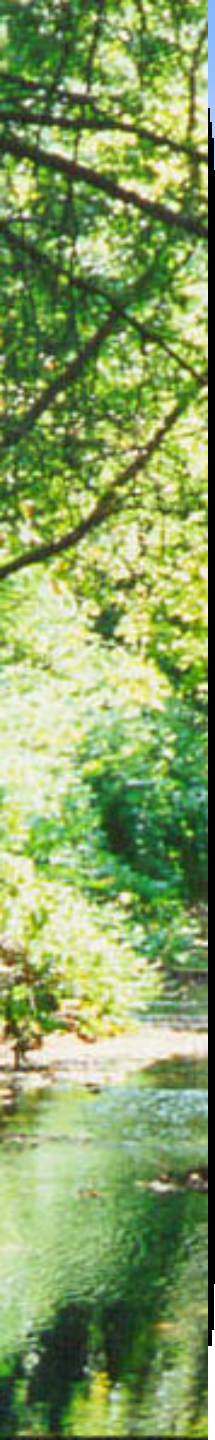


CLEAN WATER ATLANTA

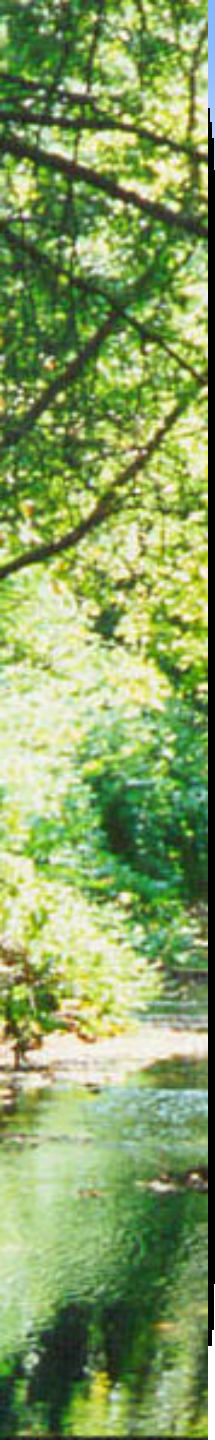
drinking water, stormwater, wastewater

Long-term Monitoring Program for the City of Atlanta

EMAP Conference 2004

May 6, 2004 - Newport, Rhode Island

CH2MHILL



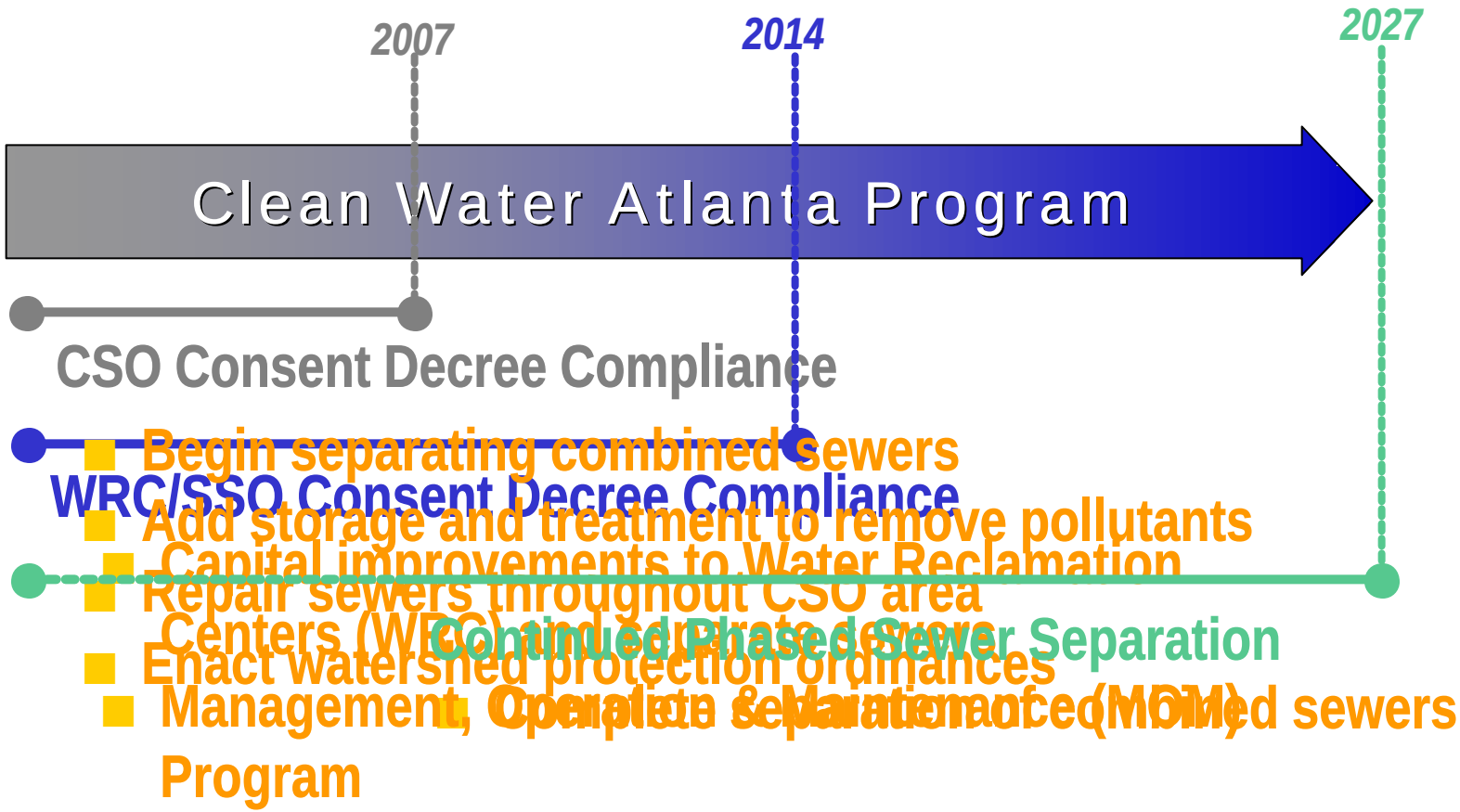
Overview

- Program Background
- Program Objectives
- Recommended Long-term Monitoring Program
  - Station selection and gage installation
  - Water quality monitoring
  - Biological monitoring
  - Data management
  - Watershed management plan
  - Public involvement
- Project Status and Available Results
- Summary and Conclusions

1995 Lawsuit Settled by Entry of Two Consent Decrees:

- Consent Decree - Sep 1998
  - led to development of a control plan that includes **storage/treatment** and **sewer separation** to reduce combined sewer overflows (CSOs)
- First Amended Consent Decree - Dec 1999
  - focused on improvements to **water reclamation centers** and **sewer rehabilitation** to reduce **I & I** leading to sanitary sewer overflows (SSOs)

Comprehensive Long-term Action Plan is a 25-year effort

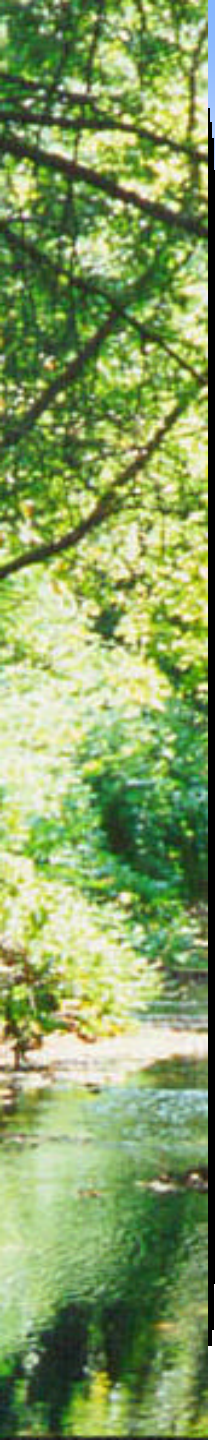


Mayor Shirley Franklin Introduces Five Point Plan (October 2002)

- Clean Water Atlanta (CWA) - a $3 Billion Program
  - Ensure professional management of the City's Consent Decree Projects
  - Reduce Flooding and pollution caused by storm water
  - Monitor water quality of major streams & rivers in Atlanta
  - Eliminate Sanitary Sewer Overflows (SSO)
  - Implement a Combined Sewer Overflow (CSO) solution that achieves high water quality, low costs and timely completion of Consent Decree obligations

Regulatory Drivers for Long-term Watershed Monitoring

- Replace event driven sampling associated with SSO Consent Decree requirements
- Consolidate other water quality program sampling requirements (NPDES)
- Satisfy Watershed Management Plan requirements
  - GA EPD Requirements associated with future wastewater discharge permit expansions



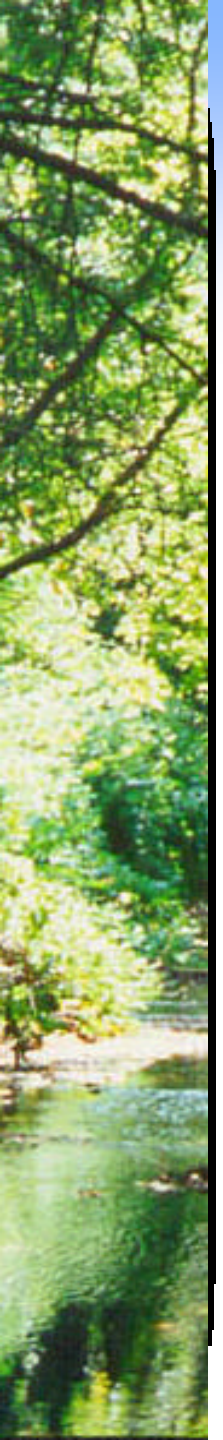
Other Objectives of Long-term Watershed Monitoring

- Assess baseline conditions
- Identify sources of impairment
- Document stream improvements
- Identify new programs to address streams requiring further action
- Provide public education on water quality

Recommended Long-term Monitoring Program

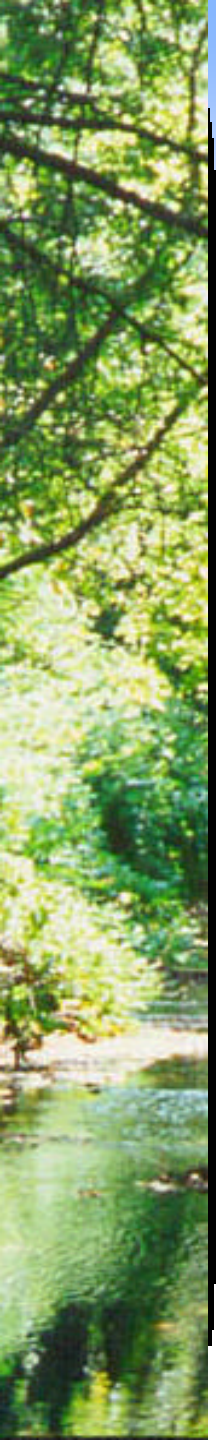
Program Components

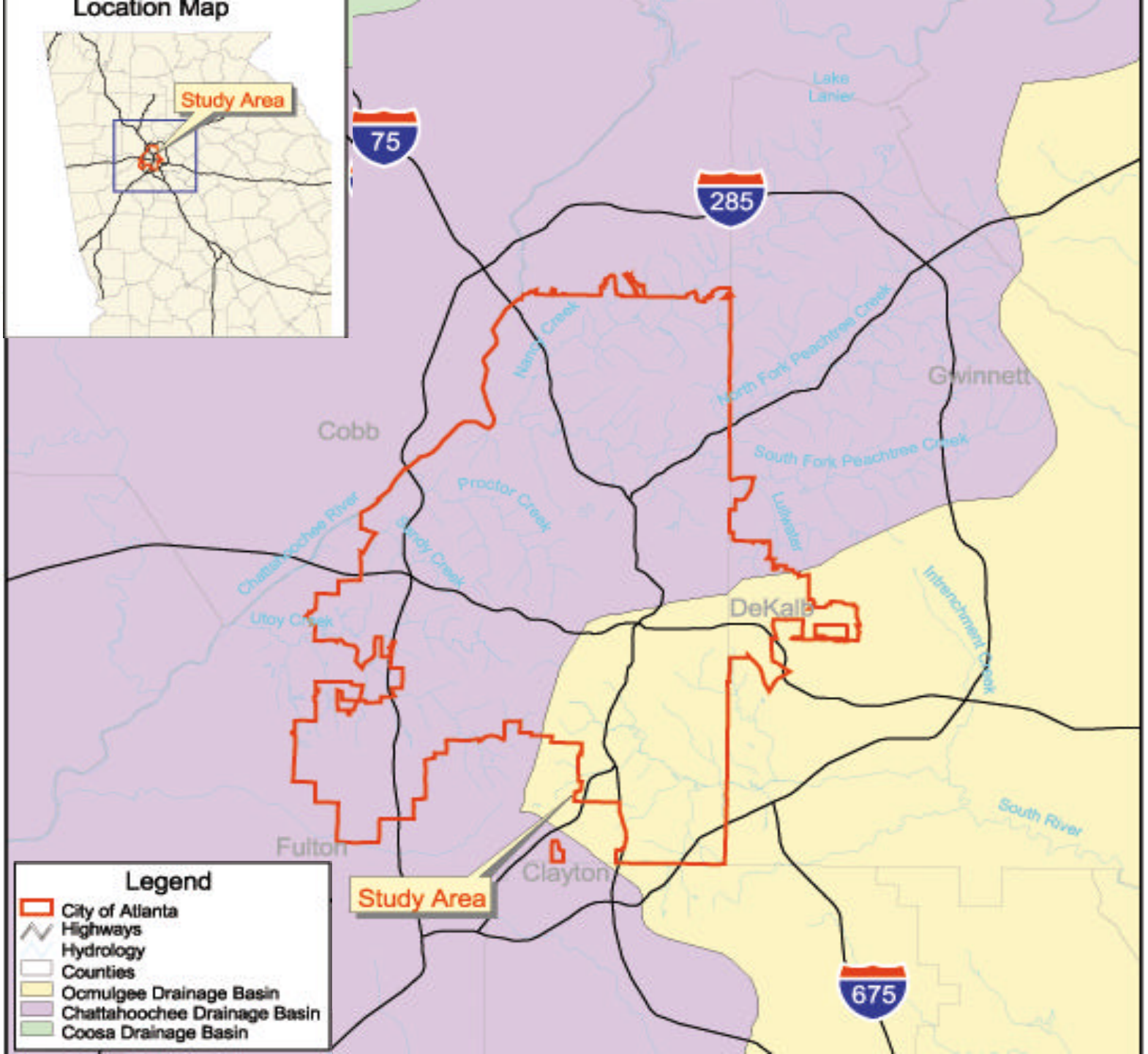
- Station selection & gage installation
- Water quality monitoring
- Biological monitoring
- Data management, analysis, and reporting
- Watershed management plan
- Public involvement

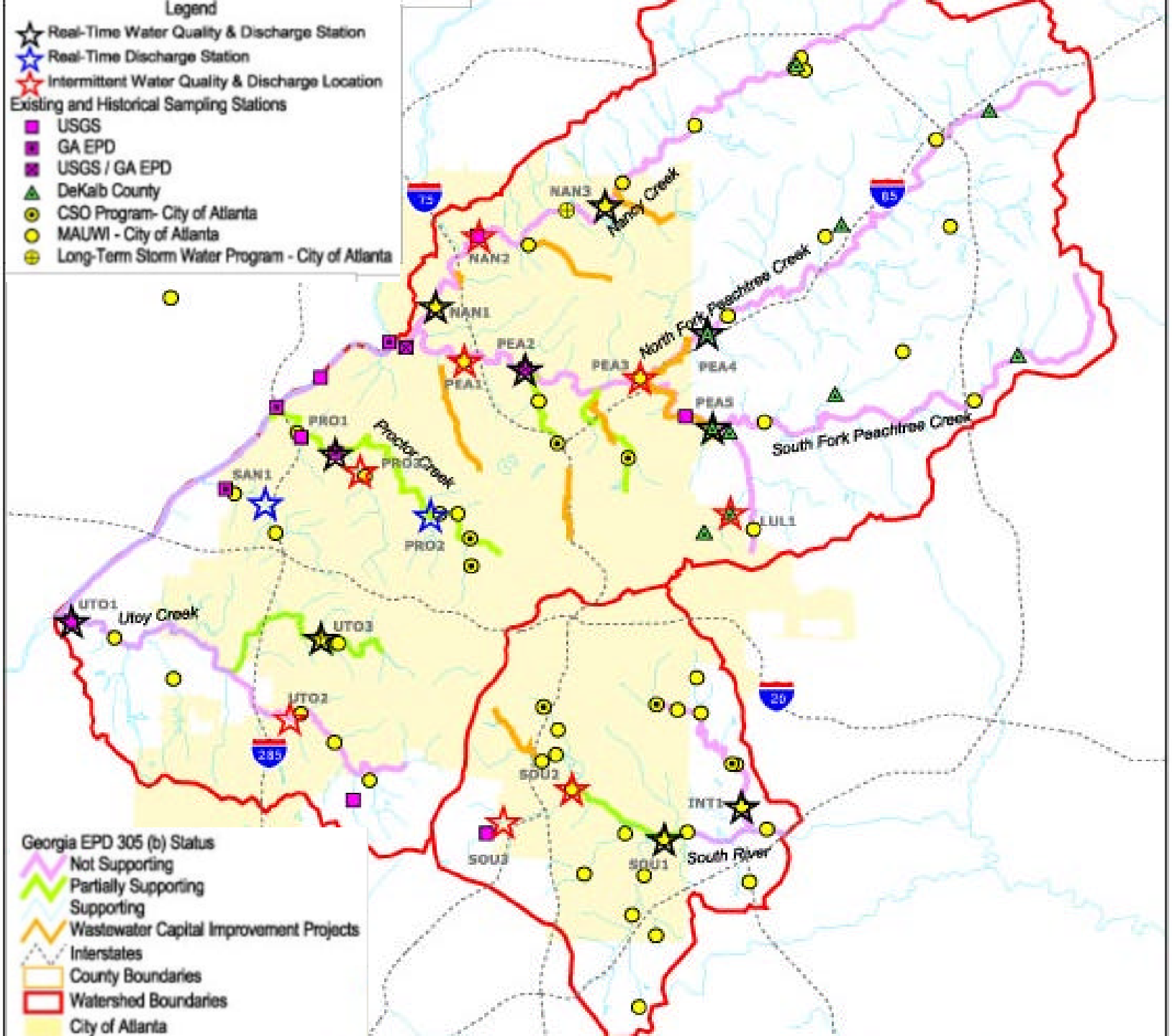


Station Selection

- Phase 1
  - Water quality status - GA EPD 303(d) list
  - Existing monitoring programs (COA, USGS, GA EPD, and adjacent counties)
  - Point source locations
  - Non-point sources (ARC land use)
  - City boundaries
  - Proposed water quality improvement projects (CIP projects)
- Phase 2
  - Field reconnaissance




Location Map
Study Area
75
285
675
Lake Lanier
Cobb
Gwinnett
DeKalb
Fulton
Clayton
Nancy Creek
North Fork Peachtree Creek
South Fork Peachtree Creek
Proctor Creek
Sandy Creek
Utoy Creek
Chattahoochee River
Intrenchment Creek
South River
Study Area
Legend
City of Atlanta
Highways
Hydrology
Counties
Ocmulgee Drainage Basin
Chattahoochee Drainage Basin
Coosa Drainage Basin

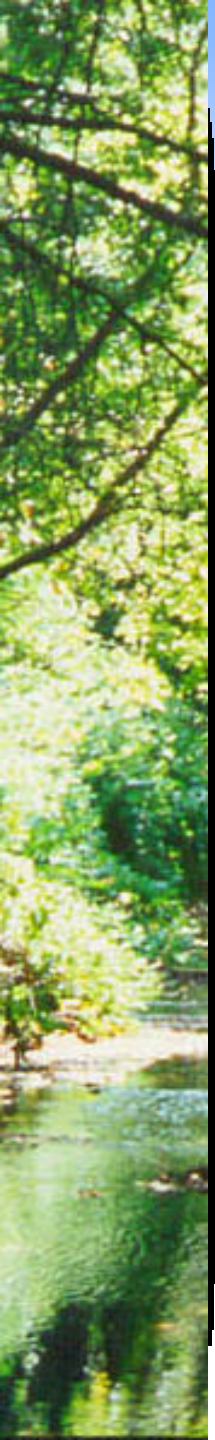

Legend
Real-Time Water Quality & Discharge Station
Real-Time Discharge Station
Intermittent Water Quality & Discharge Location
Existing and Historical Sampling Stations
USGS
GA EPD
USGS / GA EPD
DeKalb County
CSO Program- City of Atlanta
MAUWI - City of Atlanta
Long-Term Storm Water Program - City of Atlanta
Georgia EPD 305 (b) Status
Not Supporting
Partially Supporting
Supporting
Wastewater Capital Improvement Projects
Interstates
County Boundaries
Watershed Boundaries
City of Atlanta
NAN3
Nancy Creek
NAN2
NAN1
PEA2
PEA1
PEA3
North Fork Peachtree Creek
PEA4
PEA5
South Fork Peachtree Creek
PRO1
Proctor Creek
PRO3
SAN1
PRO2
LUL1
UTO1
Utoy Creek
UTO3
UTO2
SOU2
INT1
SOU3
SOU1
South River
75
85
20
285

Recomme

Strea

- Total
  - 10 re
  - 2 re
  - 8 in

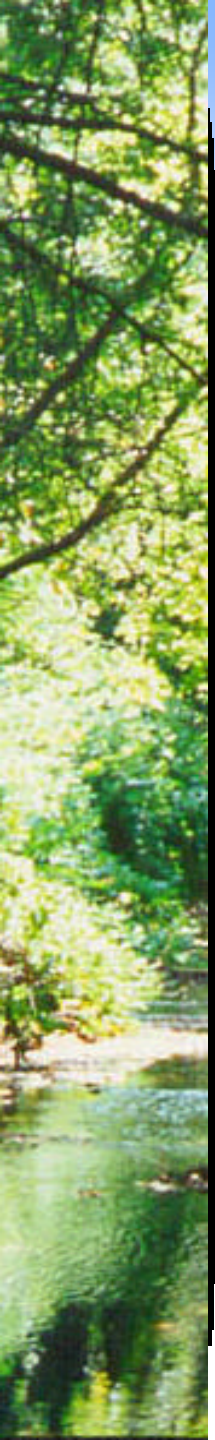
  stati
- USGS
  install



Recommended Program

Water Quality Sampling

- Hydrologically-based sampling using USGS protocols (12 samples/year)
  - Depth- and width-integrated
  - Grab
  - Storm
  - Synoptic
- USGS to initially collect and analyze water quality samples
- CWA Program and City staff to assist in sampling



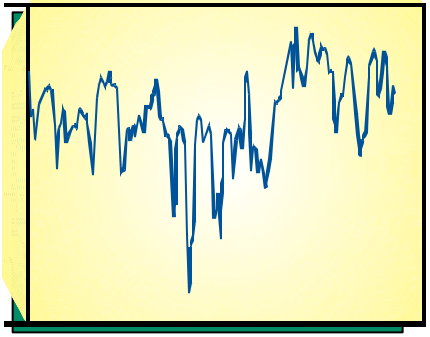
Recommended Program

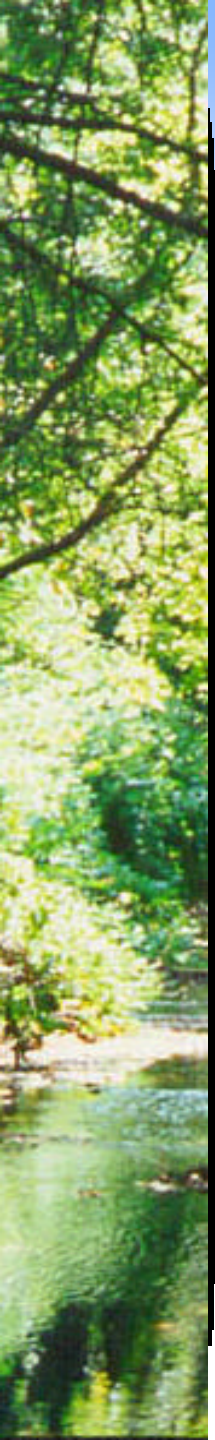
“Health” of a stream includes...

Habitat

Biology

Water Quality

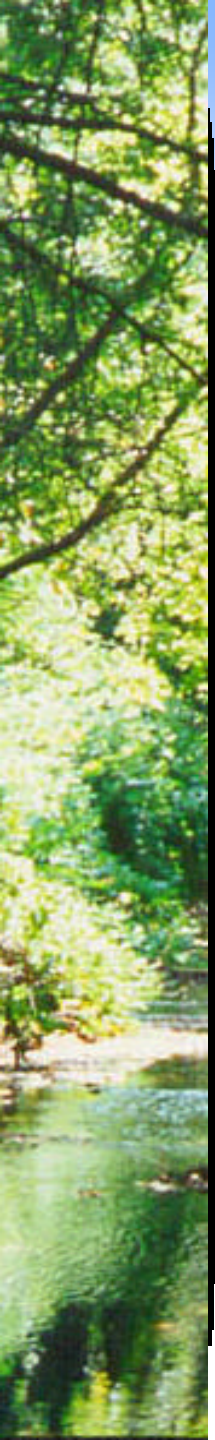




Recommended Program

Biological Monitoring

- Biannual biological monitoring using State approved methods
  - **Habitat** assessments
  - **Fish** and **macroinvertebrate** community assessments
- Scoring protocol has recently transitioned from the use of a reference station to a “fixed” criteria:
  - located in the **same ecoregion**
  - selected from **least disturbed** streams & watersheds

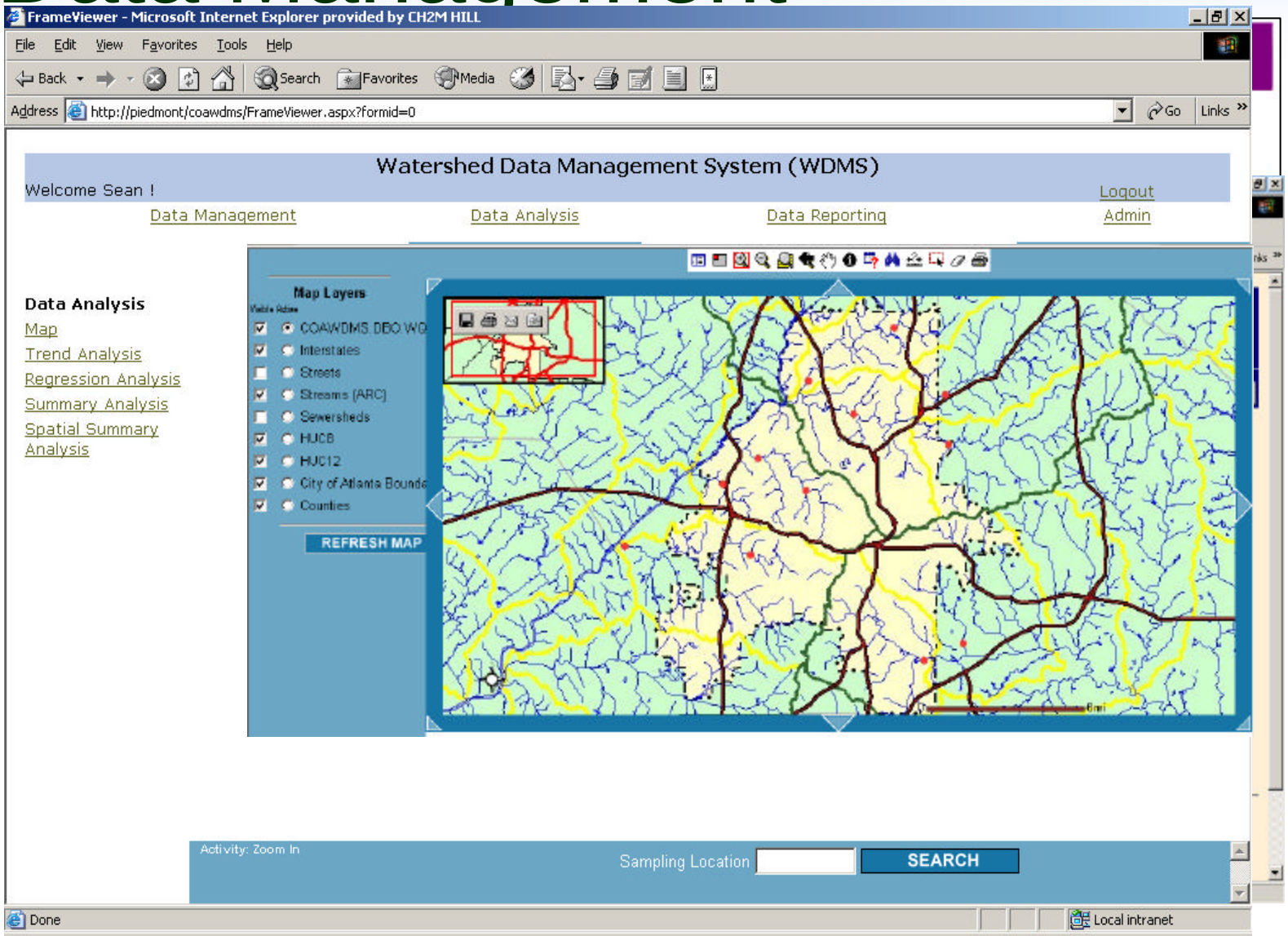


Recommended Program

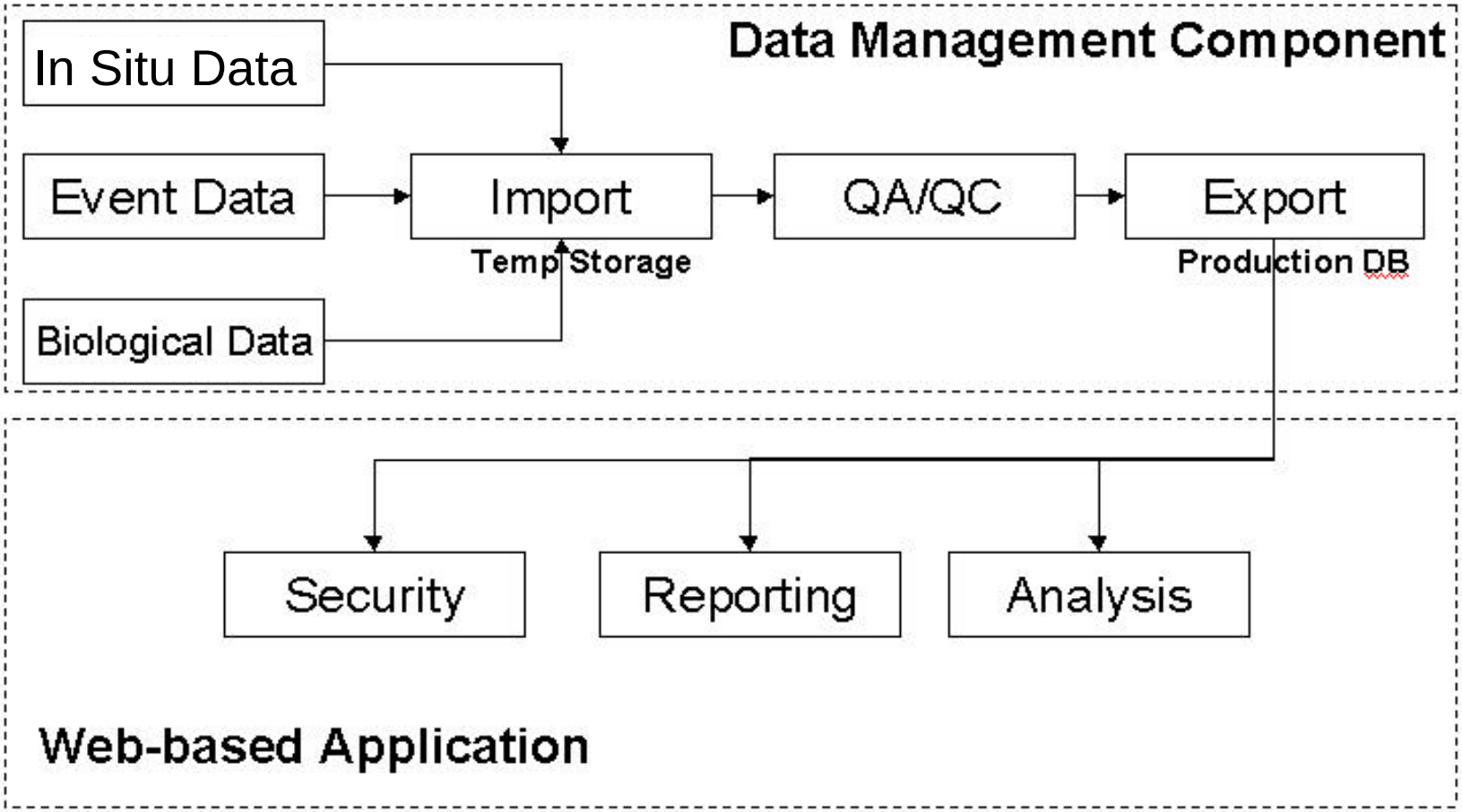
Biological monitoring uses multiparameter protocols

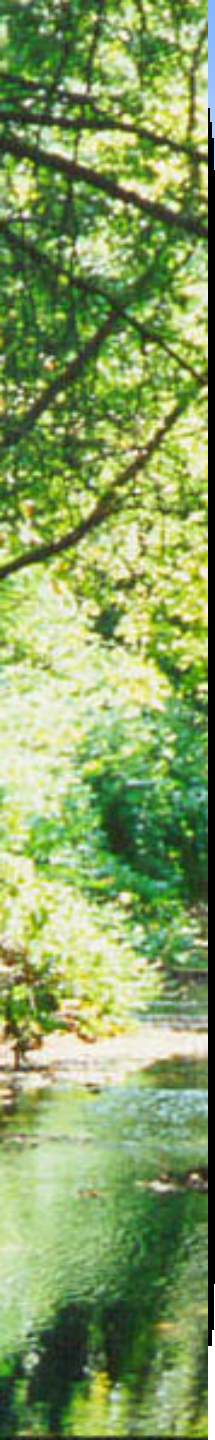
- Stream habitat
  - GADNR standard operating procedures
  - Uses a one-to-one comparison to a reference condition
- Benthic macroinvertebrates
  - GADNR/EPA RBP-III
  - Expectation criteria developed based on five sample stations evaluated by GAEPD
- Fish
  - EPA RBP-V/ Index of Biotic Integrity
  - Uses a reference database

Data Management



Application Flow Diagram





Recommended Program

Watershed Data Management System (WDMS) will allow the City to...

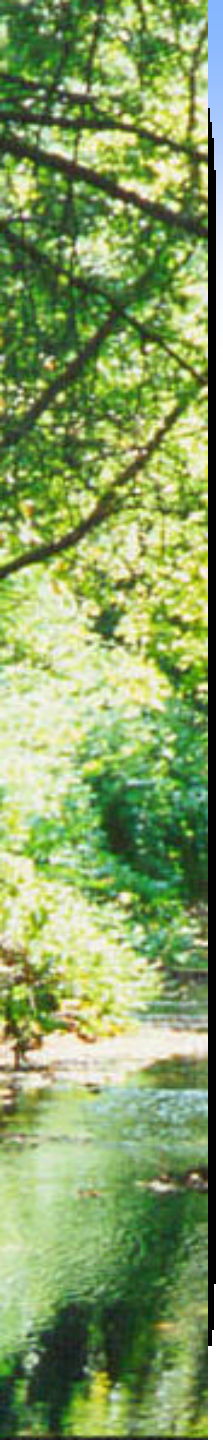
- Import data c
  various sourc
- Perform data
  - Trend and cor
  - Statistical Ana
  - Spatial Analys
- Satisfy repor

GA Environmental Protection Division Annual Report

Station Name	CH1	**Road Crossing**	Brock Rd
Major Tributary	Suwannee Creek	**Drainage Basin**	Chattahoochee Basin
Stream Name	Jacks Creek		

In-Situ Data	Flow (CFS)	DO (mg/L)	Temp (Deg C)	Turbidity (NTU)	Conductivity (ms/cm)	pH (std units)
Count	2	3	2	2	2	2
Average	4.35	5.67	14.00	39.50	15.00	6.5
Minimum	3.30	1.00	13.00	30.00	15.00	6.5
Maximum	5.40	8.00	15.00	49.00	15.00	6.5
Std Deviation	1.48	4.04	1.41	13.44	0.00	0.0
Dry Mean	5.40	8.00	13.00	49.00	15.00	6.5
Wet Mean	3.30	4.50	15.00	30.00	15.00	6.5

Laboratory	TSS (mg/L)	TP (mg/L)	TKN (mg/L)	NH3-N (mg/L)	NO2+NO3-N (mg/L)	Fecal C. (#/100ml)	BOD (mg/L)
Count	2	2	2	2	2	3	2
Average	40.50	1.51	1.10	0.75	0.55	630	12.50
Minimum	22.00	0.81	0.59	0.40	0.30	0	8.00
Maximum	59.00	2.20	1.61	1.10	0.81	1,380	17.00
Std Deviation	26.16	0.98	0.72	0.49	0.36	698	6.36
Dry Mean	22.00	0.81	0.59	0.40	0.30	510	8.00
Wet Mean	59.00	2.20	1.61	1.10	0.81	690	17.00



Recommended Program

Watershed Management Plan

- Phase 1
  - Update MAUWI Study based on current land use
- Phase 2
  - Water quality modeling
  - Update impacts assessment
  - Evaluate watershed management scenarios
  - Develop watershed management plan

Public Involvement

- The public involvement program consists of three components:
  - Stakeholder committee
  - Fact Sheets
  - Speaker's Bureau
- In addition, a Technical Advisory Committee (TAC) provides oversight

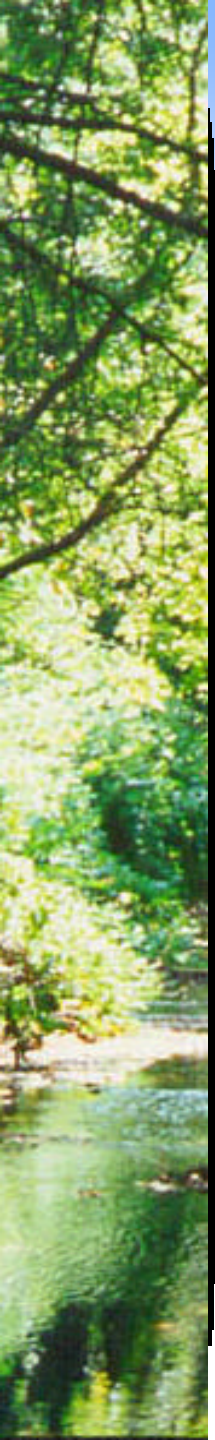
Project Status
and
Initial Results

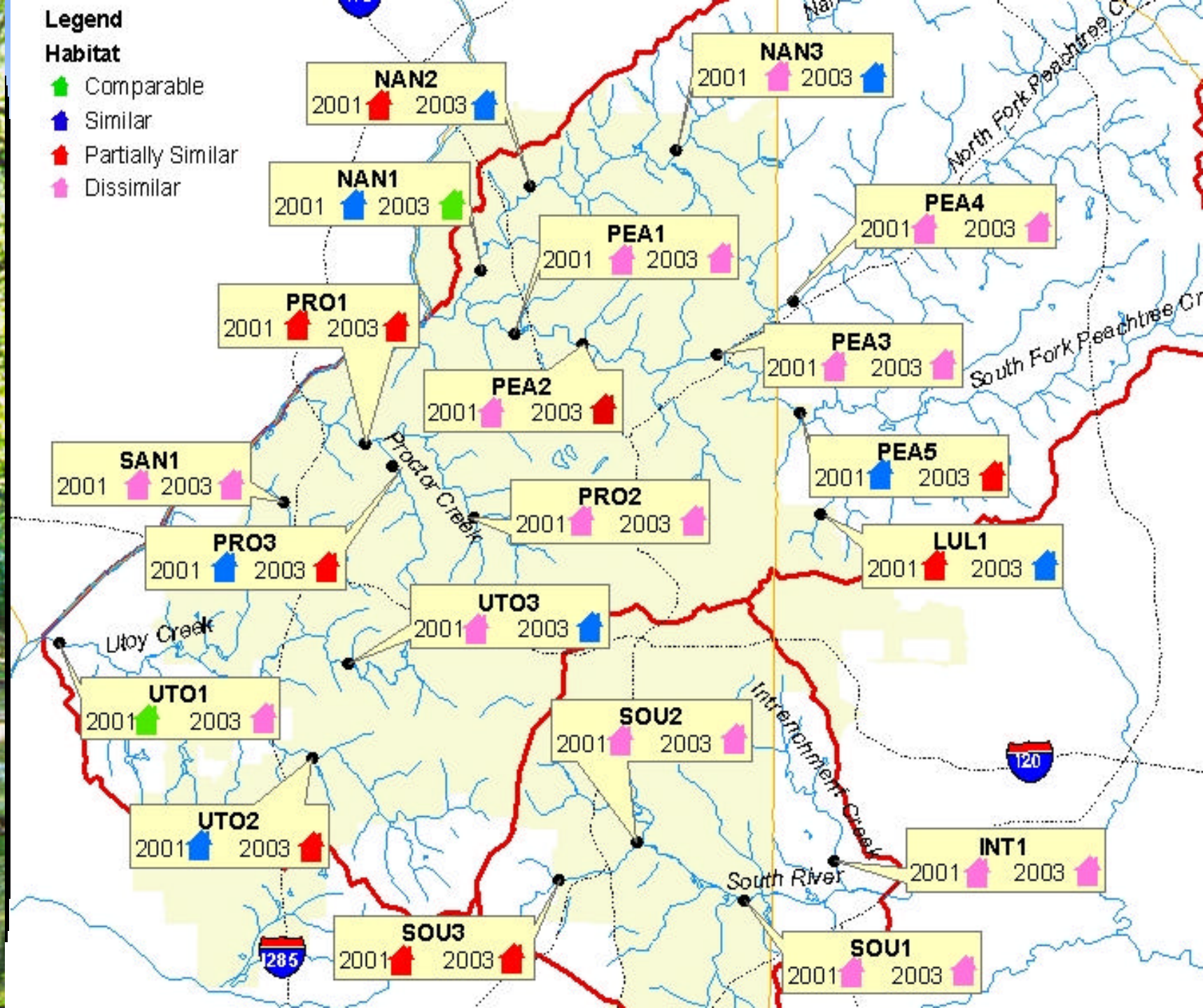
Current Project Status

- Installation of **real-time monitors** is complete
- **Water quality sampling** began in June 2003
- **Biological sampling** was initiated in December of 2001, and was conducted again in October of 2003
- **Management Plan** will be completed once one year of data has been collected (Winter 2004)
- Presented **recommended program** and selected monitoring stations to:
  - **Stakeholders** in December 2001
  - TAC in April 2003
  - Fully Initiated in June 2003

Habitat assessments continues showing signs of urbanization

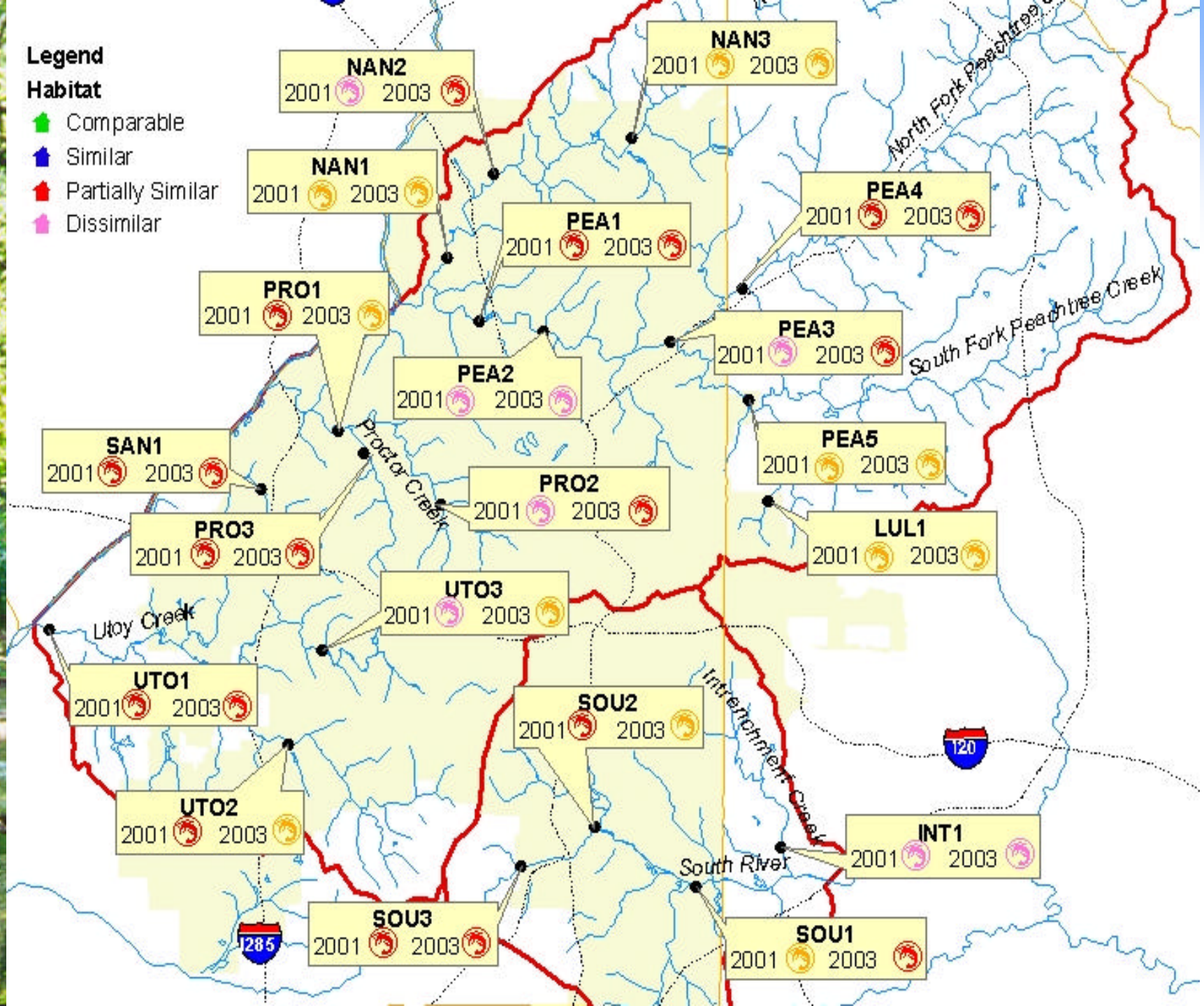
- With widespread signs of degradation found at nearly all 20 stations
  - 9 stations were rated “dissimilar”, 6 stations were rated “partially similar”, 4 stations were rated “similar”,1 station was rated “comparable to reference”
- Several parameters were consistently rated as poor, including:
  - riparian buffer zones
  - bank vegetative protection
  - bank stability
  - embeddedness




Legend
Habitat
Comparable
Similar
Partially Similar
Dissimilar
NAN2 2001 2003
NAN3 2001 2003
NAN1 2001 2003
PEA1 2001 2003
PEA4 2001 2003
PRO1 2001 2003
PEA3 2001 2003
PEA2 2001 2003
SAN1 2001 2003
PEA5 2001 2003
PRO2 2001 2003
PRO3 2001 2003
LUL1 2001 2003
UTO3 2001 2003
UTO1 2001 2003
SOU2 2001 2003
UTO2 2001 2003
INT1 2001 2003
SOU3 2001 2003
SOU1 2001 2003
North Fork Peachtree Cr
South Fork Peachtree Cr
Proctor Creek
Utoy Creek
Intrenchment Creek
South River
120
285

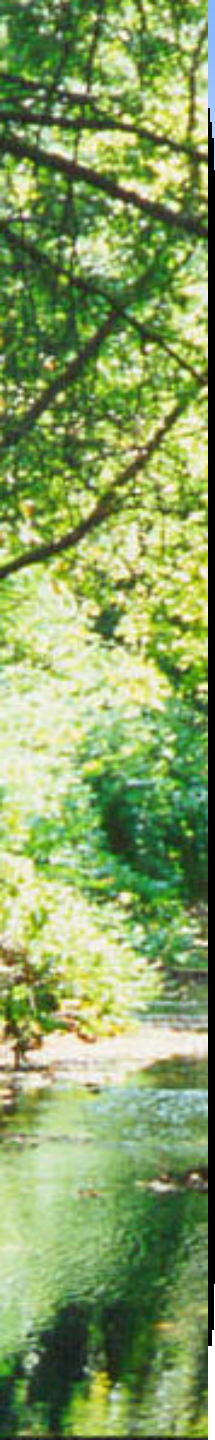
Macroinvertebrate communities also show signs of impact

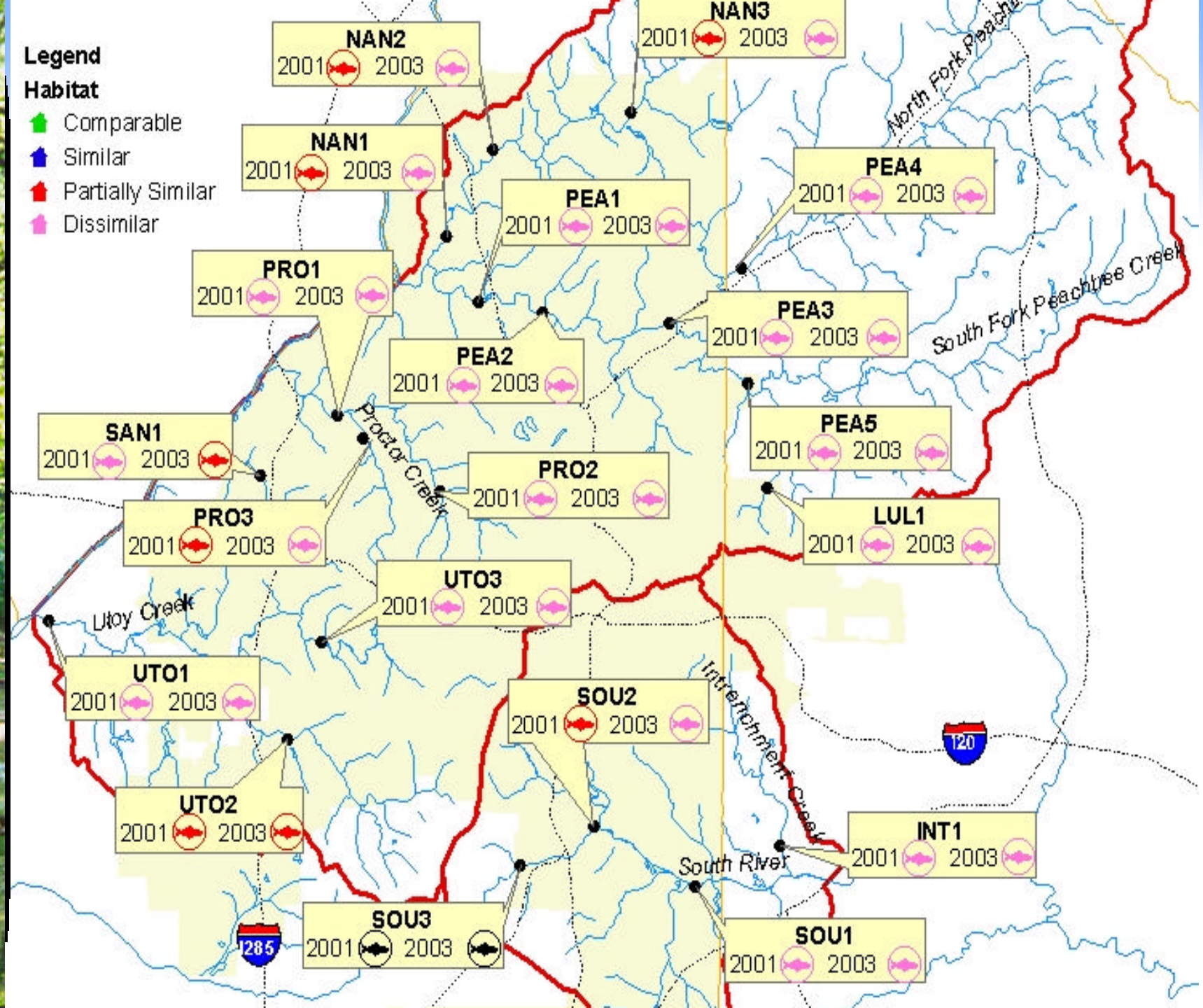
- The biotic integrity was rated “very poor” at 2 stations, “poor” at 10 stations
- The greatest number of taxa found was 43 (UTO-2) and the least umber of taxa found was nine (SOU-3). The average number of species found was 29.
- Very few sensitive species were noted during the analysis

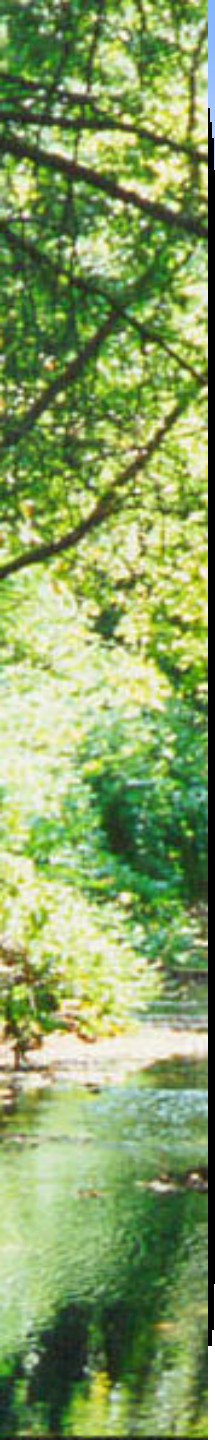

Legend
Habitat
Comparable
Similar
Partially Similar
Dissimilar
NAN2 2001 2003
NAN3 2001 2003
NAN1 2001 2003
PEA1 2001 2003
PEA4 2001 2003
PRO1 2001 2003
PEA3 2001 2003
PEA2 2001 2003
SAN1 2001 2003
PEA5 2001 2003
PRO2 2001 2003
PRO3 2001 2003
LUL1 2001 2003
UTO3 2001 2003
UTO1 2001 2003
SOU2 2001 2003
UTO2 2001 2003
INT1 2001 2003
SOU3 2001 2003
SOU1 2001 2003
North Fork Peachtree Creek
South Fork Peachtree Creek
Proctor Creek
Utoy Creek
Intrenchment Creek
South River
I20
I285

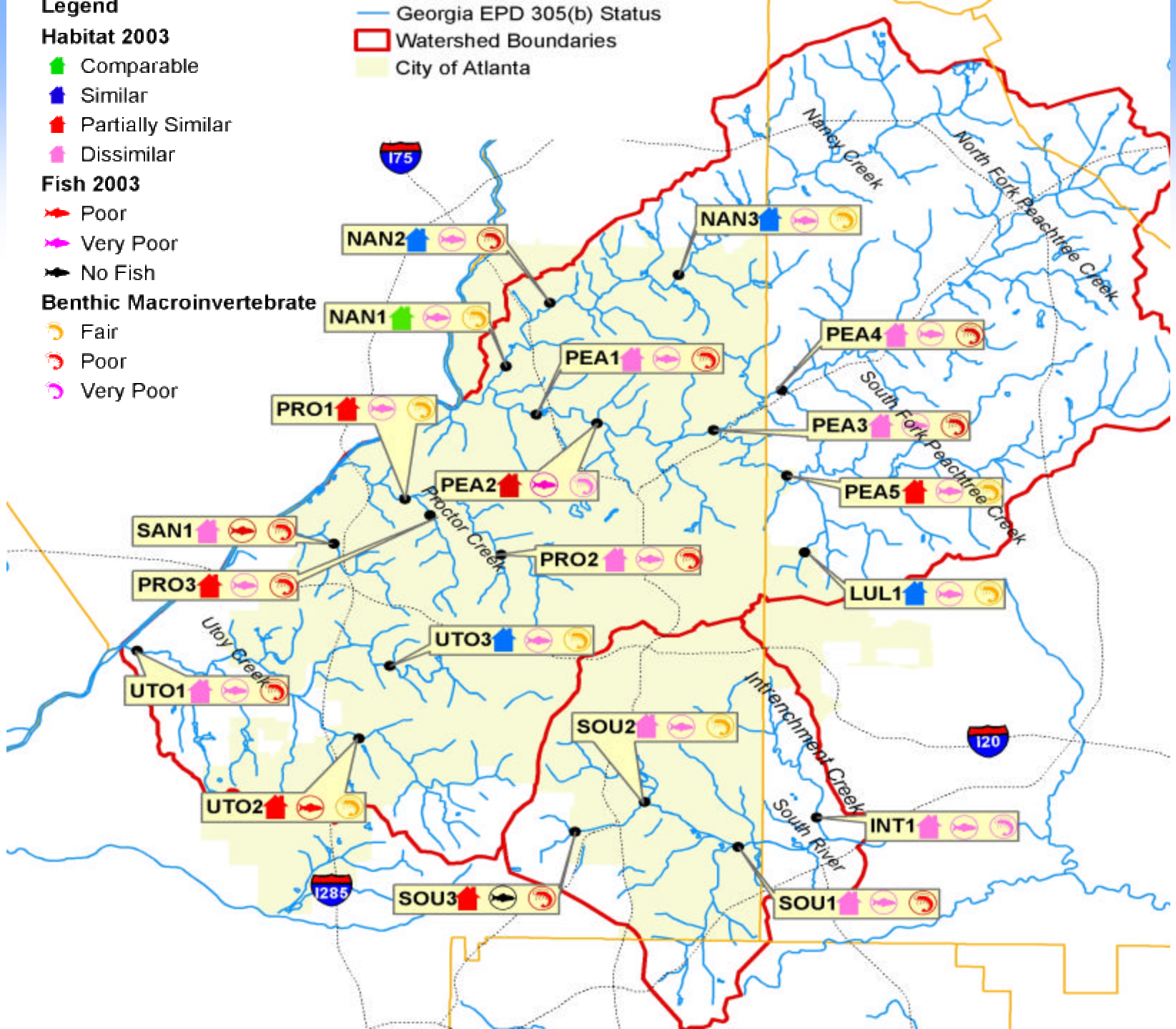
Fish community analysis also impacted

- 28 fish species and one hybrid were found during the sampling
- Species richness was greatest among tolerant groups (i.e., minnows, sunfishes and basses, suckers, and catfishes)
- 14 stations rated “very poor” and 2 “poor”, and in the Chattahoochee Basin
- 3 stations rated “very poor”, and 1 “no fish” in the South River Basin




Legend
Habitat
Comparable
Similar
Partially Similar
Dissimilar
NAN2
2001 2003
NAN3
2001 2003
NAN1
2001 2003
PEA1
2001 2003
PEA4
2001 2003
PRO1
2001 2003
PEA3
2001 2003
PEA2
2001 2003
SAN1
2001 2003
PEA5
2001 2003
PRO2
2001 2003
PRO3
2001 2003
LUL1
2001 2003
UTO3
2001 2003
UTO1
2001 2003
SOU2
2001 2003
UTO2
2001 2003
INT1
2001 2003
SOU3
2001 2003
SOU1
2001 2003
North Fork Peachtree
South Fork Peachtree Creek
Proctor Creek
Utoy Creek
Intrenchment Creek
South River
120
1285




Legend
Habitat 2003
Comparable
Similar
Partially Similar
Dissimilar
Fish 2003
Poor
Very Poor
No Fish
Benthic Macroinvertebrate
Fair
Poor
Very Poor
Georgia EPD 305(b) Status
Watershed Boundaries
City of Atlanta
I75
I20
I285
NAN1
NAN2
NAN3
PEA1
PEA2
PEA3
PEA4
PEA5
PRO1
PRO2
PRO3
SAN1
UTO1
UTO2
UTO3
SOU1
SOU2
SOU3
INT1
LUL1
Nancy Creek
North Fork Peachtree Creek
South Fork Peachtree Creek
Proctor Creek
Utoy Creek
Intrenchment Creek
South River

Summary and Conclusions

Summary of Program Design

- Designed to:
  - **consolidate multiple existing requirements** into a single, comprehensive monitoring strategy,
  - **determine baseline conditions** to establish trends and help **demonstrate improvement** in water quality and/or biotic integrity,
  - potentially **develop new programs** to address **identified sources of impairment**, and
  - **provide reliable data** consistent with on-going regional monitoring networks.

Long-term Monitoring Program for the City of Atlanta

Questions? Comments?