

# **Paper Presentation for Lake Symposium 2014**

**Indian Institute Of Science**

**Presented By:**



**Gnana Jyothi School Team**

**STUDY OF PHYSICO-CHEMICAL  
AND BIOLOGICAL  
CHARACTERISTICS OF YELAHANKA  
AND ALLALASANDRA LAKES**

# Today's Presentation

- ❖ Introduction
- ❖ Objectives
- ❖ Materials and Methods
- ❖ Result and Discussion
- ❖ Conclusion





# INTRODUCTION

- **Wetlands are one of the most productive ecosystems.**
- **Functions of wetlands:**
  - water storage (domestic, agricultural and industrial usage),
  - protection from storms and floods,
  - recharge of ground water,
  - water purification,
  - storehouse for nutrients,
  - erosion control
  - stabilisation of local climate (such as temperature and rainfall),
  - maintain the ecological balance.
- **Lakes occupy less than 0.007% of the world's fresh water.**

- **Water is getting polluted day-by-day due to discharge of domestic and industrial wastes, oil spills , run off from agricultural fields etc. into nearby lakes .**
- **Water quality includes all physical, chemical and biological factors that influence the beneficial use of water.**
- **Water bodies support algae, zooplankton, fish, mollusk, birds etc.**

## **The objective of the study were**

- The objectives of the present study were
  - a) to study the nature of water quality
  - b) to analyse the physico- chemical parameters
  - c) to study and observe the nature of waste water algae.



MATERIALS AND METHODS

# Study Area

- **Allalassandra Lake** is located in Bangalore North at Lal Bahadur Shastri Nagar, Yelahanka. In 2009, the Allalassandra lake bed was dryland.
- **Restored by the BBMP** in 2010-11 → fencing the lake area, desilting the lake bed, building a pathway, and installation of benches and lights.
- But still untreated sewage inflows can be seen.
  
- **Yelahanka Lake** is located on northern side of Bangalore (about 200 Acres).
- **Restoration measures** started during 2008 - 2009 included: Construction of bridge, desilting, diversion drain, embankment and pitching.
- **Yelahanka Kere** and its nearby lake, **Puttenhalli lake** has **officially been declared as a bird sanctuary.**

# Yelahanka Lake



Yelahanka Lake		
Sites	Latitude	Longitude
S1	13.112153°N	77.599295°E

# Allalassandra Kere



Sites	Latitude	Longitude
S1	13.089945°N	77.587125° E
S2	13.091474°N	77.58437°E



## Water Sample Collection

- ❖ Water samples were collected from two different lakes (Yelahanka and Allalassandra) for the analysis of physico-chemical parameters and phytoplankton identification.

## Algae and Macrophyte

### Sampling and Identification

- ❖ Algae and macrophyte samples were collected from the two lakes.
- ❖ Algae were identified microscopically (Trivedy and Goel (1986), Prescott (1959), Desikachary (1959) & APHA (1998)).

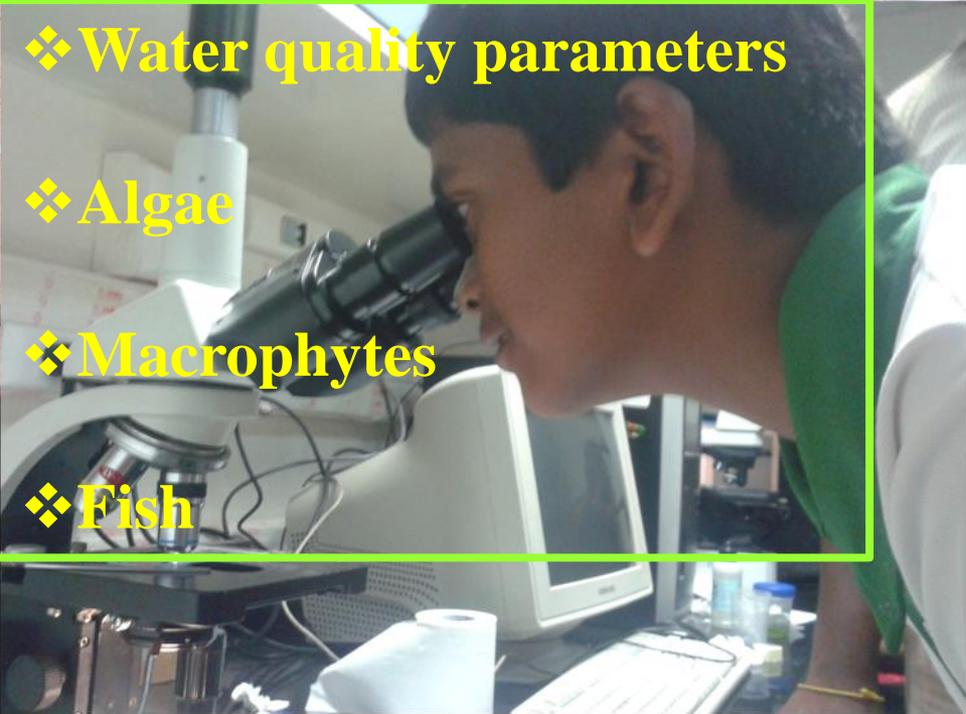
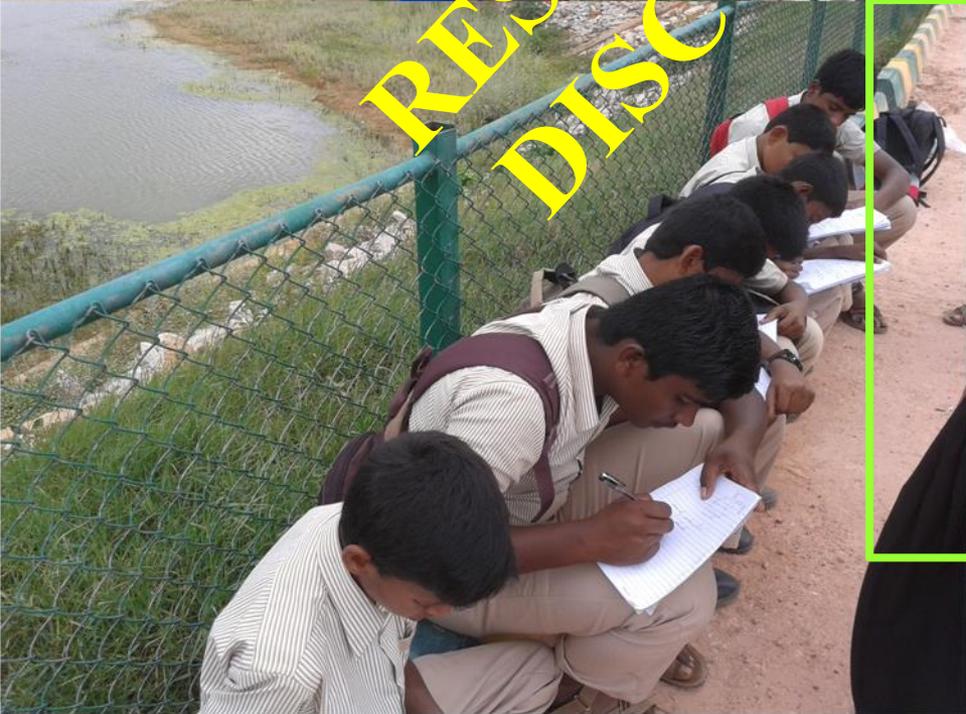
## Analysis of Physico-Chemical Parameters:

### Onsite analysis:

- ❖ Water temperature, pH, Electrical Conductivity, TDS, Free CO<sub>2</sub> & DO

### Off site analysis:

- ❖ Nitrate, Phosphate, Alkalinity, Calcium and Magnesium Hardness, Total Hardness, Chlorides, COD, BOD, Sodium & Potassium (Trivedi & Goel (1986) & APHA (1998)).



# RESULTS AND DISCUSSION

- ❖ Water quality parameters
- ❖ Algae
- ❖ Macrophytes
- ❖ Fish

## Onsite Parameters

<b>Parameters</b>	<b>Yelahanka</b>	<b>Allalassandra 1</b>	<b>Allalassandra Inlet</b>	<b>BIS Standards (1998)</b>
Air temperature (°C)	30	29.1	31	
Water temperature (°C)	27.1	25.1	28.6	
TDS (mg/l)	562	462	487	500
EC (µS)	912	783	864	1000
pH	8.26	8.15	7.79	6.5-8.5
Free CO <sub>2</sub>	0	12.32	24.64	
DO (mg/l)	8.13	6.26	1.71	6.0

## Offsite Parameters

Parameters	Yelahanka	Allalasanra 1	Allalasanra Inlet	BIS Standards
Alkalinity (mg/l)	214.67	324	353.33	200-600
Chloride (mg/l)	265.54	142	116.91	250-1000
Total Hardness (mg/l)	200	209.33	200	300-600
Ca Hardness (mg/l)	37.41	52.1	51.84	75-200
Mg Hardness (mg/l)	39.51	38.21	36	
BOD (mg/l)	16.26	24.39	40.65	3.0-6.0
COD (mg/l)	18	30	92	
Phosphate (mg/l)	0.025	0.777	1.412	0.3
Nitrate (mg/l)	0.195	0.246	0.38	45
Sodium (mg/l)	675.6	301.6	154.4	100
Potassium (mg/l)	42.8	40.8	38	10



*Alternanthera sp. & Eichhornia sp.*



*Potamogeton sp.*

**MACROPHYTES IN YELAHANKA  
KERE**

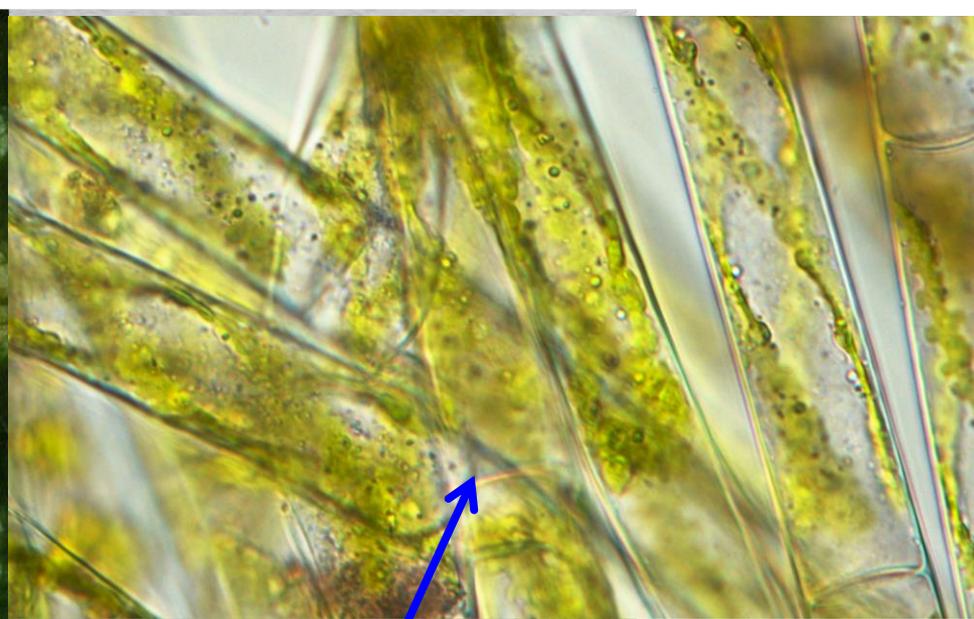
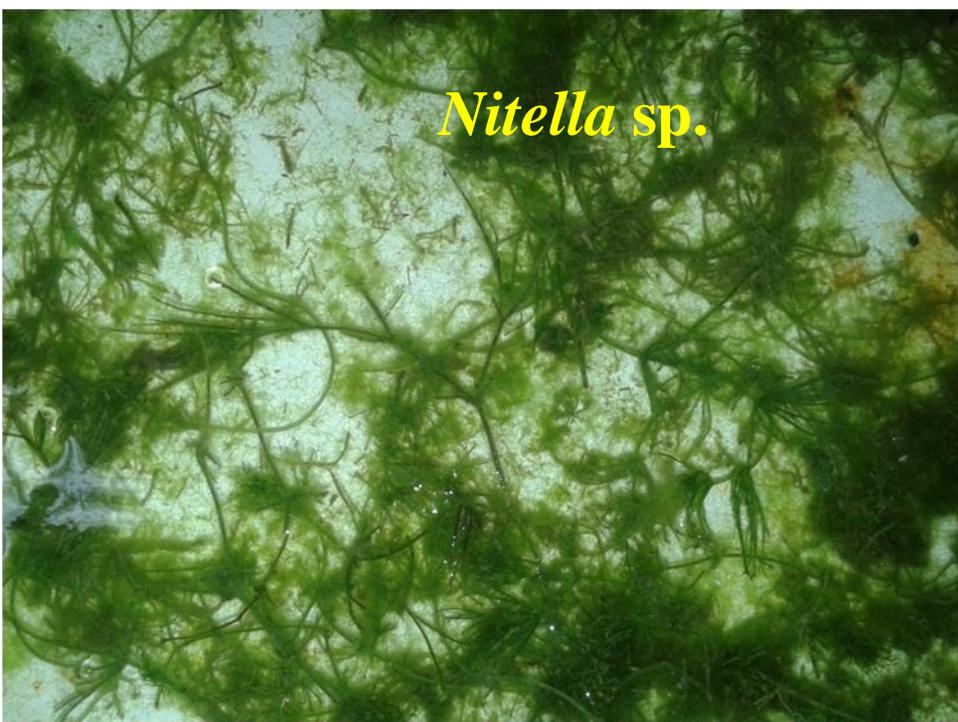


*Typha sp.*



*Hydrilla sp.*

*Nitella sp.*



*Chara sp.*



*Spirogyra sp.*



ALGAE

*Gyrosigma* sp.



*Cyclotella* sp.



*Tetraedron* sp.



## Yelahanka Kere

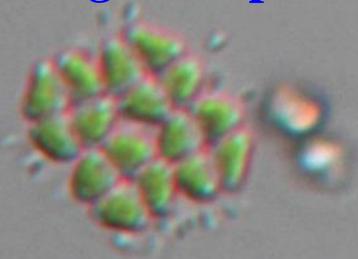
*Scenedesmus* sp.



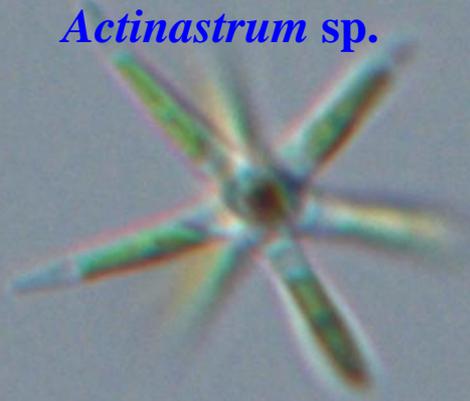
*Merismopedia* sp.



*Crucigenia* sp.



*Actinastrum* sp.



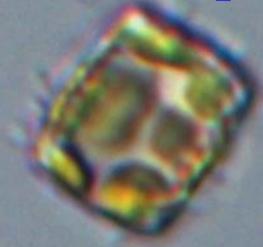
*Synedra* sp.



*Ankistrodesmus* sp.



*Cyclotella* sp.

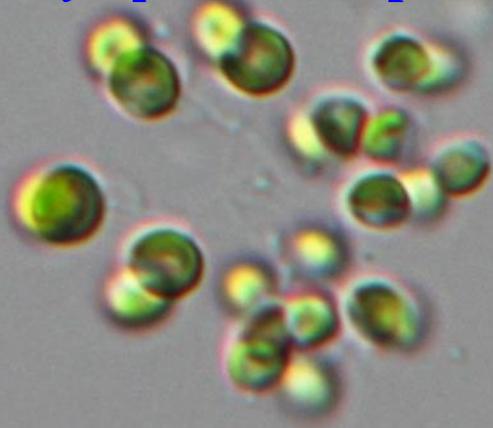


*Melosira* sp.



Yelahanka Kere

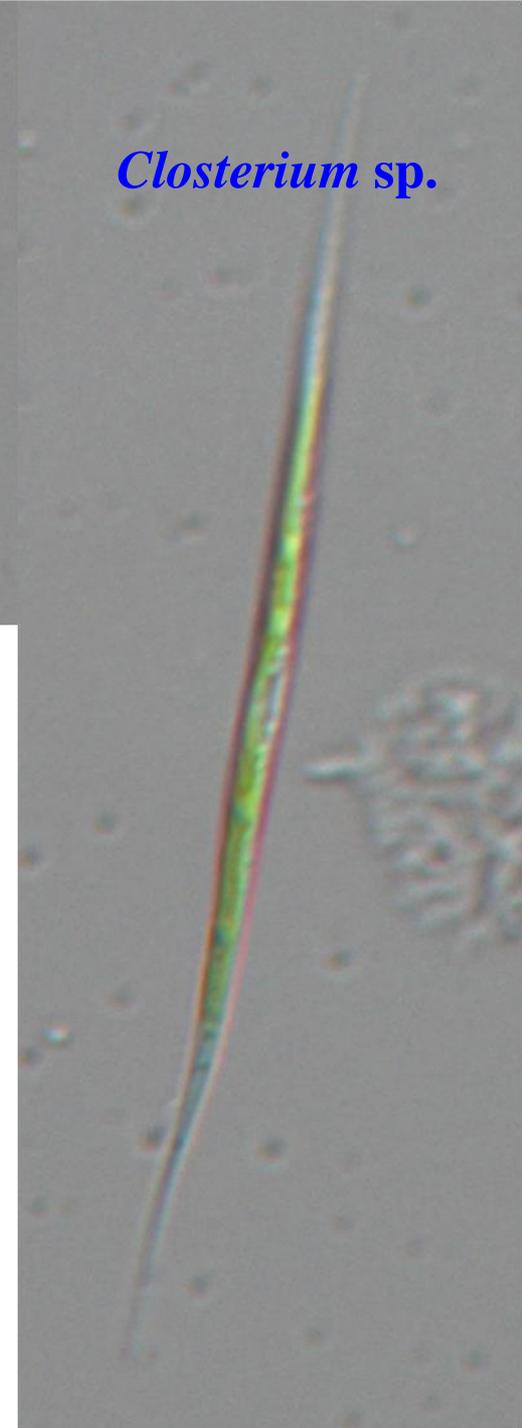
*Dictyosphaerium* sp.



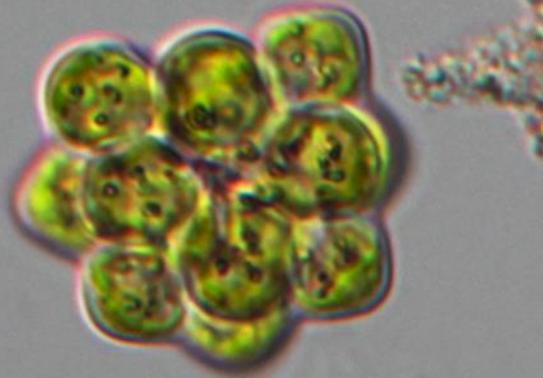
*Staurostrum* sp.



*Closterium* sp.



*Coelastrum* sp.



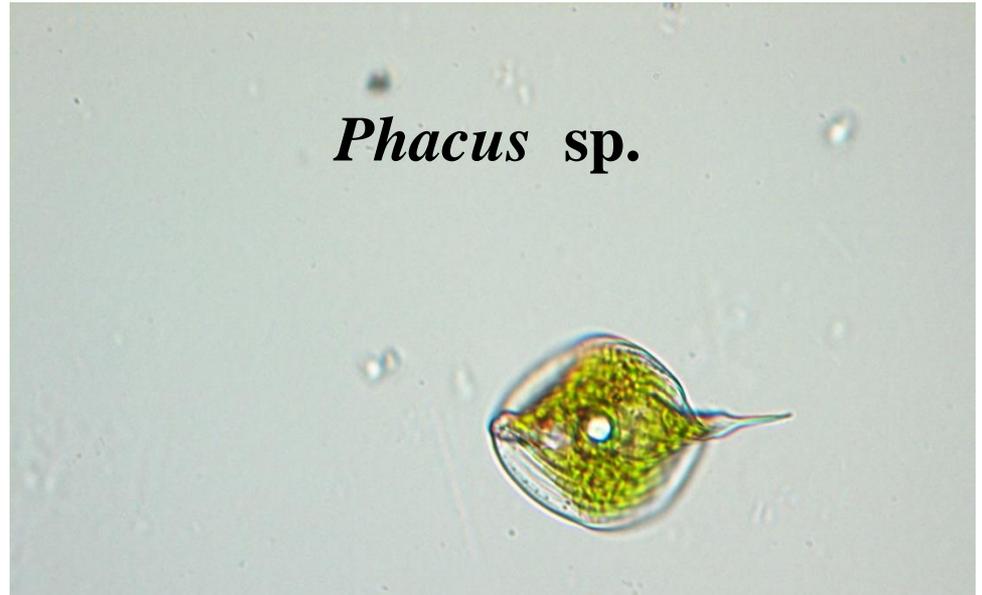
**Yelahanka  
Kere**

# Allalassandra Kere

*Spirulina* sp.



*Phacus* sp.



# Fishes In Yelahanka

- *Catla* sp.
- African tilapia (*local name jalebi meen*)
- Rohu (*rohita* sp.)
- Grass Carp (*idella* sp.)

# Birds In Yelahanka

- **Paddyfield pipit** or Oriental pipit, (*Anthus rufulus*)
- **Purple Gallinule** (*Porphyrio martinicus*)
- **White-breasted Waterhen** (*Amaurornis phoenicurus*)
- **Red-wattled lapwing** (*Vanellus indicus*)
- **Brahminy kite** (*Haliastur indus*)
- **Black kite** (*Milvus migrans*)
- **Little Cormorant**
- **Little egret** (*Egretta garzetta*)
- **Cattle egret** (*Bubulcus ibis*)



CONCLUSION

- ❖ Yelahanka lake is a good aquatic ecosystem supporting variety of algae, macrophytes, zooplankton, fishes and birds. All the parameters are within the permissible limits except TDS, BOD, Sodium and Potassium.
  
- ❖ In Allalassandra lake, sewage inflow had increased nutrient levels. All the parameters are within the permissible limits except BOD, Magnesium, Sodium and Potassium. Spirulina sp. is the most dominant algae present.

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# Biological Sciences



**THANK YOU**