPCB |                                                                                                      |                                |                                           |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------|
| Class of water                                                | Designated best use                                                                                  | Criteria                       |                                           |
| A                                                             | Drinking water source without conventional treatment but after disinfection                          | Total Coliform MPN/100 mL      | <50                                       |
|                                                               |                                                                                                      | pH                             | 6.5 – 8.5                                 |
|                                                               |                                                                                                      | DO                             | >6mg/L                                    |
|                                                               |                                                                                                      | BOD 5 days, 20°C               | <2mg/L                                    |
| B                                                             | Notified primary water quality criteria for bathing water (water used for organized outdoor bathing) | Faecal Coliform (MPN/100mL)    | 500 (Desirable)<br>2500(Max. permissible) |
|                                                               |                                                                                                      | FaecalStreptococci (MPN/100mL) | 100 (Desirable)<br>500(Max. permissible)  |
|                                                               |                                                                                                      | pH                             | 6.5 – 8.5                                 |
|                                                               |                                                                                                      | DO                             | >5mg/L                                    |
|                                                               |                                                                                                      | BOD 3 days @ 27°C              | <3mg/L                                    |
| B                                                             | Outdoor bathing (Organized)                                                                          | Total Coliform MPN/100mL       | <500                                      |
|                                                               |                                                                                                      | pH                             | 6.5 – 8.5                                 |
|                                                               |                                                                                                      | DO                             | >5mg/L                                    |
|                                                               |                                                                                                      | BOD 5 days @ 20°C              | <3mg/L                                    |
| C                                                             | Drinking water source after conventional treatment and disinfection                                  | Total Coliform (MPN/100 mL)    | <5000                                     |
|                                                               |                                                                                                      | pH                             | 6 – 9                                     |
|                                                               |                                                                                                      | DO                             | >4 mg/L                                   |
|                                                               |                                                                                                      | BOD 5 days, 20°C               | <3mg/L                                    |
| D                                                             | Propagation of wild life and fisheries                                                               | pH                             | 6.5 to 8.5                                |
|                                                               |                                                                                                      | DO                             | >4 mg/L                                   |
|                                                               |                                                                                                      | Free Ammonia (as N)            | <1.2mg/L                                  |
| E                                                             | Irrigation, Industrial cooling, controlled waste disposal                                            | pH                             | 6 – 8.5                                   |
|                                                               |                                                                                                      | EC at 25°C                     | Max. 2250 $\mu\text{s/cm}$                |
|                                                               |                                                                                                      | SAR                            | Max. 26                                   |
|                                                               |                                                                                                      | Boron                          | Max. 2 mg/L                               |

**3.1 Interpretation on the water quality analysis results of the water samples collected on 29.08.2023, 04.10.2023, 10.10.2023 and 27.11.2023 given in Table.1**

*The analysis results of 05 nos. of samples (sample no. 718-722) collected on 29.08.2023 are presented in Table 1. The results were compared with*

the 'Designated Best Use Water Quality Criteria' prescribed by CPCB and also with 'Primary Water Quality Criteria for Bathing water (water used for organized outdoor bathing)' notified under the Environment (Protection) Rules, 1986 by the Ministry of Environment, Forests and Climate Change (MoEFCC). The analysis results indicated that 02 out of 05 nos. of samples viz., sample no. 718 and 719 qualified the water quality criteria for Class 'D' – Designated best use 'Propagation of wild life and fisheries'. The concentration of DO (sample no. 718: 6.2mg/L; sample no. 719: 6.4 mg/L), Free ammonia (as N) (sample no. 718: 0.32mg/L; sample no. 719: 0.33 mg/L), and pH (sample no. 718: pH-8.4; sample no. 719: pH-8.3) were found to comply with the prescribed criteria. The Oxygen (Dissolved) (DO) for Class 'D' - Designated best use should be >4mg/L. However, DO in sample no. 720 and 722 were found to be significantly low i.e., 0.9 mg/L and 1.0 mg/L, respectively and such locations are not suitable environment for fish survival. Further, the Biochemical Oxygen Demand (BOD) concentration in the said samples were 19.0 mg/L and 24 mg/L relatively higher than the other three collected samples (Sample No.718: 5.8 mg/L; Sample No. 719: 5.0mg/L; Sample No. 721: 5.0 mg/L). Sample no. 720 and 722 qualified the water quality criteria for Class 'E' – Designated best use 'Irrigation, Industrial cooling, controlled waste disposal', whereas the water quality of sample no. 721 was found to be below the water quality criteria for Class 'A-E'. Although, the concentrations of DO (6.4 mg/L) and free ammonia (0.85 mg/L) in sample no. 721 complied with the prescribed concentrations of >4.0 mg/L and <1.2 mg/L, respectively, the pH (actual value 8.7) exceeded the prescribed water quality criteria (prescribed value pH-6.5-8.5) for Class 'D' – Designated Best Use.

Significant higher concentrations of Ammonical Nitrogen ( $\text{NH}_3\text{-N}$ ), Phosphate, Total Kjeldahl Nitrogen (TKN), Faecal and Total Coliform were

observed in sample no. 720 and 722, indicating sewage contamination and presence of other pathogens.

*The relatively higher concentrations of Fe, Al, Mn, in all 05 nos. of samples may be attributed to high sediment load input containing metal elements received from the catchment area during rainy season. DO less than 5 mg/L (in sample no. 720 and 722) in water bodies may cause release of anaerobic gases (obnoxious gases) from the sediment. DO less than 1 mg/L is recognized as lethal threshold concentration for some fish species.*

Higher concentration of Phosphate and Nitrogen may lead to algal bloom and eutrophication. Dead macrophytes, phytoplankton, aquatic plants settle to the bottom of a water body, stimulating microbial breakdown processes that require oxygen. Eventually, such condition may lead to depletion of oxygen in such water body. Aquatic life may be hampered when the entire water body experiences daily fluctuations in dissolved oxygen levels as a result of plant respiration specially at night. Extreme oxygen depletion can lead to death of fish species.

*The analysis results of samples collected at three different locations (sample no. 1102-1104) on 04.10.2023 are presented in **Table.1**. The analysis results indicated that all 03 nos. of samples qualified the water quality criteria for Class 'E' – Designated best use 'Irrigation, Industrial cooling, controlled waste disposal'. The DO concentrations in sample no. 1102, 1103, and 1104 were found to be 1.8 mg/L, 1.5 mg/L, and 1.0 mg/L, respectively, which is significantly lower than that prescribed for Class 'D' – Designated best use 'Propagation of wild life and fisheries'. Considerable concentrations of NH<sub>3</sub>-N and TKN were also reported in all three samples. Further, the total coliform and faecal coliform concentrations in all three*

samples were greater than 17000 MPN/100 mL, and 3400 MPN/100 mL, respectively, which may be attributed to contamination by sewage.

*The analysis results of samples collected at four different locations (sample no. 1107-1110) of Lingambudhi Lake on 10.10.2023 are tabulated in **Table.1**.* The analysis results indicated that all 03 nos. of samples qualified the water quality criteria for Class 'E' – Designated best use 'Irrigation, Industrial cooling, controlled waste disposal'. On comparing the analysis results of samples collected on 04.10.2023 and 10.10.2023, significant reduction in the concentration of total coliform, faecal coliform, BOD, COD, and heavy metals were observed; whereas, concentration of DO, total suspended solids, turbidity, alkalinity increased considerably which may be attributed to rainfall on 27.08.2023. Temperature is reported as 18°C in all cases and at this temperature, DO is bound to show higher values.

Samples were collected at two different lakes (sample no. 1739-1740) at the upstream of Lingambudhi Lake on 27.11.2023 (**Table 1**). The analysis results of the said samples are tabulated in Table.5. The results indicated that the water quality of both the lakes were complied with the Class 'C' – Designated best use 'Drinking water source after conventional treatment and disinfection' except for the Total coliform parameter. The total coliform concentration to qualify for Class 'C' should be <5000 MPN/100 mL, where the concentration in sample no. 1739 and 1740 were found to be 6300 MPN/100mL and 5800 MPN/100 mL, respectively. The aforesaid samples qualify Class 'D' – Designated best use 'Propagation of wild life and fisheries'.

The Karnataka State Pollution Control Board is regularly monitoring the Lingambudhi Lake under National Water Quality Monitoring Programme

(NWMP). The analytical results of samples collected from Lingambudhi lake during January-November, 2023 are given in **Table.2**. Comparison of analysis results with the 'Designated Best Use Water Quality Criteria' and with the 'Primary Water Quality Criteria for Bathing Water (water used for organized outdoor bathing)' indicated that the water quality of Lingambudhi lake qualifies the Class 'E' – Designated Best Use 'Irrigation, industrial cooling, controlled waste disposal'. The trend in the water quality of Lingambudhi lake over the said period indicated that DO concentration was relatively lower (ranged between 3.4 - 4.9 mg/L), and the concentrations of BOD (ranged between 8.0 – 14.0 mg/L), COD (ranged between 96 – 154 mg/L), Faecal Coliform (ranged between 1100 – 1700 MPN/100 mL), Total Coliform (ranged between 6300 to 8400 MPN/100 mL) were relatively higher during the period of February – June, 2023 (which may be due to lean period) as compared to the trend during July-November, 2023, wherein the DO concentrations were >5.0 mg/L (ranged between 6.2 – 12.2 mg/L), and concentrations of BOD (ranged between 3.0 – 7.4 mg/L), COD (60 – 108 mg/L), Faecal Coliform (ranged between 780 – 1700 MPN/100 mL), and total coliform (ranged between 5800 – 7900 MPN/100 mL). This trend may be attributed to the seasonal effect.

Comparison of analysis results of the said samples with the sample collected by KSPCB at the Lingambudhi lake during November-2023 under NWMP indicated that the concentration of total coliform and BOD were comparable; whereas, DO in Lingambudhi lake in November-2023 was 6.9 mg/L. On the other hand, DO in sample 1739 and 1740 were found to be 5.0 mg/L and 5.8 mg/L, respectively, indicating that the DO concentration at the upstream of Lingambudhi lake were lower.

#### 4. Gap analysis with regard to the Sewage, Solid Waste and Industrial Effluent Management in Mysuru

Mysuru District is located between latitude 11°45' to 12°40' N and longitude 75° 57' to 77°15'E. It is bounded by Mandya District to the Northeast, Chamarajanagar District to the southeast, Kerala state to the south, Kodagu District to the west, and Hassan District to the north. It has an area of 6,854 km<sup>2</sup> (ranked 12th in the state). The administrative center of Mysuru District is Mysuru City. The District is a part of Mysuru division. Prior to 1998, Mysuru District also contained the Chamarajanagar District before that area was separated off.

Mysuru City is the headquarters of the District. Mysuru District is subdivided into eight taluks: Periyapatna, Hunsur, Krishnarajanagara, Mysuru, Heggadadevanakote, Nanjangud, Saragur and TirumakudaluNarasipura. Mysuru District consists of 14 Urban Local Bodies-City Corporation – Mysuru, City Municipal Council -Hunsuru, Town Municipal Council -KR Nagar, Town Municipal Council - Periyapatna, Town Municipal Council - HD Kote, Town Panchayat -Sarguru, City Municipal Council Nanjangud, Town Municipal Council -TN Pura , Town Municipal Council –Bannurum. City Municipal Council – Hootagally, Town Panchayat –Srirampura, Town Panchayat –Bogadi , Town Panchayat –Kadakola, and Town Panchayat –Rammanahalli.

The city of Mysuru is situated on the southern Deccan plateau and the Kaveri River flows through the eastern and the north-western part of the city. A famous reservoir, known by the name of Krishna Raja Sagara has been built on the river and it lies in the northern part of the city. The Mysuru District falls in Cauvery river basin. The Kabani, also called Kabinior

Kapila. It originates in the Wayanad District of Kerala state by the confluence of the Panamaram River and the Mananthavady River. It flows eastward to join the Kaveri River at TirumakudaluNarasipura in Karnataka.

The average minimum and maximum temperatures vary from 21.4 to 34° C in April to 16.4 to 28.5 ° C in January. Relative humidity ranges from 21 to 84%. Wind speed ranges from 7.9 in October to 14.1 kmph in July. Annual potential evapo-transpiration is 1533.5 mm.

Mysuru stands the second major city in the state of Karnataka and is recognized as the cleanest city among 476 cities in India. The city is stretched across an area of 128.42 sq km and is located at the bottom of Chamundi Hills. Mysuru plays a very important tourist center of state of Karnataka. The place is recognized as palace city of India and declared as Heritage City. The Amba Villas Palace (popularly known as Mysuru Palace) in the city is one of the mainly visited monument in India. Major tourism spots include Mysuru Palace, Chamundi Hills, Mysuru Zoo, St.Philomena's Church, Rail museum, Mysuru Sand sculpture Museum, Jaganmohan Palace, Karanji lake and park,SukaVana, Kukkarahalli lake, Lalitha Mahal Palace, Wax-MuseumMelody Park, Ranganathittu birds sanctuary, Brindavan garden(KRS), Nanjungud temple, Shivanasamudra falls etc.

Gap analysis with regard to the sewage management, solid waste, industrial effluent management in the jurisdiction of MCCas per MCC and Senior Environmental Officer, KSPCB, ZO, Mysuru is given in the subsequent paras.

#### 4.1. Mysuru City Corporation (MCC)

**Sewage Management:** -The Mysuru City Corporation (MCC) is having 65 wards and its population is about 9,20,550 (as per 2011 census). The total area of MCC is 155.7 Sq km and number of household is about 2,27,296. The main source of water supply is from Devaraya Canal, Right Bank Low Level Canal (RBLL), Kaveri River Megalapura and Kabini River. The total water supplied is about 290 MLD. Total sewage generation is about 232 MLD. The MCC is having 4 STPs having total capacity of 180.6 MLD which are located at different locations i.e., 1. Kesere STP 'C' – Capacity 45 MLD, caters 23 wards + outskirts, water command areas-Melapura and Hongalli, 2. Rayanakere STP 'A' & 'D' – Capacity 60 MLD which caters 17 wards + outskirts, water command areas-Kabini and Hongalli, 3. Vidyranyapuram STP 'B' - Capacity 67.6 MLD which caters 13 wards, water command areas Kabini and Belagola and 4. Hebbal STP – Capacity 8 MLD, which caters 4 wards and water command area-Hongalli. *Therefore, presently, minimum of 51.4 MLD of untreated sewage is discharged.*

The area falls under the Drainage District "D" of Mysuru City Corporation is having underground drainage (UGD) network with terminal treatment facility of capacity 60 MLD. In the said drainage District missing links of UGD network is resulting and flowing in to the lake. Apart from this, part of the area falls under newly formed Town Panchayath Bogadhi waste water passing through the Mysuru City Corporation storm water drain and finally joining Lingambudhi Lake.

A part of drainage District "A" on Eastern side (Ramakrishnanagar) of the lake where the UGD line has damaged and the sewage entering in to the lake has been diverted to UGD as an immediate measure to control the sewage entry in to Lingambudhi lake.

Apart from the above, two Private layouts located on Western side of the lake under the jurisdiction of Mysuru Urban Development Authority. These Two Layouts have provided Septic tank facility and during overflow, the waste water joining the Lingambudhi lake. Attended missing links locations prior and after fish death at Lingambudhi lake, by the MCC is given at Fig.7.

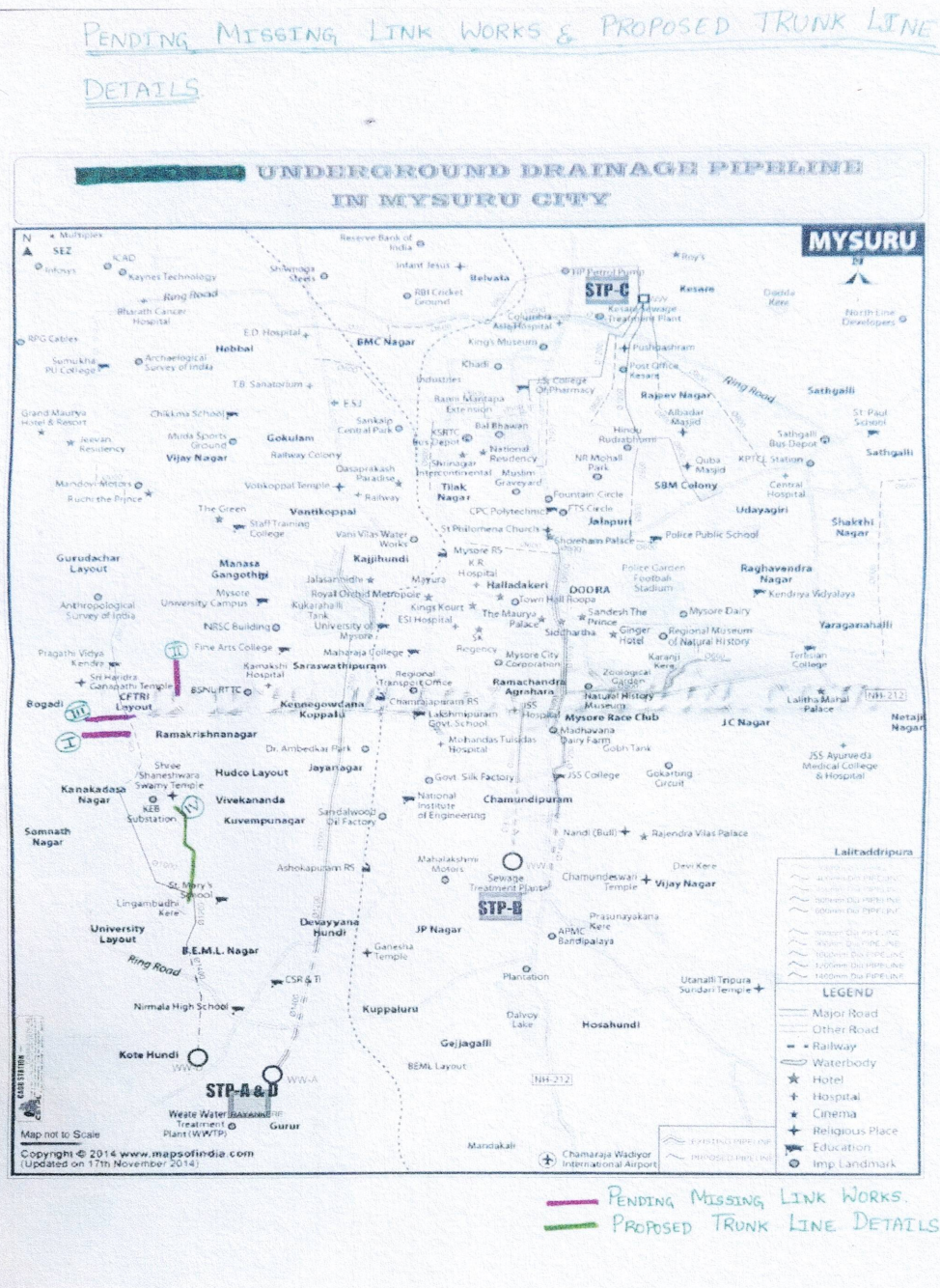


Fig.7: Attended missing links locations prior and after fish death at Lingambudhi lake, by the MCC.

**Solid Waste Management:-**As per MCC, total solid waste generation from the MCC is about 450 TPD. The MCC is collecting waste from door to door in all the wards. The MCC is having existing compost (200 TPD) and land fill facility at Vidyaranyapuram. The MCC has already commissioned new compost facility at Kesereof Capacity 150 TPD and new one proposed at Rayankereof capacity 200 TPD. The MCC is having 6 Zero Waste Management Units and each unit is having the capacity of 5 TPD, where dry waste are segregated and sent to recyclers or re-processors and wet waste is converted as compost.

**Industrial effluent management:** As per Karnataka State Pollution Control Board (KSPCB), no industrial areas are located in the catchment area of Lingambudhi lake. Most of the largescale industries (Red:26, Orange:31, Green:33, Total:90) are located at Hebbal, Metagalli, Belavadi, Hootagalli, KooragalliBelagola, YadavgirilIndustrial suburb which are located at Northern Part of Mysuru City. All these industrial units are having captive effluent treatment plants and complying to the effluent discharge norms and these discharges does not lead to the Lingambudhi lake.

#### **5. Reasons for fish kill at Lingambudhi Lake on 28.08.2023.**

As per Karnataka Veterinary, Animal and Fisheries Sciences University, Mangalore, analysis report of the dead fish collected from the Lingambudhi Lake reveal that (i) the mere presence of aeromonas sp. In the dead fish does not provide enough evidence to conclude the cause of death, (ii) Presence of coliform indicates the faecal contamination (sewage in the given water sample), (iii) High BOD indicates high organic load in the water which may cause low dissolved oxygen, (iv) The cause of death of

fishes may be due to core water quality parameters. Therefore, the report has clearly ruled out involvement of any Pathogen or epidemic diseases.

*Also, there was heavy rainfall on August 27, 2023 in the upstream areas of Lingambudhi lake viz., Belawadi, Vijayanagar, Dattagalli and Bogadi and caused sudden inflow of water (containing pollutants as well as organic content) in to the Lingambudhi lake which caused turbulence due to which there could be churning of settled sludge and could have led to evolving of gases like ammonia, methane, H<sub>2</sub>S and caused abrupt reduction in Dissolved Oxygen (DO) level in the lake and would have caused fish kill on the night of 28.08.2023.*

**5. Ongoing activities of Lingambudhi lake by the Dept. of Forest, Govt. of Karnataka.**

Measures Taken before and after the death of fishes, as per Forest Department, Government of Karnataka detailed in subsequent paras. *Before the mass death of fishes, various activities performed and actions initiated such as*

- Periodical cleaning of Stagnant litter using coracles, boats & earth movers
- Periodical removal of algae, hydrophytes & other waste particles
- Creation of awareness among school children & Public, Cleaning Drives, Plastic picking activities, World Aquatic day & Environment Day celebration by planting saplings etc. were carried out.
- Multiple Request letters have been sent to MUDA & MCC to take the necessary measures to prevent the entry of untreated sewage water into Rajakaluves from various residential areas around the lake.

Eco-tourism and Public Amenities at Lingambudhi Treepark given in **Fig. 8**



**RashiVana, NakshatraVana and NavagrahaVana:** Are created to bring awareness among children and public about importance of species of religious and sacred value and their conservation



Sign age boards are installed all over the park to create awareness about various flora, fauna, forest conservation and nature education to public.



**Pergolas: 2 numbers of pergolas were constructed to facilitate resting by walkers, do yoga and exercise. It acts as shelter on rainy time**



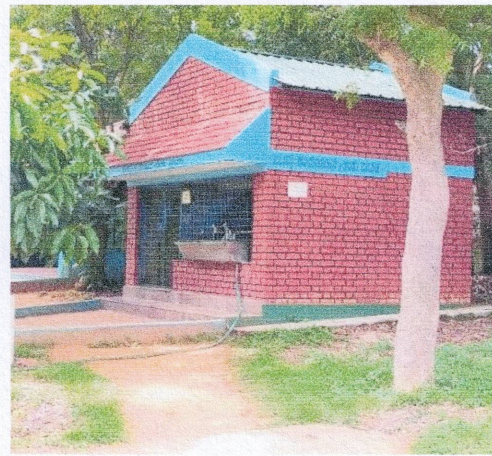
**OutdoorGym**



**Children's Play Area**



**WatchTower**



**PurifiedWaterUnit:**

|                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                            |  <p>Latitude: 12.27299<br/>Longitude: 76.61519<br/>Elevation: 726.95412 m<br/>Accuracy: 36.9 m<br/>Azimuth: 127.062<br/>Pitch: 6.749215<br/>Time: 01-02-2023 12:08<br/>Note: ramakrishnanagara</p> |
| <p><b>Walking Path ( Total Length 5 KM)</b></p>                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                           |                                                                                                                                                                                                   |
| <p><b>Benches ( 2 Nos)</b></p>                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                      |
|  <p>Latitude: 12.271169<br/>Longitude: 76.616381<br/>Elevation: 731.41421 m<br/>Accuracy: 12.9 m<br/>Azimuth: 297.062<br/>Pitch: -16.91341<br/>Time: 01-04-2023 11:54<br/>Note: Linga Road Park Hort</p> |                                                                                                                                                                                                  |
| <p><b>Chain Link Mesh all along the Lake</b></p>                                                                                                                                                                                                                                            | <p><b>Dust Bins ( 25 Nos)</b></p>                                                                                                                                                                                                                                                    |

**Fig. 8. Eco-tourism and Public Amenities at Lingambudhi Tree Park**

## 6. Proposed action plan for control of pollution and restoration of Lingambudhi Lake in Mysuru

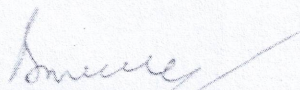
Based on the interactions held with the Technical Committee constituted by the Deputy Commissioner, Mysore, officials of MCC, MUDA, Forest Department, Mysore, as well as KSPCB, gaps were identified and accordingly remedial action plans have been prepared as a part of restoration of Lingambudhi lake. The action plans indicating the organization responsible for the implementation and the proposed timelines for the compliance is tabulated in **Table.5**.

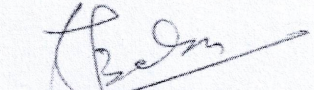
**Table 5. Proposed action plan for control of pollution and restoration of Lingambudhi Lake in Mysuru**


| Sl. No. | Proposed Remedial measures                                                                                                 | Organization responsible for implementation                                                                                                                                                                                                         | Proposed Time line for execution |
|---------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 1       | Rejuvenation of lake by introducing suitable local Fish species as a biological restoration                                | <b>Forest Department</b> : Introduction of Hatchlings & further harvesting in Monsoon                                                                                                                                                               | By June-July, 2024               |
| 2       | Water quality Assessment of Upstream Lakes and natural drains contributing to pollution under NWMP                         | <b>KSPCB</b> : Water Quality Monitoring of Lakes (including upstream lakes connected to Lingambudhi Lake as well as Natural Drains contributing to inflow to Lake under NWMP)                                                                       | Every Month                      |
| 3       | Treating the sewage water before the entry point of the lake and then letting the water after removing the floating solids | <b><u>Mysuru City Corporation (MCC)</u></b> :<br>To arrest sewage entering in to the lake through missing links of UGD identified at 09 places. Missing link has been attended at identified 06 places, and balance 03 places are pending as below: |                                  |

|  |       |                                                                                                                                                                                                                                                                         |                 |
|--|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|  | a     | Near AshrayaBadavane, TP Bogadhi                                                                                                                                                                                                                                        | Within 6 Months |
|  | b     | Near Cabana Hotel in Ward No. 44 of TP Bogadhi                                                                                                                                                                                                                          | Within 6 Months |
|  | c     | Near Deaf & Dum School in Ward No. 44 of MCC                                                                                                                                                                                                                            | Within 6 Months |
|  | d     | Lingambudhi lake road to Udayaravi road through Dakshineshwara Road of MCC (Trunk line sewer for ultimate flow). Measures already taken to divert the sewage to nearby manhole and completion of UGD network.                                                           | Within 6 Months |
|  | 2.    | To install screen chamber and silt traps in storm water drains leading to Lingambudhi lake to arrest floating and silt materials.                                                                                                                                       | Within 6 months |
|  |       | <b><u>MUDA:</u></b>                                                                                                                                                                                                                                                     |                 |
|  | 1.    | To monitor the Septic tank provided in 2 Private Layouts located at Western side of the tank and desludging the septic tank regularly as a short term plan. De-sludge water without allowing to over flow and join lake is proposed to transport and treated at MCC STP | Within 6 months |
|  | 2. a. | Establishment of Decentralized treatment plant with provision to utilize the treated effluent for gardening (long term plan)                                                                                                                                            | Within 2 years  |
|  | 2. b. | Connecting the sewer line to ADB main line of MCC located near the Lingambudhi tank and further treat in STP located at Rayanakere.                                                                                                                                     | Within 2 Years  |

|    |                                                                                                                                                          |                                                                                                                                                         |                                                                                    |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 4  | To install environmentally friendly floating aerators / surface aerators / diffusers                                                                     | <b>Forest Department</b> ( Work is in progress to install aerators)                                                                                     | Within 6 months                                                                    |
| 5  | Provision of Water Sports like Kayaking, Peddling etc.,                                                                                                  | <b>Forest Department</b> ( work is in progress to conduct feasibility assessment for water sports )                                                     | Within one year                                                                    |
| 6  | To place the Screen chamber at suitable locations along the Raja Kaluvas for cleaning of sewers periodically.                                            | <b>Mysore Urban Development Authority (MUDA)</b>                                                                                                        | Within 6 months                                                                    |
| 7  | Periodic De-weeding using mechanical equipment                                                                                                           | <b>Forest Department</b> ( Proposed to take up this work in upcoming summer)                                                                            | Within 6 months (initially)and in every year thereafter                            |
| 8  | Periodic De-sludging/De-silting of lake to enhance capacity of the lake                                                                                  | <b>Forest Department</b> ( Proposed to take up this work in upcoming summer)                                                                            | Within 6 months (initially) and in every year after (depending on the requirement) |
| 9  | Measurement of inflow at all the drains contributing to flow                                                                                             | <b>Forest Department</b> Installation of V Notch to all the Natural Drains leading to Lingambudhi Lake for flow measurements and its record maintenance | Within one year                                                                    |
| 10 | Restoration of all natural storm water drains by interception and diversion of sewage to the existing nearby STPs or to the new STP of adequate capacity | <b>Mysuru City Corporation (MCC) and Mysore Urban Development Authority</b>                                                                             | Within one year                                                                    |

  
 (Dr. B. M. Prakash)  
 Regional Senior  
 Environmental Officer  
 Zonal Office, KSPCB, Mysuru

  
 (J. Chandra Babu)  
 Regional Director  
 CPCB, RD, Bengaluru

  
 (Dr. K. V. Rajendra)  
 Deputy Commissioner and  
 District Magistrate, Mysuru.

Item No. 01

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

**(BY VIDEO CONFERENCE)**

Original Application No. 541/2023

In re: news report published in The Hindu dated 29.08.2023 titled **"Fish kill at Lingambudhi lake in Mysuru"**

Date of hearing: 05.09.2023

**CORAM: HON'BLE MR. JUSTICE PRAKASH SHRIVASTAVA, CHAIRPERSON  
HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER  
HON'BLE DR. A. SENTHIL VEL, EXPERT MEMBER**

Respondent: Mr. Mukesh Kumar, Advocate for KSPCB

**ORDER**

1. This original application has been registered in *suo motu* exercise of power on the basis of the newspaper report dated 29.08.2023 published in "The Hindu Bureau" relating to fish kill at Lingambudhi lake in Mysuru. The report discloses a major fish kill incident in the said lake with hundreds of dead fish floating in the foreshore of the waterbody. It further mentions that in the preliminary assessment it was found that there was a rainfall on August 27 in Vijayanagar, Dattagalli and Bogadi which may have led to inflow of water bringing pollutants as well as organic content into the lake and their decomposition putrefaction may have led to depletion in the oxygen level in the water resulting into the fish kill.

2. The incident clearly reveals violation of environmental norms and the provisions of the scheduled Act.

3. Hon'ble Supreme Court in the matter of "*Municipal Corporation of Greater Mumbai vs. Ankita Sinha & Ors.*" reported in 2021 SCC Online SC 897 has upheld the power of NGT to take *suo motu* action.

4. Hence, we form a joint Committee comprising of Member Secretary, Karnataka State Pollution Control Board (KSPCB), Member Secretary, Central Pollution Control Board (CPCB), Bengaluru Office and the District Magistrate, Mysuru. The District Magistrate, Mysuru will act as nodal agency for coordination and compliance. The Committee will visit the site, collect sample, collect the analysis reports of the sample, if any, already collected by the KSPCB and Fisheries Department of the State and ascertain the clear cause of fish kill and also take appropriate action against the defaulting parties as also remedial measures in accordance with law. The Committee will submit a report before the Tribunal within six weeks.

5. Since the matter relates to the Southern Zone Bench of this Tribunal, therefore, it is transferred for listing on 01.12.2023. The Registry is directed to transfer the records of this matter to the Southern Zone Bench, Chennai.

A copy of this order be forwarded to KSPCB, CPCB and District Magistrate, Mysuru by e-mail for compliance.

Prakash Shrivastava, CP

Sudhir Agarwal, JM

Dr. A. Senthil Vel, EM

September 05, 2023  
Original Application No. 541/2023  
DV

**Item No.02:-**

**BEFORE THE NATIONAL GREEN TRIBUNAL  
SOUTHERN ZONE, CHENNAI**

*(Through Video Conference)*

**Original Application No.174 of 2023 (SZ)**

**[Earlier O.A. No. 541 of 2023(PB)]**

**IN THE MATTER OF:**

Tribunal on its own motion - SUO MOTU based on the News item in The Hindu dated 29.08.2023, titled "**Fish kill at Lingambudhi lake in Mysuru**".

*And*

CPCB, Rep. by its Chairman,  
New Delhi and Ors.

...Respondent(s)

**Date of hearing: 24.11.2023.**

**CORAM:**

**HON'BLE Smt. JUSTICE PUSHPA SATHYANARAYANA, JUDICIAL MEMBER**

**HON'BLE Dr. SATYAGOPAL KORLAPATI, EXPERT MEMBER**

For Applicant(s):                      Suo Motu.

For Respondent(s):                      Mr. Rajat Jonathan Shaw represented  
Mr. K.M. Darpan for R2, R3 & R5.

## ORDER

1. This is a matter which was transferred from the Principal Bench after Suo Motu cognizance was taken by them.
2. Already the Joint Committee was constituted and directed to visit the place, collect sample, and get their analysis report to find out the cause of the mass mortality of fish at Lingambudhi Lake in Mysuru.
3. Let notice be issued to the respondents through the Tribunal.
4. The learned counsel Mr. Rajat Jonathan Shaw representing Mr. K.M. Darpan accepts notice on behalf of Respondents No. 2, 3 and 5.
5. Post the matter on 11.01.2024.

Sd/-

Smt. Justice Pushpa Sathyanarayana, JM

Sd/-

Dr. Satyagopal Korlapati, EM

O.A. No.174/2023 (SZ)  
24<sup>th</sup> November, 2023. AD.

**Proceedings of the meeting of Technical Committee for Preparation of Analysis Report & for Suggesting remedial Measures regarding Lingambudhi lake Issue held on 4.10.2023 at Aranyabhavan, Ashokapuram Mysuru.**

Mass Death of fishes was found in Lingambudhi lake on Date: 28.08.2023. All the dead fishes were taken out from the lake & disposed off scientifically as per the directions of Dept. of Fisheries, Mysur, water samples were taken by Pollution control Board officials for analysis and fishes samples were sent to Fishery college, Mangalore to ascertain the cause of death.

Later, National Green Tribunal registered a SUO-MOTO case OA No. 541/2023 dated: 05.09.2023 in this regard, & formed a joint technical committee comprising of Member secretary Central Pollution Control Board (CPCB), Member Secretary Karnataka Pollution Control Board (KSPCB) & District Magistrate, Mysuru.

In Continuation, On 29.09.2023 Deputy Commissioner, Mysuru has constituted a Technical committee with Deputy Conservator of Forests, Mysuru Division as Member Convener & Superintendent Engineer- Mysore Urban Development Authority (MUDA) & Mysuru City Corporation (MCC), Environmental Officer, KSPCB RO-1 as the members of the committee for preparing report on analyzing the causative factors & remedial measures on the Lingambudhi lake issue.

In this regard, the meeting convened on Date:04.10.2023 by The Member Convener & Deputy Conservator of Forests, Mysuru Division, Mysuru.

**Following Officers were present:**

| Sl No | Name                      | Designation                                                                               |
|-------|---------------------------|-------------------------------------------------------------------------------------------|
| 1.    | Dr. Basavaraja K.N, I.F.S | Member Convener & Deputy Conservator of Forests, Mysuru Division, Mysuru                  |
| 2.    | Shri J. Chandra Babu      | Regional Director, Central Pollution Control Board (CPCB), Bangalore                      |
| 3.    | Dr. B.M Prakash           | Regional Senior Environmental Officer, Karnataka Pollution Control Board (KSPCB), Mysuru. |
| 4.    | Shri Chennakeshava        | Superintendent Engineer, Mysuru Urban Development Authority(MUDA), Mysuru                 |
| 5.    | Shri Ashwin D.            | Executive Engineer, WS & UGD East-01 Sub-Division, Mysuru City Corporation.               |
| 6.    | Shri Dhanush B.A          | Assistant Executive Engineer, WS & UGD East-01 Sub-Division, Mysuru City Corporation.     |

|     |                      |                                                                                  |
|-----|----------------------|----------------------------------------------------------------------------------|
| 7.  | Shri Harishankar     | Environmental officer, Karnataka Pollution Control Board (KSPCB), RO-1 , Mysuru. |
| 8.  | Shri Manjunath G.H   | Deputy Director of Fisheries, Mysuru.                                            |
| 9.  | Smt. Kavitha N.      | Scientific Officer, Karnataka Pollution Control Board (KSPCB), Mysuru.           |
| 10. | Smt Vanitha H.R      | Assistant Scientific Officer, Karnataka Pollution Control Board (KSPCB), Mysuru. |
| 11. | Shri Lakshmikanth N  | Assistant Conservator of Forests, Mysuru Sub-Division, Mysuru                    |
| 12. | Smt. Dhanyashree M.R | Range Forest Officer, greening Urban Range, Mysuru                               |

Deputy Conservator of Forests, Mysuru Division, Mysuru invited all the officers to the meeting & gave a brief introduction on the agenda of the meeting inviting all the participants to give their suggestions on the issue.

Thereafter, Range Forest Officer (RFO), Greening urban range, Mysuru gave the presentation about the Lingambudhi Forest & lake and issue of mass death of fishes occurred on 28.08.2023.

Lingambudhi lake is Section 4 Forest having total extent of 216 acres & 60-70% of this area is under submergence. Lingambudhi lake has chronic issue of discharge of untreated Sewage & influx of floating litter through Rajakaluves, discharge of organic load leading to eutrophication & increased Biological Oxygen demand (BOD). All this has made the survival of aquatic fauna difficult. RFO also informed that the Lingambudhi lake has Tree park surrounded by it, the foul odor eventually causing inconvenience to the daily visitors to the Park. The catchment area of the lake is from the surrounding residential areas of Mysuru city i.e. from Bogadhi, Belavadi, Dattagalli , Karle Layout, Horticulture area through Storm water drains (Rajakaluve.)

The Regional Director, CPCB enquired about the Rajakaluve's around the lake, to which DCF replied that there are totally 3 Rajakaluve draining into the lake.

RFO further explained various measures taken prior to and after the mass death of fishes to address the issues plaguing the lake :

**Measures taken before the death of fishes:**

1. Periodical cleaning of Stagnant litter using coracles, boats & Earth movers
2. Periodical removal of algae, hydrophytes & other waste particles

3. Creation of awareness among school children & Public, Cleaning Drives, Plastic picking activities, World Aquatic day & Environment day celebration by planting saplings etc. were carried out.
4. Multiple Request letters have been sent to MUDA & MCC to take the necessary measures to prevent the entry of untreated sewage water into Rajakaluves from various residential areas around the lake.

**Measures taken after the death of fishes:**

- All the dead fishes were taken out manually by engaging around 25 laborers for 3 days using Coracles.
- As per the guidance from Dept. of Fisheries, Disposal was carried out scientifically by deep burial by applying enough quantity of limestone powder to ensure no carnivores, Scavengers and Birds feed on this and also no epidemics emerges.
- Water samples were taken by Pollution control Board officials for analysis and fish samples were sent to Fishery college, Mangalore to ascertain the cause of death.
- The results revealed that the main cause for death of fishes is because of the lake water containing high level of BOD leading to low Dissolved Oxygen level. Report has clearly ruled out involvement of any Pathogen or epidemic diseases.
- As per the suggestion of Dept. of Fisheries, Destocking was attempted but there were very few fishes of harvestable size that could be captured.

The Regional Director, CPCB asked about outlets present for the lake, DCF & Regional Senior Environmental Officer, (KSPCB), Mysuru. explained that the waste weir present at preethi layout side connected to water drainage at Rayanakere and eventually joins Kabini. The Regional Director, CPCB Bangalore enquired about the preventive measures taken for removal of algae, hydrophytes & other waste particles in the lake, DCF clarified that the periodic Cleanup drives have been taken up to clean the Hydrophytes & other floating debris but due to organic load and vigorous multiplication of aquatic weeds, eradication is difficult to achieve.

RFO further continued, The Tree park around the lake is a very good Urban lung space catering to around 1000 people daily using the walking path and outdoor GYM equipments. There are 5 natural islands in the lake providing shelter & breeding grounds to around 256 Species Of Birds combining both local & migratory birds. They also attract Bird watchers and Wildlife Photographers.

DCF explained about the Drone survey conducted in the month of June to check the drainage pattern & Sewer lines draining into the Rajakaluves. Drone survey reveals that Storm and sewage water is coming mainly from Dattagalli, Bogadi & Belavadi areas.

The Regional Director, CPCB expressed his doubt on any mischief on letting chemicals into the lake which caused massive death of fishes in the lake, for which RFO replied that the samples of the dead fishes were subjected to Microbiological and poison testing by Fishery college, Mangalore to ascertain the cause of death of fishes. According to the report, mass death is due to heavy loads of organic matter present in water and increase in BOD.

The Regional Director further enquired about the number of Sewage Treatment Plants (STP) situated in the city. Executive Engineer, MCC replied that there are 4 no. of STP's in the whole city, of which only one STP is related to Lingambudhi lake and this STP is having capacity of 187.5 MLD covering 3 adjoining wards around the lake.

In continuation to the discussion, The Regional SEO KSPCB also added that the drainage overflow from surrounding areas of Rajarajeshwari Nagar, Dattagalli, Bogadi, Kuvempu nagar, Ramakarishna nagar will also join the lake due to missing links in the UGD of the Corporation limit areas.

DCF requested the Executive Engineer, MCC to provide Sewage/Drainage network map to get the overview on sewage flow to the lake. The Regional SEO, KSPCB explained about the Sewage pattern that also covers few of the MUDA areas. DCF requested MCC & MUDA to provide the Map on the Sewage network around the lake at the earliest

**(Action: S.E, MCC & S.E, MUDA)**

The Regional Director, CPCB enquired about the Fecal sludge management in the city to which The Regional SEO KSPCB replied that there is no Fecal sludge management carried out in the city. In addition, the upstream side lakes might also be contributing to the issue & should examine the amount of sewage joining the lake from these Upstream lakes.

Further discussion on the issue continued with the field visit of the Lake.

#### **Observations during the Field Visit:**

The team visited Lingambudhi Section 4 forest and surrounding area after initial discussions.

The Regional director of PCB, directed MCC & MUDA to check & find the missing links of sewer lines and storm water drains (Raja kaluve) in Dattagalli limit and also suggested to prepare a map for better understanding. The water flowing in the Raja Kaluve showed less than 20% of DO level on field.

**(Action: S.E, MCC & S.E, MUDA and other Urban Local Bodies(ULB's) around Mysuru City)**

The MCC officers informed the team that along with corporation areas, sewage water is entering the lake from the Bhogadi & Srirampura Town panchayat areas .

The Regional director (PCB) was instructed to communicate in letter and get the work done by respective authorities and also to cross examine the catchment area.

Then the team visited the Lingambudhi forest and Lake area, The scientist from PCB expressed her opinion about water quality which has depleted due to over accumulation of organic matter emanating foul odour, water colour is green which comes under category D to E which may be the reason for increased BOD.

Later the team inspected the horticulture Botanical garden where sewage water is entering the Lake. Damage of manhole noticed by team due to which high chance of drainage water entering lake. The Regional director of PCB, asked MCC to address the issue as early as possible.

**(Action: S.E, MCC )**

To know the waste weir run off pattern & water storage capacity, the team visited preethi layout side of the Lake, where surplus water runs off through drainage. Then the team visited karle layout side where the layout is neither having proper drainage system nor a sludge disposal plan. The drainage water getting filled in the septic tanks is overflowing & intern joining the Lake. The RD (PCB) directed MCC to check this septic tanks damage & take action against concerned person.

**(Action: S.E, MCC )**

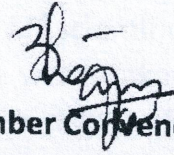
Finally The Regional director of (PCB) Directed MCC & MUDA in a time bound manner to check the Rajakaluve area where sewage missing links leading to mixing of sewage water to the Lake, to prepare map of sewage water connecting links & also to instruct other agencies contributing in depletion of quality of water in the Lingambudhi lake.

To sum-up the discussion, the committee agreed upon the following remedial measures:

1. **Rejuvenation of lake by introducing suitable local Fish species as a biological control to reduce the organic load and periodical harvesting of the same**  
(Action: DCF Mysuru In consultation with Dept. of Fisheries.)
2. Water Quality check at the exit points of the upstream lakes .  
(Action: S.E, MCC & S.E, MUDA in consultation with Regional SEO KSPCB )
3. Treating the sewage water before the entry point of the lake & then letting the water after removing the floating litter.  
(Action: S.E, MCC & S.E, MUDA)
4. To install environmental friendly floating aerators/ surface aerators/diffusers, Introducing Water sports like Kayaking, peddling etc.in the lake to ensure adequate level of Dissolved OXYgen (DO) level in the lake  
(Action: DCF Mysuru )
5. To place the sewer traps at regular intervals along the arajakaluves to filter the floating waste joining the lake and also periodic cleaning of these Sewer Traps to prevent blockages.  
(Action: S.E, MCC & S.E, MUDA)
6. Periodic de-weeding and de-sludging of the lake.  
(Action: DCF Mysuru )
7. To keep track of the inflow to the lake & capacity of the lake.  
(Action: S.E, MCC , S.E, MUDA & DCF Mysuru )
8. To suggest the time bound action plan after receipt of detailed information from the concerned departments with regard to the inflow quantities into the lake with GPS maps of all the natural drains, characteristics of waste water inflows, existing sewage treatment plants capacity & gaps in sewage treatment, identification of illegal discharges  
(Action: S.E, MCC & S.E, MUDA and other Urban Local Bodies (ULB's) around Mysuru City)

It was decided to have the next meeting after receipt of analysis reports of the samples collected by KSPCB during the visit to lake and preliminary information from all the concerned ULBs to take further course of action in the matter.

Meeting concluded with a vote of thanks to all the participants and request to submit action taken on all the issues discussed by the respective agencies in a time bound manner.



**Member Convener &  
Deputy Conservator of Forests,  
Mysuru Division, Mysuru**