



new jersey  
department of environmental protection

njdep

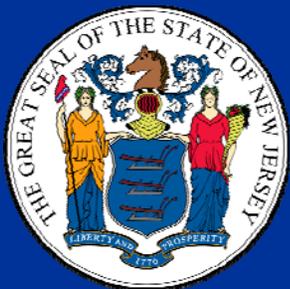


# Exchanging Ambient Water Quality Data: A New Jersey Perspective

Presented by

Paul Morton

NJDEP Water Monitoring and Standards



Presented at the  
New Jersey Water Monitoring Coordination Council  
West Trenton, New Jersey  
June 11, 2008



NJDEP Water Monitoring and Standards

# Presentation Overview



- Review the **need** for ambient water quality monitoring results
- Identify the **challenges** facing Organizations in migrating from STORET to WQX
- Describe the **solutions** NJDEP will be implementing



# Project Goals

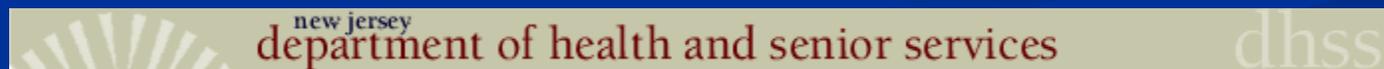
- Develop an up to date, searchable **inventory** of ambient water quality monitoring in New Jersey
- **Integrate** ambient water quality monitoring data into NJDEP's enterprise environmental data management system (NJEMS) to enable more integrated environmental decisions
- Make NJ's ambient water quality monitoring data **available** to the public
- **Exchange** ambient water quality monitoring data with USEPA via EPA's Central Data Exchange (CDX)

Funding: **National Environmental Information Exchange Network Grant**



# Project Partners

- NJ Water Monitoring Coordinating Council (Inventory)
- NJDEP
  - Bureau of Water Quality Standards and Analysis
  - Bureau of Freshwater and Biological Monitoring
  - Bureau of Marine Water Monitoring
  - Division of Watershed Management
  - Division of Science, Research, and Technology
- NJ DHSS Laboratory
- Local / County Governments
- Volunteer Monitors
- USEPA
- USGS

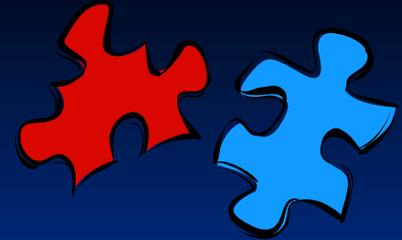


# Need for Ambient Water Quality Monitoring Results

- High quality ambient water quality monitoring results are essential to timely, accurate **statewide water quality assessments** and Total Maximum Daily Load (**TMDL**) calculations.
- States and other organizations are required to use all “**publicly available**” water quality data in making assessments and TMDL calculations
- Relating ambient water quality monitoring results to regulated **facility** data and land use enhances assessments and calculations
- Ambient monitoring results are critical to assessing the **effectiveness of water quality based management practices**



# Challenges



- EPA will **stop accepting Oracle exports** from local copies of STORET, but sending the data to EPA is still a grant requirement
- **XML** and the Exchange Network is **very new** to many of us
- Even with STORET we don't have a good handle on **who** is doing **what** monitoring, **where** they are doing it, **when** they do it and **why**
- Because STORET and NWIS use different formats, it is a **major reformatting** headache to combine data from both sources for assessment purposes





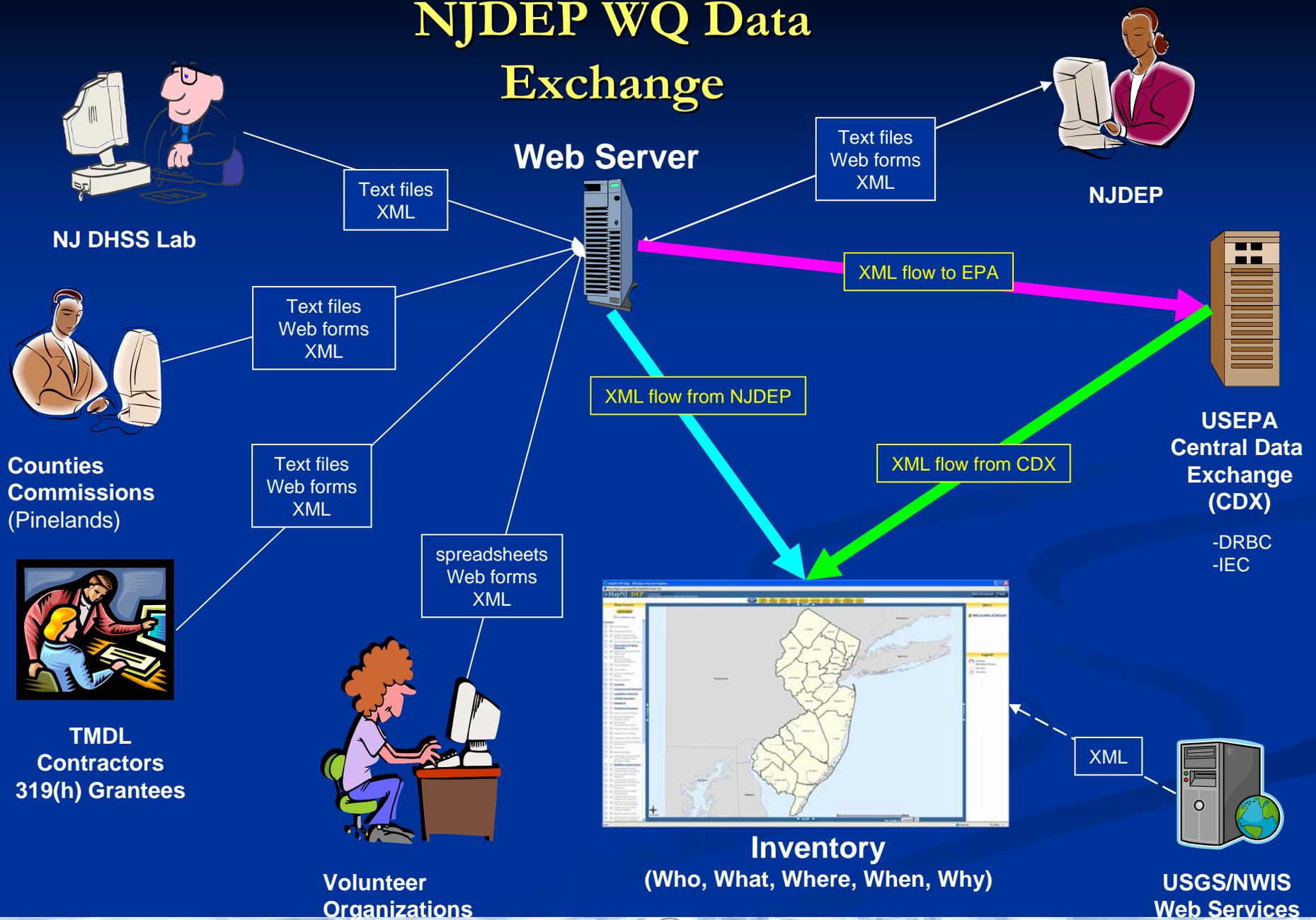
# Solutions



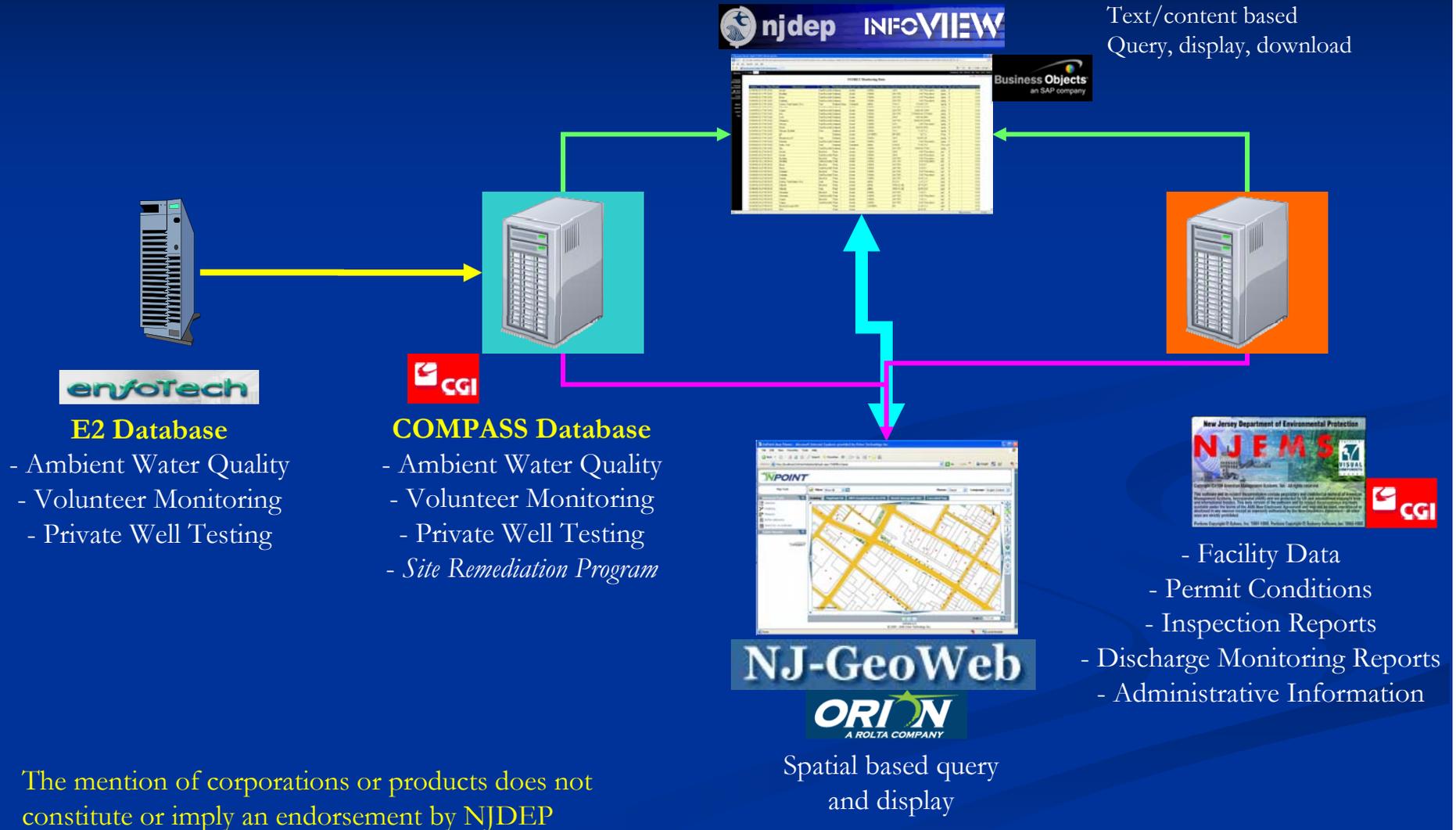
- We are building a **Web based application** to accept data from multiple partners and send it to EPA via our Exchange Network node. Data owners control if and when data goes to EPA CDX
- Monitoring programs in NJDEP will **keep their desktop databases** for metric calculation, data assessment and reporting due to the small base of users and frequently changing requirements
- XML is too big a leap for many groups, so we are building our application to also accept **Web forms and text files**
- Our application will include an up to date, **searchable inventory of ambient water monitoring**
- Our proposed “Give Back” to the EN Community will be to enhance the EN Browser and ENDS to **query both the USGS and EPA web services** and return the information in a common format.



# NJDEP WQ Data Exchange



# NJDEP Enterprise Solution



The mention of corporations or products does not constitute or imply an endorsement by NJDEP



# Core Components



WQX Module on **E2**

(Web based solution for importing data)

Data **Validation** Procedures

(including historical range checks, characteristic unit pairing and logical checks)

NJ Water Monitoring **Inventory** and Data Portal

(Web based query and mapping of monitoring project & results)

WQX **Schema Extension**

(accommodate additional data elements identified by partners)

**Internal Data Transmission** Services between E2 and NJDEP  
COMPASS database

Outbound Data **Transmission to CDX**



# Web Forms

One alternative for entering Information for:

- Organizations
- Projects
- Stations

Other alternative is batch loading XML or text files

• Register Organization

Detail Information of Organization.

## Organization Information

Organization Name:  New Jersey Department of Environmental Protection  
 Other:

Division:

Bureau:

Organization EPA Identifier:

Organization Description:

Organization Type:

Organization URL:

## Address

### Location

Address Line 1:

Address Line 2:

City:

State:

Zip Code:

Copy Address

### Mailing

Address Line 1:

Address Line 2:

City:

State:

Zip Code:

## Contact Information

Contact Name:

Phone:

Phone Type:

Email:

Submit

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P. O. Box 402  
Trenton, NJ 08625-0402

entoTech



NJDEP Water Monitoring and Standards

# .csv Import Mapping Procedure (CIMP)



Import Configurations

Configuration Header

Configuration File Name:  User/Owner:

Description:

Config File Type:

Text Delimiter:

Skip Header in Import File

Configuration Details

Req.?	Position / Order	Column Name	Auto-Generate Column	Default Value	Insert Value if Empty	Max Length	Data Type	Data Format	Characteristic / Unit Pair (Data Logger)	Characteristic	Unit
<input type="checkbox"/>	<input type="text"/>	Activity Start Date	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Project ID	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Monitoring Location ID	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Activity ID	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Activity Type	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Result	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Characteristic	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Unit	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text"/>	Analytical Method	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>

Add New Row Mapping Translations Group Codes Exit Save

Tell CIMP which column holds which piece of info. Option to fill in blanks, generate new columns and define formats (ex. date)  
Can even import continuous data (data sonde/hydrolab/data logger information in the one column per Characteristic layout)



# Translation



Mapping Translations

Configuration File Name:

Column Name	Value Provided	Map To
<input type="text" value="Characteristic Name"/>	<input type="text" value="DO"/>	<input type="text" value="Dissolved Oxygen"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

CIMP scans the file. If it finds values not in its allowed lists (domain values) it prompts you to provide a translation. Option to map this information ahead of time and to import/export these translations so they can be used by others



# Data Element Groups

## (reduce the load on data submitters)

### ■ Sample Collection Group:

- MethodIdentifier
- MethodIdentifierContext
- MethodName
- MethodQualifierTypeName

### ■ Characteristic Group

- CharacteristicName
- MethodSpeciationName
- ResultSampleFractiontext
- ResultMeasureUnitCode

### ■ Sample Preparation Group:

- MethodIdentifier
- MethodIdentifierContext
- MethodName

### ■ Analysis Method Group:

- MethodIdentifier
- MethodIdentifierContext
- MethodName

Define the group code once then submit the group code rather than all the parts that make up the code



# Input Data Validation

- Compared to historical range for Characteristic
- Checked for appropriate Characteristic unit pairings
- Checked for dissolved < total (within error ranges)



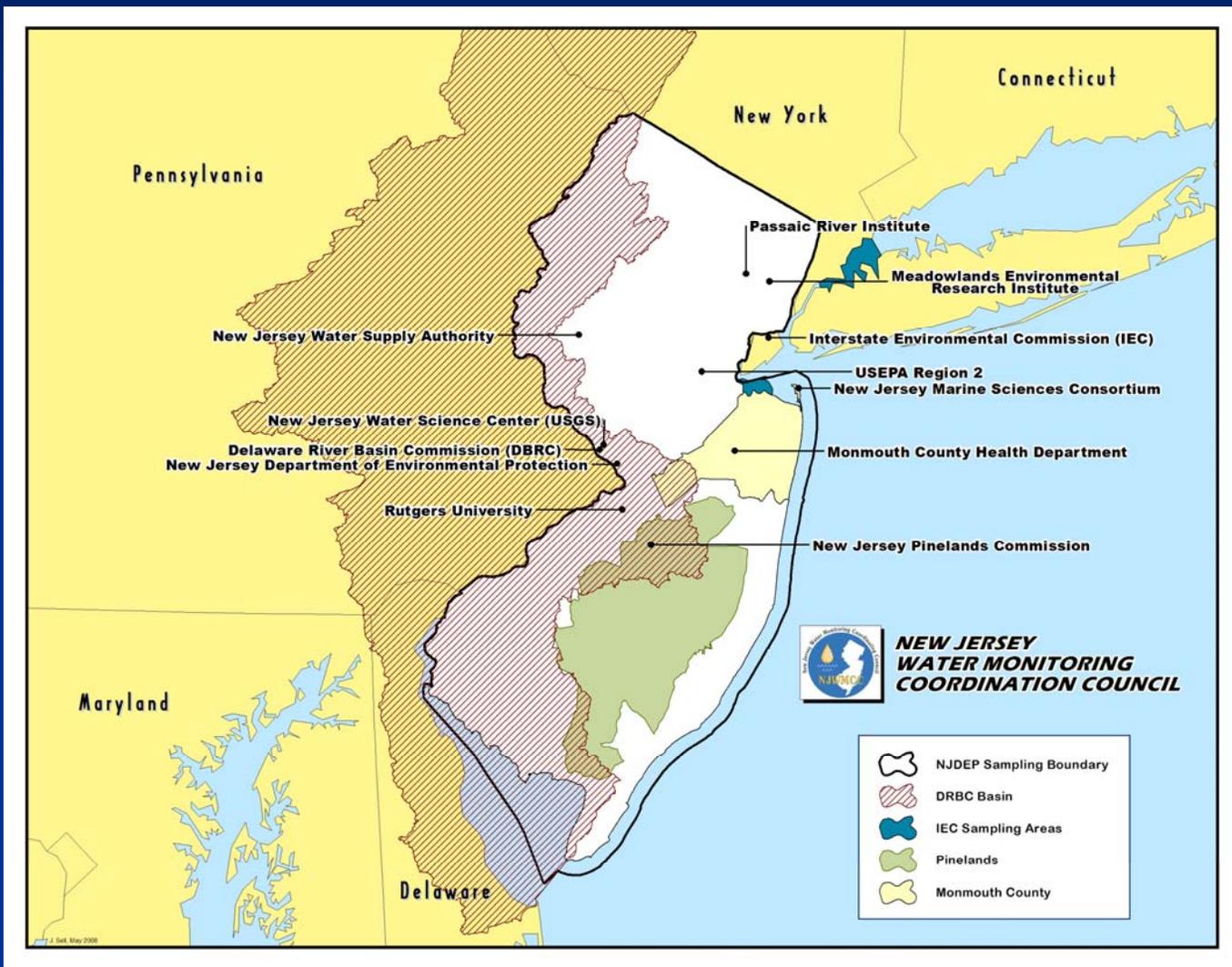


# Inventory Solution

- Improve Exchange Network Browser to:
  - Make it more user-friendly
    - Easier to use User Interface
    - Change focus from EN-audience only to include non-EN-audience
  - Meets business needs for discovering/retrieving/viewing water quality data
  - Improve mapping capabilities for querying/viewing
  - Ensure solution is generic to so it can be applied to:
    - Other data providers of water quality data
    - Other data flows (air, waste, etc...)



# Inventory Users



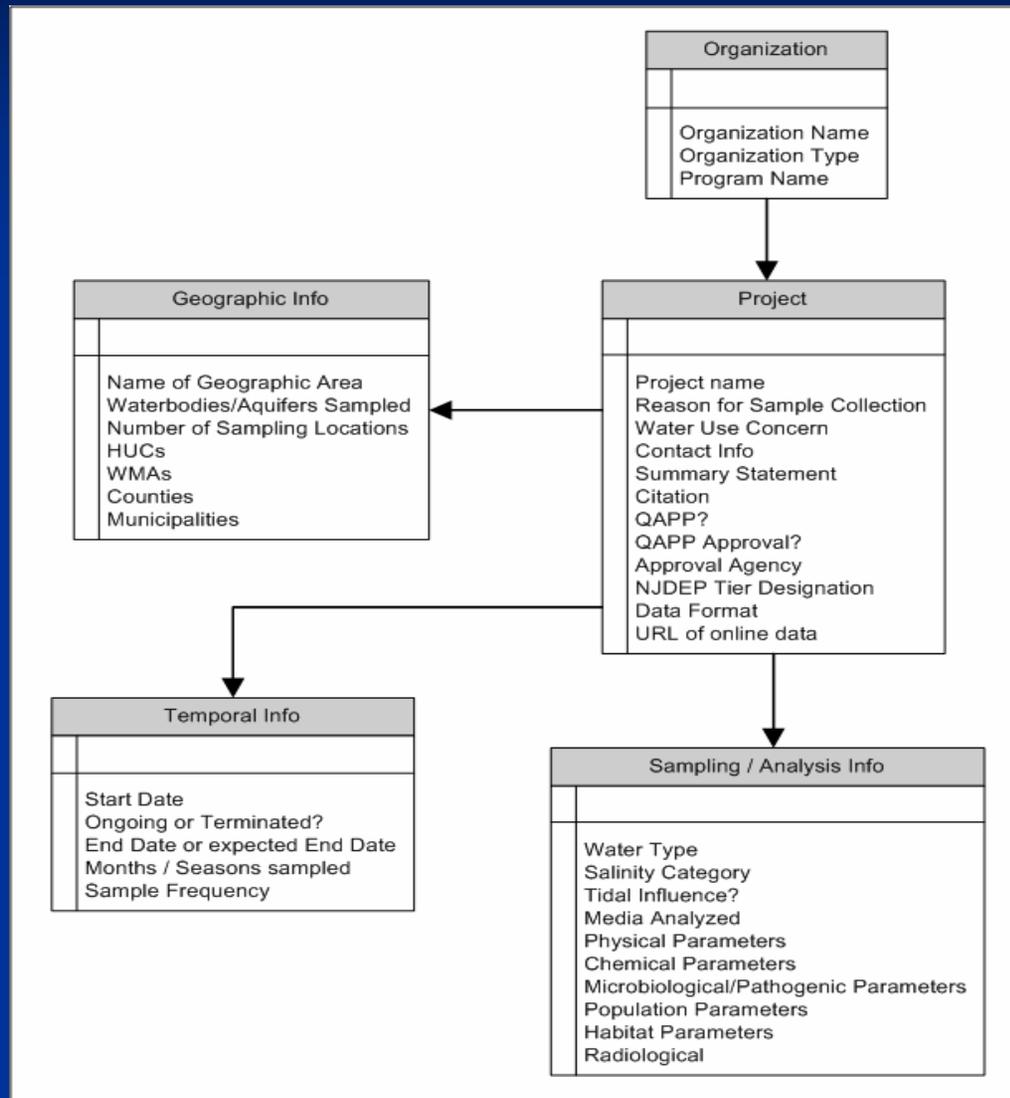
# Sources of Monitoring Information

## (2008 Integrated Report Data Solicitation Respondents)

- **USEPA**
- **USGS**
- **Delaware River Basin Commission**
- **NJDEP**
- **NJ Pinelands Commission**
- **NJ Meadowlands Commission**
- **NJ Water Supply Authority**
- NJ Harbor Discharge Group
- Lake Hopatcong Commission
- **Monmouth County Health Department**
- Ocean County Health Department
- Atlantic County Health Department
- Cape May County Health Department
- Great Swamp Watershed Association
- Pequannock River Coalition
- Pompeston Creek Watershed Association
- South Branch Watershed Association
- Stony Brook-Millstone Watershed Association (SBMWA)
- Wallkill River Watershed Management Group
- Brick Municipal Utilities Authority
- Musconetcong Sewage Authority (Najarian Associates)
- Sussex County MUA
- Warren County MUA (HydroQual, Inc.)
- TRC Omni Environmental



# Inventory Data Elements



# Project/Results Discovery

## Exchange Network Browser

Environmental Information



Welcome to the Exchange Network Browser. This tool allows people to discover and retrieve data from environmental data providers who have published their data on the [Exchange Network](#) and registered their data with the Exchange Network Discovery Service.

### What Kind of Data Are You Looking For?

---

Ambient Water Quality Data

Water Quality eXchange (WQX) data captures ambient water quality monitoring projects, stations, activities, and may include chemical, biological, physical habitat, or population census results.

Ambient Air Quality Data

Provides ambient air quality monitoring data published by states as part of the Air Quality Data Exchange (AQDE) data sharing initiative.

Open Dump Inventory

Provides an inventory of Open Dumps, primarily provided by Tribal organizations.

Continue

# Data Providers Discovery

Exchange Network Browser

Environmental Information



Ambient Water Quality Data

Ambient Air Quality Data

7 Data Providers Available

Filter Data Providers

GetWQXInventory

GetWQXData

Organization Information

Project Information

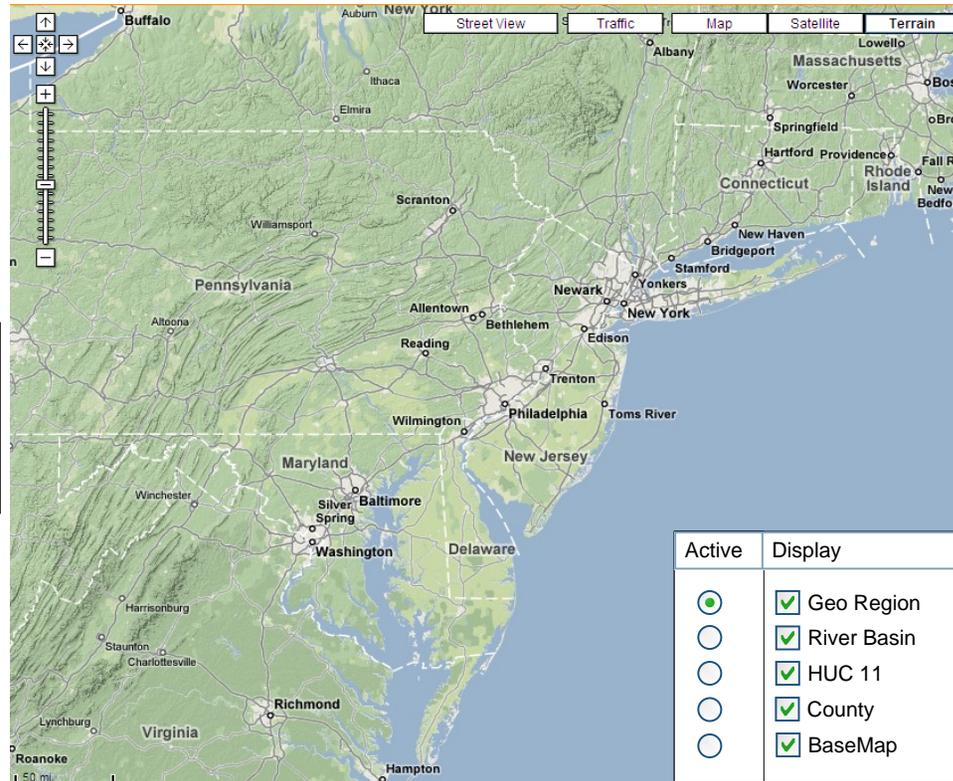
Geographic Information

Activity/Result Information

Temporal Information

Data Quality

Retrieve Data



# Available Sources of Data

## Available Service

### Available Services:

Select	Provider	Data Flow	Request	Map Service	EN Registry	Public Access	Node Ping Status
<input checked="" type="checkbox"/>	NJDEP	WQX	GetWQXInventory	Yes	Yes	Yes	Pending
<input checked="" type="checkbox"/>	NJDEP	WQX	GetWQXData	Yes	Yes	Yes	Pending
<input type="checkbox"/>	NYDEC	WQX	GetWQXInventory	Yes	Yes	Yes	Failed
<input type="checkbox"/>	NYDEC	WQX	GetWQXData	Yes	Yes	Yes	Ready
<input type="checkbox"/>	PADEP	WQX	GetWQXInventory	Yes	Yes	Yes	Ready
<input checked="" type="checkbox"/>	NJDEP	AQX	GetAQXData	Yes	Yes	Yes	Pending

Select All

Refresh

Filter Data Providers

# Service Discovery

Exchange Network Browser

Environmental Information



Ambient Water Quality Data

Ambient Air Quality Data

3 Data Providers Available

Filter Data Providers

GetWQXInventory

GetWQXData

Organization Information

Project Information

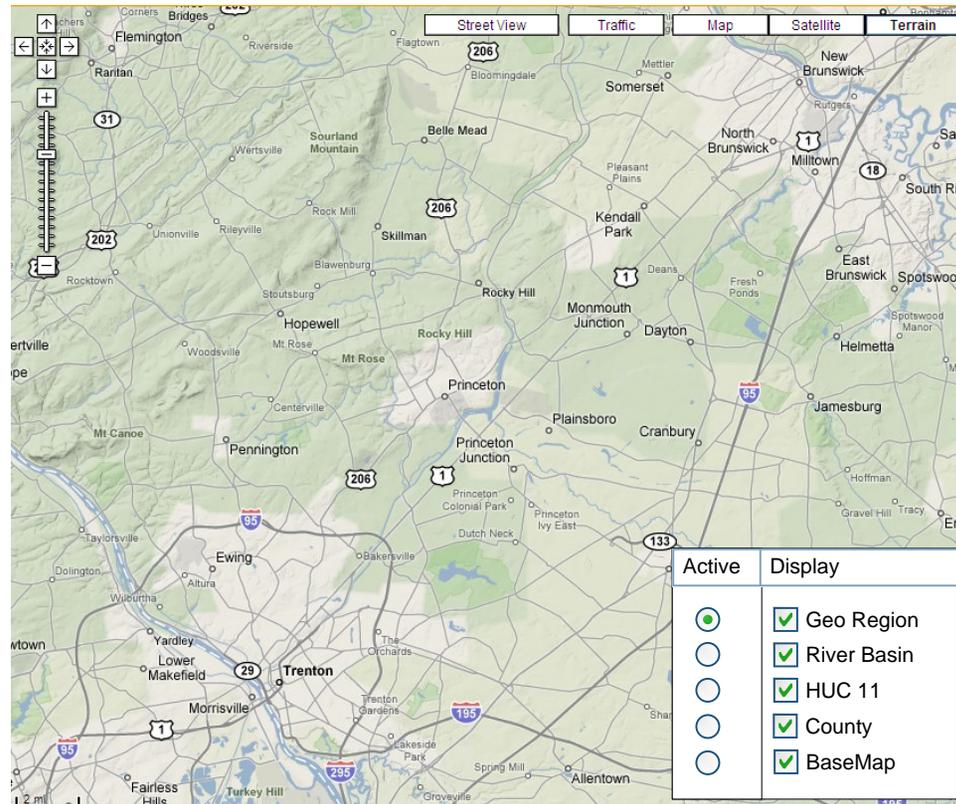
Geographic Information

Activity/Result Information

Temporal Information

Data Quality

Retrieve Data





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**Search Criteria:** You have chosen 3 Data Providers. Click to [Filter Data Providers](#)

Ambient Water Quality Data    Ambient Air Quality Data

GetWQInventory    GetWQData

Organization Information

Organization Name: (freetext search)

Project Information

Project Name: (freetext search)

Geographic Information

Geographic Region: (freetext search)

Sample & Analysis Information

Tidal Influence:  Tidal     Non Tidal

Temporal Information

Project Start-End Date: [calendar icon] - [calendar icon]

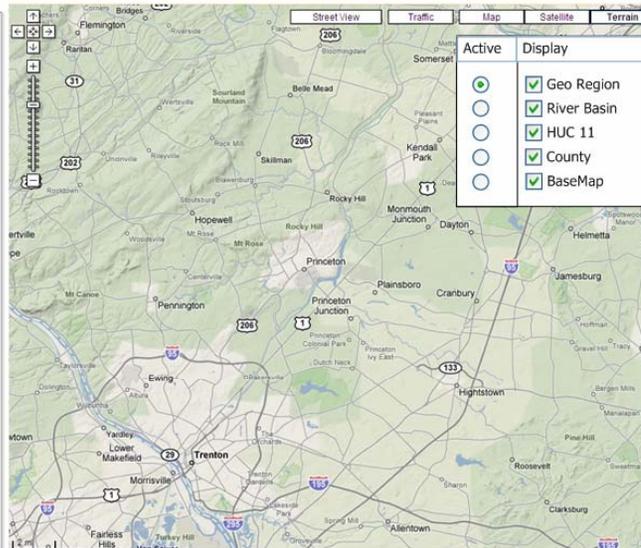
Data Quality

QAPP Indicator:  Yes     No

QAPP Approved Indicator:  Yes     No

[Populate Pick List](#)

[Retrieve Data](#)



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Say  
South Riv  
Spotswooc  
Manor  
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on  
in

# Search Projects

## Organization NJDEP-BFBM-012

**Organization Description**  
Organization Identifier: NJDEP-BFBM-012  
Organization Formal Name:  
Organization Type: Government - State  
Division Name: Division of Water Monitoring  
Bureau Name: Bureau of Freshwater and Bio  
Organization Contact Name: Alfred L. Korndoerfer

**Electronic Address**

Electronic Address	Address
Alfred.Korndoerfer@dep.state.nj.us	Email
http://www.nj.gov/dep/wms/bfbm/	Internet

**Organization Address**

Address Type	Address
Location	35 Arctic Parkway
Mailing	P.O. Box 427

### Water Quality Data Portal

**CSV Output Configuration:**

Parameters on the left  
 Parameters on the top

## Project 1 (AMN)

**Project Description**  
Project Identifier: AMNET-2007  
Project Name: Ambient Biomonitori  
Project Type: Ambient-Routine  
data Format: NJ Data Portal  
Result Provided Indicator: Y

**Project Contact**  
Contact Name: Tom Miller  
Telephone Number: 6092922232  
Electronic Address: tom.miller@dep.state.nj.us

**Project Geographic**  
Geographic Region: Statewide.  
HUC Eleven Digit Code: 01584845231. Station Count: 562  
County Code: 01, 02. County Name:  
Locality Name: Lawrence.

**Project Temporal**  
Project Start Date: 2007-03-21 Project End Date: 2007-09-24  
Temporal Status: In progress-discrete  
Temporal Comment: Active, ongoing monitoring program: sites sampled on 5 year rotating basis  
Sampling Season: Year round. Monitoring Frequency: Daily, Annually, Monthly.

File Download

Do you want to open or save this file?

Name: SubmissionDataFile.txt  
Type: Text Document  
From: logan

Open Save Cancel

While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file.

Data Quality  
 Data Quality

Save Output Configuration



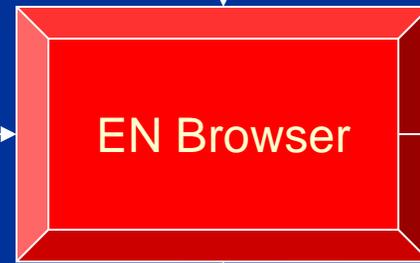
Delaware River Basin Commission  
 Interstate Environmental Commission  
 Meadowlands Environmental Research Institute  
 Rutgers University  
 Passaic River Institute/Montclair University  
 NJ Water Resources Research Institute  
 NJ Marine Sciences Consortium  
 Monmouth County Health Department  
 NJ Pinelands Commission  
 NJ Water Supply Authority  
 EPA Region 2  
 USGS NJ Water Science Center  
 NOAA



US EPA  
 Delaware River Basin Commission  
 Interstate Environmental Commission  
 Beach Monitoring  
 PA  
 NY  
 MD  
 DE



COMPASS



EN Browser



Maps



Data

Text  
 XML  
 HTML



NJDEP 305(b)/303(d) Data Solicitation Respondents  
 NJDEP TMDL Contractors  
 NJDEP 319(h) Grantees  
 NJ Volunteer Monitors  
 NJ Counties



NASA  
 Global Change  
 Master Directory



CUAHSI  
 Hydrologic  
 Information System



USGS Web  
 Services

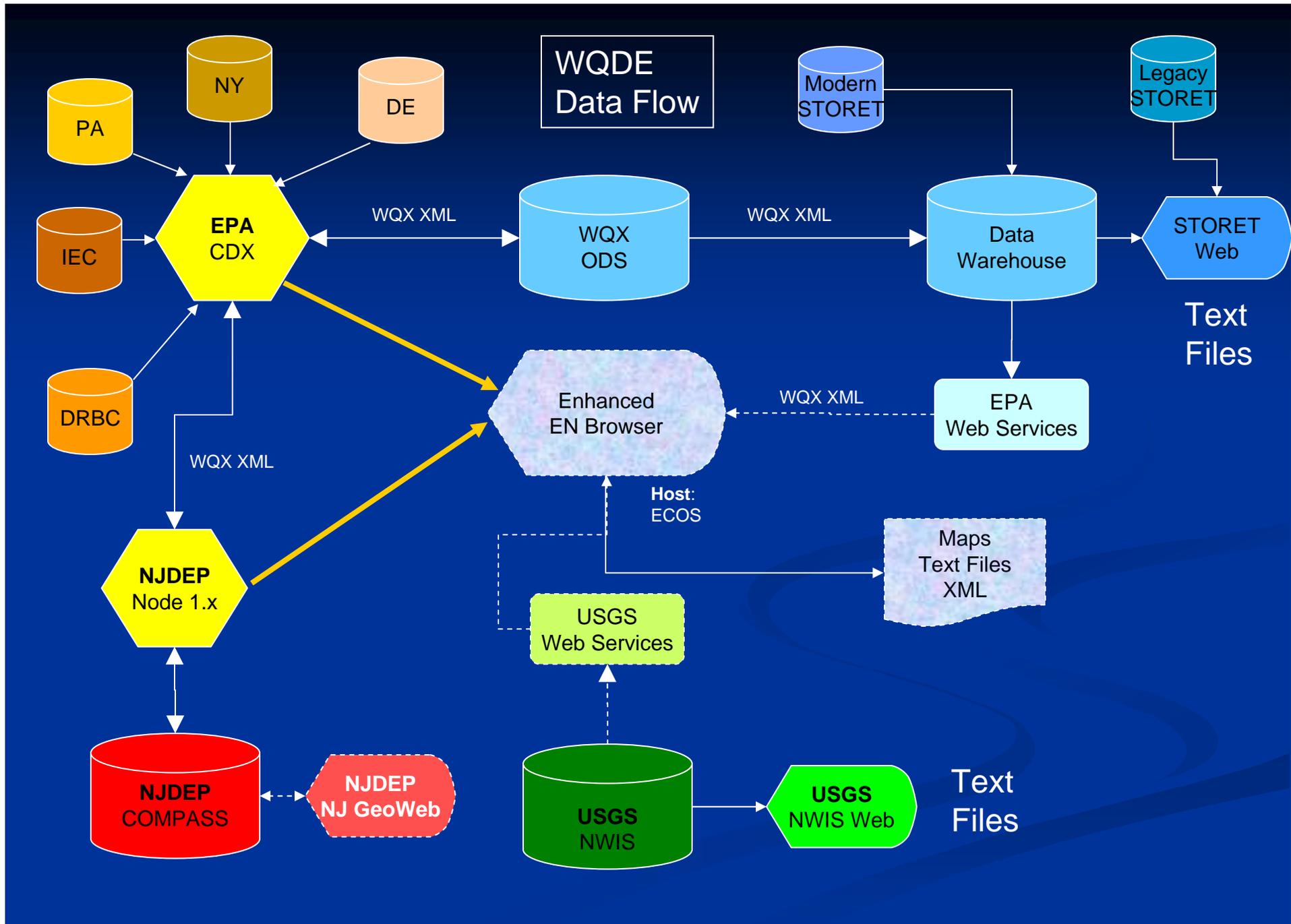
Flow Data  
 Continuous Data  
 Water Quality Data

WQDE

WQX

WQX





# Status



- Business Process **Analysis** – Done!
- Functional **Requirements** – Done!
- System **Design** – Draft design document available for review
- System **Development**, Data Preparation and Implementation – “Data in” portion and database changes being deployed to a test server
- **Testing** – Planned for the near future



# What Goes on In Testing?

- Follow test scripts (step by step instructions)
- Use your own data
- Find out what works and what doesn't
- Consultant fixes bugs overnight and during the intervening week
- Follow-up testing to make sure the bugs got fixed and new ones weren't created



# Who Should Test the System?

- Anyone who plans to use the system
  - Managers/Administrators
  - Data Entry Staff
  - Data Users/Report Generators



# Schedule

	<b>Testing</b>	<b>Production</b>
Data Entry	July 14 – Aug 8, 2008	August 22, 2008
Inventory/ Portal	Oct 6 – 31, 2008	Nov 14, 2008
Data to EPA/CDX	Dec 22, 2008 – Jan 9, 2009	Jan 15, 2009
Data from EPA and USGS	Feb 2 – Mar 6, 2009	Mar 31, 2009



# Special Thanks To:

- *Leslie McGeorge, Alena Baldwin Brown,* NJDEP Water Monitoring and Standards
- *Alfred Korndoerfer, Leigh Lager, Carol O'Donnell-Kee,* NJDEP Bureau of Freshwater & Biological Monitoring
- *Angela Witcher,* NJDEP/Office of Information Resource Management
- *Douglas Timms,* EnfoTech & Consulting



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- Paul Morton, Water Program Contact
  - NJDEP Water Monitoring & Standards
    - [Paul.Morton@dep.state.nj.us](mailto:Paul.Morton@dep.state.nj.us)
  
- Angela Witcher, WQDE Project Manager
  - NJDEP Office of Information Resource Management
    - [Angela.Witcher@dep.state.nj.us](mailto:Angela.Witcher@dep.state.nj.us)

