

Ambient Water Quality Monitoring Program

Past, Present, and Future...



- Presented By: Monmouth County Health Department
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Topics of Discussion

1. History of Program
2. Current program functions
 - Location Types (Stream, lake, saline-estuarine)
 - Route Information
 - Sampling Parameters
3. Resulting studies (TSS/Turbidity, etc)
4. Other GIS Applications for the Water Pollution Prevention Program
5. Future Plans

1. History

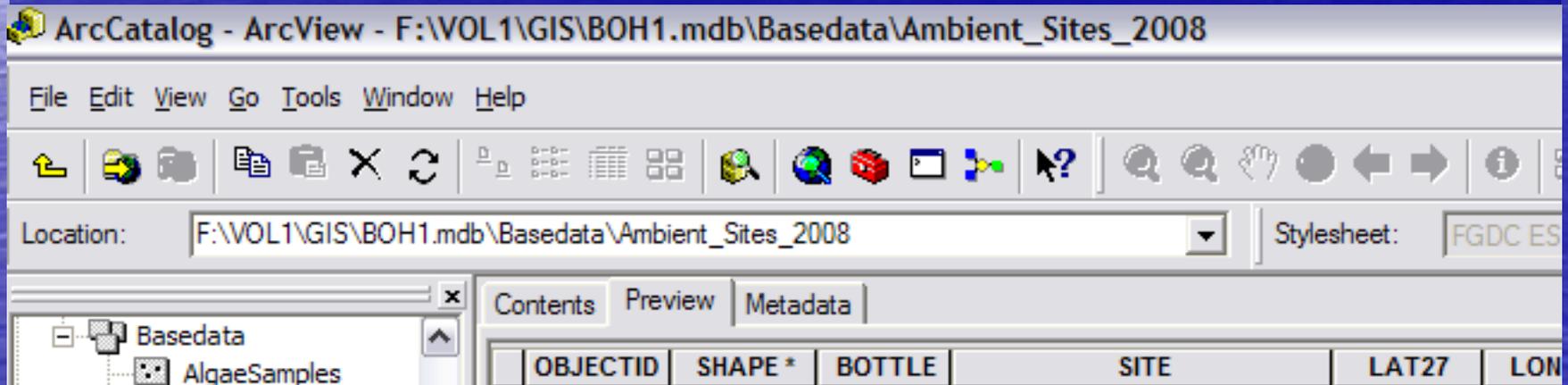
- Initial discussion for sampling – November 1980 (Monmouth County Environmental Work Program)
- First interagency agreement with CEHA to conduct ambient sampling – March 1987
- GPS data collection began in 1992 – Magellan units
- Sampling data available from 1992-Present

Project Objectives

- Support NJDEP watershed initiatives
- Track water quality trends through time
- Establish background water quality
- Obtain water quality data which can be correlated with specific land uses
- Coordinate the collection of chemical and bacterial data with Monmouth County Health Department Biological Assessment Program and Cooperative Coastal Monitoring Program.

2. Current Ambient Program

- 80 Sites GPS'd in Monmouth County
 - 9 Lakes
 - 43 Streams
 - 28 Saline-Estuary



Data Availability

- Shapefiles sent to NJDEP Bureau of Water Monitoring annually
- Sampling results available on <http://co.monmouth.nj.us/ambients.asp>

Ambient Surface Water Monitoring

The Monmouth County Department of Health (MCHD) monitors 80 representative sites throughout Monmouth County. Measurements are performed in the field and at the laboratory.

Select a location below to see the results of a stream in your area:
Standards can be found on the NJDEP's website .

< 2006 2007 + 2007 +
 Historical Stream table: Ambient Streams Lakes table: Ambient Lakes

Select Location:

Showing results for: MUDDY FORD BROOK, HOWELL

Site	Collection Date	Fecal	Enterococci	Ecoli	Turbidity	Total Suspended Solids	pH	Specific Conductivity	Disolved Oxygen	Total Phosphorous	Salinity ppt	Temperature C	SWQS
17	6/3/2008	70		110	6.56	8.4	6.64	94.4				16.5	FW2-NT

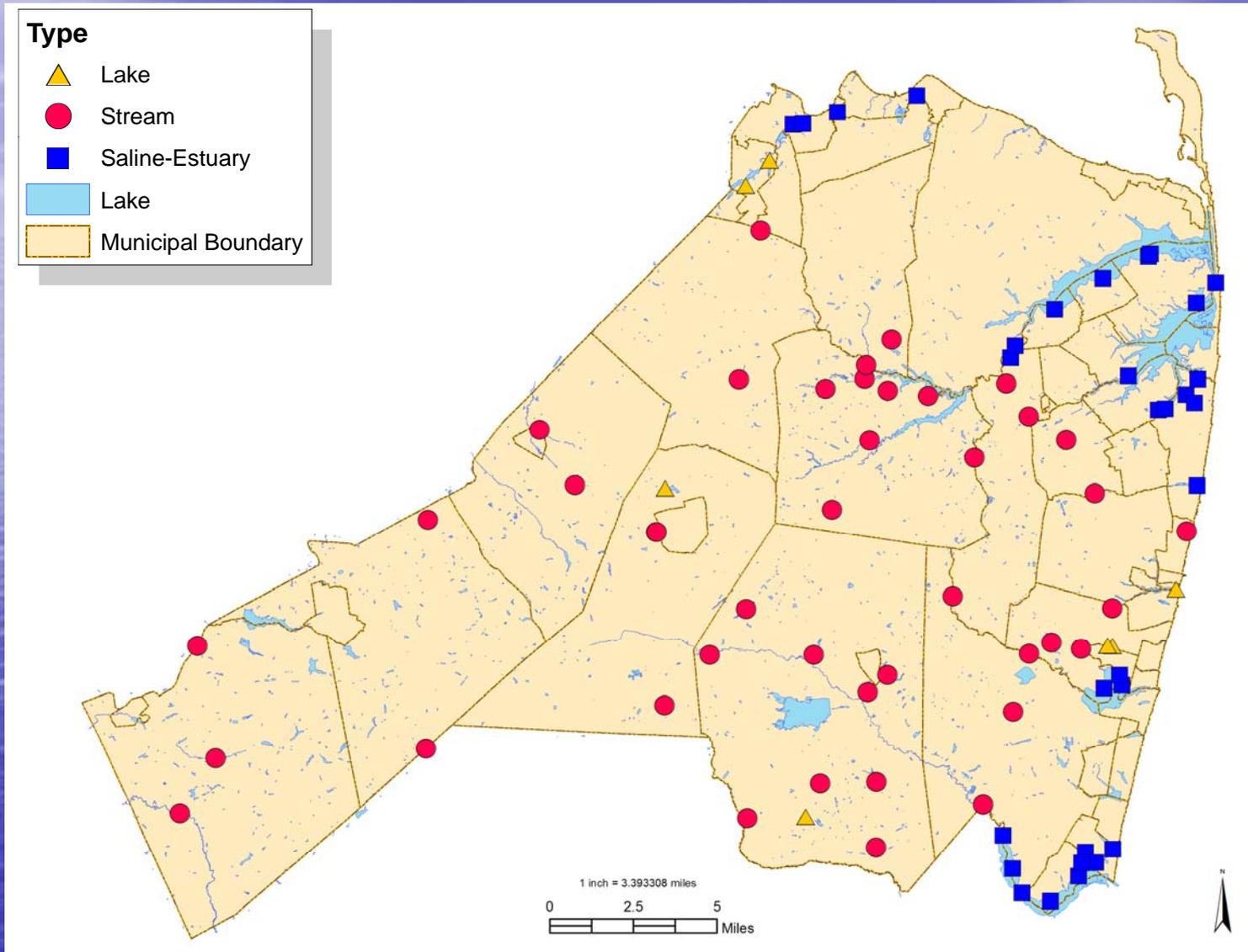
View from a desk...

- **The Big Four**

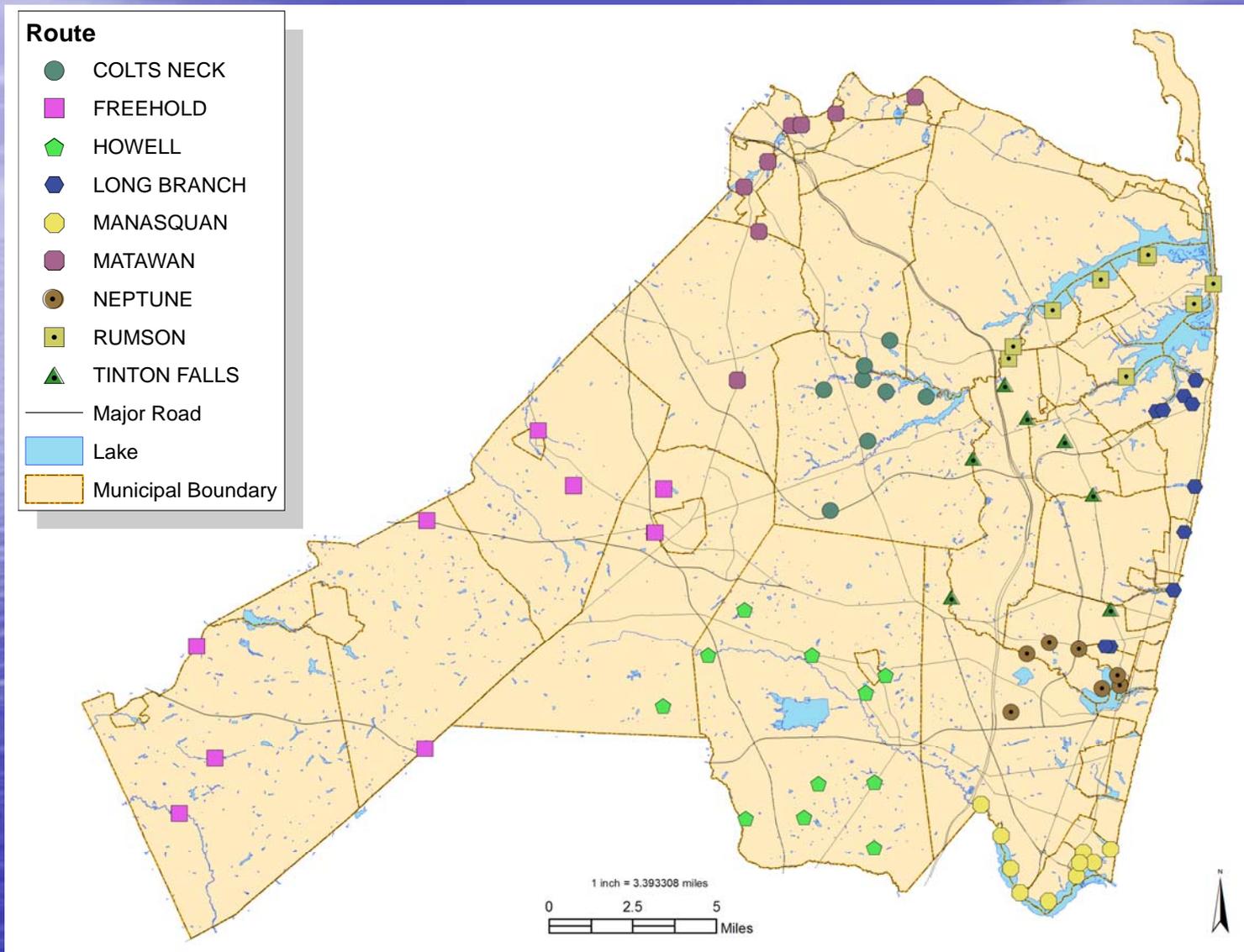
1. ArcGIS
2. Pictometry
3. Trimble GeoXH
4. ...iPod



Ambient Site Location Types - 2008



Sampling Routes - 2008



Sampling Parameters

- **Lakes**

- Ammonia
- Collection Date
- Dissolved Oxygen
- Ecoli
- Enterococci
- Fecal
- Nitrate Nitrogen
- pH
- Salinity (ppt)
- Site
- Specific Conductivity
- SWQS
- Temperature C
- Total Kjeldahl Nitrogen
- Total Phosphorous
- Total Suspended Solids
- Turbidity

- **Streams**

- Ecoli
- Enterococci
- Fecal
- pH
- Salinity (ppt)
- Specific Conductivity
- Temperature C
- Total Phosphorous
- Total Suspended Solids
- Turbidity

3. Total Suspended Solids (TSS) Versus Turbidity – 2007 Study

- Surface Water Quality Standards
 - Waterbody characterizations in Monmouth County

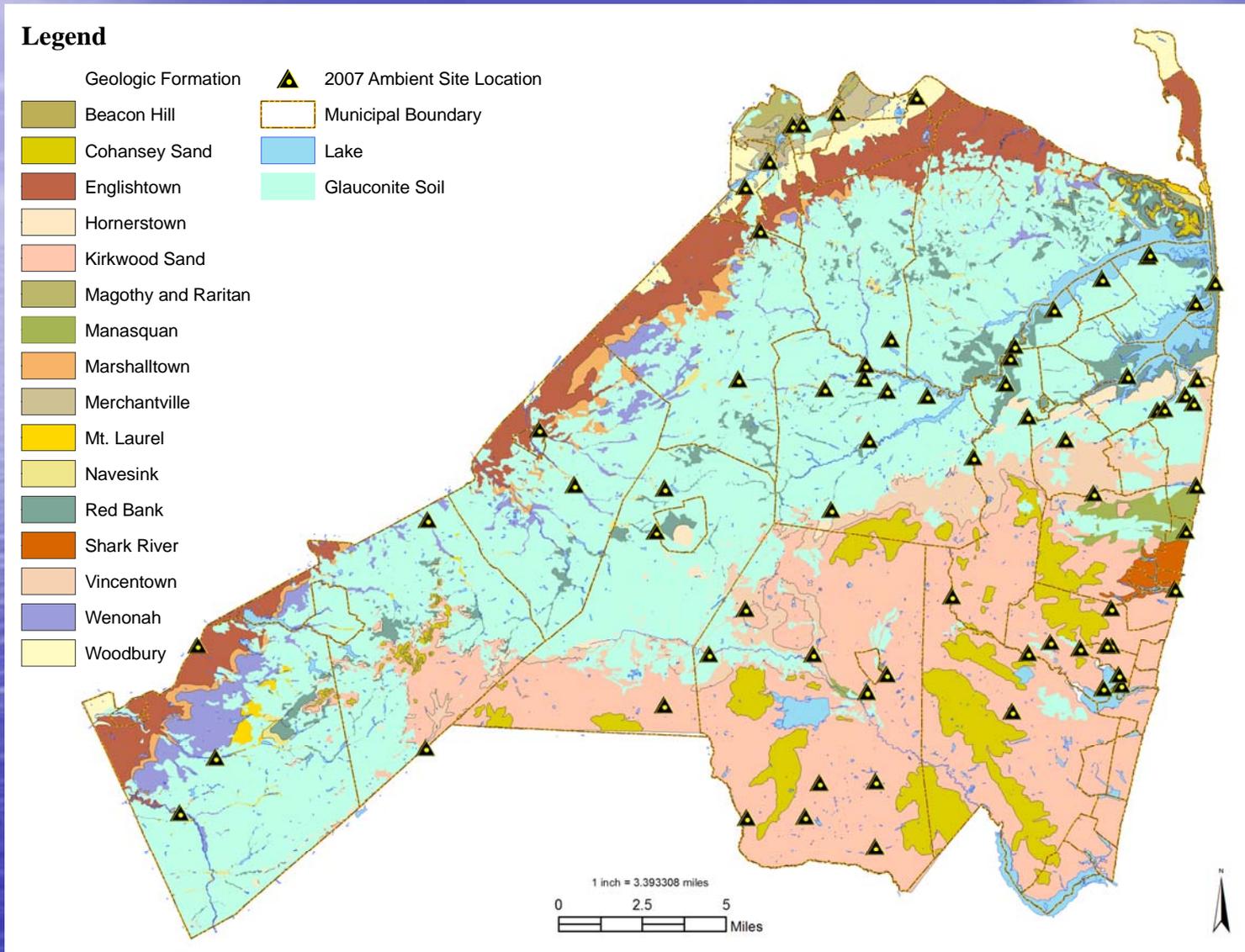
Category	Description	SWQS TSS Standard (mg/l)*	SWQS Turbidity Standard (NTU)**
FW2-NT	General fresh water, non-trout production	40	50 NTU
FW2-TM	General fresh water, trout maintenance	25	Avg 15, maximum 50
SE	Saline estuary	Suitability	30 NTU

2007 Exceedences

- Turbidity Mean value: 15 NTU
- TSS Standard: Non-Trout = 40 mg/l, Trout = 25mg/l
- Glauconitic Soils: Higher turbidity than Sandy Soils

SITE_#	SITE LOCATION	TSS	TURBIDITY	SWQS CAT	Soil Type
77	West Side Lake Alberta	19.6	25.50	FW2-NT	Kirkwood Sand
23	Mingamahone Brook	10.2	20.67	FW2-TM	Kirkwood/Glauconite
70	Shark River	5.4	19.50	FW2-TM/C1	Cohansey
24	Marsh Bog Brook	9.0	18.96	FW2-NT	Kirkwood/Glauconite
47	Troutman's Creek	57.6	18.20	FW2-NT/SE1	Glauconitic Soil
36	Chingarora Creek	14.0	17.70	FW2-SE1	Merchantville
35	Waackcaack Creek	14.6	17.15	FW2-SE1	Woodbury
76	East Side Lake Alberta	10.0	15.40	FW2-NT	Kirkwood Sand
69	Wemrock Brook	9.6	15.30	FW2-NT	Glauconitic Sand

Glaucconitic Soils



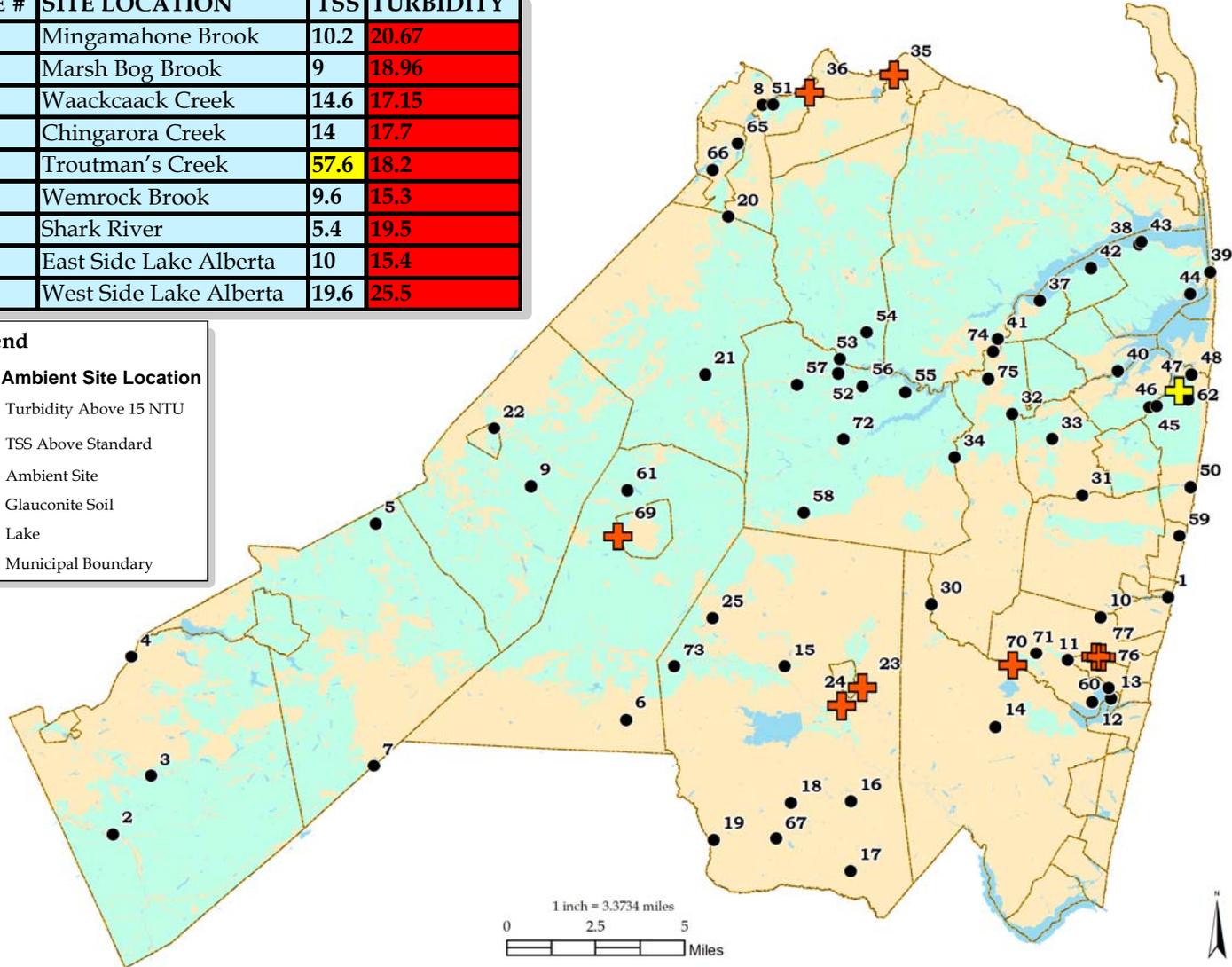
TSS/Turbidity Levels

SITE #	SITE LOCATION	TSS	TURBIDITY
23	Mingamahone Brook	10.2	20.67
24	Marsh Bog Brook	9	18.96
35	Waackcaack Creek	14.6	17.15
36	Chingarora Creek	14	17.7
47	Troutman's Creek	57.6	18.2
69	Wemrock Brook	9.6	15.3
70	Shark River	5.4	19.5
76	East Side Lake Alberta	10	15.4
77	West Side Lake Alberta	19.6	25.5

Legend

2007 Ambient Site Location

-  Turbidity Above 15 NTU
-  TSS Above Standard
-  Ambient Site
-  Glauconite Soil
-  Lake
-  Municipal Boundary



Anomalous Spikes

- Attributed to unusual and visually noticeable environmental events.
 - A heavy algae bloom of *Mycrocystis spp.* at a lake site was noted
 - High wind and wave action caused bottom sediment to re-suspend at an estuarine site
 - Normally high iron content, indigenous to Monmouth County soils, resulted in an iron bacteria biomass and attributed to a TSS and turbidity spike on a stream.

Exceedences

- Only One Site above TSS standard in 2007
- 2007: Lower TSS and Turbidity than usual
 - Turbidity levels still generally exceed TSS in freshwater



Conclusions

- Turbidity levels exceed TSS levels in freshwater
- TSS: should be re-evaluated as parameter of choice for watershed and Best Management Practice evaluation for streams in this region.

4. Other GIS Applications for Water Pollution Prevention Program

- Aids in response to water quality complaints
- GIS maps along with aerial photography are utilized to determine sources of sediment to streams

MCHD Poplar Brook Study

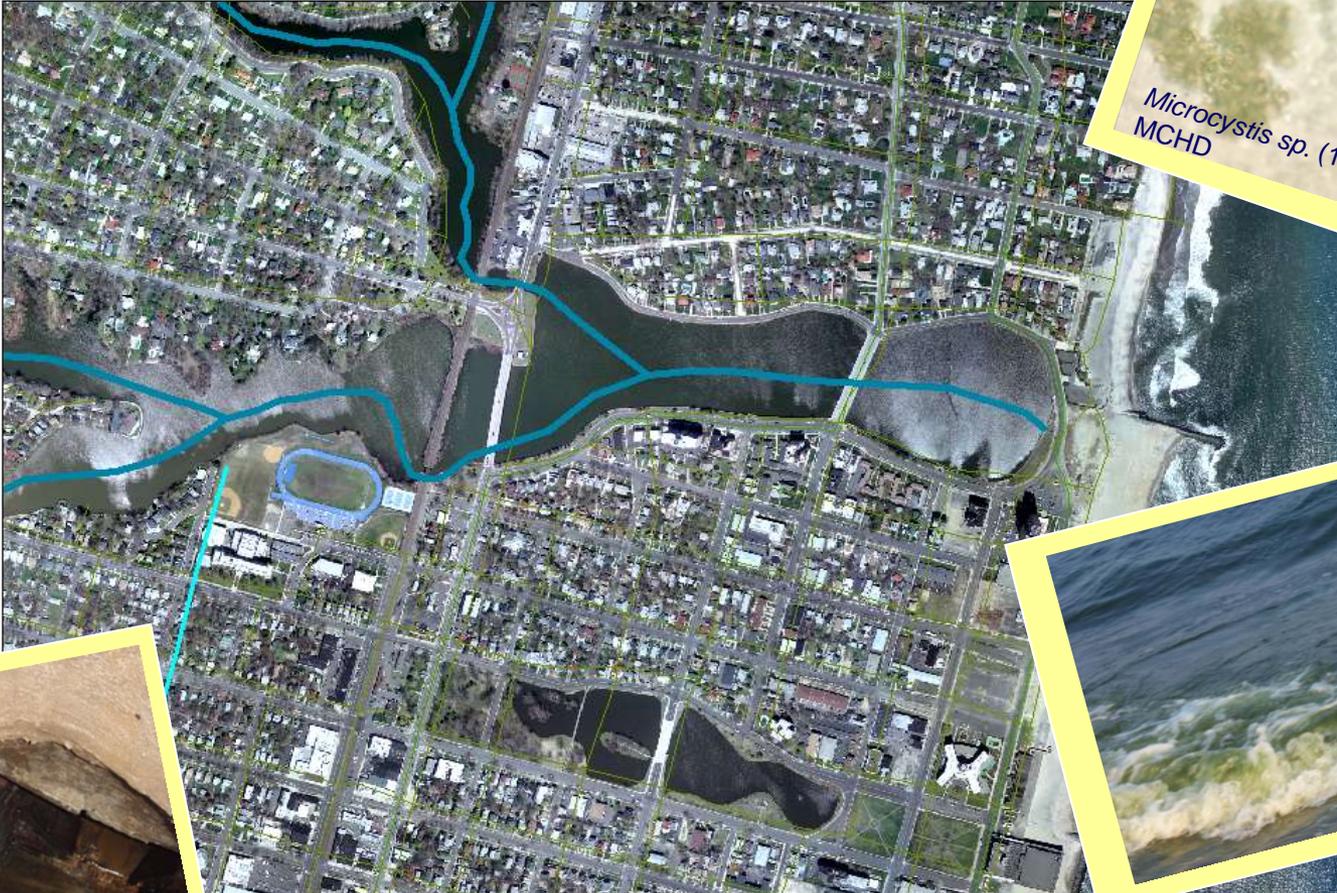


Condie 093008
3/water/ambient/poplarbrookstudy

Recent Example: Deal Lake



Deal Lake Microcystis Bloom & Optical Brightener work on Comstock Ave



Microcystis sp. (100x) PHOTO:
MCHD



C. Condie 06/05/2008
f:\vol1\gis\office2008\water\deal lake microcystis bloom

5. Future Plans...evolving...

- Route/Site modification
- Web-based – Google’s API, ArcServer
- “Just-in-time” packets for additional programs
 - Locational maps
 - Directions
 - Standard Operating Procedures
 - Notification Protocol
 - New Analysis procedures to compensate for staffing changes

Questions?

- Contact Information:

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