The Water Data Collaborative: Citizen Science Monitoring Data and Data Sharing

Webcast sponsored by EPA's Watershed Academy

Thursday, May 9, 2019, 1:00pm – 3:00pm Eastern

Speakers:

- Samantha Briggs, Acting Clean Water Program Director, Izaak Walton League of America (IWLA)
- John Dawes, Executive Director, Chesapeake Commons
- Emily Wiggans, GIS Analyst, Chesapeake Conservancy

Webcast Logistics

- **To Ask a Question** – Type your question in the "Questions" tool box on the right side of your screen and click "Send."
- **To Report any Technical Issues** (such as audio problems) – Type your issue in the "Question" tool box on the right side of your screen and click "Send" and we will respond by posting an answer in the "Questions" box.
- **Slides & Recording** – The slides are posted and a recording will be available within 2-3 weeks. https://www.epa.gov/watershedacademy/lessons-learned-integrating-water-quality-and-nature-based-approaches-hazard
- **Certificate of Attendance** – a certificate of attendance will be available at the end of the webcast. We will provide directions to retrieve this at the end of the webcast.

Speakers

- **Samantha Briggs,** Acting Clean Water Program Director, Izaak Walton League of America (IWLA)
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Water Data Collaborative

SUPPORTING COMMUNITY WATER SCIENCE

Samantha Briggs
Izaak Walton League of America
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Water Data Collaborative

SUPPORTING COMMUNITY WATER SCIENCE

river NETWORK connecting people·saving rivers

WATERKEEPER® ALLIANCE

Duke NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS

CUAHSI universities allied for water research

CONSERVATION INNOVATION CENTER CHESAPEAKE CONSERVANCY

Chesapeake COMMONS

Water Data Collaborative

Why a Water Data Collaborative?

- **Integration** – Build a cooperative program between NGOs, water technology developers, and open data stewards to inform integrated technology innovations
- **Engagement** – Engage existing networks of community water scientists to design support that meets needs and reaches groups effectively
- **Inclusion** – Represent the valuable NGO data community to open water data efforts

Pisces Foundation Objectives

Access: Public has access to data collection tools to supplement government data with their own.

Share: Data collectors (governmental, academic and citizen science) can share and understand each other's data.

Use: Tools are available to turn data into *actionable* decision making to protect and restore freshwater resources.

Water Data Collaborative

Water Data Collaborative

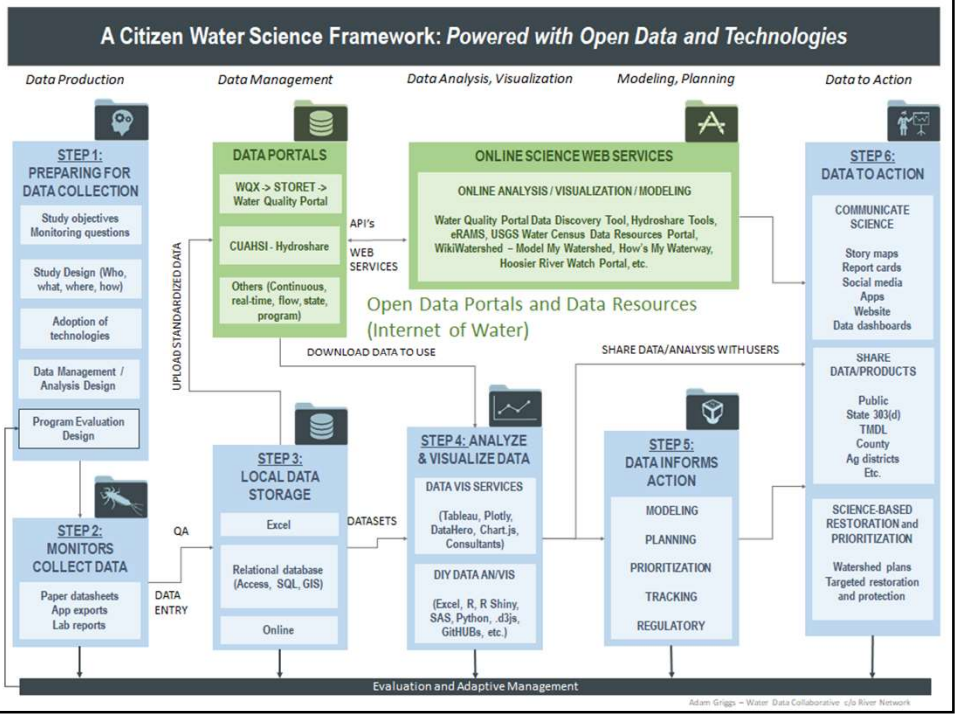
Goal:

Increase the quality, accessibility, and use of NGO-collected water data

- Create a collaborative network of support for community water science
- Improve the data infrastructure that supports NGOs and community water science
- Increase adoption of best-practice resources, and technologies

Water Data Collaborative

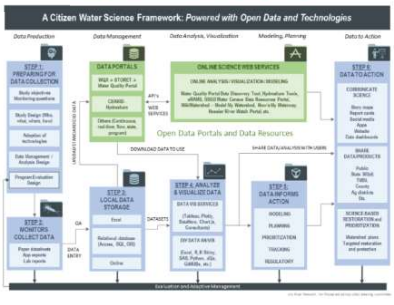
1) Document Existing Resources
2) Demonstrate the role of open data resources
3) Organize and guide access to resources



Water Data Collaborative

Catalogue Water Science Resources

Science and Technical Resources Portal



Monitoring and Data Production

- Find resources and information on monitoring study design, quality assurance, methods and equipment for monitoring, and discover new technologies changing how data is being collected.

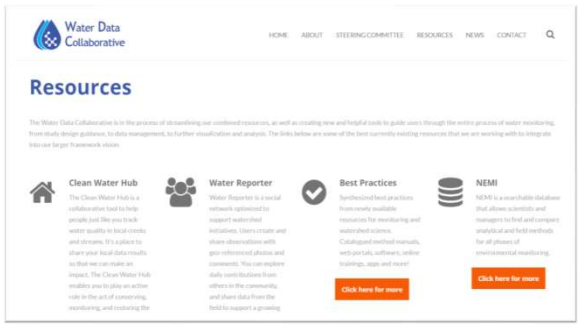
Data Management and Storage – *Coming Soon!*

- Find guidance for developing data management plans.
- Learn about different database options and research options that fit your data management needs.

Accessing and Sharing Data Online

- Discover and learn how to use data resource portals from federal, state, university, and NGO partners.

www.waterdatacollaborative.org



Water Data Collaborative

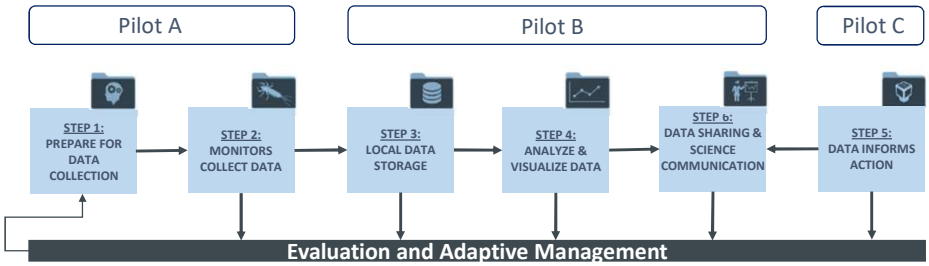
Building New Tools

1) Addressing gaps and barriers to adoption

Standardization
Collaboration
Capacity-building

Water Reporter
Access Database
Clean Water Hub

Data-driven
watershed
applications



Water Data Collaborative

Water Data Collaborative

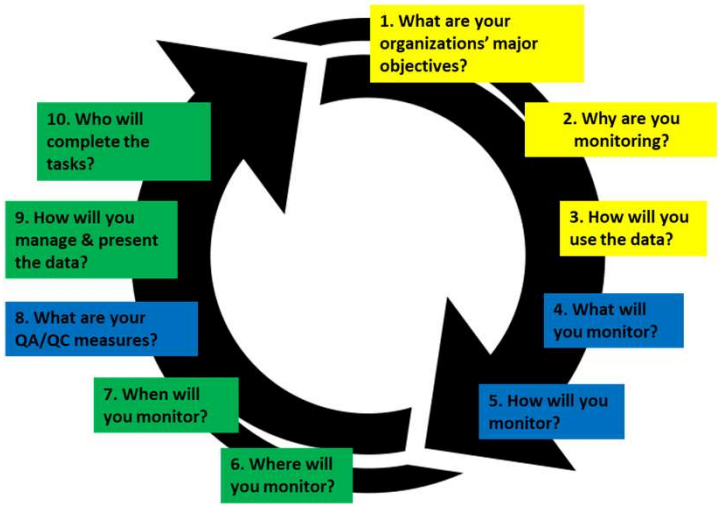
Beginning with the End in Mind: Tools from the Water Data Collaborative for Effective Program Planning from the Water Data Collaborative

Samantha Briggs
Izaak Walton League of America
sbriggs@iwla.org

The Typical Problems for Volunteer Monitoring Groups:

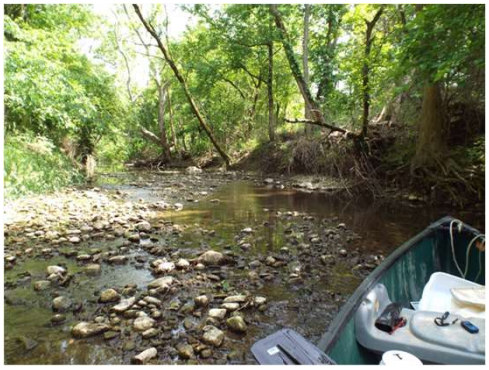
- Effective/complete Study Design
- Choosing the correct protocol for your needs
- Navigating data solutions and data sharing

Study Design Process – the most important step!



River Network

Why is a study design needed?



- Focus
- Clearly articulated methods
- Scientific process
- QA/QC
- Continuity
- Data use pipeline

Study Design Resources – they exist!

- Tons of resources with National Water Quality Monitoring Council
- QAPP Resources – EPA, River Network
- ALLARM Study Design Manual
- …and more!

The Water Data Collaborative's Solution:

Meeting people where they are!

Water Data Collaborative

Study Design Guidance Modules

Evaluation Modules Need Identified

Module 1

Module 2

Module 3

Module 4

Module 5

Possible Products

1. Monitoring Plan
2. QAPP
3. Data Management Plan
4. Data Delivery Plan
5. Evaluation Plan
6. Published Data to NWP other info products

Accessible Repository like NEMI for products

Module 1: Evaluating Where You Are

What have you documented?

What pieces are missing?

Module 2: Program Design:
the who and the why

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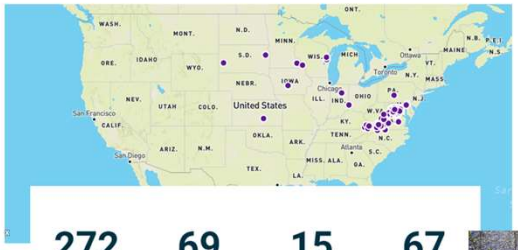
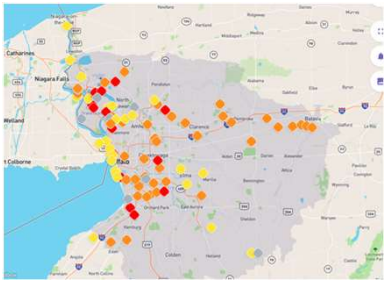
the who and the why



272 Stations 69 Samples 15 Organizations 67 Members

Module 3: Technical Design:
the what, when, where, data quality and management



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38.33279	-77.61132	Spotsylvania		Rappahannock Chapter IWL	11/15/2018
38.33287	-77.61265	Spotsylvania		Rappahannock Chapter IWL	12/12/2018
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38.90528	-78.02970	Fauquier		Goose Creek Association	10/30/2018
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38.93306	-77.80780	Fauquier		Goose Creek Association	10/31/2018
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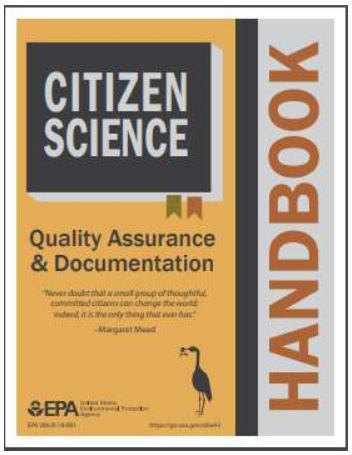
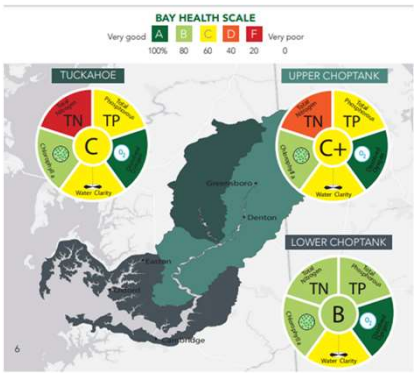
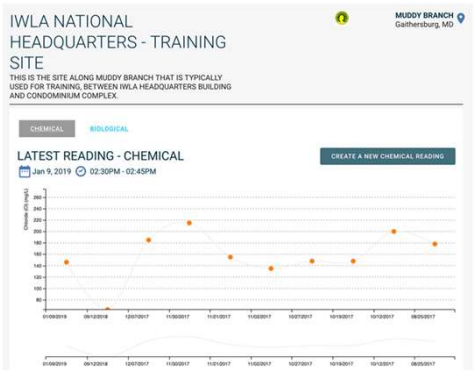


Module 4: Information Design:
Data to Information through Analyses, Interpretation, Reporting & Communicating





Module 5: Evaluation Design:
Will it work and how will I know?

- Communication
- Adoption
- Surveys
- QA/QC
- Evidence of data use

Study Design Tools from the WDC – stay tuned!

An online platform that connects monitoring groups nationwide with a streamlined study design process

Study Design Tools from the WDC – stay tuned!

- Training tools – videos, worksheets, evaluations, etc.

Fish and other aquatic life need oxygen like we do -- they just
6.2K views · October 3, 2018

Clean Water Minute with Sam Briggs, IWLA Save Our Streams
7.8K views · September 26, 2018

Clean Water Monitoring S
75 views · Ma

Study Design Tools from the WDC – stay tuned!

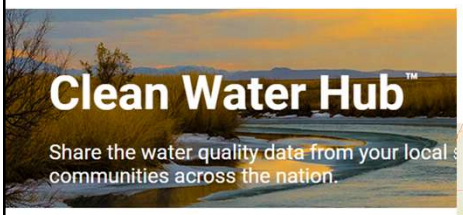
Connection to service providers, such as NEMI, state contacts, other vol mon groups, and contacts from the WDC to help fill gaps in your program

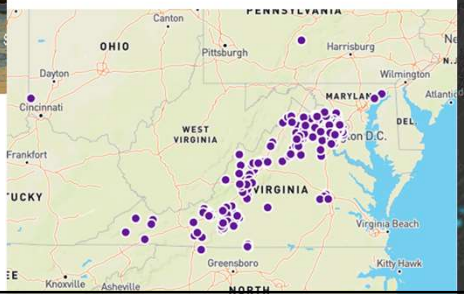
NWQMC

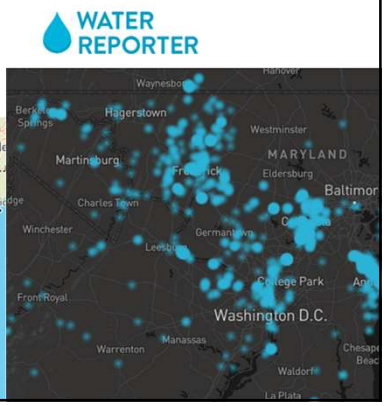
NEMI
National Environmental Methods Index

Study Design Tools from the WDC – stay tuned!

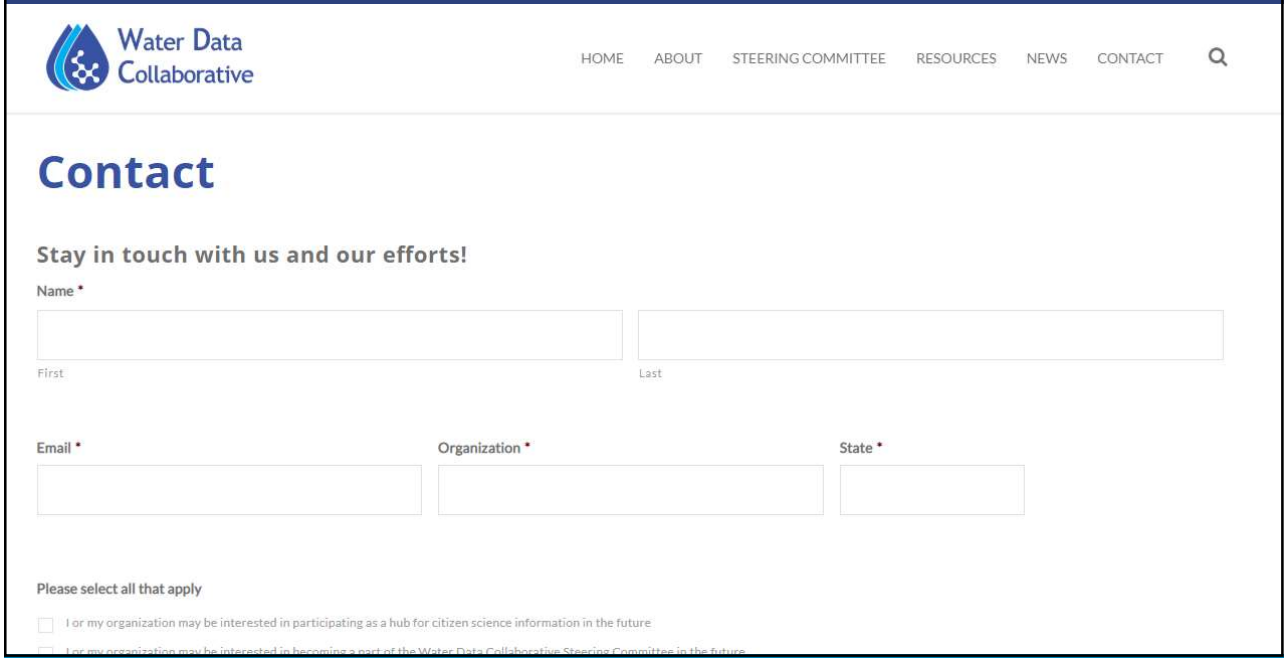
- Guidance for data management and use – Clean Water Hub, Distributed Database, Water Reporter, etc.







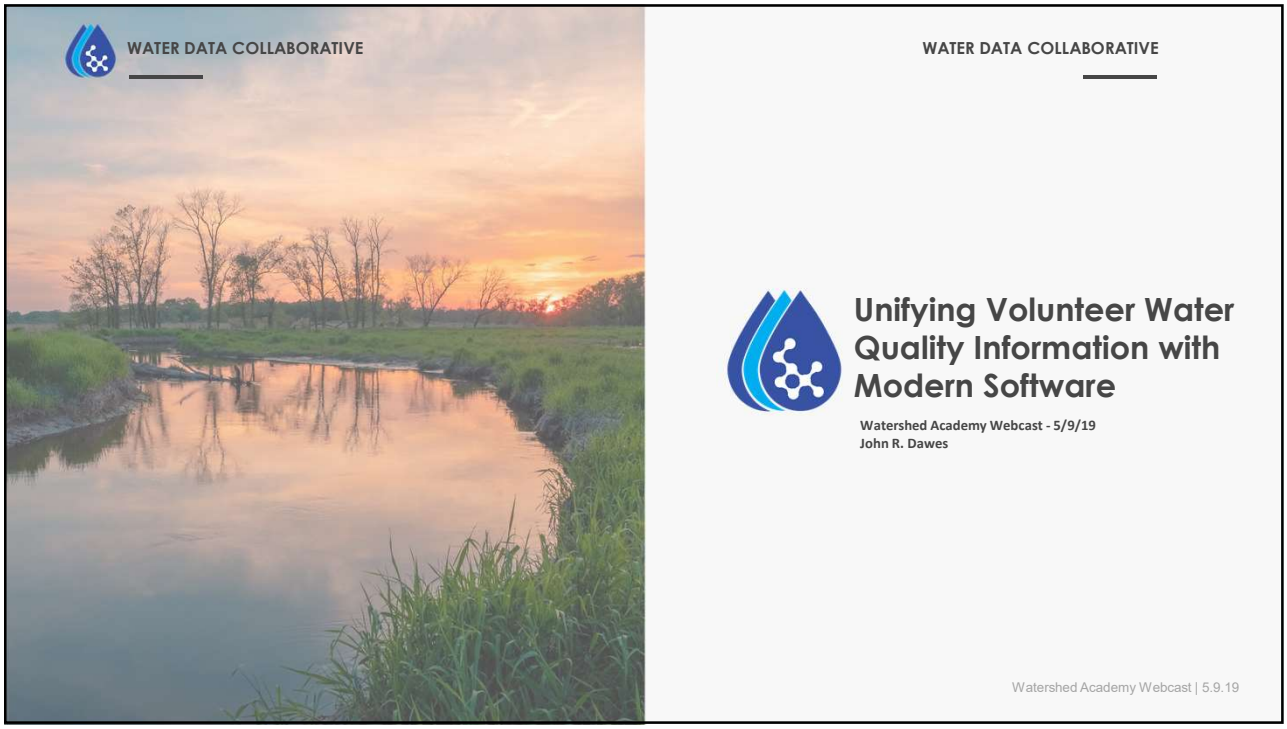
www.waterdatacollaborative.org



Thank You!

sbriggs@iwla.org

Water Data Collaborative:
https://waterdatacollaborative.org



WATER DATA COLLABORATIVE

01 Defining the Why

Exploration of new ways to think about study design and building support for an outcome driven monitoring program.

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Bloodlines of our nation

Watershed Academy Webcast | 5.9.19

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3.5 million miles of streams across the U.S.

WATER DATA COLLABORATIVE

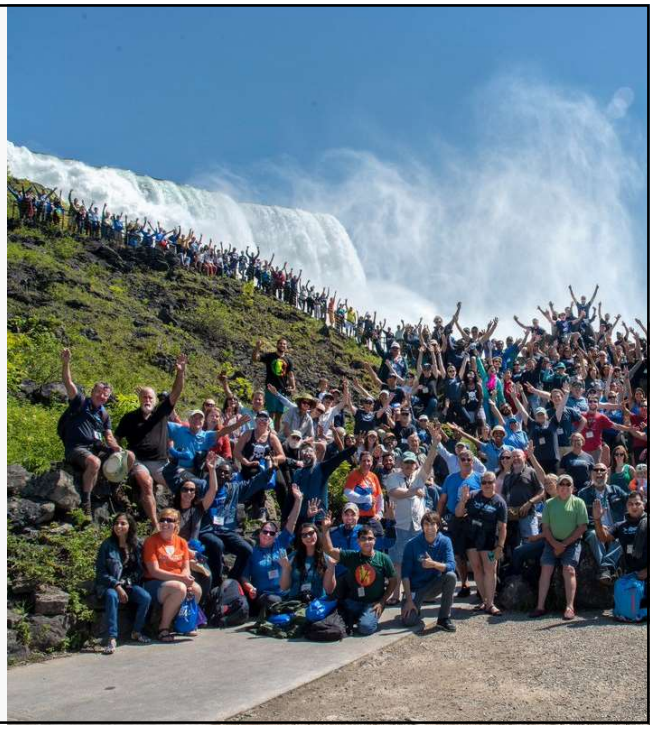
1 in 3 of us get drinking water from streams affected by the Clean Water Rule

WATER DATA COLLABORATIVE

357 thousand miles of streams are public water systems

WATER DATA COLLABORATIVE

"Our Technology is a bridge to making environmental issues resonate with thousands inside and and outside the choir"



WATER DATA COLLABORATIVE

02 Monitoring 2.0

Meeting volunteers where they are. Integrating modern technologies into volunteer monitoring programs

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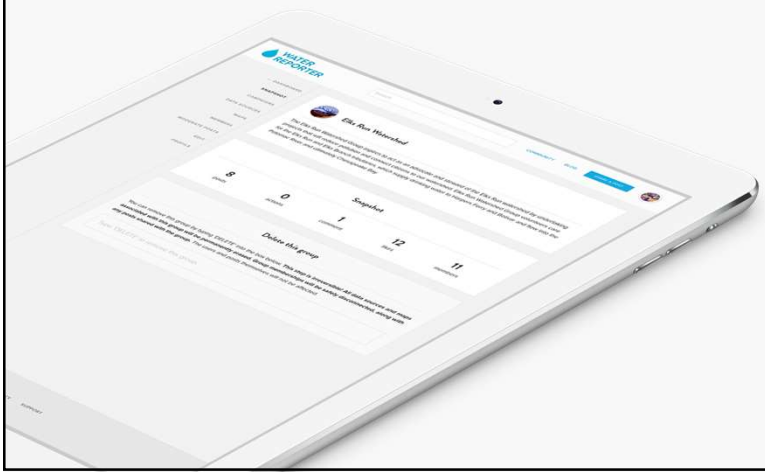

Engagement strategies must modernize

In order to retain existing and convert new monitors, our tools must emulate the user experiences they interact with on a daily basis.

Simple and Interoperable

Modern software supporting these efforts should be built to enhance specific use cases and have a clear value proposition

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03 Case Studies and Tools

Data-driven approaches to tell the story of your watershed and program. The importance of machine readable data.

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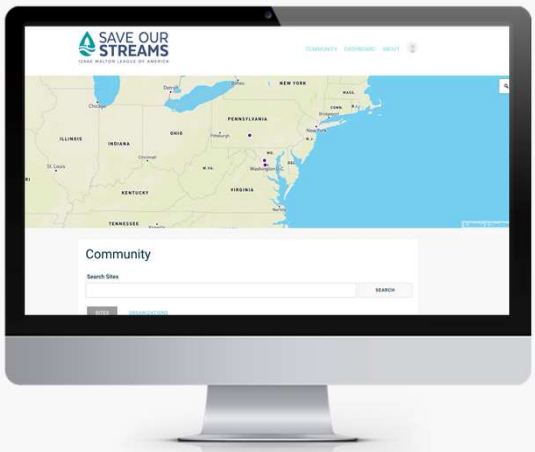

The Clean Water Hub

Easily bring online new or existing monitoring sites, manage your group, and collect data of a known quality.

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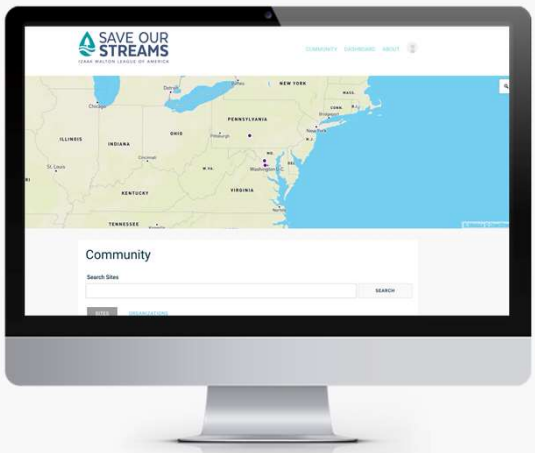

The Clean Water Hub

Manage macro invertebrate counts on your own map. Invite members of your monitoring team to your organization.

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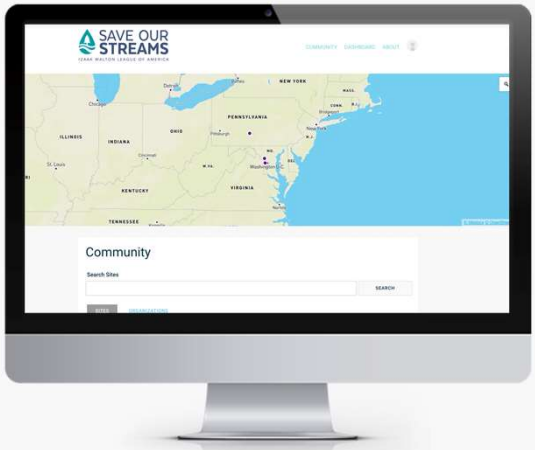

The Clean Water Hub

Coming Soon: Automatically integrate your monitoring data with federal data stores such as the Water Quality Exchange.

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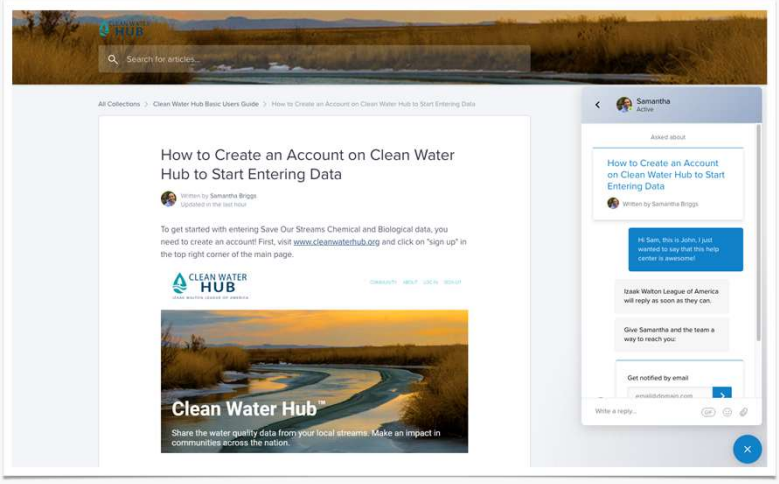
Help Center and Clean Water Minute

Empowering users with chat support, helpful, videos, and searchable documentation



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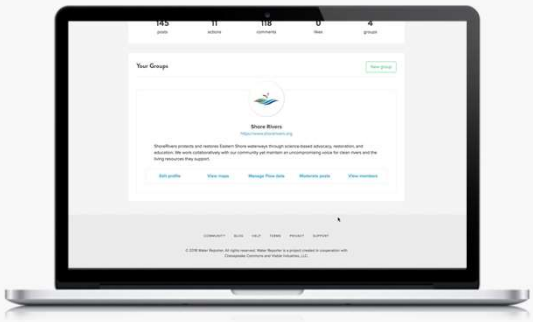
Water Reporter Data Sources

#01 Manage WQM data in one place



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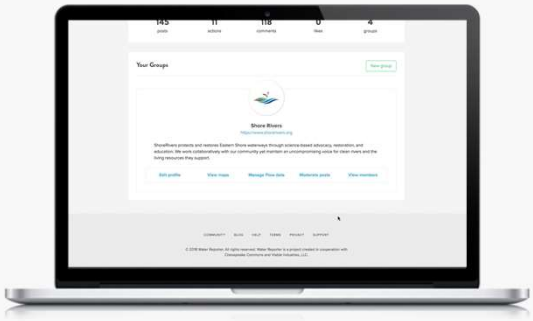
Water Reporter Data Sources

#02 Configurable station scoring



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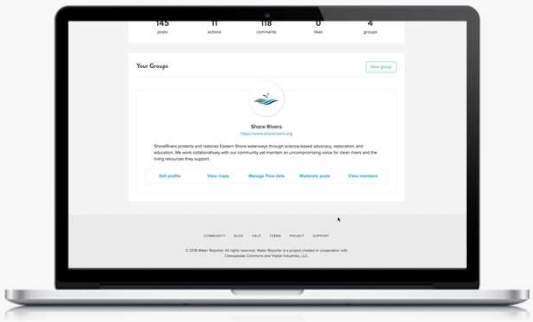
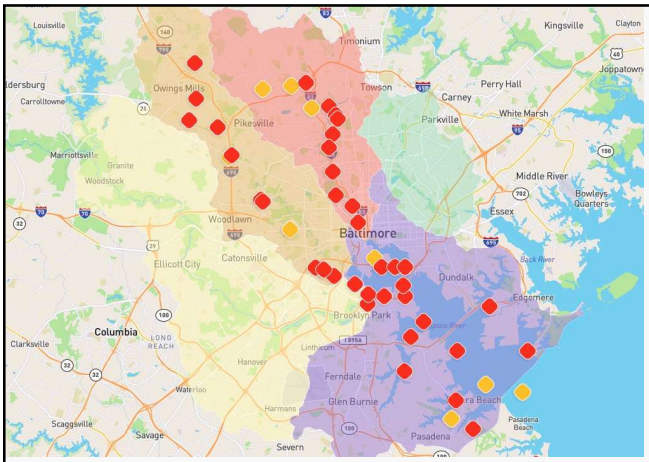
Water Reporter Data Sources

#03 Add live station maps in your website





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33k readings, 49 sites, 7 years. Tracking State Water Quality Standards with Water Reporter Data Sources

Data Sources

Maps

Indicators

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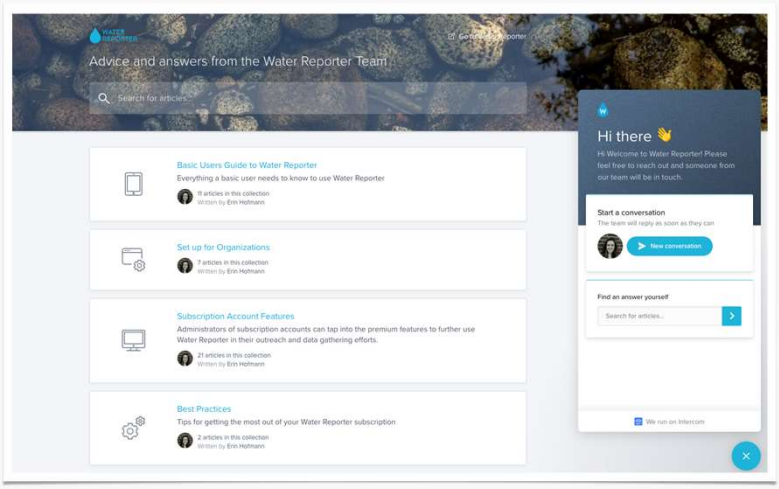
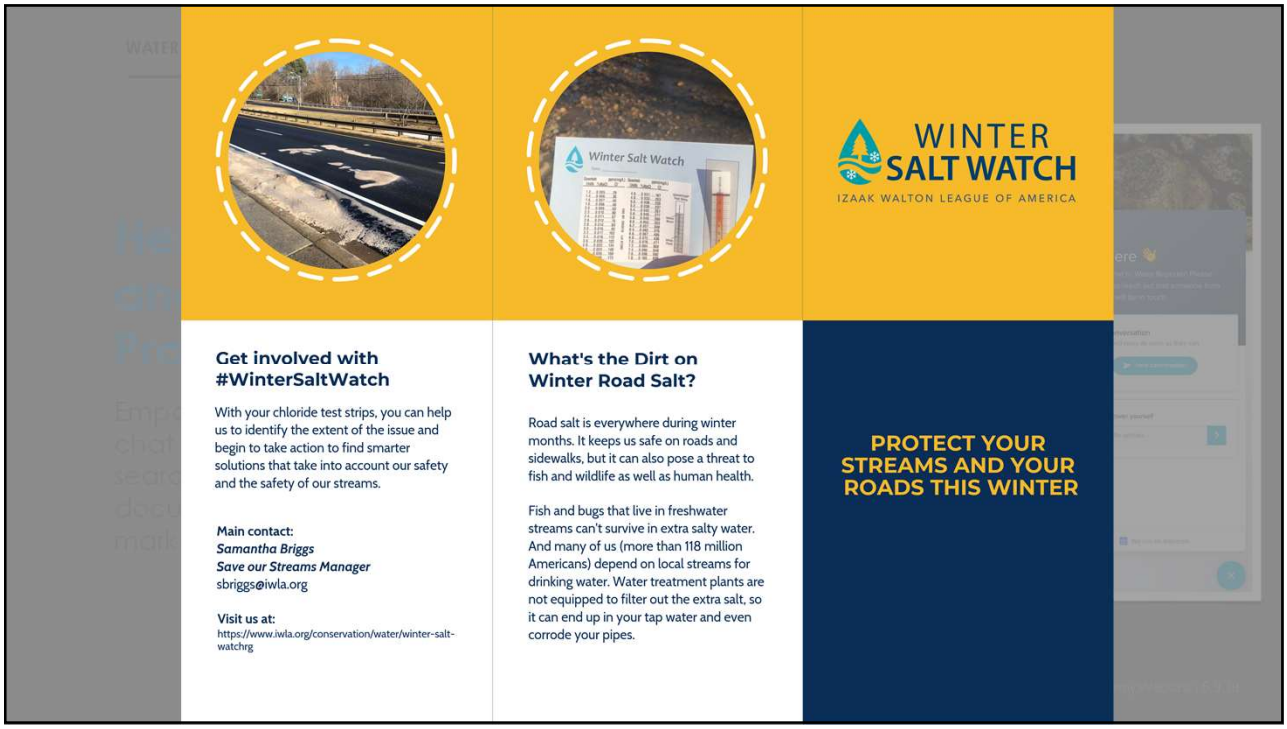
Help Center and Material Production

Empowering users with chat support, helpful, searchable documentation, and marketing materials.





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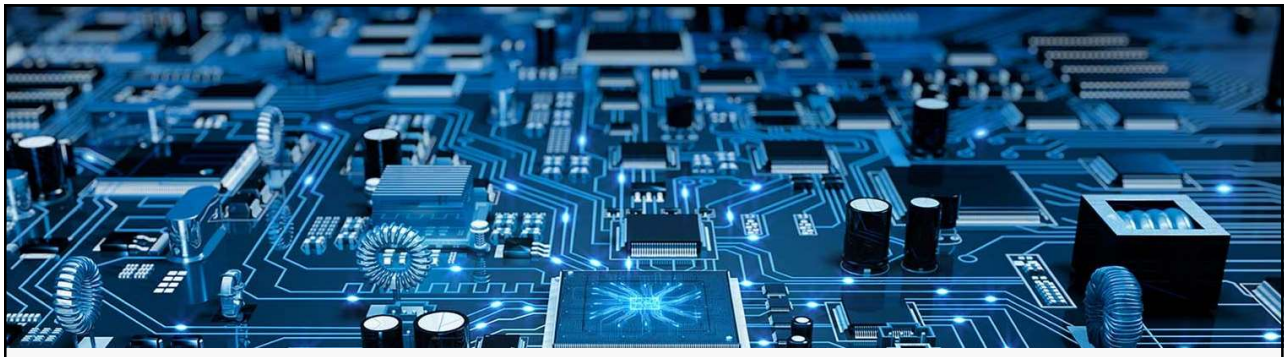
04 Looking Ahead

Growing our community, technology and data sources with a forward comparable approach



Internet of Water

Empower users to create data that is searchable and discoverable

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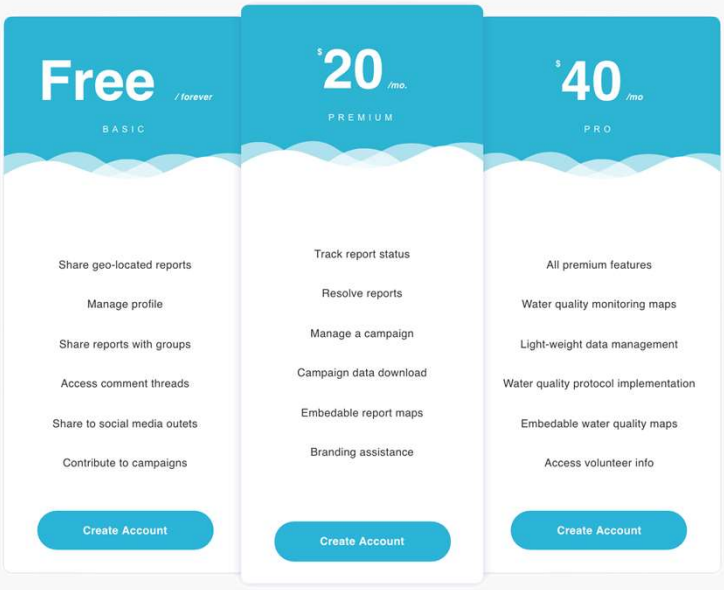

Diversify Revenue

Ensure software produces clear value to users and the movement

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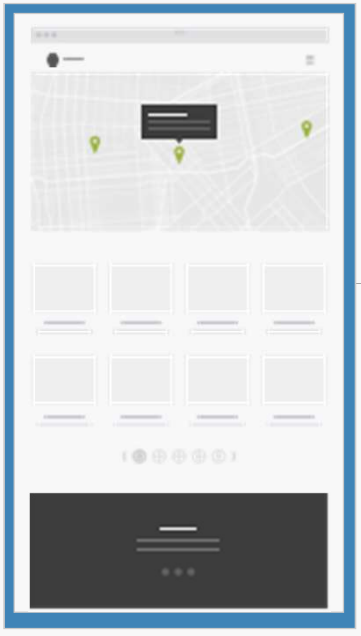

Support deeper levels of configurability among products

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Sensor Integration

Increasing the quantity and quality of our monitoring network.

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Thank You!

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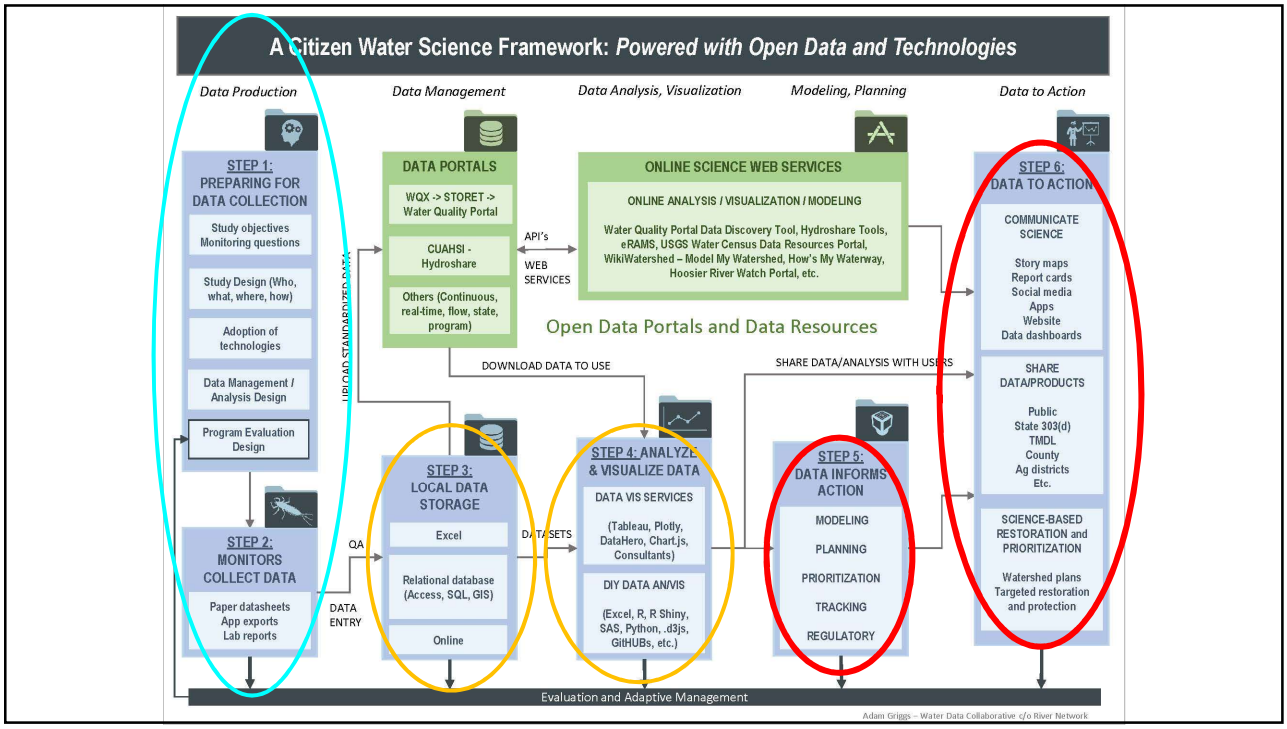
CONSERVATION INNOVATION CENTER
CHESAPEAKE CONSERVANCY

Emily Wiggans, GIS Analyst

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National Scale, National Challenges
GROUNDWATER DEPLETION FROM 1900-2008
ROAD CLOSED


Precision Conservation
Water Data Collaborative
"Getting the right practices, in the right places,
at the right scale, and
making sure they are working"

Case Study: South River, Anne Arundel County, Maryland

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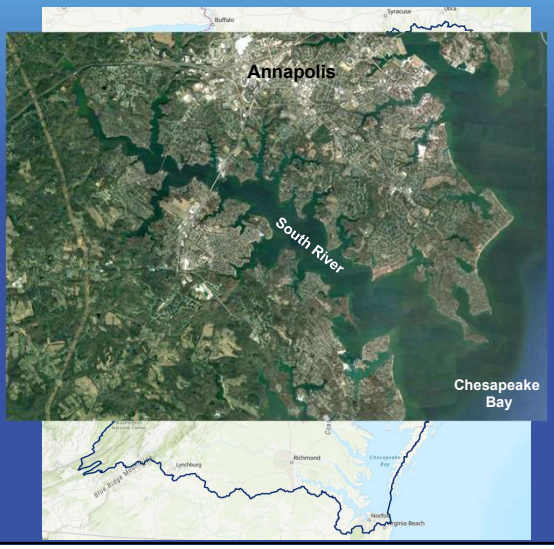
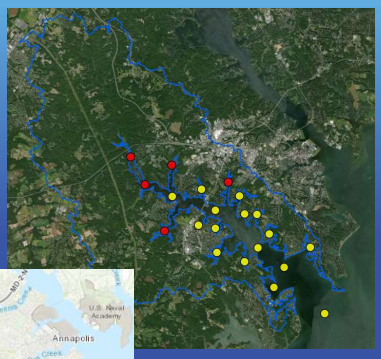
- Existing relationship; high-quality monitoring program with standardized data
- https://southriverdata.net
- Concerns: dissolved oxygen levels, bacteria, and water clarity especially for SAV!

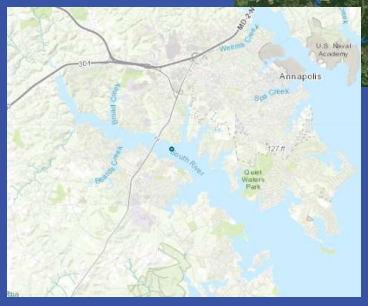


Clarity in the South River

Water Data Collaborative

- Measured with Secchi disk at 21 stations by the now-*Arundel Rivers Federation*
- EPA's WQP has… 1!
- What story do the 21 sites tell that the EPA's does not?



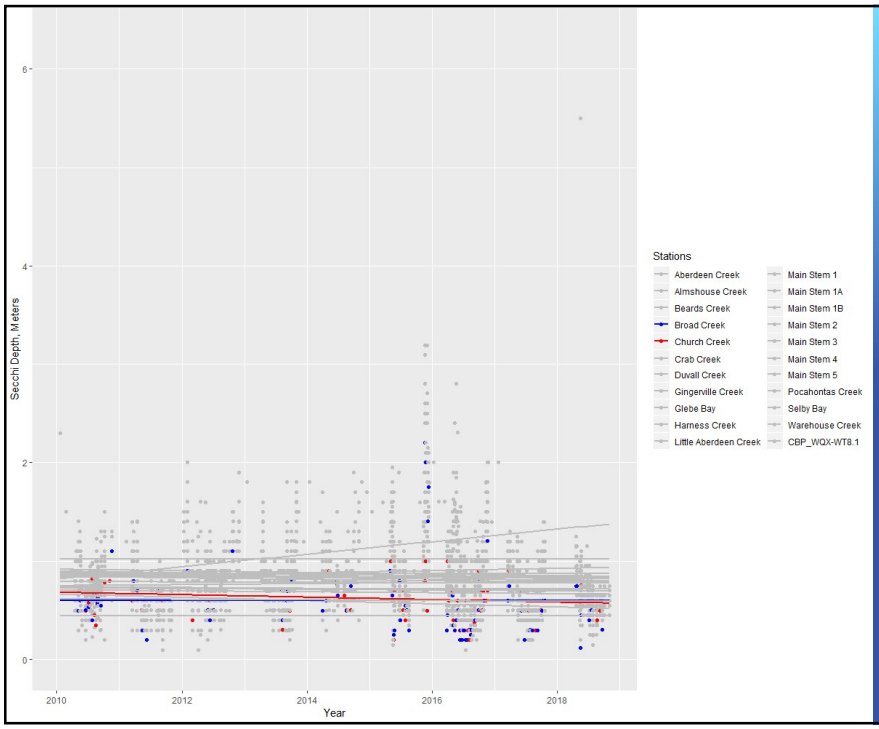


Arundel Rivers FEDERATION

Working Smarter with R

Water Data Collaborative

- Why R? The benefits!
  - Open-source
  - Resources and tutorials available online
  - Built for statistical analysis
  - Handles spatial data well
- Use USGS' dataRetrival function package to read in Secchi disk data for the site of interest through the EPA's WQP
- 3 Scenarios for use:
  - All WQX data – Use R!
  - Some WQX data, some of your own – Use R! Import your own as a .CSV (this example!)
  - All your own data – use R from a CSV or Excel file!



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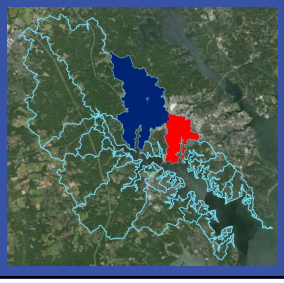
Plotting in R

1. All stations
2. WQX station
3. Demo stations
4. Add trend lines
5. Dive deeper…



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ArcGIS Pro Model Demo

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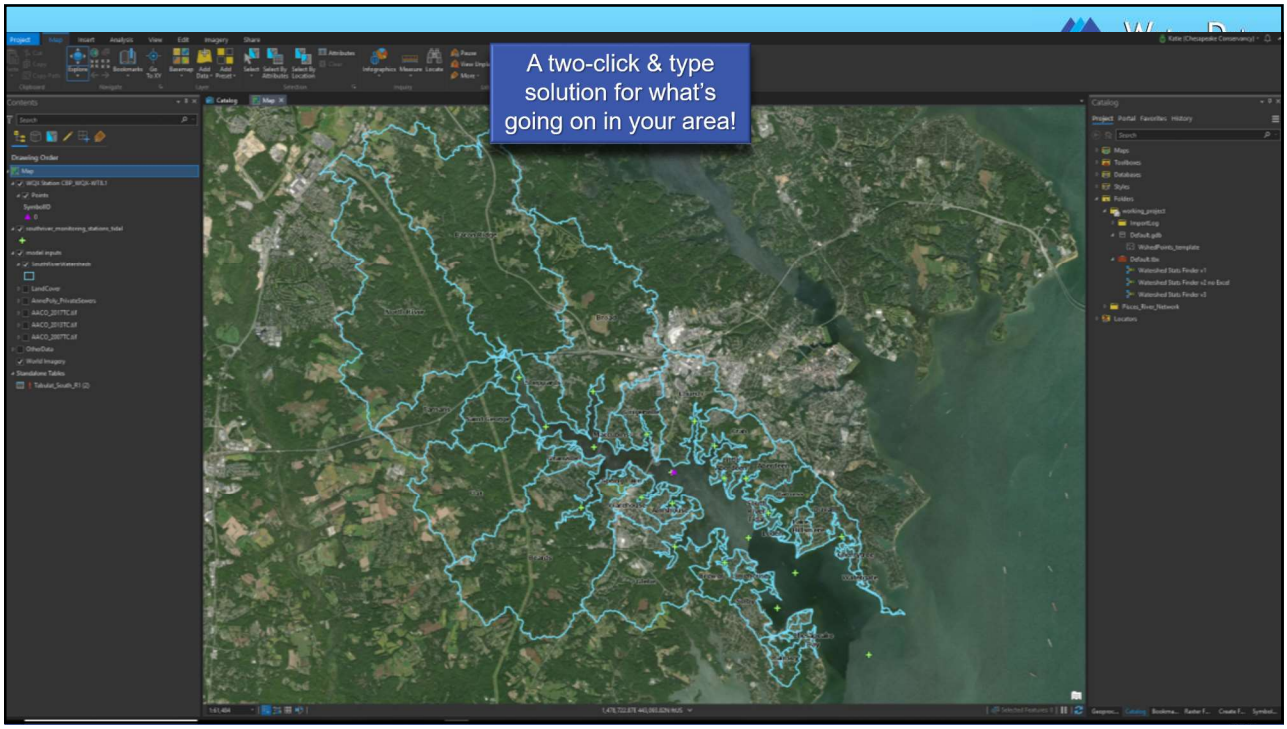
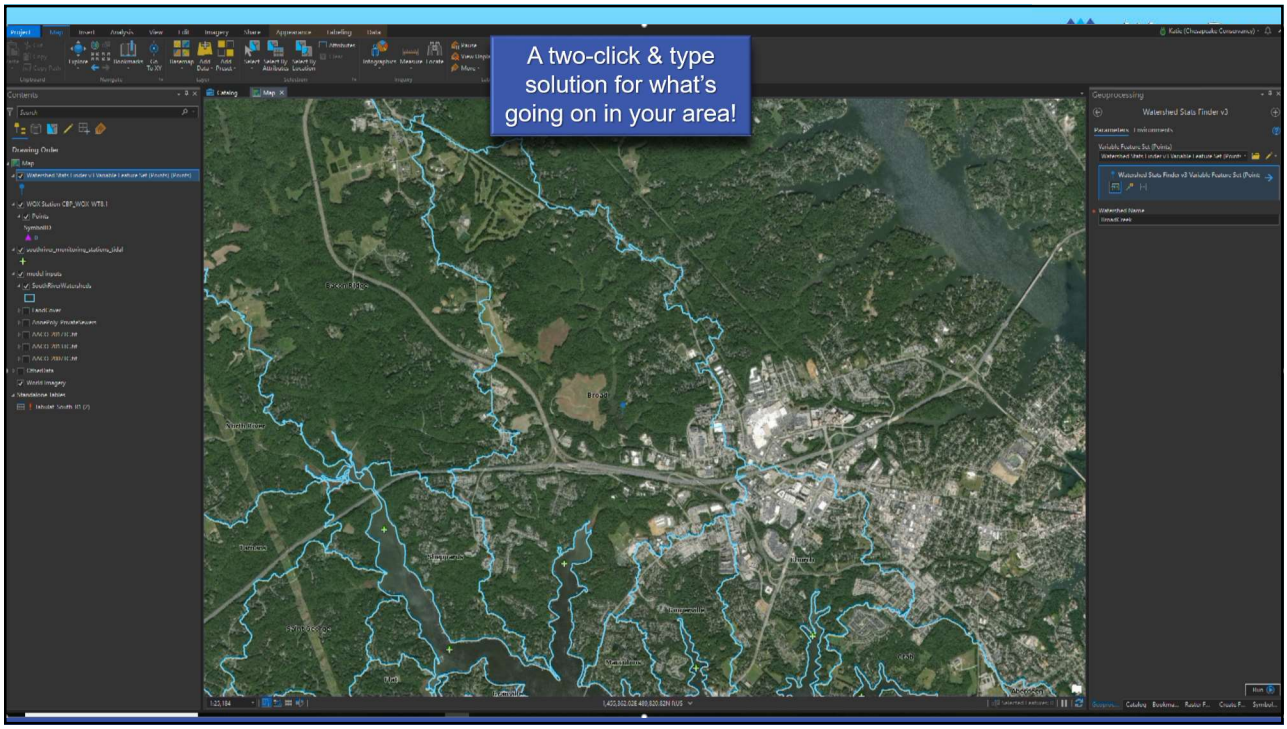
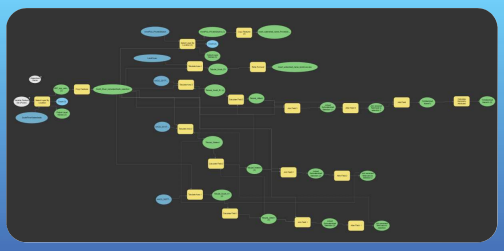
Input Datasets

(not showning parcel sewer data)

Get land cover data for the entire Chesapeake Bay Watershed:
https://tinyurl.com/y3d8ozd2







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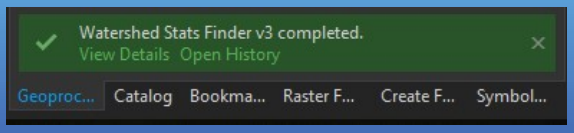
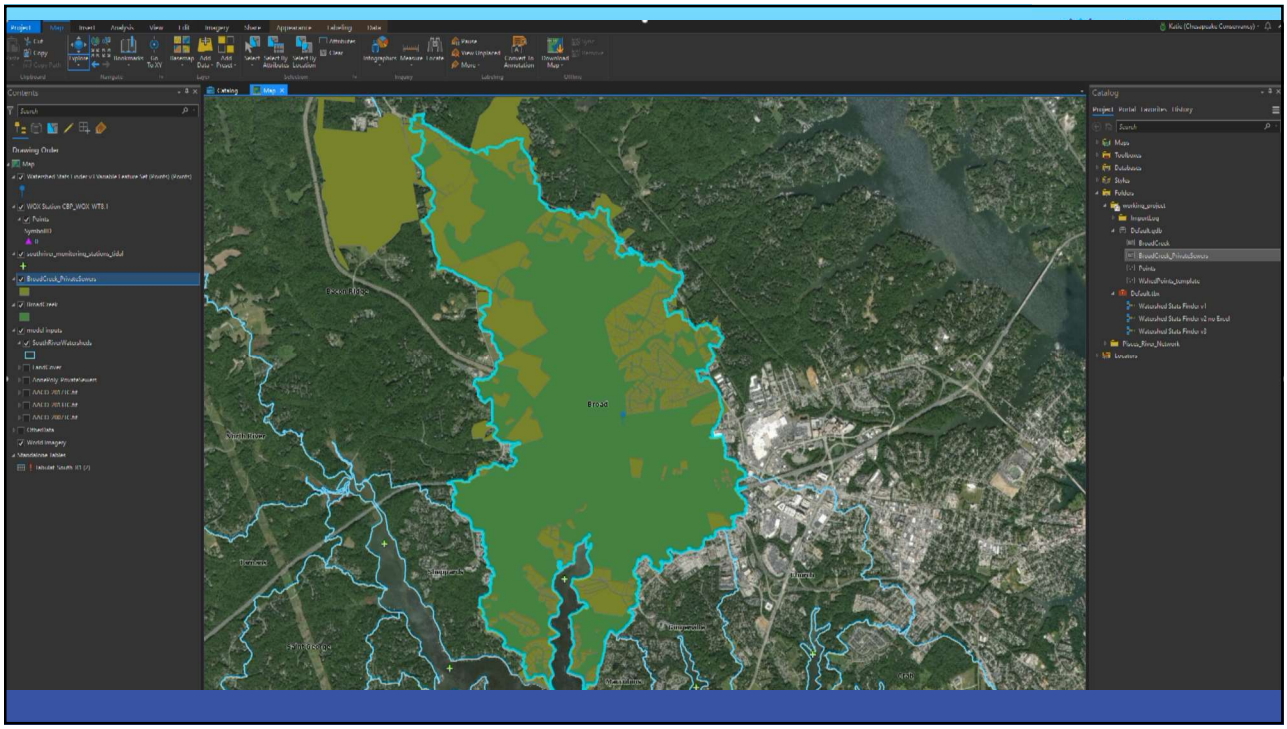
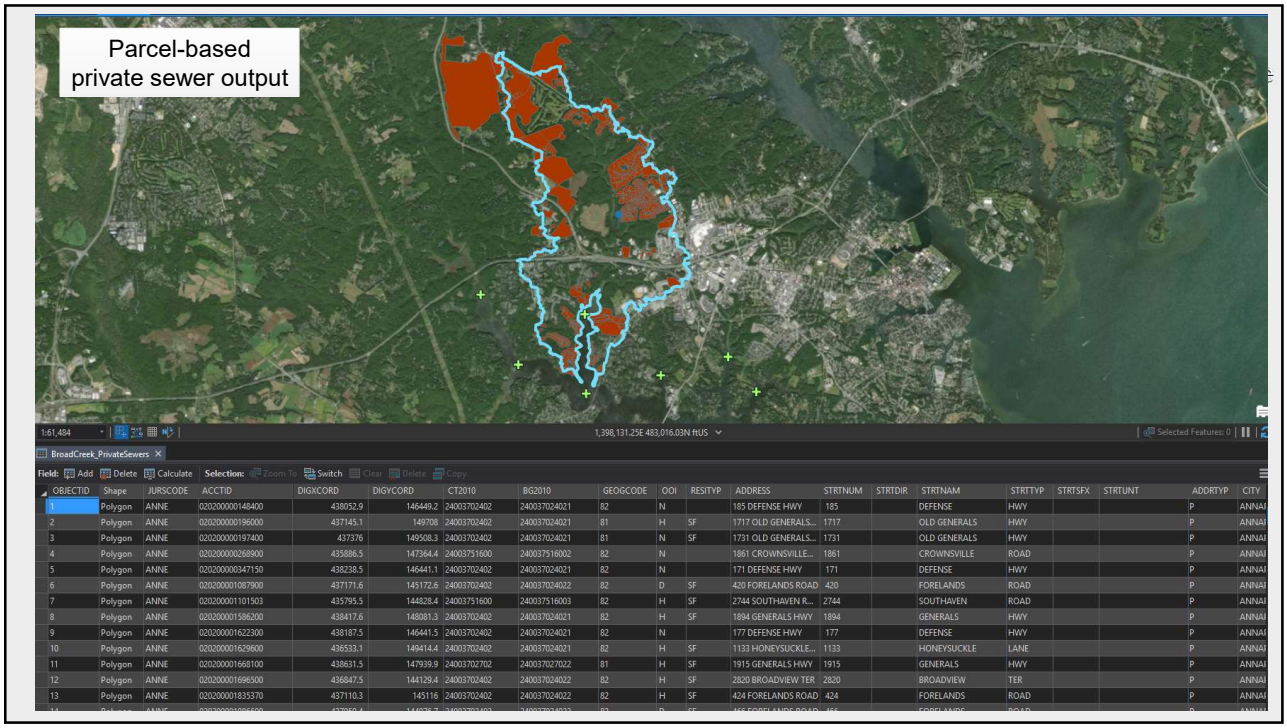


Basic Process

Select watershed of interest → Calculate areas for input datasets within the selected watershed → Join calculated values back to the original selection → Intersect selected watershed with all 'touching' private sewer parcel data → Copy area of land cover within watershed to Excel output

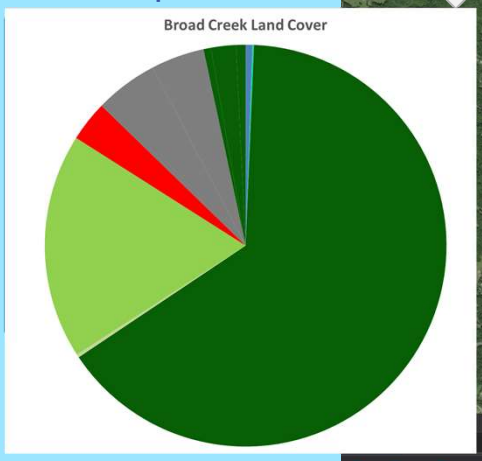


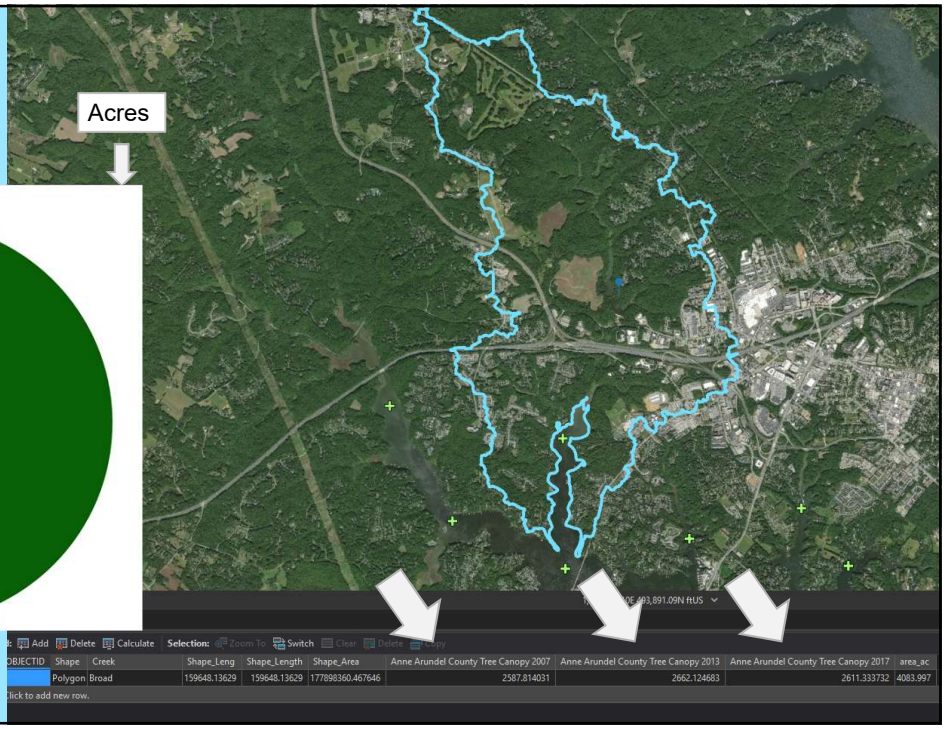

Parcel-based
private sewer output

Watershed Stats:

- Tree Canopy - GIS
- Total Acreage - GIS
- Land Cover – direct Excel output

Acres





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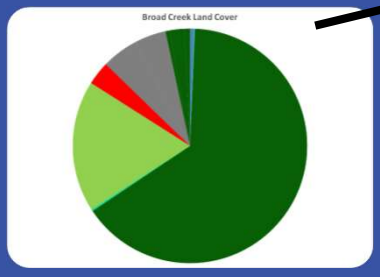
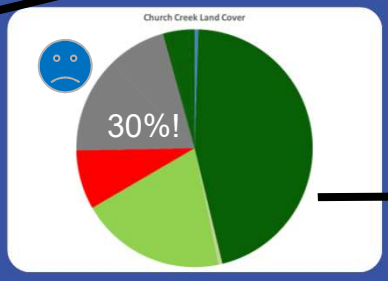
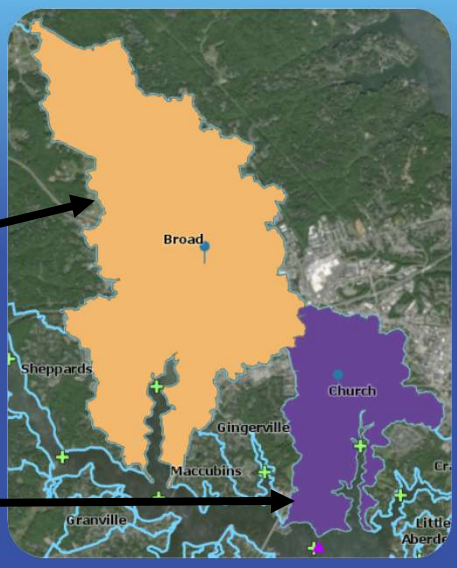
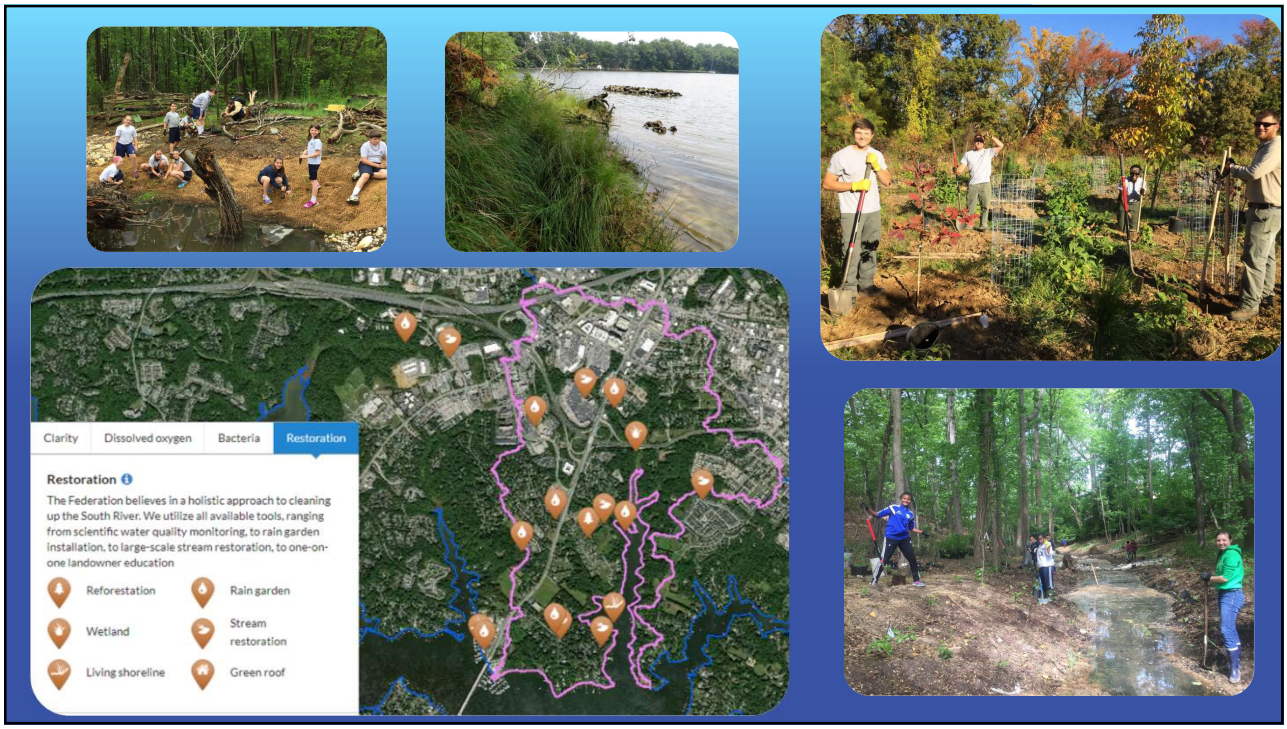
Why Does It Matter?

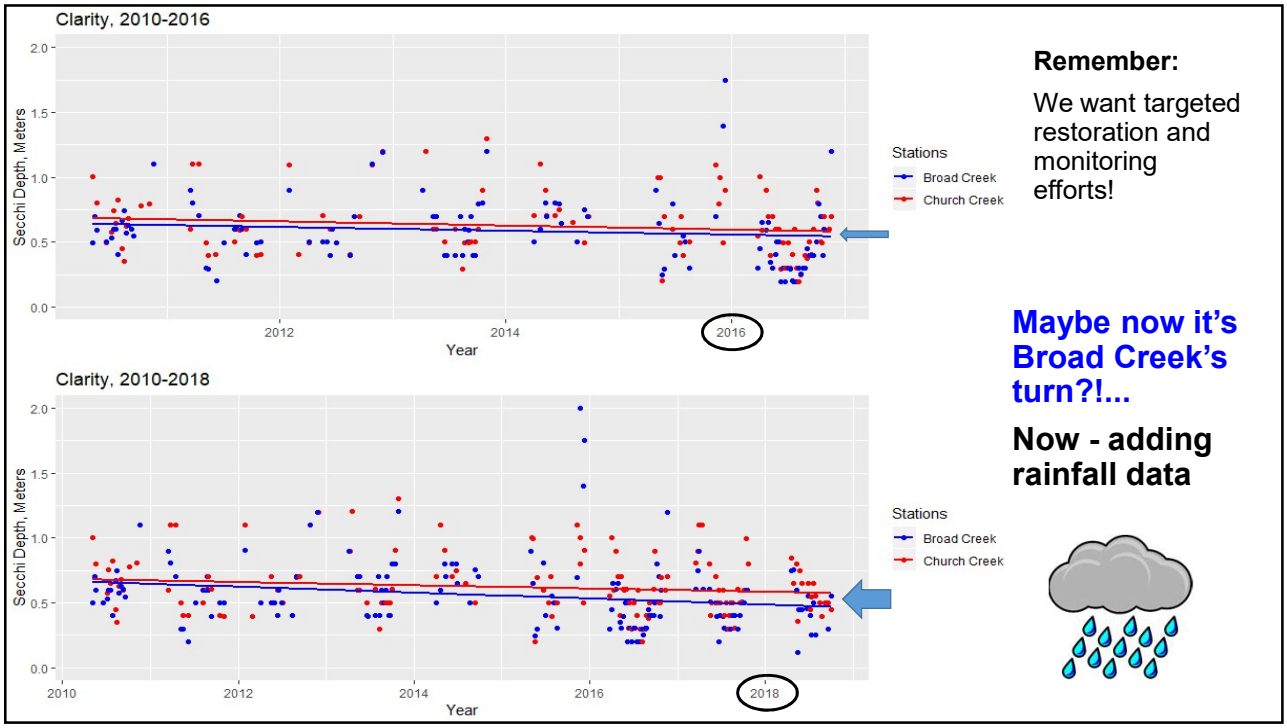
- Compare watersheds to determine most need
- Targeted restoration efforts
- Targeted monitoring efforts











Remember:

We want targeted restoration and monitoring efforts!

Maybe now it's Broad Creek's turn?!...

Now - adding rainfall data

A Candidate Area..?

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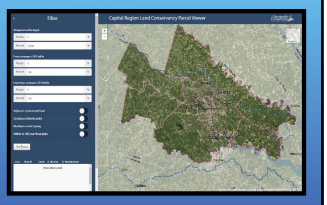
Next Steps: Scaling Nationally

- Web App for Analysis
- Story Map for data sourcing
  - Land cover, watersheds, tree canopy, and more!
  - What do you need? *Let us know!*
- R analysis/data integration connected to GIS analysis process
- *Full process shared:* Web App, code on Github, ArcGIS Toolbox for download – stay as **transparent** as possible!



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Participation Certificate

- If you would like to obtain a participation certificate you can access the PDF in the **Handouts** section of your control panel.
- You can type each of the attendees names into the PDF and print the certificates.

Watershed Academy Webcasts

More webcasts coming soon!

www.epa/gov/watershedacademy

The slides from today's presentations are posted.
A recording will be posted within the next 2-3 weeks.

Thank You!