

NONPOINT SOURCE POLLUTION AND WATER QUALITY



Presented by Craig Fleming

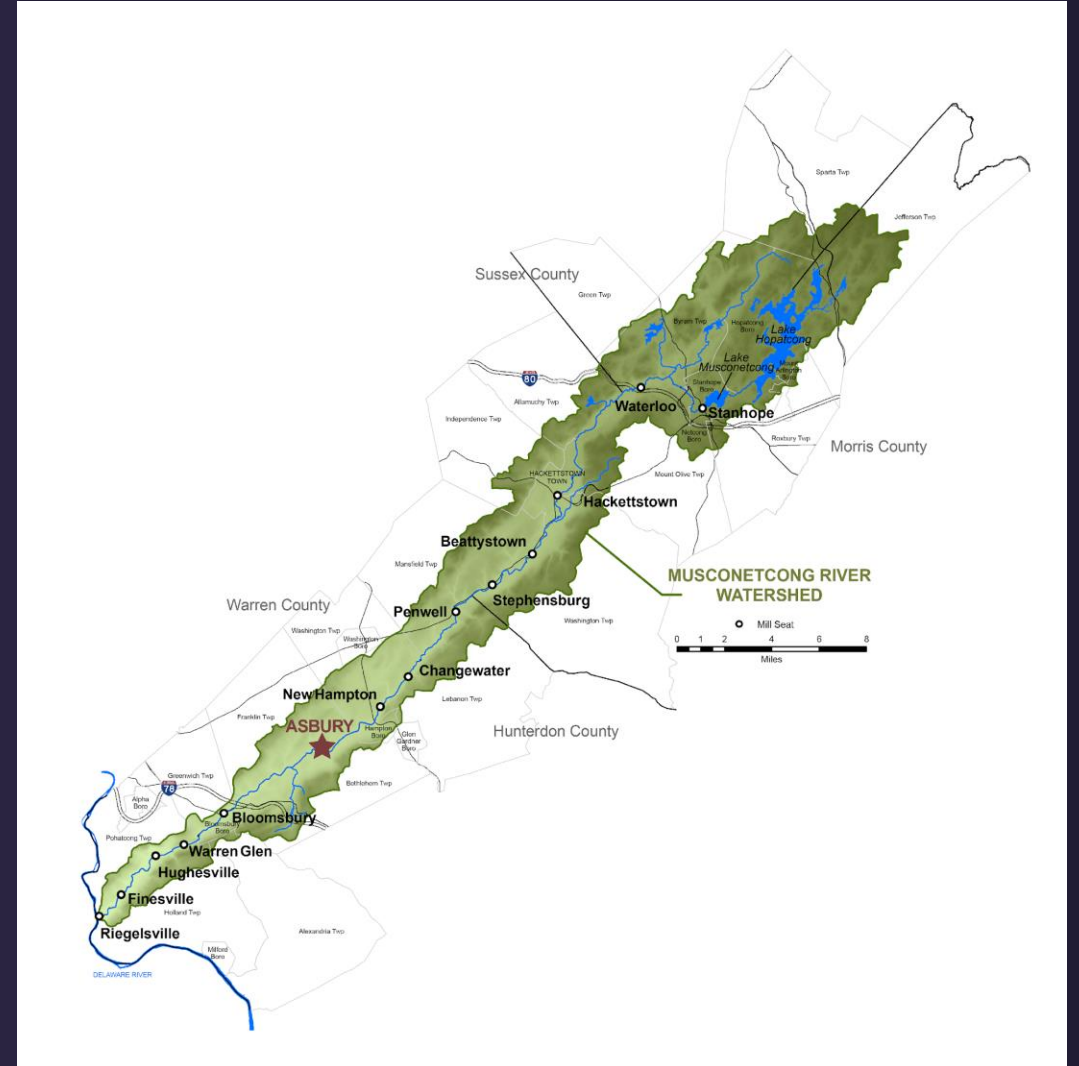
Water Quality Program Coordinator

The Musconetcong Watershed Association



OUTLINE

- MWA Background
- Watershed Protections
- Nonpoint source pollution – what is it and what effects can be seen?
- What does the MWA monitor for and what are we seeing?
- What Best Management Practices can be put in place to reduce NPS?
- Questions?
- Closing



BACKGROUND INFORMATION

- The Musconetcong Watershed was founded in 1992 in Asbury, New Jersey.
- The MWA is an independent, non-profit 501(c)-3 organization

Mission Statement: Protect and improve the quality of the Musconetcong Watershed and its waters for people and nature.

Vision: By 2050, the watershed is a healthy ecosystem; the river and its aquifers are resilient to threats, restored as needed and are a valued part of the communities in which they flow. See [MWA Vision Plan](#)

- MWA Pillars: Planning, Education, Advocacy, Stewardship

A LITTLE BIT MORE BACKGROUND



- The MWA can't do all that we do, on our own...
- The River Watcher program

Volunteer community scientist group

Over 50 active members since 2007

Continuous data collection throughout the year

HABs

Road Salts

Macroinvertebrates and Habitat

Assessments

Bacteria

STREAM Station Stewards

WATERSHED PROTECTIONS

- 28.5 miles of the Musconetcong River were designated through an Act of Congress in 2006 as "Wild and Scenic"

This designation, not only provides more stringent standards but also money to help protect and promote the outstanding natural resource values which can be found in the watershed.

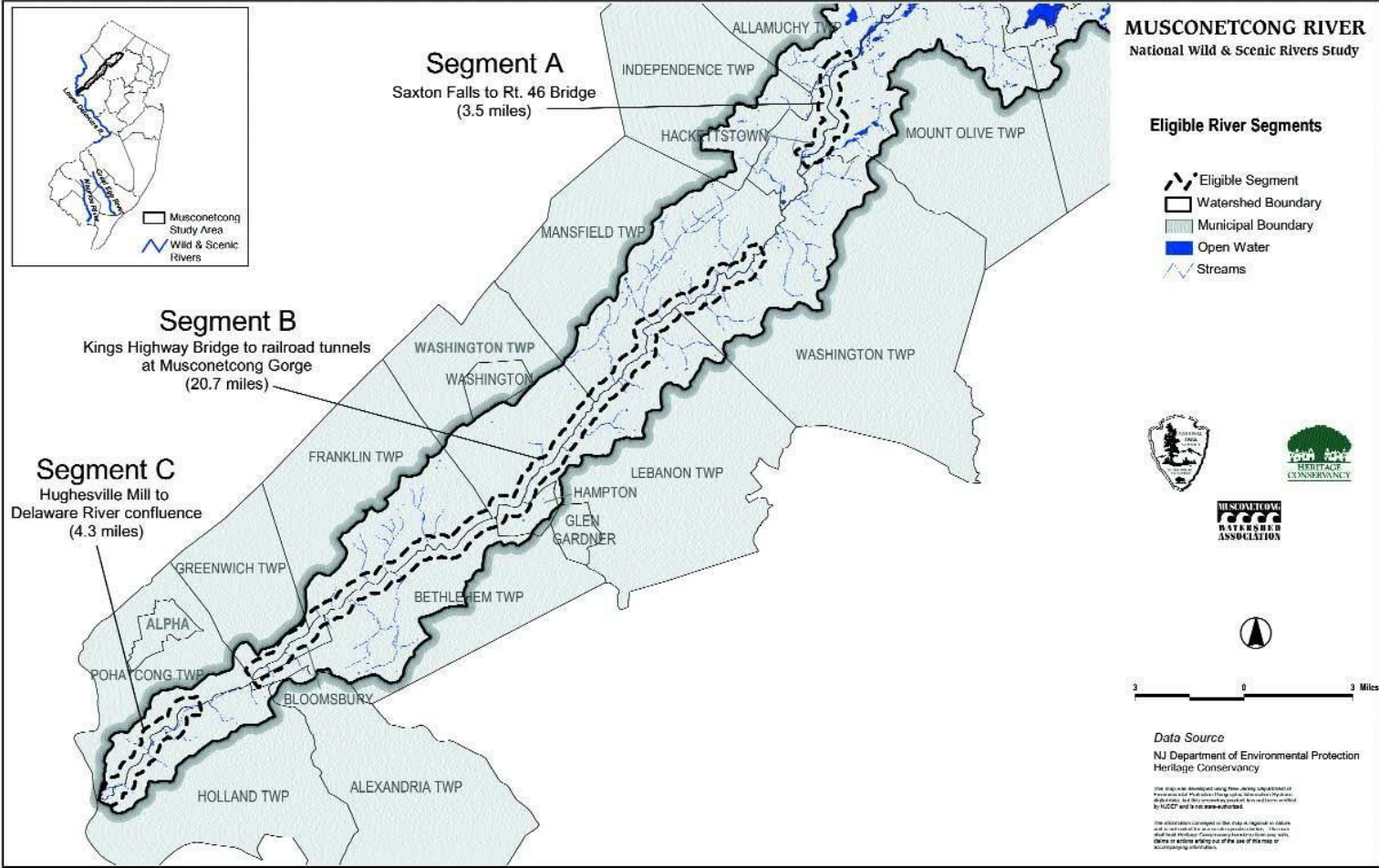
- The Musconetcong River is classified as a Category One Waters (C1), due to its great water quality, ecological significance, and value as a drinking water source.

This designation means the Musconetcong is protected from any measurable changes in water quality. It also requires impaired (polluted) water to be restored.

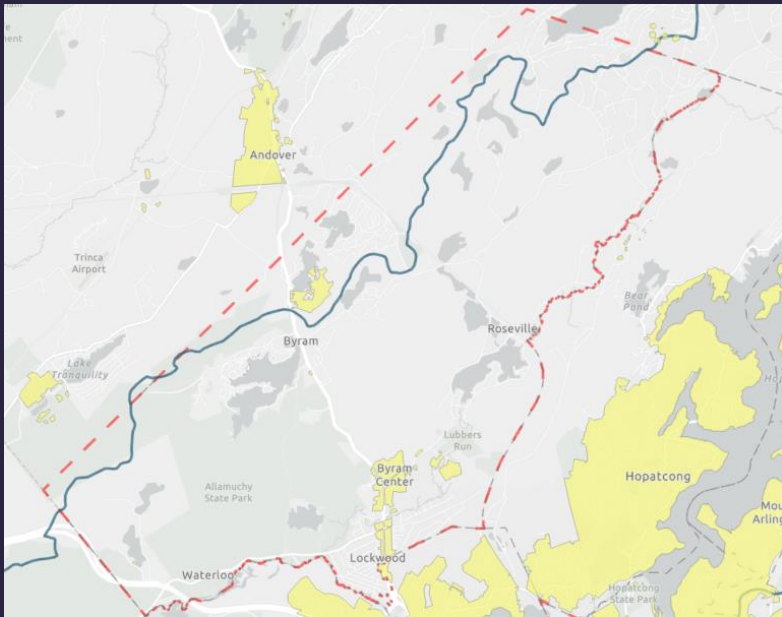
All C1 rivers must also have a 300-foot riparian buffer to protect the river from pollution and excess heat (Source: NJDEP).

- NJDEP also classifies portions of the Musconetcong as trout maintenance or trout production (TM and TP respectively) which come with more stringent standards for water quality.

LET'S VISUALIZE



NONPOINT SOURCE POLLUTION



- Nonpoint source pollution is most easily defined by its counterpart, point source pollution, which is defined under the Clean Water Act as:
Any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.
- Nonpoint source pollution is defined as any source of water pollution that does not meet the legal definition above.
- Nonpoint source pollution can include:
Excess fertilizers, herbicides and insecticides from agricultural lands and residential areas
Oil, grease and toxic chemicals from urban runoff and energy production
Sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks
Salt from irrigation practices and acid drainage from abandoned mines
Bacteria and nutrients from livestock, pet wastes and faulty septic systems
Atmospheric deposition and hydromodification

MWA MONITORING

- Road Salts

Monitors nps pollution in the form of road salts since road salts act as an indicator for other harmful pollutants (ex. heavy metals and tire rubber)

The more developed an area, the higher concentration of elevated chloride readings

- HABs

Monitors nps pollution in the form of harmful algal blooms, which indicate elevated nutrients and temperature of a waterbody

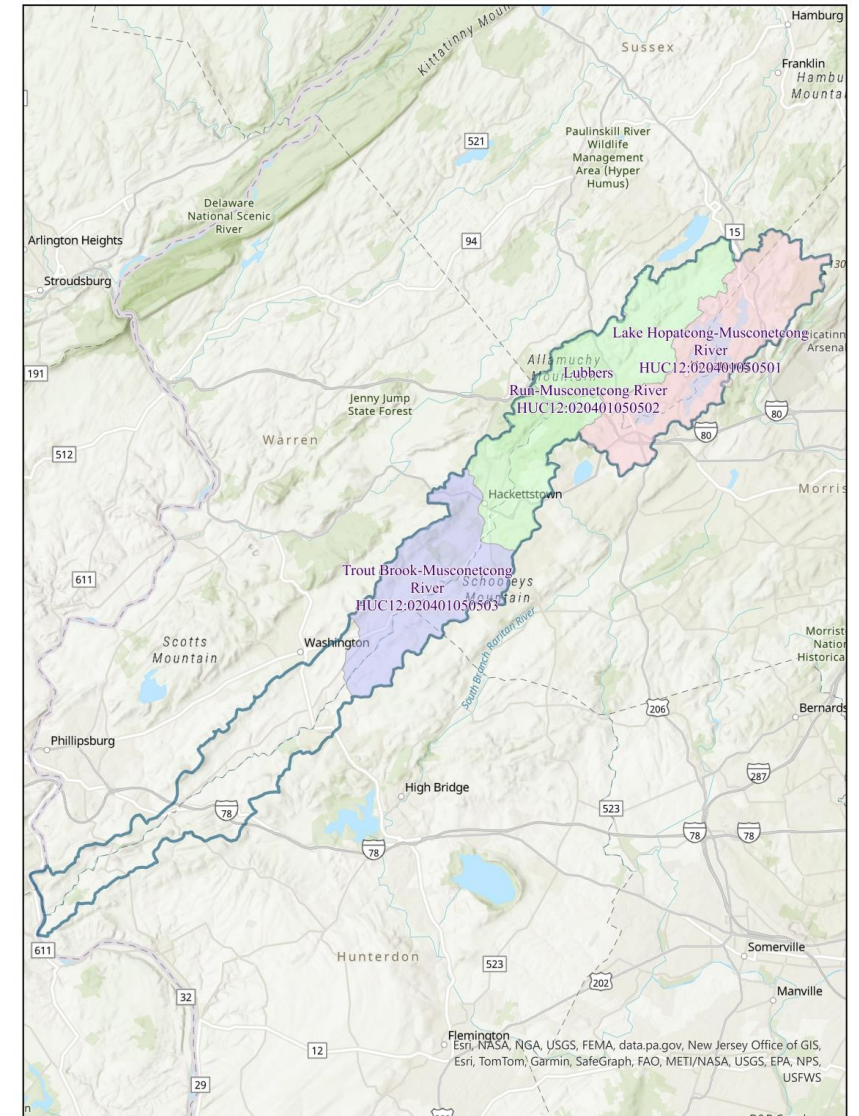
The more developed and/or agriculturally influenced an area is, the higher the risk of HAB blooms

- Bacteria

Monitors for nps pollution in the form of e.coli and total coliforms, which help identify leaky septic systems

The main source of bacterial pollution is human, most likely coming from improperly maintained septic systems.

- NWQI: National Water Quality Initiative, National Resources Conservation Service (NRCS) has given us funding for Watershed Management Plans for all three HUC 12s in the upper watershed



HARMFUL ALGAL BLOOMS

- Harmful Algal Blooms (HABS) - are a phenomenon that occurs when algae grow out of control and produce harmful or toxic events.

It is important to note that algae is an important part of aquatic ecosystems, so the algae itself isn't harmful but rather the quantity in which it can appear in a system is.

Certain HABs are comprised of cyanobacteria which are toxin producing and have known health impacts on humans (ex. Microcystis and Dolichospermum).

Regardless of the species, HABs cause serious concerns to water quality in the form of decreased dissolved oxygen and decreased biodiversity.

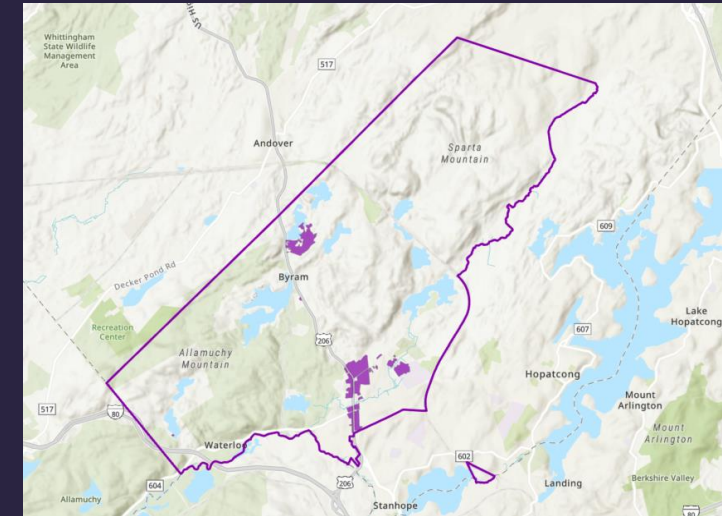
HABs have a higher chance of forming in systems with slow moving, warm, nutrient rich water and saline.

BEST MANAGEMENT PRACTICES

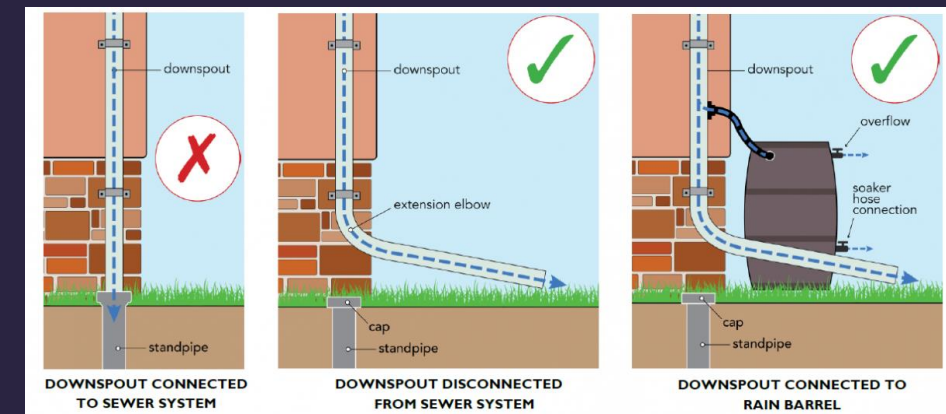
- Detached rain gutters
- Rain Gardens
- Bioswales/tree trenches/curb cuts
- Riparian buffers
- Rain barrels
- Pervious Pavement/strategic pavement placement
- Proper septic maintenance
- Operation and Maintenance Plans*



C: EPA



C: ArcGIS mapping



C: DC water

TREE/SHRUB PLANTING

[Recommended Species list](#)

[Web Soil Survey](#)

Prioritize species beneficial for wildlife, erosion control, and habitat restoration.

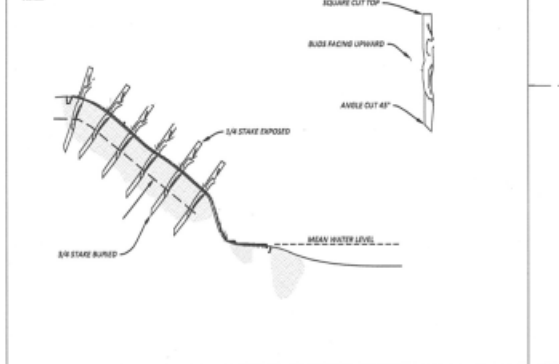
1. Planting Depth & Spacing
 1. Dig a hole twice the width of the root system but no deeper than the root collar.
 2. Avoid planting too deep—ensure root flare is visible above ground.
 3. Space trees and shrubs based on species size and growth habits (3-15 ft apart).
2. Water immediately after planting and regularly during first two years.
3. Install tree shelters, stakes, or fencing if needed (to prevent browsing or damage).
4. Control weeds and invasive species for 3-5 years.
5. Monitor growth and replace failed plants as needed.

Ideal live stake species: Black Willow, Red Osier Dogwood, or Silky Dogwood.

LIVE STAKING

1. Harvest Stakes
 1. Cut ½ to 1-inch diameter branches 1-3 ft long with Angle-cut bottom (45°), flat-cut top, and side branches removed.
2. Plant Stakes
 1. Drill a pilot hole if needed.
 2. Insert at 90° to bank, ensuring nodes are both above and below ground and space 1-3 ft apart in a zig-zag pattern.
3. Maintain & Monitor
 1. Keep in moist soil (avoid high placement).
 2. Expect ~50% survival, replant if needed.

Live stake installation details. Transport the live stakes to the planting area in a bucket of water or packed in moist straw, etc. to keep them from drying out while installing. Use a dibble, rebar or planting bar to make a pilot hole for the live stake. Push or carefully drive with a rubber mallet the live stake ¾ of the length of the live stake into the soil pointed end first. Tamp around the planting hole with your foot to compress soil around live stake. Cut off any damaged ends from installation process. Stakes should be spaced 3-10' on average for most applications, using a 2' long live stake.



Plan design: Watershed Consulting Associates, LLC

Vermont Bioengineering Manual

LET'S TALK NUMBERS

[RU Green Infrastructure Champions Program](#)

GI Practice	Recharge potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. Ft./second)	Estimated size (sq. Ft)	Estimated Cost
Rain barrel	0.036	6	1,000	0.08	1,000 (gal)	\$2,000
Rain garden	0.288	48	21,834	0.82	2,765	\$13,000
Pervious pavement	0.352	59	26,651	1.00	2,410	\$60,000

BETTER MANAGEMENT PRACTICES



- Require a change in expectations and perceptions:
 - "A native garden isn't beautiful and is considered unkept and messy"*
 - "A native garden blooms at different times of the year providing me with beautiful colors throughout the season all while providing me water quality benefits."*
 - "I have a bulkhead on my property, I don't need a riparian buffer to help filter stormwater runoff"*
 - "Having both a bulkhead and a riparian buffer will help not only reduce the risk of erosion to my property, but it will also help filter out pollutants from stormwater runoff!"*
 - "I think I have a septic system, but it hasn't caused an issue yet, so I'm not going to worry"*
 - "If I can spend a few hundred dollars every few years to regularly maintain my septic system then I can save myself thousands of dollars in septic repairs or replacement."*
 - "Removing boulders, trees and shrubs from my property, it will make it easier to maintain"*
 - "By keeping boulders, trees and shrubs on my property, I am keeping soils locked in place, since the slopes in my neighborhood pose a huge risk to erosion and potentially much larger investments to my property down the line to address the erosion issues"*
- Creation of a Watershed Improvement Plan under the MS4 requirements

QUESTIONS?

- Thank you!

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