

ADVANCED TECHNIQUES FOR AUTOMATED WATER QUALITY ASSESSMENTS

Jack Pflaumer, Roop Guha, Joseph Aiello
New Jersey Department of Environmental
Protection

Introduction

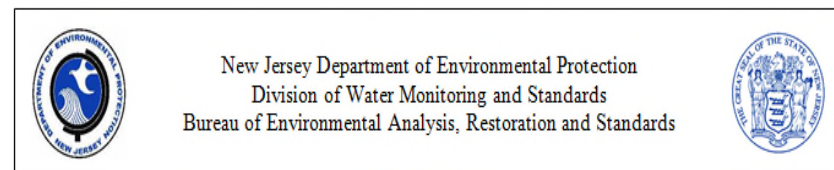
- Why do we need automation?
- Individual aspects of the process
- Automation steps
- Analyses and plotting tools developed
- Demonstration
- Future Projects

- [illegible]

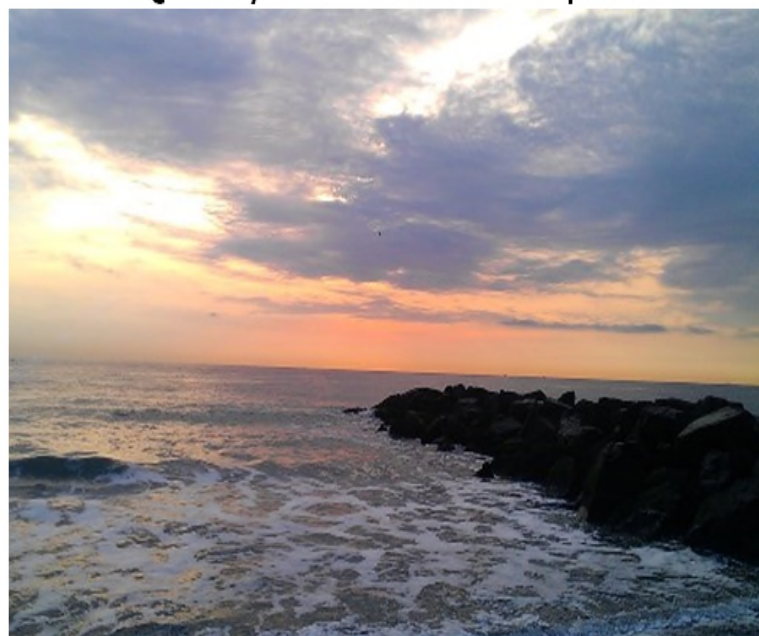


Integrated Reporting Process

- Chemistry Data Crunching
 - 958 assessment units (HUC14)
 - 5 - >10 years of data
 - > 10,000 discrete stations
 - > 3.2 million discrete data
 - > 300 continuous monitoring stations
 - > 90 parameters
 - Biological data
- Assessments
 - Station level
 - HUC level chemistry and biological assessment rollup
 - Designated Use assessment



2014 New Jersey Integrated Water Quality Assessment Report



Atlantic Ocean at Rock Jetty, Long Branch, New Jersey
Photo: Courtesy of Jon Dugan (AmeriCorps NJ Watershed Ambassador)

Draft
December 2015

Process Components

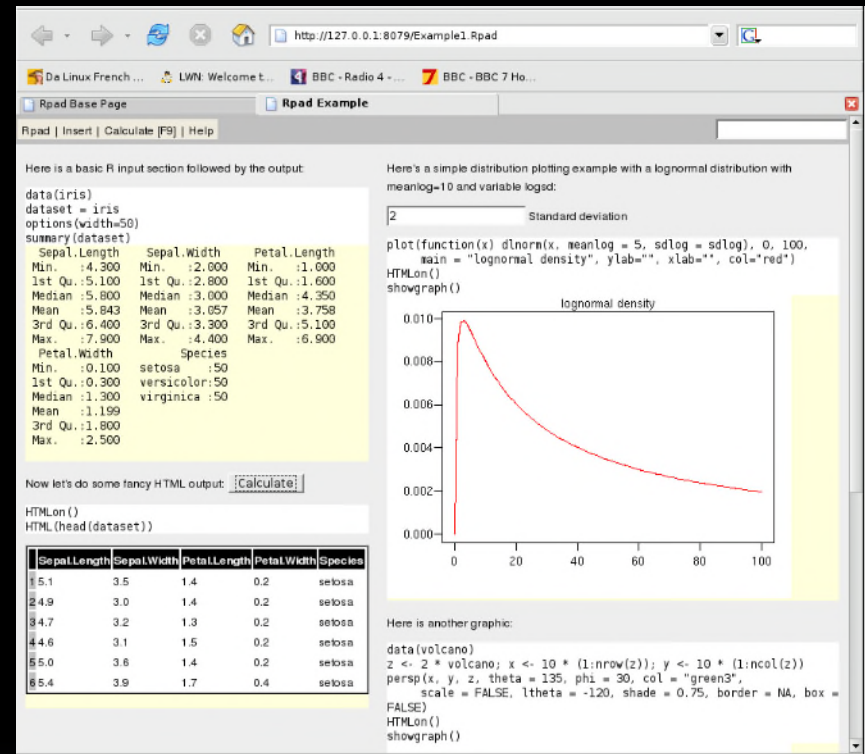
- Data solicitation
- Methods document
- Data download

- Data QA
- Data Analyses
- Comprehensive Assessment - Tools
- Compile tables and graphs for Report

R

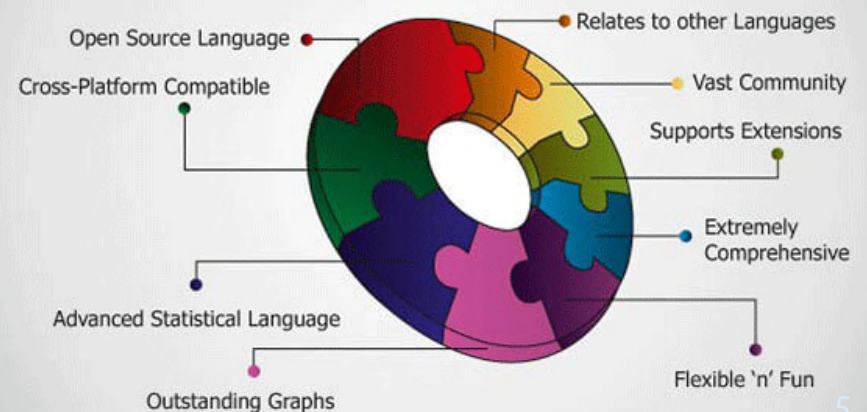
R-Shiny

- Report Generation
- ATTAINS batch files upload – **FINAL SCHEMA NOT YET AVAILABLE**



Why Learn R?

edureka!



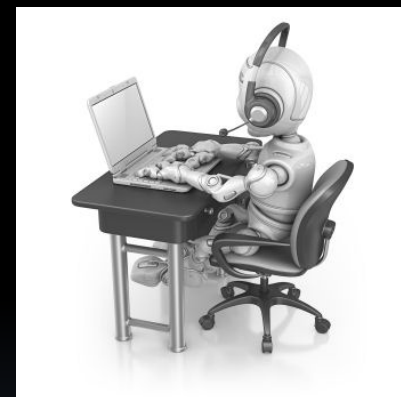
Quality Assurance Tools

- Check duplicate records – entire record, USGS duplicates (e.g. NH₃ is reported by both mg/L-N and mg/L-NH₃)
- Remove
 - Continuous data including max/min (Cont. data assessed separately)
 - Quality control data
 - Continuous records
 - Lab comments
 - Site conditions
 - Result comments
 - Data errors
 - Data without approved QAPPs
- Substitutes censored data
- Normalizes reporting units and parameter names
- Flags preliminary and estimated data

A	B	C	D	E	H	L	M	N	O	P	Q	R
orgid	actid	actyp	stdate	sttime	locid	metcont	metnam	detcond	charnam	samfrac	val	valunit
31DELRBC	31DELRBC_WQX-1003	Field Msr/l	3/22/2010	10:07:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		8.52	mg/l
31DELRBC	31DELRBC_WQX-1004	Field Msr/l	4/20/2010	10:05:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		9.16	mg/l
31DELRBC	31DELRBC_WQX-1005	Field Msr/l	5/25/2010	10:03:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		9.97	mg/l
31DELRBC	31DELRBC_WQX-1006	Field Msr/l	6/22/2010	0:00:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.53	mg/l
31DELRBC	31DELRBC_WQX-1007	Field Msr/l	7/20/2010	12:46:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.48	mg/l
31DELRBC	31DELRBC_WQX-1008	Field Msr/l	8/30/2010	10:23:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		7.01	mg/l
31DELRBC	31DELRBC_WQX-1009	Field Msr/l	9/27/2010	10:28:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.04	mg/l
31DELRBC	31DELRBC_WQX-1010	Field Msr/l	10/26/2010	9:42:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		8.73	mg/l
31DELRBC	31DELRBC_WQX-1104	Field Msr/l	4/26/2011	9:46:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		10.48	mg/l
31DELRBC	31DELRBC_WQX-1105	Field Msr/l	5/24/2011	10:26:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		8.96	mg/l
31DELRBC	31DELRBC_WQX-1106	Field Msr/l	6/21/2011	10:08:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.14	mg/l
31DELRBC	31DELRBC_WQX-1107	Field Msr/l	7/19/2011	10:27:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.45	mg/l
31DELRBC	31DELRBC_WQX-1108	Field Msr/l	8/22/2011	10:36:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		5.86	mg/l
31DELRBC	31DELRBC_WQX-1109	Field Msr/l	9/14/2011	10:06:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		7.62	mg/l
31DELRBC	31DELRBC_WQX-1110	Field Msr/l	10/17/2011	10:26:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		9.76	mg/l
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31DELRBC	31DELRBC_WQX-1205	Field Msr/l	5/22/2012	10:03:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		7.46	mg/l
31DELRBC	31DELRBC_WQX-1206	Field Msr/l	6/25/2012	10:49:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.65	mg/l
31DELRBC	31DELRBC_WQX-1207	Field Msr/l	7/23/2012	10:33:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		4.36	mg/l
31DELRBC	31DELRBC_WQX-1208	Field Msr/l	8/21/2012	9:56:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		4.3	mg/l
31DELRBC	31DELRBC_WQX-1209	Field Msr/l	9/24/2012	10:14:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.12	mg/l
31DELRBC	31DELRBC_WQX-1210	Field Msr/l	10/22/2012	10:00:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		7.78	mg/l
31DELRBC	31DELRBC_WQX-1304	Field Msr/l	4/23/2013	10:46:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		10.57	mg/l
31DELRBC	31DELRBC_WQX-1305	Field Msr/l	5/21/2013	9:37:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		6.26	mg/l
31DELRBC	31DELRBC_WQX-1306	Field Msr/l	6/25/2013	9:52:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		7.51	mg/l
31DELRBC	31DELRBC_WQX-1306	Field Msr/l	6/25/2013	9:52:00	31DELRBC_WQX-892065	USEPA	USEPA		Dissolved oxygen (DO		7.51	mg/l

Analysis Tools

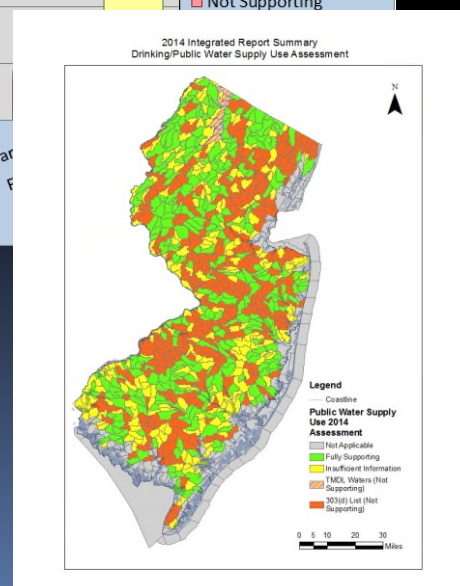
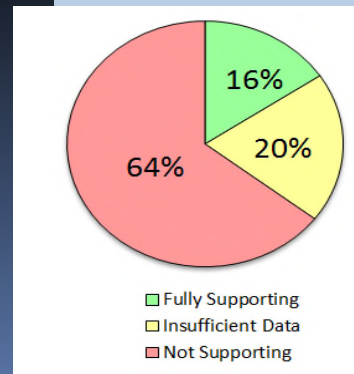
- Preliminary manual-work to update lookup tables
 - Station – classifications, stations' groupings, stations HUC associations
 - Parameter – criteria tables
- Discrete chemistry and pathogen
- Continuous monitoring
 - NJDEP data from Rutgers University website
 - USGS data from USGS directly
- Compile chemistry (discrete and continuous), biological, pathogen at data level, station level and AU level



Assessment and Reporting Tools

- Assessment results compiled
- Data plots
- Pie charts, bar charts, maps for reports based on assessment results
- IRONMAN - Tool to plot and navigate through the data and assessment results

Organization ID	Activity ID	Activity Type	Date	Time	Activity Depth	Activity Depth Unit	Station Name	Activity Comment	Hydrologic Condition
29	21NJDEP1-163763-SASMN-2005-0	Sample	2005-08-23	09:30:00			21NJDEP1-01378895		
30	21NJDEP1-156934-SASMN-2005-0	Sample	2005-11-17	09:20:00			21NJDEP1-01378895		
31	21NJDEP1-159641E-SASMN-2005-0	Sample	2006-02-22	09:30:00			21NJDEP1-01378895		
32	21NJDEP1-163233E-SASMN-2005-0	Sample	2006-05-08	10:33:00			21NJDEP1-01378895		
33	21NJDEP1-161005E-SASMN-2005-0	Sample	2006-07-31	11:10:00			21NJDEP1-01378895		
34	21NJDEP1-155801E-SASMN-2005-0	Sample	2006-10-24	09:15:00			21NJDEP1-01378895		
35	21NJDEP1-155843E-SASMN-2007-0	Sample	2007-01-22	11:14:00			21NJDEP1-01378895		
36	21NJDEP1-164965E-SASMN-2007-0	Sample	2007-04-23	08:30:00			21NJDEP1-01378895		



IRONMAN DEMO



*Parameter Call

Total Phosphorus

Plot Criteria

streams lakes

Date Range

2005-01-01

to

2016-04-08

*HUC 14

HUC02030103010190

HUC02030103010060

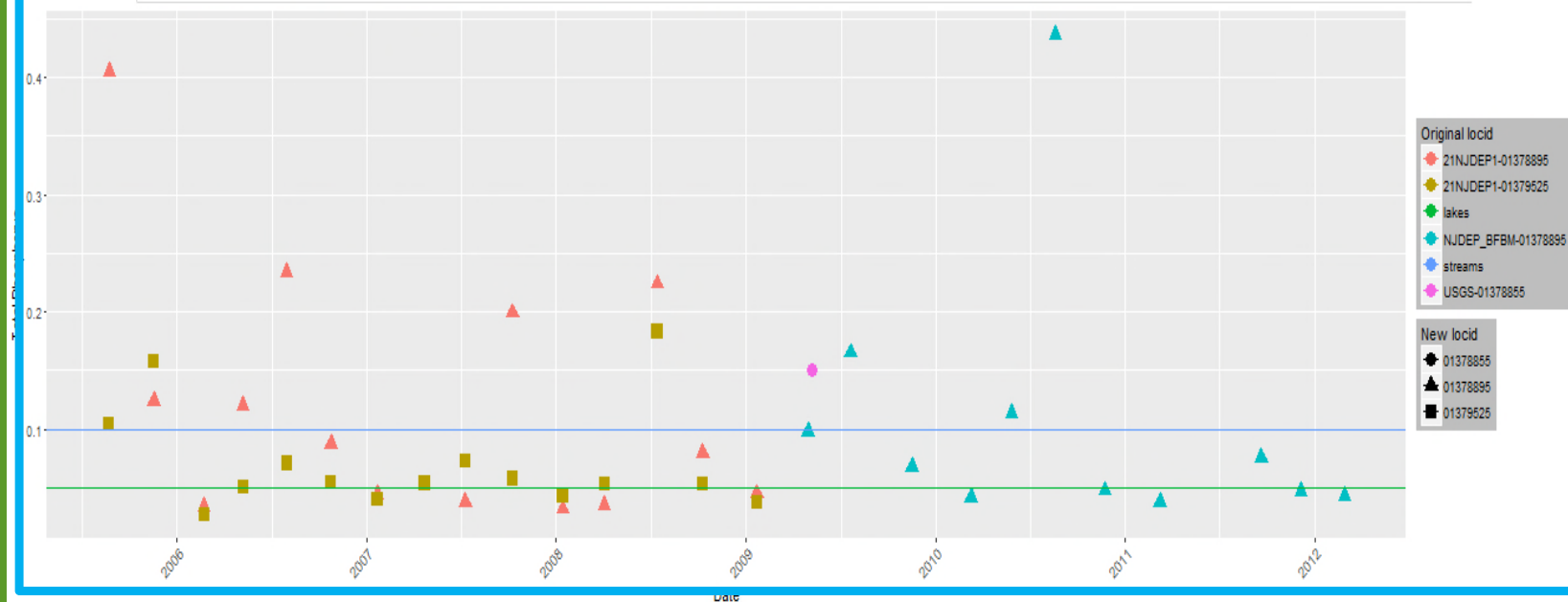
New Location ID

ALL

Location ID

ALL

Dashboard Station level Assessment HUC level Assessment Overall Assessment



Search:

	Organization ID	Activity ID	Activity Type	Date	Time	Activity Depth	Activity Depth Unit	Station Name	Activity Comment	Hydrologi Condition
29	21NJDEP1	21NJDEP1-163763-SASMN-2005 -0	Sample	2005-08-23	09:30:00			21NJDEP1-01378895		
30	21NJDEP1	21NJDEP1-156934-SASMN-2005 -0	Sample	2005-11-17	09:20:00			21NJDEP1-01378895		
31	21NJDEP1	21NJDEP1-159641E-SASMN-2005 -0	Sample	2006-02-22	09:30:00			21NJDEP1-01378895		
32	21NJDEP1	21NJDEP1-163253E-SASMN-2005 -0	Sample	2006-05-08	10:33:00			21NJDEP1-01378895		
33	21NJDEP1	21NJDEP1-161005E-SASMN-2005 -0	Sample	2006-07-31	11:10:00			21NJDEP1-01378895		
34	21NJDEP1	21NJDEP1-155801E-SASMN-2005 -0	Sample	2006-10-24	09:15:00			21NJDEP1-01378895		
35	21NJDEP1	21NJDEP1-155843E-SASMN-2007 -0	Sample	2007-01-22	11:14:00			21NJDEP1-01378895		
36	21NJDEP1	21NJDEP1-164985E-SASMN-2007 -0	Sample	2007-04-23	08:30:00			21NJDEP1-01378895		

*Parameter Call

Total Phosphorus ▼

Plot Criteria

lakes streams

Date Range

2005-01-01

to

2016-04-08

*HUC 14

HUC02030101170020

HUC02030103010060

HUC02030103010150

HUC02030103030120

HUC02030103030150

HUC02030103070040

HUC02030103030130

New Location ID

ALL

Location ID

ALL

Dashboard

Station level Assessment

HUC level Assessment

Overall Assessment

Save Changes

	newlocid	NumofUniqueStaln10yrs	ListUniqueStaln10yrs	Listv
1	01376273	3	21NJDEP1-01376273, NJDEP_BFBM-01376273, USGS-01376273	0.06, 0.04, 0.01, 0.1, 1.16, 0.3, 0.04, 0.03, 0.04, 0.05, 0.02, 0.03, 0.05, 0
2	01376274	1	USGS-01376274	0.03, 0.03, 0.05, 0.05, 0.05, 0.04, 0.04, 0.07
3	01378855	1	USGS-01378855	0.15
4	01378895	2	21NJDEP1-01378895, NJDEP_BFBM-01378895	0.4, 0.12, 0.03, 0.12, 0.23, 0.09, 0.04, 0.05, 0.04, 0.2, 0.03, 0.03, 0.22, 0
5	01379504	3	21NJDEP1-01379504, NJDEP_BFBM-01379504, USGS-01379504	0.36, 0.24, 0.09, 0.3, 0.28, 0.15, 0.15, 0.07, 0.31, 0.45, 0.11, 0.13, 0.47, 0
6	01379550	1	USGS-01379550	0.72, 0.34, 0.14, 0.1
7	01380125	3	21NJDEP1-01380125, NJDEP_BFBM-01380125, USGS-01380125	0.02, 0.03, 0.01, 0.06, 0.03, 0.03, 0.03, 0.04, 0.04, 0.04, 0.03, 0.03, 0.21
8	01380270	3	21NJDEP1-01380270, NJDEP_BFBM-01380270, USGS-01380270	0.08, 0.04, 0.01, 0.05, 0.03, 0.03, 0.03, 0.05, 0.04, 0.03, 0.03, 0.03, 0.02
9	01380320	1	USGS-01380320	0.02, 0.03, 0.05, 0.02, 0.01, 0.02, 0.02, 0.02, 0.03, 0.03, 0.02, 0.04, 0.01
10	01380450	2	21NJDEP1-01380450, NJDEP_BFBM-01380450	0.04, 0.04, 0.01, 0.06, 0.04, 0.03, 0.03, 0.04, 0.04, 0.03, 0.03, 0.04, 0.03
11	01380500	1	USGS-01380500	0.03, 0.02
12	01385800	1	USGS-01385800	0.02, 0.03, 0.04, 0.04, 0.01, 0.05, 0.06, 0.01
13	01386000	3	21NJDEP1-01386000, NJDEP_BFBM-01386000, USGS-01386000	0.02, 0.04, 0.02, 0.01, 0.02, 0.03, 0.02, 0.03, 0.03, 0.02, 0.02, 0.02, 0.03
14	NJW04459-031-1	1	NJDEP_BFBM-NJW04459-031-1	0.02, 0.04, 0.02
15	NJW04459-031-2	1	NJDEP_BFBM-NJW04459-031-2	0.02, 0.04, 0.02
16	NJW04459-031-3	1	NJDEP_BFBM-NJW04459-031-3	0.02, 0.05, 0.03
17	NJW04459-076-1	1	NJDEP_BFBM-NJW04459-076-1	0.05, 0.04, 0.02
18	NJW04459-160-1	1	NJDEP_BFBM-NJW04459-160-1	0.04, 0.04, 0.02, 0.11, 0.02, 0.01, 0.01, 0.03
19	NJW04459-160-2	1	NJDEP_BFBM-NJW04459-160-2	0.04, 0.04, 0.06, 0.02, 0.02, 0.01, 0.01, 0.03
20	NJW04459-264-1	1	NJDEP_BFBM-NJW04459-264-1	0.04, 0.06, 0.02, 0.03, 0.01
21	NJW04459-264-2	1	NJDEP_BFBM-NJW04459-264-2	0.03, 0.06, 0.02, 0.03, 0.01
22	NJW04459-264-3	1	NJDEP_BFBM-NJW04459-264-3	0.06, 0.02, 0.02, 0.01
23	NJW04459-264-O	1	NJDEP_BFBM-NJW04459-264-O	0.03, 0.12, 0.02

*Parameter Call

Total Phosphorus ▼

Plot Criteria

lakes streams

Date Range

2005-01-01 to 2016-04-08

*HUC 14

HUC02030101170020
HUC02030103010060
HUC02030103010150
HUC02030103030120
HUC02030103030150
HUC02030103070040
HUC02030103030130

New Location ID

ALL

Location ID

ALL

[Dashboard](#)[Station level Assessment](#)[HUC level Assessment](#)[Overall Assessment](#)

Save Changes

	WMA	Number	HUC14	Region	WatershedSizeSqmi	RiverMiles	LakeAcres	OceanSqMiles	NumofStations	
1	6	02030103010060-01	HUC02030103010060	Northeast	14.20	27.59			2	NA, NJDEP_BFBM-01378895
2	6	02030103030120-01	HUC02030103030120	Northeast	9.01	15.71	287.19		4	NJDEP_BFBM-01380125, USGS-01380125,
3	6	02030103010150-01	HUC02030103010150	Northeast	8.41	18.86	11.81		2	NJDEP_BFBM-01379504, USGS-01379550
4	6	02030103030150-01	HUC02030103030150	Northeast	6.90	12.78	798.79		2	NJDEP_BFBM-01380450, NA
5	5	02030101170020-01	HUC02030101170020	Northeast	2.66	8.33	1.70		3	NJDEP_BFBM-01376273, USGS-01376273,
6	6	02030103030130-01	HUC02030103030130	Northeast	12.29	31.15	225.51		8	NJDEP_BFBM-01380270, USGS-01380270,
7	3	02030103070040-01	HUC02030103070040	Northeast	11.76	34.20	107.98		3	USGS-01385800, NJDEP_BFBM-01386000,

*Parameter Call

Total Phosphorus ▼

Plot Criteria

lakes streams

Date Range

2005-01-01 to 2016-04-08

*HUC 14

HUC02030101170020
HUC02030103010060
HUC02030103010150
HUC02030103030120
HUC02030103030150
HUC02030103070040
HUC02030103030130

New Location ID

ALL

Location ID

ALL

[Dashboard](#)[Station level Assessment](#)[HUC level Assessment](#)[Overall Assessment](#)

Save Changes

	V1	WMA	Waterbody	Name	Fish-Mercury	Fish-Dioxin	Fish-Chlordane	Fish-PCB	Fish-DDT and metabolites	Biologi
106	107	6	02030103010060-01	Black Brook (Great Swamp NWR)	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Not Ap
221	222	6	02030103030120-01	Den Brook	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Not Ap
629	630	6	02030103010150-01	Passaic R Upr (Columbia Rd to 40d 45m)	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Not Ap
783	784	6	02030103030150-01	Rockaway R (Boonton dam to Stony Brook)	Non Attaining	Insufficient Data	Non Attaining	Non Attaining	Non Attaining	Not Ap
839	840	5	02030101170020-01	Sparkill Brook	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Not Ap
860	861	6	02030103030130-01	Stony Brook (Boonton)	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Not Ap
928	929	3	02030103070040-01	West Brook/Burnt Meadow Brook	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Not Ap

Date Range

2005-01-01

to

2016-04-08

*Parameter Call Top

Total Phosphorus

Plot Criteria

streams

aqfacute

lakes

*Parameter Call Bottom

Total Dissolved Solids

Plot Criteria

FW2 aqfacute

*HUC 14

HUC02030103170010

New Location ID

ALL

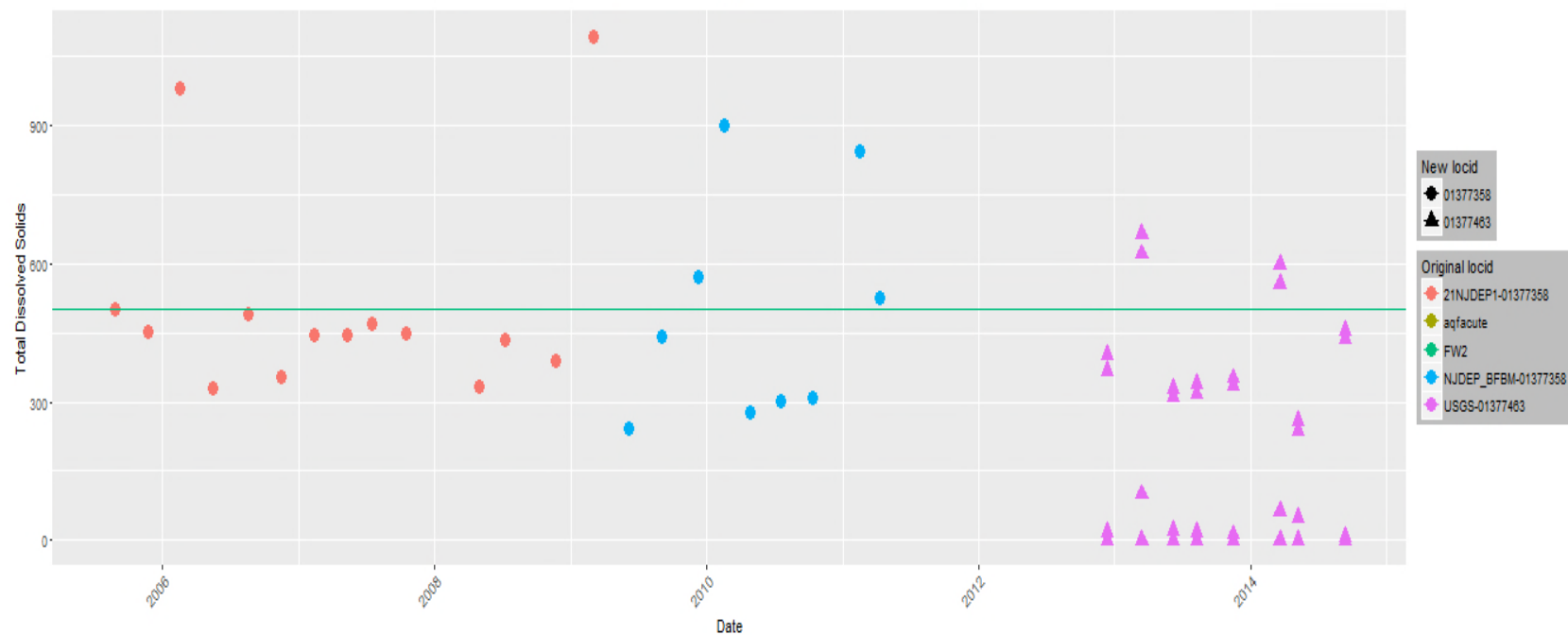
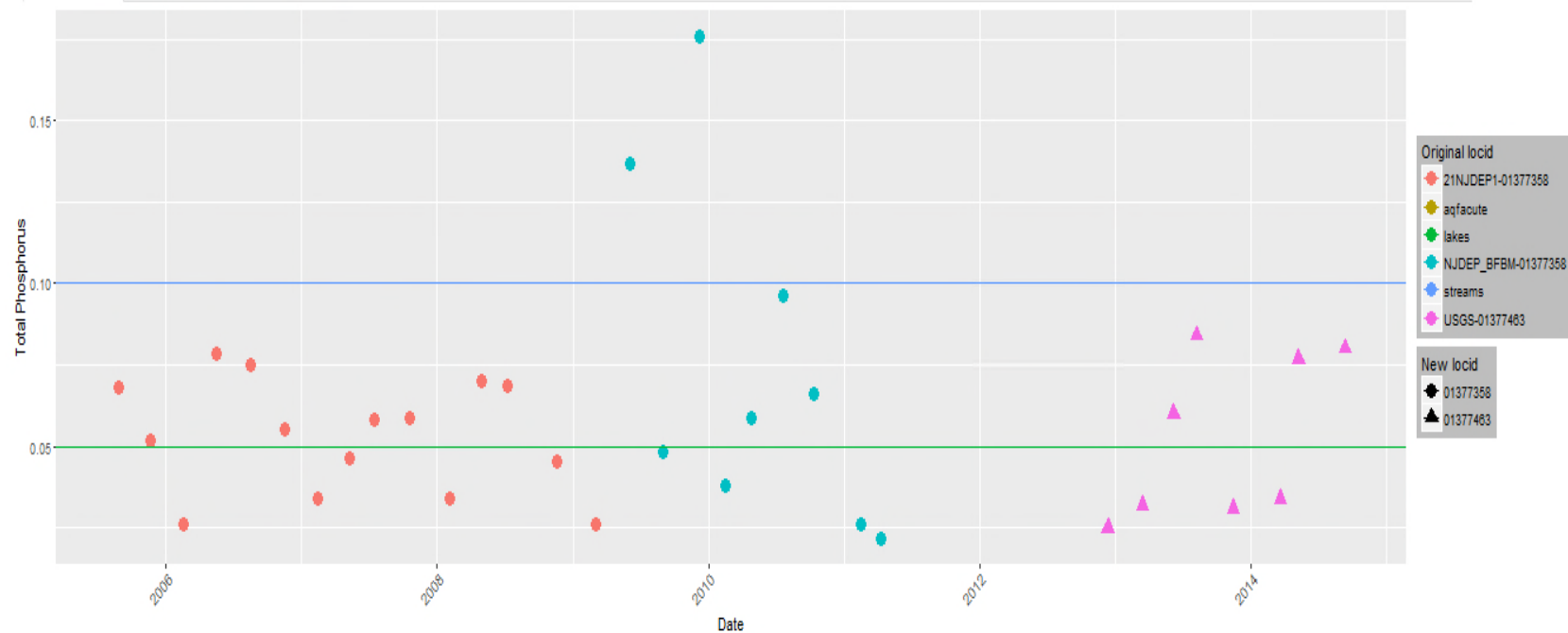
Location ID

ALL

MultiPlot

Multi Huc

Multi Stat



Date Range

2005-01-01 to 2016-04-08

*Parameter Call Top

Total Phosphorus

Plot Criteria

*Parameter Call Bottom

Total Suspended Solids

Plot Criteria

*HUC 14

HUC02030103170010

New Location ID

ALL

Location ID

ALL

MultiPlot

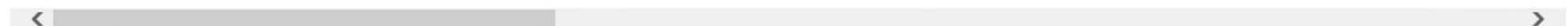
Multi D

	charnam	samfrac	val	valunit	valqual	valstat	statcode	valtype	precval	valcom	valdep	valdepun	valmetnam	metdesc
1	Phosphate-phosphorus as P	Total	0.07	mg/l				Actual						
2	Phosphate-phosphorus as P	Total	0.05	mg/l				Actual						
3	Phosphate-phosphorus as P	Total	0.03	mg/l				Actual		J-R = Approximate value result is below the reporting level				
4	Phosphate-phosphorus as P	Total	0.08	mg/l				Actual						
5	Phosphate-phosphorus as P	Total	0.08	mg/l				Actual						
6	Phosphate-phosphorus as P	Total	0.06	mg/l				Actual						
7	Phosphate-phosphorus as P	Total	0.03	mg/l				Actual		JR=Approximate value result is below reporting level				
8	Phosphate-phosphorus as P	Total	0.05	mg/l				Actual		J-R = Approximate value result is below reporting level				
9	Phosphate-phosphorus as P	Total	0.06	mg/l				Actual						
10	Phosphate-phosphorus as P	Total	0.06	mg/l				Actual						
11	Phosphate-phosphorus as P	Total	0.03	mg/l				Actual		Approximate value result is below reporting level				
12	Phosphate-phosphorus as P	Total	0.07	mg/l				Actual						
13	Phosphate-phosphorus as P	Total	0.07	mg/l				Actual						
14	Phosphate-phosphorus as P	Total	0.05	mg/l				Actual		Approximate value result is below reporting level				
15	Phosphate-phosphorus as P	Total	0.03	mg/l				Actual		J-R Approximate value result is below reporting level				

	charnam	samfrac	val	valunit	valqual	valstat	statcode	valtype	precval	valcom	valdep	valdepun	valmetnam	metdesc
1	Total suspended solids	Total	2.00	mg/l				Actual						
2	Total suspended solids	Total	1.00	mg/l				Actual						
3	Total suspended solids	Total	1.00	mg/l				Actual						
4	Total suspended solids	Total	1.00	mg/l				Actual						
5	Total suspended solids	Total	2.00	mg/l				Actual						
6	Total suspended solids	Total	2.00	mg/l				Actual						
7	Total suspended solids	Total	9.00	mg/l				Actual						
8	Total suspended solids	Total	3.00	mg/l				Actual						
9	Total suspended solids	Total	3.00	mg/l				Actual						
10	Total suspended solids	Total	6.00	mg/l				Actual						
11	Total suspended solids	Total	8.00	mg/l				Actual						
12	Total suspended solids	Total	4.00	mg/l				Actual						
13	Total suspended solids	Total	1.00	mg/l				Actual						
14	Total suspended solids	Total	3.00	mg/l				Actual						
15	Total suspended solids	Total	14.00	mg/l		Final		Actual					Total Suspended Solids in Water	https://www.nemi.gov/methods/methods

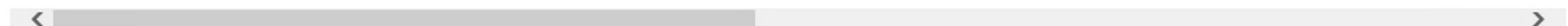
FIBI

	LOCATION_1	LOCATION_N	LOCATION_T	LATITUDE_M	LONGITUDE_	SPC_NORTH	SPC_EAST	MUN	
1	FIBI017a	South Branch Rahway River	River/Stream	40.58	-74.31	635328.30	545679.50	WOODBIDGE TWP	MI
2	NJPB-108	Rahway River SB at Chain O Hills Road	River/Stream	40.58	-74.31	635335.00	545721.80	WOODBIDGE TWP	MI
3	FIBI077	Pequannock River, off Rt 694/Paterson-Hamburg Tpk, Appelt Par	River/Stream	41.00	-74.32	790092.00	542908.00	BLOOMINGDALE BORO	PA
4	NJS11-131	Pequannock River at Waterfall Court	River/Stream	41.00	-74.35	790953.00	534334.30	BLOOMINGDALE BORO	PA



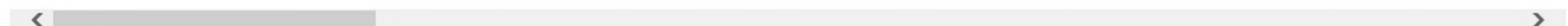
HIBI

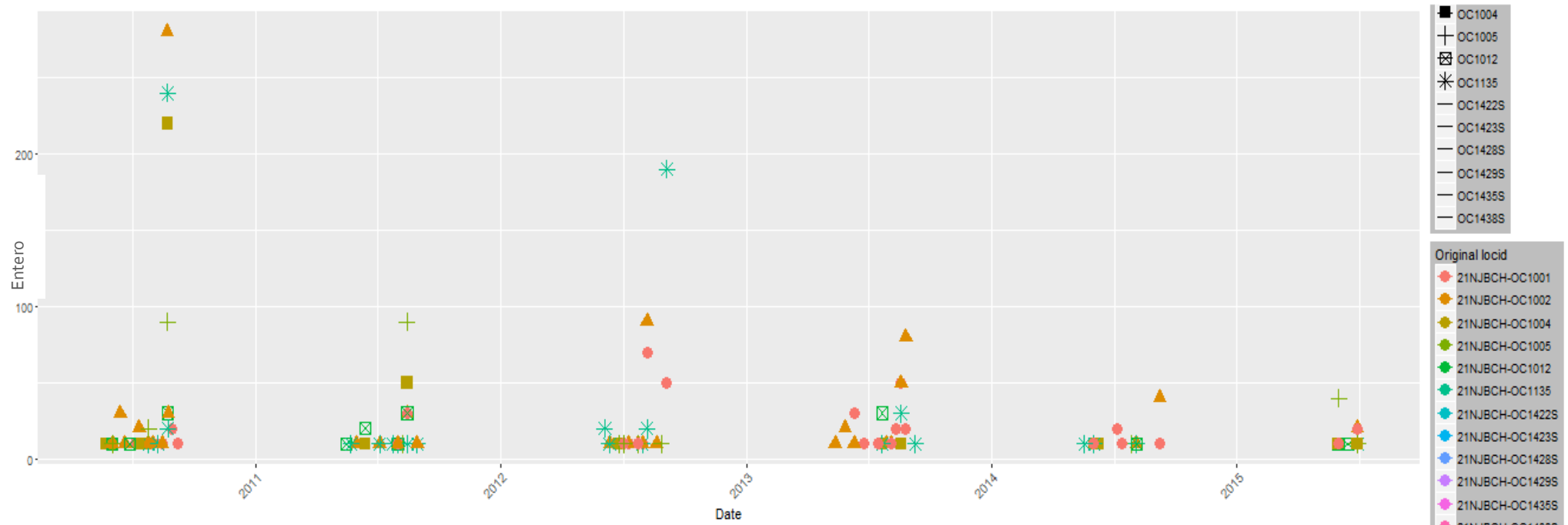
	Station_ID	Start_Date	Waterbody	LOCATION	MUN	COUNTY	DEP_Water	X_coord	Y_coord	HIBI_Score	Impairment	Habitat_Sc	Habitat_Ra
1	FIBI524	7/23/2013	Mossmans Brook UNT	off Clinton Road	WEST MILFORD TWP	PASSAIC	Northeast	-74.43	41.12	51.13	Good	177.00	Optimal
2	FIBI527	7/25/2013	India Brook	off Calais Road	RANDOLPH TWP	MORRIS	Raritan	-74.59	40.83	51.24	Good	146.00	Sub-optima
3	FIBI537	7/7/2014	India Brook	Combs Hollow Road	RANDOLPH TWP	MORRIS	Raritan	-74.61	40.81	62.93	Good	160.00	Optimal
4	FIBI542	6/24/2015	Mossmans Brook	Clinton Road	WEST MILFORD TWP	PASSAIC	Northeast	-74.43	41.11	43.15	Fair	179.00	Optimal
5	NJPB-119	7/9/2014	India Brook	India Brook Drive	MENDHAM TWP	MORRIS	Raritan	-74.62	40.79	72.54	Good	170.00	Optimal



Amnet

	FID_1	V2	SITE	WATER	LOC	MUN	COUNTY	WMA	WMA_NAME	WR_NAME	ACTIVE	METHOD	INDEX_
1	594	0.00	AN0260	Mossmans Bk	Clinton Rd (abv res)	WEST MILFORD TWP	PASSAIC	3.00	Pompton, Wanaque, Ramapo	Northeast	<input checked="" type="checkbox"/>	GPS	HGMI
2	147	0.00	AN0344	UNT to India Bk	Calais Rd	RANDOLPH TWP	MORRIS	8.00	North and South Branch Raritan	Raritan	<input checked="" type="checkbox"/>	GPS	HGMI
3	148	0.00	AN0344A	India Bk	Calais Rd BR#733	RANDOLPH TWP	MORRIS	8.00	North and South Branch Raritan	Raritan	<input checked="" type="checkbox"/>	GPS	HGMI
4	212	0.00	AN0345	India Bk	Mountainside Rd	MENDHAM BORO	MORRIS	8.00	North and South Branch Raritan	Raritan	<input checked="" type="checkbox"/>	GPS	HGMI
5	252	0.00	AN0200	Rahway R S Br	Parsonnage Rd	EDISON TWP	MIDDLESEX	7.00	Arthur Kill	Raritan	<input checked="" type="checkbox"/>	GPS	HGMI
6	693	0.00	AN0201	Rahway R S Br	Merrill Park	WOODBIDGE TWP	MIDDLESEX	7.00	Arthur Kill	Raritan	<input checked="" type="checkbox"/>	GPS	HGMI



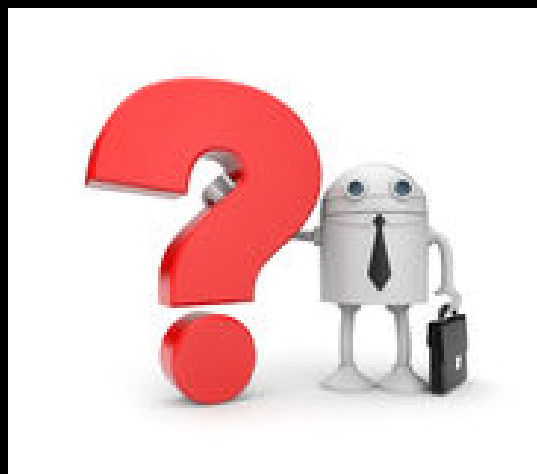


	parameter	staid	HUC14	swqs	year	Startday	Endday	Dayswithdata	Monthswithdata	weekswithdata	Maxvalue	Num
206	ENT	OC1002	HUC02040301910010	SC	2010	2010-06-02	2010-08-24	9	3	8	280.00	
207	ENT	OC1002	HUC02040301910010	SC	2013	2013-05-13	2013-08-26	7	4	7	80.00	
208	ENT	OC1002	HUC02040301910010	SC	2011	2011-05-31	2011-08-30	5	3	5	30.00	
209	ENT	OC1002	HUC02040301910010	SC	2012	2012-06-11	2012-08-20	6	3	6	90.00	
210	ENT	OC1002	HUC02040301910010	SC	2014	2014-08-04	2014-09-08	2	2	2	40.00	
219	ENT	OC1012	HUC02040301910010	SC	2010	2010-06-02	2010-08-23	3	2	3	30.00	
220	ENT	OC1012	HUC02040301910010	SC	2011	2011-05-16	2011-08-15	4	3	4	30.00	
238	ENT	OC1001	HUC02040301910010	SC	2010	2010-06-02	2010-09-07	6	4	6	20.00	
239	ENT	OC1001	HUC02040301910010	SC	2011	2011-08-01	2011-08-15	2	1	2	30.00	
240	ENT	OC1001	HUC02040301910010	SC	2013	2013-06-10	2013-08-26	8	3	8	50.00	
241	ENT	OC1001	HUC02040301910010	SC	2012	2012-06-18	2012-09-04	8	4	8	70.00	
242	ENT	OC1001	HUC02040301910010	SC	2014	2014-06-02	2014-09-08	4	3	4	20.00	
243	ENT	OC1135	HUC02040301910010	SC	2010	2010-06-02	2010-08-24	5	3	4	240.00	
244	ENT	OC1135	HUC02040301910010	SC	2011	2011-05-23	2011-08-30	6	3	6	10.00	
245	ENT	OC1135	HUC02040301910010	SC	2013	2013-07-22	2013-09-09	3	3	3	30.00	
246	ENT	OC1135	HUC02040301910010	SC	2012	2012-06-04	2012-09-04	5	4	5	190.00	
247	ENT	OC1135	HUC02040301910010	SC	2014	2014-05-19	2014-08-04	3	3	3	10.00	

Future Projects

- Automated data downloads
- Story Maps (NOT R) However...
- Link IRONMAN to Story Maps for public
- Web interface applications
- ATTAINS batch upload
- Trends
- Detecting threatened/degrading waters
- WQ27 AND WQ28 prioritization and tracking
- Restoration project effectiveness

Questions



Point of Contacts:

Roop Guha: (609) 292-1592	biswarup.guha@dep.nj.gov
Joseph Aiello: (609) 777-0786	joseph.f.aiello@dep.nj.gov
Jack Pflaumer: (609) 633-0499	jack.pflaumer@dep.nj.gov

New Jersey Department of Environmental Protection
Division of Water Monitoring and Standards
Bureau of Environmental Analysis, Restoration and Standards