

# Increasing Development, Drought Challenges, and Harmful Algal Blooms

*Prince William County, Virginia*



*2025 Potomac River Conference*



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# The Water Quality Program

## Promotes:

- Water quality awareness and community/citizen science data
- Natural Resource Conservation
- The County's Green Community Goals





# Water Quality Program: Promotes Water Quality Awareness and Fosters Green Community Goals in Prince William County

Prince William Soil and Water Conservation District (PWSWCD)

## 4 Water Quality Programs

1. Floatable  
Monitoring  
(FM) program

Data strictly for  
County's assessment  
& reports  
(MS4 permit etc)

2. Biological  
Monitoring

Benthic Macroinvertebrate  
monitoring  
( Across PWC)

Water  
Quality  
Monitoring

- Promote
- Environmental education/STEM
  - Community Science
  - Community Engagement/Stewardship
  - Collects data to promote research

4. Adopt-A-Stream/  
Pond/ Lake/River  
(Program)

3. Chemical Monitoring  
Temperature, pH, Conductivity, Turbidity



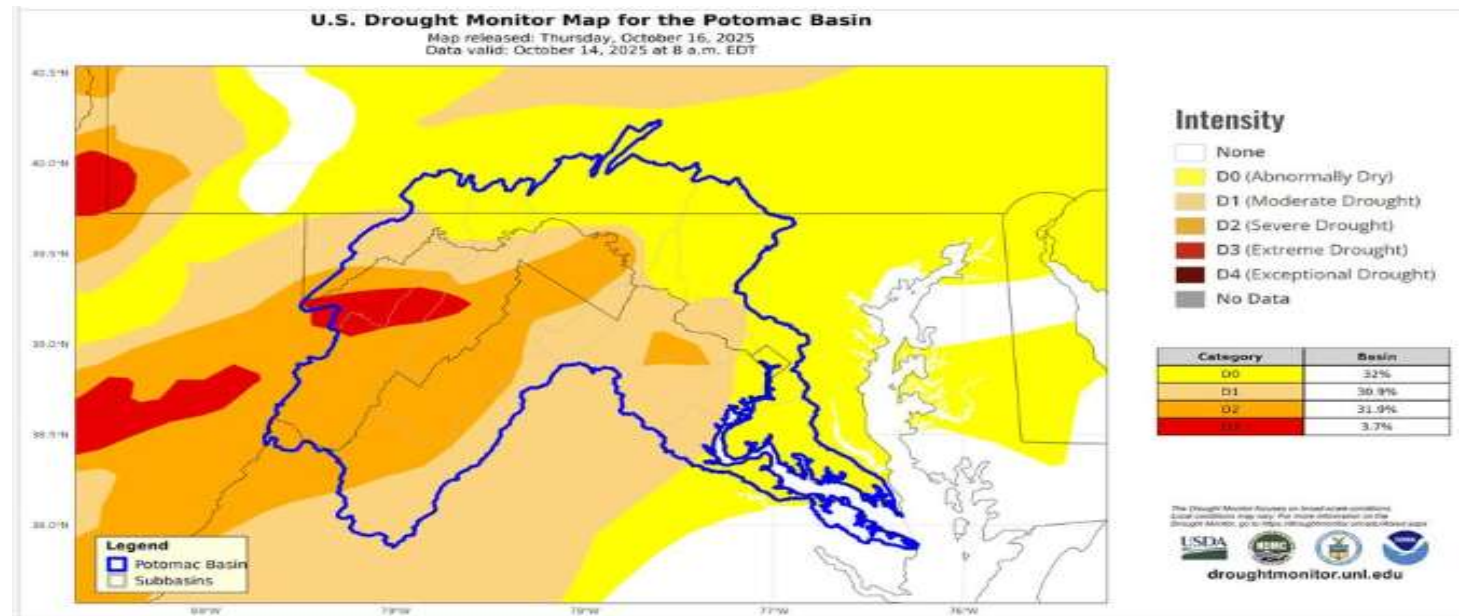
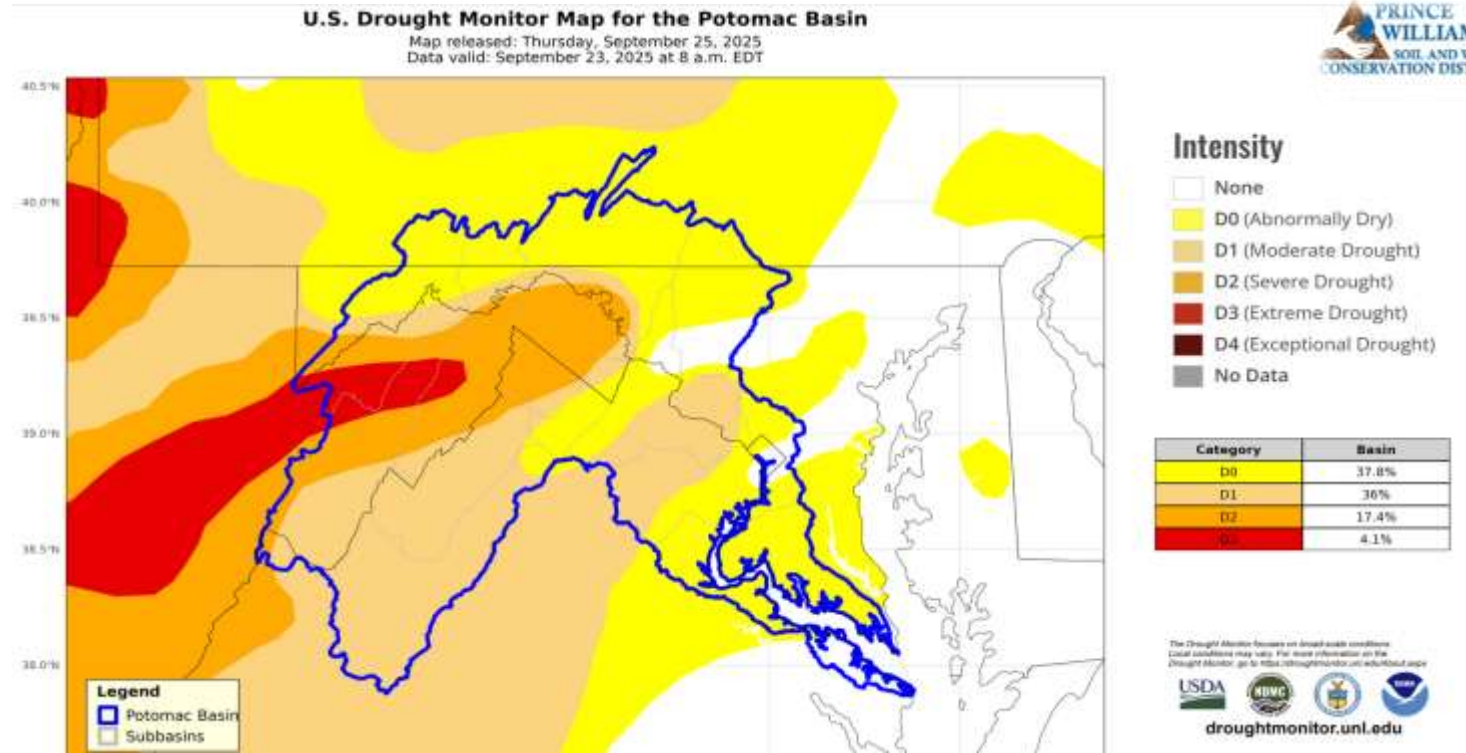
This Program was the 2022 National Earth Team Award Winner. An award from the Natural Resources and Conservation Service (NRCS) with the USDA

In 2024, over 1,400 volunteers saved over \$145,000 in taxpayers' money as volunteer time under the Program.

(2023 Independent Sector Volunteer Rate )

# Freshwater Challenges in the Potomac Basin

- The Potomac River Basin is currently experiencing significant drought conditions with over 90% of the basin affected.
- This drought is said to be similar to those of 1965, 1998, and 2001, **but** the flow rate is 7.8 inches below average, and the region is under a drought warning.
- The loss of trees to development is exacerbating these Drought Conditions, with high evapotranspiration reducing freshwater flow rate in local streams and ponds, giving rise to HABs

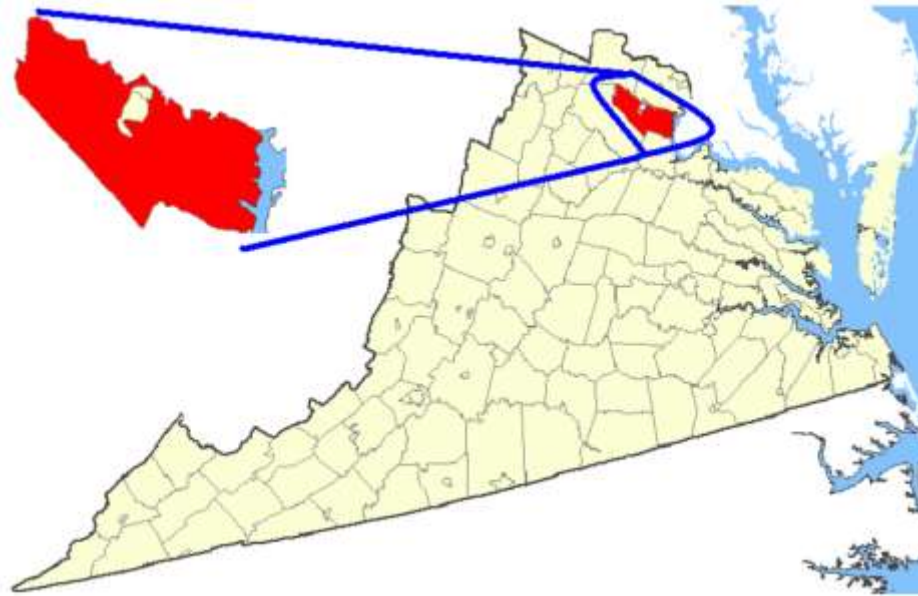


# What are Harmful Algal Blooms/Cyanobacteria?

- Harmful Algal blooms (blue-green algae) are **toxin-producing algae that grow excessively in water bodies**
- HABs-forming cyanobacteria **thrive in warm, slow-moving water. They typically occur when the water temperature is warmer**
- They **grow faster than other algae**
- They **migrate up and down the water column better than other algae and thrive well with nutrients**
- Cyanobacteria **absorb sunlight and release heat**



- **Increasing droughts** cause waterbodies to **retain nutrients longer, helping HAB species to flourish.**
- **High stormwater and runoffs** will **flush HABs and their toxins into nearby water bodies, estuaries, and the marine areas, leaving these areas at great risk**



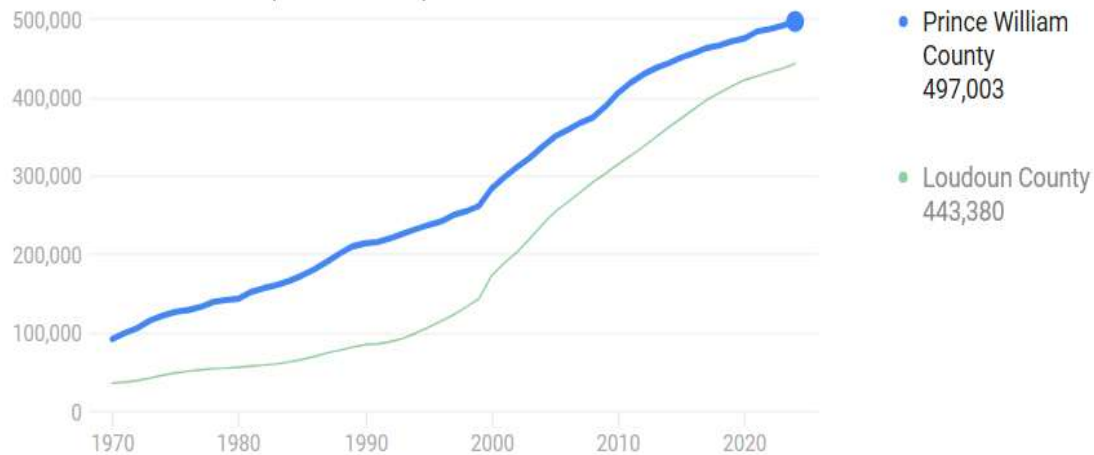
Wiki

Prince William County (PWC) is a fast-growing suburban County in the Chesapeake Bay Watershed.

It is Virginia's second-most populous County.

Prince William County / Population

497,003 (2024)

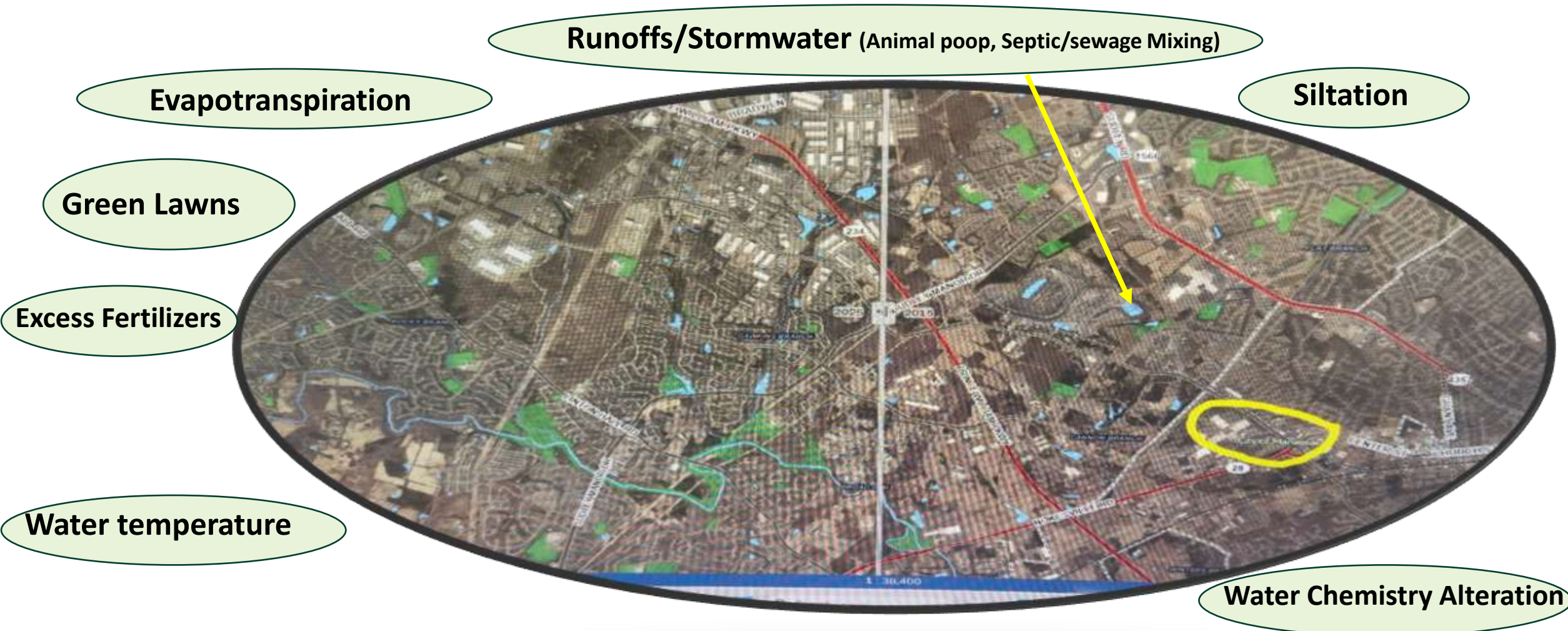


### Virginia's population increase rate

Year	VA Population Increase Rate
2020 -2021	27%
2022 -2023	46%

# Tree Loss and Water Quality Challenges in Prince William

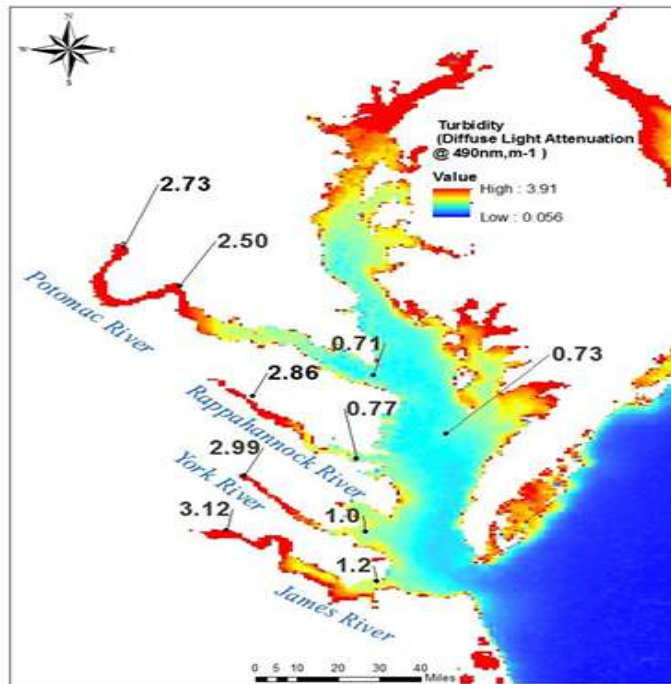
2025/2015 Aerial Swipe



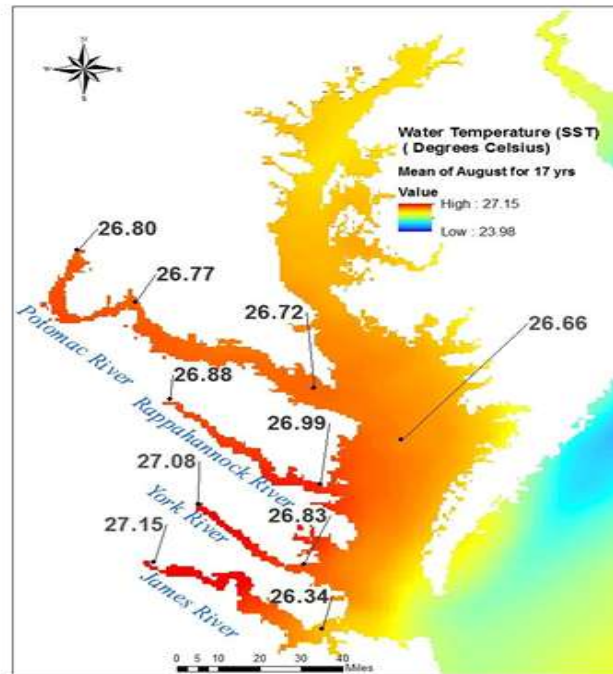
Prince William County is anticipated to be the world's largest Data Center hub. (PrinceWilliamTimes 2024)

# Water Quality Challenges

## “Increasing Impervious Surfaces”

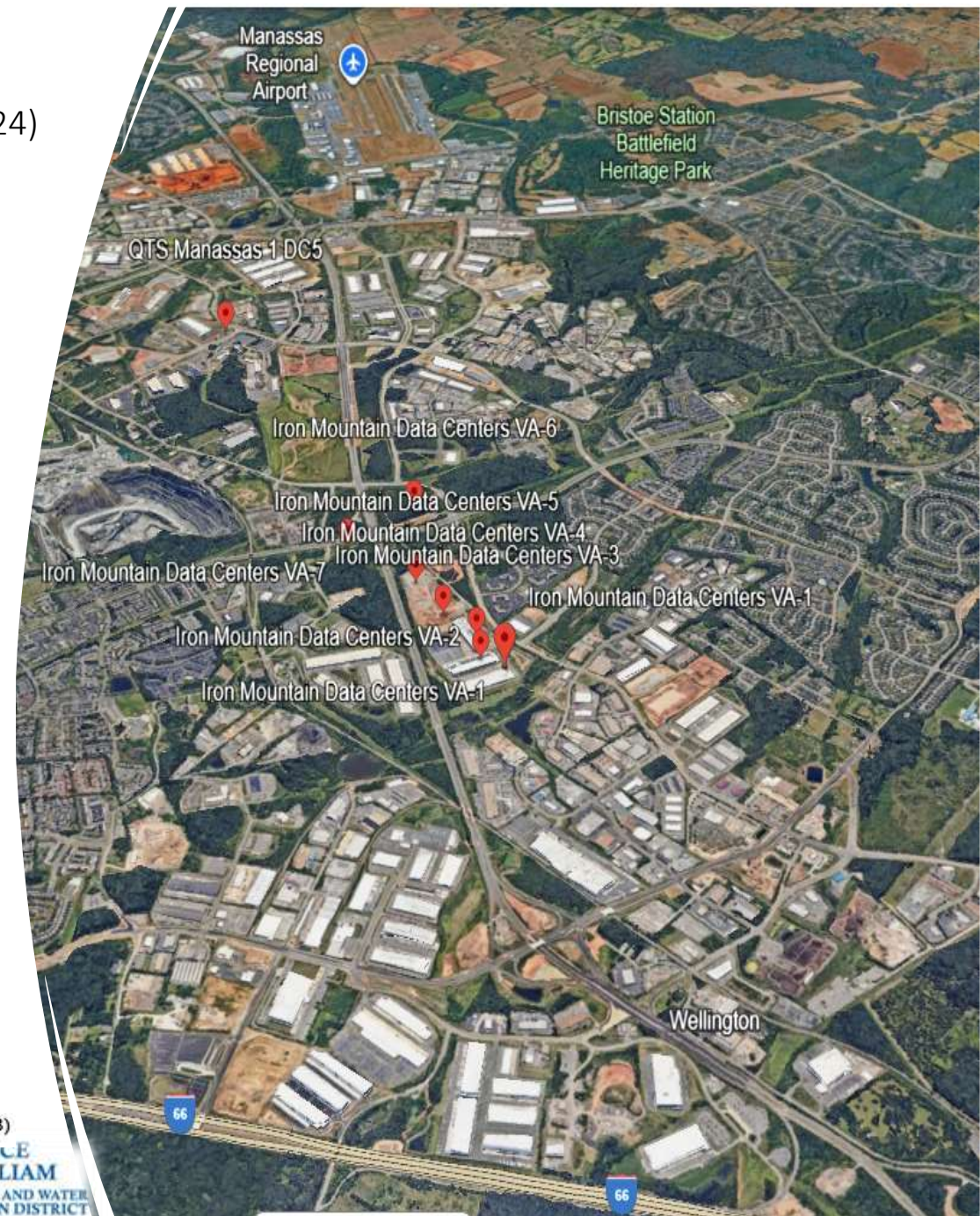


Turbidity: August Mean (K490) for 7 yrs. (2011-2018)



Water Temperature (Celsius) Mean of August (2001-2018)

Veronica Tangiri (2019) NOAA Project



# Our Major Drinking Water Sources

Primary drinking water sources for most parts of Prince William & Fairfax Counties

PWC has over 1,100 miles of streams.

Occoquan River Reservoir

Potomac River

There is a need to protect Riparian areas.

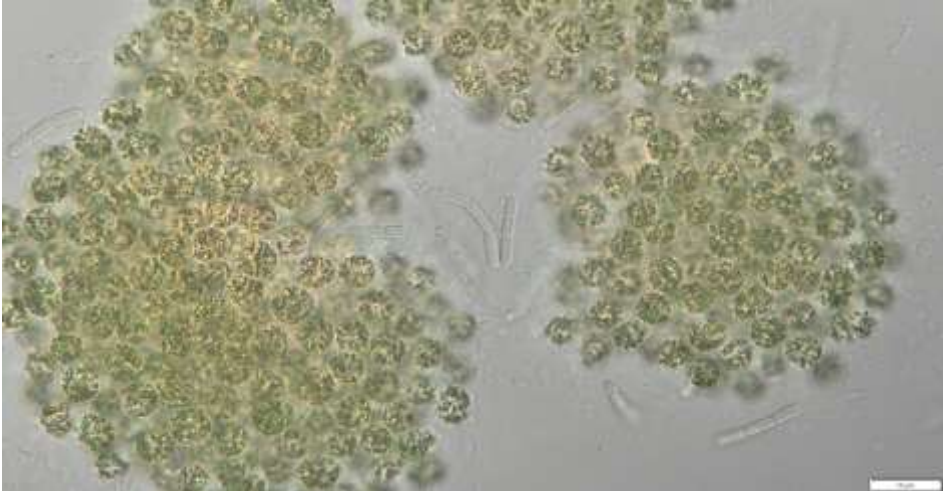
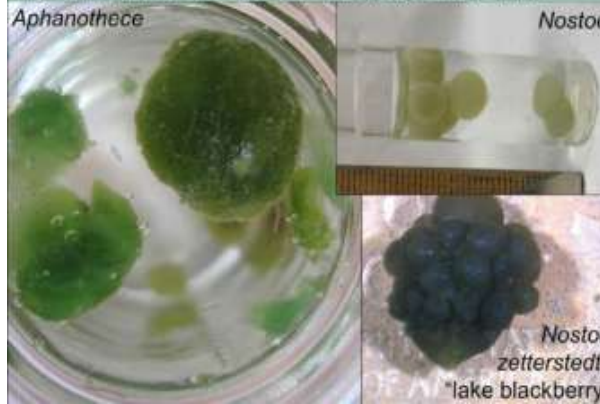
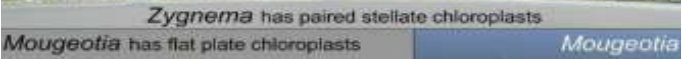


An aerial view of the Occoquan Reservoir, which is the drinking water source for 800,000 residents in eastern Prince William and Fairfax counties. Photo by Roger Snyder.

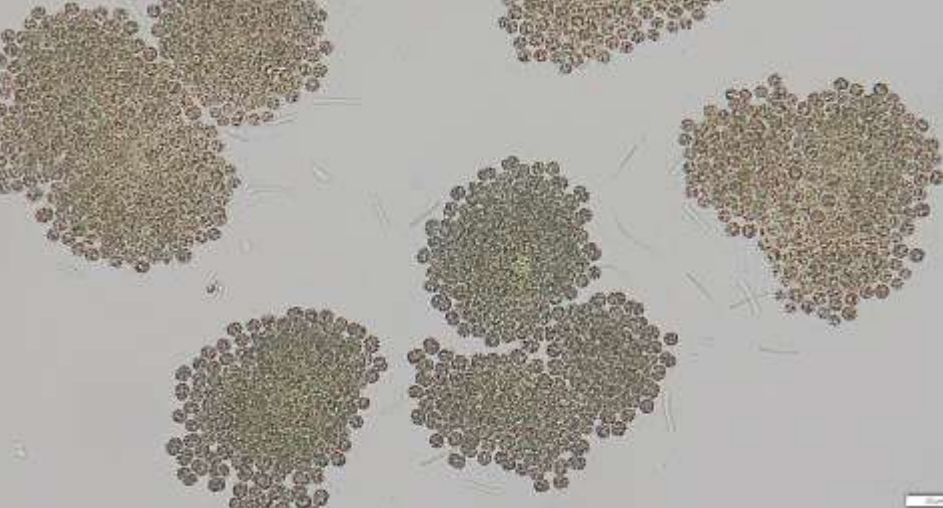
# Green Algae OR Harmful Algae Blooms (Blue-green algae)?



Filamentous Green Algae



Cyanobacteria -Microcystic Colonies (Manassas City)



Pseudanabaena Confirmed!

Photo Credit: Dr. Rosalina Christova (GMU)

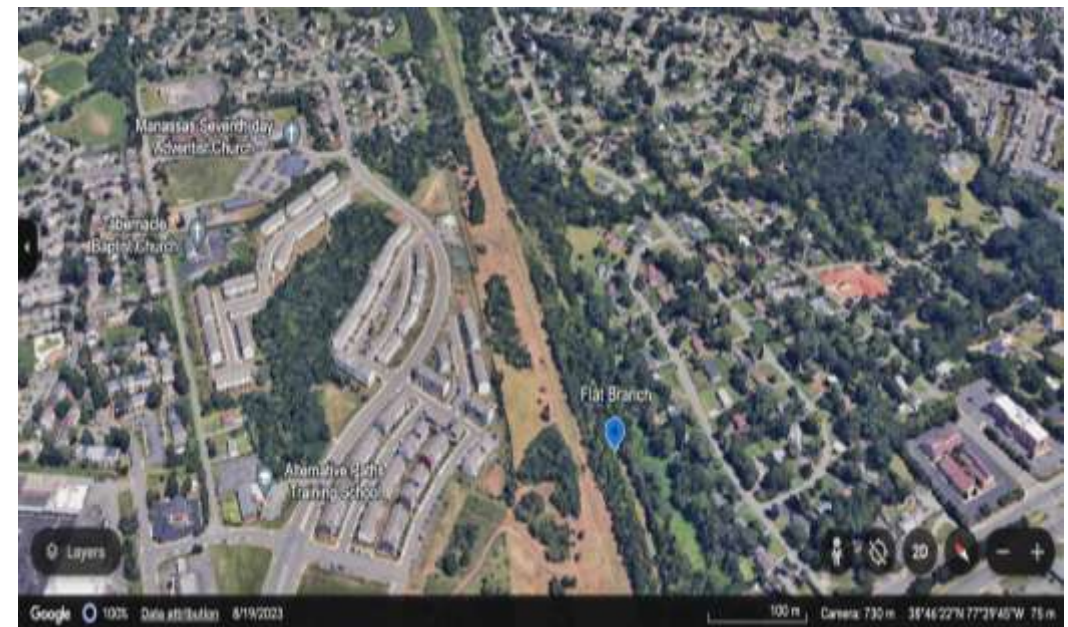
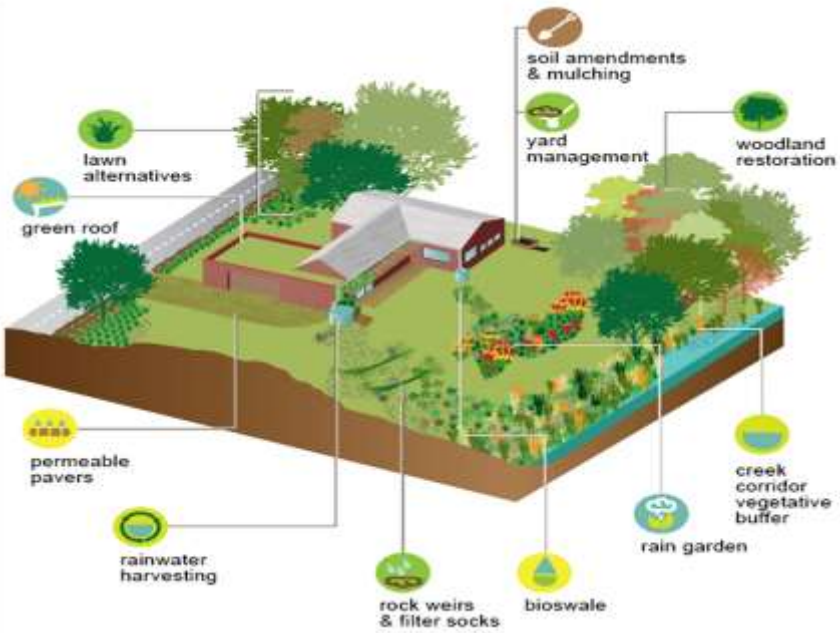
# Tree loss, Urbanization, Climate Change, Droughts = HABs



Harmful algal blooms tend to grow in warm water with high levels of nutrients.

© CDC.gov

# How can we promote Water Quality awareness and prevent HABs in Prince William?



- Promote Community Water Quality Awareness
- Promote Environmentally Friendly Practices and Policies that protect water quality

# How can we promote Water Quality awareness and prevent HABs in Prince William?...

## Our Pollutants

- *Nutrients*
- *Salts*
- *Sediments*
- *Trash*
- *Animal Waste*
- *Toxicants( PFAS, 6ppd quinone)*
- *Pesticides*
- *Thermal*



- **Promote Monitoring and Community Engagement/Involvement**
- **Promote Community Partnerships and Meaningful Collaborations**
- **Promote Science Data and Research**





- *Thanks to the Lake Champlain Committee in Vermont for training our volunteers*
- *Thanks to GMU (Dr. Rosalina Christova) for following up with our samples*



**Thanks to All Our Volunteers!**

**Thank you!**

**Questions?**

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