



**Steve Nelson**, Environmental Scientist Water Quality Division

# Agricultural Source Water Protection Efforts on a Local Scale

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# Agenda

- Agriculture within the Patuxent Reservoirs Watershed
- Patuxent Agricultural Cost-share program
- Collaborative Stream Restoration project at Maple Dell Farm
- New initiatives: increase BMPs on rented farmland & MDA's BMP Verification Assessment
- Possibly one, new Ag-related insight for water utilities





#### Agriculture extent in the Patuxent Reservoirs Watershed (PRW)

- Land uses/cover about evenly split between Ag, Residential and Forest
- Ag mostly located in upper portions of the PRW, draining primarily to Triadelphia Reservoir
- Algal bloom implications





## Ag Land in Montgomery County

- Ag Reserve (1980) ahead of its time!
  - o 93,000 acres (~29% of county)
  - Land mostly drains to Potomac and Patuxent Rivers!
- Ag Census data (2017)
  - o 490 dairy cows
  - I,853 beef cows
  - o 2,225 chickens
  - o 10,000 horses!
  - o ~12,000 acres in corn
  - o ~14,500 acres in soybean





## **Ag Land in Howard County**

- No Ag zoning district
- Ag land preserved via many State/County funded programs
- Most Ag land remaining in Triadelphia Reservoir watershed
- Observed more algal blooms in Triadelphia Reservoir compared with T. Howard Duckett (Rocky Gorge) Reservoir



#### Patuxent Ag Cost-Share Program

- Program created in 1998, updated in 2014
- Collaborative funding from WSSC Water and counties
- Meets a need for farmers ineligible for State/Federal programs and targets increasing horse population
- Recently, this program more useful to Howard SCD than to Montgomery SCD
- Originally, program partly funded a SCD position to focus on the watershed, but now funding BMP implementation
- <u>DWSPP Ag Workgroup application</u>: worth considering as a future Ag imitative?









## Stream Restoration at Maple Dell Farm Project Background

- Public- Private cooperative effort!
  - MD DNR Grant Awarded \$1.8M
  - 32+ acres of impervious area credit towards meeting County's MS4 Permit
- Maple Dell Farm Facts
  - 96-acre dairy farm in Howard County with a herd of 200 cows
  - Cows with access to the 1.2 miles of stream channel on the farm
- Streams are tributaries to Triadelphia Reservoir
- Triadelphia is considered impaired by phosphorus and sediment with resulting TMDLs established in 2008









#### Farm's Location within Patuxent Reservoirs Watershed

- Streams flow through Maple Dell Farm into Cattail Creek, eventually reaching Triadelphia Reservoir
- Triadelphia Reservoir watershed is ~79 square miles







#### **Stream Restoration Components**

- 15-acre riparian easement
- Stream channel restoration
- Tree planting
- Fencing to exclude dairy herd





#### **Stream Restoration - over time**







### Maple Dell Farm Stream Monitoring

- Streams flow through farm
- Three monitoring stations were constructed:
  - MD-1 downstream of farm
    MD-2 and MD-3 upstream of farm





#### **Pre-restoration monitoring summary**

- Compared Upstream and Downstream median concentrations
- Higher nutrient and sediment concentrations downstream of farm
- Phosphorus downstream median concentration was 5X upstream
- Total nitrogen, suspended solids, and total organic carbon median concentrations were also higher downstream
- Opportunity for improvement by stream restoration





#### **Pre- and Post-restoration comparison: Phosphorus**

• "Gap" closed – By Post-restoration Year 4 upstream and downstream phosphorus concentrations were similar





#### **Biological Assessment Results** Assessed stream habitat, aquatic insect and fish communities before/after restoration





Photos courtesy of KCI Technologies



#### **Project Summary**

- Stream channel was restored, cows excluded, vegetation fully established!
- Pre-restoration monitoring showed opportunities for improvement
  - $\,\circ\,$  Nutrient and sediment concentrations downstream of farm were higher than upstream
- Post-restoration monitoring showed water quality improvements
  - By Year 4, downstream phosphorus, suspended solids, and total organic carbon concentrations were similar to upstream concentrations
  - o Some progress with nitrogen
  - Biological Assessments show rapid and sustained improvements for stream habitat and fish community <u>and</u> recent (2022) improvement of the aquatic insect community

#### • Lessons Learned:

- If you plant it, they will come! Incorporate eventual "beaver invasion" into the stream channel study design
- Farmers are BUSY! Where possible, ensure that they make time for needed maintenance
- o Get everything in writing!



#### **New Ag Initiatives!**

- Address the need for more BMPs installed on rented farmland
  - o About 50% of farmland in MD is rented/leased to others
  - Only about 25% of rented farmland in MD contains conservation practices
  - Represents a great need AND opportunity to increase conservation on ½ farmland in MD by addressing different impediments.
  - Initial plan is to continue efforts by U of MD Ag Law Education Initiative to educate landowners about writing lease agreements with conservation in mind w/in Patuxent
  - Initial step conduct a survey of landowners who rent farmland to assess their specific needs
- <u>DWSPP Ag Workgroup application</u>: potential opportunity to collaborate with Patuxent Partnership to expand this effort beyond the Patuxent



#### **New Ag Initiatives!**

- MDA BMP Verification Assessment
  - Howard County 67% of Bay TMDL WIP BMPs assessed with 78% of those meeting standards
  - Montgomery County 76% of Bay TMDL WIP BMPs assessed with 77% of those meeting standards
- <u>DWSPP Ag Workgroup application</u>: how are other MD Counties in the Potomac River Basin doing?



## Possibly a New Ag-Related Insight?

- One of the Bay TMDL WIP Strategies for Ag is a widely used BMP called Conservation Tillage or "no-till" farming – planting with minimal soil disturbance
- While it's great to celebrate this achievement that reduces soil loss from cultivated fields, farmers <u>still need to rid crop fields of those pesky weeds</u>!
- There's a tradeoff for (at least) the water utilities downstream
  - o Herbicides, Insecticides, and Fungicides, oh my!
  - USDA Quick Stats for the Potomac R. Basin
    Future candidate(s) for DWSPP's list of CECs?



A no-till planter is used to plant soybeans into a terminated cover crop. Photo credit: Jason Johnson, NRCS-Iowa









