Adaptive Management, Innovation, and Monitoring Insights for the Chesapeake Bay Watershed

Christina Lyerly
Maryland Department of the Environment

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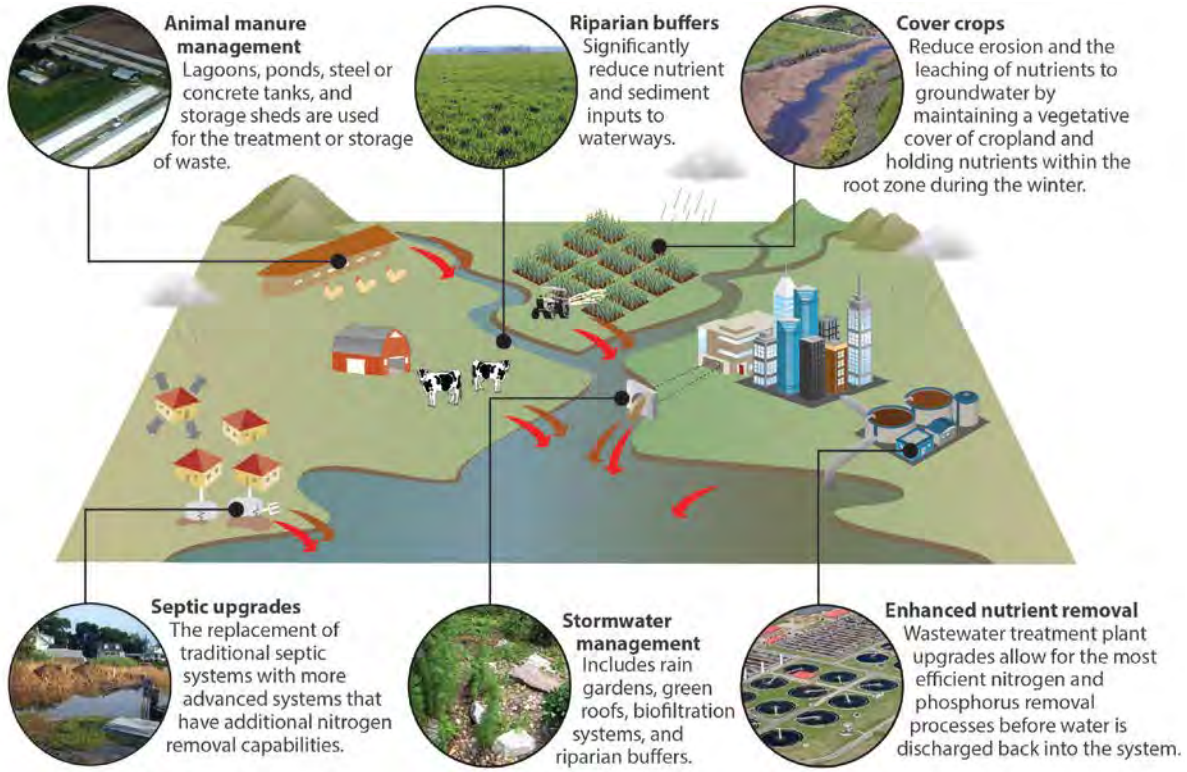
Authors: Christina M. Lyerly, Ana L. Hernández Cordero, Katherine L. Foreman, Scott Phillips and William C. Dennison

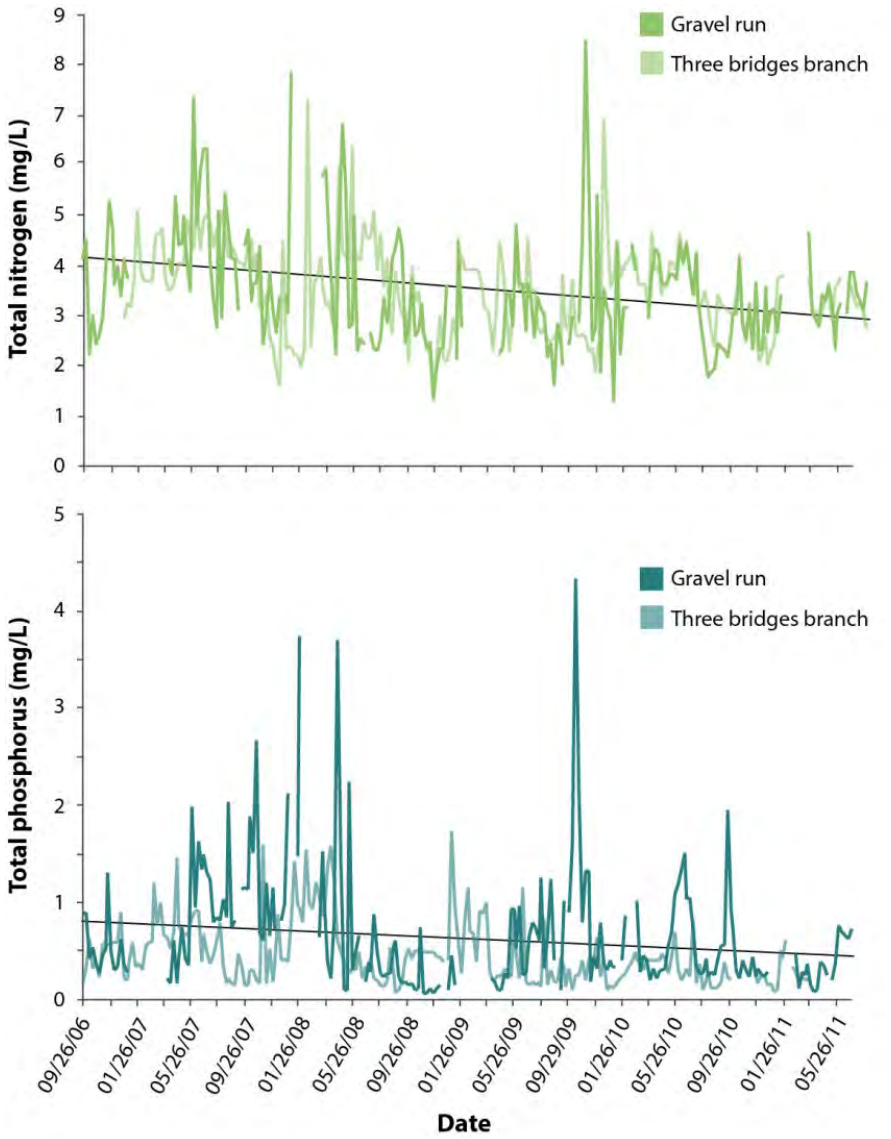
Lesson 6

Observable water quality responses are more likely to occur if A) location specific sources of pollution are **identified** and B) **targeted** practices are implemented.



Corsica River, MD

Improvements in nontidal water quality in the Corsica River were observed after aggressive implementation of multiple nutrient reduction practices



Changes in total nitrogen and total phosphorus concentrations in Three Bridges Branch and Gravel Run (2006-2011)

Data from Batchelor et al., 2011

Corsica River, MD

Water quality improvements have not yet been observed in the tidal portions of the Corsica River

- A nutrient budget suggests a tipping point – 50% reduction in nitrogen loading
- Goundwater lag times may delay a tidal response
- Most BMPs have not been fully implemented

Mouth of the Corsica River

Photo Credit: Ben Longstaff, UMCES

Corsica River, MD

What does the Corsica River tell us about assessment science and adaptive management?

- Develop a conceptual model
- Create a nutrient budget
- Monitor and measure
- Measure early and often
- Stick with it
- Collaborate
- Utilize strong leadership

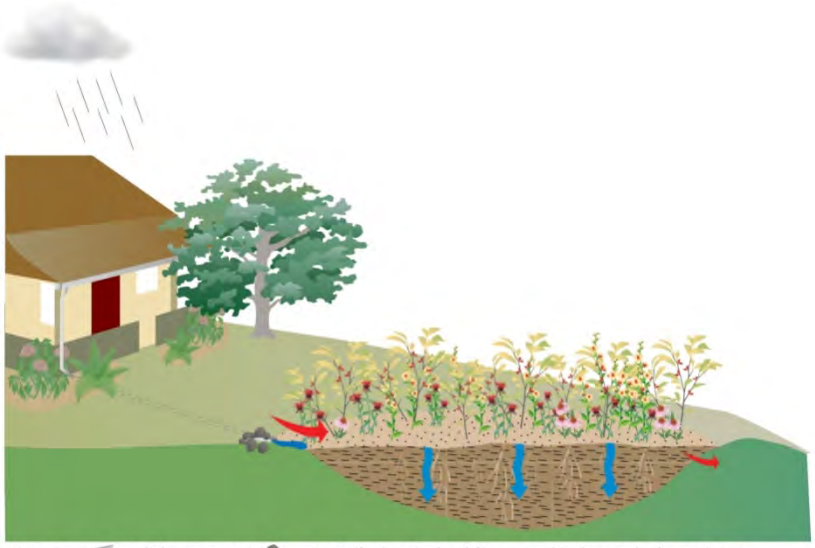
Non-Tidal Corsica River
Top: Three Bridges Branch
Bottom: Gravel Run

Adapted from Boynton et al. 2010

Lesson 7

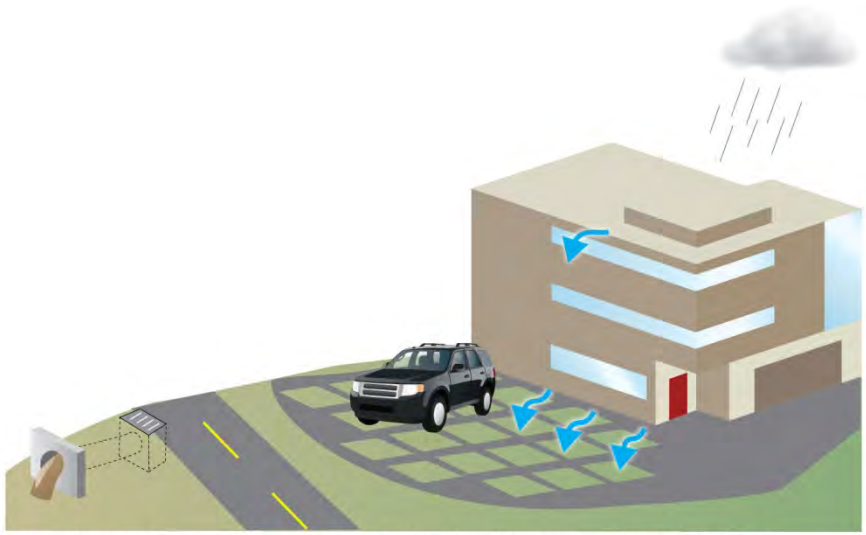
An array of practices to promote stormwater infiltration and retention are needed in urban and suburban areas

Rain gardens



Gutters and downspouts installed onto buildings and in lawns help assist in directing rain water from the roof to the garden. A landscape of native, drought resistant plants is well adapted to local conditions and easily maintained. Plants with deep root systems encourage stormwater infiltration and help absorb excess nutrient runoff. Additionally, a berm on the downward slope of a rain garden will help hold water in the garden during heavy rains, further improving its filtering capacity.

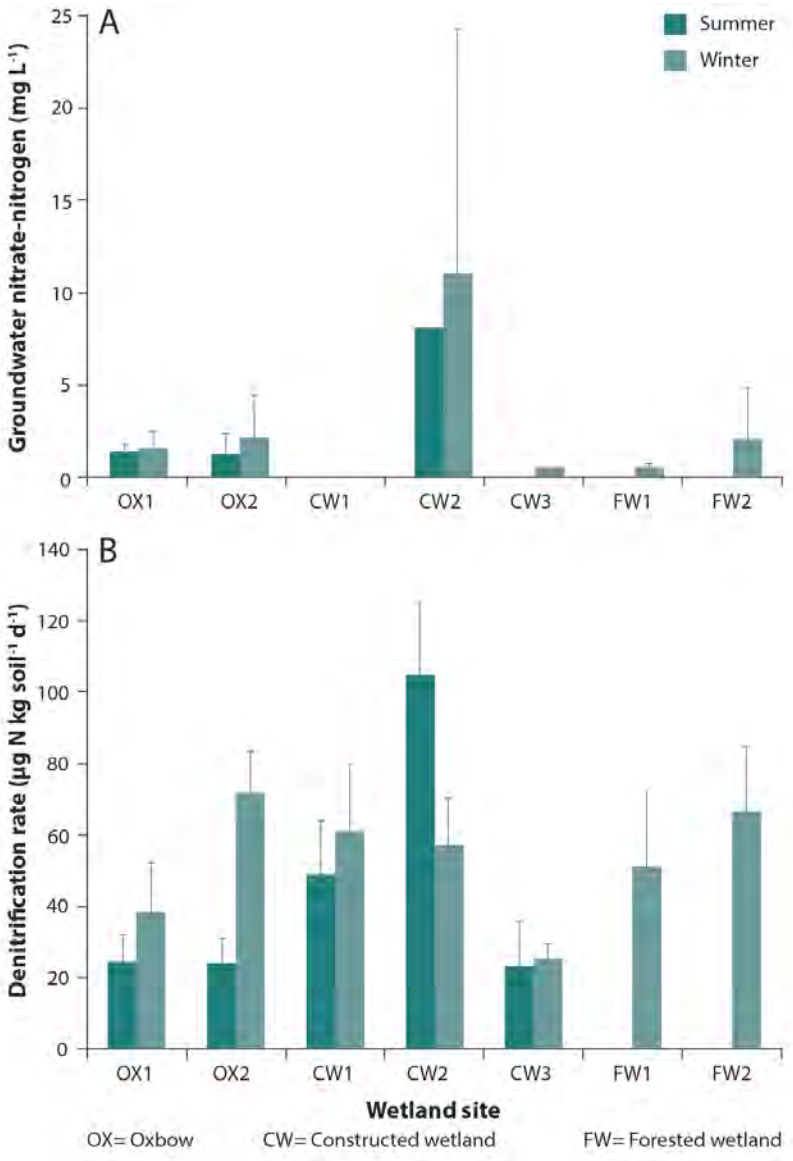
Pervious surfaces



Impervious surfaces such as cement, asphalt and roofing prevent the infiltration of stormwater, increasing the volume and velocity of surface runoff which carries nutrients and sediments with it. Pervious surfaces, such as pervious pavement or pavers, allow for stormwater to filter through the surface and into the ground, rather than into nearby streams and storm drains.

Baltimore County, MD

Constructed wetlands in Baltimore, MD demonstrated the potential to reduce nitrate entering streams through stormwater runoff



Mean groundwater nitrate-N concentrations (A) and denitrification rates (B) in oxbow, forested, and constructed wetlands in Baltimore, MD

Harrison et al., 2011

Fairfax County, VA

Sophisticated stormwater best management practices implemented in Fairfax County, Virginia have removed and retained greater soil phosphorus and sediments than traditional stormwater basins

Stormwater detention basins planted with wetland vegetation → ↓ Sediments, Soil Phosphorus

Stormwater Pond Retrofit in Fairfax County

Photo credit: http://www.fairfaxcounty.gov/nvswcd/newsletter/understanding-stormwater-ponds.htm

Hogan and Walbridge, 2007

Montgomery County, MD

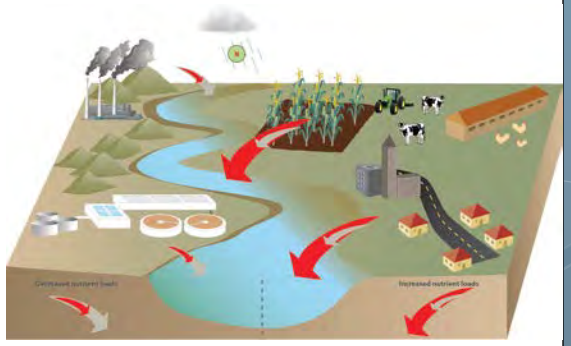
Multiple redundant stormwater best management practices and combinations of different best management practices were more effective than a single practice

- Erosion and sediment control practices were implemented
  - Forebays
  - Baffles
  - Floating skimmers
  - Greater storage volumes
  - Super silt fencing
  - Series of dual basins
- Stormwater runoff was managed
  - Filtering systems
  - Water storage
  - Recharge volume
- Reductions in pollution loads were achieved, but…
- Biological aquatic communities are still impaired

Implications

1. What is Working
   - The Clean Water Act is working
   - The Clean Air Act is working
   - Multiple practices that reduce agricultural nutrient loads can work

2. Challenges
   - Delays in improvements necessitates patience, persistence and perspiration
   - Increased population pressures and unsustainable changes to the landscape can hinder our efforts



3. Opportunities
   - Location matters: practices must be targeted and outcomes measured
   - Innovative and proven stormwater management practices should be implemented and testing is needed

Thank You

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christina.lyerly@maryland.gov

Questions?

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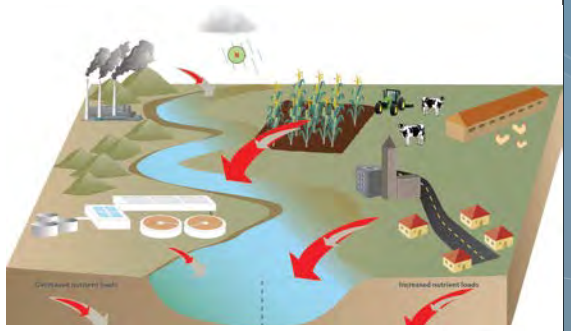

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