Driving Change with Citizen Science Data

.0	12.1	13.2	14.4	15.5	16.6
.2	13.4	14.5	15.6	16.8	17.9
.5	14.6	15.8	16.9	18.1	19.3
.8	16.0	17.1	18.3	19.5	20.6
.1	17.3	18.5	19.7	20.9	22.1
.5	18.7	19.9	21.1	22.3	23.5
.9	20.1	21.3	22.6	23.8	25.0
.3	21.6	22.8	24.1	25.3	26.6

Stan Stephansen

United States Environmental Protection Agency

Clean Water Division, EPA Region 2

Long Island Sound Citizen Summit

June 3rd, 2016

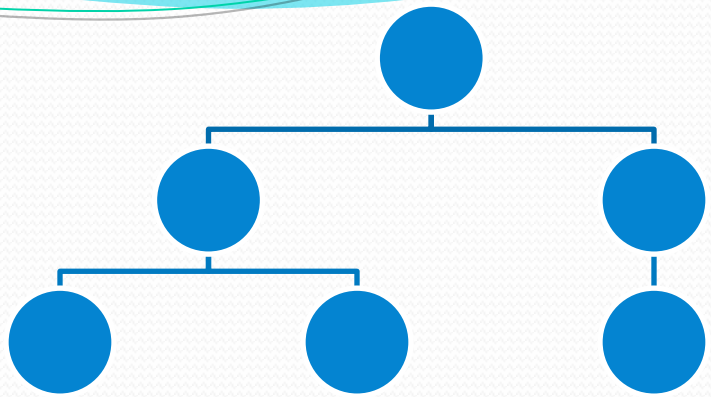
Stony Brook University

EPA The mission of the EPA is to protect public health and the environment

Overview of Presentation

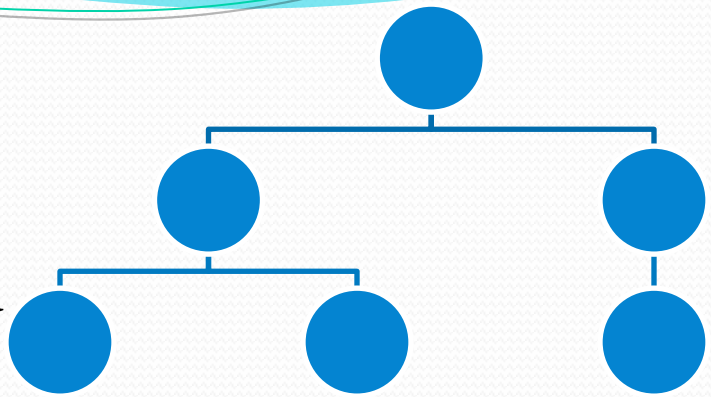
- Designing Your Program
- Existing Data and Data Systems
- Citizen Scientists – Driving Change
- Sharing Information
- Example Forms and Data Templates
- Data Verification and QA
- Questions

Designing Your Program



- Program Goals and Objectives
  - What do you really want to do?
  - How to accomplish your objectives?
  - Project Goals, Objectives, Tasks
- Degree of Regulatory Involvement and Understanding
  - Water Quality Standards, Assessment Program
  - Beach Program, TMDLs
  - NPDES Permits, Stormwater/MS4 program
- Collaborators
- Information Needs

Designing Your Program



- Know Your waterbody/Watershed
  - Sensitive Areas
  - Water Quality Standards/Criteria
  - Ambient Conditions, Assessment
  - Pollutant Sources
    - Point, Nonpoint
  - Land Use / Ownership
  - Assess and Analyze Existing Data
  - Put information on a map

Information Sources and Data Systems

- STORET
- WQX and Water Quality Portal
- Water Quality Portal Data Discovery Tool
- My Waters Mapper
- ECHO – Enforcement and Compliance History Online
- Excel File
- Map

Information Sources and Data Systems

- **STORET**
- Storage and Retrieval of Water Quality Data
  - Physical/Chemical
  - Biological
- Database Information owned by Organizations
- Organizations > Projects, Stations, Methods
  Results
- Additional metadata included/required
- Storet Data Warehouse
  - Select and Download
  - Web Services

STORET Central Warehouse

STORET Data Report

Geographic Location

Select a single type of location search that you wish to perform (state/county, latitude/longitude, or HUC). Then enter the corresponding search criteria.

○ **State/County**
(Option A)

State Name	County Name
ALL	ALL

Look Up

○ Select one or more state(s)
(Option B)

ALL
ALABAMA
ALASKA
AMERICAN SAMOA
ARIZONA
ARKANSAS
BAKER ISLAND
CALIFORNIA
COLORADO
CONNECTICUT

◉ Latitude/Longitude
(in decimal degrees)
(Option C)

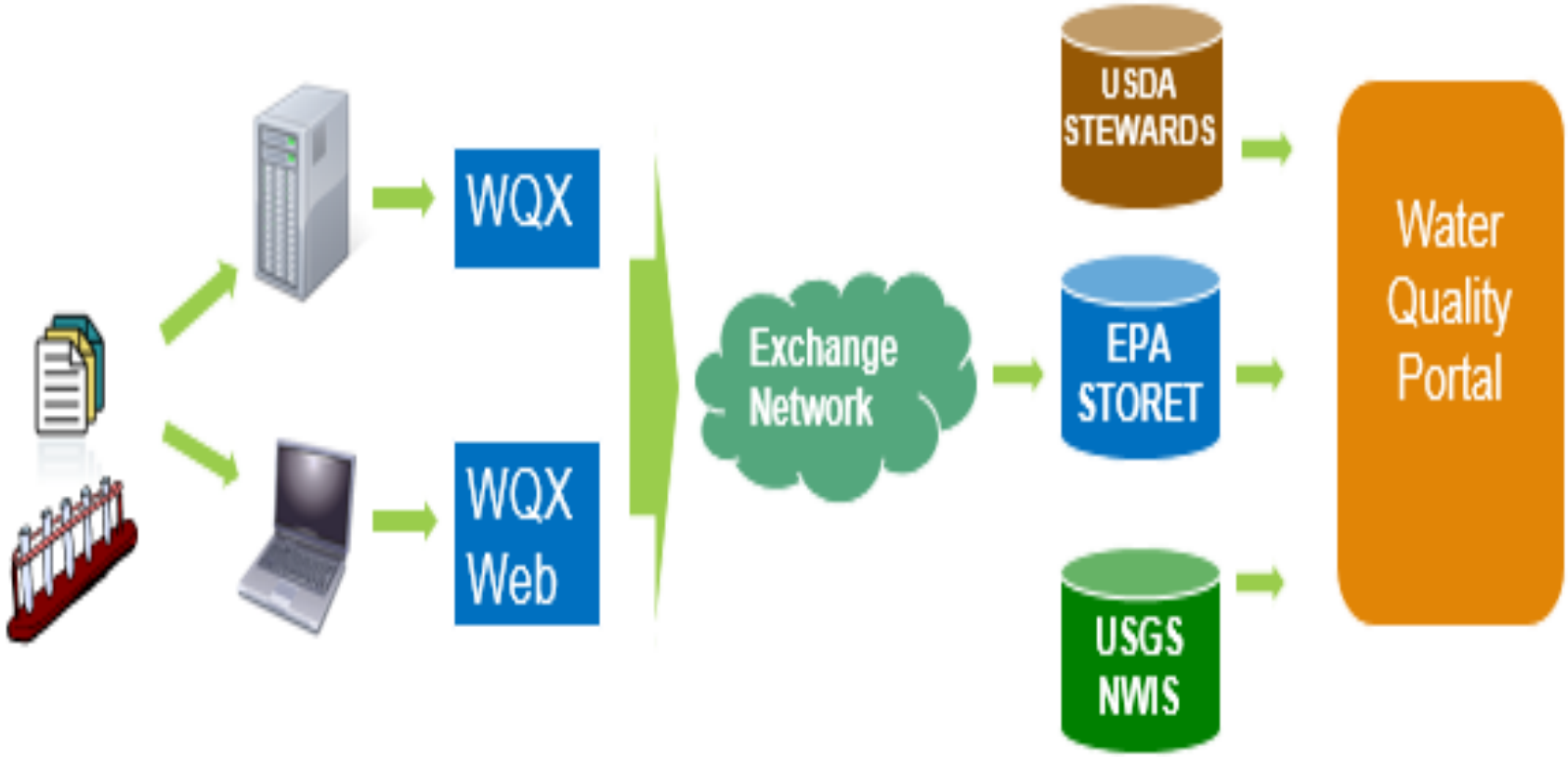
North Limit [ ] N

West Limit [ ] W

East Limit [ ] W

Click image for interactive map

Water Quality Exchange and Portal



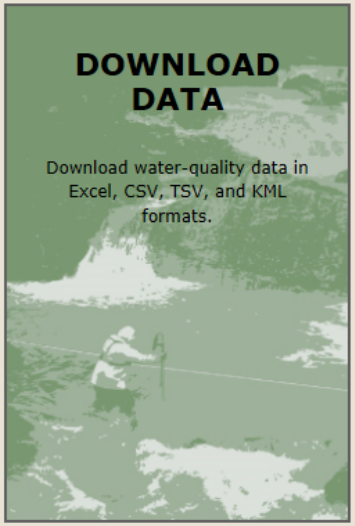
For more information on the portal see: www.waterqualitydata.us

National Water Quality Monitoring Council

Working together for clean water

Water Quality Portal

The Water Quality Portal (WQP) is a cooperative service sponsored by the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), and the National Water Quality Monitoring Council (NWQMC). It serves data collected by over 400 state, federal, tribal, and local agencies.



HOW TO USE THE WQP

User Guide
Web Services Guide
FAQs
Upload Data

NATIONAL RESULTS COVERAGE

Water-quality data in your state.

ABOUT THE WQP

What is the WQP?
Contributing organizations
Other Water Quality Portals
Contact us

National Water Quality Monitoring Council

Working together for clean water

Water Quality Data

WQP Home | Download Data | How to use the WQP | National Results Coverage | About the WQP

LOCATION

Place:

Country: All ?

State: All ?

County: All ?

Point Location: ?

Within 3 miles of

Lat: 40.91404

Long: -73.12330

Use my location

Bounding Box: ?

North:

South:

East:

West:

SITE PARAMETERS

Site Type: All ?

Organization ID: All ?

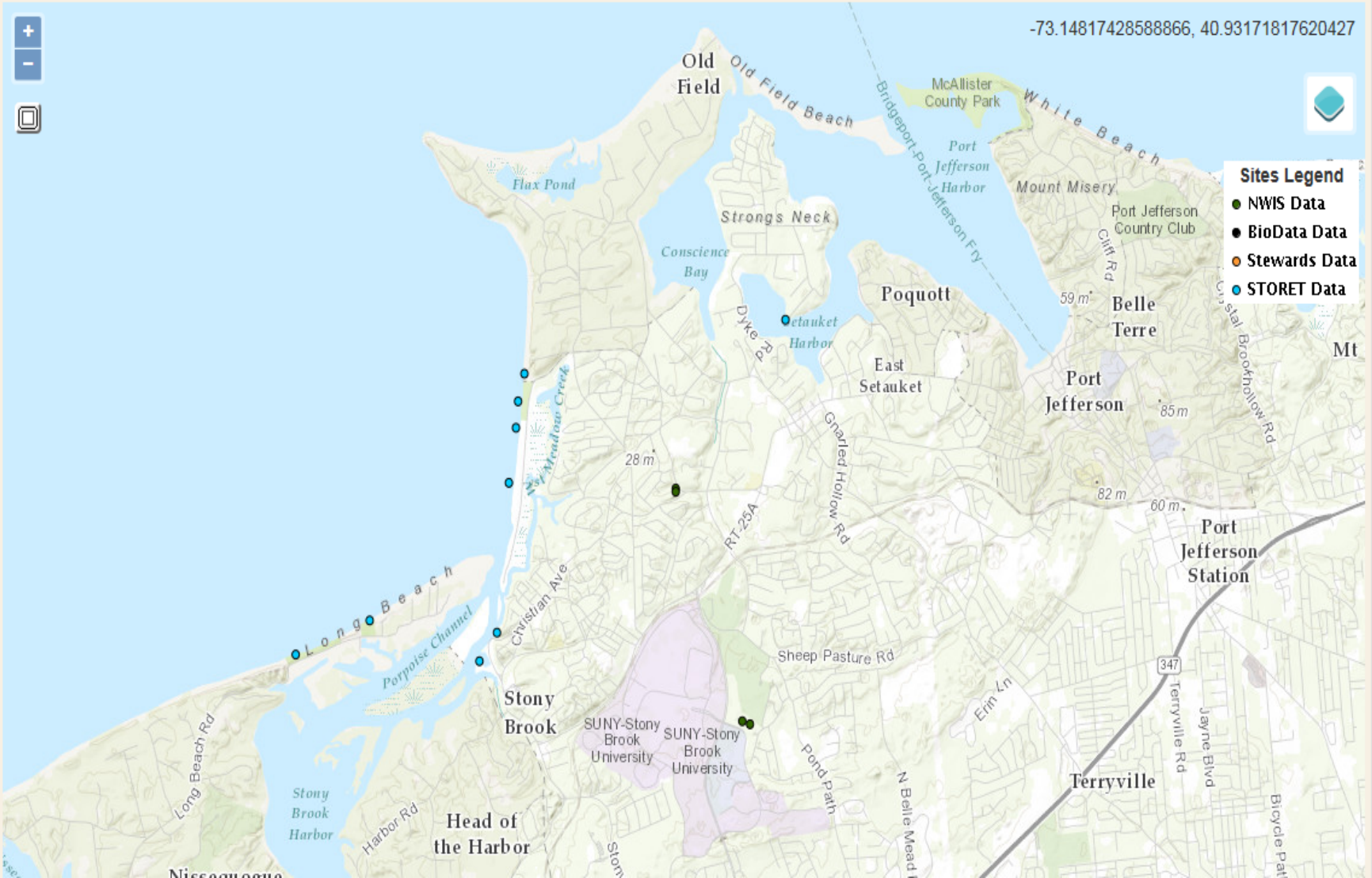
SAMPLING PARAMETERS

Sample Media: × Water ?

Characteristic Group: × Microbiological ?

Show sites on map

-73.14817428588866, 40.93171817620427



Information Sources and Data Systems

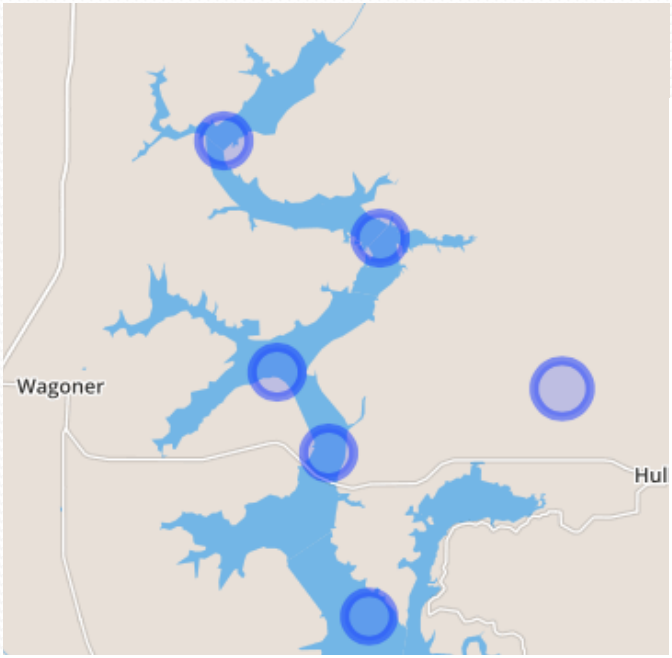
- **Data Discovery Tool**

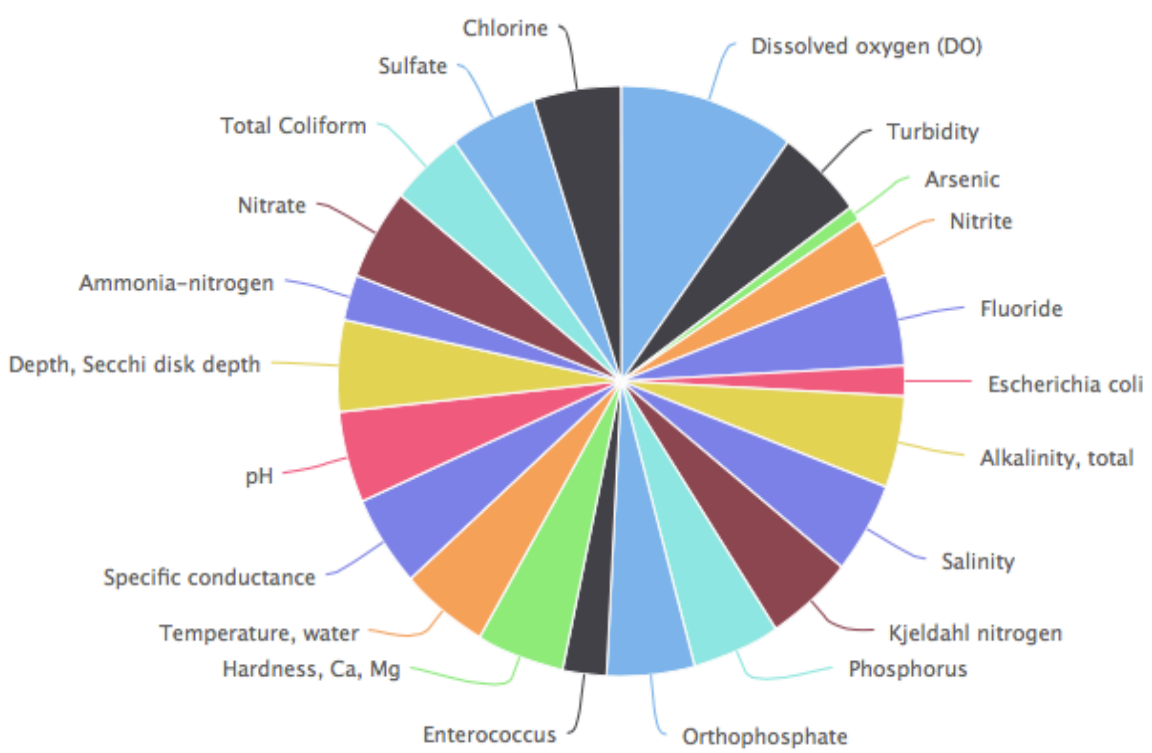
- Tool Uses Data from the Water Quality Portal
- Allows users to more easily discover data
  A. Advanced query functions
  B. More information about data before downloading

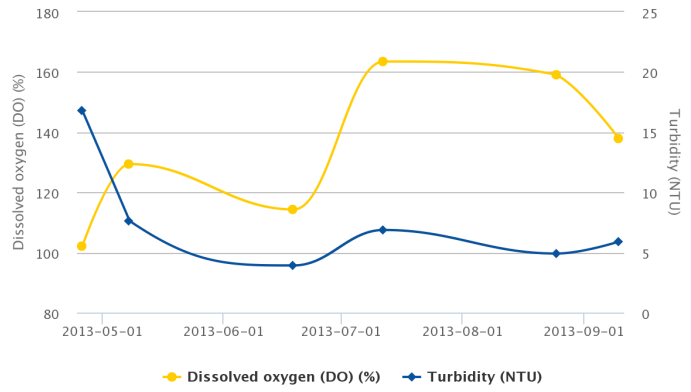
- Uses Open Source Coding - R

- First Step in creating analysis tools off of the Water Quality Portal!

Information Sources and Data Systems Discovery Tool Outputs

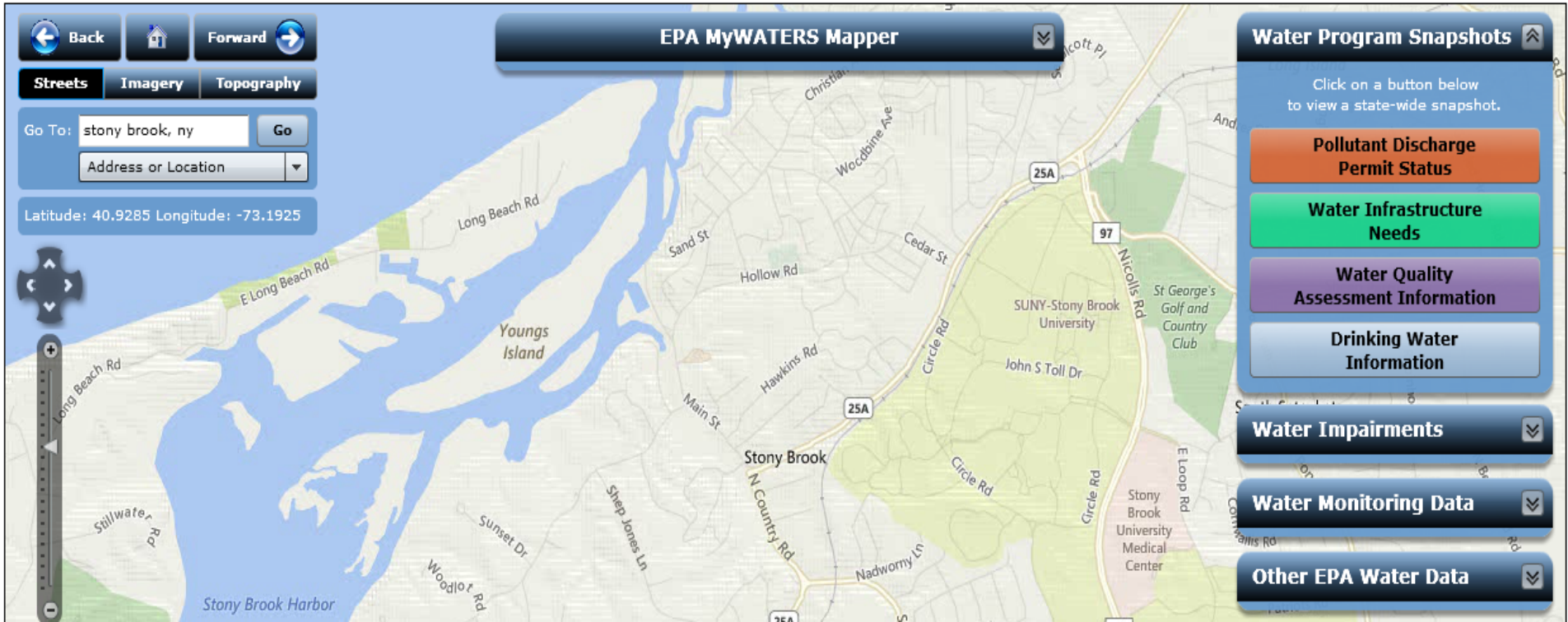






My WATERS Mapper

MyWATERS Mapper dynamically displays snapshots of EPA Office of Water program data. This version of MyWATERS Mapper depicts the status of NPDES permits for each State; summary information from the Clean Watershed Needs Survey; and water quality assessments. Future versions will include other Office of Water Program Snapshots. MyWATERS Mapper also contains water-related geographic themes such as 12-digit watersheds, the national stream network known as the National Hydrography Dataset, and other water-related map layers. MyWATERS Mapper enables you to create customized maps at national and local scales.



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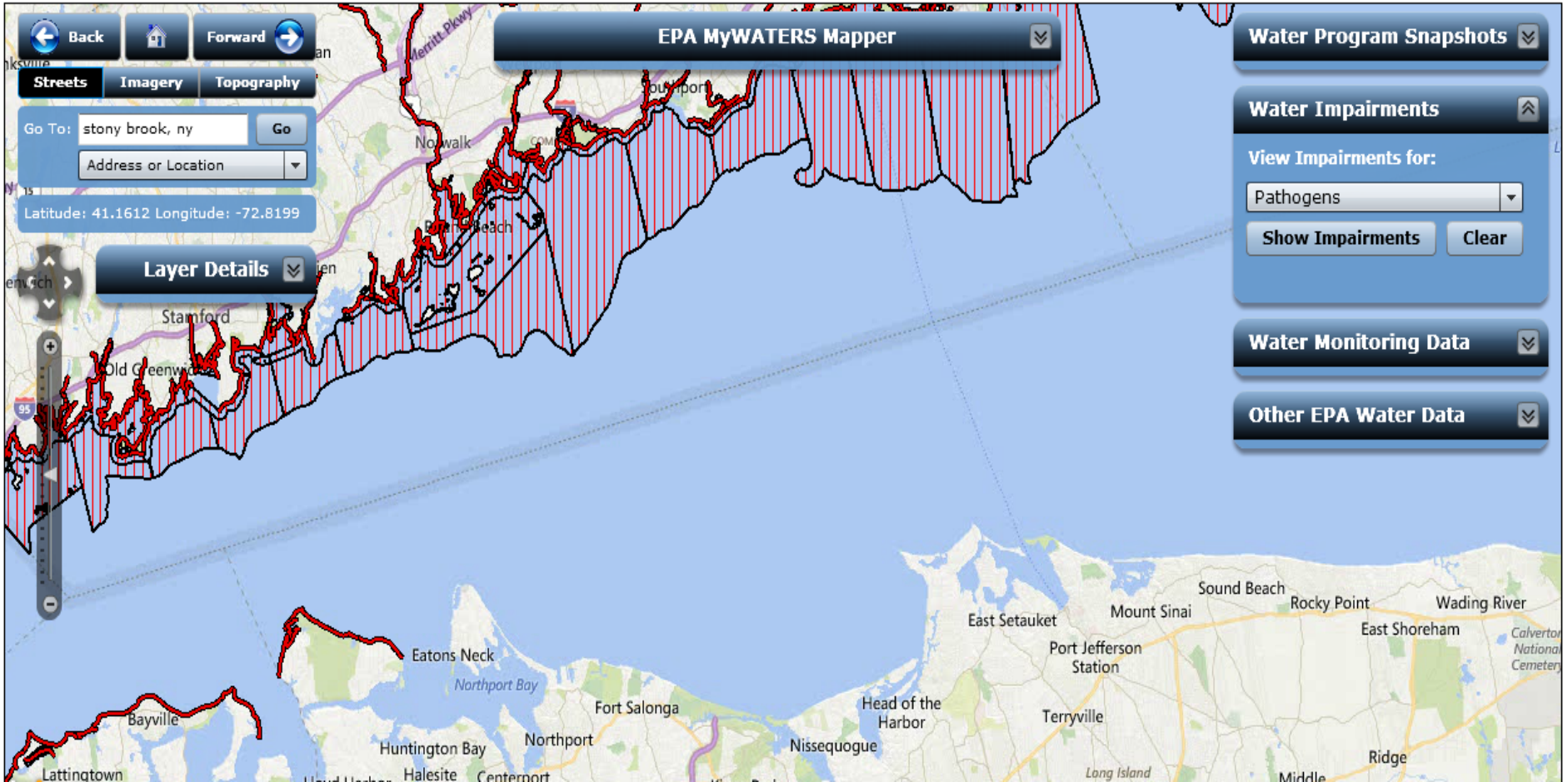

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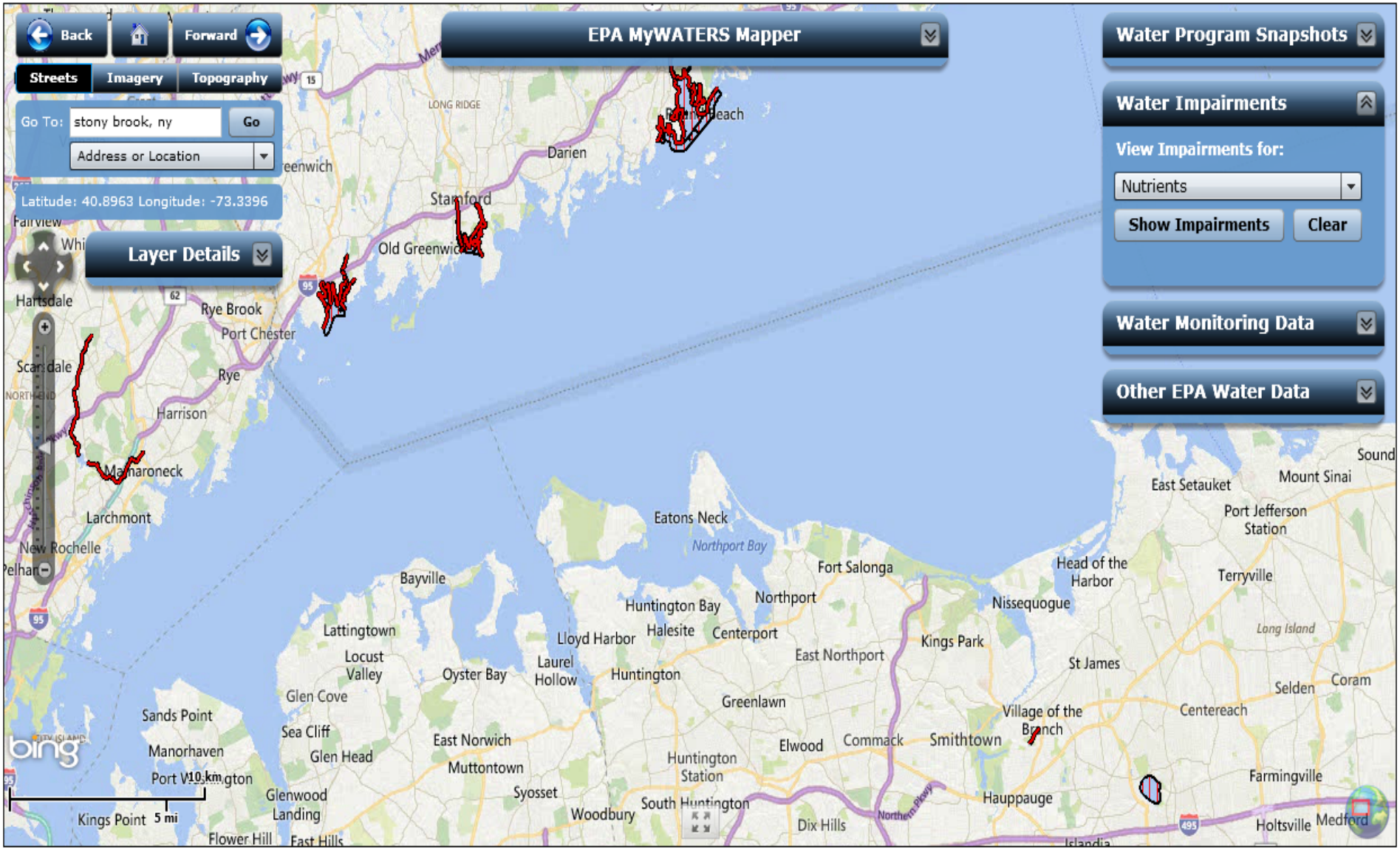


ECHO Enforcement and Compliance History Online

ECHO Gov Login | Contact

You have been redirected from the former ECHO site to the modernized ECHO, now at echo.epa.gov. Please update your bookmarks, and see our ECHO Modernization Information page to learn about the new ECHO.

Search Community

Explore Facilities

Search Community

Use EPA's Enforcement and Compliance History Online website to search for facilities in your community to assess their compliance with environmental regulations. You can also investigate pollution sources, examine and create enforcement-related maps, or explore your state's performance. Learn more about ECHO

Quick Search

Enter city, state and/or zip code

Search

Tutorial

More Search Options

Create Maps

Analyze Trends

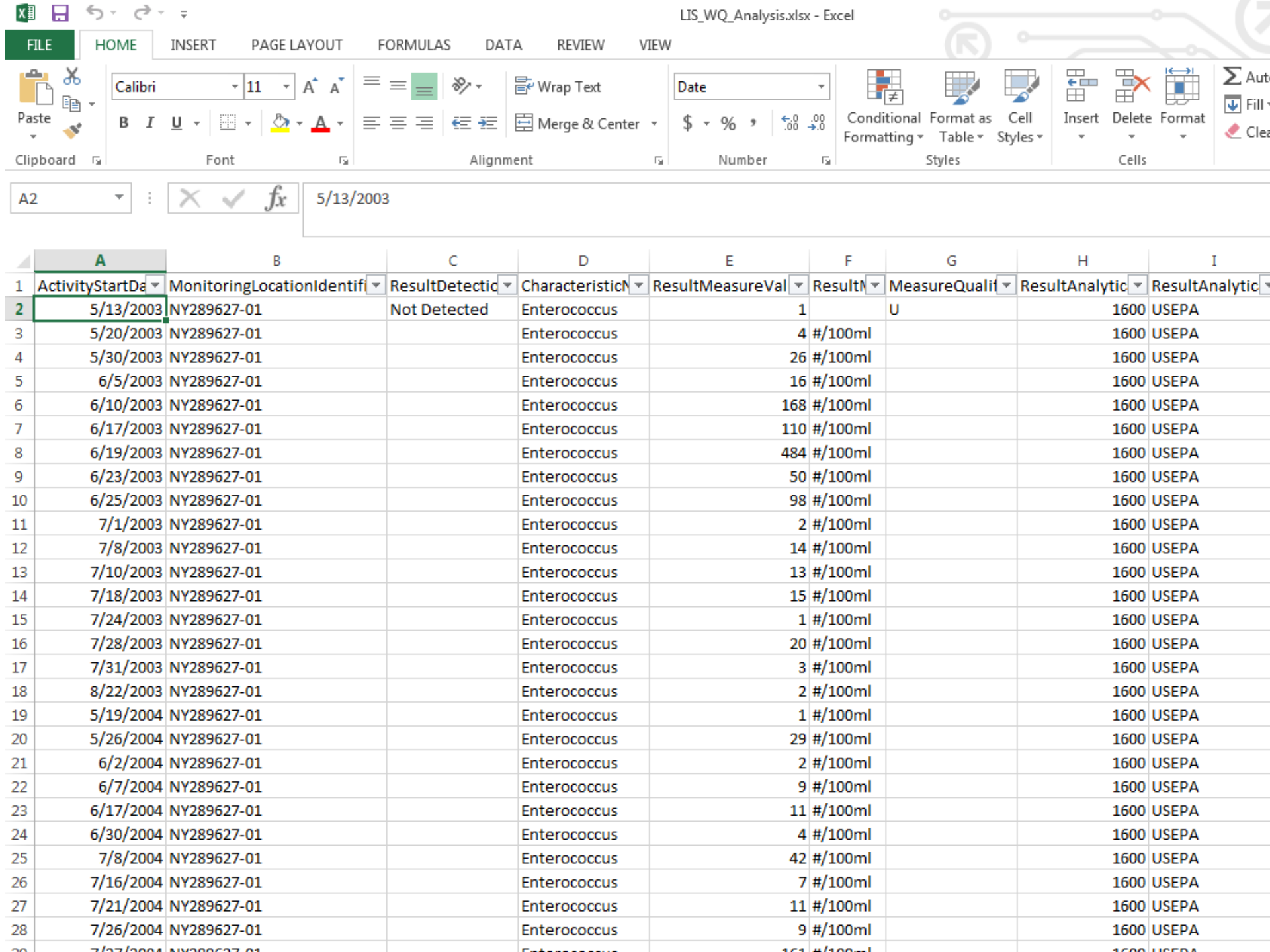
Latest News | ECHO News

- Check here for monthly webinars on ECHO tools!
- EPA Enforcement Case Search Enhanced
- What's New in ECHO
- Join the ECHO Listserv

Help

Resources

Advanced Tools



	A	B	C	D	E	F	G	H	I
1	ActivityStartDa	MonitoringLocationIdentif	ResultDetectic	CharacteristicN	ResultMeasureVal	ResultM	MeasureQualif	ResultAnalytic	ResultAnalytic
2	5/13/2003	NY289627-01	Not Detected	Enterococcus	1		U	1600	USEPA
3	5/20/2003	NY289627-01		Enterococcus	4	#/100ml		1600	USEPA
4	5/30/2003	NY289627-01		Enterococcus	26	#/100ml		1600	USEPA
5	6/5/2003	NY289627-01		Enterococcus	16	#/100ml		1600	USEPA
6	6/10/2003	NY289627-01		Enterococcus	168	#/100ml		1600	USEPA
7	6/17/2003	NY289627-01		Enterococcus	110	#/100ml		1600	USEPA
8	6/19/2003	NY289627-01		Enterococcus	484	#/100ml		1600	USEPA
9	6/23/2003	NY289627-01		Enterococcus	50	#/100ml		1600	USEPA
10	6/25/2003	NY289627-01		Enterococcus	98	#/100ml		1600	USEPA
11	7/1/2003	NY289627-01		Enterococcus	2	#/100ml		1600	USEPA
12	7/8/2003	NY289627-01		Enterococcus	14	#/100ml		1600	USEPA
13	7/10/2003	NY289627-01		Enterococcus	13	#/100ml		1600	USEPA
14	7/18/2003	NY289627-01		Enterococcus	15	#/100ml		1600	USEPA
15	7/24/2003	NY289627-01		Enterococcus	1	#/100ml		1600	USEPA
16	7/28/2003	NY289627-01		Enterococcus	20	#/100ml		1600	USEPA
17	7/31/2003	NY289627-01		Enterococcus	3	#/100ml		1600	USEPA
18	8/22/2003	NY289627-01		Enterococcus	2	#/100ml		1600	USEPA
19	5/19/2004	NY289627-01		Enterococcus	1	#/100ml		1600	USEPA
20	5/26/2004	NY289627-01		Enterococcus	29	#/100ml		1600	USEPA
21	6/2/2004	NY289627-01		Enterococcus	2	#/100ml		1600	USEPA
22	6/7/2004	NY289627-01		Enterococcus	9	#/100ml		1600	USEPA
23	6/17/2004	NY289627-01		Enterococcus	11	#/100ml		1600	USEPA
24	6/30/2004	NY289627-01		Enterococcus	4	#/100ml		1600	USEPA
25	7/8/2004	NY289627-01		Enterococcus	42	#/100ml		1600	USEPA
26	7/16/2004	NY289627-01		Enterococcus	7	#/100ml		1600	USEPA
27	7/21/2004	NY289627-01		Enterococcus	11	#/100ml		1600	USEPA
28	7/26/2004	NY289627-01		Enterococcus	9	#/100ml		1600	USEPA

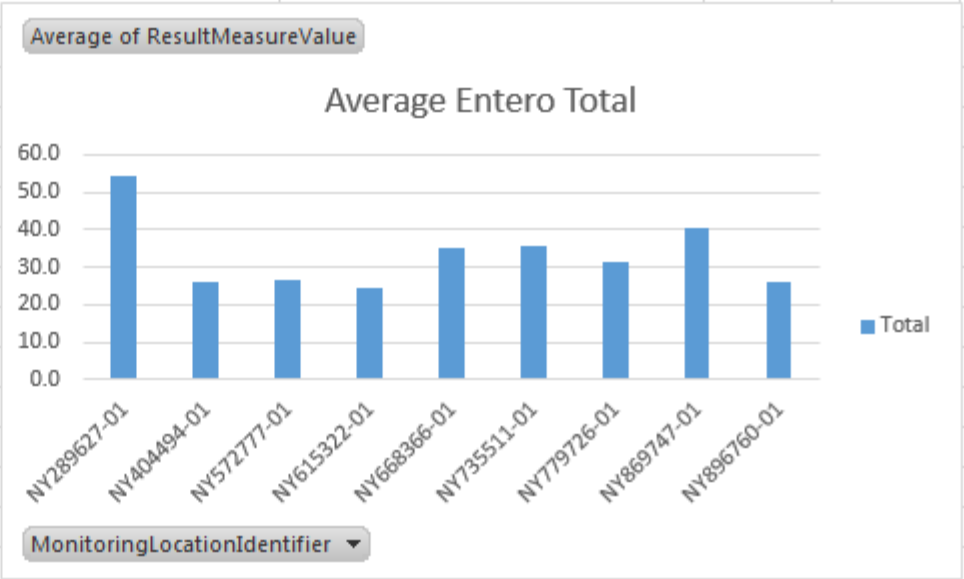
Calibri 11 Wrap Text General Merge & Center Conditional Formatting Format as Table Cell Styles Insert Delete Form

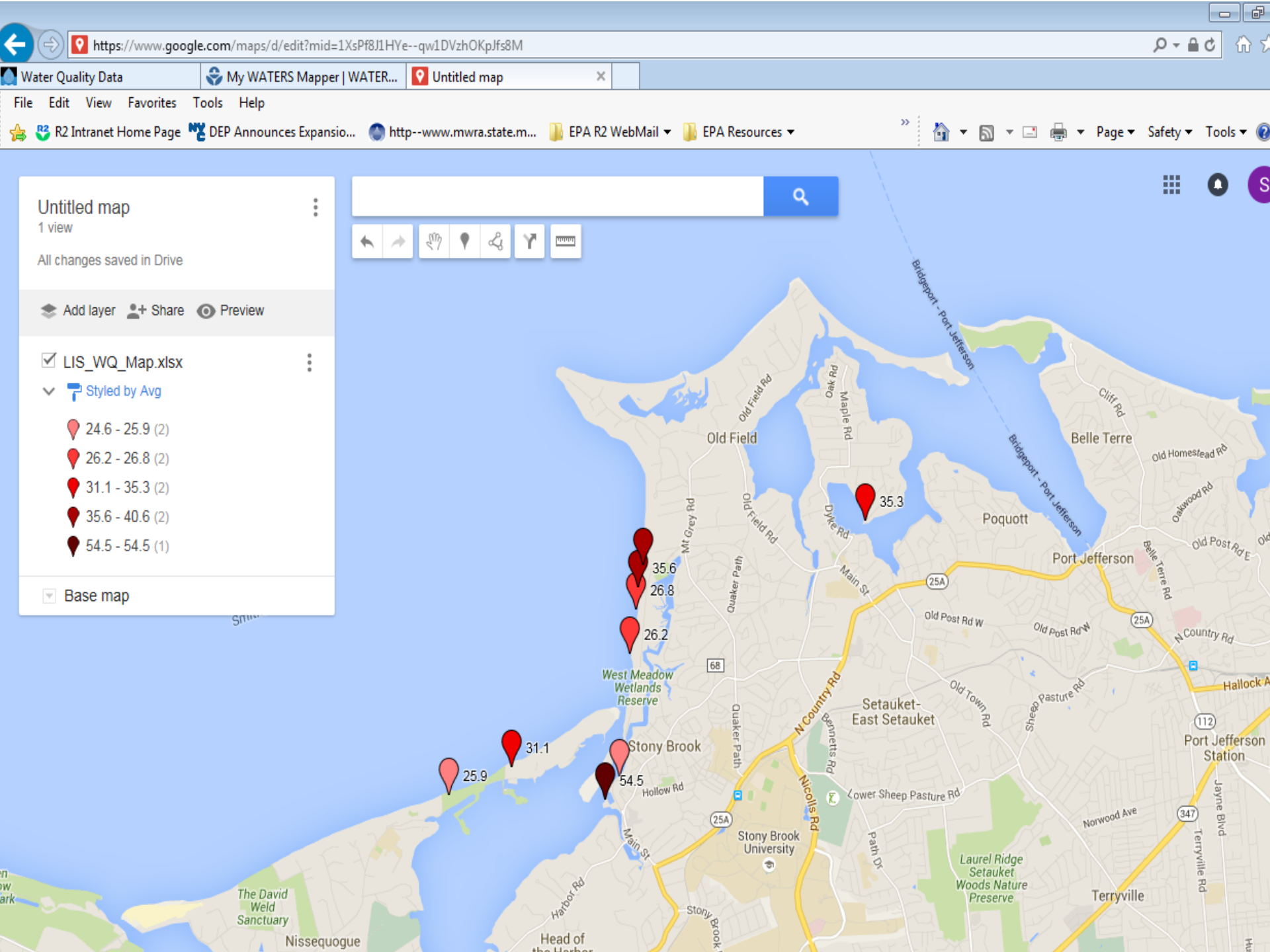
Font Alignment Number Styles Cells

Row Labels

Row Labels	Count of ResultMeasureValue	Max of ResultMeasureValue	Average of ResultMeasureValue
NY289627-01	359	1880	54.5
NY404494-01	370	716	25.9
NY572777-01	204	800	26.8
NY615322-01	372	800	24.6
NY668366-01	194	612	35.3
NY735511-01	374	752	35.6
NY779726-01	369	612	31.1
NY869747-01	370	800	40.6
NY896760-01	55	172	26.2
Grand Total	**2667**	**1880**	**34.5**

Row Labels	Average of ResultMeasureValue
NY289627-01	54.5
NY404494-01	25.9
NY572777-01	26.8
NY615322-01	24.6
NY668366-01	35.3
NY735511-01	35.6
NY779726-01	31.1
NY869747-01	40.6
NY896760-01	26.2
Grand Total	**34.5**




https://www.google.com/maps/d/edit?mid=1XsPf8J1HYe--qw1DVzhOKpJfs8M
Water Quality Data
My WATERS Mapper | WATER...
Untitled map
File Edit View Favorites Tools Help
R2 Intranet Home Page
DEP Announces Expansio...
http--www.mwra.state.m...
EPA R2 WebMail
EPA Resources
Page Safety Tools
Untitled map
1 view
All changes saved in Drive
Add layer
Share
Preview
LIS_WQ_Map.xlsx
Styled by Avg
24.6 - 25.9 (2)
26.2 - 26.8 (2)
31.1 - 35.3 (2)
35.6 - 40.6 (2)
54.5 - 54.5 (1)
Base map
35.3
35.6
26.8
26.2
31.1
25.9
54.5
Old Field
Poquott
Port Jefferson
Belle Terre
Setauket-East Setauket
Stony Brook
Stony Brook University
Port Jefferson Station
Terryville
Nissequogue
Head of the Harbor
West Meadow Wetlands Reserve
The David Weld Sanctuary
Laurel Ridge Setauket Woods Nature Preserve
Bridgeport - Port Jefferson
Old Field Rd
Mt Grey Rd
Quaker Path
Main St
Dyke Rd
Maple Rd
Oak Rd
Cliff Rd
Old Homestead Rd
Oakwood Rd
Old Post Rd E
Old Post Rd W
Belle Terre Rd
N Country Rd
Old Town Rd
Sheep Pasture Rd
Bennetts Rd
Nicolls Rd
Lower Sheep Pasture Rd
Hollow Rd
Harbor Rd
Path Dr
Norwood Ave
Jayne Blvd
Terryville Rd
Hallock A
25A
68
112
347

Citizen Scientists – Driving Change

STATEMENT OF MRS. HUGH F. STODDART

MASSACHUSETTS COORDINATOR,

NASHUA RIVER CLEAN UP COMMITTEE

GROTON, MASSACHUSETTS

MRS. STODDART. Thank you.

Chairman Stein, Conferees, ladies and gentlemen, I am Mrs. Hugh F. Stoddart, the Massachusetts Coordinator of the Nashua River Clean Up Committee and I represent the 155,000 people in the Nashua River Watershed who want the maximum number of uses for the Nashua River attained as expeditiously as possible.

successfully pushed to raise the River Classification from “U”, unsuitable for the transportation of waste, to “B-“, suitable for all uses including fishing, swimming, and boating

Citizen Scientists – Driving Change

Nashua River – 1960's vs 1980's

(downloaded 6/2/2016 from http://www.ricka.org/Conservation/nrwa.html)

NY Water Quality Standards

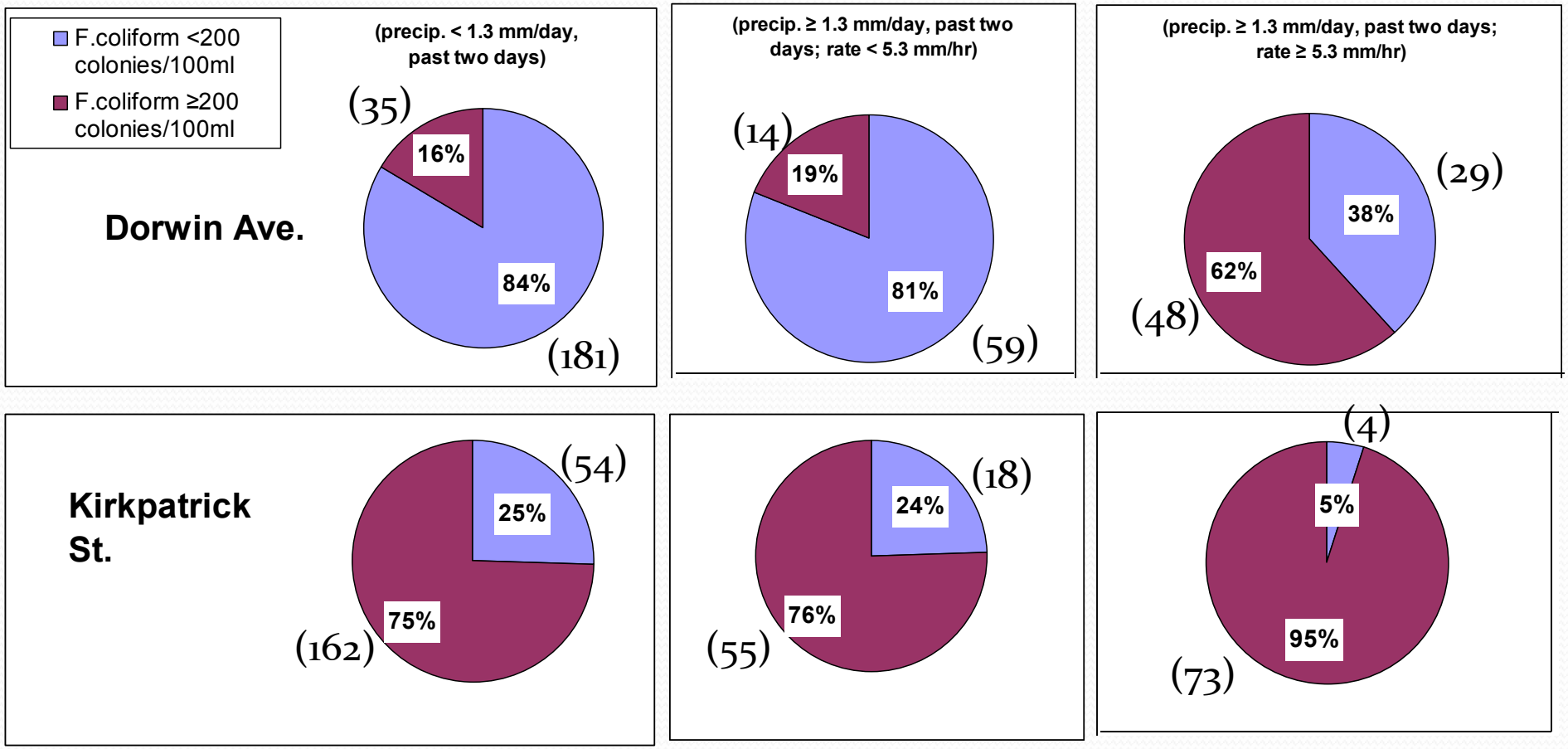
Class	Best Use	DO - criteria	Fecal Coliform - criteria
SA	Shellfishing, primary and secondary contact recreation; and fishing. Wildlife propagation and survival.	Not < daily avg. of 4.8 mg/L. Not < 3.0 mg/L at any time.	**Total Coliforms:** MPN Not > 70
SB	Primary and secondary contact recreation; and fishing. Wildlife propagation and survival.	Not < daily avg. of 4.8 mg/L. Not < 3.0 mg/L at any time.	Monthly geometric mean, from a minimum of five examinations, shall not exceed 200
SC	Fishing. Wildlife propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.	Not < daily avg. of 4.8 mg/L. Not < 3.0 mg/L at any time.	Monthly geometric mean, from a minimum of five examinations, shall not exceed 200
I	Secondary contact recreation and fishing. Wildlife propagation and survival.	Not < 4.0 mg/L at any time.	Monthly geometric mean, from a minimum of five examinations, shall not exceed 2000
SD	Fishing. Fish, shellfish, and wildlife survival.	Not < 3.0 mg/L at any time.	

Citizen Scientists – Driving Change

- Murray Stein
  - Mr. Stein usually dealt with resistance through soft-spoken amiability. His standard lines were: “We’re dealing with facts subject to scientific measurement. Once we get agreement on the facts, the solutions will present themselves.”
  - His technique was to preside over hearings at which local officials and corporate executives were confronted with evidence of pollution and then invited or cajoled into adopting remedial programs.
- Onondaga Environmental Institute
  - Monitoring and Remediating Pathogen Discharges to Urban Surface Waters
  - Syracuse, NY

Comparison of Onondaga Creek Waters to NYS Standard Value for Pathogens

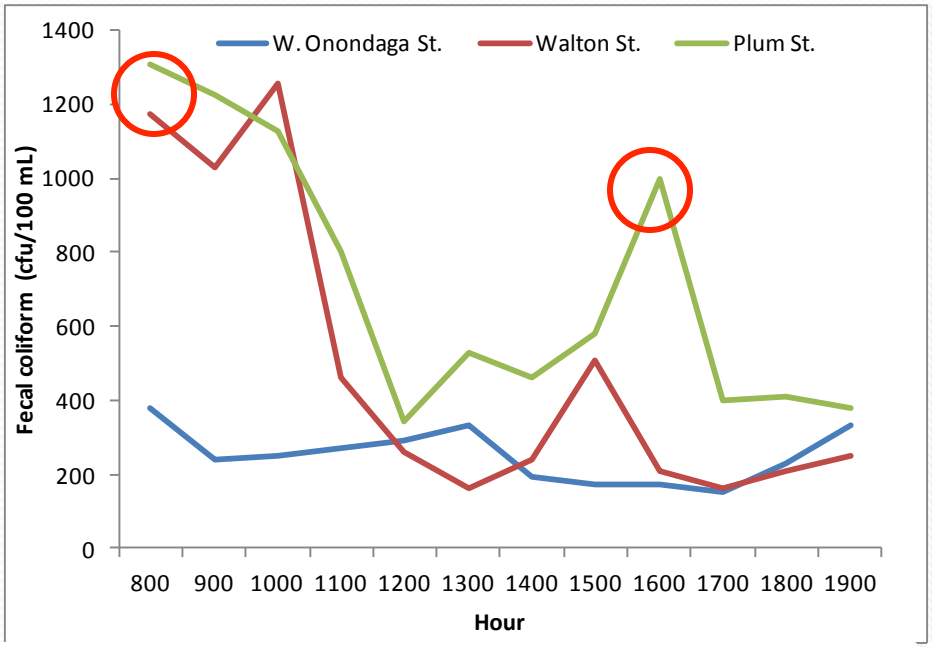
Weather condition:	Dry Weather	Light Precipitation	Heavy Precipitation
Days per year:	216 d/yr	73 d/yr	77 d/yr



All data collected by Onondaga County between January 1, 2000 and Dec. 31, 2006. Weather data are collected at Metro sewage treatment plant.

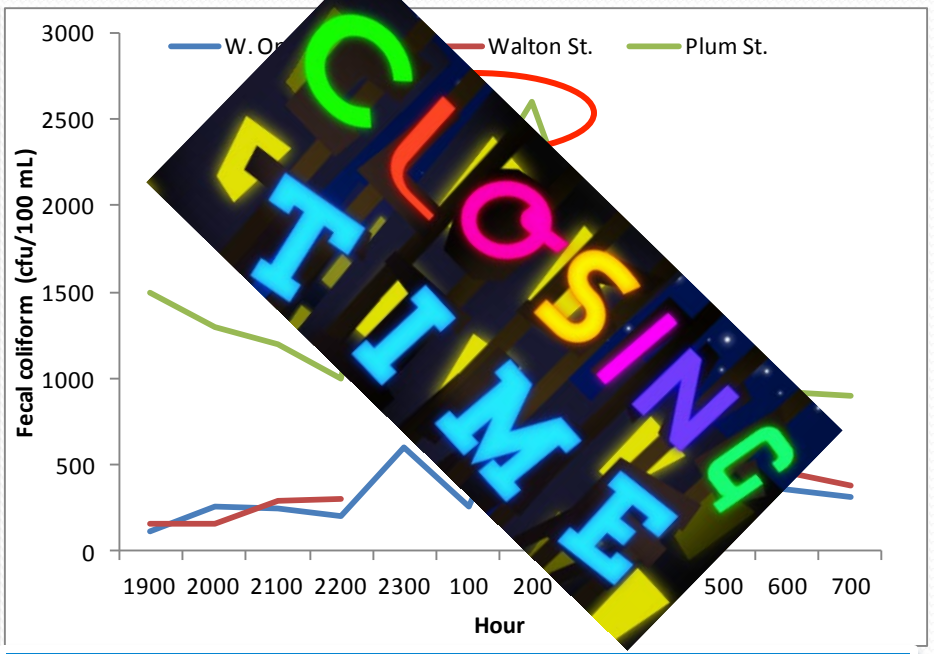
Temporal: Onondaga Creek

7/11/12 (Daytime)



Peaks in the morning and midafternoon

8/22/12 (Nighttime)

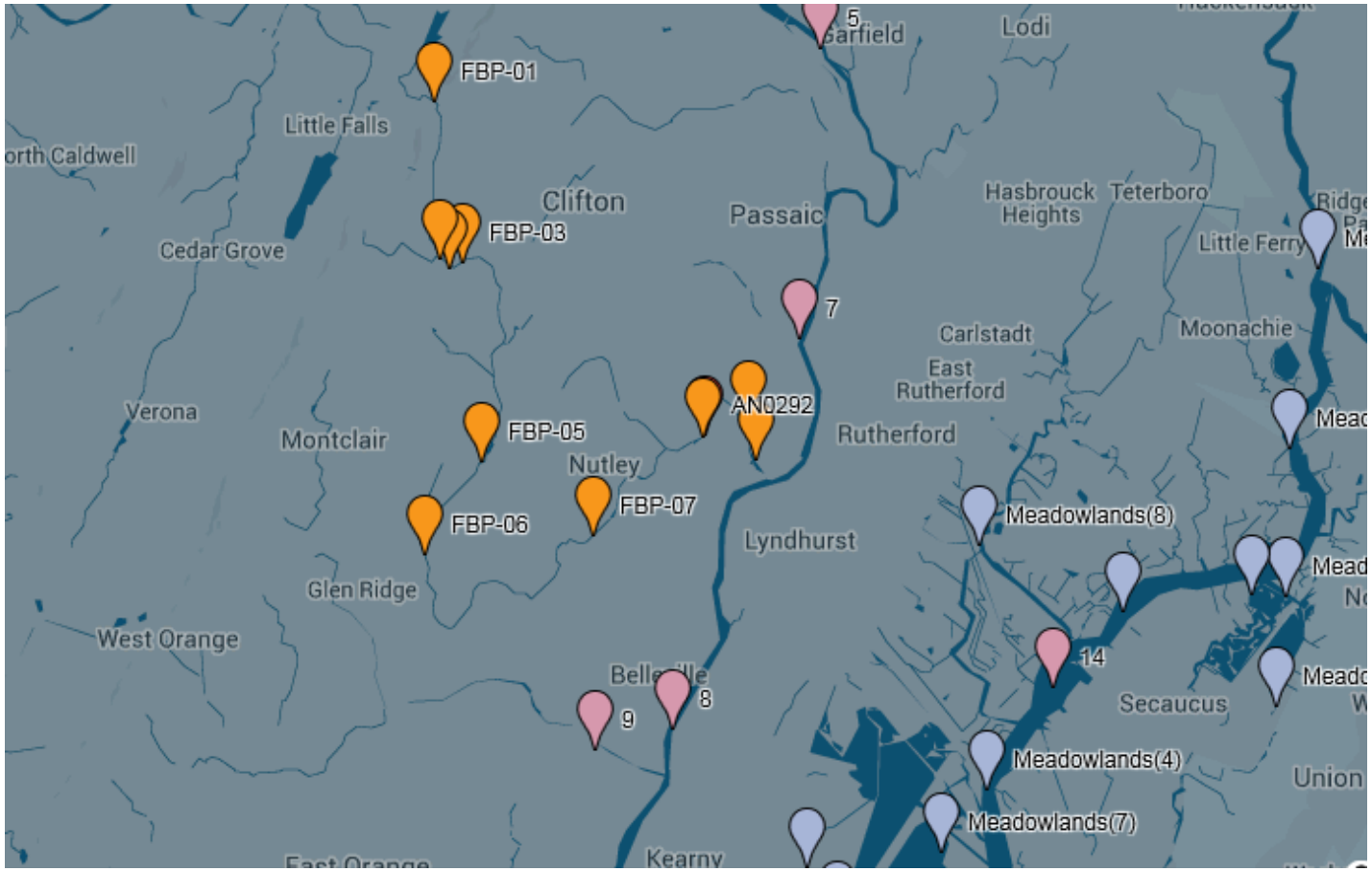


Peaks in the early morning

Sharing Information

- Electronic data are more valuable than data in file cabinets
- The more data are re-used, the more valuable they become
  - Collect once – use multiple times
- Shared data are of even higher value
  - Provide for better planning decisions
  - Incentivize collaborative efforts
  - Make the most use of the data collection resources being invested
  - Avoid duplication of efforts

Using WQX/Storet to identify locations



Sharing Information

- Encourage the use of WQX/Storet
  - Training sessions
- Development of Standardized Forms for Citizen Scientists
  - Field, Lab, COC
- Initial Data Template (Excel)
- Staff to assist/load Data Template into WQX/Storet
- Data Validation and QA needed prior to entry/archival in WQX/Storet
  - GIGO
- Metadata is important

Links and Contact Information

- Storet
- https://www.epa.gov/waterdata/storage-and-retrieval-and-water-quality-exchange
- Water Quality Portal
- http://www.waterqualitydata.us/
- Water Quality Portal Data Discovery Tool
- https://www.epa.gov/waterdata/water-quality-portal-data-discovery-tool
- My Waters Mapper
- https://watersgeo.epa.gov/mwm/
- ECHO – Enforcement and Compliance History Online
- https://echo.epa.gov/?redirect=echo

Contact Information

Stan Stephansen
•EPA Region 2, Clean Water Division
•Stephansen.Stanley@epa.gov
•212-637-3776

.0	12.1	13.2	14.4	15.5	16.6
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.1	17.3	18.5	19.7	20.9	22.1
.5	18.7	19.9	21.1	22.3	23.5
.9	20.1	21.3	22.6	23.8	25.0
.3	21.6	22.8	24.1	25.3	26.6