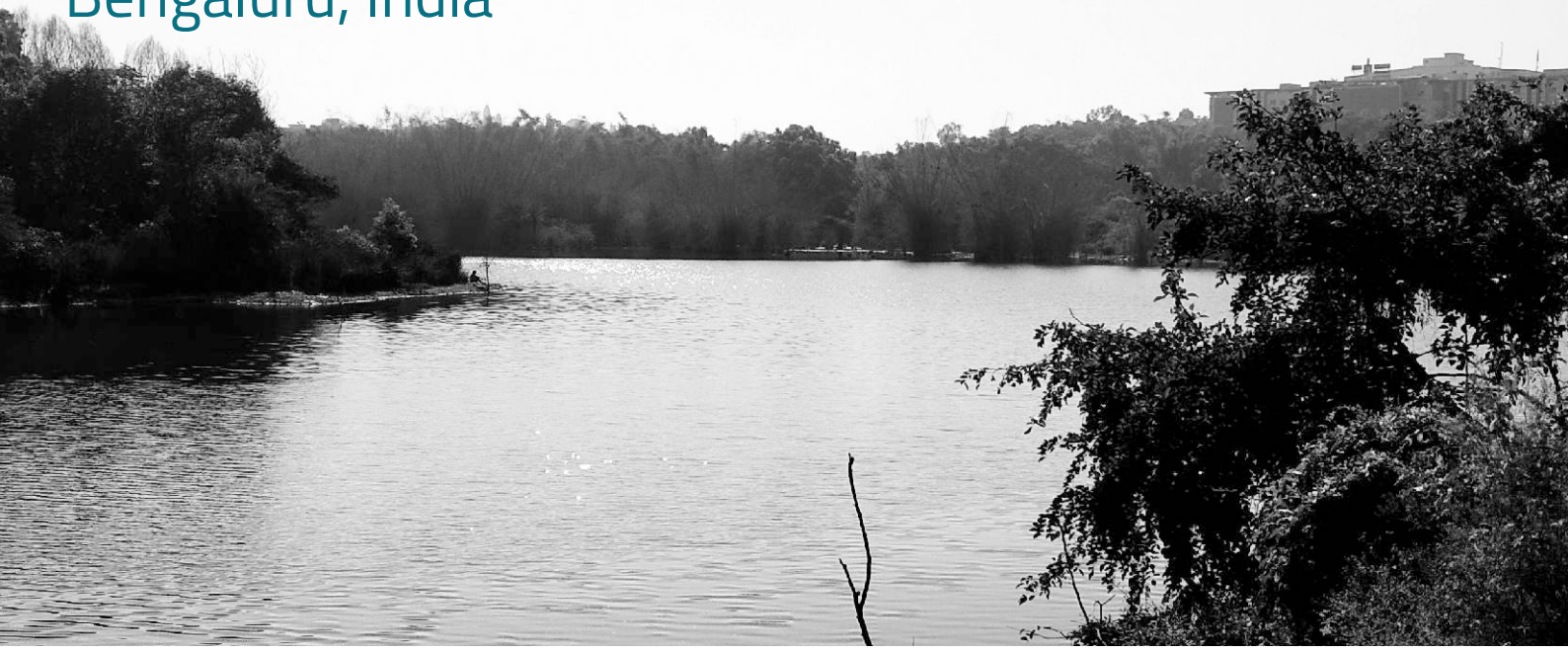
Preparation of Rejuvenation Plans for 5 lakes

Bengaluru, India



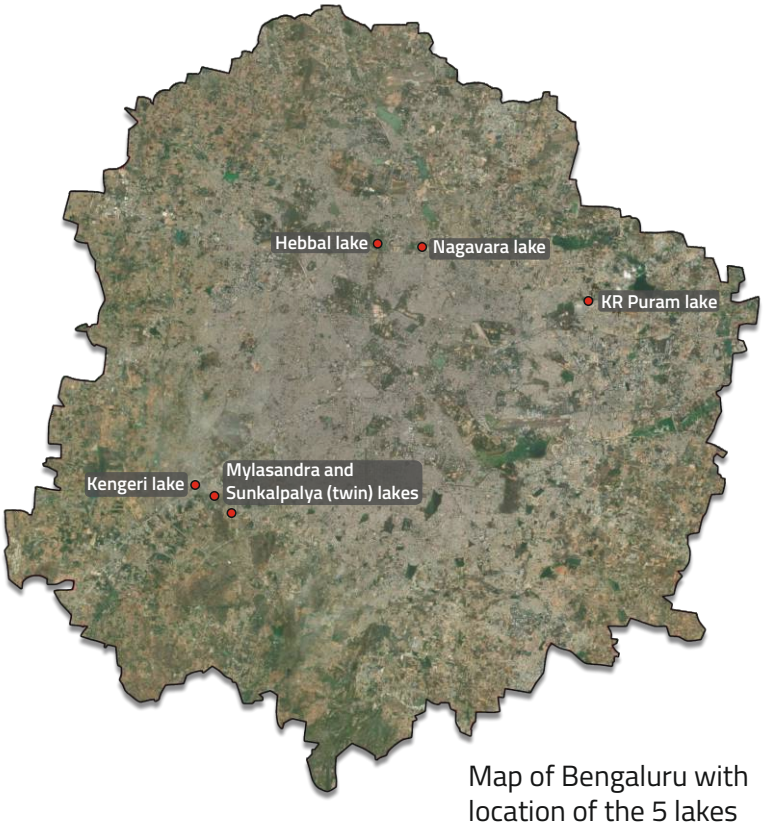
Project Background

We supported Karnataka Forest Department (KFD) and Bruhat Bangalore Mahanagara Palike's (BBMP)* efforts in rejuvenating Bengaluru's lakes, by creating rejuvenation plans for 5 of the city's lakes. Our plans identify prominent issues plaguing the lakes and recommend customised, wholistic and sustainable solutions that could restore these lakes to their original state. The clarity and direction in the plans can help KFD attract funding support from the Government as well as Corporates.

These efforts have been funded by Hansa-flex (the world's leading supplier of hydralic solutions). Since 2016, they have been holding a Christmas Donation program wherein, in lieu of Christmas gifts to clients and employees, they donate to three non-profits (shortlisted by their own team) instead. Clients and employees themselves vote for three projects put forth by these non-profits. Our project - **Preparation of Proposal for the Rejuvenation of 5 lakes in Bangalore (India)**- was shortlisted as one of three projects under this program; and received the most votes,helping secure 30,000 euros (~Rs. 23 lakhs) to carry out this work. .

*The lakes shortlisted for this project were initially under the custody of KFD; and handed over to BBMP mid-way through the project.

Lakes chosen for the study



Map of Bengaluru with location of the 5 lakes

Common challenges across the lakes

Solid waste and debris dumping

Weed growth

Eutrophication due to sewage entry

Insufficient water inflows

Entry of sewage into lakes

Broken infrastructure and lack of regular maintenance

Rejuvenation Approach

- Restoring the wholesomeness of lake to its original state
- Conserving and enhancing its biological diversity and ecological services
- Managing the lake in context of sustainable development while meeting its current and future demands and without compromising its ecological health/character
- Reconnecting the community with the lakes
- Preparation of proposal which can be submitted to funding agencies encouraging them to invest in lakes in order to rejuvenate them

A view of the rejuvenated Mahadevapura Lake in Bengaluru

Activities undertaken

Reconnaissance survey and data collection in order to identify issues plaguing the lakes

- Topographical survey
- Drain mapping
- Brief catchment analysis
- Mapping hydraulic structures
- Quantity and Quality analysis of sewage and lake water

Prioritizing issues based on criticality and preparing rejuvenation plans

- Stakeholder consultation
- Conceptualization of solutions
- Preparation of rejuvenation plans including schematic drawings and cost estimates

Submission and presentation of prepared schematic plans to BBMP

- Presentation and submission to BBMP

Topographic survey

Flow measurements

Drain mapping

Water sampling

A view of Nagawara Lake

KR Puram Lake (*Vengayanna Kere*)

Location: situated on Old Madras Road (NH4), in the Hebbal valley

The Lake is spread over 55 acres with water spread area of 40 acres. The lake was once rejuvenated along with Nagavara and Hebbal Lakes under the Indo-Norwegian schemes in 2013. It was renamed as Fantasy Lagoons, with boating facilities, a children's play area, amusement park, food court with fast food and refreshments. Presently, the lake park is abandoned – all facilities stand deserted. It is now severely affected by sewage, weeds and solid waste.

Key problems:


Uncontrolled sewage entry


Weed growth


Solid waste dumping

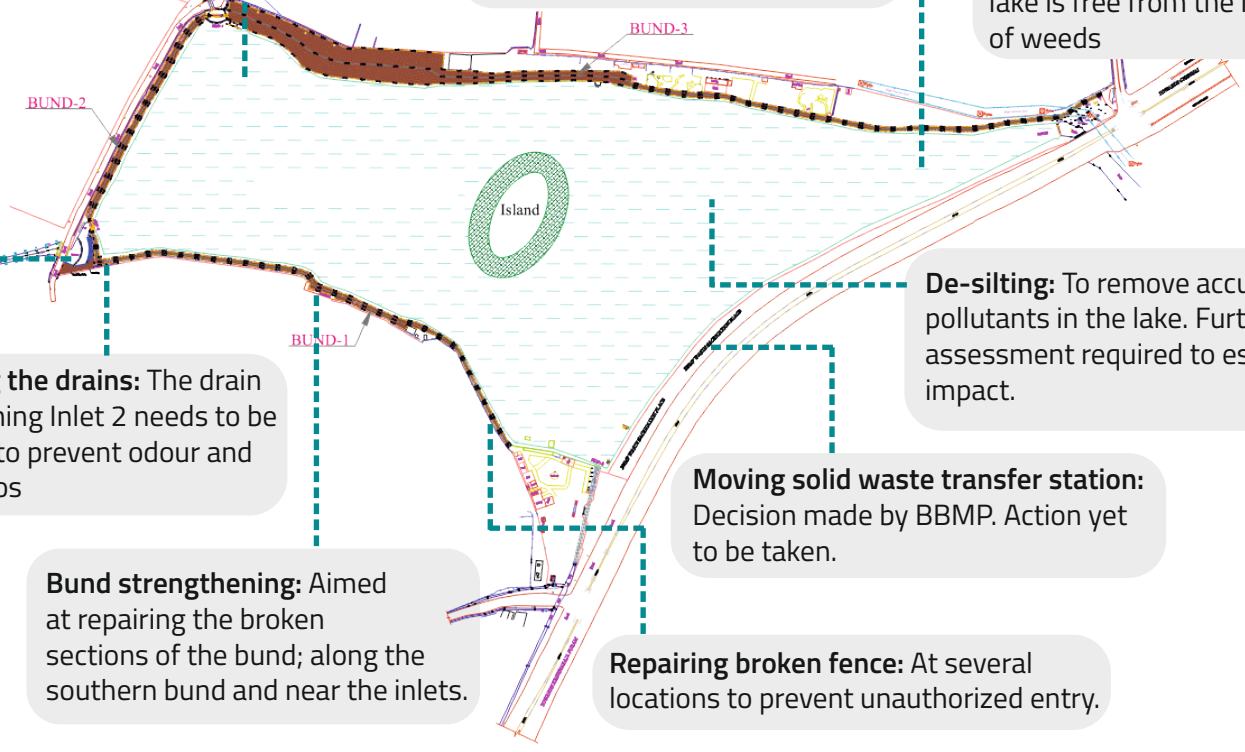

Dilapidated infrastructure

Proposed solutions:

Solid waste removal and screening arrangements for inlets: To remove existing solid waste deposition and to prevent further solid waste entry.

Design of sedimentation basins: Near the inlet zone. In order to trap the solids, before entering the main lake bed and to provide different zones for treatment

De-weeding: Fixed interval of removal to be done until the lake is free from the invasion of weeds



De-silting: To remove accumulated pollutants in the lake. Further assessment required to estimate impact.

Covering the drains: The drain approaching Inlet 2 needs to be covered to prevent odour and mosquitos

Moving solid waste transfer station: Decision made by BBMP. Action yet to be taken.

Bund strengthening: Aimed at repairing the broken sections of the bund; along the southern bund and near the inlets.

Repairing broken fence: At several locations to prevent unauthorized entry.

Mylasandra and Sunkalpalya (twin) Lakes

Location: near Uttarahalli, Kengeri

The lakes are spread over 12.2 and 15.4 acres respectively. Historically these lakes were interconnected and used to receive runoff from the nearby Turahalli forest. This flow has been interrupted due to development activities along the lake edges. While Sunkalpalya lake receives sewage from nearby establishments. Mylasandra lake has lost its connection with Sunkalpalya lake and remains dry except during the monsoons. The outlet connection from lakes to Vrishabavathi river has been disturbed too, due to development of settlements.

Key problems:

Sewage entry

Algal growth in Sunkalpalya lake

Dry condition of Mylasandra Lake

Encroachments on water paths

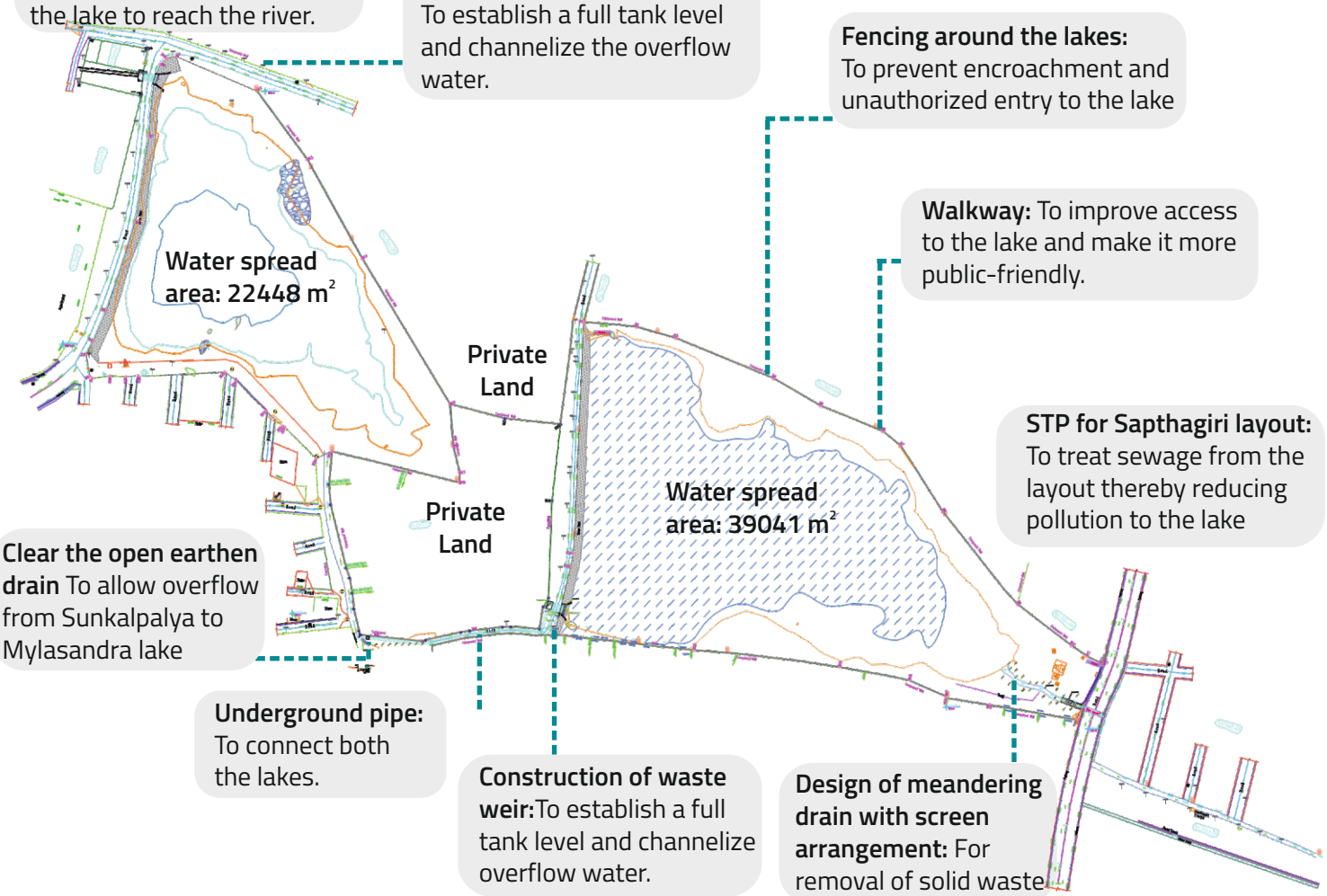
Proposed solutions:

Underground pipe to connect the outlet to Vrishabhavathi river: To allow overflow from the lake to reach the river.

Construction of a waste weir: To establish a full tank level and channelize the overflow water.

Fencing around the lakes: To prevent encroachment and unauthorized entry to the lake

Walkway: To improve access to the lake and make it more public-friendly.



STP for Sapthagiri layout: To treat sewage from the layout thereby reducing pollution to the lake

Clear the open earthen drain To allow overflow from Sunkalpalya to Mylasandra lake

Underground pipe: To connect both the lakes.

Construction of waste weir: To establish a full tank level and channelize overflow water.

Design of meandering drain with screen arrangement: For removal of solid waste

Nagavara Lake

Location: alongside outer ring, adjacent to Manyata Tech park

Previously known as Lumbini Gardens, this lake was a prominent recreational spot in north Bangalore. The lake is divided into two segments - water (50 acres) and wetland area (22 acres). The water area is in a healthy condition with a thriving aquatic life. It also hosts fisheries.

The wetlands, on the other hand, are mostly dry and covered with weeds. Since most of the identified problems are with the wetlands, it has been proposed to develop a rejuvenation plan for the wetlands alone.

Key problems:

- Excessive water hyacinth growth in the wetland.
- Inefficient use of treated water from the Hebbal STP for replenishing the wetland.

- Damaged bunds near the north western inlet
- Absence of proper hydraulic structure to allow stormwater overflow into the wetland.

- Constriction of open drain width from 15m to 2m, causing overflow into wetland during heavy rains.

Proposed solutions:

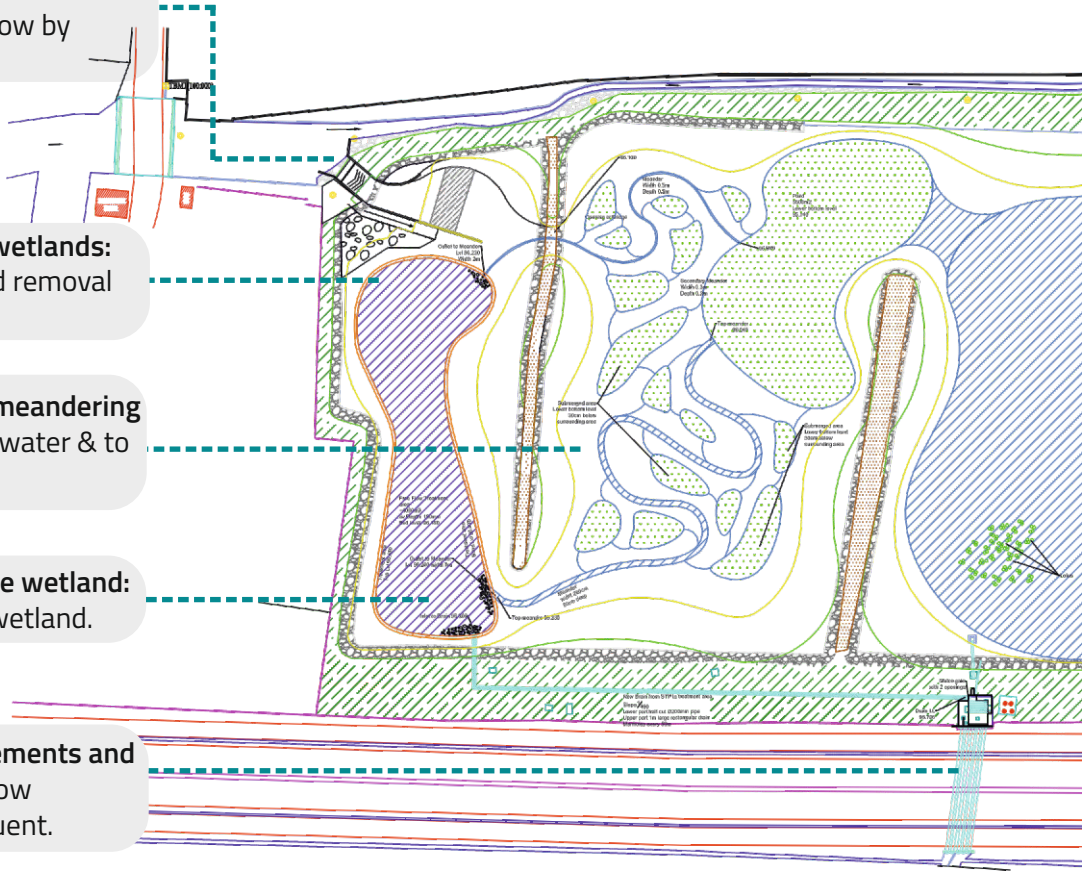
Construction of inlet structure with screens : For regulated inflow of stormwater into the wetland instead of blocking the inflow by raising the bunds.

Implementing free surface wetlands: To improve water quality and removal of organic load.

Submerged pond areas and meandering drains: for aeration of inflow water & to improve its quality.

Rerouting STP inflow into the wetland: to replenish all areas of the wetland.

Improving diversion arrangements and installing sluice gates: to allow controlled inflow of STP effluent.



Kengeri Lake

Location: in the Vrishabhavathi river basin, opposite Kengeri bus station

The lake covers a total area of 32 acres with the water area spread over 23 acres. Though it is part of the Byramangala Lake series, it is an independent lake with no connection to any upstream lakes.

The outlet of the lake joins the Vrishabhavathi River. The major source of inflow is the wastewater coming from the nearby layouts.

Key problems:

Abandoned condition of lake

Broken sewage infrastructure adding to pollution

Excessive water hyacinth growth, dried condition of lake

Broken/ dilapidated infrastructure

Proposed solutions:

De-weeding: With fixed interval of removal

Catchment interventions: To ensure clear stormwater paths

Ensuring inflow to lake By clearing diversion drains, redesigning inlet arrangements and finding an alternate water source*

Fencing: To restrict unauthorized entry to the lake

Repair structures: Such as the inlets, outlets and other hydraulic structures

Pollution reduction: Through the implementation of sanitation facilities, UGD, and a solid waste management plan for the upstream layouts

* The BWSSB STP of 60 MLD capacity is situated opposite the lake, on the other side of Mysore road. Treated water from the STP can be discharged into the lake - though a distribution arrangement or sedimentation basin will need to be created for the same.

A view of Kengeri Lake

Hebbal Lake

Location: in north Bengaluru, adjacent to the junction of Old Bellary Road and Outer Ring Road

The lake is spread over 192 acres, which includes bunds, pathways, government nurseries, fisheries etc. The water spread area of lake is around 100 acres. The lake consists of a wetland space spread over 15 acres and also has four bird islands. Hebbal Lake was rejuvenated in 2003 under Indo-Norwegian scheme.

East India Hotels (EIH) had adopted the lake in 2006 and had executed some interventions to transform it into a recreational space. Today, the lake maintains a pristine appearance with no signs of any sewage while the wetlands are covered with water hyacinth. The lake boundary is also shared by horticulture and fisheries department

A view of Hebbal Lake

Key problems:

- Excessive water hyacinth growth in the wetlands, which has begun to spread to the lake too.
- Lack of maintenance of the wetlands.

Proposed solutions:

Scientific deweeding of the wetlands and developing it with planned water paths and suitable native plant varieties might hold the key to improving their condition. This will in turn reflect positively on the overall sustainability of the lake.

Key conclusion

- The lake rejuvenation plans provide an **ecological approach** to improve the overall health of each lake.
- A **balanced development** of each lake has been attempted, such that any recreational activity planned in the lake area does not interfere with the biodiversity.
- The proposed rejuvenation plans recommend **nature-based solutions** that mimic natural biological processes for improving the water quality.
- However for a long term impact, **effective management of stormwater, sewage and solid waste** along with stricter vigilance on encroachment should be ensured by the lake governing bodies.

FOREST DEPARTMENT KARNATAKA

Bruhat Bengaluru Mahanagara Palike

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Consortium for DEWATS Dissemination Society | Bangalore
Survey No.205 (Opp. Beedi Workers Colony),
Kommaghatta Road, Bandemath Kengeri Satellite Town,
Bangalore 560 060, Karnataka, India.
+91-80-28486700 bangalore@cddindia.org