



UNITE FOR LAKES **SAVE BENGALURU**



**Bruhat Bengaluru
Mahanagara Palike**



United Way Bengaluru

Bengaluru – A City Born on Lakes

A unique city whose fate is intertwined with that of its lakes

A CITY BIRTHED ON LAKES

Cities are often born on rivers or on coasts. Water is the lifeblood of all human civilisation, and cities have grown around water.

Bengaluru is a unique megacity that thrives around lakes instead of rivers or the sea. The growing city of Bengaluru has hundreds of lakes in and around it, and what lakes survive today are a fraction of what once flourished in this heart of the South Indian peninsula.

Bengaluru was born with the creation of lakes, almost 500 years ago. Kempe Gowda I, the local feudatory of the Vijayanagara Empire, built numerous lakes by damming small streams. Others who have governed Bengaluru built more lakes till early in the 20th century.

From 937 lakes in 1937 to under 200 lakes now – Bengaluru's rapid urbanization and infrastructural development has taken a toll on the city's lakes. Bengaluru's lakes are under threat from encroachment, pollution from sewage flows and a host of other problems.

LAKES AND THE CITY

Lakes perform important functions in a city, and these functions are only more important for a city like Bengaluru.

Lakes are heat sinks that can cool growing heat islands like Bengaluru. According to a study conducted by the Centre for Ecological Sciences (CES), Indian Institute of Science in Bengaluru, the water bodies of the city have reduced from 3.4% in 1973 to less than 1.5% in 2005, while the built up area increased from 27% to 45%.

In April 2016, Bengaluru recorded temperatures above 40°Celsius for the first time ever.

The Karnataka State Natural Disaster Monitoring Centre recorded 40.6° in Yelahanka on April 12. Lakes are critical nodes in any region's water cycle. The rains that fall on a city's watershed are supposed to flow into the lakes via storm drains, and collect there. This water eventually flows down into rivers and into the sea.

Lakes are also the primary sinks for recharging groundwater, the invisible lifeline of all Indian cities. In Bengaluru, groundwater is used as the primary source of drinking water for millions of residents. Groundwater is also vital for a city's plant life, and by extension, the animal life. The gardens in the garden city need groundwater to grow and flourish.

Lakes are reservoirs of not just water, but biodiversity as well. Lakes are critical habitats for birds, fish and a variety of other fauna – as well as a host of local flora, trees, shrubs and bushes.

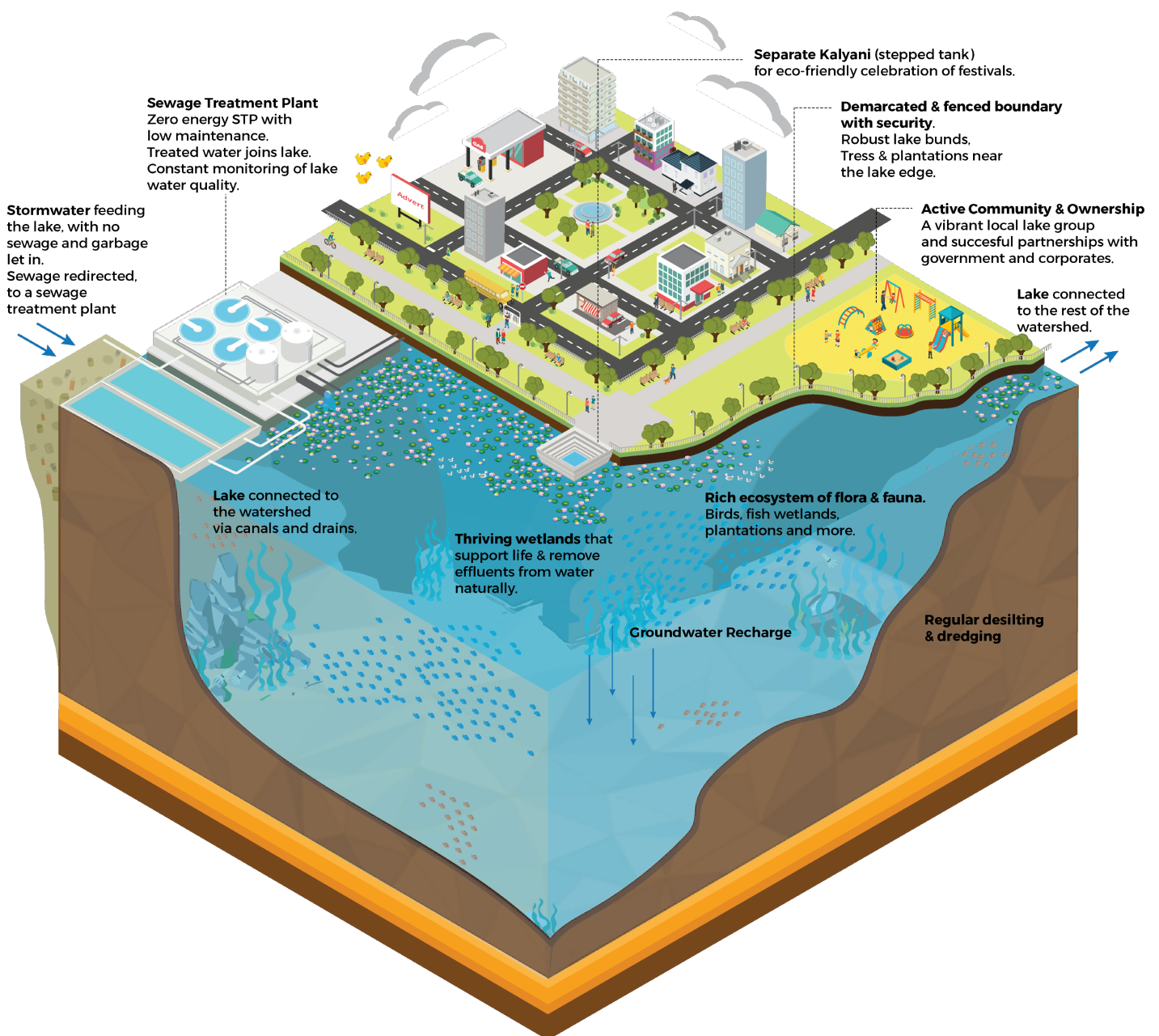
Lakes are also the commons of a city, public spaces where local residents and communities can take a break from busy city life. Lakes also provide livelihoods to fisherfolk who continue to live and work as the city grows.

TOWARDS AN IDEAL LAKE

United Way Bengaluru has completed a comprehensive study of 200 lakes in the Greater Bengaluru region, to examine their health and status. This report shares the results from the study, and examines how far away they are from becoming ideal lakes for the city – and how one can get there.

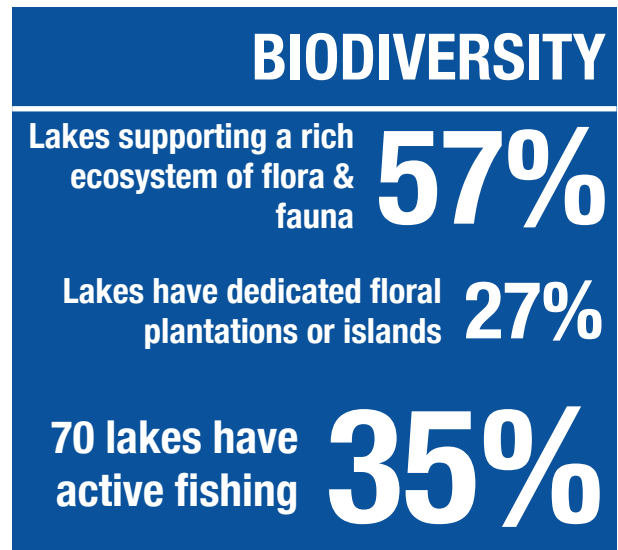
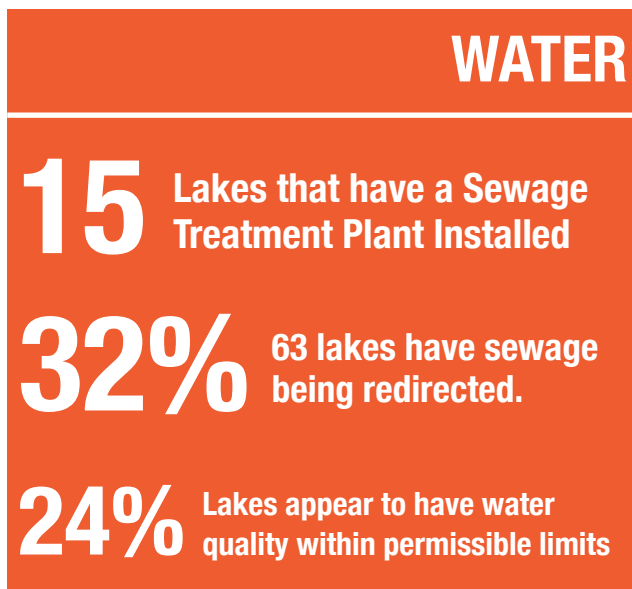
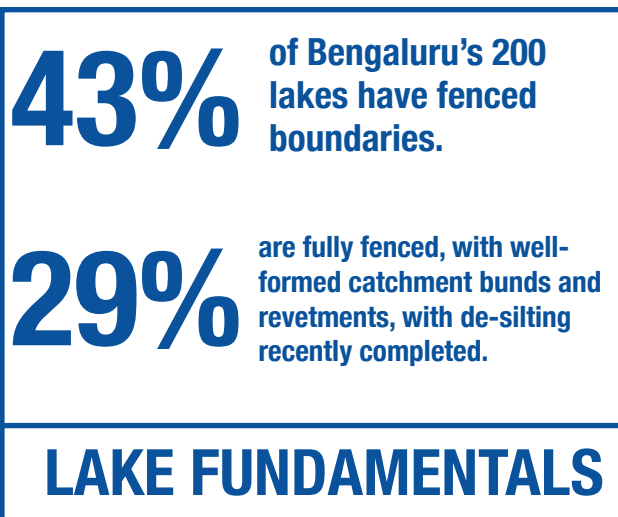
This report also shares a few citizen guides for lake rejuvenation and recognises citizen champions who have worked tirelessly to improve Bengaluru's lakes.

AN IDEAL BANGALORE LAKE



The State of Bengaluru's Lakes

200 lakes in the Greater Bengaluru region were studied in 2016, on how they fared on 10 parameters on the physical fundamentals of a lake, state of water, biodiversity and community involvement. The study examines how far each lake is from the ideal lakes that the city needs.



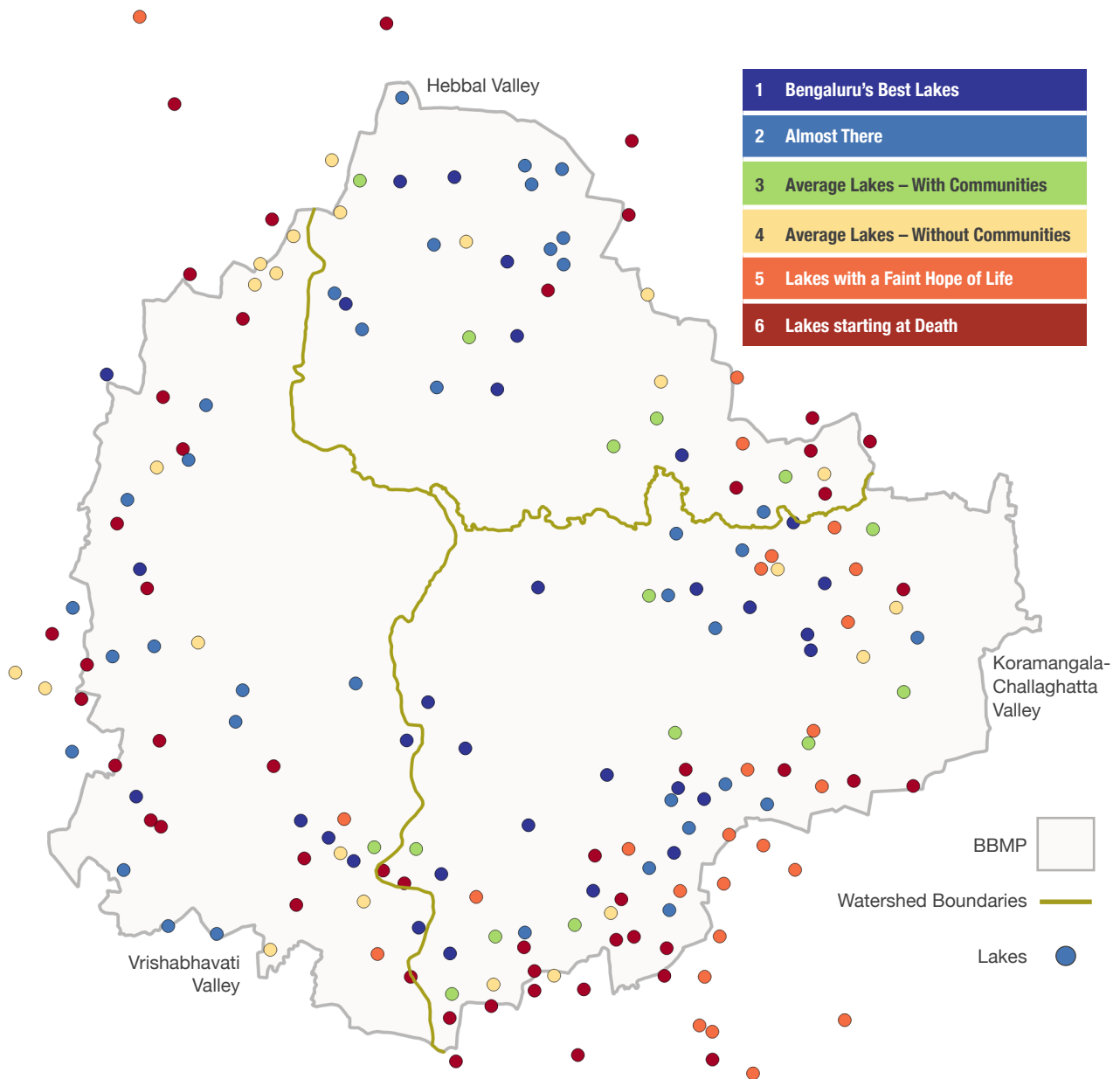
Types of Lakes		#	Description	Next Steps
1	Bengaluru's Best Lakes	33 lakes	Lake physically intact and complete, Sewage diverted and treated, rich biodiversity and has an active community. Not yet an ideal lake.	Developing the watershed. Get all stormwater from the catchment in. Install a zero energy use STP.
2	Almost There	42 lakes	1-2 aspects of the above aspects are missing. Steps away from joining the best lake.	Foster a community, if missing. Mobilise efforts to complete the missing aspects.
3	Average Lakes – With Communities	16 lakes	Several steps needed become one of the city's best lakes. Lacking in biodiversity or water treatment or some physical aspects. Have active communities.	Solve the easiest challenges. Develop sustainable sources of revenue.
4	Average Lakes – Without Communities	25 lakes	Several steps needed become one of the city's best lakes. Also lacking communities	Mobilise a lake community. Solve the easiest challenges. Raise funds for maintenance.
5	Lakes with a Faint Hope of Life	29 lakes	Fencing not complete, significant physical work needed, some lakes are fully dry, low on biodiversity or have sewage water coming in. But having active communities that are trying to change things.	Capital investment needed, demarcation and fencing paramount, major channels need to be oriented to let water in.
6	Lakes starting at Death	55 lakes	Lakes facing death, and not currently having communities that care. High encroachment, may also have legal disputes.	Mobilise a lake community to work towards rescuing a lake. Resolve legal disputes.

The 200 lakes fall into 6 distinct categories. While none of Bengaluru's lakes are 'Ideal', about 33 lakes are in the best condition in Bengaluru, followed by another 42 lakes that just fall short. On the other end, 55 lakes face a grave risk of death.

Another 29 lakes have faint hope as communities have started to gather around them.

Each of these 6 types of Bengaluru's lakes have different actions needed to improve them.

The State of Bengaluru's Lakes



Bengaluru's Best Lakes

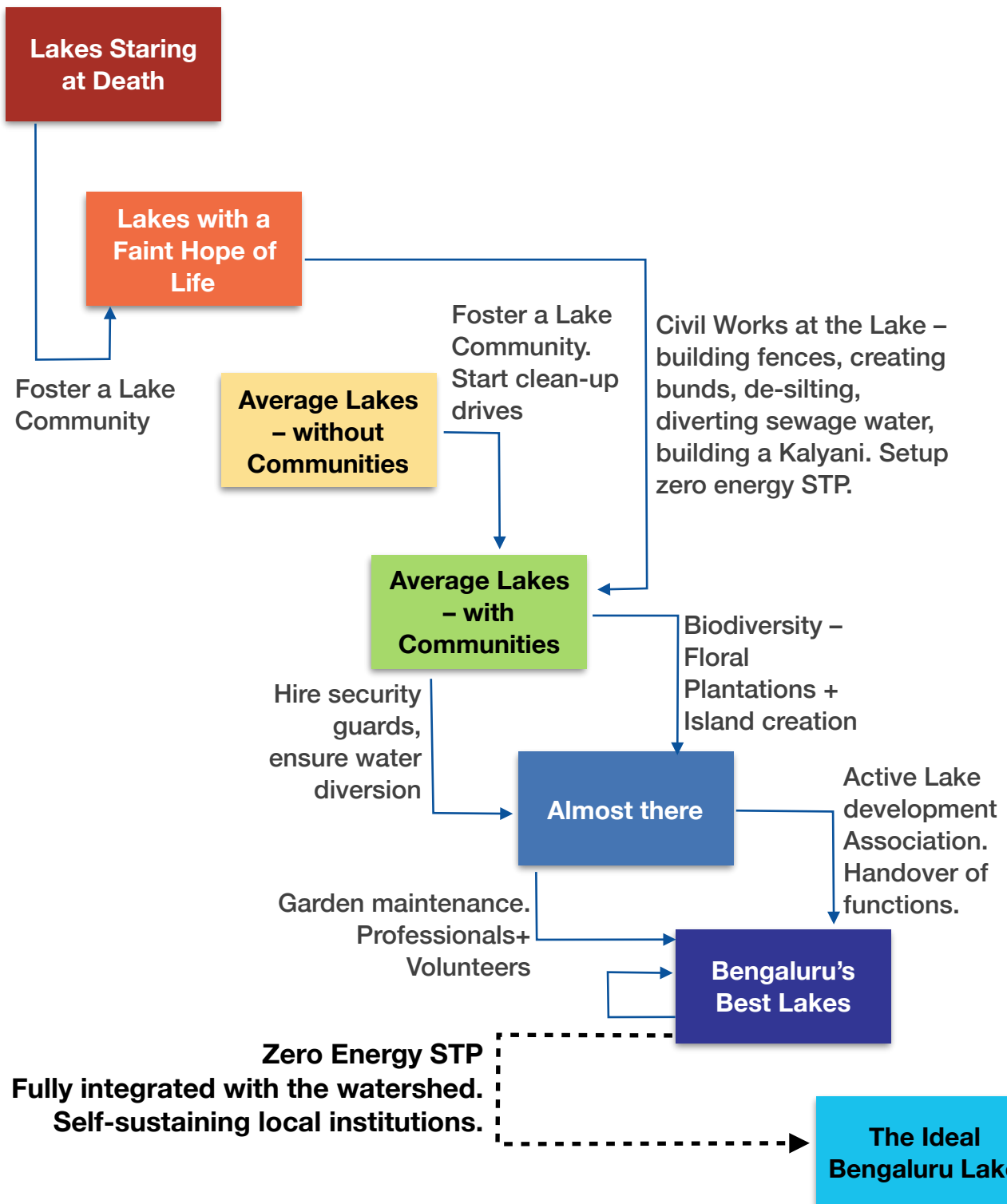
Agara lake
Ambalipura kelagina kere
Anchepalya lake
Byrasandra lake
Chikka begur lake
Chikka Devasandra lake
Chinnapanahalli lake
Doddanakundi lake
Dorekere lake
Harlur lake
Herohalli lake

Jakkur lake
JP Park lake
Kagdaspora lake
Kaikondrahalli lake
Kalena Agrahara lake
Kengeri lake
Kothnur lake
Kowdenahalli lake
Lalbagh lake
Madivala lake
Munnekolalu lake

Nagvara lake
Vidyaranyapura lake
Puttenahalli lake
Rachenahalli lake
Sankey tank
Sitaram palya lake
Ulsoor lake
Uttarahalli lake
Vasanthapura lake
Yedyur lake
Yelahanka lake

Reviving Bengaluru's Lakes

A Roadmap and guide for how lakes can be revived by corporates, active communities, the BBMP and United Way.



The Wake The Lake Campaign



United Way Bengaluru launched *Wake The Lake* campaign in 2011. The campaign has impacted 14 lakes in the city by mobilising resources, volunteers and community.

Initially, UWB focused on complementing the work of the BBMP to ensure that the lakes already rejuvenated by the BBMP are protected, preserved and maintained well.

UWB signs MoU with the BBMP for specific lakes, mobilise resources from the neighbourhood corporates and engages the local community to take care of the lake.

Resources mobilised from the corporates are directly deployed by UWB to vendors to enhance the flora at the lake, check the sewage entry into the lake and for community and volunteering activities.

Apart from this, United Way Bengaluru is also working with BBMP to rejuvenate Kundanahalli Lake in Whitefield, and Saulkere Lake where the Sewage Treatment Plant is sponsored by a corporate. The Kundanahalli lake project costs an estimated 15 crore rupees over a three year period, and has several corporates coming forward to support the endeavour.

THE CASE OF UTTARAHALLI LAKE

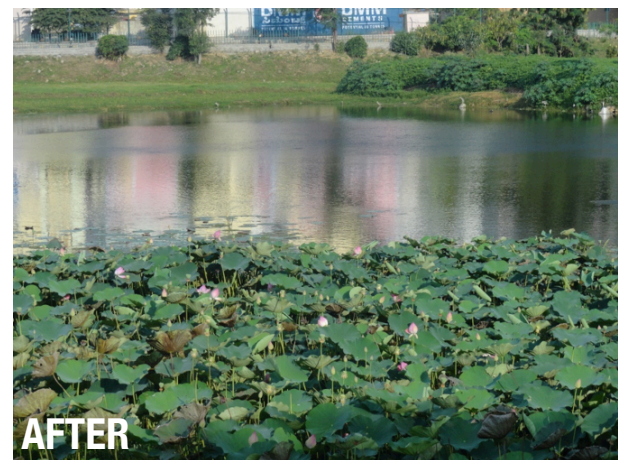
A few years ago, Uttarahalli Lake was choking. It was fighting a losing battle against garbage piles, weeds and pollutants. **Ingersoll Rand** pitched in and the story took a different turn.

As part of their social convergence initiative and to promote sustainability and environment conservation, the organisation partnered with United Way Bengaluru to adopt Lake Uttarahalli for maintenance and preservation.

The enterprise has been supporting this lake since 2011, transforming it into a flourishing eco-system. Today, the lake's flora and fauna are thriving. Walkers, joggers and communities living around the lake treasure this asset. Water birds have returned and ground water has increased in the surrounding areas. The lake is well maintained with

facilities such as clean toilets and a fully functional sewage treatment plant.

Uttarahalli Lake is today an example of how collaboration among corporates, United Way Bengaluru, the government and local communities can result in a win-win situation for all.



“Ingersoll Rand believes in ‘Social Convergence’ to bring together corporate organizations, government bodies and the larger public to take collaborative action towards environmental sustainability. Working with United Way Bengaluru to conserve Lake Uttarahalli has helped us create a greater understanding of the environment and spread awareness about saving Bangalore’s dying lakes amongst our employees, community and other corporates.”

Swati Bhattacharya, VP – Corporate Relations, Public Affairs & Branding, Ingersoll Rand.

Citizen Guide: Building Communities around Lakes

WHY IS IT IMPORTANT?

Community support is essential to improve the condition of the Bengaluru lakes. There are three ways in which lakes are being abused: encroachment, dumping of debris and sewage.

In most cases, people are not conscious of the fact that their land ends around the lake. This is a major cause for debris to enter the lake and create further areas for encroachment. Once an area is built up, there's aren't many ways to restrict the encroachment.

With lakes drying up, there aren't many option left where citizens can socialise, jog, walk, or just enjoy nature. This restricts the breathing spaces in the city and limits the public spaces to concrete structure like malls. It is vital for citizens to have breathing spaces in areas other than Cubbon park and Lalbagh.

WHAT CAN YOU DO?

Individuals or communities can adopt a lake. There's only two agencies that own a lake, either the BBMP or the BDA. The citizens should also get lake's chief engineer involved. Once the support group is ready, the next important part is to raise financial resources and get the legal issues fixed like securing the lake boundary.

An important next step will be to setup a Sewage Treatment Plant (STP) to process the sewage entering the lake. Another way to reduce the sewage load can be by conserving water. Finally United Way can help you get in touch with the relevant interest groups, corporates and the government.

HOW TO GO ABOUT IT?

Adopt a lake

- ★ Talk to BBMP and BDA officials and meet the lake's chief engineer.
- ★ Create awareness about the lake in the neighbouring regions
- ★ Talk to concerned citizens in the neighbouring regions

Raise financial resources

- ★ You approach either government or corporates to divert funds for the lake
- ★ You can also approach UWB, who Corporate Social Responsibility (CSR) funds and government money into a Public Private Partnership.

Get the legal issues in place

- ★ Ask Tehsildar to establish the lake boundary after with conducting a survey to study the land ownership in the neighbouring region.
- ★ Ensure that the lake boundary is physically secured even if it is with stone markers

Establish embankments

- ★ Create walls to support the lake during overflow of water or create a bund
- ★ Remove the sludge from the bottom of the lake and use it to create an island in the middle of the lake

Build a lake shore STP preferably not dependent on electricity.



Community members at Kundanahalli were active & knowledgeable well before UWB got involved – and later vetted vendors for STPs and hosted activities around the lake.

Citizen Guide: Making Lakes Reservoirs of Biodiversity

WHY IS IT IMPORTANT?

The increasing emission of effluents, chemical wastes, along with public waste, garbage and dust has led to an increase in the pollution in Bengaluru's lakes. Trees play an important role in controlling this pollution by producing life sustaining oxygen, cooling the atmosphere, controlling the stormy weather, reducing the impact of heavy rain, and percolating water into the soil etc.

Trees also provide an aesthetic beauty to the landscape, besides adding fertility to soil.

Creating a diverse biodiversity also helps maintain the quality of environment around lake and the water in the lake, plantation programs with indigenous species have been taken up.

WHAT CAN YOU DO?

In order to improve the quality of environment around lake and the water in the lake, plantation programs with indigenous species can be taken up.

For example, you can grow important species of plants along the path ways, fencing and lake bund area. This would help subside the biodiversity concerns and improve the aesthetics around the lake.

Measures can be taken to develop the lake as a habitat for the flora and fauna to coexist. If proper amenities for security and entertainment are put into place, these lakes can also serve as our local getaways.

HOW TO GO ABOUT IT?

Identify a professional/ expert on bio-diversity.

Assess the lake to calculate how much area needs to be allocated for tree plantation, garden area, walk paths etc.

Based on the assessment decide:

- ★ How many trees need to be planted?
- ★ What kind of trees should be planted to attract birds? Should it be primarily fruit trees, flowering trees or ornamental?
- ★ What time of the year they should be planted? Experts recommend tree plantation to be undertaken preferably before monsoon

Create an island to ensure there is no human interference. This will help secure habitat for the birds to nestle and bustle.

Regular maintenance activities should be undertaken like watering, de-weeding, mulching, manuring, pruning, sprucing and trimming.

Provisions should be made for round the clock security.

Volunteers, corporate members and community members should look after the upkeep of the lake.

Lakes should be modified to adapt to the need of the fauna around. For instance:

- ★ Lights should be switched such that the nocturnal birds and animals can thrive.
- ★ Butterfly garden can be introduced to increase pollination.
- ★ Fishing activities can be encouraged to attract wide array of birds.



UWB has worked with the Mahadevapura Parisara Samrakshane Mattu Abhivrudhi Samiti (MAPSAS) to develop the bio-diversity in Kaikondrahalli lake.



Citizen Guide: Treating Sewage and Enriching Lakes

WHY IS IT IMPORTANT?

Many Bengaluru lakes contain more sewage than water in a year. These lakes are filled with sewage for most of rest of the year. It is only during rainy season that they have any water in them.

As the water flowing into the lakes has become increasingly polluted, building a Sewage Treatment Plants (STP) on the lake shore has turned into a necessity. The key role of STPs is to purify the water and make it reusable.

Recent lake STPs include the setup at Kundalahalli lake, Jakkur lake, and one coming up near the Soukhere lake.

WHAT CAN YOU DO?

Based on the scale of the waste and sewage in the lake, you can either let the nature be the STP or create one. Sewage at a 'medium scale' can be processed by just being left in the open.

At larger volumes, you can setup a STP to process the sewage. Conventional STP uses motor to process the waste is highly dependent on electricity and therefore create huge costs.

Rain water harvesting is another important way by which lake water can be recharged.

HOW TO GO ABOUT IT?

Take measures to test their waste

If the lake is rain fed, it is preferable to divert the sewage using STPs or wetlands.

You can revive or create wetlands around the lake to ensure water purification, control flooding, and shoreline stability.

If there is no natural provision to make wetlands you can set up a STP.

To set up an STP you need to first select the appropriate type suitable for the lake.

- ★ Some STPs need electricity and other technologies don't. A Zero energy STP is cheaper and eco-friendly.

The STP should be installed near the inlet of the lake.

- ★ If there are several inlets, the water from all these inlets should be diverted to the STP
- ★ Only the treated water must be released into the lake.

Surrounding communities should be encouraged to take measures to segregate the waste.

You can also check the flow of lake by filling it up with already treated water from external sources like apartments and corporate campuses.



The STP at Kundalahalli lake is uncommon eco-friendly that does not consume any electricity. It is being set up with the support of UWB, corporate partners, neighbouring community, and Whitefield Rising. Bacteria are used to process waste without power. It will also be underground allowing scope for creating public spaces above.



Recognising Lake Champions

Civic-minded citizens who are transforming our lakes.



USHA RAJAGOPALAN

"We want to make the lake a community responsibility."

Disappointed with the condition of the Puttenahalli lake, Usha approached her friends and other like minded people to rejuvenate the lake. After continuous determination and perseverance they finally got the BBMP to rejuvenate the lake in 2009 and Puttenahalli Neighbourhood Lake Improvement Trust was setup in June 2010.



PRIYA RAMASUBBAN

"I always harboured the desire to give back to the society."

On one of her visits to the Kaikondrahalli Lake, Priya encountered a magical moment when she saw thousands of dragonflies around the lake. Priya immediately made a few calls and didn't stop until Mahadevapura Parisara Samrakshane Mattu Abhivrudhi Samiti (MAPSAS) was set up. MAPSAS with UWB has managed to make the lake much livelier with over 1000 trees planted.



ARBIND GUPTA

"If we can capitalise on combined power, we can do much more."

Taking hints from other success stories, Arbind slowly started to rework his work schedule to undertake lake rejuvenation projects starting with the Arekere lake. He ensured that all the plans made by BBMP materialised. Currently Arbind is actively working on the Arekere Lake and the Madiwala Lake, which are now amongst the healthy lakes in Bengaluru.



MS VISHWANATH

"It is heartening to see the lake bed, once a patch of dry land, now receiving treated water."

Viswanath used to accompany his mother Smt. Lalithamma to several social and environment related events. These early learnings stayed with him. Viswanath helped in forming Uttarahalli Maghekere Nadigedarara Vedike (UMNV) in March 2014. With UWB support, UMNV started conducting several activities to generate community interest for the lake.



RAVI KUMAR

“Our fight is to empower lakes with sufficient power and resources rejuvenation work.”

Ravi Kumar started working on rain water harvesting in 1988 and took up lake rejuvenation as an extension to that. This was close to his heart as he had seen the demise of a pond in his village where he had spent most of childhood. He started working on two lakes Chikatalasandra lake and Goundanpalya lake, both in Padmanbhanagar. He also runs a Green Ambassador program, a 6 months course on lake rejuvenation.



ARVIND KEERTHI

“Systematic thinking, raising awareness, pooling funds, time and with love, lakes can be clean once again.”

Appalled by the scant regard for the upcoming lakes, Arvind started taking active interest in lake rejuvenation. Along with United Way and Qualcomm, Arvind also became a part of the project to set a zero-electricity sewage treatment plant on the shores of Kundalahalli lake. If Arvind and co. are successful, thousands of families adjacent to the lake will benefit.



MAJ. GEN. HARIDAS GOPALAN

“Our mission is to stop the continuous flow of sewage into the lake.”

Maj Gen Gopalan stays in an apartment facing the Rachenahalli Lake. Looking at the deplorable condition of the lake, he founded Jalmitra Trust and started community awareness programmes in his area. The amount raised was used to initiate lake development activities like building a pathway, clearing underground, securing the premises with the BBMP's support and others.



SHIVKUMAR

“It was a joyous occasion to see lake bund overflowing.”

The rich history of Yelahanka lake and its potential loss made Shivkumar anxious to fix the lake. He approached the Local MLA Shri Viswanath who promptly agreed to extend his support to the cause. Now four years later, Shivkumar is bursting with pride that the Yelahanka lake has begun to resemble its former self.

UNITED WAY OF BENGALURU

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