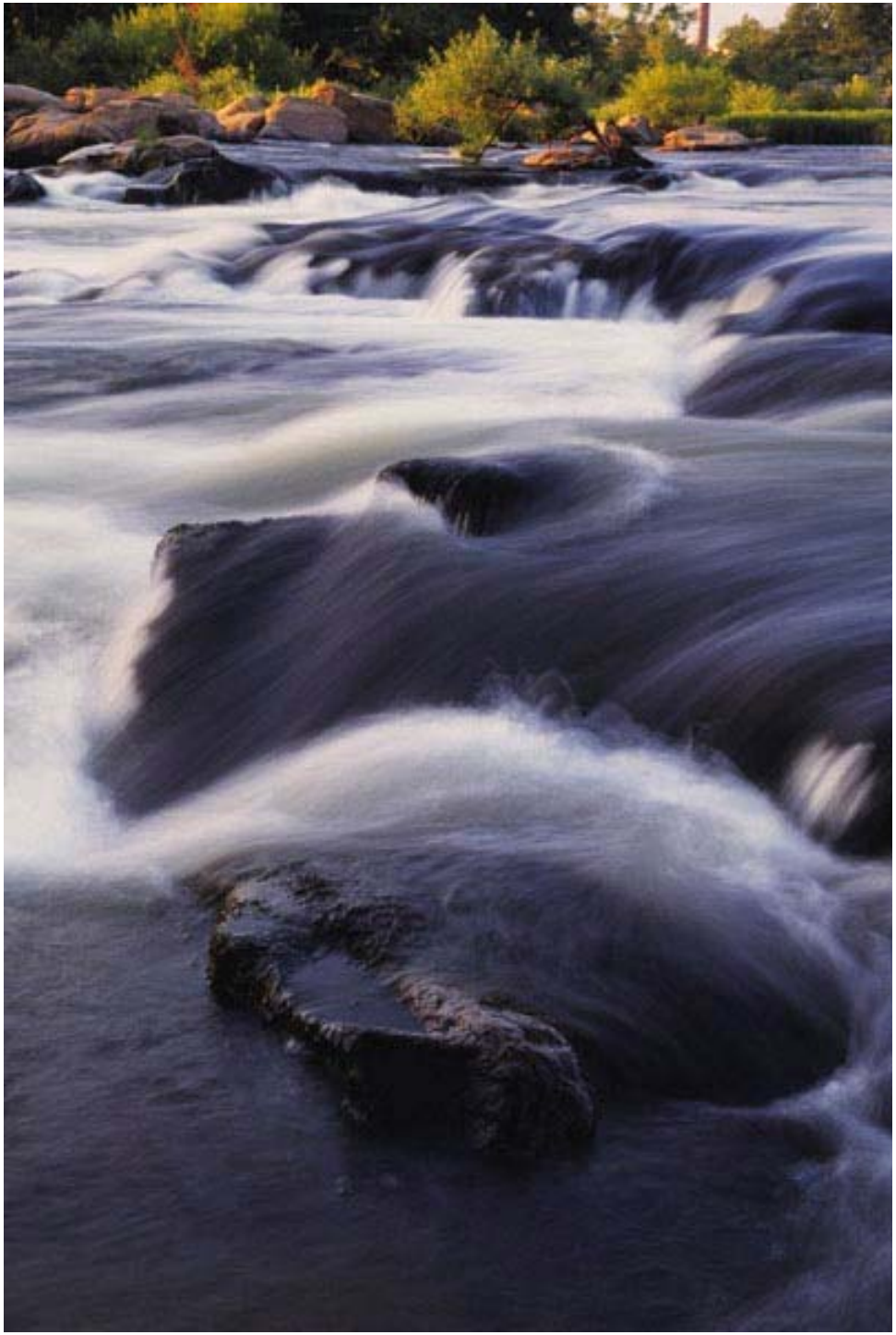

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Our River. Our Water. Our Future.

James River Watch

Monitoring River Conditions on the James

Ben Watson
Staff Scientist
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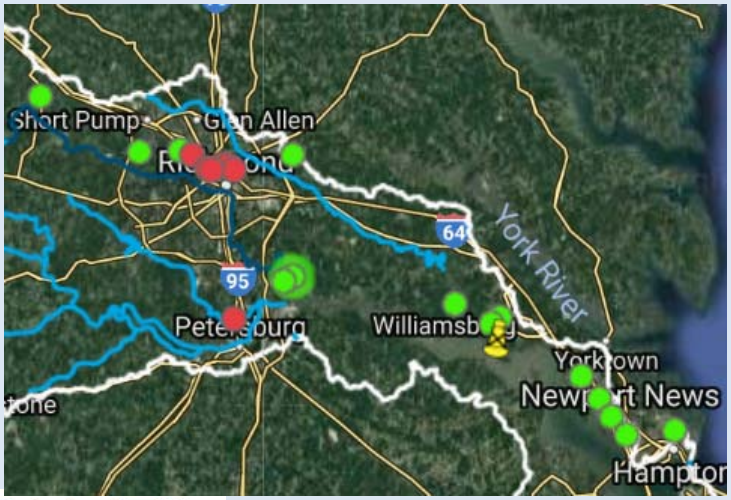
What is James River Watch?

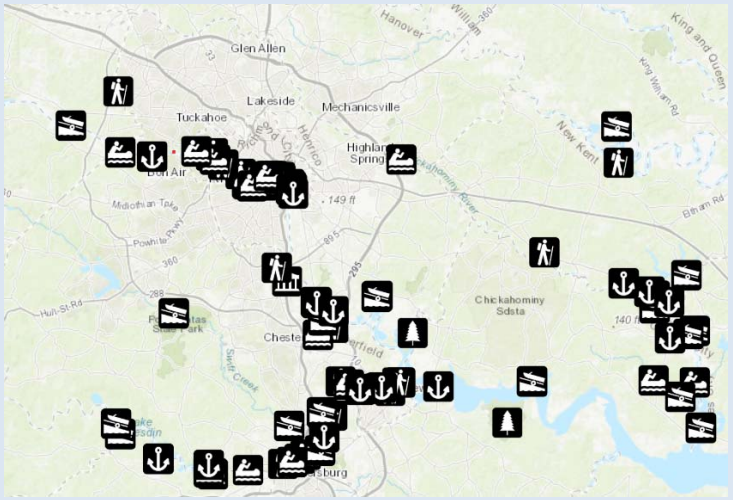
A water quality monitoring program and web application designed for outdoor recreators

- Empowers river users to plan their activities – swimming, boating, or fishing – in a safer and better informed manner
- Funding from DEQ, Ballyshannon Fund, Oak Hill Fund, Campbell Foundation, Bama Works – thanks to our funders, partners, and volunteers!
- Can be used in conjunction with some of our other mapping products

James River Watch



Richmond Region River Access



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Why James River Watch?

Q: Is it safe to swim in the James?

A: Almost always yes, but it depends

…on river levels

…on weather conditions

…on bacteria levels

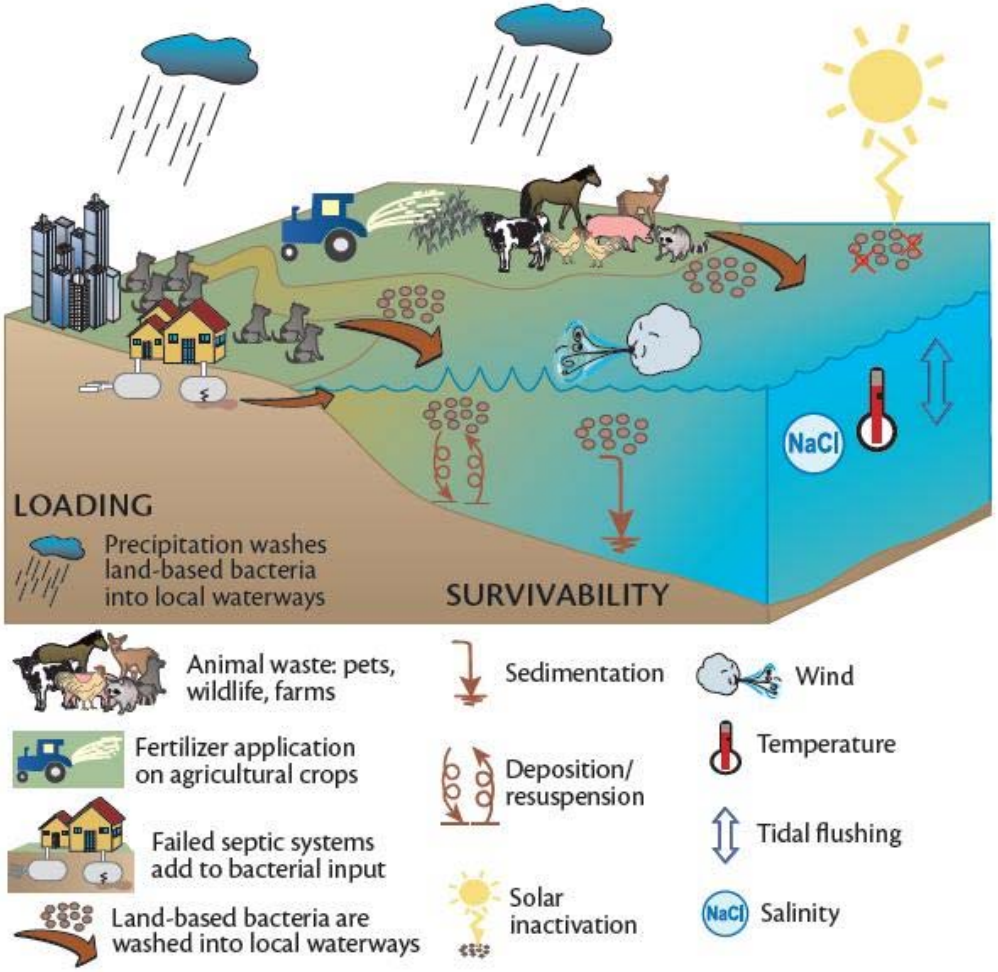
USGS science for a changing world

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

James River Association River Rats

Bacteria in the James

- Based on concentrations of *Escherichia coli (E. coli),* found within the intestines of warm-blooded animals.
  - *Enterococci* in saltwater
- Pathogens can come from:
  - feces of many animals, including wildlife and pets
  - humans, through leaking septic systems and broken sewage lines
- DEQ, VDH, other agencies monitor bacteria too
  - Different areas of study
  - Different monitoring schemes and objectives



Universe of bacteria monitoring data collected for different purposes, not directly comparable

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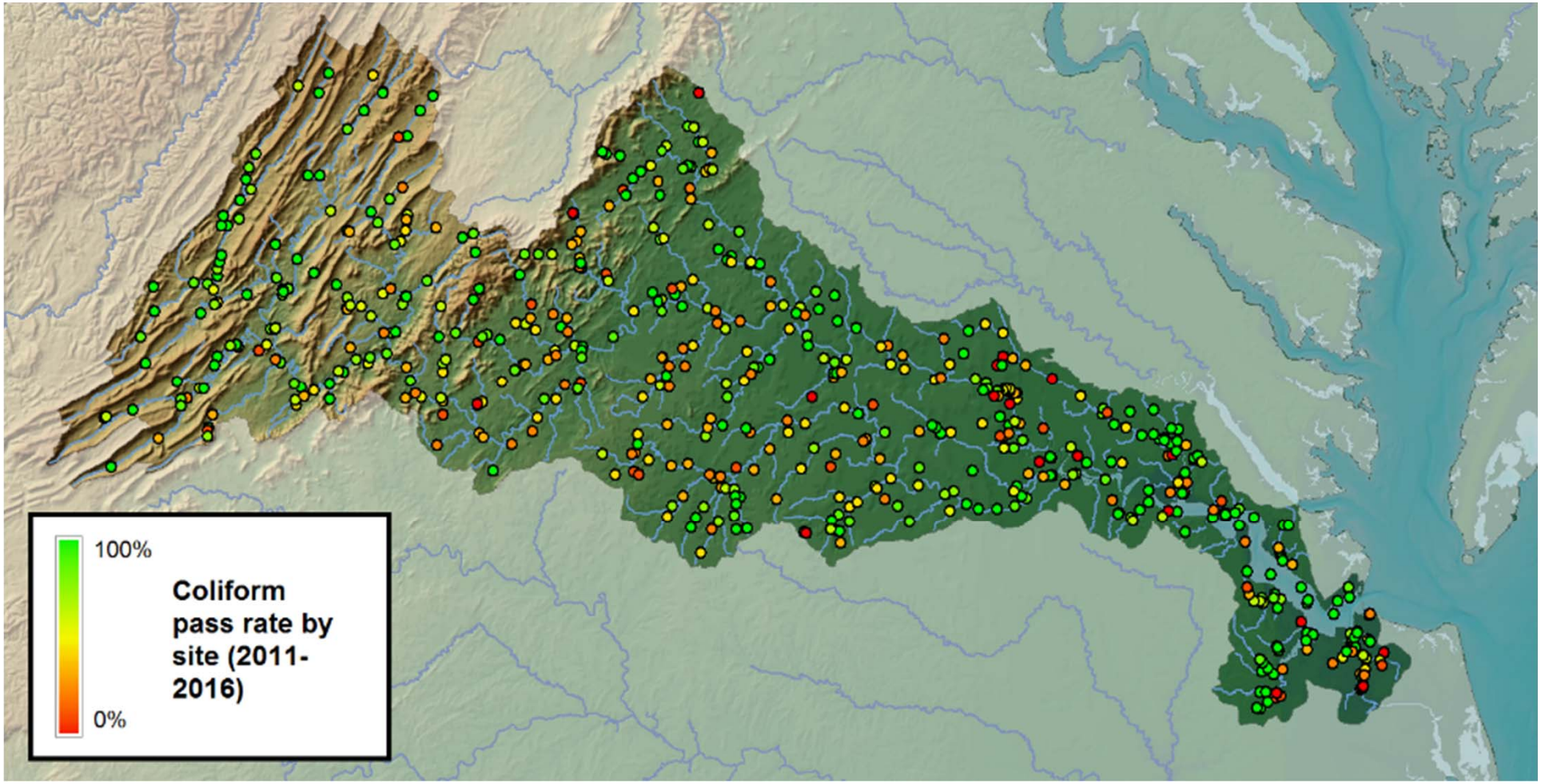

Universe of bacteria monitoring data collected for different purposes

Mixed-purpose data creates need for product catered to outdoor rec community

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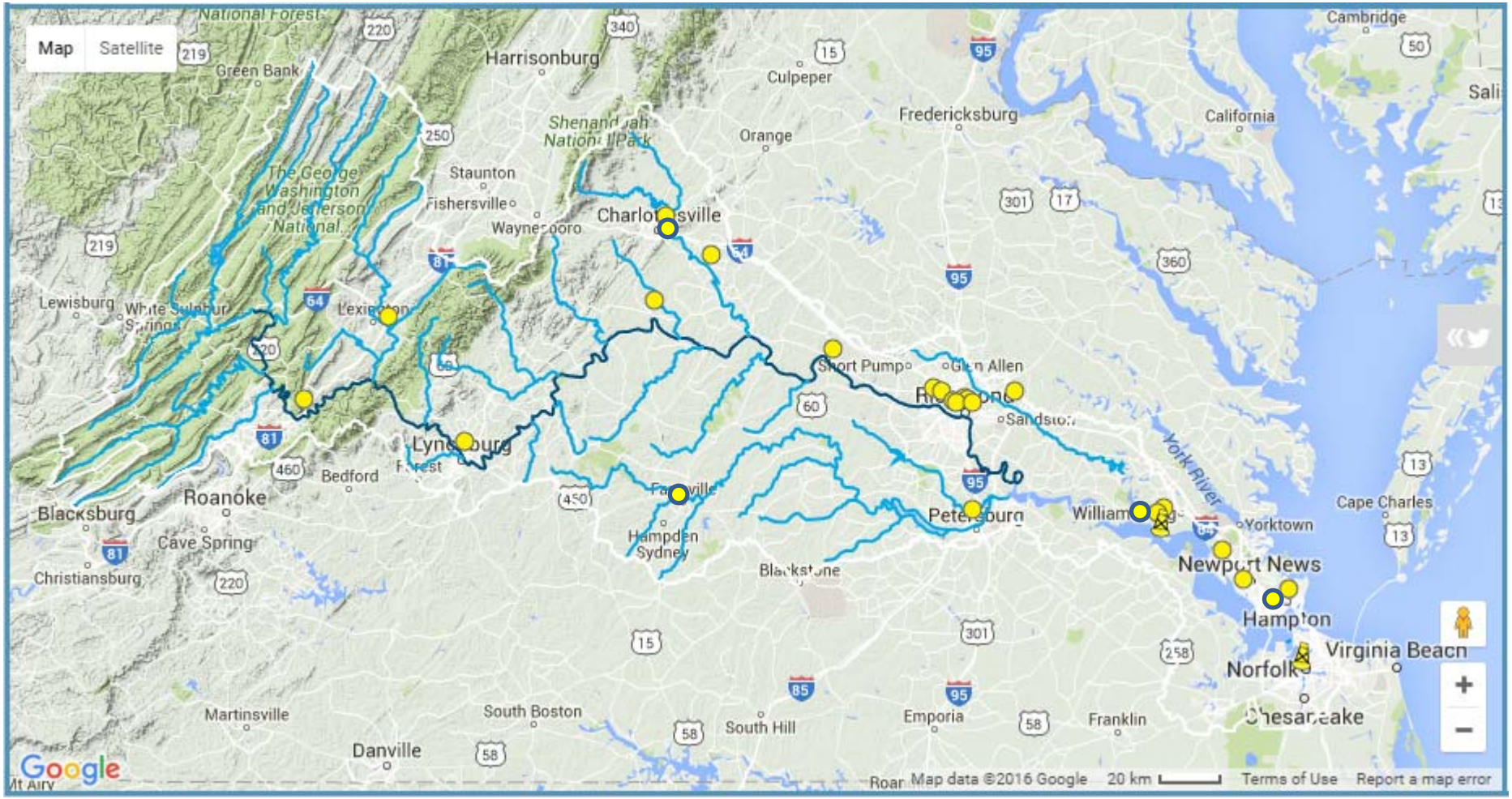
Sampling Locations



2018: 27 active sites across the watershed

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Methods

- QA/QC ensured by DEQ
- All data is volunteer-collected
  - Roughly 70 volunteers this past season
- Volunteers are given pre-season trainings on data collection, upload, and management
- Testing conducted from Memorial to Labor Day
  - Thursday testing, Friday results
- Sites are split between ColiScan and ColiLert

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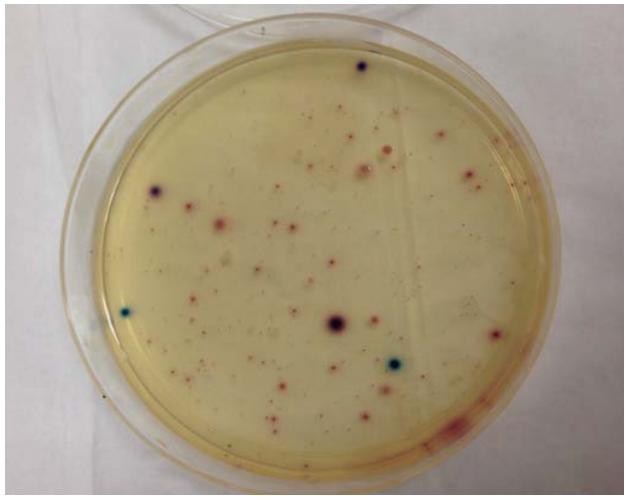
Methods

ColiScan

- Used at 21 sites
- Growth agar that differentiates bacteria by color
  - *E. coli* colonies appear purple/blue



ColiLert

- Used at 6 sites
- UV fluorescence indicates *E. coli* presence/absence
- Higher-precision data capable of higher-level use; future of JRW?

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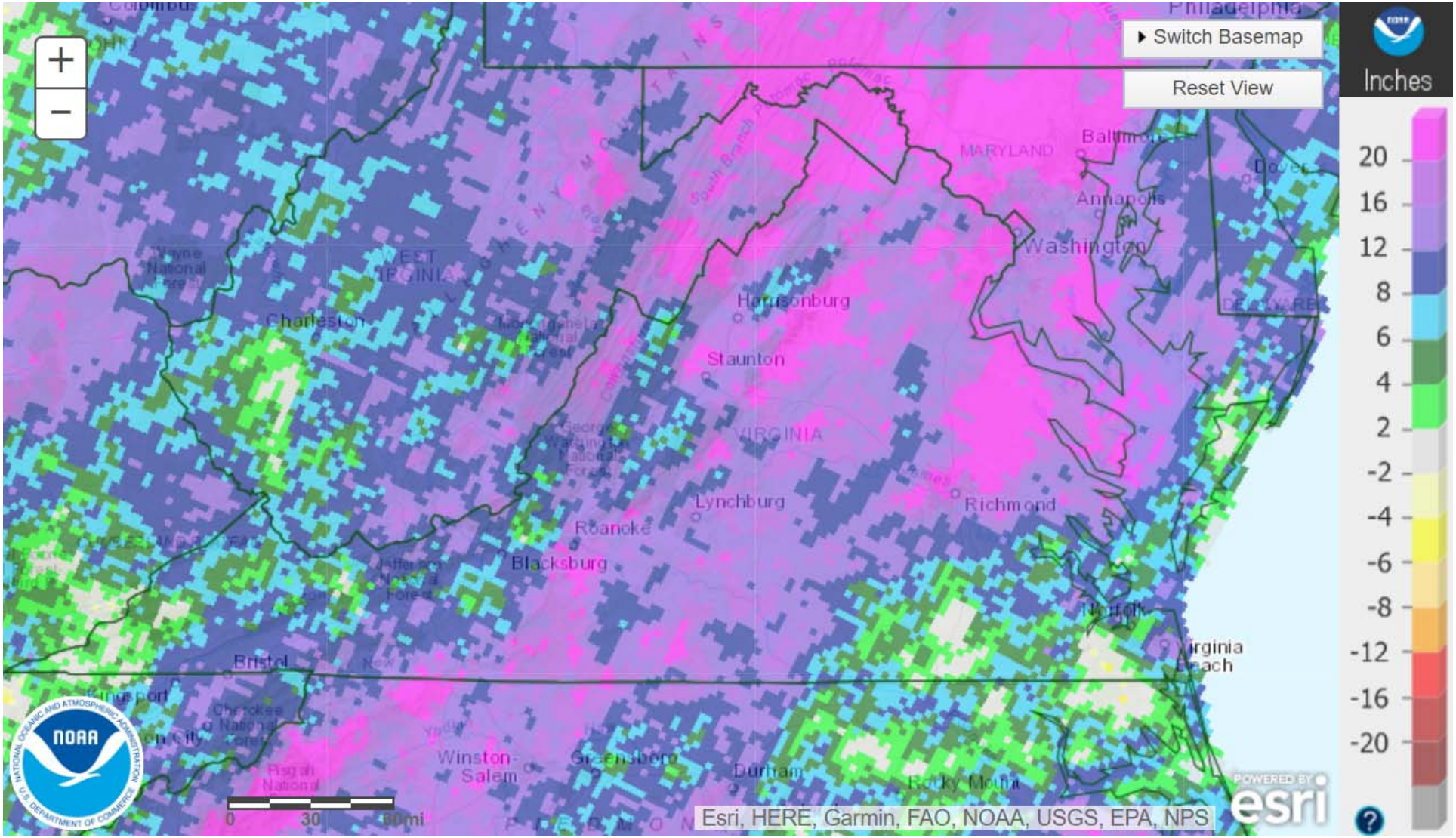

Rainfall departures from normal (in inches, Apr 23 – Oct 23)

It’s been a wet summer…

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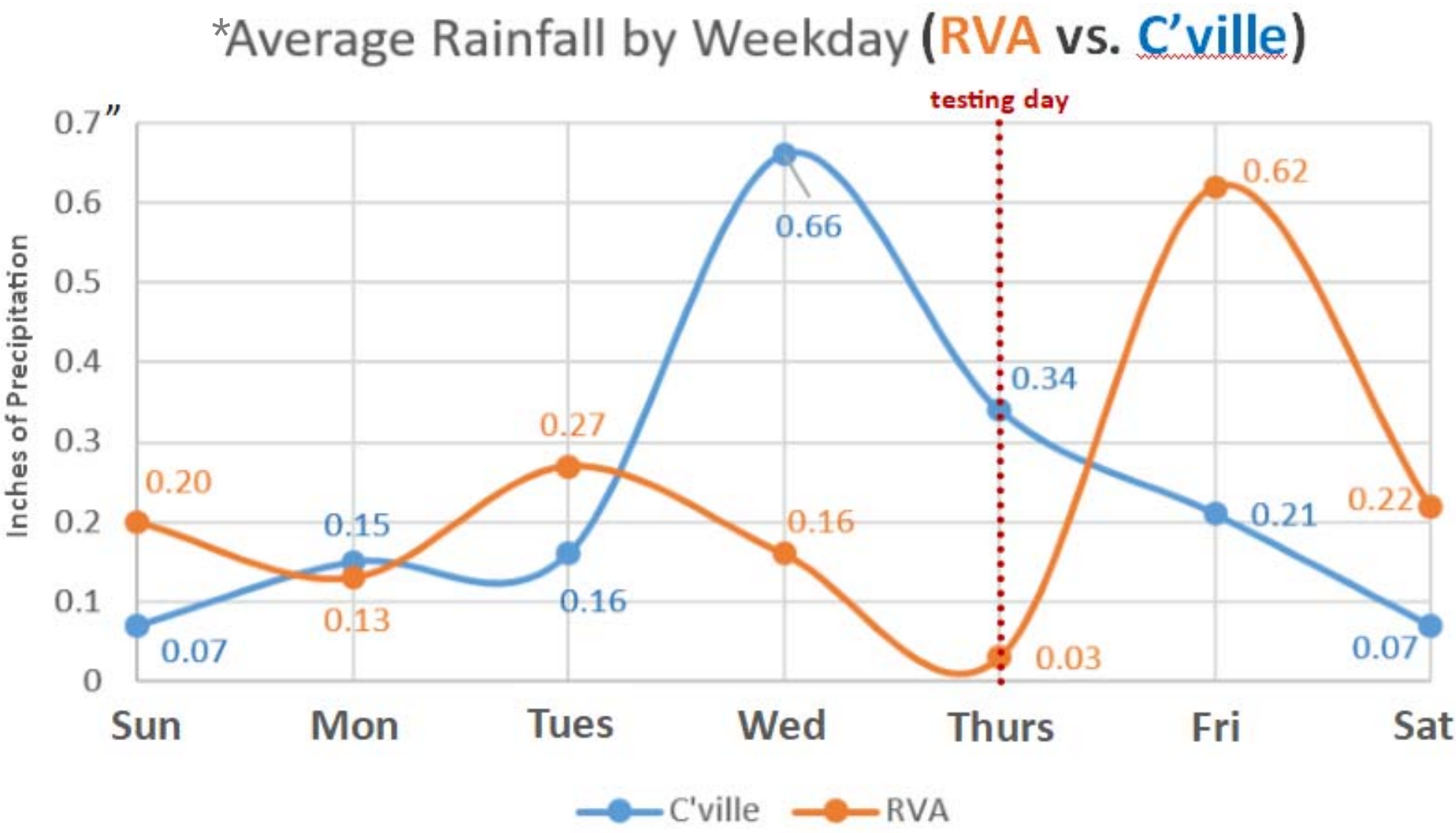
-Bacteria sites in gray, passes in green, failures in red
-Look for high water events in mid May, early June, early August

SITE NUMBER	SITE NAME	LOCATION	LENGTH OF RECORD (YRS)	PASS RATE (2013 – '17)	PASS RATE (2018)	CHANGE	SAMPLES
1	Buchanan Boat Ramp	Buchanan	6	72%	**86%**	+14	14
2	Maury at Ben Salem	Rockbridge	5	86%	**88%**	+2	8
3	Riveredge Park	Lynchburg	6	95%	**93%**	-2	15
4	Scottsville Boat Ramp	Scottsville	6	93%	**80%**	-13	15
5	Rivanna at Riverview	Charlottesville	4	83%	**67%**	-16	15
6	Rivanna at Darden Towe	Charlottesville	3	85%	**67%**	-18	15
7	Main St. Bridge	Farmville	2	93%	**92%**	-1	13
8	Tucker Park/Maidens	Goochland	6	88%	**85%**	-3	13
9	Robious	Chesterfield	3	93%	**86%**	-7	14
10	Huguenot	Richmond	4	93%	**87%**	-6	15
11	Pony Pasture	Richmond	4	91%	**93%**	+2	15
12	42nd Street	Richmond	4	77%	**87%**	+10	15
13	Reedy Creek	Richmond	4	84%	**93%**	+9	15
14	Tredegar	Richmond	6	82%	**87%**	+5	15
15	14th Street	Richmond	6	71%	**87%**	+16	15
16	Rockett's Landing	Richmond	5	63%	**67%**	+4	15
17	Harvell Dam	Petersburg	5	79%	**86%**	+7	14
18	Hopewell (Rt. 10)	Hopewell	3	94%	**100%**	+6	15
19	City Point	Hopewell	6	73%	**93%**	+20	14
20	Grapevine Bridge	Henrico	5	82%	**100%**	+18	14
21	Chickahominy Riverfront Park	James City	3	100%	**92%**	-8	12
22	Jamestown Beach	James City	6	96%	**100%**	+4	14
23	Powhatan Creek	James City	4	71%	**73%**	+2	15
24	Denbigh Boat Ramp	Newport News	5	91%	**89%**	-2	9
25	Riverside Beach	Newport News	5	98%	**100%**	+2	12
26	James River Fishing Pier	Newport News	3	100%	**---**	---	--
27	Hampton River	Hampton	4	90%	**100%**	+10	12
28	Deep Creek	Newport News	2	--	**100%**	---	14
TOTAL	----------	------	------	**85%**	**86%**	**+1**	**372**

Despite the rain, numbers are pretty good!

-Evidence of regional trends?



*Precipitation averaged from May 20 to Sep 1

-Bacteria levels and recreation conditions depend on timing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Applications

- High quality data can:
  - Convey river conditions and safety to interested members of the public
  - Inform stream impairment classifications
  - Help construct local WIPs and TMDLs
  - Contribute to large-scale analyses

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Conveying Info to the Public

- www.jamesriverwatch.org had 4,500 unique site visits this past summer
- Bacteria white paper released this spring
  - Picked up by the media
  - Available on our website
- New website coming out soon!

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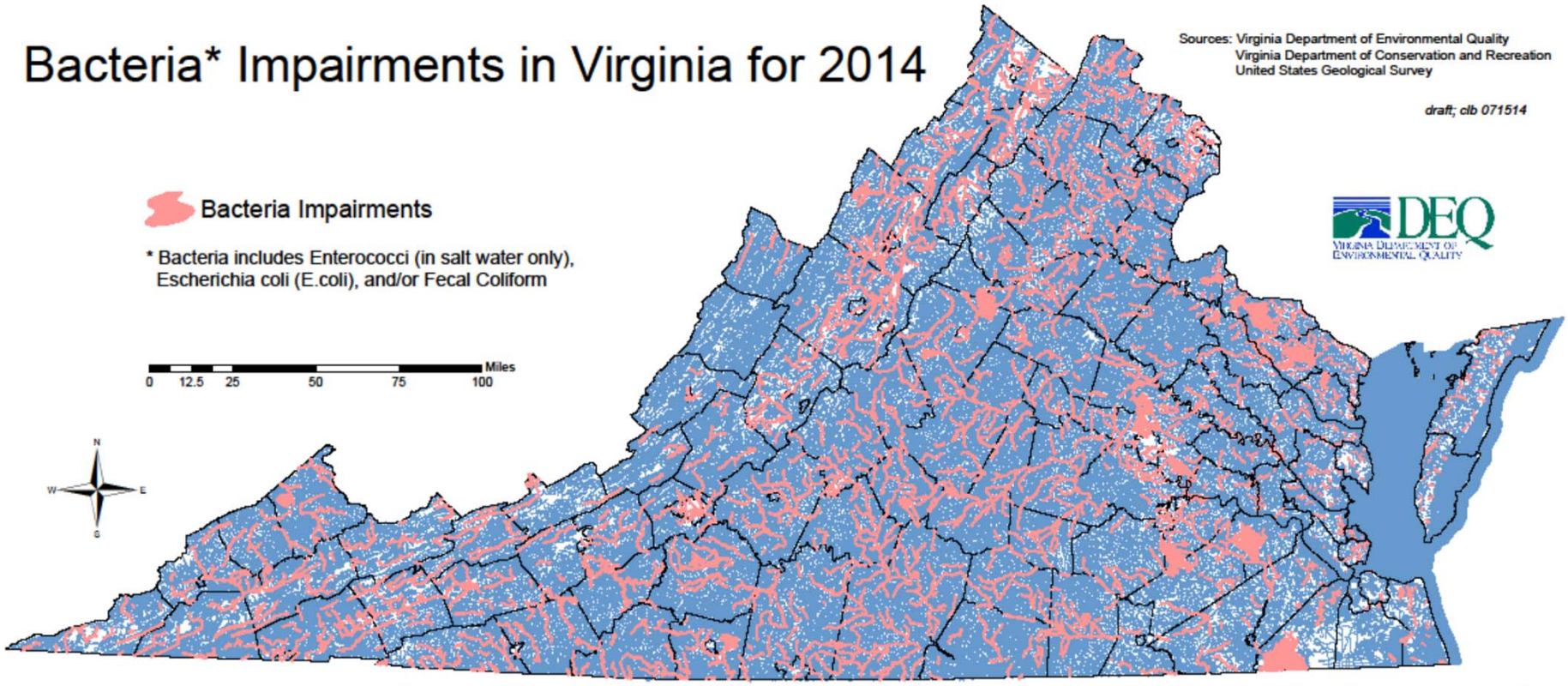
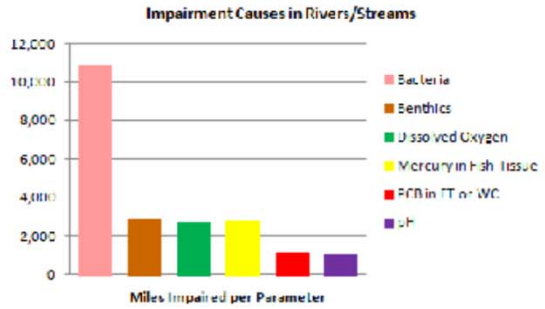
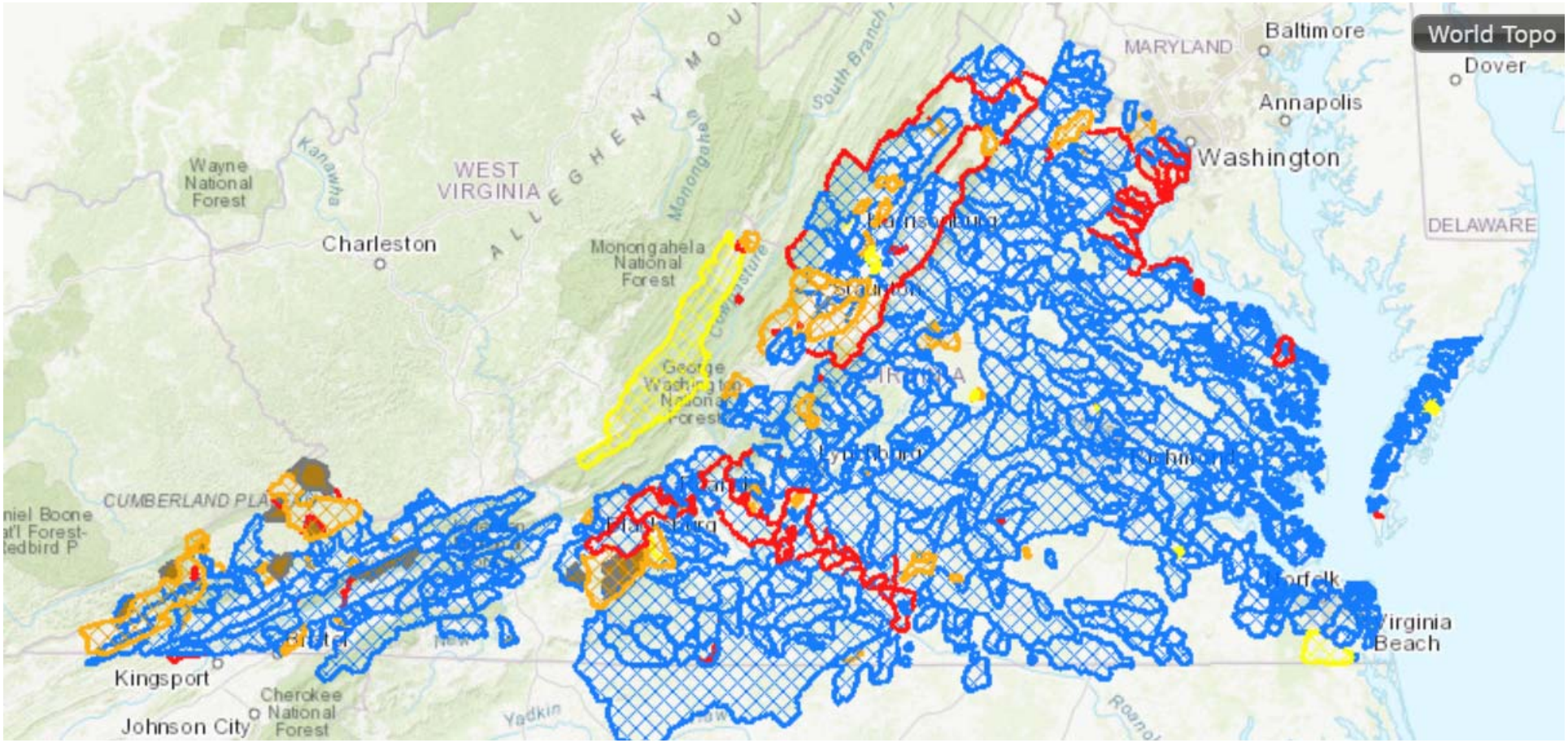
Informing Impairment Classifications





Bacteria are *by far* the most common impairment of Virginia rivers and streams

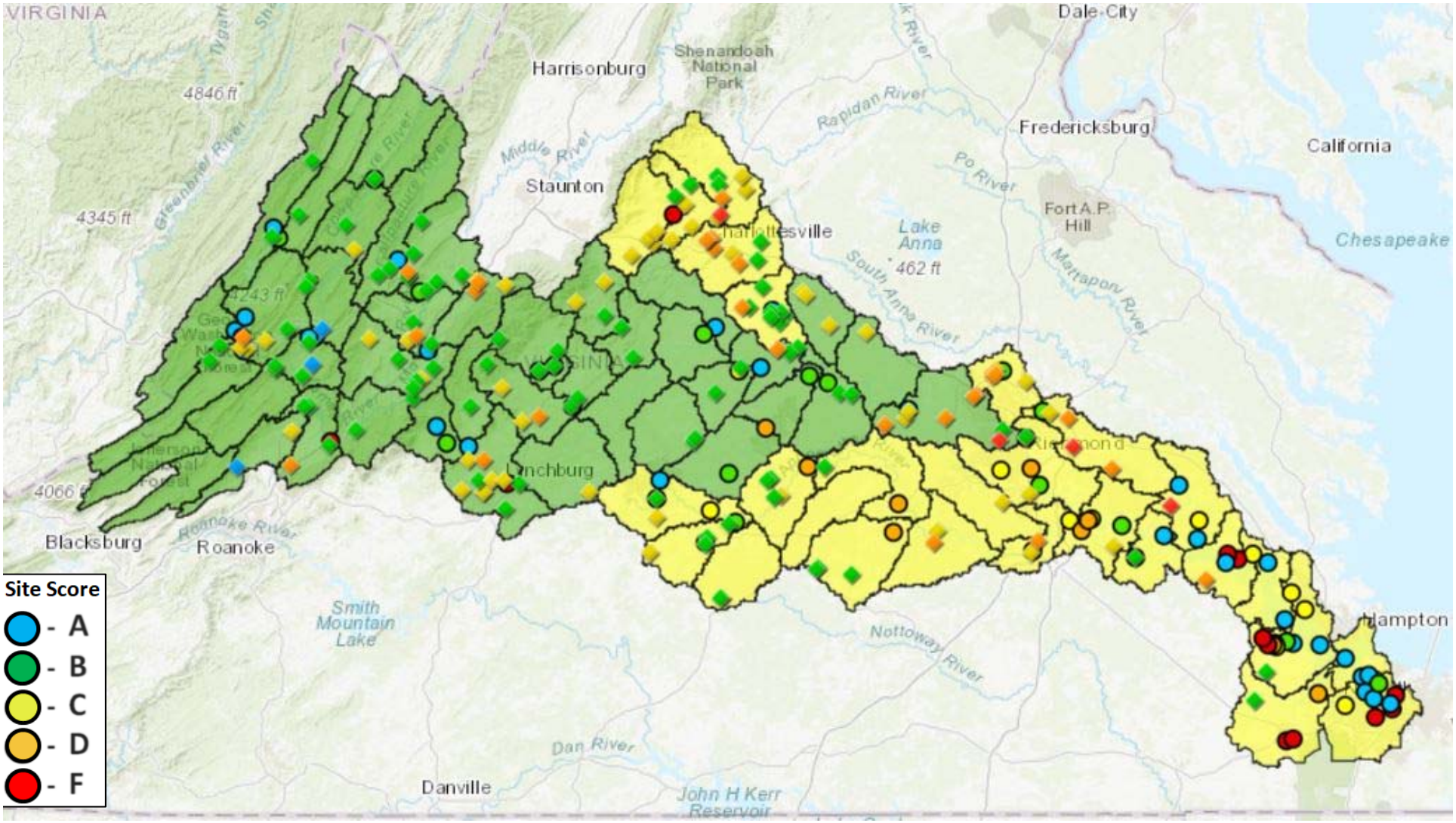
Implementing Local TMDLs



Bacteria TMDLs shown in blue

Contributing to Large-Scale Analyses

Subwatershed Health (2009)



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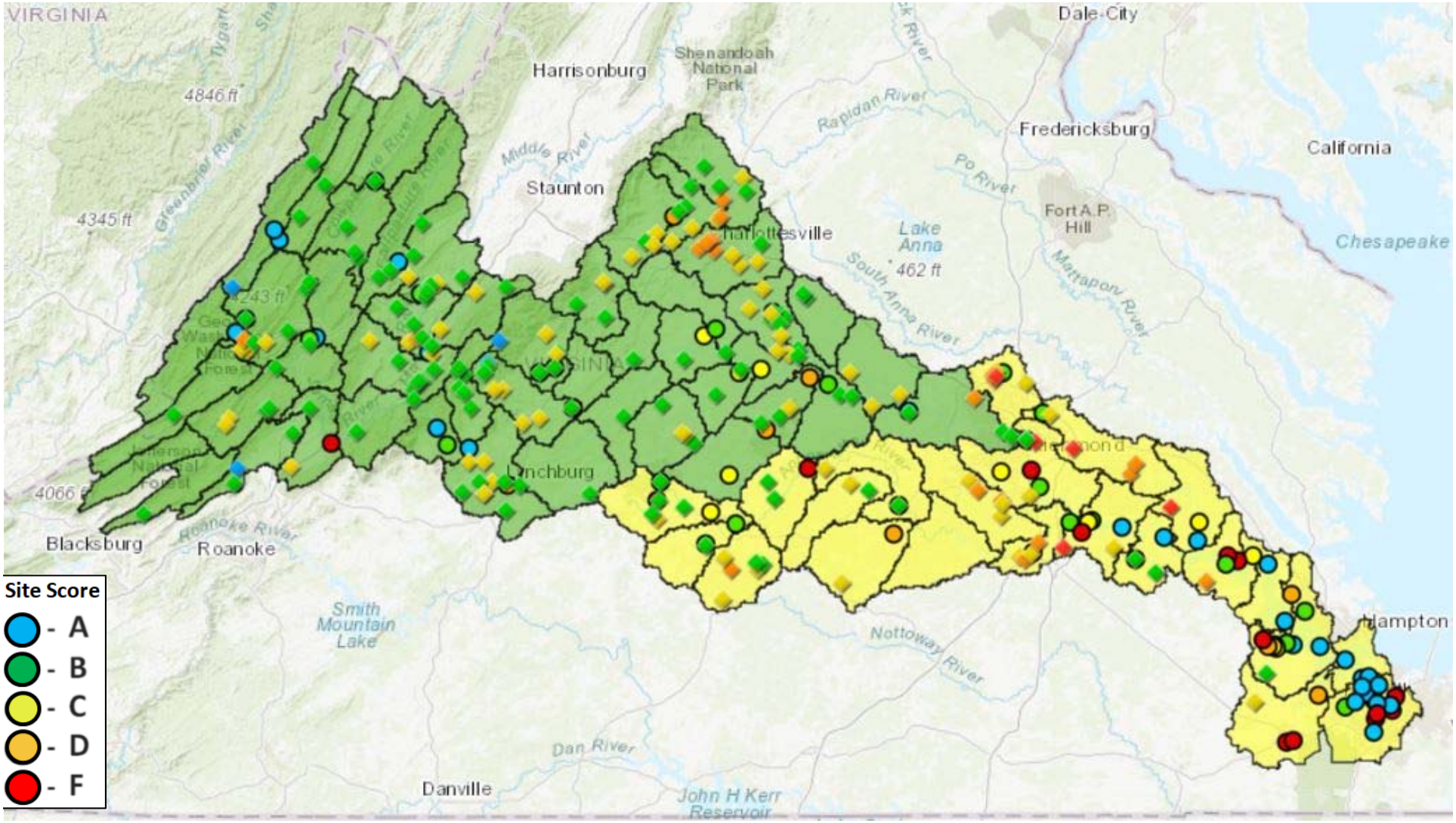
Subwatershed health (2009) based on bacteria monitoring (circles), stream health (diamonds), and riparian buffer coverage.

Subwatershed Health (2011)



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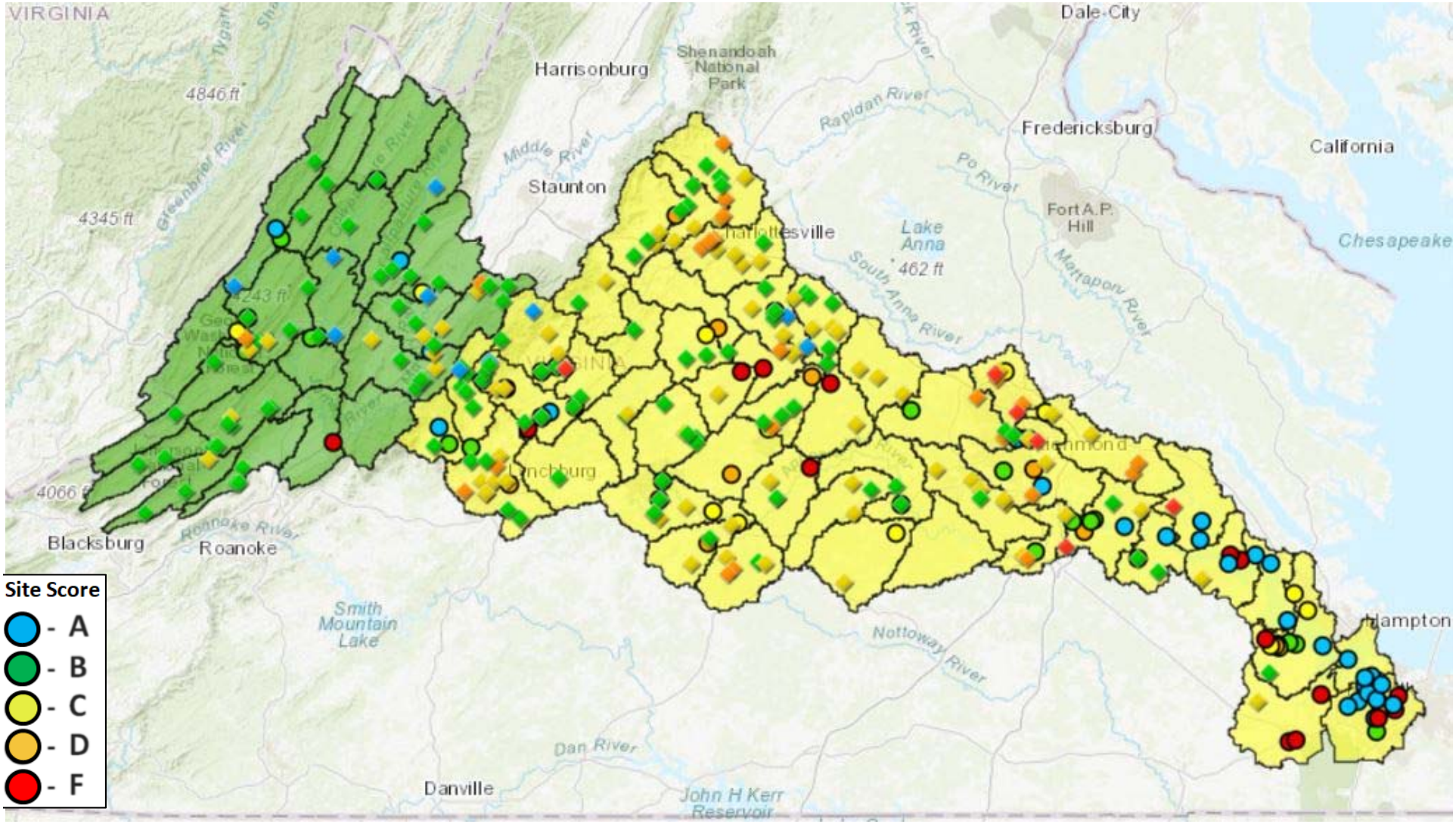
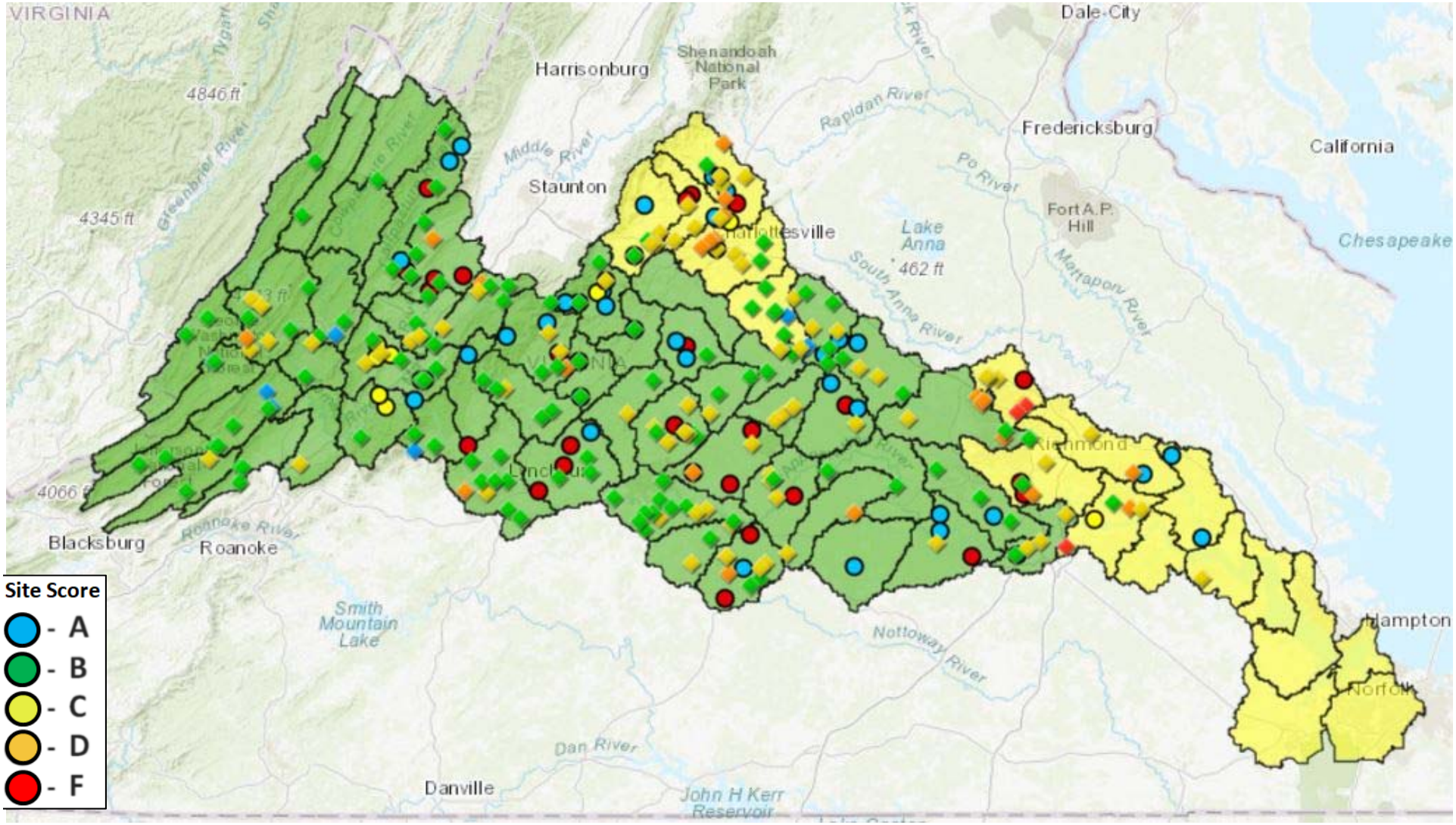
Subwatershed health (2011) based on bacteria monitoring (circles), stream health (diamonds), and riparian buffer coverage.

Subwatershed Health (2013)



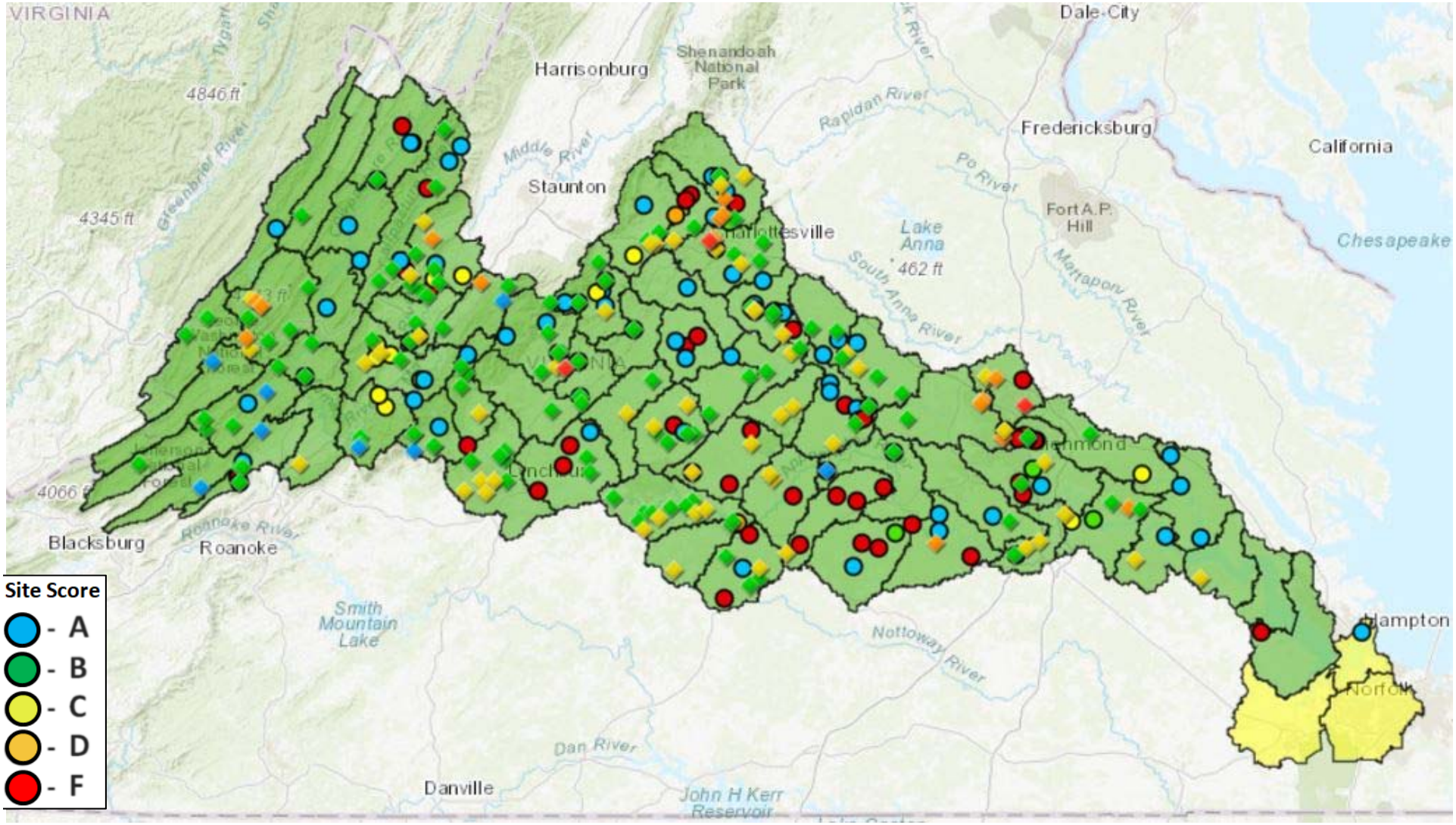
Subwatershed health (2013) based on bacteria monitoring (circles), stream health (diamonds), and riparian buffer coverage.

Subwatershed Health (2015)



Subwatershed health (2015) based on bacteria monitoring (circles), stream health (diamonds), and riparian buffer coverage.

Subwatershed Health (2017)



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For those interested, this interactive tool is available online


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Conclusions

- **Program-Specific**
  - JRW fills a gap in bacteria monitoring
  - Despite the rain, this year's numbers look pretty good
  - Timing is the biggest predictor of river conditions

- **Big Picture**
  - How can we make JRW data serve multiple purposes?
    Integration with other monitoring programs? Use in gov't or academia?
  - Monitoring programs are usually independent
    Is there room for more complementary efforts?
  - Data sharing and availability
    Data hubs exist, but how can we further data sharing and open science?

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The James River is a great place to recreate – get out there and enjoy it!

Questions?

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