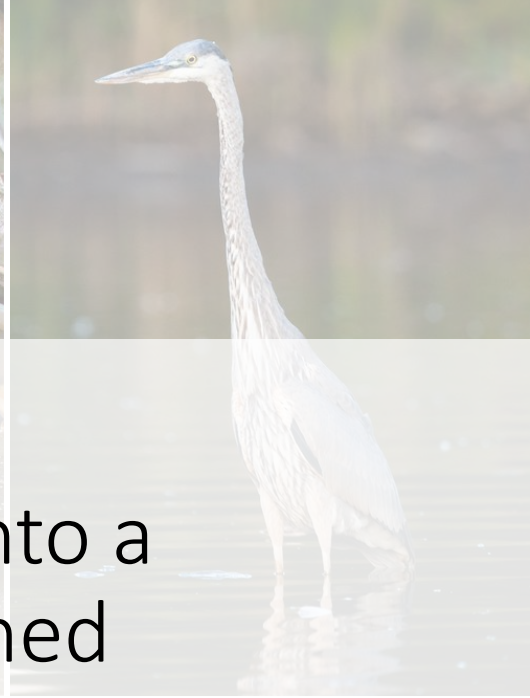
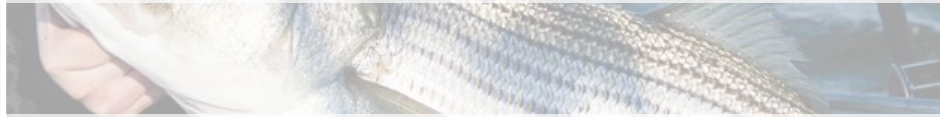




# WIP Development Dashboard

## Integrating 30 years of Chesapeake Bay data into a new decision support framework for Watershed Implementation Plan development



**Water Quality GIT Meeting**
**9/24/2018**

**Emily Trentacoste, PhD**

Contributions from: Aera Hoffman, John Wolf, Jimmy Webber, Doug Moyer, Joel Blomquist, Jeni Keisman, Rebecca Murphy, Matt Johnston, Qian Zhang, Lindsey Gordon & more

# From the Science side…

## A LOT of new and updated science available

### Monitoring & Trends

Non-tidal water quality

Tidal water quality

Tidal attainment

Submerged aquatic vegetation

### Modeling Tools

CBP Watershed Model

Geographic load distribution

Geographic influence on Bay

BMP progress reports

### Synthesis Analyses

USGS Non-tidal Syntheses

-Regional Nitrogen, Phosphorus and Sediment

-Groundwater

SAV Syntheses

Water Clarity Synthesis

Water Quality Synthesis

# From the Management side…

## New plans, new expectations, new requests

### Phase III WIPs

Assess what's been working and what hasn't

Develop "local area goals" at finer resolution

Identify remaining opportunities for BMPs

Planning for urban growth and climate change

### Better decision-making

Targeting restoration efforts

- Geographically
- By sector

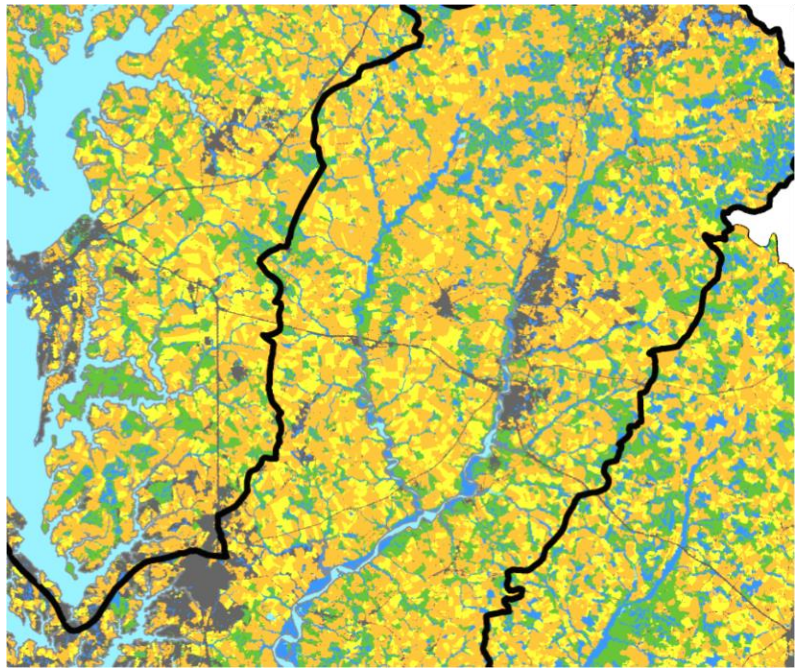
Co-benefits of nutrient and sediment reduction

Planning for urban growth and climate change

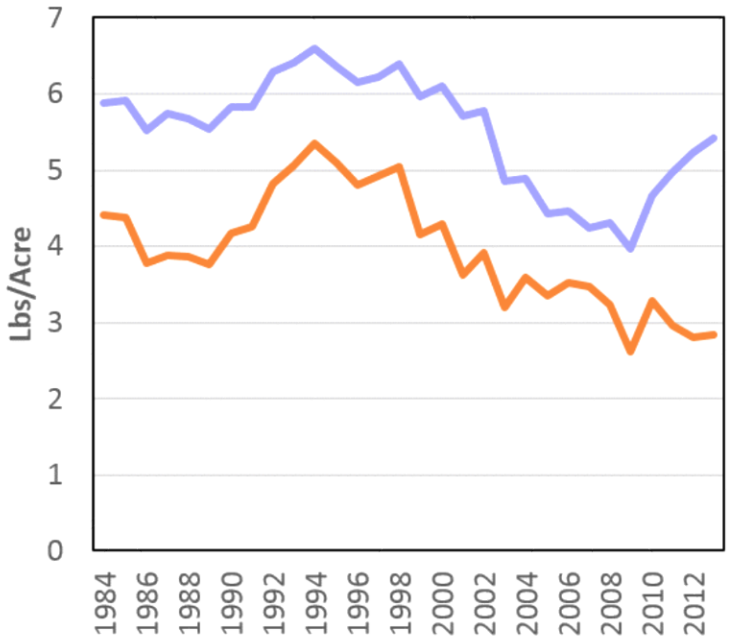
# Some issues arise working with 30 years of data

## 1) Data come in all shapes, sizes and flavors

### Spatial



### Temporal



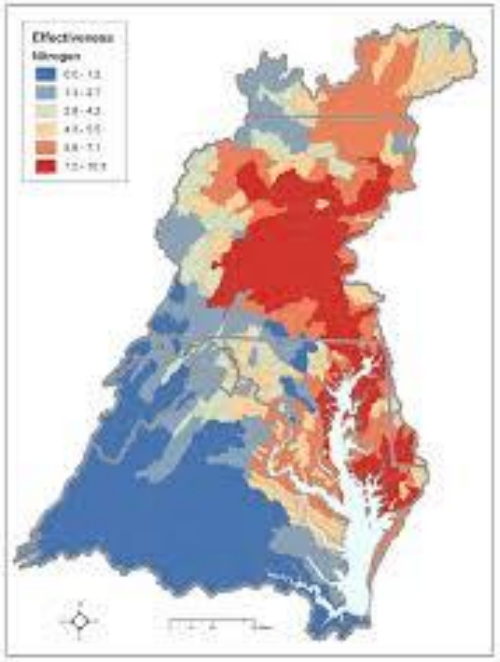

### Tabular

| Agricultural BMPs | Nitrogen $/lb reduced/year | WIP-2 Level |
|---|---|---|
| Grass Buffer with Fencing | 2.84 | 6.6% |
| Forest Buffer | 4.34 | 3.2% |
| Barnyard Runoff Control | 5.00 | 0.0% |
| Floodplain Wetland Restoration | 6.70 | 0.1% |
| Forest Buffer with Fencing | 6.71 | 0.7% |
| Water Control Structures | 7.38 | 0.0% |
| Agricultural Stormwater Management | 7.82 | 0.0% |
| Prescribed Grazing | 12.95 | 56.8% |

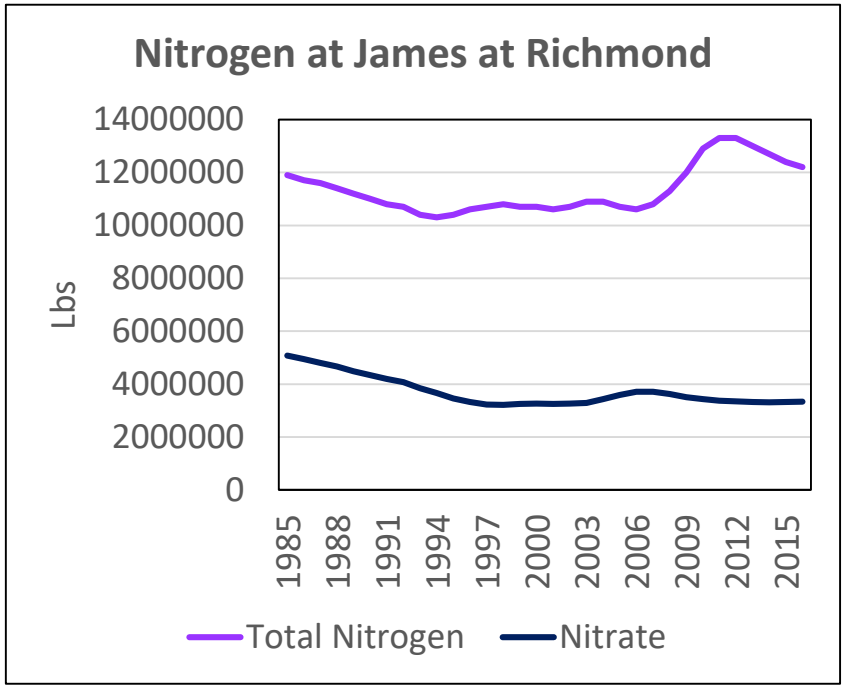
# Some issues arise working with 30 years of data

1) Data come in all shapes, sizes and flavors

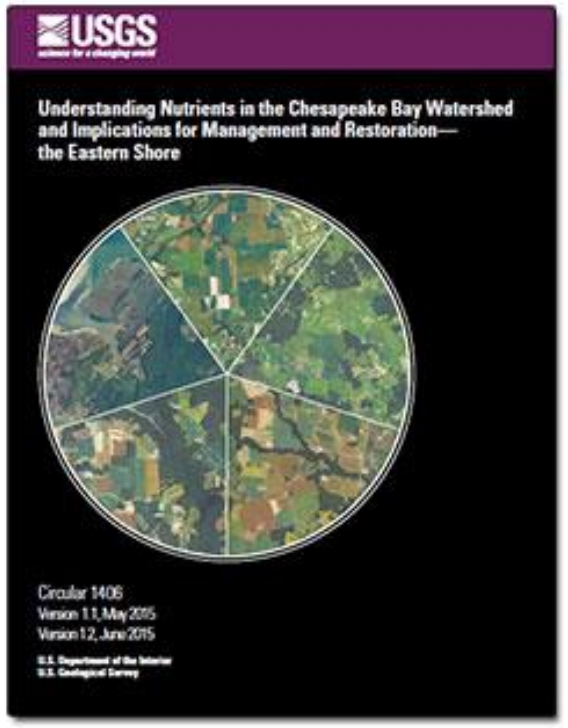
## Modeling



## Monitoring

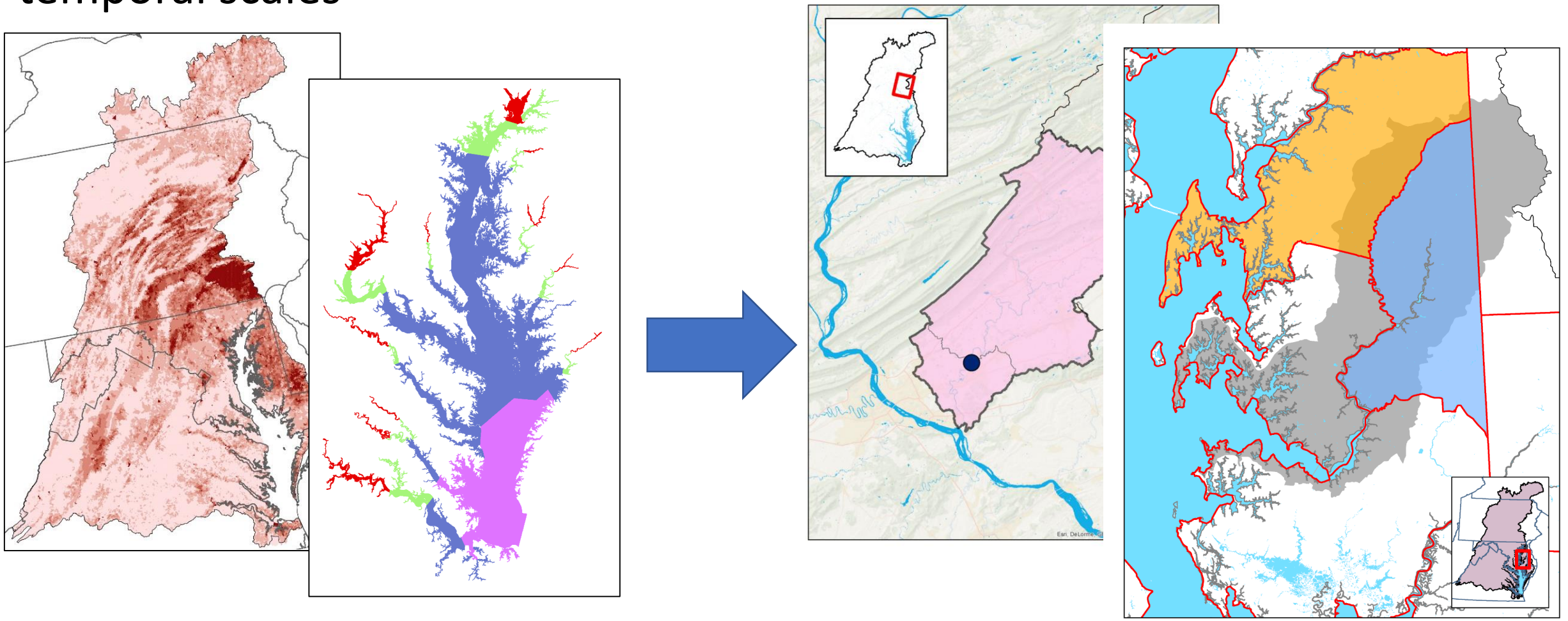



## Research



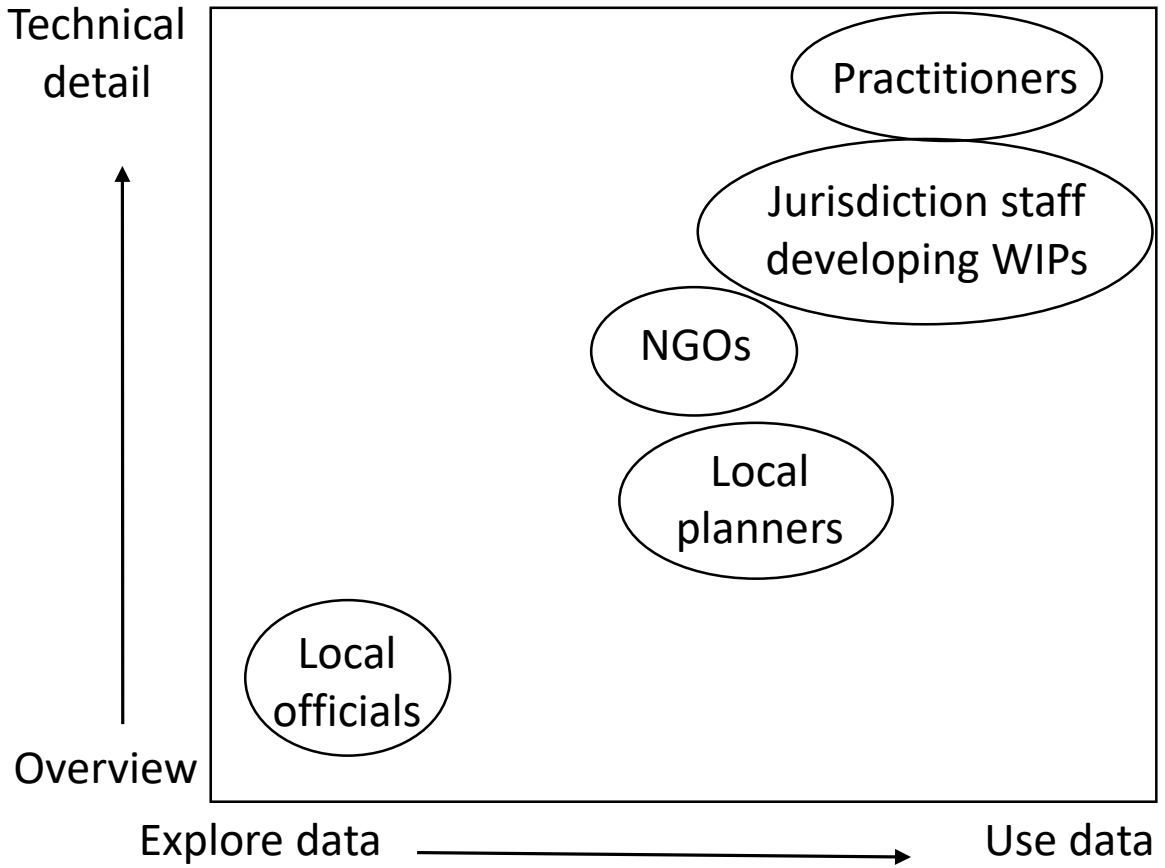
# Some issues arise working with 30 years of data

2) Science and management don’t always work at the same spatial or temporal scales



# Some issues arise working with 30 years of data

3) Audience and users range widely from local city planners to state agency staff to non-profit practitioners



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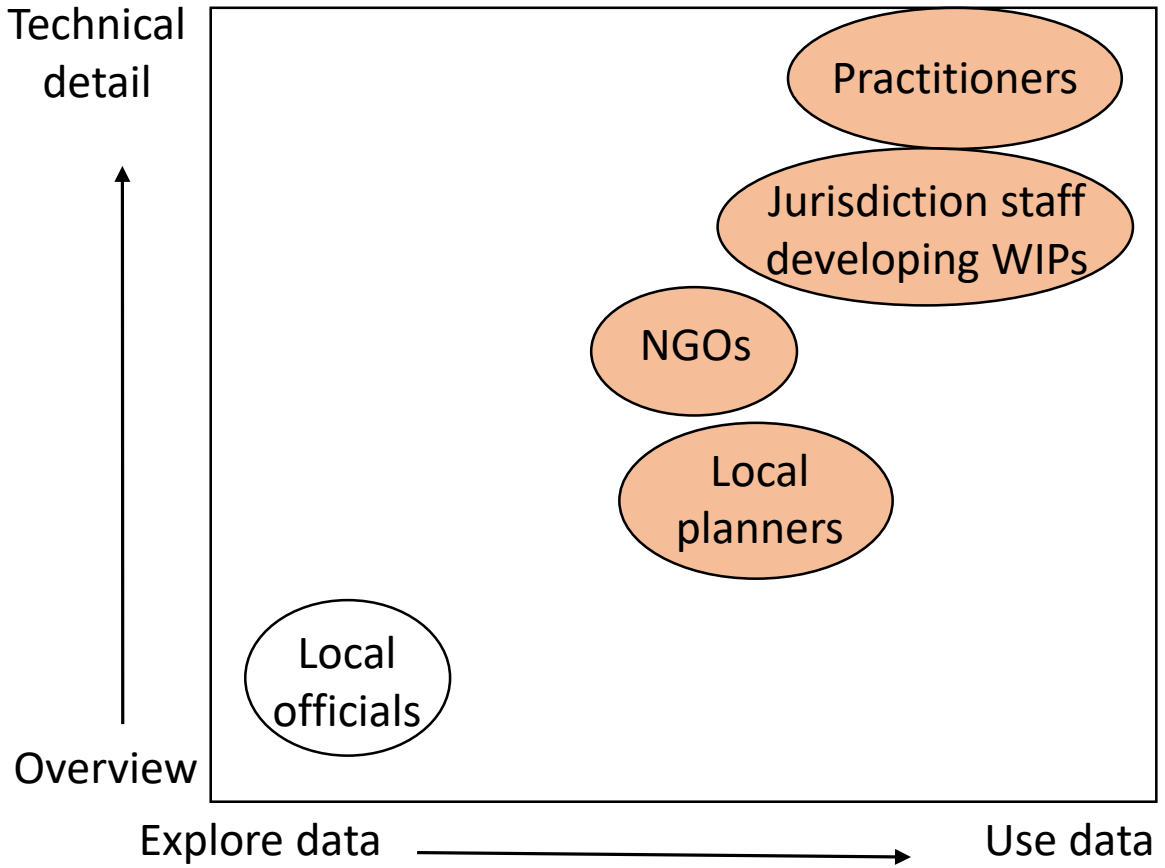


# The WIP Development Data Dashboard

## What is the Dashboard?

**The purpose of the WIP Development Data Dashboard is to consolidate and provide accessibility to technical and scientific information in one cohesive location and to provide guidance on how and why the information should be used.**

This information includes, but is not limited to:

- Tidal and watershed water quality monitoring trends
- SAV trends and their explanations
- Urban growth projections
- Information to help geographically target restoration efforts
- Information to help choose BMPs
- Current BMP implementation and opportunities

# The WIP Development Data Dashboard

## What can you do with it?

The Dashboard provides information that can inform planning efforts and help to:

- Understand status of local water quality and change over time
- Understand local pollution sources and drivers of water quality
- Target, focus or prioritize restoration efforts
- Identify co-benefits associated with management practices
- Identify effective and cost-effective practices
- Identify opportunities for implementing practices
- Plan for future growth and development.

Some uses of this information include:

- Targeting restoration efforts geographically, by sector, or by practice
- Developing scenarios to run on the Chesapeake Assessment Scenario Tool (CAST)
- Outreach and communication of water quality information
- Building local stories

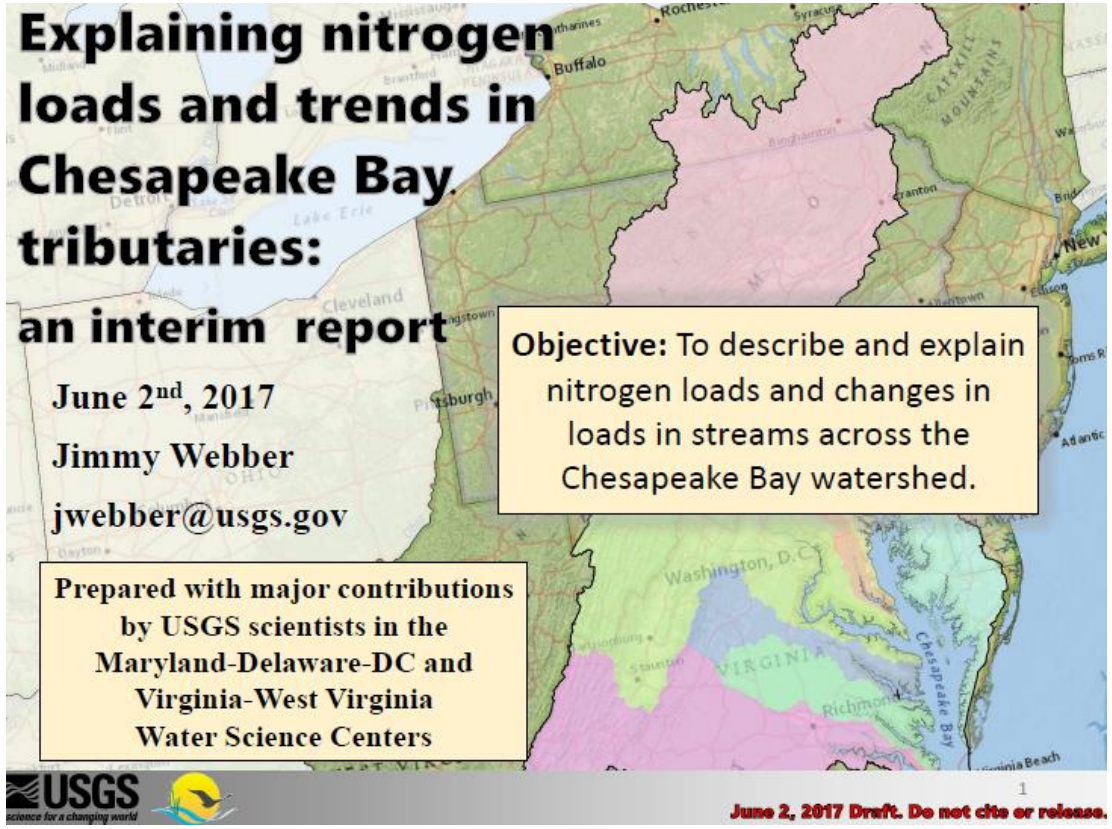
# The WIP Development Data Dashboard

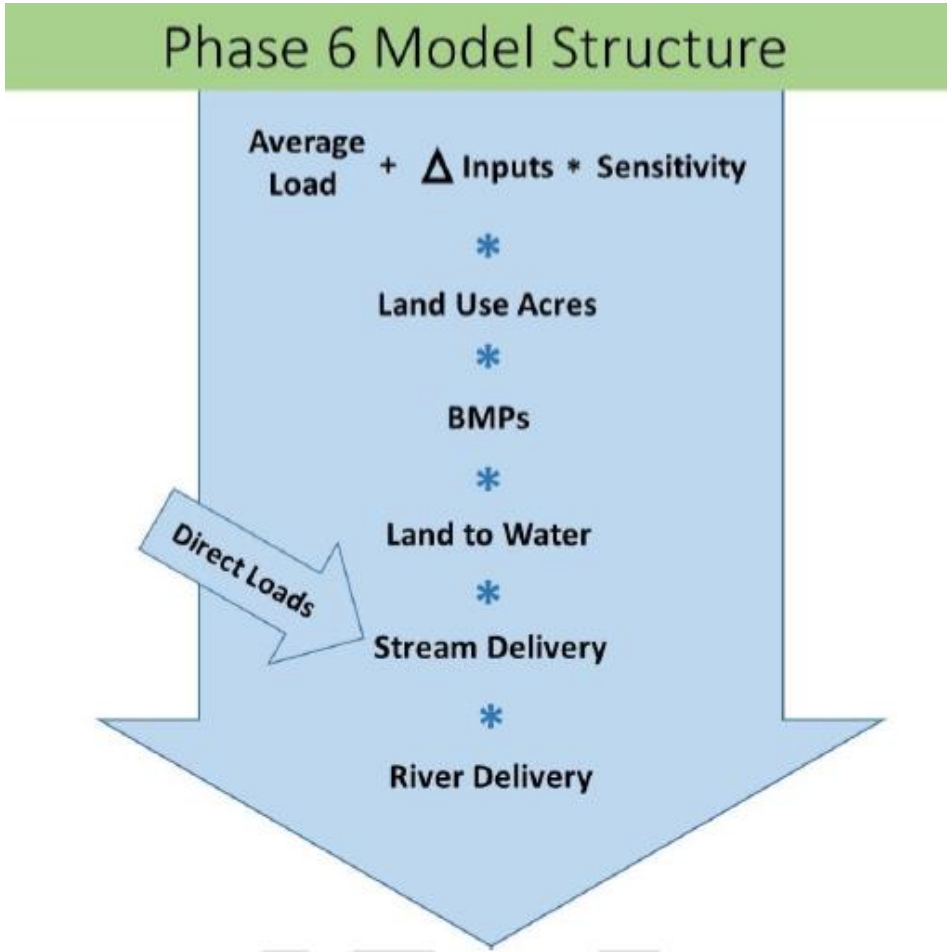
## How do I get started?

| What are you trying to do? | Example Topics | Corresponding Module |
|---|---|---|
| Understand **status of local water quality** and change over time | Current water quality and trends of freshwater rivers and streams | Freshwater Rivers & Streams |
| | Current water quality and trends of tidal waters | Tidal Water Quality & Living Resources |
| | Current status, trends, and explanations for tidal submerged aquatic vegetation | |
| Understand local **pollution sources and drivers** of water quality | Sources of nutrients and sediment by sector | Targeting Restoration Efforts |
| | Land use in different areas | |
| | Highest loading areas geographically | |
| | Sources of applied nutrients | |
| **Target, focus or prioritize** restoration efforts | Importance of goundwater | Targeting Restoration Efforts |
| | Effective places to implement | |
| | Vulnerable areas of the watershed | |
| Identify **cobenefits** associated with management practices | Other priorities addressed by water quality practices | Targeting Restoration Efforts |
| Identify **effective and cost-effective** practices | Most effective practices at reducing nutrients and sediment | Management Practice Implementation |
| | Cost-effectiveness of practices | |
| Identify **opportunities for implementing** practices | Current implementation rates of practices | Management Practice Implementation |
| | Remaining acres available for practices | |
| Plan for **future growth and development** | Areas of predicted growth | Planning for Change |
| | Conservation and smart growth opportunities | |
| | Projected changes in loads due to growth | |

# Going from data to decision-support tools

1) Work with scientific community to determine essential scientific messages and data to back them up



# Going from data to decision-support tools

2) Solicit feedback from management community on essential information needed to make their decisions

"Tell me my options, but don't tell me what to do…"

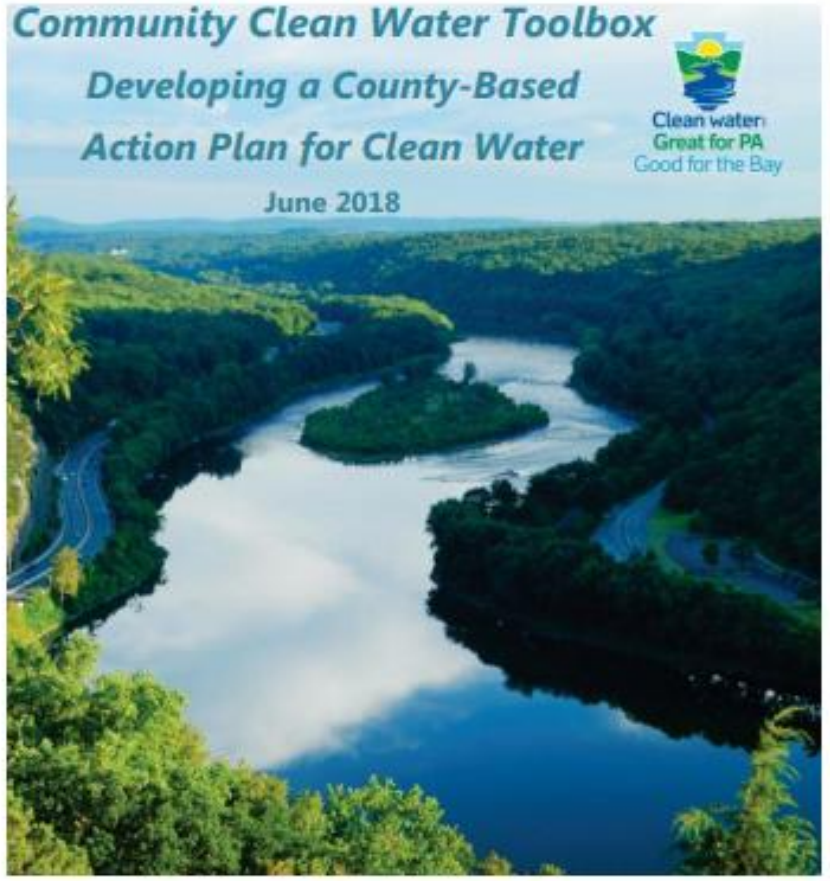
Water Quality Goal Implementation Team

Soil Conservation Districts

Phase III WIP Steering Committees

STAC Workshops

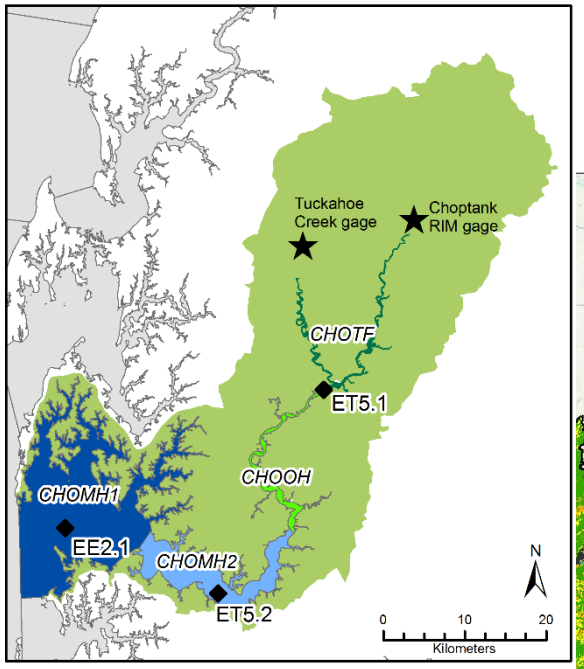
Local Government Advisory Committee

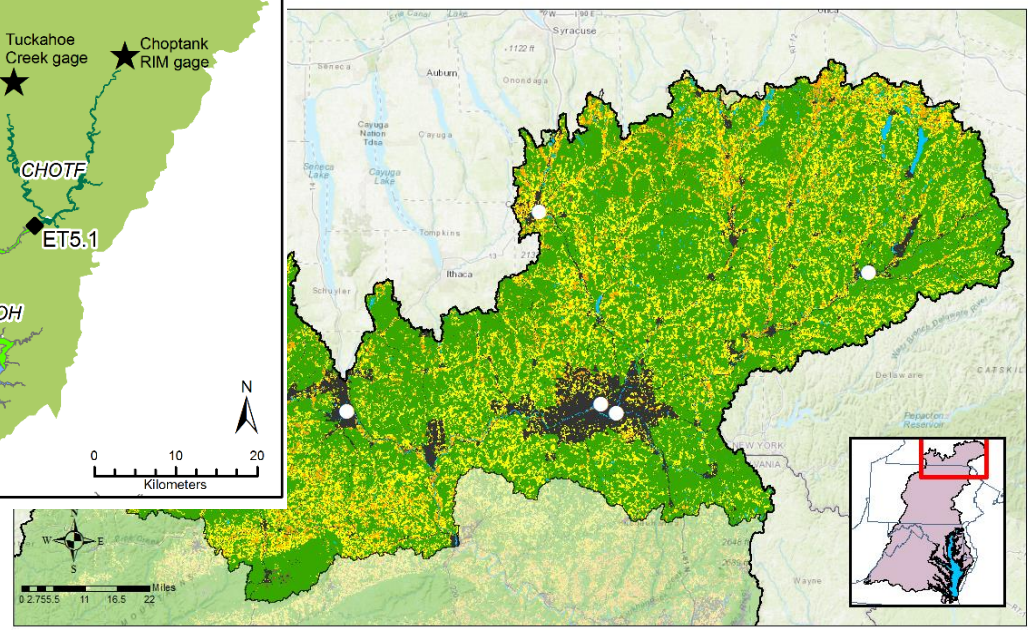


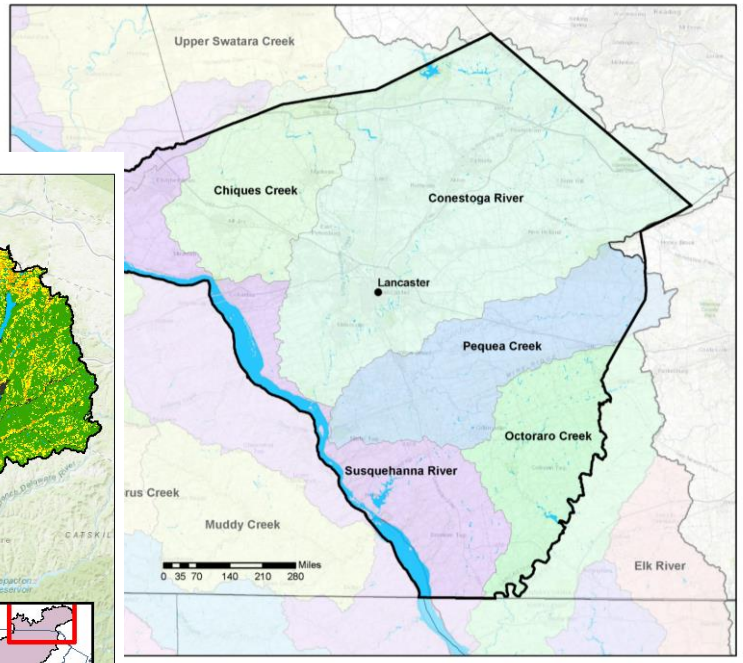
# Going from data to decision-support tools

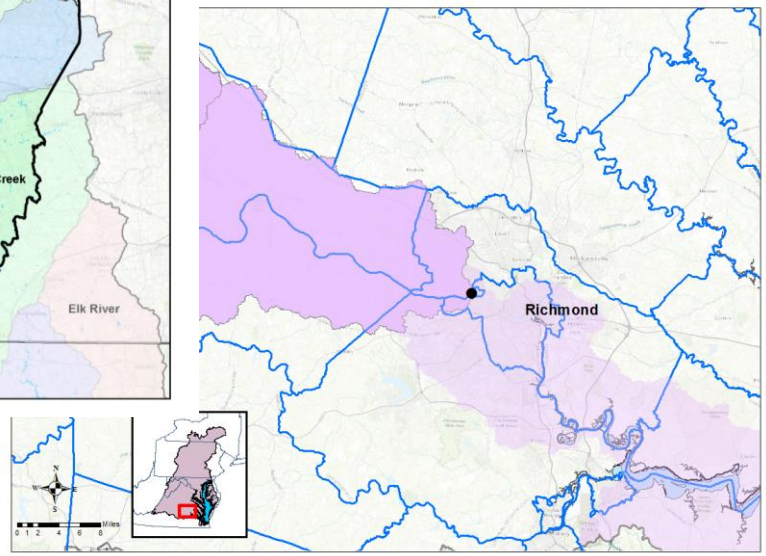
3) Determine a way to communicate data that resonates with managers

We found that using the data to tell local stories (“storylines”) resonated best



# Going from data to decision-support tools

## 3) Determine a way to communicate data that resonates with managers


What's happening with local water quality in my area? What's the status? What are the trends?

Where does pollution come from?
Where geographically?
How is pollution getting onto the landscape?
How is pollution making it to streams?

What practices address the sources and drivers?
What are the most effective practices?
What are the most cost-effective practices?

Where are the most effective places to focus efforts?
What practices have been implemented and to what extent?
Do they address the sources and drivers?
Are they the most effective?
Where do opportunities for implementation exist?

# Going from data to decision-support tools

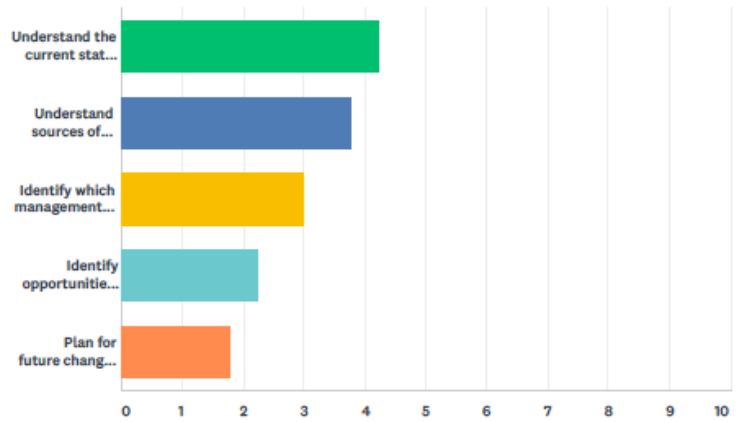
4) Conduct preemptive user research to understand how, when and why users would want to access decision-support information

Essential considerations for user research:

- Business case for decision-support tool
- Who *exactly* your users are
- What they should be using it to do
- What questions you need answered

Q2 Please select the order in which you might look for information on these topics as you go through the planning process. Click and drag (or select the dropdown) in order of importance with 1 being highest.

Answered: 13 Skipped: 0




| | 1 | 2 | 3 | 4 | 5 | N/A | TOTAL | SCORE |
|---|---|---|---|---|---|---|---|---|
| Understand the current status of water quality in your area and trends over time | 69.23% 9 | 7.69% 1 | 7.69% 1 | 7.69% 1 | 7.69% 1 | 0.00% 0 | 13 | 4.23 |
| Understand sources of pollution and drivers of water quality in your area | 15.38% 2 | 61.54% 8 | 7.69% 1 | 15.38% 2 | 0.00% 0 | 0.00% 0 | 13 | 3.77 |
| Identify which management practices are effective and cost-effective for your area | 7.69% 1 | 15.38% 2 | 53.85% 7 | 15.38% 2 | 7.69% 1 | 0.00% 0 | 13 | 3.00 |
| Identify opportunities in your area for implementing management practices | 7.69% 1 | 7.69% 1 | 15.38% 2 | 38.46% 5 | 30.77% 4 | 0.00% 0 | 13 | 2.23 |
| Plan for future changes in your area such as urban growth or climate change | 0.00% 0 | 7.69% 1 | 15.38% 2 | 23.08% 3 | 53.85% 7 | 0.00% 0 | 13 | 1.77 |

# Going from data to decision-support tools

## 5) Inventory current data visualization products & projects

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Inventory of Data Visualization Products for Midpont Assessment, Phase III WIP Development and Implementation** | | | | | | | | | | | |
| 2 | **Product** | **Basic Description** | **Functionalities** | **End Target Audience Product** | **Priority Use** | **Status** | **Timeline (when needed)** | **Action Needed** | **Review needed?** | **Priority** | **Location** | |
| 3 | **USGS Nontidal Website** | Location where nontidal monitoring data is housed | USGS concentration data | Jurisdictions, Localitie | MPA, Explaining Trends | Complete | Ongoing | Consolidation or distillation of information for other audiences (like PSC) | No | Low | https://cbrim.er.usgs.gov/ | |
| 4 | USGS Interactive Map | Trends and loads | NTN loads 2014 | | | | | | | | | |
| 5 | | | NTN trends in loads ('05-'14) | | | | | | | | | |
| 6 | | | NTN trends in loads ('85-'14) | | | | | | | | | |
| 7 | | | NTN yields (ave. '05- | | | | | | | | | |
| 8 | USGS Static Figures | Display most recent trends and loads info | NTN trends in loads ('05-'14) | | | | | | | | | |
| 9 | Maps | | NTN trends in loads ('85-'14) | | | | | | | | | |
| 10 | | | NTN loads 2014 | | | | | | | | | |
| 11 | | | NTN yields (ave. '05- | | | | | | | | | |
| 12 | | | NTN combined yields trends ('05-'14) | | | | | | | | | |
| 13 | Bar graphs | | NTN trends in loads ('05-'14) | | | | | | | | | |
| 14 | | | | | | | | | | | | |
| 15 | **Nontidal Dashboard (Tableau)** | Interactive maps with station-specific nontidal monitoring and trends info | NTN annual loads ('85-'14) | Jurisdictions, localitie | MPA, Explaining Trends | Being updated by John Wolf | August | Remaining development, user experience, review, consolidation or distillation of info for other | ITAT, WQGIT | Medium | https://public.tableau.com/profile/bryan.chastain#!/vizhome/CBPNon-TidalV6/Non-TidalWaterQualityDashboard | |
| 16 | | | Flow-normalized annual loads ('85-'14) | | | | | | | | | |
| 17 | | | NTN trends in loads ('05-'14) | | | | | | | | | |

Tools Inventory | Tools by questions | Info status | Tool status

# Going from data to decision-support tools

## 6) Organize information in manageable chunks – “modules”

What is the status of water quality in my area?

- Freshwater Rivers & Streams Water Quality
- Tidal Water Quality & Living Resources

What are sources & drivers of pollution? Where geographically is most effective to focus?

- Targeting Restoration Efforts

What are the most effective and cost effective BMPs? Where can I implement them?

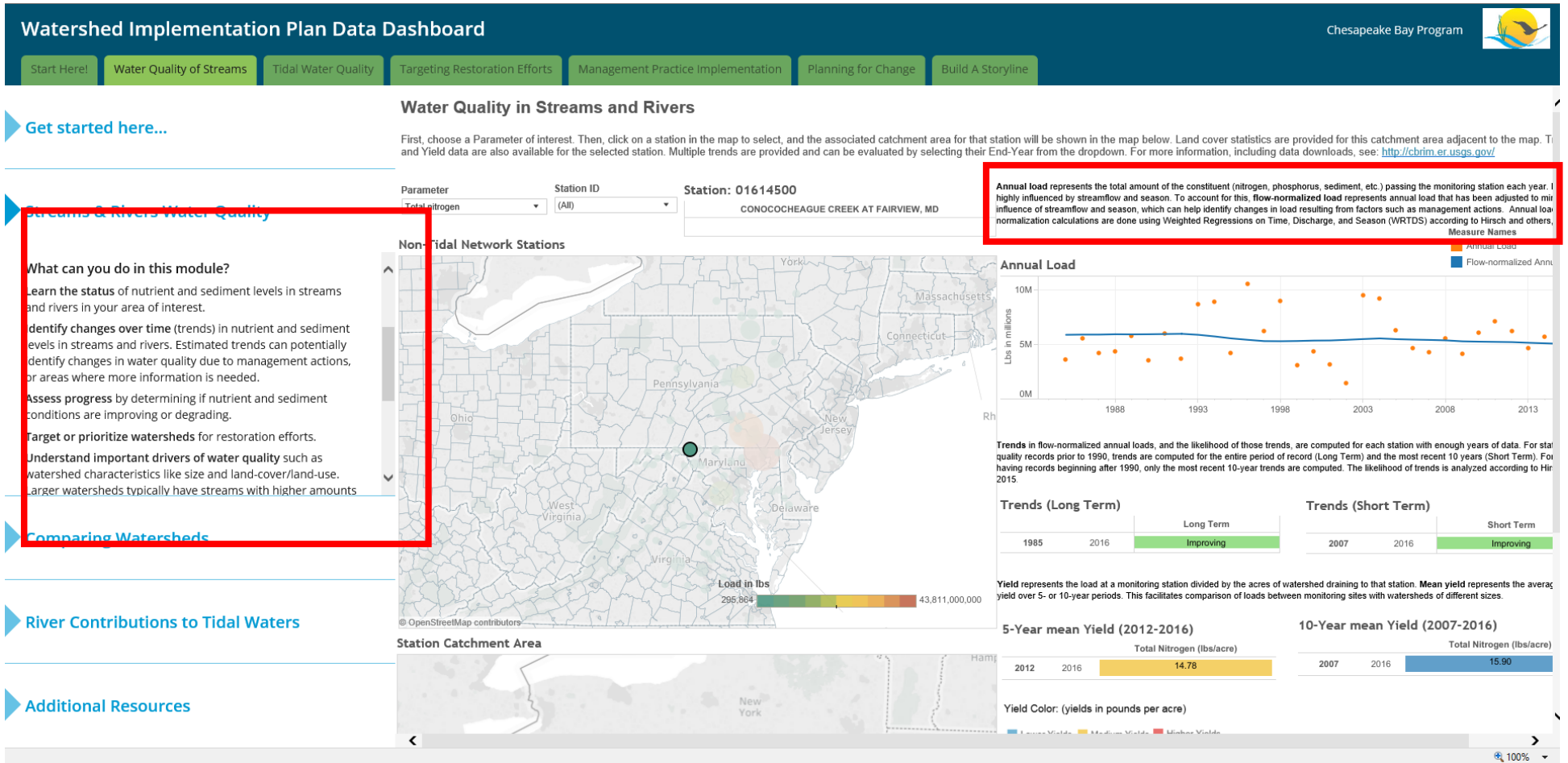
- Identifying Implementation Opportunities

How can I plan for growth and mitigate issues associated with it?

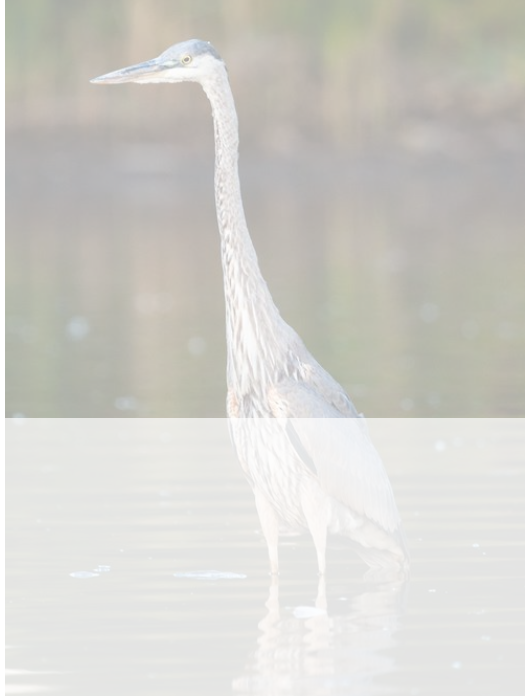
- Planning for Urban Growth

# Going from data to decision-support tools

7) Utilize user research and management input to provide significant guidance with data





Thank you!

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