

# NEW JERSEY INTEGRATED AUTOMATED ASSESSMENT PROCESS

Jack Pflaumer,  
New Jersey Department of  
Environmental Protection

# Introduction

- Why do we need automation?
- Integrated Report Process
- Data Solutions
- Analyses and plotting tools developed
- Integrated Report Open Network, Mapping, and Assessment Navigator (IRONMAN)
- Future Projects


# The Problem - Why Do We Need Automation?

- Resource and time constraints
- Issues with data from multiple sources
- QA is tedious – large number of stations / parameters
- Lot of repetitive processes / time consuming
- Improve transparency and sharing information




# Integrated Reporting Process

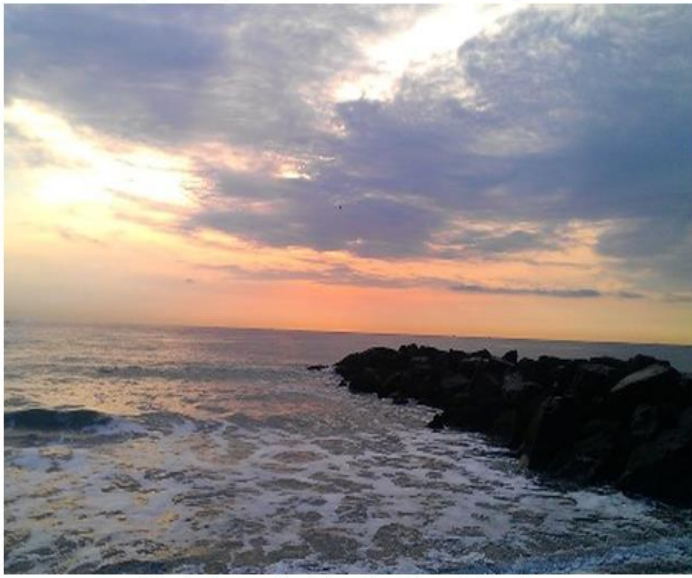
- Data Crunching
  - 958 assessment units (HUC14)
  - 5 - >10 years of data
  - > 10,000 discrete stations
  - > 3.2 million discrete data
  - > 300 continuous monitoring stations
  - > 90 parameters
  - Biological data
- Assessments
  - Station level
  - HUC level chemistry and biological assessment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



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



## 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

# Data Solution-Water Quality Portal

- One Stop Shop for data (except for continuous)
  - Department-wide access to data
  - Publically available and easily accessible
- Standardized data protocol
- Easy to use interface with help desk
- Closer collaboration with stakeholders
- Improved efficiencies (based on EPA collaboration)
  - Typically can improve work efficiencies:
    - Water Quality Assessment Project – 39% time savings, 44% cost savings
    - TMDL/Permit Project - 19% time savings, 26% cost savings
    - Effectiveness Monitoring Project - 17% time savings, 23% cost savings
- **ISSUES: quality of data, missing data/information, parameter names, duplicates, site information**
- **NJ Solution: Mandatory QAPP**



# Continuous Data Issue

- Continuous Data Monitoring—NJDEP and Rutgers University
  - STORET unable to accept data
  - No data standard
  - Difficulty sharing data
  - NJ Solution – web accessible database
  - Expandability
    - Other stakeholders
    - EPA is working with Rutgers

Governor Chris Christie • Lt. Governor Kim Guadagno  
NJ Home | Services A to Z | Departments/Agencies | FAQs  
Search [All of NJ]

STATE OF NEW JERSEY  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
DWM&S Continuous Data Monitoring Program

DEP Home | About DEP | Index by Topic | Programs/Units | DEP Online

In addition to its many discrete monitoring activities, the [Division of Water Monitoring & Standards](#) (DWM&S) also manages numerous continuous monitoring activities that involve the use of short and long term data loggers throughout NJ in both fresh and marine waters. Data loggers are electronic devices that utilize sensors and probes to measure various water quality parameters 24 hours per day, 7 days per week. Data logger deployments may range from several days to many months. Sites for continuous monitoring are chosen for a variety of reasons, including to support and/or supplement the discrete data collected by DWM&S, as well as for project-specific purposes.

Continuous monitoring data in NJ are used for a variety of purposes, including measuring fluctuations of Dissolved Oxygen and Temperature to determine the ecological health of streams, acquisition of data for comprehensive analysis and decision making to support [Barnegat Bay's Comprehensive Action Plan](#), and generation of the [New Jersey Integrated Water Quality Monitoring and Assessment Report \(Integrated Report\)](#). Every two years, a new water region in NJ is given a comprehensive monitoring and assessment focus which starts new continuous monitoring site selection.

On this website, users will find the locations of DWM&S managed continuous monitoring activities – both long and short term, active and historical, as well as information specific to each location. Data associated with each location is available for download and graphing.

Map | Data | Graph

NOTE: Provisional Data Subject to Revision.

Contact DEP | Privacy Notice | Legal Statement & Disclaimers | Accessibility Statement

Water Monitoring & Standards Home  
Department: NJDEP Home | About DEP | Index by Topic | Programs/Units | DEP Online  
Services: NJ Home | Services A to Z | Departments/Agencies | FAQs  
Copyright © State of New Jersey, 1996-2016  
Last Updated: March 10, 2015

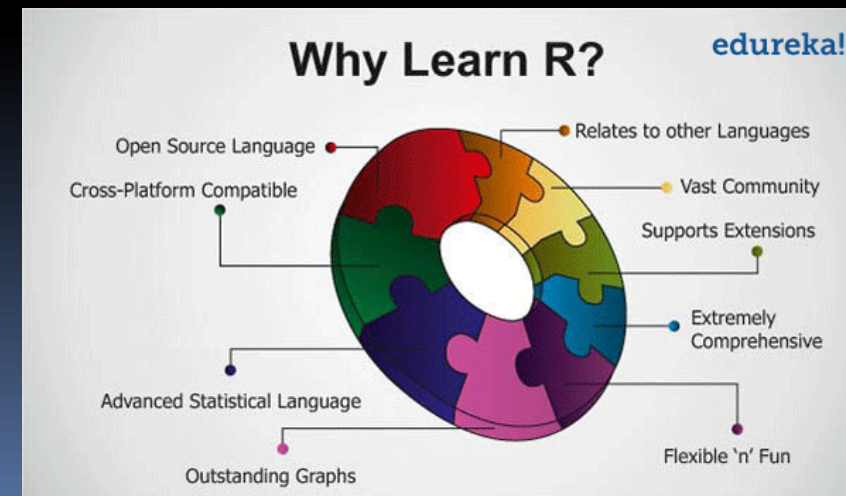
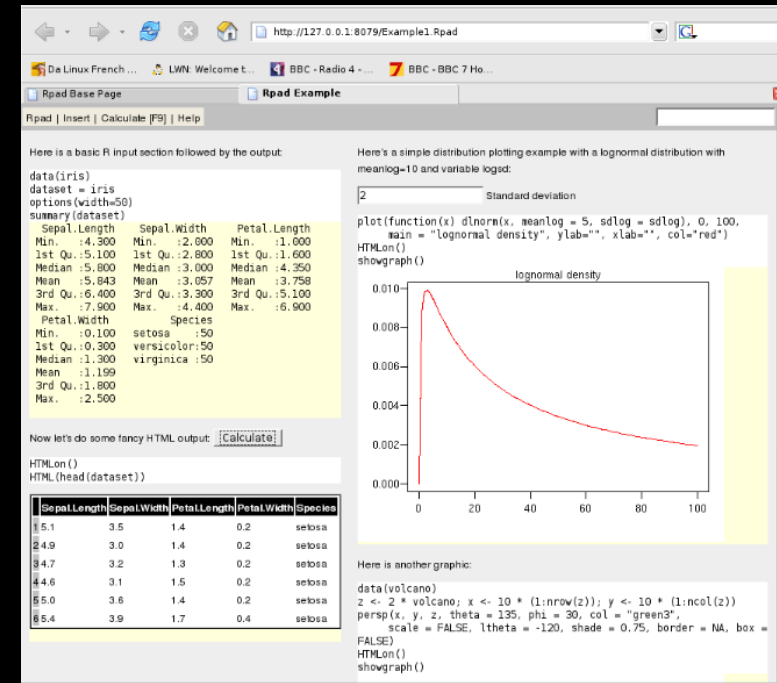


# Automation Benefits (R/R Shiny)

- One-stop shop for Data/Assessment
- Improve Efficiency – Reduce Resource / Time
- Improve Accuracy
- Eliminate Repetitiveness
- Streamline Process Structured for easy Modifications
- More Information for Review / BPJ Decisions
- User Friendly Visualization Tools
- Tracking through Cycles

## Challenges with automation:

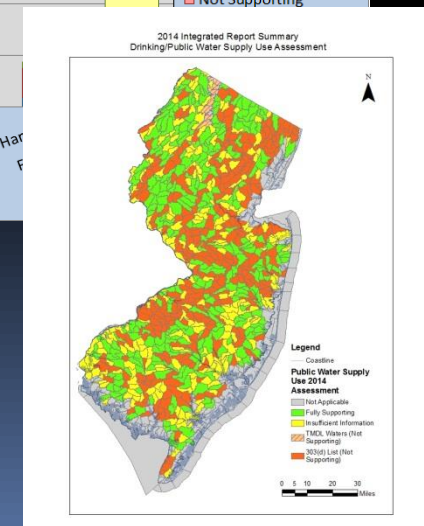
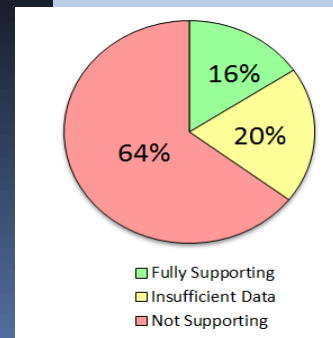
- Qualified programmers
- Constant updates
- Time
- Validation – human element



# IRONMAN – Integrated Report Open Network, Mapping, and Assessment Navigator

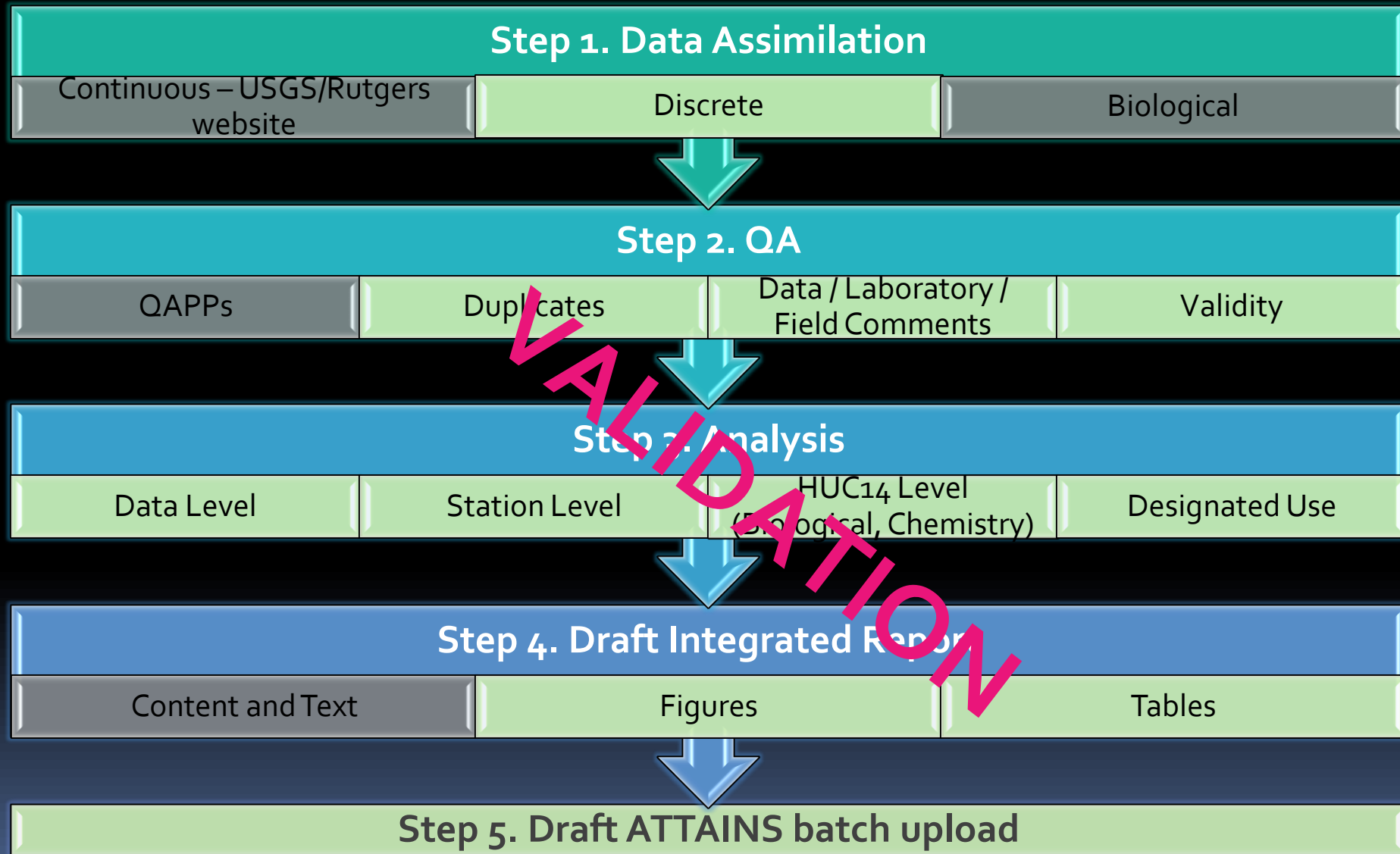
- Automated data retrieval, QA/QC
- Automated assessment results
- Tool to plot and navigate through data and assessment results
- Pie charts, bar charts, maps for reports based on assessment results

Organization ID	Activity ID	Activity Type	Date	Time	Activity Depth	Activity Depth Unit	Station Name	Activity Comment	Hydrological Condition
21NJDEP1	21NJDEP1-163763-SASMIN-2005-0	Sample	2005-08-23	09:30:00			21NJDEP1-01378895		
21NJDEP1	21NJDEP1-156934-SASMIN-2005-0	Sample	2005-11-17	09:20:00			21NJDEP1-01378895		
21NJDEP1	21NJDEP1-159641E-SASMIN-2005-0	Sample	2006-02-22	09:30:00			21NJDEP1-01378895		
21NJDEP1	21NJDEP1-163233E-SASMIN-2005-0	Sample	2006-05-08	10:33:00			21NJDEP1-01378895		
21NJDEP1	21NJDEP1-161002E-SASMIN-2005-0	Sample	2006-07-31	11:10:00			21NJDEP1-01378895		
21NJDEP1	21NJDEP1-155801E-SASMIN-2005-0	Sample	2006-10-24	09:15:00			21NJDEP1-01378895		
21NJDEP1	21NJDEP1-155843E-SASMIN-2007-0	Sample	2007-01-22	11:14:00			21NJDEP1-01378895		
21NJDEP1	21NJDEP1-164985E-SASMIN-2007-0	Sample	2007-04-23	08:30:00			21NJDEP1-01378895		





# Automated Assessment Process



# Future Projects

- Automate ALL data downloads (continuous, biological)
- Integration with GIS
- Link to Story Maps
- Web interface applications
- Trends
- Detecting threatened/degrading waters
- Tracking TMDL, restoration, and other actions

# IRONMAN DEMO



# Data Download and Assessment

127.0.0.1:6517

2 INTRO **Where-It-Begins** Overall Single Parameter DATA Multi Parameter Plotting Biological Data

Step 1: If Data Not Downloaded  
**Select Date Range for Data Download**

Base year cycle 2016 ▼

**Select Output File type**

Tab Seperated ▼

Begin Downloading

**Select Comprehensive Assessment Region**

Raritan ▼

**Select IR Cycle Date Range**

2010-01-01 to 2015-07-01

Run Step 2 Assessment

Optional: List New Unique Stations

Click to output unique Stations

Step 3: Compile Assessed Data

Begin Compiling

QA Downloaded Data (Required on first Download)

Run Step 1 evaluation

Step 4: Compile Assessment for Attains submission

Output Attains Files



# Designated Use/Parameter Results

Mark 42    INTRO    Where-It-Begins    **Overall**    Single Parameter DATA    Multi Parameter Plotting    Biological Data

**Designated Uses**    Stations    All HUC Assessments

**Targeted HUC**

**Designated Use**

**Public Water Supp**  
Attaining

**Aquatic Life Gener**  
Attaining

**Comments**  
Cause Unknown

**Shellfish Harvest**  
Insufficient Data

**Aquatic Life Trout**  
Non Attaining

**Fish Consumption**  
Non Attaining

**Recreation**  
Insufficient Data

Designated Use Assessment for the HUC14 chosen

Parameter specific assessment used for Designated Use Assessment for the HUC14 chosen

**Use Specific Parameters**

	WMA	Waterbody	Name	Biological.(Cause.Unkn
1	15	HUC02040302020030	Absecon Creek (AC Reserviors) (gage to SB)	2



# Dashboard – Data Review

Mark 42   INTRO   Where-It-Begins   Overall   **Single Parameter DATA**   Multi Parameter Plotting   Data

Dashboard   Station level Assessment   HUC level Assessment   Compiled Stat Assessment

Recreational Assessment

Dissolved Oxygen

Date

Legend

Original locid

- 01378780
- AN0215

Actual Data Table with assessments

Station Name	New Station ID	Date	Time	SWQS Classification	Sample Fraction	V	fr	p
All				All				
NPSWRD-MORR_NPS_CSP	NPS-CSP	2005-06-15	11:30:00	FW2-TP	DO			
NPSWRD-MORR_NPS_CSP	NPS-CSP	2005-06-30	14:30:00	FW2-TP	DO			
NPSWRD-MORR_NPS_CSP	NPS-CSP	2005-07-15	08:38:00	FW2-TP	DO			

\*Parameter Call  
Dissolved Oxygen

Plot Criteria  
FW2.TP

Date Range  
2000-01-01 to 2016-12-18

\*HUC 14  
HUC02030103010020

New Location ID  
ALL

Location ID  
ALL

Select  
Parameters  
SWQS Threshold  
Date Range  
HUC14 (1 or more)  
Stations



# Biological Results Review

Mark 42    INTRO    Where-It-Begins    Single Parameter DATA    Multi Parameter Plotting    **Biological Data**    Overall

## FIBI\_2-Rows

	LOCATION_1	LOCATION_N	LOCATION_T	LATITUDE_M	LONGITUDE_	SPC_NORTH	SPC_EAST	MUN	COUNTY	GNIS	SSN	MUN_CODE	KEY
1	NJS11-153	Passaic River off Arlington Ct	River/Stream	40.72	-74.40	686529.60	519569.30	CHATHAM TWP	MORRIS	882194	1405	1405	340271213
2	NJS11-154	Flat Brook at Lower Mountain Road	River/Stream	41.11	-74.95	829164.30	369000.20	WALPACK TWP	SUSSEX	882259	1923	1923	340377664

## HIBI\_1-Rows

	Station_ID	Start_Date	Waterbody	LOCATION	MUN	COUNTY	DEP_Water	X_coord	Y_coord	HIBI_Score	Impairment	Habitat_Sc	Habitat_Ra	INDEX_NAME	Station
1	FIBI509	5/7/2013	Salt Brook	Beech Street	NEW PROVIDENCE BORO	UNION	Northeast	-74.40	40.70	33.72	Fair	91.00	Marginal	HIBI	FIBI509

## Amnet\_6-Rows

	SITE	WATER	LOC	MUN	COUNTY	WMA	WMA_NAME	WR_NAME	ACTIVE	METHOD	INDEX_	NJIS1	IMPAIR1	NJ
1	AN0208	Dwars Kill	End of Anderson Ave	ALPINE BORO	BERGEN	5.00	Hackensack and Pascack	Northeast	<input checked="" type="checkbox"/>	GPS	HGMI	24.00	None	9
2	AN0402	Pike Run	Rt 206	HILLSBOROUGH TWP	SOMERSET	10.00	Millstone	Raritan	<input checked="" type="checkbox"/>	GPS	HGMI	18.00	Moderate	9
3	AN0229	Passaic R	Stanley Ave	SUMMIT CITY	UNION	6.00	Upper Passaic, Whippany, and Rockaway	Northeast	<input checked="" type="checkbox"/>	GPS	HGMI	6.00	Severe	9
4	AN0230	Passaic R	Summit Ave	SUMMIT CITY	UNION	6.00	Upper Passaic, Whippany, and Rockaway	Northeast	<input checked="" type="checkbox"/>	GPS	HGMI	3.00	Severe	9
5	AN0007	Flat Bk	Rt 615	WALPACK TWP	SUSSEX	1.00	Upper Delaware	Northwest	<input checked="" type="checkbox"/>	GPS	HGMI	30.00	None	9
6	AN0008	Flat Bk	Rt 615	WALPACK TWP	SUSSEX	1.00	Upper Delaware	Northwest	<input checked="" type="checkbox"/>	GPS	HGMI	30.00	None	9



# Questions



Roop Guha: (609) 292-1592      [biswarup.guha@dep.nj.gov](mailto:biswarup.guha@dep.nj.gov)

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