Rapid reporting in long-term monitoring programs for detection of illicit discharges by NPDES SMS4 communities

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NPDES Phase II Stormwater Program for small MS-4 communities

Six Minimum Measures

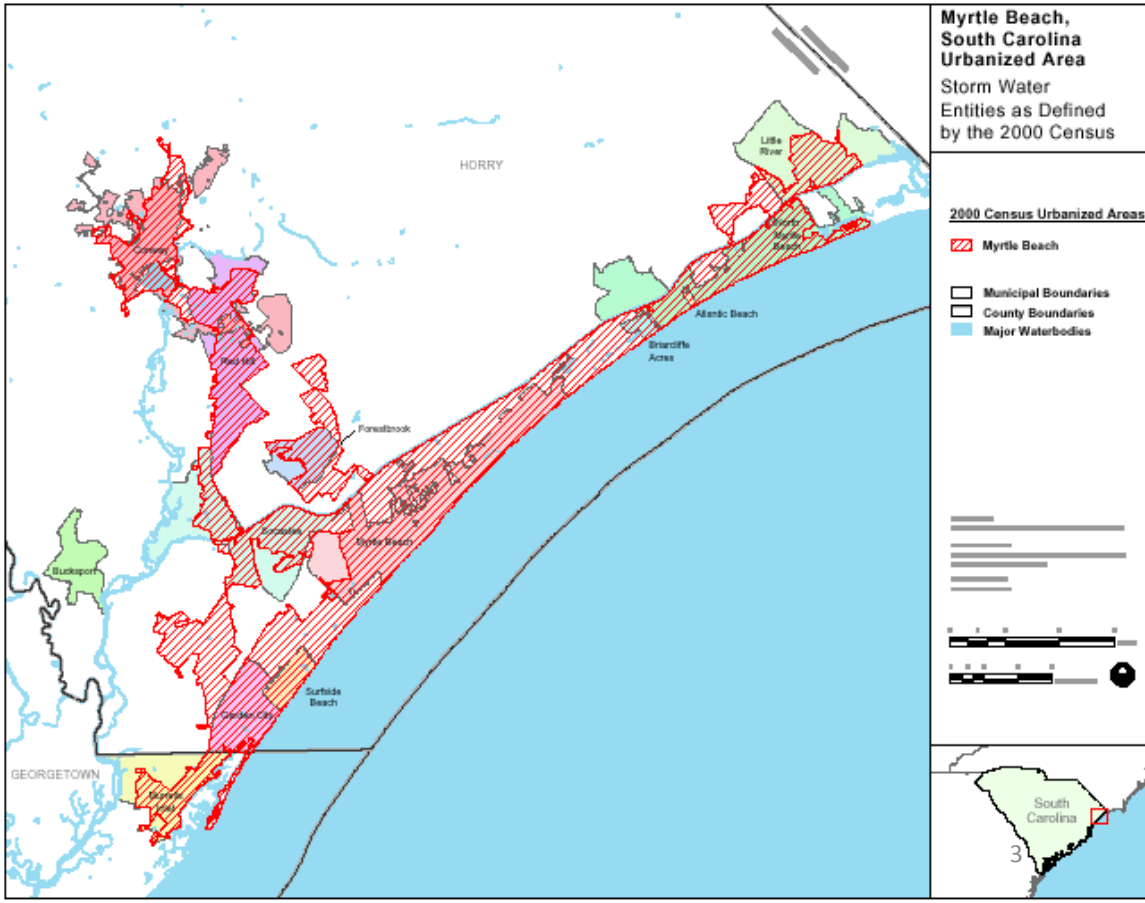
1. Public *education* and outreach on stormwater impacts
2. Public *involvement*/participation
3. *Illicit discharge* detection and elimination
4. *Construction* site stormwater runoff control
5. *Post-construction* stormwater management in new development and redevelopment
6. Pollution *prevention/good housekeeping* for municipal operations (*you are the role model*)

How do you do this with really small SMS4's?

Myrtle Beach Urbanized Area
"Small" SMS-4 Communities

- Horry County
  - Myrtle Beach (27,109)
  - N. Myrtle Beach (13,754)
  - Surfside Beach (3,837)
  - Conway (17,103)
  - Briarcliffe Acres (457)
  - Atlantic Beach (334)
  - Unincorporated (68,302*)
- Georgetown Co. (5,233*)

*US Census of 2000**



How do you do this with really small SMS4's?

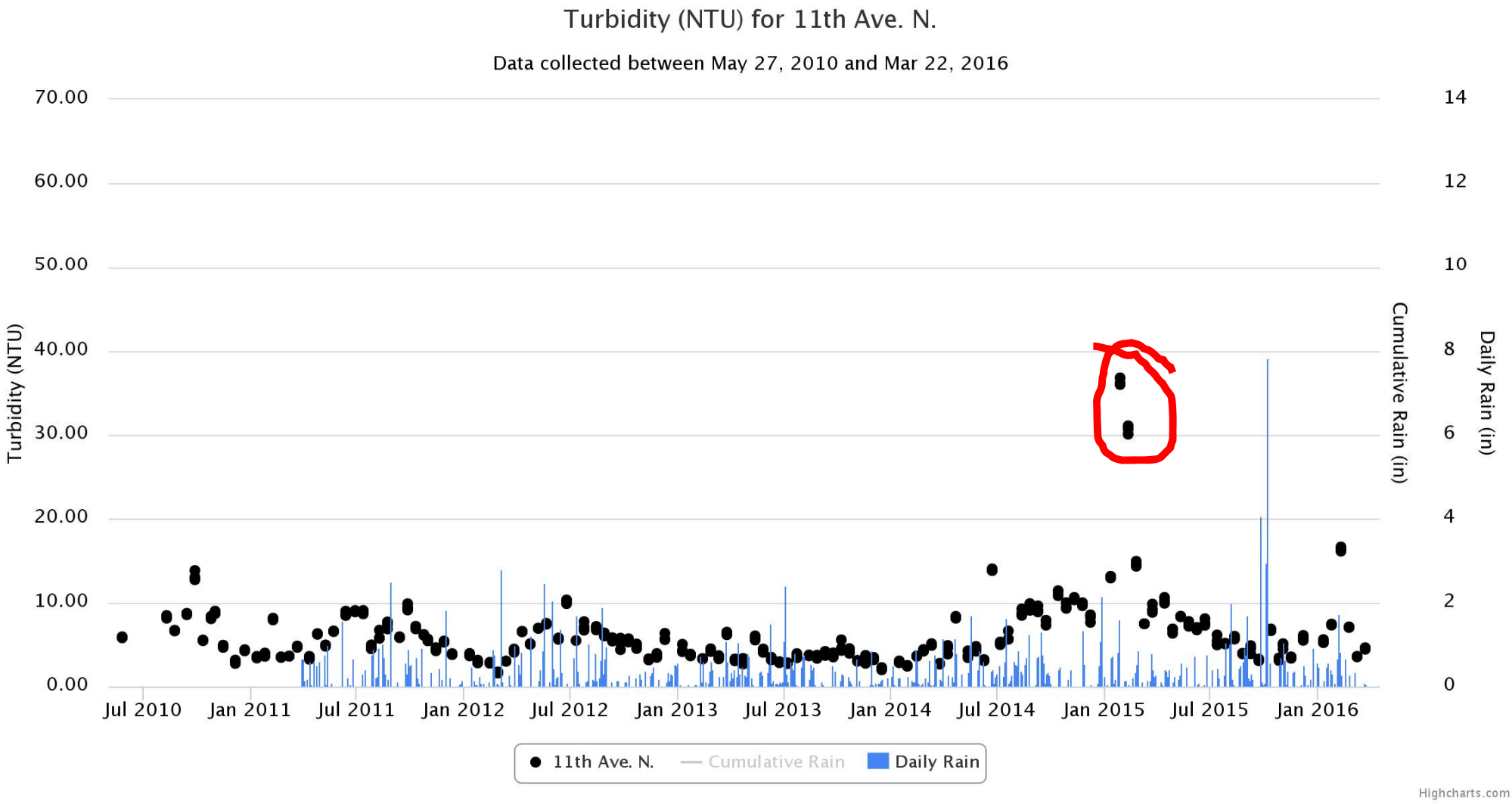
- Leverage resources
- Cooperate
- Use the watershed approach

Data sources: Rivers, Estuaries and Ocean

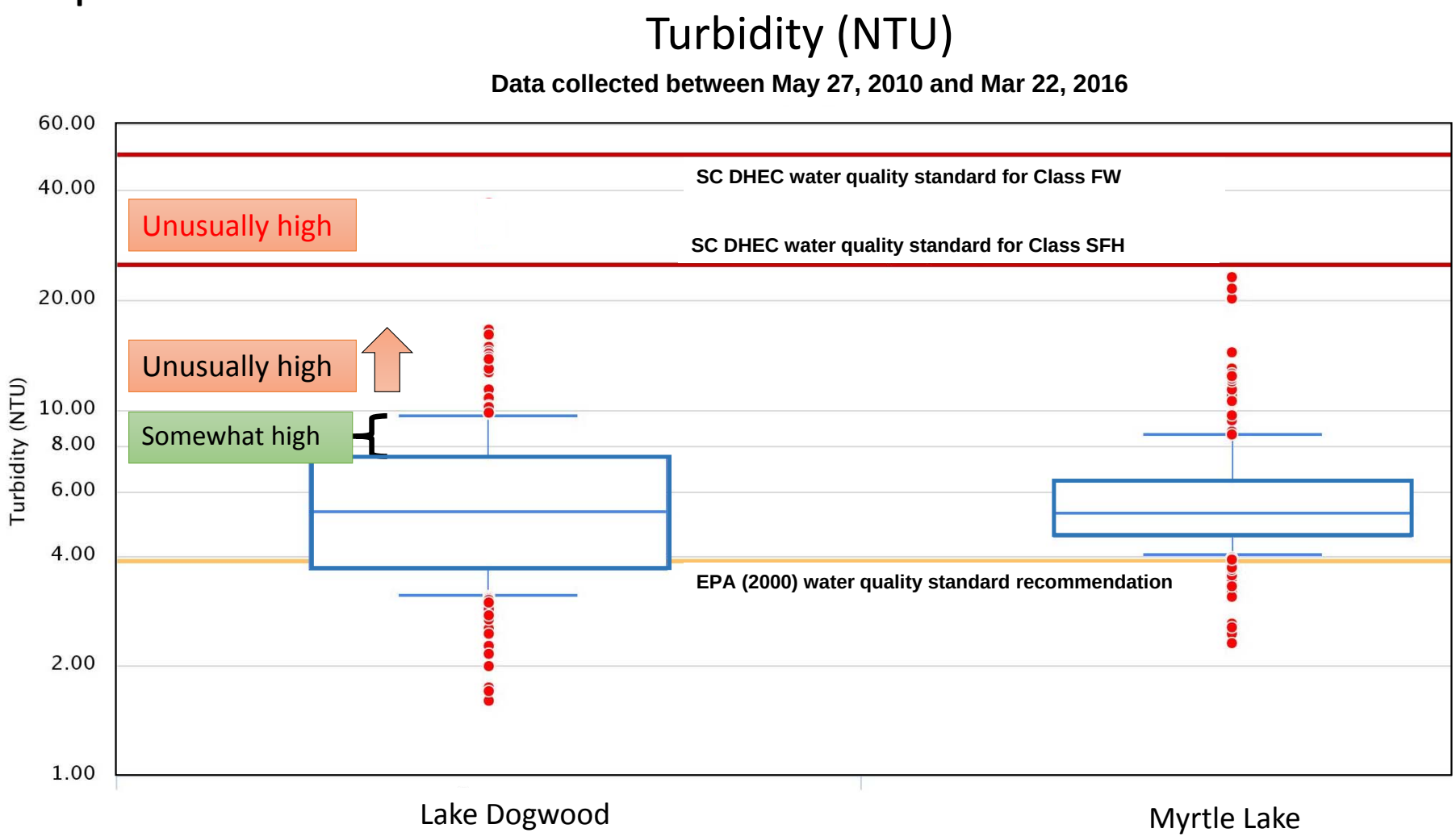
- Certified labs
  - Coastal Carolina University
  - (SC Department of Health and Environmental Control)
- Volunteers
- Continuous Sensors
  - United States Geological Survey (river)
  - Coastal Carolina University (ocean fishing piers)
- Meteorology
  - Nexrad
  - CDO (old NCDC), including CoCoRAHs

Really Rapid Illicit Discharge Reporting

- Prior to sampling
  - Notify staff and volunteers that unusual conditions may be encountered
- Provide site-specific norms and regulatory water quality criteria for samplers to use in the field
  - Don’t report contraventions if they are site normal
- Samplers phone or text abnormal results
  - Evaluate whether they can collect more data with what they have on hand.
  - Take pictures
- Provisionally vet the data
  - Type of data validation
- Pass data to stormwater managers and field leaders via phone or email.

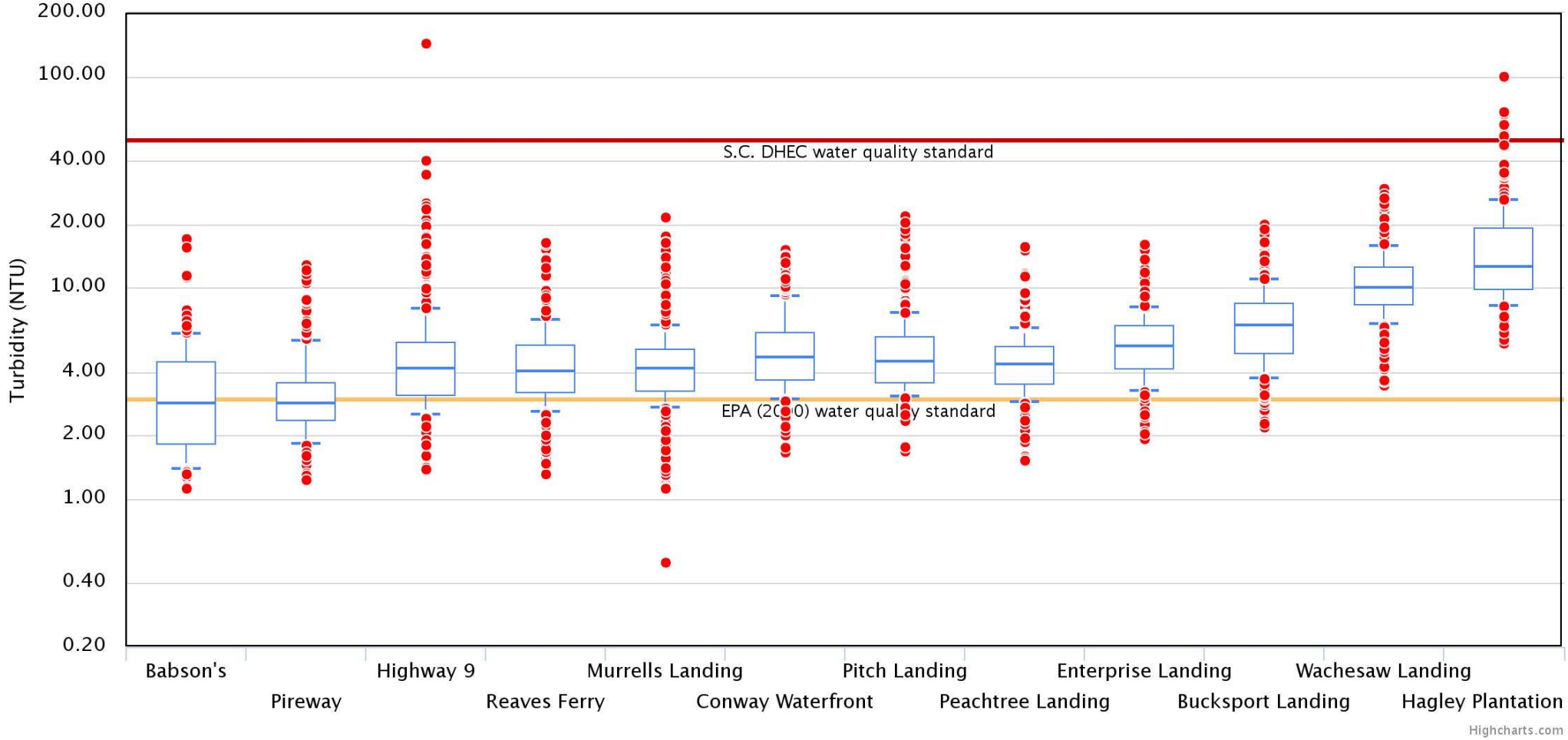

Turbidity (NTU) for 11th Ave. N.
Data collected between May 27, 2010 and Mar 22, 2016
Turbidity (NTU)
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cumulative Rain (in)
Daily Rain (in)
14
12
10
8
6
4
2
0
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
11th Ave. N.
Cumulative Rain
Daily Rain
Highcharts.com

Site-specific norms



Turbidity (NTU)

Data collected between June 06, 2006 and Mar 23, 2016



“Provisional Reporting”

- Produced within 1-day (certified lab) or 2 weeks post sampling
- Emailed to end users as a spreadsheet attachment
- Format developed collaboratively with end users
  - Riverkeeper
  - Stormwater managers
- Contents
  - Percentile and water quality standard comparisons
  - Ancillary data: rain, tide, discharge
  - Narrative
    - Use online data web app to check for longer term time trends

Waccamaw River Volunteer Monitoring: 11/4/2015

Sampling Sites	Conductivity (µS/cm)	TDS (ppm)	pH	DO (mg/L) < 20 C	% DO < 20 C	Temp < 20 C	Turbidity (NTU)	Nitrate (ppm N)	Nitrite (ppm N)	Ammonia (ppm N)	E. coli (CFU/100 mL)	Total coliform (CFU/100 mL)
LAWA Dam	<10th	<10th	Site Normal	<25th	Site Normal	> 90th	Site Normal	Site Normal	Site Normal	Site Normal	Site Normal	>75th
Canal Cove	<25th	<25th	Site Normal	>75th	>75th	> 90th	> 90th	Site Normal	Site Normal	Site Normal	Site Normal	> 90th
Maple Street	Site Normal	Site Normal	Site Normal	<10th	<25th	> 90th	>75th	Site Normal	Site Normal	Site Normal	Site Normal	> 90th
Big Creek	<25th	<25th	Site Normal	<25th	<25th	> 90th	Site Normal	Site Normal	Site Normal	Site Normal	Site Normal	>75th
Babson's Landing	<10th	<25th	Site Normal	<25th	<25th	> 90th	Site Normal	Site Normal	Site Normal	Site Normal	> 90th	> 90th
Pireway Landing	<10th	<10th	Site Normal	<25th	<25th	> 90th	> 90th	Site Normal	Site Normal	>75th	> 90th	> 90th
Highway #9	<10th	<10th	Site Normal	<25th	Site Normal	> 90th	> 90th	Site Normal	Site Normal	Site Normal	> 90th	> 90th
Reaves Ferry	<10th	<10th	Site Normal	<25th	Site Normal	> 90th	> 90th	Site Normal	Site Normal	Site Normal	> 90th	> 90th
Murrells Landing	<10th	<10th	<25th	<10th	<10th	> 90th	Site Normal	Site Normal	Site Normal	Site Normal	> 90th	> 90th
Sterritt Swamp	<10th	<10th	Site Normal	Site Normal	>75th	> 90th	> 90th	Site Normal	Site Normal	Site Normal	> 90th	> 90th
Conway Waterfront	<10th	<10th	Site Normal	Site Normal	>75th	> 90th	> 90th	Site Normal	Site Normal	Site Normal	> 90th	> 90th
Pitch Landing	<10th	<10th	Site Normal	<25th	<25th	> 90th	> 90th	Site Normal	Site Normal	Site Normal	> 90th	> 90th
Bucksport Landing	<25th	<25th	<25th	<10th	<10th	> 90th	<10th	Site Normal	Site Normal	Site Normal	>75th	>75th
Peachtree Landing	<10th	<10th	Site Normal	<10th	<25th	> 90th	Site Normal	Site Normal	Site Normal	>75th	> 90th	Site Normal
Enterprise Landing	<25th	<25th	Site Normal	<10th	<10th	> 90th	Site Normal	Site Normal	Site Normal	Site Normal	> 90th	Site Normal
Wachesaw Landing	Site Normal	Site Normal	Site Normal	<25th	<25th	> 90th	<25th	Site Normal	Site Normal	Site Normal	> 90th	Site Normal
Hagley Landing	Site Normal	Site Normal	Site Normal	<25th	Site Normal	> 90th	<25th	Site Normal	Site Normal	> 90th	>75th	Site Normal
Sampit River	<25th	<25th	Site Normal	<10th	<25th	> 90th	Site Normal	Site Normal	Site Normal	Site Normal	>75th	> 90th

ALERT: value is somewhat to highly unusual and contravenes WQS

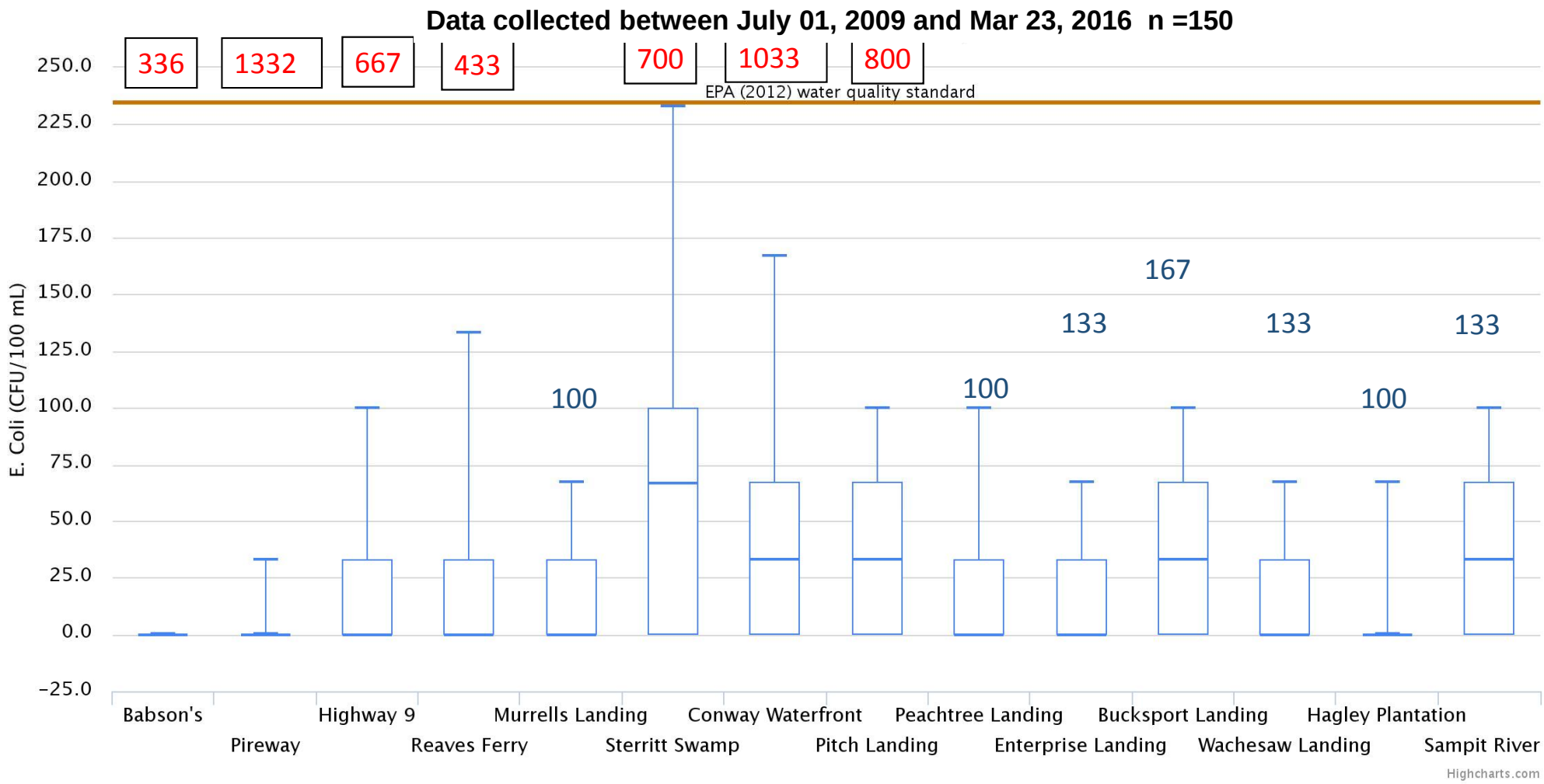
Warning: Value contravenes WQS, but is not unusually bad

Caution: Value is highly unusual, but does not contravene WQS

Value is somewhat unusual and should be watched

For threat levels: For the highest threat, first consider the cells that are red font on red shading. Then consider red shaded cells with black font as these suggest some new and significant event has occurred. The second level of threat are the green shaded cells. Those in black font are of lowest concern but bear watching.

E. coli (CFU/100 mL)



Site	E.coli (RG: MPN/100 mL) (VM: CFU/100 mL)			Turbidity (RG and VM: NTU) (USGS: FNU)					
	River Gaging 11/5/15	Vol. Mon. (11/4/15)	%RPD (VM-RG)	River Gaging 11/5/15	USGS 11/5/15	%RPD (EQL-USGS)	Vol. Mon. (11/4/15)	USGS (11/4/15)	%RPD (VM-USGS)
Babson's Lndg, NC		366					3.4		
Pireway, NC		1332					10.7		
Buck Creek	687			16.0	18	-13%			
Highway 9	517	667	25%	13.9	15	-8%	20.2	23.0	-14%
Reaves Ferry	345	433	23%	8.3	8.5	-3%	15.8	15.0	5%
Murrells Lndg		100					3.9		
Sterritt Swamp		700					10.5		
Crabtree	980			24.4	26	-7%			
Conway	326	1033	104%	8.2	9.3	-14%	11.0	11.0	0%
Pitch Landing		800					9.2		
Bucksport	118	100	-16%	4.7			3.3		
Peachtree Lndg		133					4.6		
Enterprise Lndg		167					4.5		
Wachesaw Lndg		133					8.0		
Hagley	186	100	-60%	15.1			9.6		
Gallivants Ferry	365			5.7	5.7	1%			
Sampit		133					9.7		

> SC DHEC WQS

>75th percentile

>90th percentile

From: Fuss, Dave [mailto:fussj@HorryCounty.org]
Sent: Tuesday, November 10, 2015 4:22 PM
Subject: RE: High E. coli in the Waccamaw River

In the Crabtree Swamp basin, I am aware of **sewer overflows** near the Oak St restoration site and Sherwood Ave associated with the big storm in early October and then again near Oak St restoration site early last week. I consulted with Grand Strand Water and Sewer Authority and they have not had any overflows in the Hwy 9/Buck Creek area - sewer is limited in that area anyway. During the big storm in early October (4-5), the Central wastewater plant on Jackson Bluff Rd failed and overflowed. I'm not sure that this would still be affecting Pitch Landing, though.

The magnitude of these numbers could be attributed to washoff of wildlife or domestic animal waste or compromised septic systems, but it is difficult to pinpoint specific sources of these contributors. Sewer overflows typically result in bacteria numbers several orders of magnitude or higher.

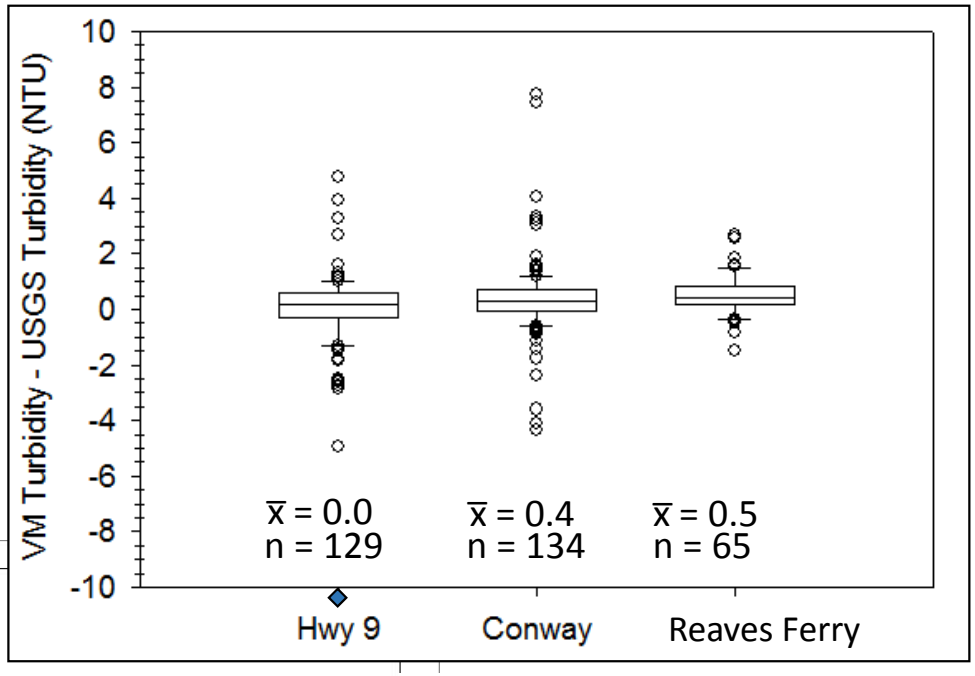
I will continue to monitor these areas as I can to check for possible sources.

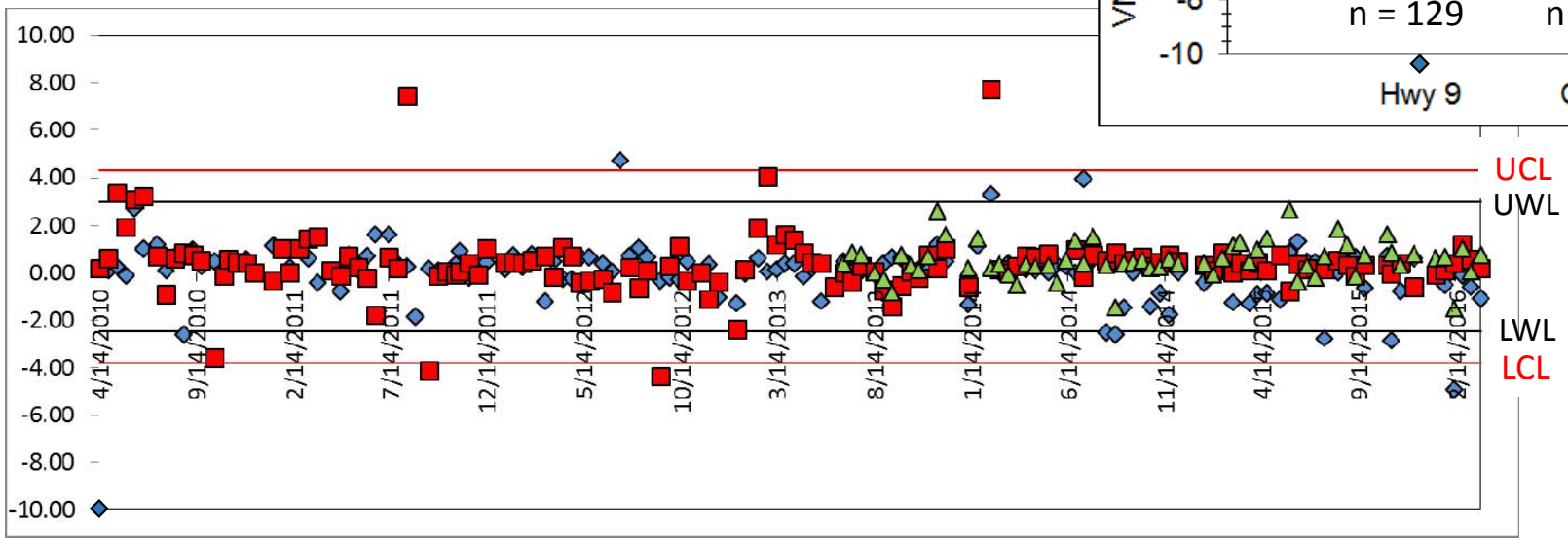
Dave Fuss | Watershed Planner
Horry County Government
Stormwater Management
4401 Privetts Road, Conway, South Carolina 29526
Tel 843-915-6952 | Fax 843-365-2208 | fussj@horrycounty.org

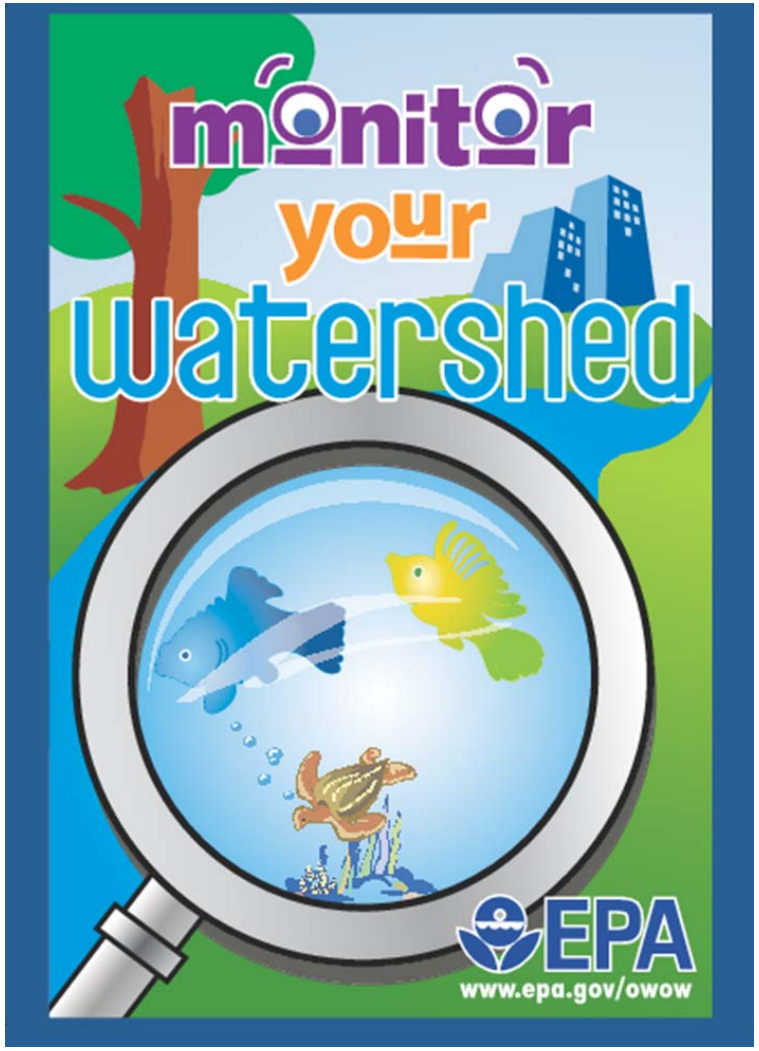
Other benefits of data comparisons

- Detection of gross errors caused by equipment issues
- Detection of sampling site issues

VM Turbidity (NTU) – USGS Turbidity (FNU)





Increasing IDDE response

- Tightening of site-specific norms with increasing size of the datasets
- More effective integrated data analysis arising from increased experience of the group in working together.