"New Technology for Hydrologic Features"

Implementing the National Hydro Dataset (NHD)

At High Resolution (1:2400) in New Jersey

2008 National Monitoring Conference
Atlantic City Convention Center, Atlantic City NJ
May 21st, 2008

Geographic Information Technology by the

New Jersey Department of Environmental Protection

Lawrence L. Thornton, MS Bureau of GIS

NJDEP

Quick Agenda

- High Resolution Imagery and Hydro Delineation
- Hydro at 1:24000 and New Jersey's 1:2400
- Adopting and conforming to NHD
- Conflation and attribution
- Linking to Water Data through Event Tables
- Query the water features and monitoring data LIVE!!
- Monitoring data supporting the GeoWeb

2002 Aerial Photography

- Digital imagery produced by BAE/ADR.
- Keystone Aerial Surveys conducted the flyover.
- Images produced at 1:2,400 scale, 1 ft. pixel resolution, ground accuracy of +/- 4 ft.
- Imagery is available as an image service or for individual tile download through the NJ State Clearinghouse – NJGIN

2002 Hydro Delineations

- Work was contracted to Aerial Information Systems (AIS) -- Redlands, CA.
- Hydrography linework was done in conjunction with the 2002 land use/land cover update

Previous GIS projects undertaken by AIS for State of NJ include:

- Land Use/Land Cover 1986

- Land Use/Land Cover 1995/97

Statistics of Change:

Original Hydro from DLG's © 1986

vs.

Streams 2002 (1:2,400)

Real Numbers:

- Almost 6,000 new miles of stream delineated in New Jersey.
- Over 90,000 new segments were added.

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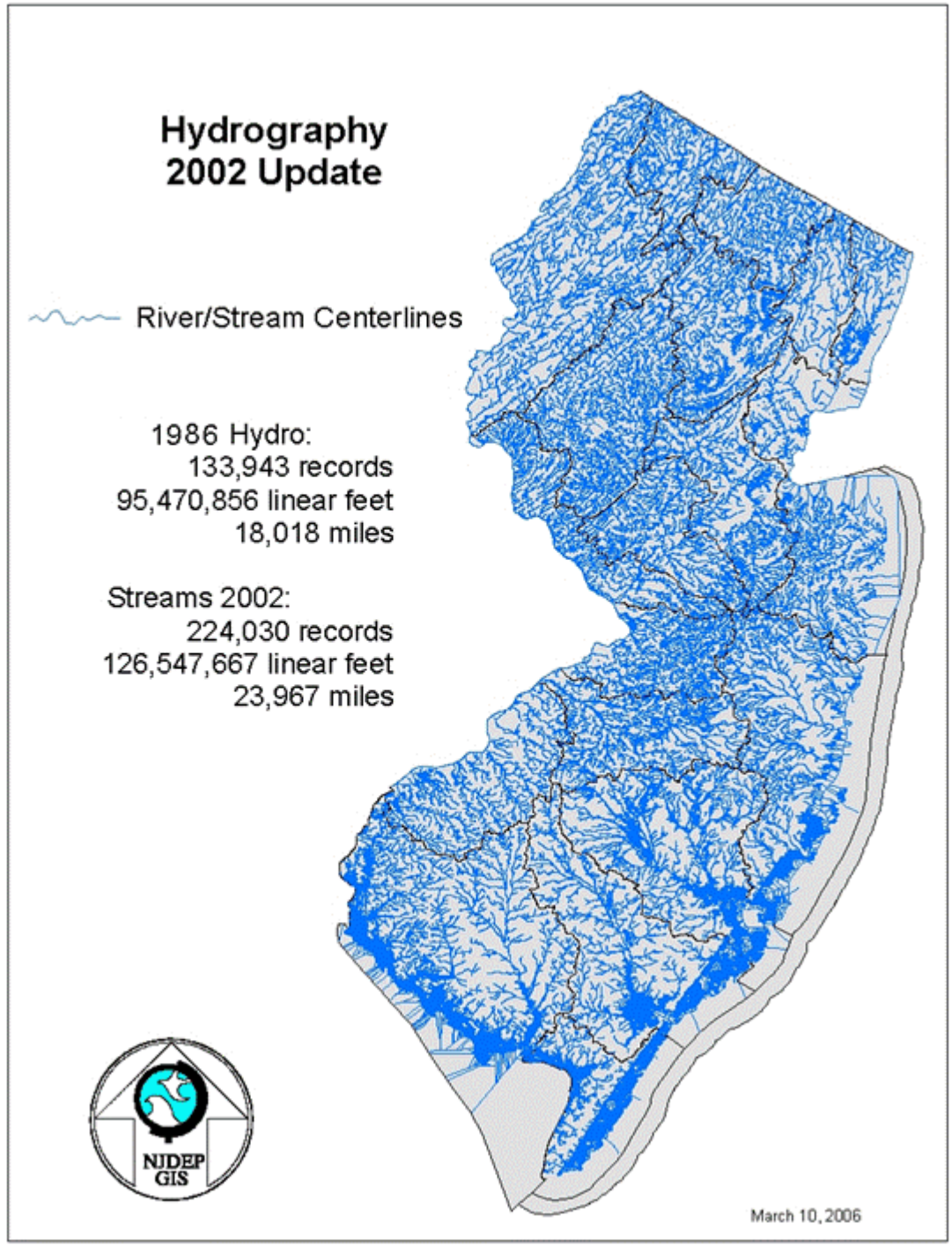
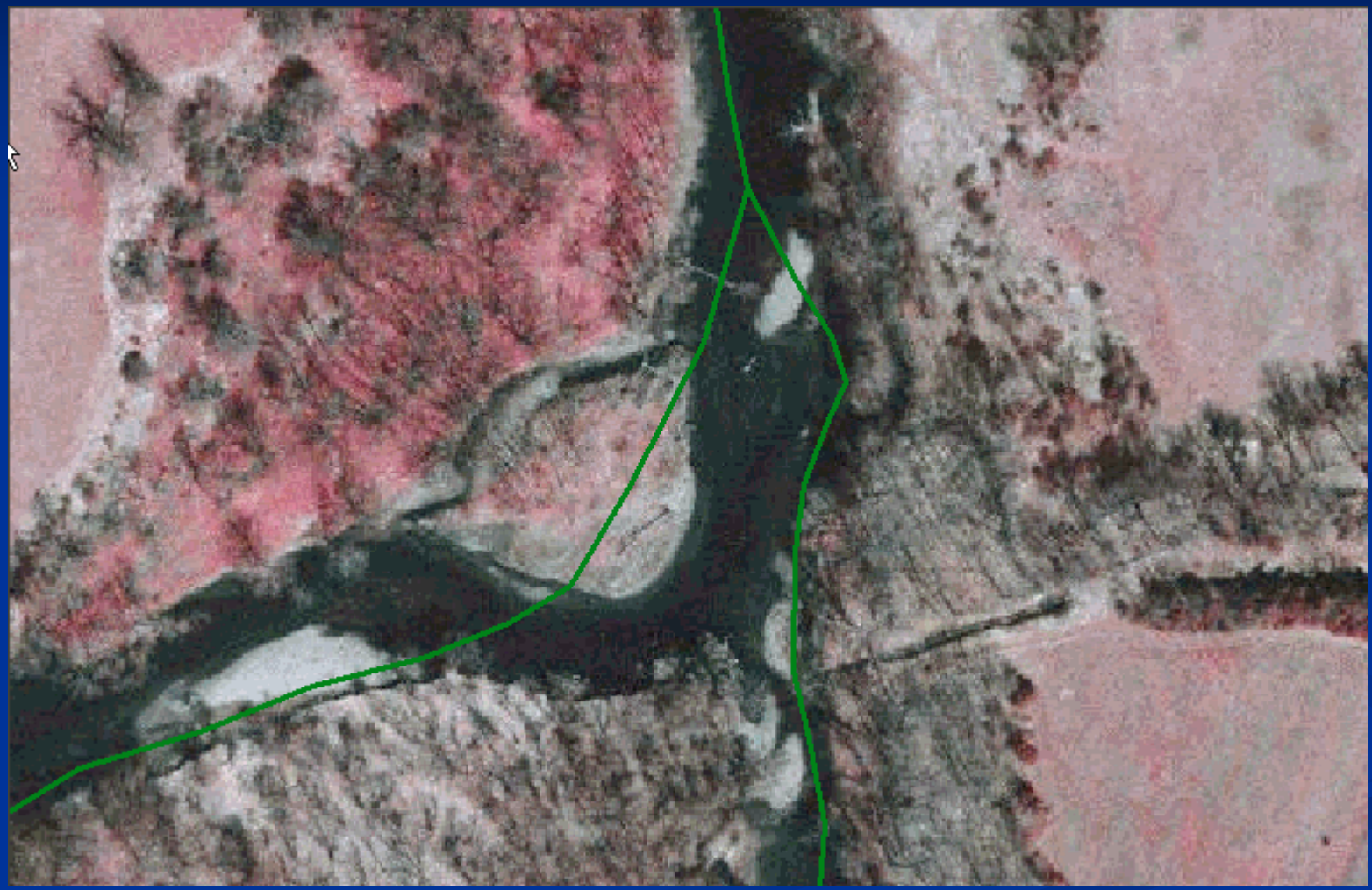


1986 Hydrogrpahy (DLG's)



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1:24,000 NHD

2002 Hydrography 1:2,400

1995/97 Lakes & Streams

New 2002 Lakes & Streams

Why NHD?

- Conforming to a federal standard for hydrography which improves interaction between reporting partners: NJDEP and EPA/USGS.
- Furthering NJDEP's investment in framework data to contribute to the National Spatial Data Infrastructure (NSDI).
- NHD is a spatial model that can provide internal links to various events critical to statewide needs. Eg. Surface Water Quality Standards, Volunteer Water Monitoring Points, etc.

Why NHD, con't.

- NHD Compliant stream linework includes a Reach code – or an identifier designated for each individual stream in the country.
- NHD also includes other important attributes such as GNIS names, flow direction and feature types.
- Streams and waterbodies in NHD are topologically linked to create a robust data collection and searching tool.

Tasks for NHD Conflation

- Attributes from NJDEP 2002 Streams will need to be replaced with NHD required attributes.
- NJDEP and USGS will agree on a crosswalk from State-produced data that accurately presents NJ's surface water features in an NHD format.
- New Reach codes will be assigned to stream segments that were not delineated until now.
- Update USGS with new 2002 NHD compliant local resolution data (1:2400 will replace 1:24,000)

1) Load NJDEP Network into NHD Compliant GeoDataBase

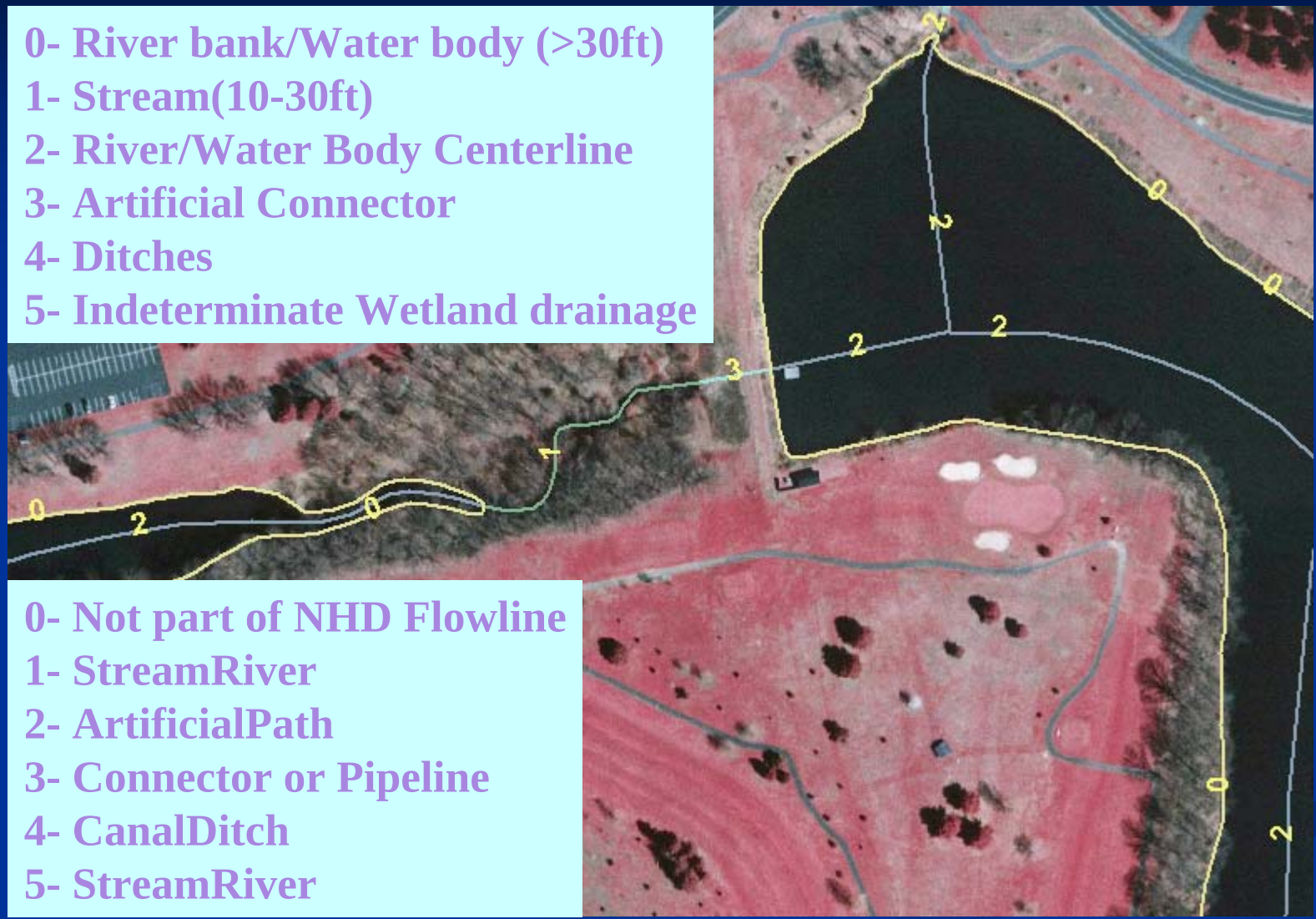
2002 NJDEP LU/LC codes

0- River bank/Water body (>30ft)
1- Stream(10-30ft)
2- River/Water Body Centerline
3- Artificial Connector
4- Ditches
5- Indeterminate Wetland drainage

Crosswalk

NHD FCodes

0- Not part of NHD Flowline
1- StreamRiver
2- ArtificialPath
3- Connector or Pipeline
4- CanalDitch
5- StreamRiver



2) Conflate NHD Attributes from 1:24000 to New NHD Compliant 1:2400

The Pilot:

- Implement NHD using one HUC8 watershed in central New Jersey
  - Conflate NHD24K attributes to NHD 2400.
  - Update compliant codes to 2400
    - COMID
    - Reach
    - GNIS ID and Name
    - Other codes

New Jersey NHD Project Status: May 2008

1. Networked with other states to share experiences and determine the best way forward.

2. Signed NHD stewardship (MOU) agreement with USGS.

3. Received training from USGS to use their NHD GeoConflation tool.

4. USGS agreed to conflate the 1:2400 pilot HUC 8.
   Pilot currently in production.

Integrating Spatial NHD 1:2400 Hydro Network with Live Database Reports

1. Integrate NJDEP Ambient Water Programs (7) data to one standardized Oracle database (ongoing).

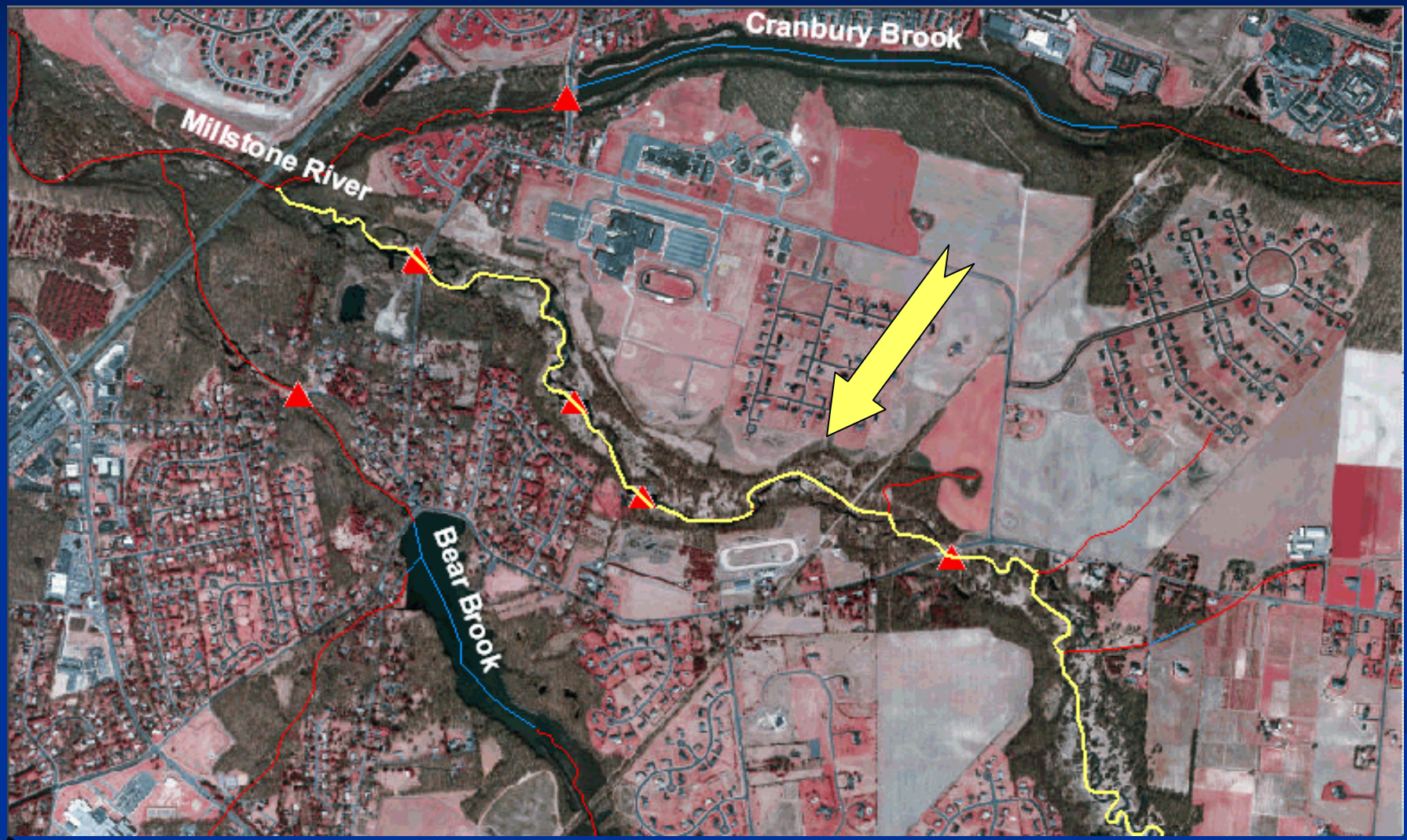
2. Link Ambient Water Database parametric data to NHD Compliant 1:2400 features.

3. Link will allow users to:
   - Query monitoring points
   - Identify TMDL segments
   - Identify SWQS segments
   - Provide spatial data and database info live
   - Allow queries in a spatial viewer or in the database

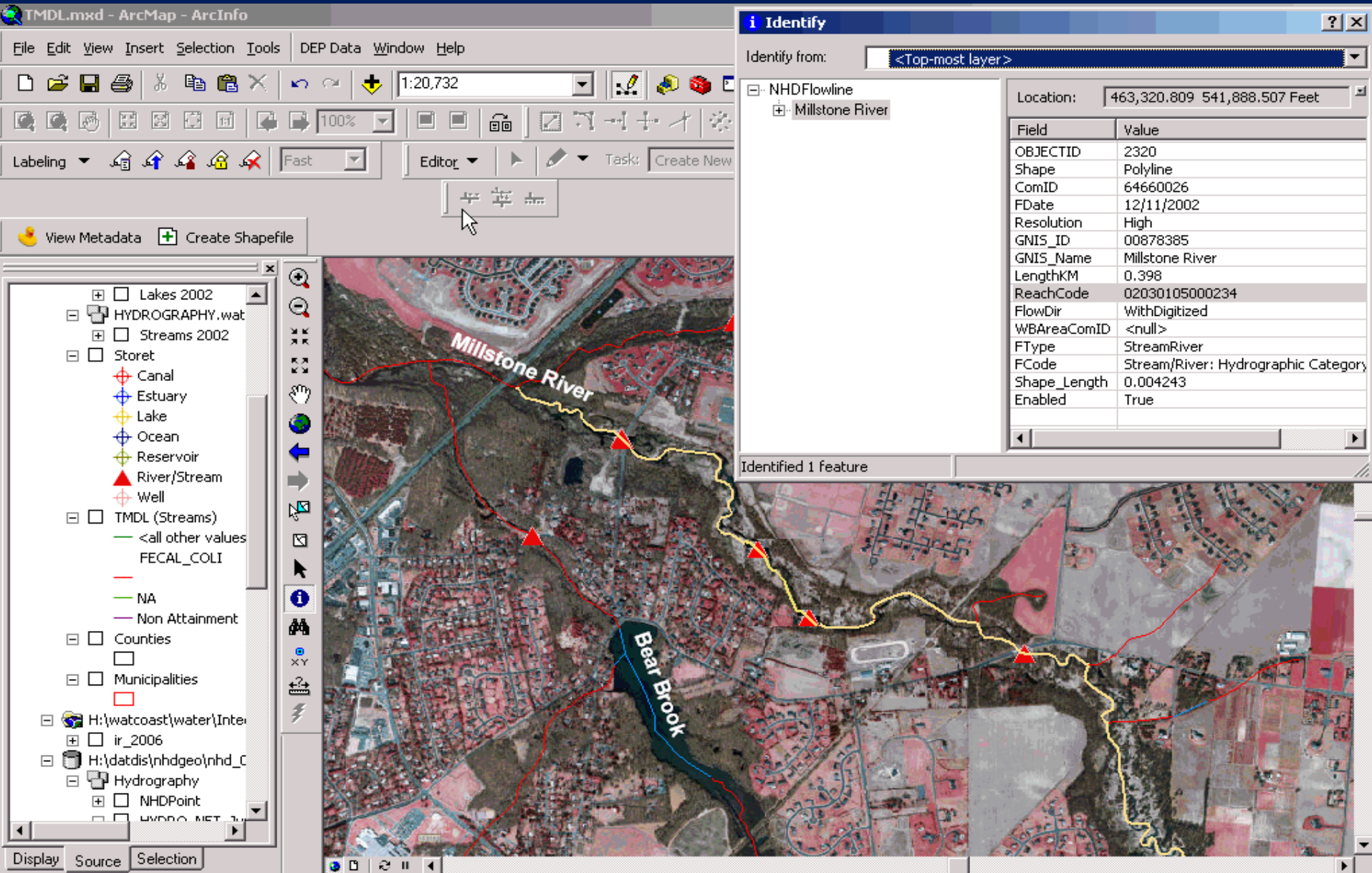
4. Ambient Water Oracle database will supply EPA's WQX through NJ Node.

How will the link work?

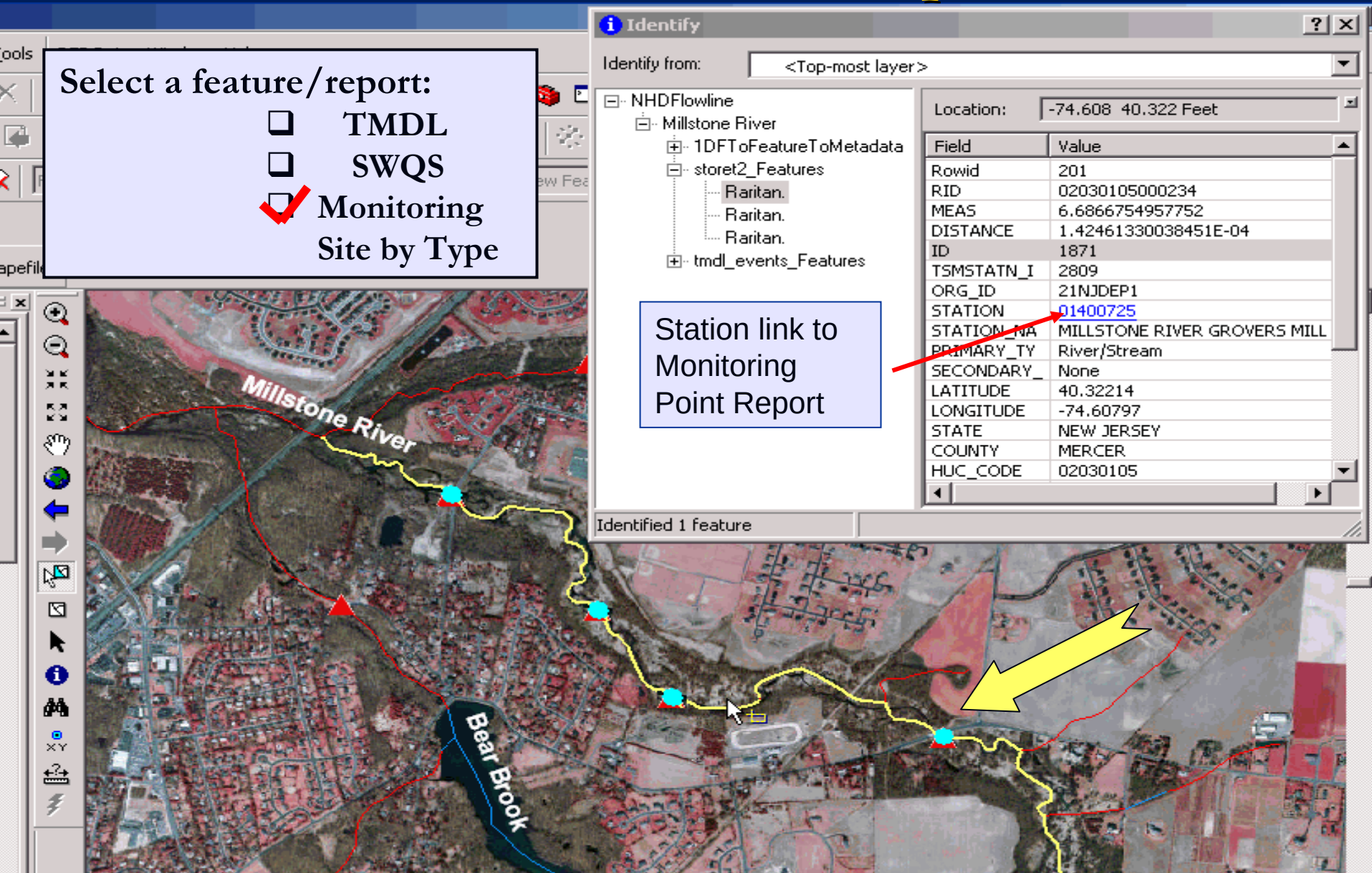
Select a watercourse segment in the GIS Viewer



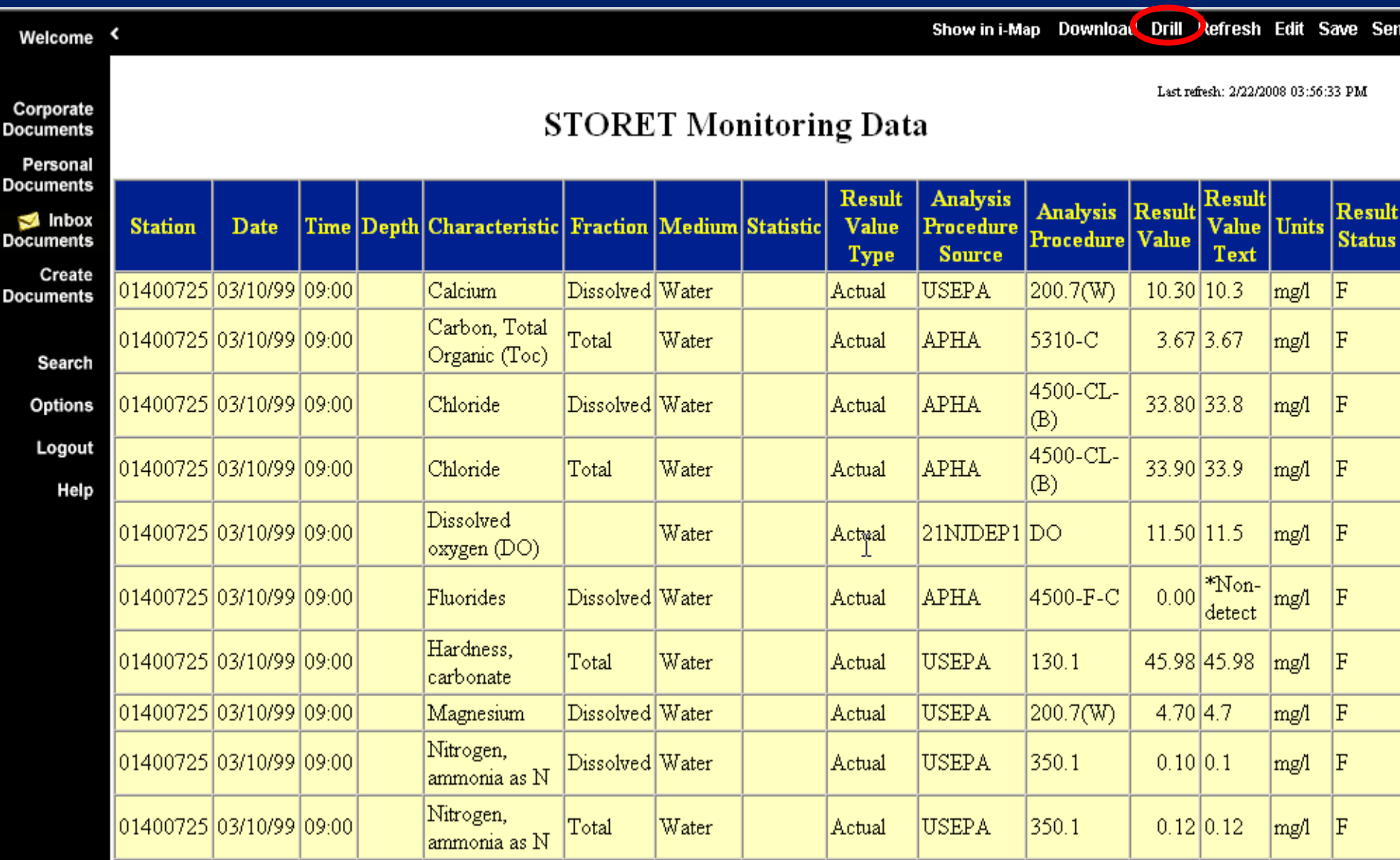
Identify the Watercourse NHD Attributes



Select a Monitoring Point of Interest: Link to a Database Report



Result: A Live Linked Database Report for the Selected Station



Welcome

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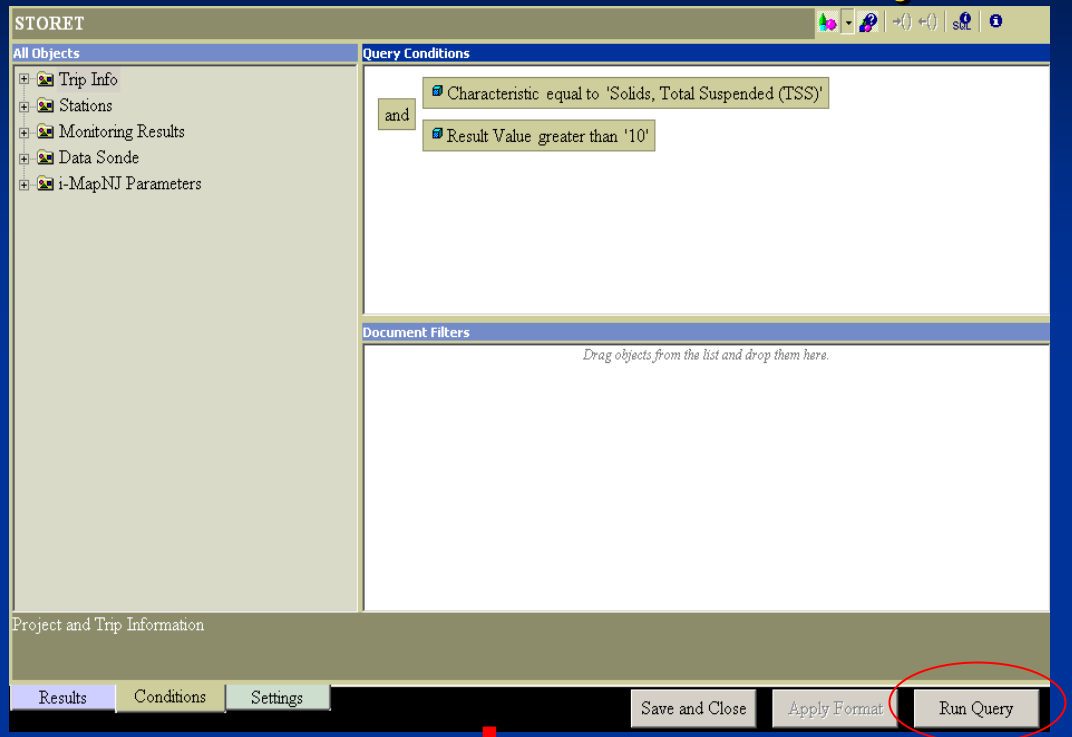
Last refresh: 2/22/2008 03:56:33 PM

STORET Monitoring Data

Station	Date	Time	Depth	Characteristic	Fraction	Medium	Statistic	Result Value Type	Analysis Procedure Source	Analysis Procedure	Result Value	Result Value Text	Units	Result Status
01400725	03/10/99	09:00		Calcium	Dissolved	Water		Actual	USEPA	200.7(W)	10.30	10.3	mg/l	F
01400725	03/10/99	09:00		Carbon, Total Organic (Toc)	Total	Water		Actual	APHA	5310-C	3.67	3.67	mg/l	F
01400725	03/10/99	09:00		Chloride	Dissolved	Water		Actual	APHA	4500-CL-(B)	33.80	33.8	mg/l	F
01400725	03/10/99	09:00		Chloride	Total	Water		Actual	APHA	4500-CL-(B)	33.90	33.9	mg/l	F
01400725	03/10/99	09:00		Dissolved oxygen (DO)		Water		Actual	21NJDEP1	DO	11.50	11.5	mg/l	F
01400725	03/10/99	09:00		Fluorides	Dissolved	Water		Actual	APHA	4500-F-C	0.00	*Non-detect	mg/l	F
01400725	03/10/99	09:00		Hardness, carbonate	Total	Water		Actual	USEPA	130.1	45.98	45.98	mg/l	F
01400725	03/10/99	09:00		Magnesium	Dissolved	Water		Actual	USEPA	200.7(W)	4.70	4.7	mg/l	F
01400725	03/10/99	09:00		Nitrogen, ammonia as N	Dissolved	Water		Actual	USEPA	350.1	0.10	0.1	mg/l	F
01400725	03/10/99	09:00		Nitrogen, ammonia as N	Total	Water		Actual	USEPA	350.1	0.12	0.12	mg/l	F

Using Database Tools: Create a Query, See the Result



New Results

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STORET Monitoring Data

Station	Date	Time	Depth	Characteristic	Fraction	Medium	Statistic	Result Value Type	Analysis Procedure Source	Analysis Procedure	Result Value	Result Value Text	Units	Result Status	BRI
01400650	05/15/02	08:32		Solids, Total Suspended (TSS)	Total	Water		Actual	APHA	2540-D	21.00	21	mg/l	F	
01400725	03/12/99	09:00		Solids, Total Suspended (TSS)	Total	Water		Actual	APHA	2540-D	12.00	12	mg/l	F	

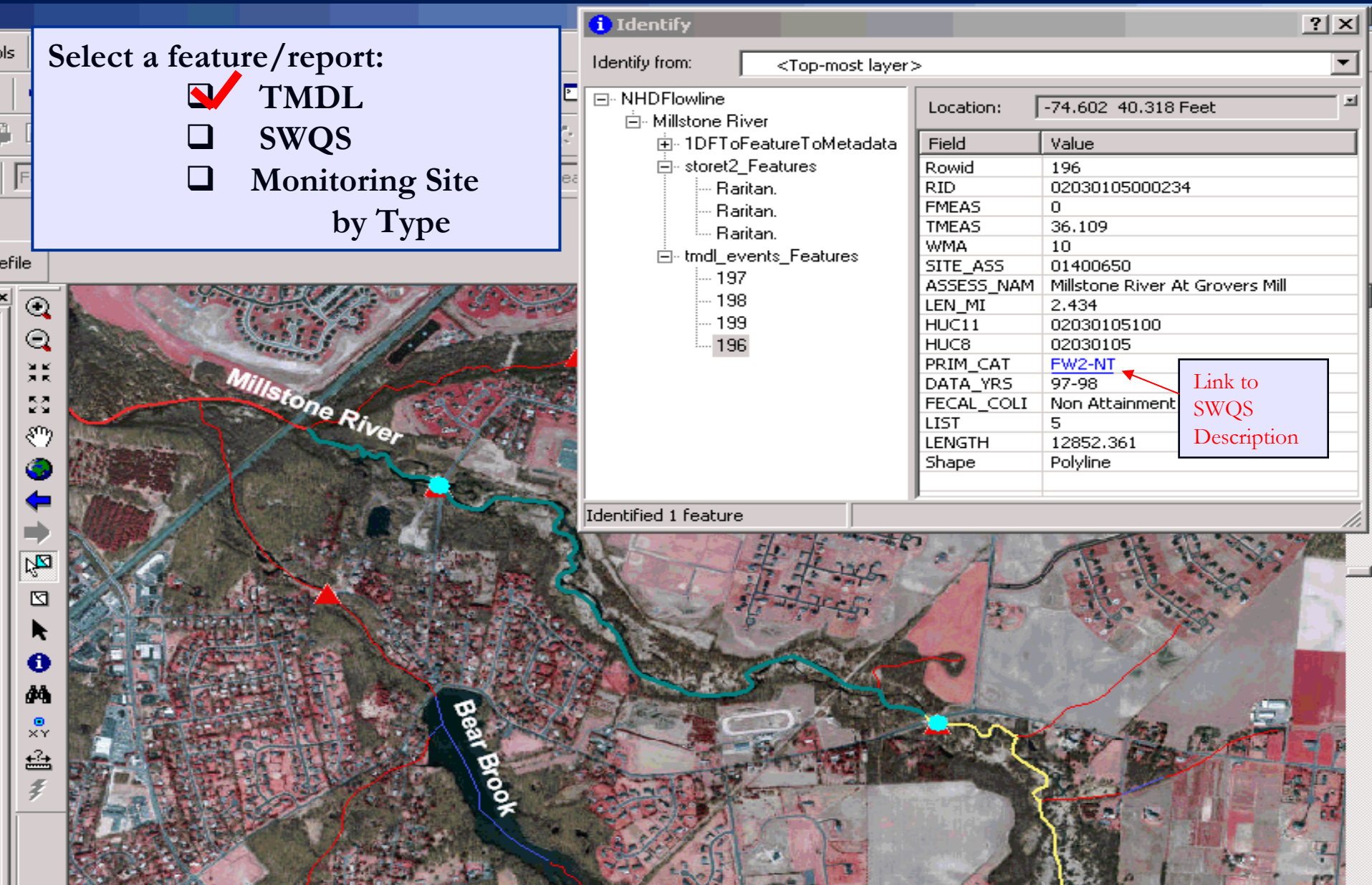
Updated locations based on database search query

Show in Map

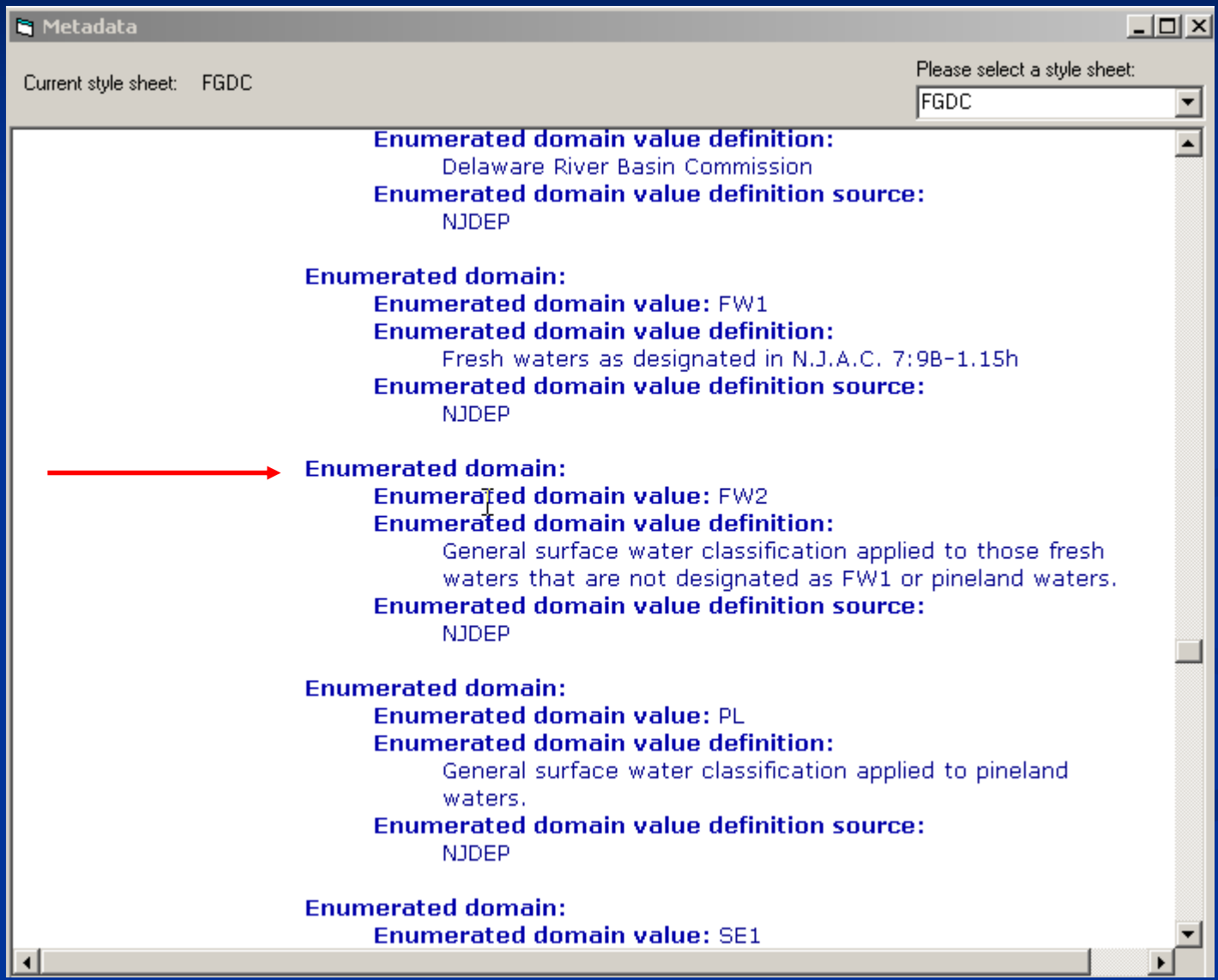
Surface Water Quality Assessments

Select a feature/report:

- ☑ TMDL
- ☐ SWQS
- ☐ Monitoring Site by Type



Attribute Definitions - Metadata



"NJ-GeoWeb"

Permitting
Compliance
Enforcement

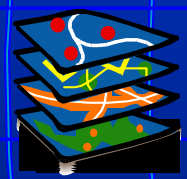
Surveillance
Inspections
ePermits

Clean & Plentiful Water

Water/Sewer Infrastructure
Water Allocation
Storm Water Runoff
Monitoring

What's in My Backyard

Regulated Sites
Incident Mgmt
Flood Mapping
Endangered Species

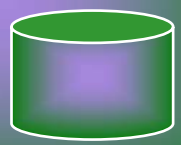


Sustainable Growth

Align Economic and Env. Goals
Env. Sensitive Areas
Green Technologies

NJ Office of Info Technology

SDE Software Services



Taking care of Business

Economic Incentives
Employment Info
Revitalize and Redevelop

Live Feeds from State Government

L.awrence Thornton, NJDEP

Thank you for your attention!

Contact Info: NJDEP, Bureau of GIS

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