

“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



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:

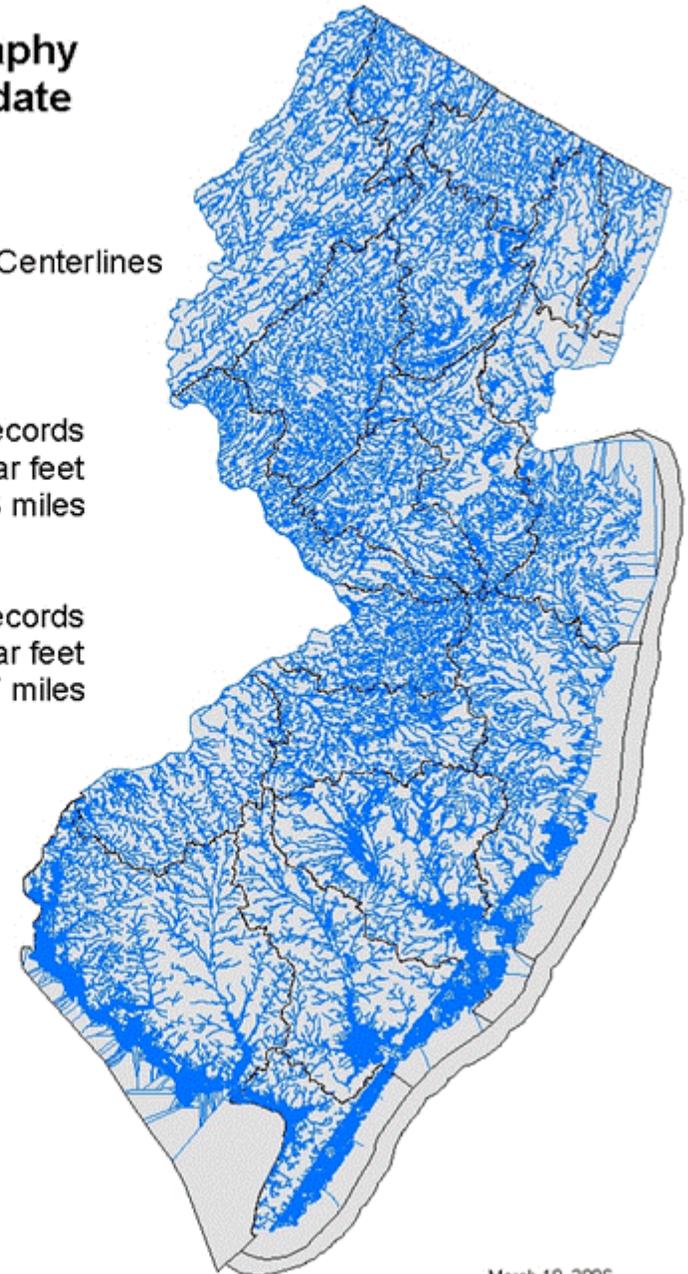
- Almost 6,000 new miles of stream delineated in New Jersey.
- Over 90,000 new segments were added.

Hydrography 2002 Update

 River/Stream Centerlines

1986 Hydro:
133,943 records
95,470,856 linear feet
18,018 miles

Streams 2002:
224,030 records
126,547,667 linear feet
23,967 miles



March 10, 2006



NJDEP

1986 Hydrography (DLG's)



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

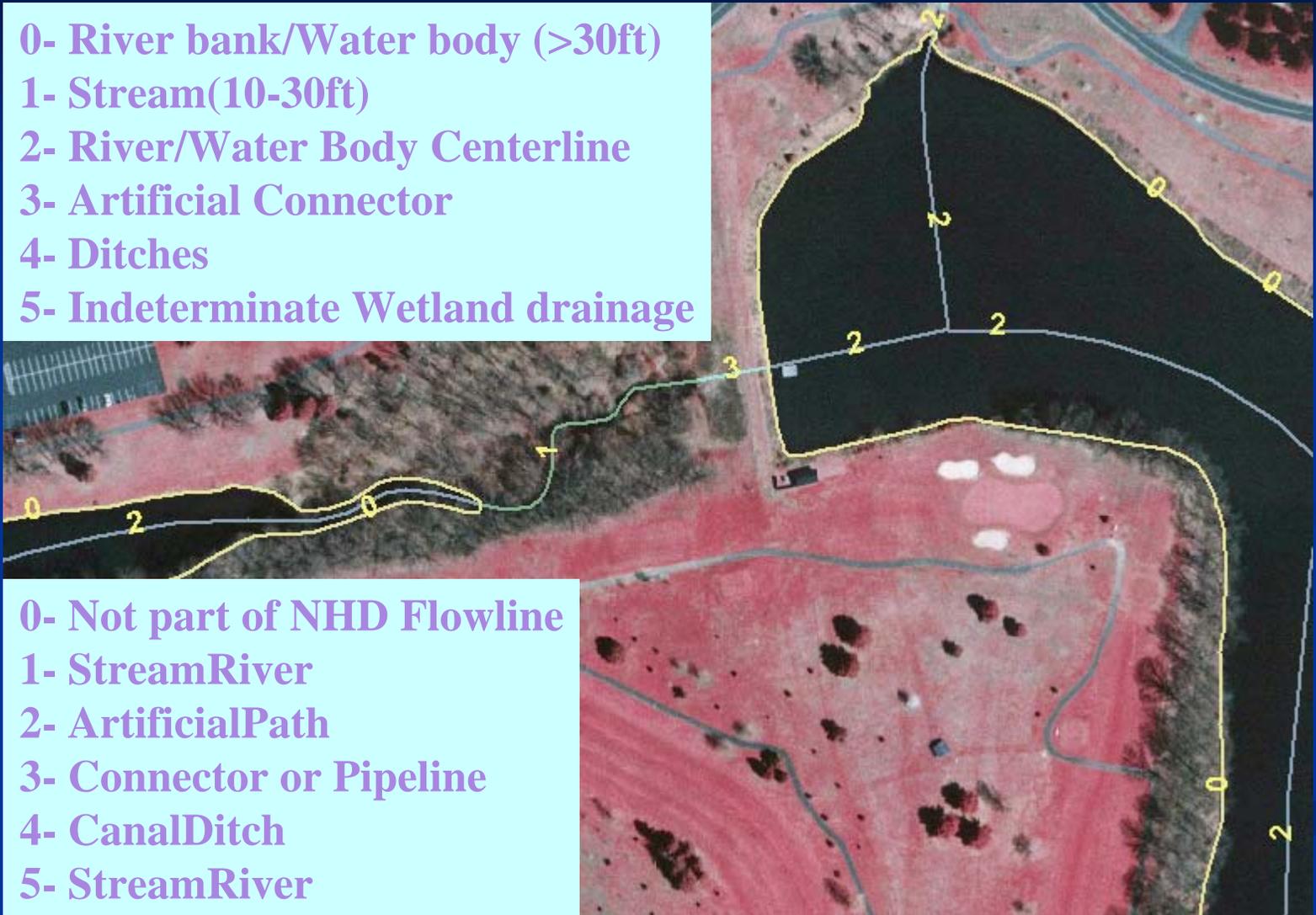
NJDEP
LU/LC
codes

- 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

The screenshot displays the ArcMap interface with a map of watercourses. The Identify window is open, showing the following table of attributes for the selected feature:

Field	Value
OBJECTID	2320
Shape	Polyline
ComID	64660026
FDate	12/11/2002
Resolution	High
GNIS_ID	00878385
GNIS_Name	Millstone River
LengthKM	0.398
ReachCode	02030105000234
FlowDir	WithDigitized
WBAreaComID	<null>
FType	Stream/River
FCode	Stream/River: Hydrographic Category
Shape_Length	0.004243
Enabled	True

The map shows the Millstone River (yellow line) and Bear Brook (blue line) flowing through a residential area. The Identify window is positioned over the Millstone River, and the table displays its NHD attributes.

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

Select a feature/report:

- TMDL
- SWQS
- Monitoring Site by Type

Identify

Identify from: <Top-most layer>

NHDFlowline

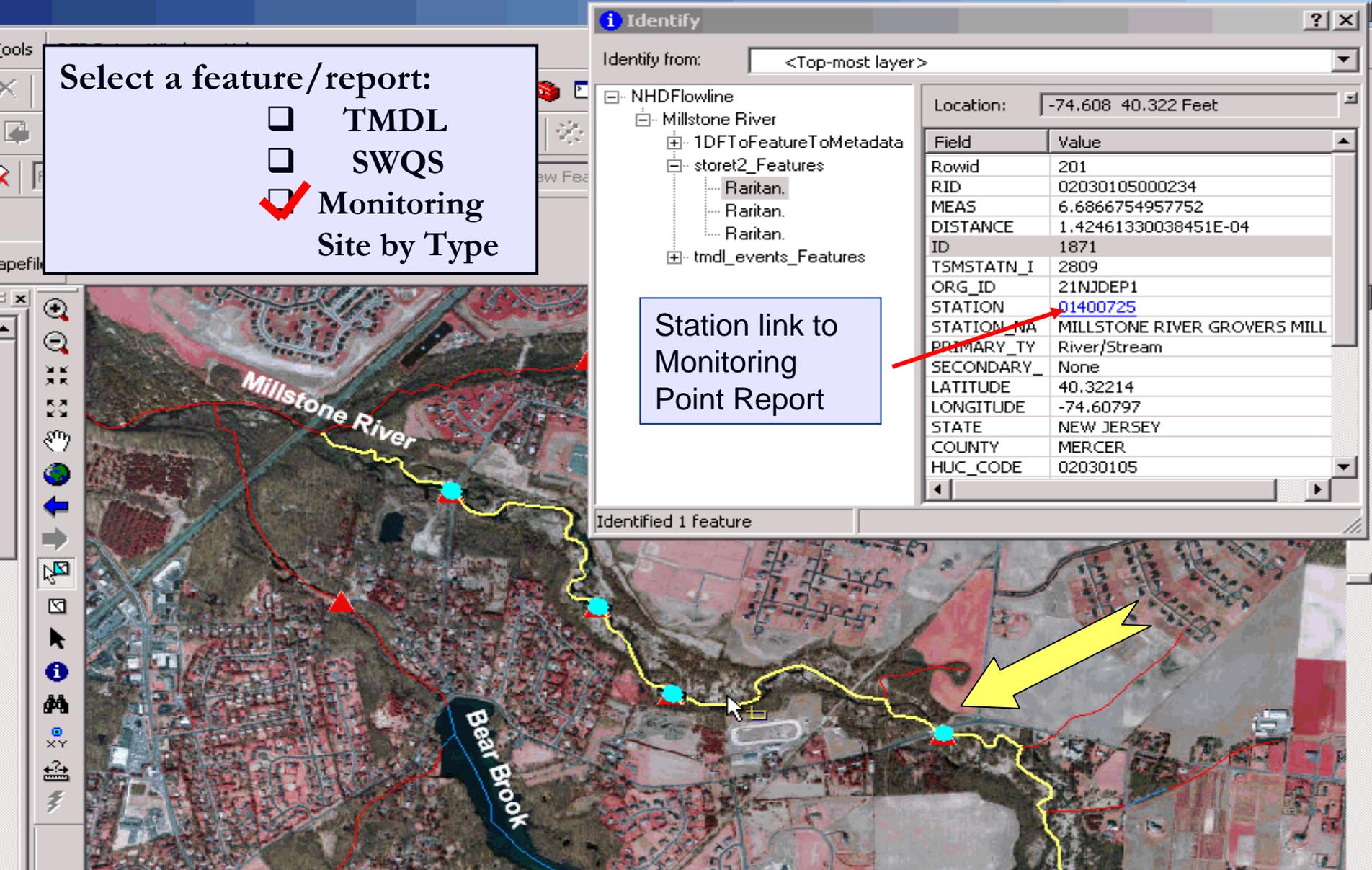
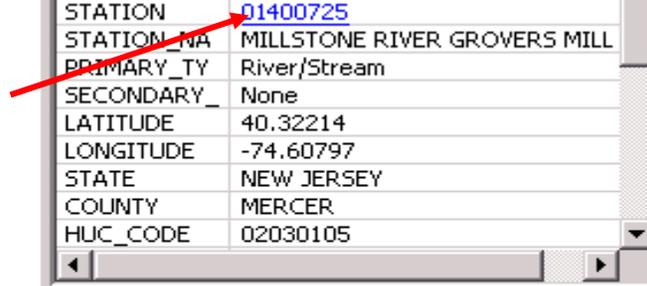
- Millstone River
 - 1DFToFeatureToMetadata
 - storet2_Features
 - Raritan.
 - Raritan.
 - Raritan.
 - tmdl_events_Features

Location: -74.608 40.322 Feet

Field	Value
Rowid	201
RID	02030105000234
MEAS	6.6866754957752
DISTANCE	1.42461330038451E-04
ID	1871
TSMSTATN_I	2809
ORG_ID	21NJDEP1
STATION	01400725
STATION_NA	MILLSTONE RIVER GROVERS MILL
PRIMARY_TY	River/Stream
SECONDARY_	None
LATITUDE	40.32214
LONGITUDE	-74.60797
STATE	NEW JERSEY
COUNTY	MERCER
HUC_CODE	02030105

Identified 1 feature

Station link to
Monitoring
Point Report



Result: A Live Linked Database Report for the Selected Station

Welcome <

Show in i-Map Download **Drill** Refresh Edit Save Send

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

Corporate Documents

Personal Documents

Inbox Documents

Create Documents

Search

Options

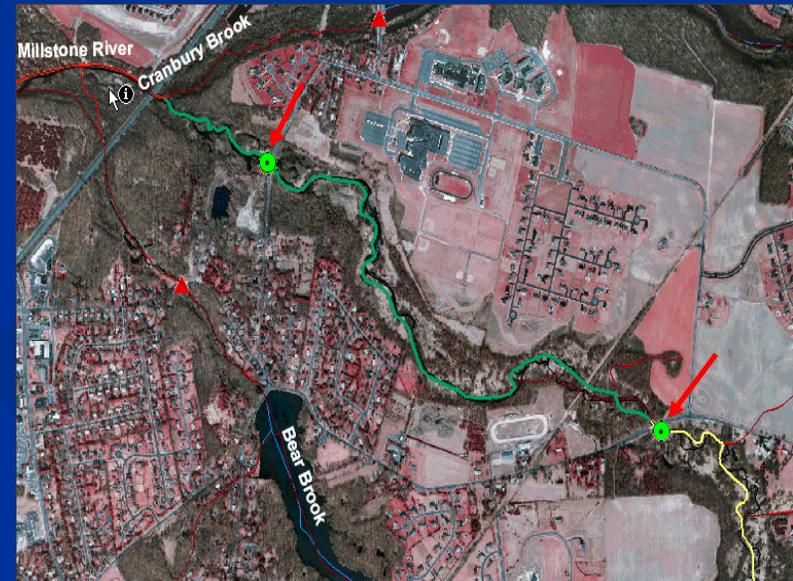
Logout

Help

Using Database Tools: Create a Query, See the Result

The screenshot shows the STORET software interface. On the left, under 'All Objects', there is a tree view with items like Trip Info, Stations, Monitoring Results, Data Sonde, and i-MapNJ Parameters. The 'Query Conditions' pane on the right contains two conditions: 'Characteristic equal to 'Solids, Total Suspended (TSS)'' and 'Result Value greater than '10'', connected by an 'and' operator. Below this is a 'Document Filters' section with the instruction 'Drag objects from the list and drop them here.' At the bottom, there are tabs for 'Results', 'Conditions', and 'Settings', and buttons for 'Save and Close', 'Apply Format', and 'Run Query'. The 'Run Query' button is circled in red.

Updated locations based on database search query



New Results

STORET Monitoring Data

Last refresh: 2/22/2008 04:41:39 PM

Station	Date	Time	Depth	Characteristic	Fraction	Medium	Statistic	Result Value Type	Analysis Procedure Source	Analysis Procedure	Result Value	Result Value Text	Units	Result Status	BR
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	

Show in Map

Surface Water Quality Assessments

Select a feature/report:

- TMDL
 - SWQS
 - Monitoring Site
- by Type

Identify

Identify from: <Top-most layer>

Location: -74.602 40.318 Feet

Field	Value
Rowid	196
RID	02030105000234
FMEAS	0
TMEAS	36.109
WMA	10
SITE_ASS	01400650
ASSESS_NAM	Millstone River At Grovers Mill
LEN_MI	2.434
HUC11	02030105100
HUC8	02030105
PRIM_CAT	FW2-NT
DATA_YRS	97-98
FECAL_COLI	Non Attainment
LIST	5
LENGTH	12852.361
Shape	Polyline

Identified 1 feature

Note: A red arrow points from the 'FW2-NT' link in the table to a callout box.

Link to
SWQS
Description



Attribute Definitions - Metadata

The screenshot shows a window titled "Metadata" with a toolbar at the top. On the left, it says "Current style sheet: FGDC". On the right, there is a dropdown menu labeled "Please select a style sheet:" with "FGDC" selected. The main content area contains several entries for enumerated domains. A red arrow points to the entry for "FW2".

Enumerated domain value definition:
Delaware River Basin Commission

Enumerated domain value definition source:
NJDEP

Enumerated domain:
Enumerated domain value: FW1
Enumerated domain value definition:
Fresh waters as designated in N.J.A.C. 7:9B-1.15h
Enumerated domain value definition source:
NJDEP

Enumerated domain:
Enumerated domain value: FW2
Enumerated domain value definition:
General surface water classification applied to those fresh waters that are not designated as FW1 or pineland waters.
Enumerated domain value definition source:
NJDEP

Enumerated domain:
Enumerated domain value: PL
Enumerated domain value definition:
General surface water classification applied to pineland waters.
Enumerated domain value definition source:
NJDEP

Enumerated domain:
Enumerated domain value: SE1



“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



Taking care of Business

Economic Incentives
Employment Info
Revitalize and Redevelop



Live Feeds from State Government



Thank you for your attention!

Contact Info: NJDEP, Bureau of GIS

Website: <http://www.nj.gov/dep/gis>

lawrence.thornton@dep.state.nj.us

