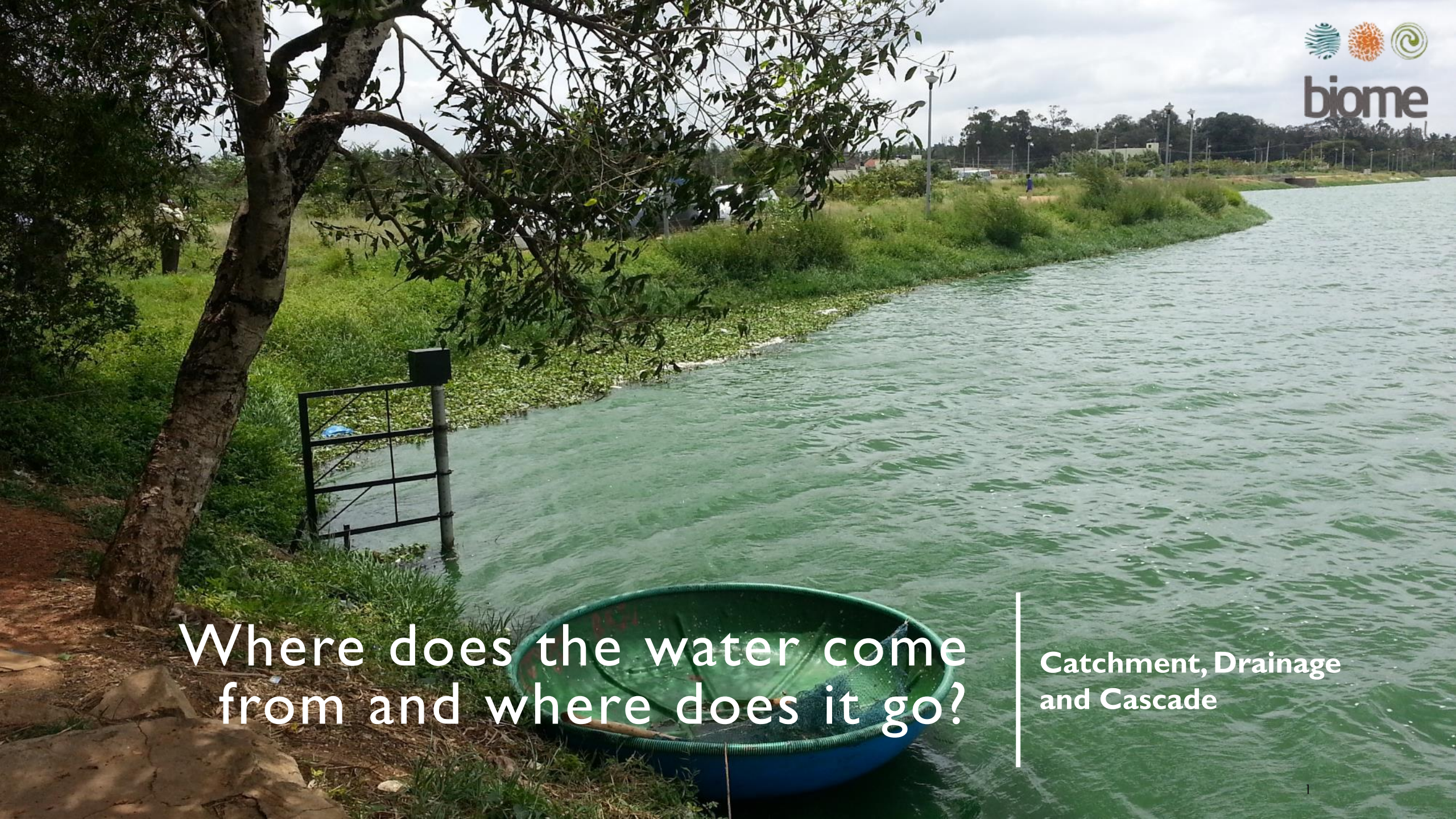

Where does the water come from and where does it go?

Catchment, Drainage and Cascade

This document has been made to be used as a community resource and is meant to evolve with the contributions and experiences of everyone working to protect lakes. Please write to us with your contributions.

Please feel free to use, share and disseminate this document. We would appreciate being informed about how it has been used.

Please write to us at water@biome-solutions.com or find us on Facebook here.

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This is Jakkur Lake's rough catchment area


Jakkur Lake has
multiple inlets


Here is its tank bund
Google
Map
3D


Here you can see the Jakkur STP
It has 10mld capacity
And here is the lake's wetland.


This is the overflow
and drainage


It has a beautiful
open well


And a Kalyani


You can’t see it but
this lake provides
200 kg of fish per
day in peak season

Many apartments that offer lake vistas are coming up


All these lakes are connected, they flow into each other.
The health of one lake affects the health of the entire system
Puttenahalli Lake
Allalsandra Lake
Jakkur Lake
Rachenahalli Lake
Hebbal Lake
Nagawara Lake

Our Lakes: Components of the Water System

The Catchment is a geographic acrea where rain falls and flows into the lake

Drainage is the network of kaluves and raja kaluves (storm water drains) through which rainwater flows

Every lake has inlets which bring this water into the lake

A lake/tank bund is a stretch or ridge that holds the water back and creates the reservoir

The overflow from the lake goes through the overflow weirs or culverts. These are traditionally referred to as Kodis.

The Achcut or command area is what is downstream of the bund and would have originally received irrigation benefits.

All these elements come together as a cascade or cascade network of lakes that are the rivers of Bengaluru

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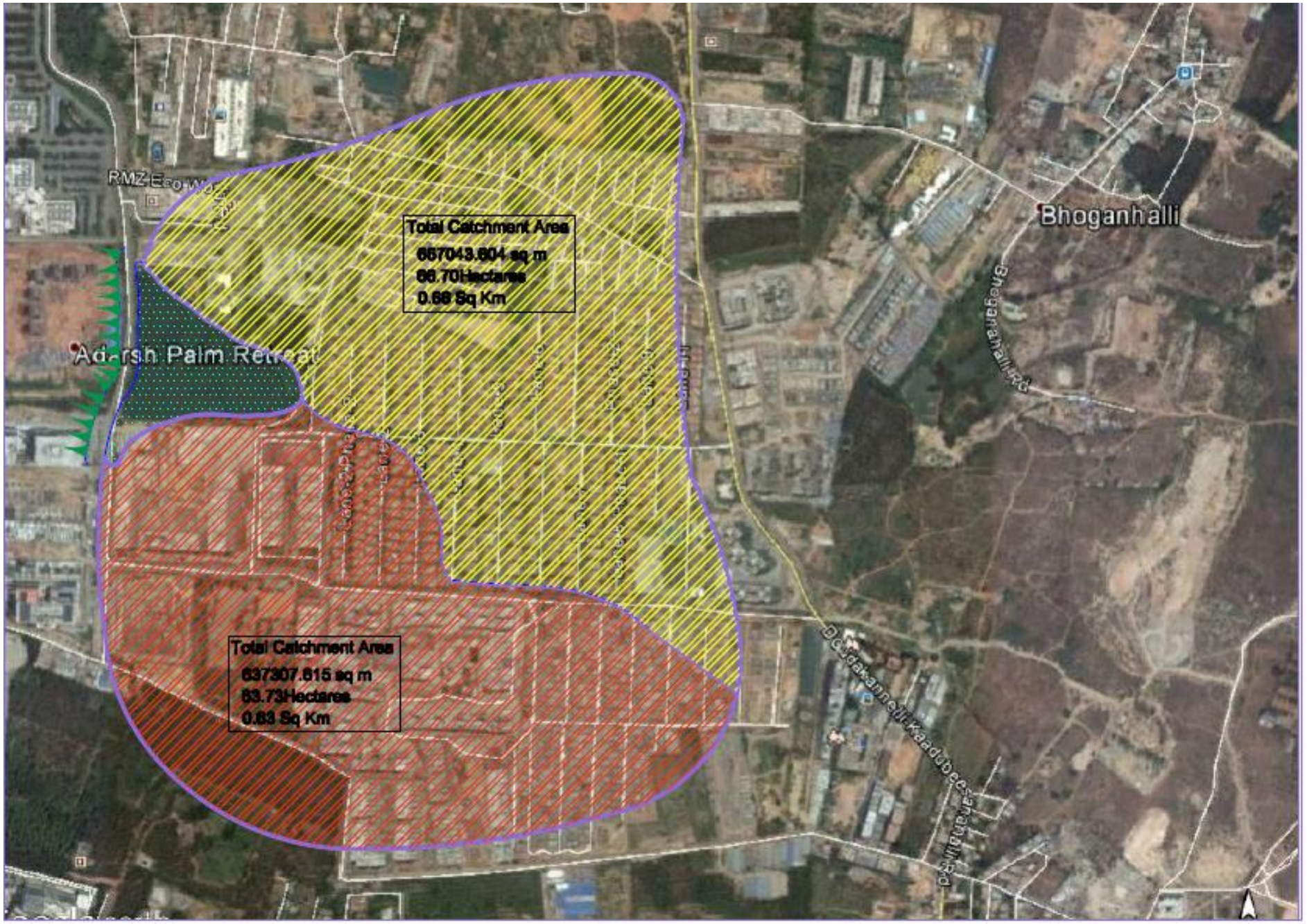

The Catchment of the lake is the extent of land where all the rainfall and surface water flow into the lake

Catchment of Devarabisanahalli Lake

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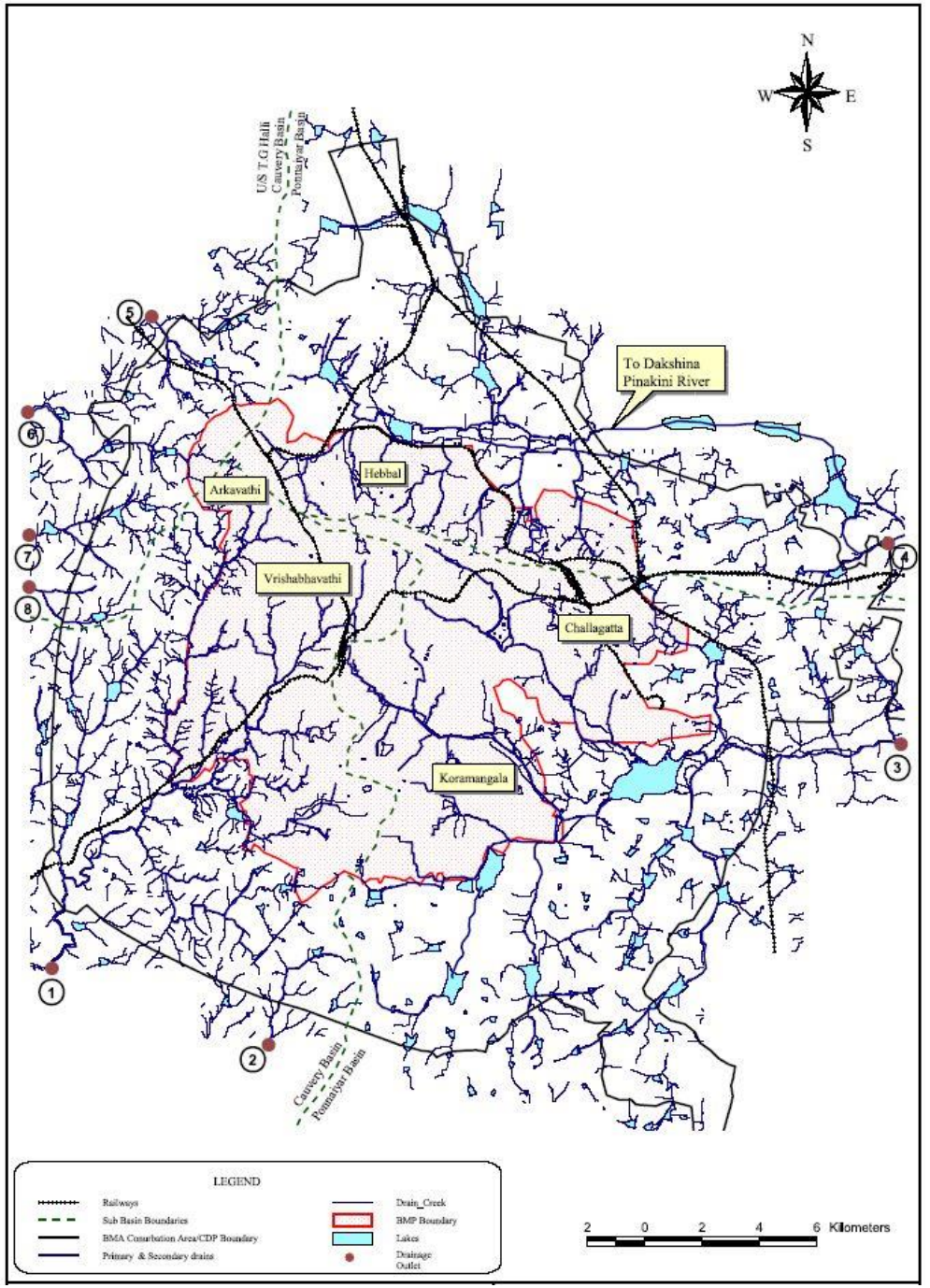
Bangalore's Stormwater Drainage

Drainage is the network of kaluves and raja kaluves (storm water drains) through which rainwater flows



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Stormwater Drains or Raja Kaluves:
A clean Raja Kaluve near Jakkur Lake and a Raja Kaluve filled with sewage in Hennur

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Inlets bring water into the lake.

Inlets in Jakkur Lake

Wetlands: Improving Water Quality Naturally

A wetland in an urban lake is a part of the water body that breeds a high density of aquatic life, and typically uses up the nutrients in the lake and enhances the water quality of the lake.

The sewage entry into many tanks tends to naturally foster wetlands if nutrient levels are high.

Some lakes, such as Jakkur, have wetlands incorporated into their design.

The overflow from the lake goes through the overflow weirs or culverts. These are traditionally referred to as Kodis.

Overflows:
Jakkur Lake

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The Cascade System

Lakes are linked to each other through drainage networks to a series of lakes or a **cascade**.

These cascades were designed to help water flow from higher to lower elevations.

These are some of Bangalore's lake series.

Map Source: ENVIS GoK

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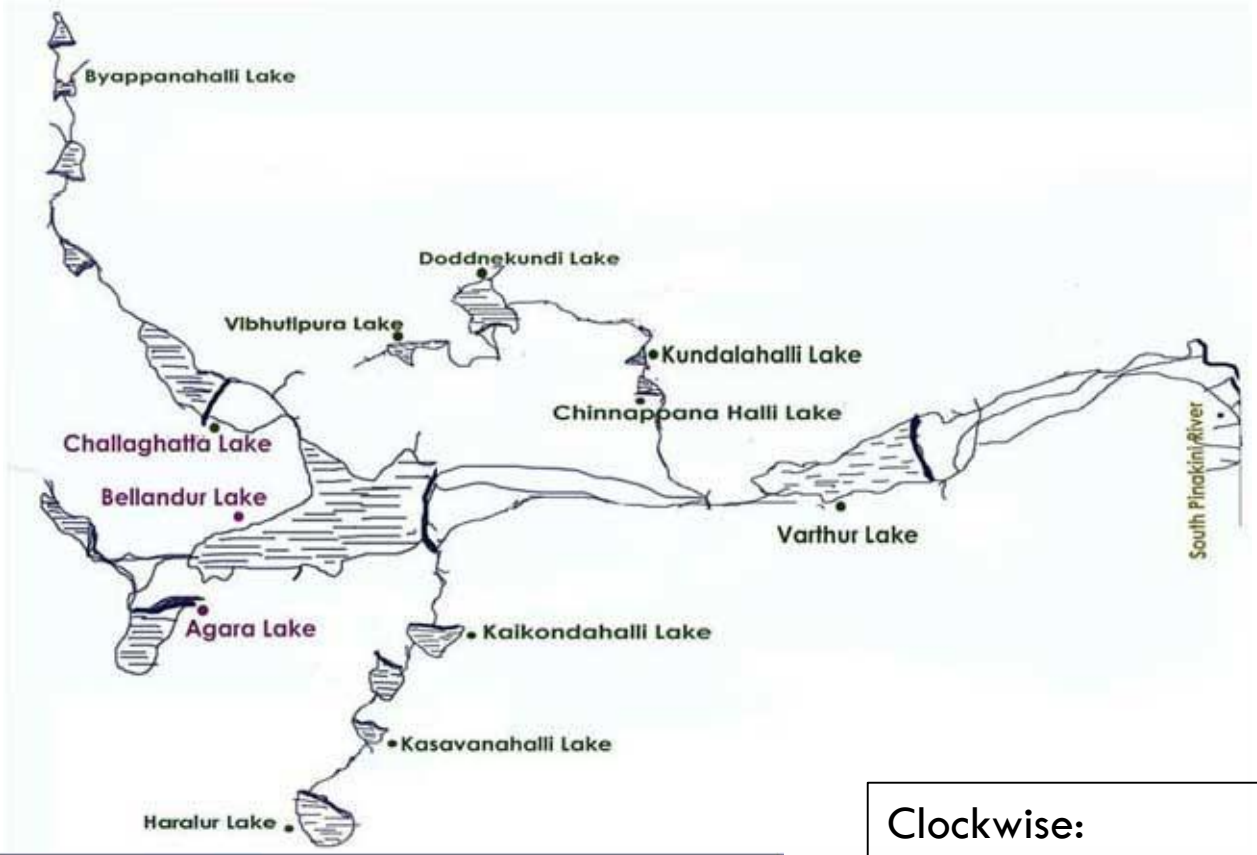

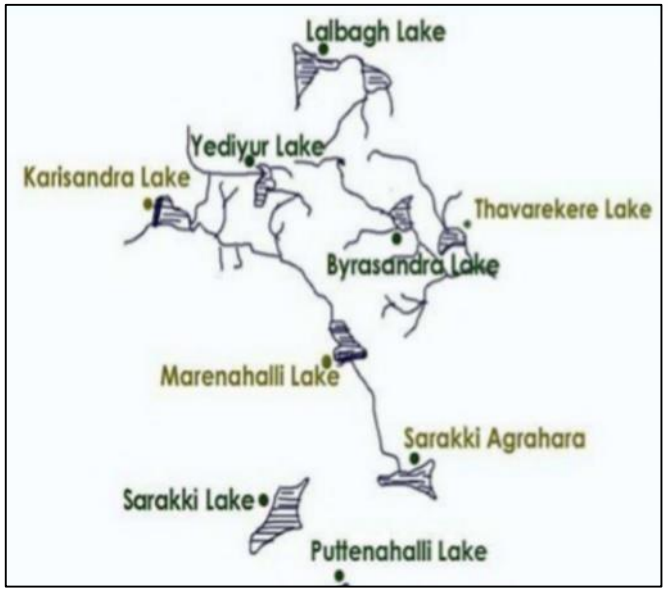

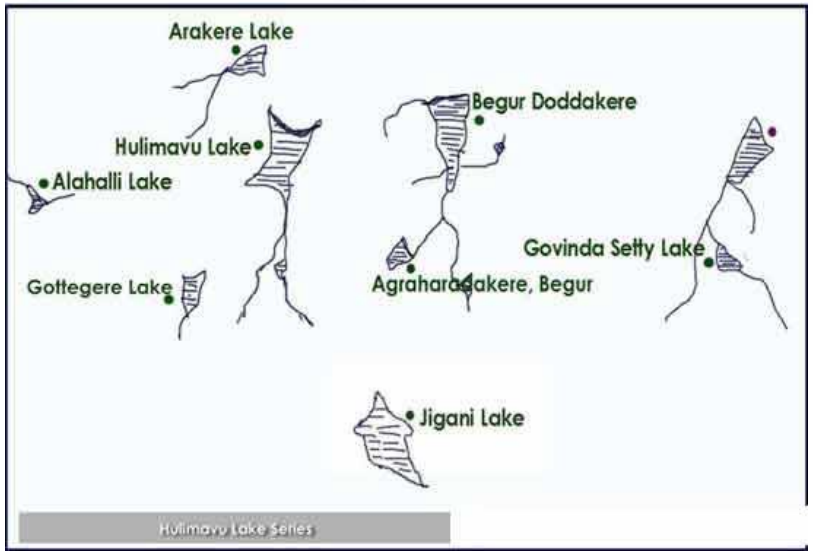

Clockwise:
Yellamallappa Chetty Lake series,
Varthur Lake series,
Hulimavu Lake series,
Lalbagh Lake series

Map Source: ENVIS GoK

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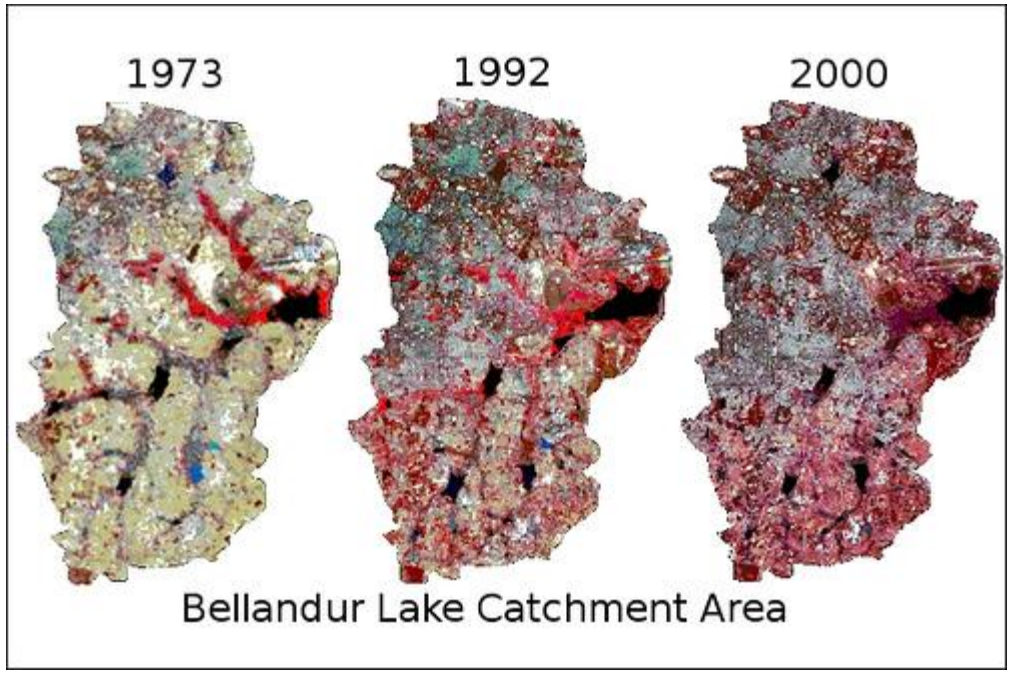
What happens to lakes over time

Community disconnect is what kills the lake

This is Bellandur Lake: A Changing Catchment



In 1973, you can see that lakes were well connected, with clear areas of vegetation growing along the networks that linked them (highlighted in red)

By 1992, as the city grew, these lake networks began shrinking and became increasingly fragmented

By 2000, the entire catchment has been transformed by the urban spread

Lakes themselves get encroached and disappear

Source: http://praja.in/hi/bangalore/2007/09/21/bellandur-lake-i

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What Happens to Drainage: Encroachment, Wastewater and Solid Waste

Flood plain encroachment

Solid waste dumping-Reduced culvert capacity, inlet block

Source: http://wgbis.ces.iisc.ernet.in/energy/water/paper/urbanfloods_bangalore/city_infrastructure.htm

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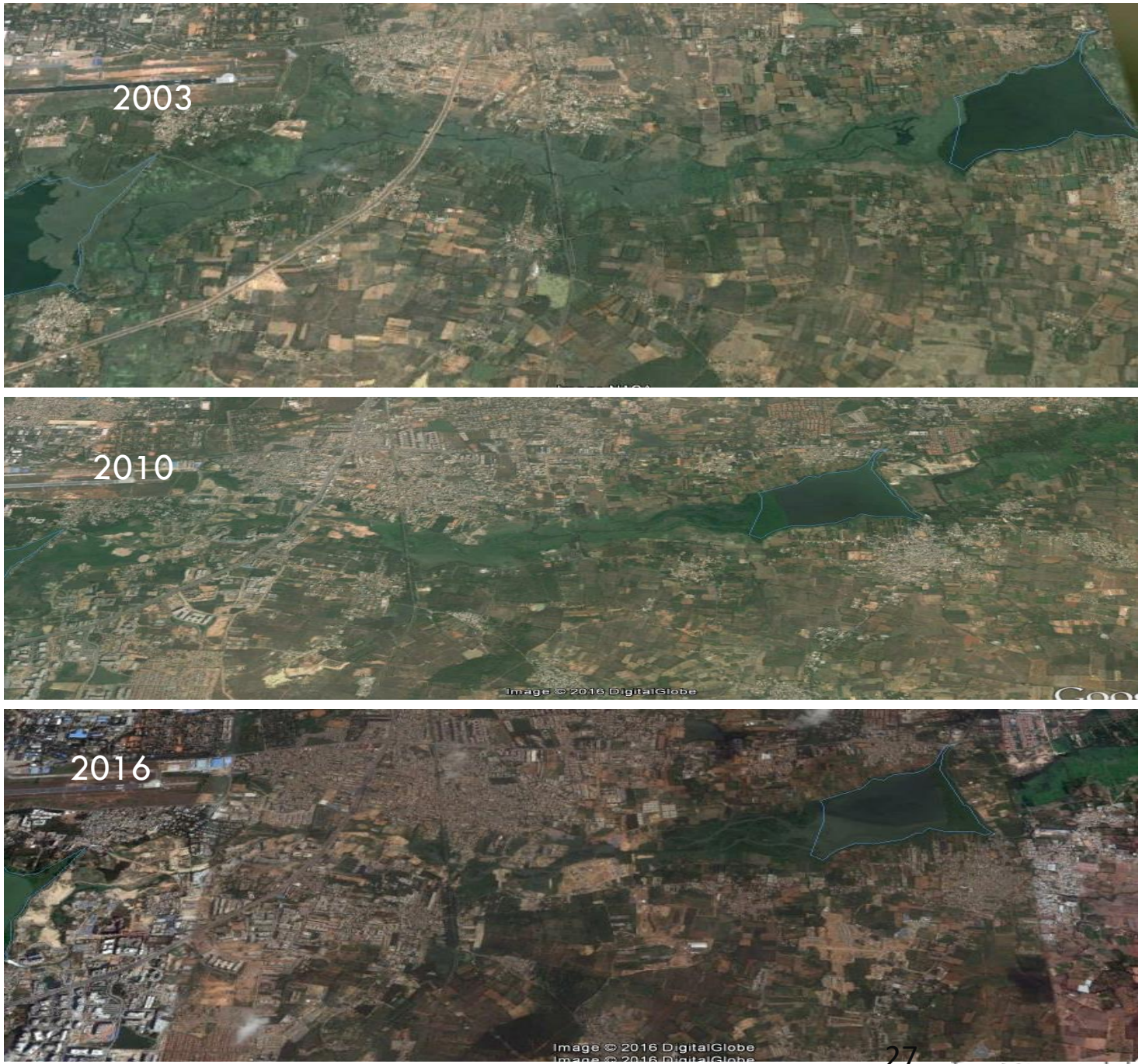
Resulting in Changes to the Cascade System



Sowl Kere

Catchment and cascade disrupted – the lake goes dry.

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Untreated Waste Water & Solid Wastes Flow into the Lakes

Dodda Kudlu Lake in 2012 and 2014 – encroachments into the lake

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Impact

Lost livelihoods: people dependent on these lakes forced out

Lost resource: Loss of the source of water for drinking, domestic, economic, environmental uses

Lost space: the community's access to the lake diminishes

A Disconnect: the Community disengages from the lake

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The Lake Becomes a Liability

The lake is a public resource, it belongs to all of us.

Over time, there has been a lack of accountability and ownership, little or no monitoring, inequitable sharing and uncontrolled growth around our lakes.

The lakes have become a source of public health issues, a hive for safety and security problems, and a sink for all our waste.

The lakes have become a liability.

Source: BBC.com

Source: thehindu.com

The lake as a liability

The lake as a liability

The lake as a liability

Get in touch with Biome Environmental Trust at water@biome-solutions.com

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With thanks to
Shri Ramprasad and Friends of Lakes, PNLIT, MAPSAS, Jalaposhan
And everyone engaged in
lake rejuvenation in Bangalore