Pollution in Upper Lake, Bhopal :
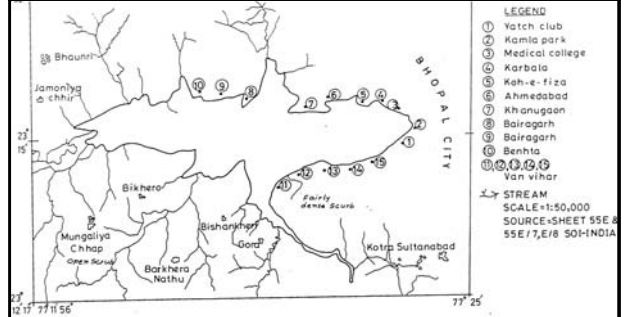**Using Remote Sensing, GPS and GIS**

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Map of the Upper Lake Bhopal

Aquatic Weeds near Benhta

Floating Algae and Macrophytes

Erosion from weathered rocks

Aquatic Vegetation Bloom at Bairagarh

Lake Water near Van Vihar

Outfall near VanVihar

Aquatic Farming in Bhopal Lake

Sampling and GPS observations

Outfall Near Koh-e-fiza

Dense Macrophytes at Dargah

Object of the study

- to propose an approach for mapping pollution in surface water streams using Geoinformatics.

UPPER LAKE BHOPAL

Lake Pollution Effects

- Siltation
- Eutrophication
- Toxic wastes from fertilizers and industires
- Potability of water reduces

Causes

- Point sources
  - Outfalls of sewer drains,
  - Storm drains
  - Hospital and Indusrial drains
- Non-Point Sources
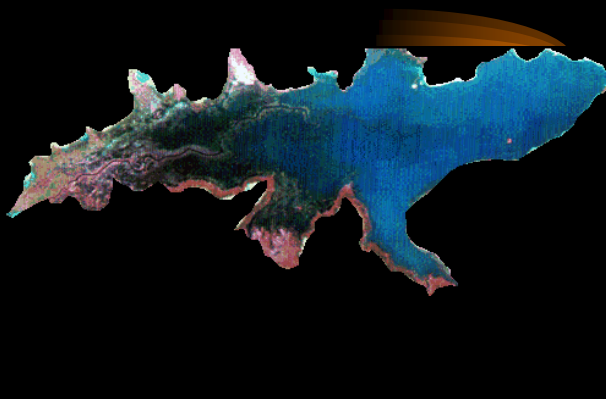 - Agricultural fields
  - Forest areas

Methodology

- GPS Data Processing
  - Transforming GPS Coordinates to Map coordinate system,
  - Apply corrections to GPS coordinates
  - Overlay GPS points on satellite data
- Retrieval of spectral reflectance values
  - IRS -1B / 1C consists of five spectral bands
  - Collect reflectance values
  - Find correlation of reflectance each bands separately with pollution parameters.

- Select suitable band
  - based on coefficient of correlation
  - for each parameter
- Develop a regression model
  - Spectral reflectance vs SSC
  - Spectral reflectance vs SD
  - Spectral reflectance vs Ch-a

- Verify the model
  - based on Chi-square test
- Develop maps of following using map calculation module in GIS adopting the selected band
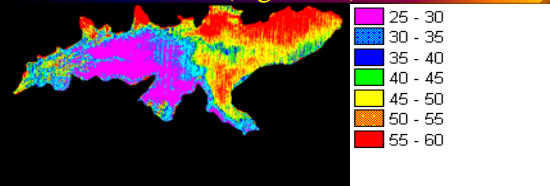 - SSC
  - SD
  - Ch-a

- Reclassify each map in selected classes
- Give weightage to each class in each map
- Overlay and sum all three maps
- Reclassify the sum map
- Create a map of total pollution of the LAKE
- Check the results with limited field checks
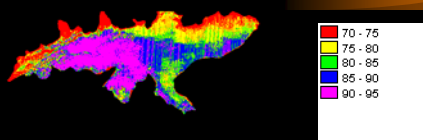
FCC OF LAKE
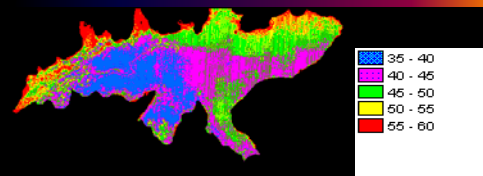

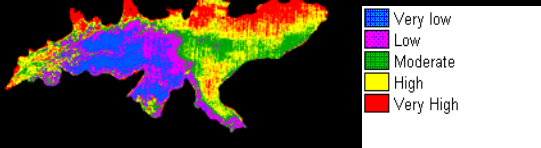## Chlorophyll -a Map of Bhopal Lake

(mg / cum)

25 - 30	
30 - 35	
35 - 40	
40 - 45	
45 - 50	
50 - 55	
55 - 60	

Sechhi Depth of Bhopal Lake (cm)

70 - 75	
75 - 80	
80 - 85	
85 - 90	
90 - 95	

Suspended Solid Concentration in Bhopal Lake

(mg / l)

35 - 40	
40 - 45	
45 - 50	
50 - 55	
55 - 60	

Pollution Zones after GIS Analysis

Very low	
Low	
Moderate	
High	
Very High	

MACROPHYTE GROWTH IN LAKE

ACQUATIC VEGETATION