

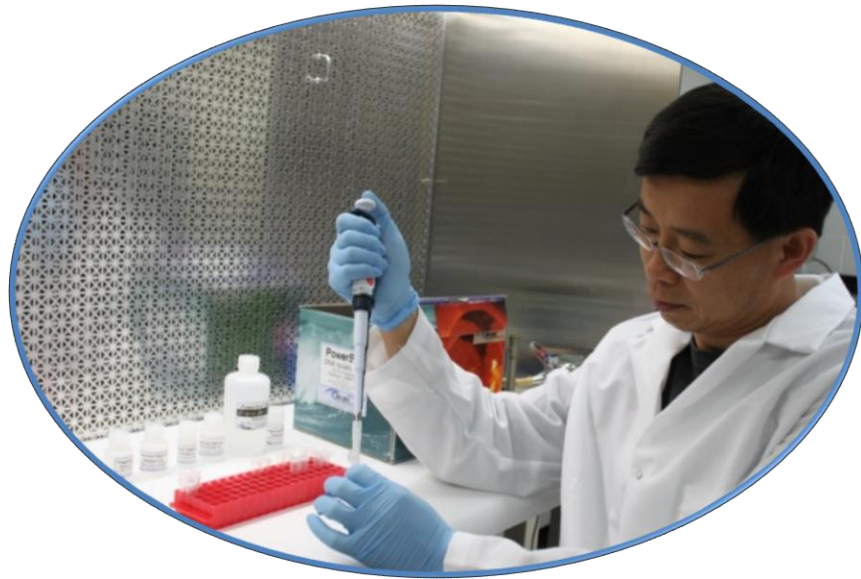


Building Healthy Riparian Buffers with Reliable Practices

Lamonte Garber
lgarber@stroudcenter.org

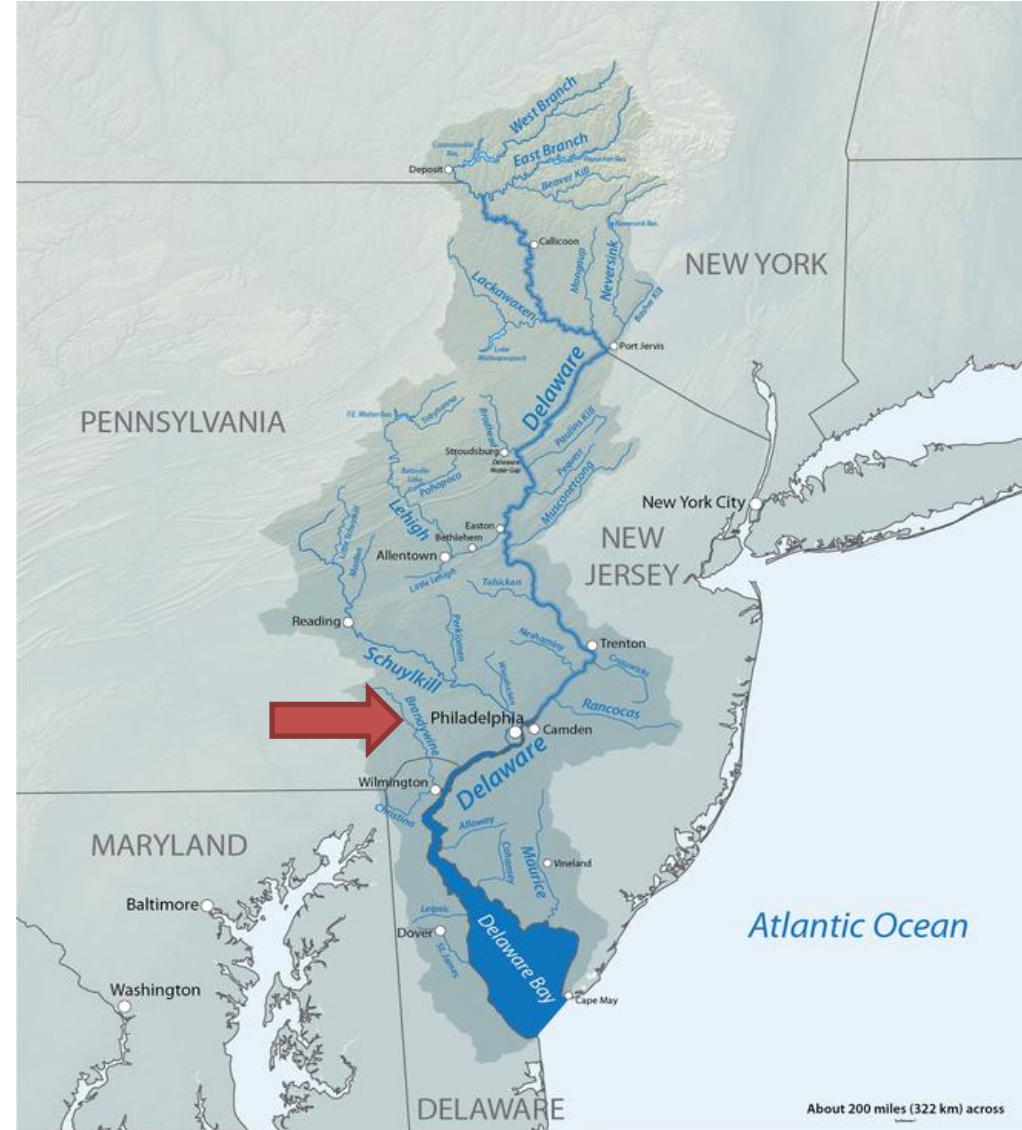
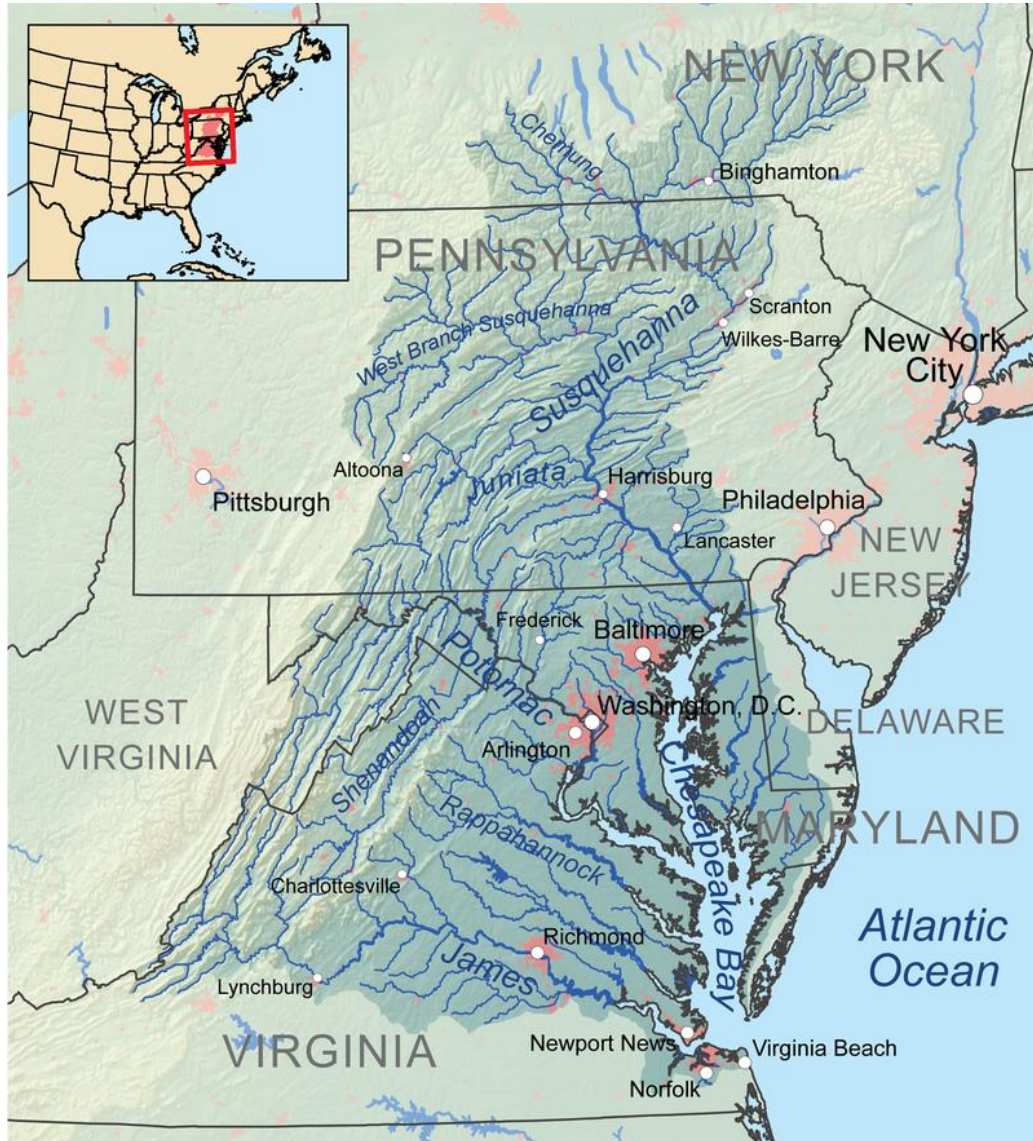
David Wise
dwise@stroudcenter.org

ADVANCING KNOWLEDGE & STEWARDSHIP OF FRESHWATER SYSTEMS THROUGH GLOBAL RESEARCH, EDUCATION, AND WATERSHED RESTORATION



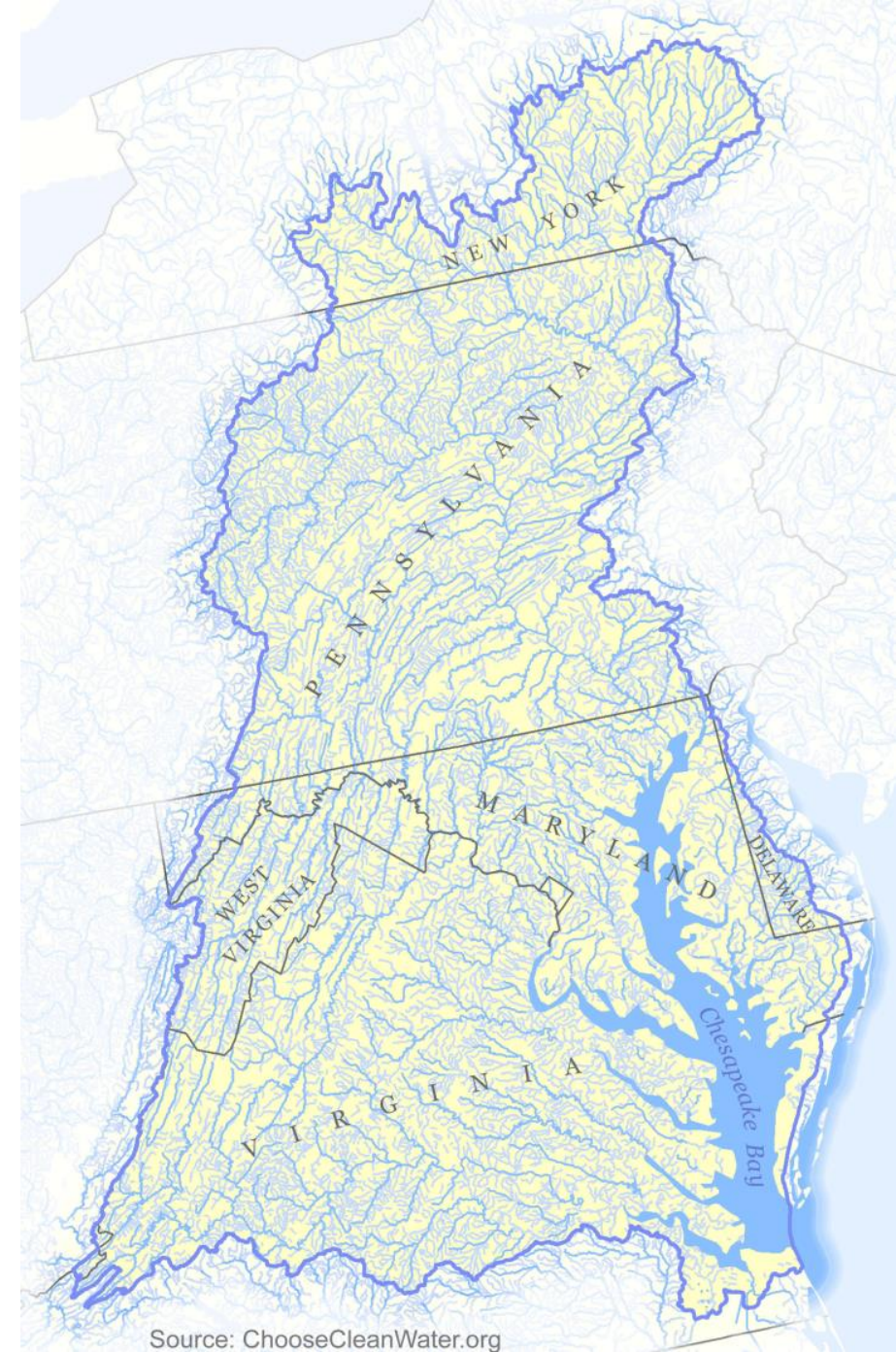
Est. 1967
Avondale, Pennsylvania
Independent 501(c)(3) non-profit

Stroud's Priority Watersheds for Restoration



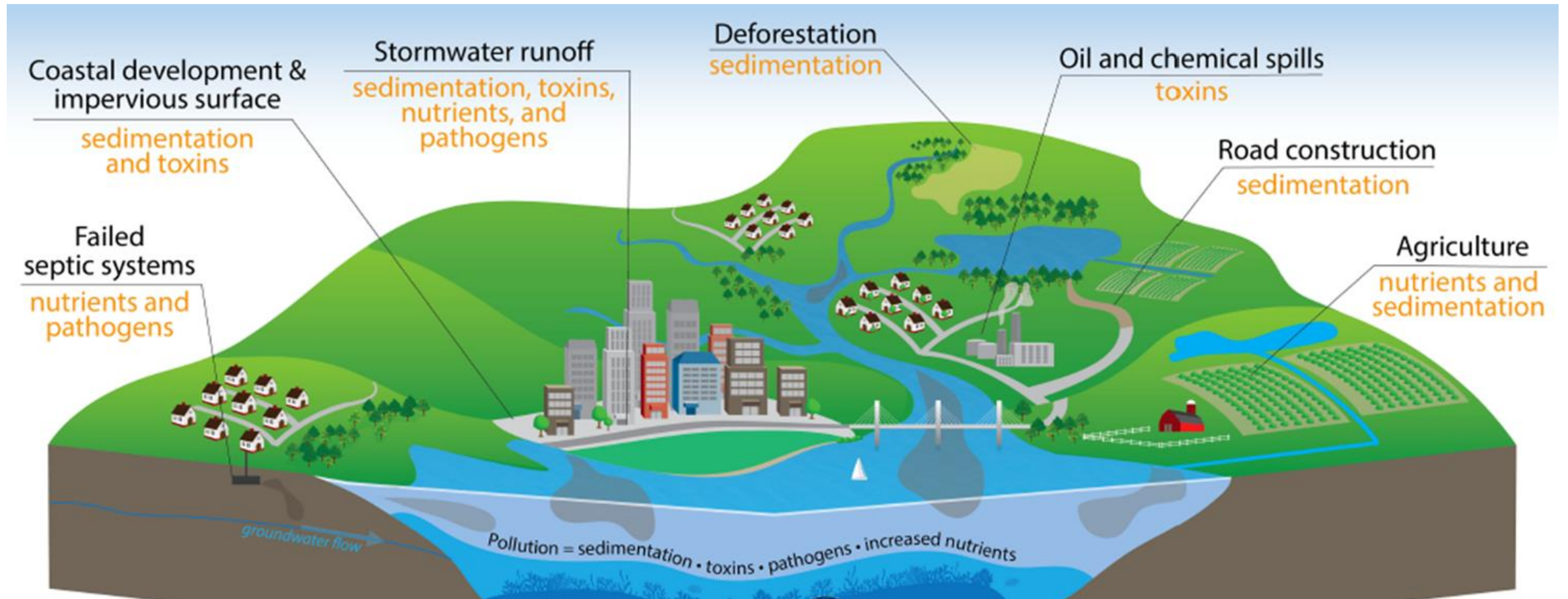
Healthier Streams: Key to Restoring Chesapeake Bay, Delaware Bay and the Gulf Of Mexico

We Need to Pursue Strategies that improve *both* local and downstream waterways simultaneously



Source: ChooseCleanWater.org

Pursue *Watershed* Restoration vs Stream (Channel) Restoration



NOAA 2017

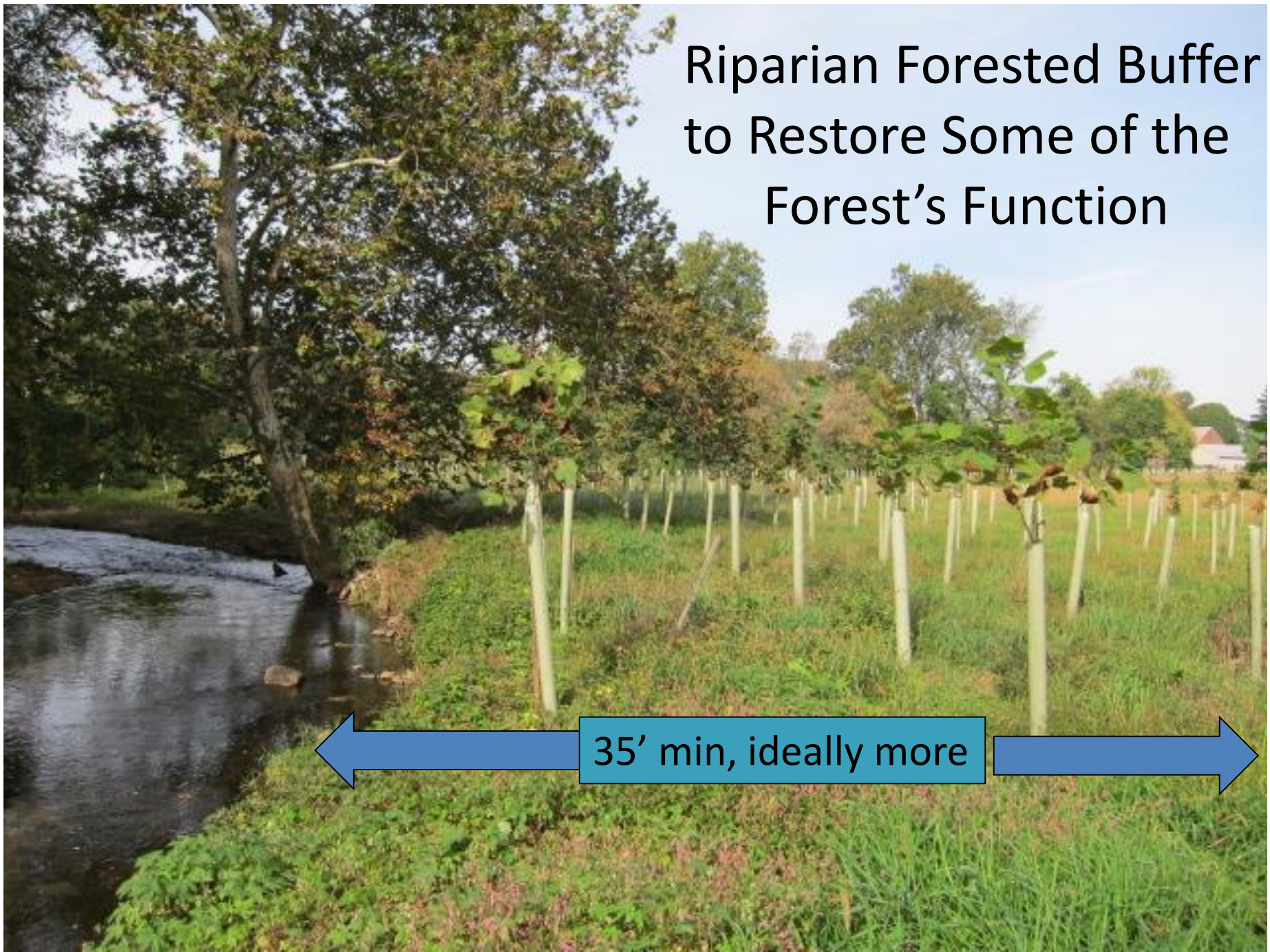




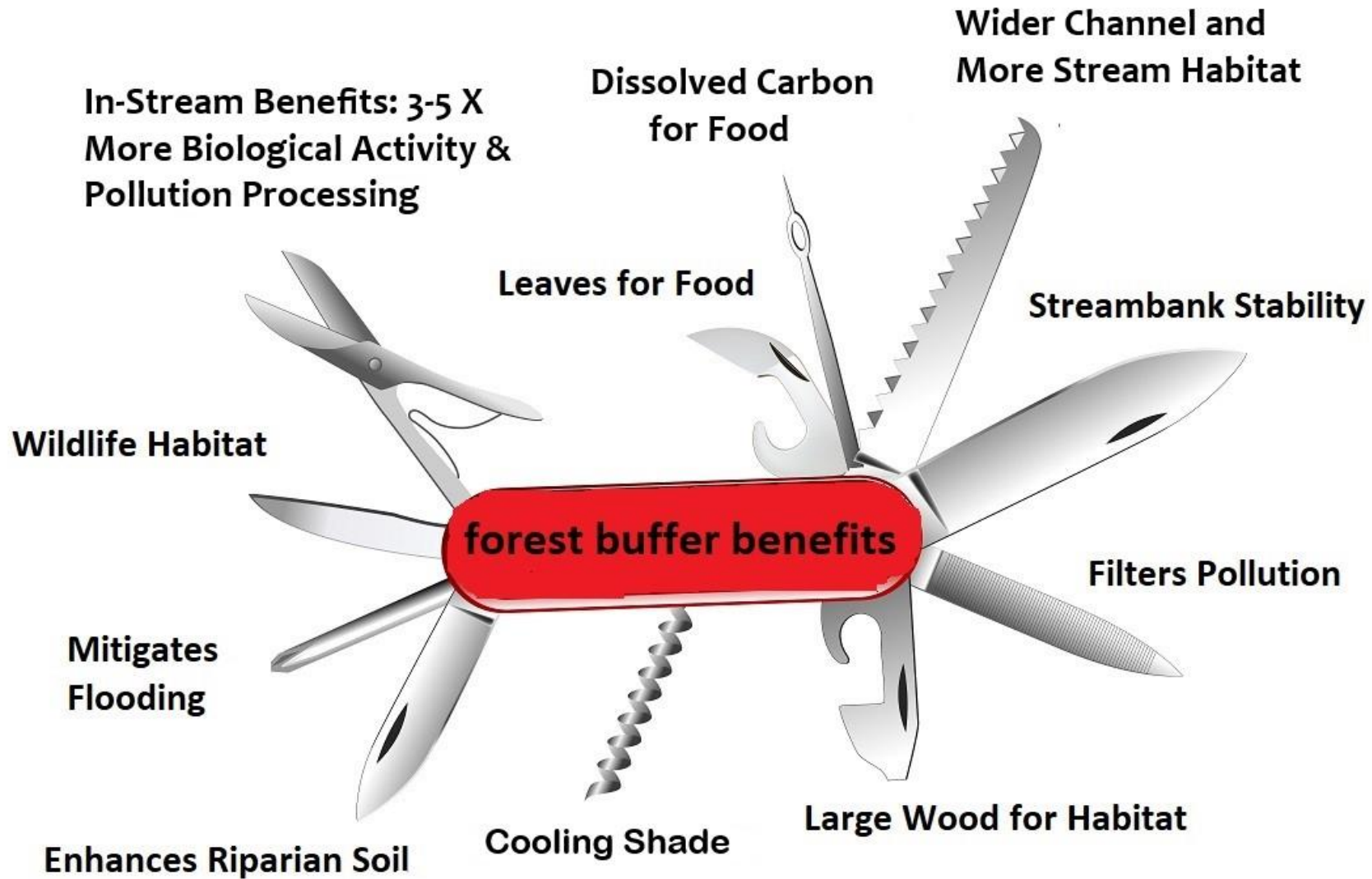
Trees: a fundamental tool for watershed restoration but not a silver bullet.

Without trees in uplands and floodplains, stream health will not recover, regardless of other actions

Riparian Forested Buffer to Restore Some of the Forest's Function



← 35' min, ideally more →



Original image used with permission from USDA-Sustainable Agriculture Research and Education Program



Bank Habitat And Stability

A photograph of a stream with woody debris. The stream is shallow and flows over a bed of rocks and fallen leaves. Several large, moss-covered logs and branches are scattered throughout the stream, creating a complex habitat structure. The surrounding forest floor is covered in fallen leaves and more woody debris.

In-Stream Habitat with Woody Debris

A photograph of a forest stream with a small waterfall. The water is clear and flows over rocks and fallen branches. The surrounding forest is lush with green moss and ferns. The text "In-Stream Habitat With Roots" is overlaid in the center of the image.

In-Stream Habitat
With Roots

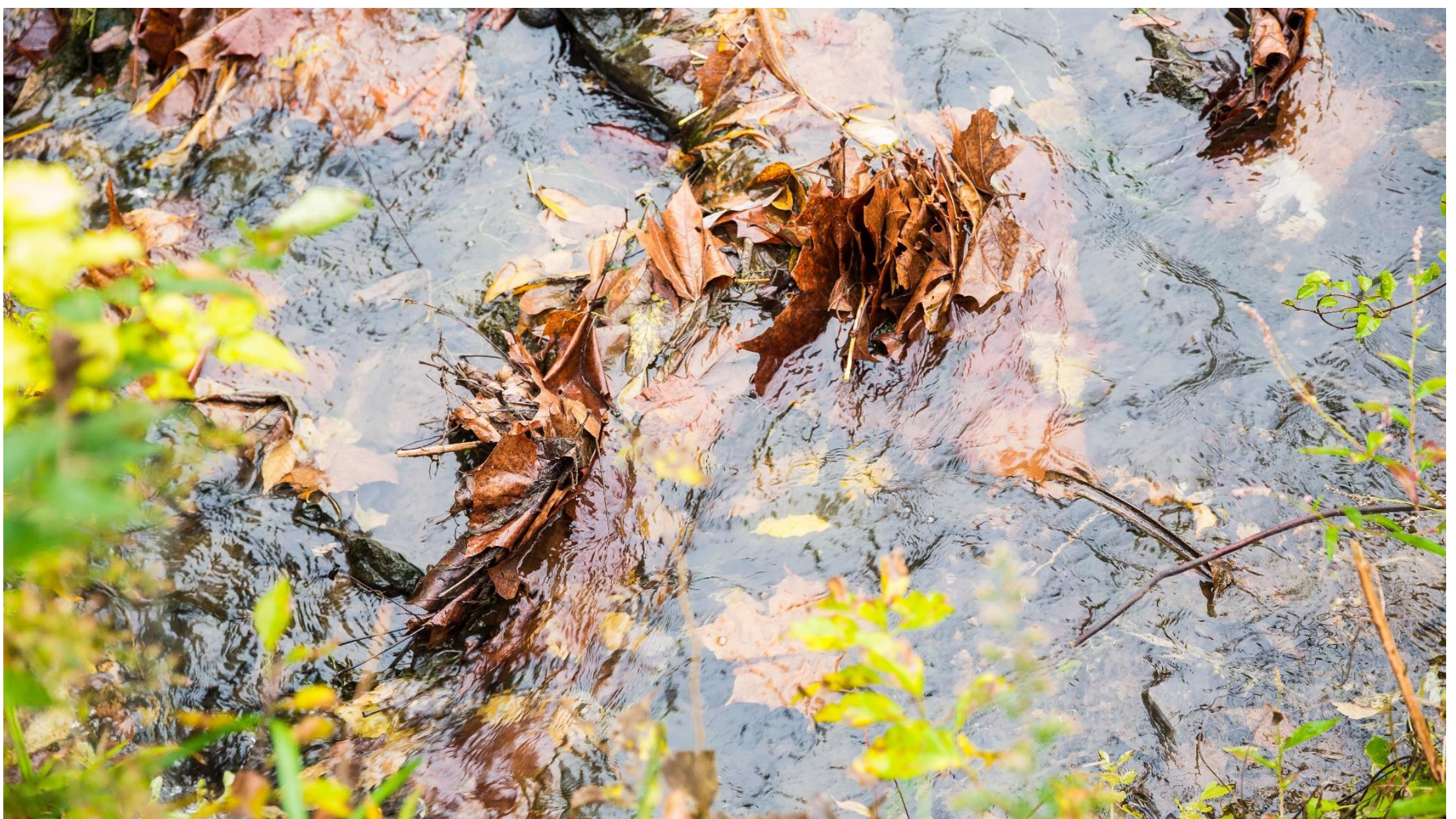


Photo:Ryan Matz Photography

Solid and Dissolved Carbon is Stream Food



More Habitat!

Forested areas: 2-3x wider than grassy areas

- 2-3x more habitat per length of stream
- More life, more ecological services

Same Stream,
Looking Other
Direction!

Grass Starves and Constricts Small Streams

Same stream, several hundred yards apart



Why Trees & Shrubs for Streams?

- Shade for cooler water
- Roots to filter runoff & stabilize banks
- Wider, shallower streams w/ better habitat
- Large woody debris for in-stream habitat
- Dissolved carbon (stream food)
- Solid carbon – leaves & twigs (stream food)

How to efficiently/reliably restore riparian forests?



How to plant a site like this and have robust tree growth NOT a weed patch?

Chester County Site, 2016



Rows Sized to Mower Deck, in Grid Pattern



Chester County, PA
Site, 2018



Chester County Site, 2021

Stroud's Typical* Methods for Riparian Buffer Establishment

With thanks to many dedicated peers, co-workers and landowners.

* Some methods under review, may shift



Stroud has 40
Years of
Riparian Forest
Insights

Research, Trial
and Error, Help
by Colleagues



There are many fine ways to plant



Have a strategy to address 5 years of “*threats*”
Plant with maintenance in mind



GREEN DEATH



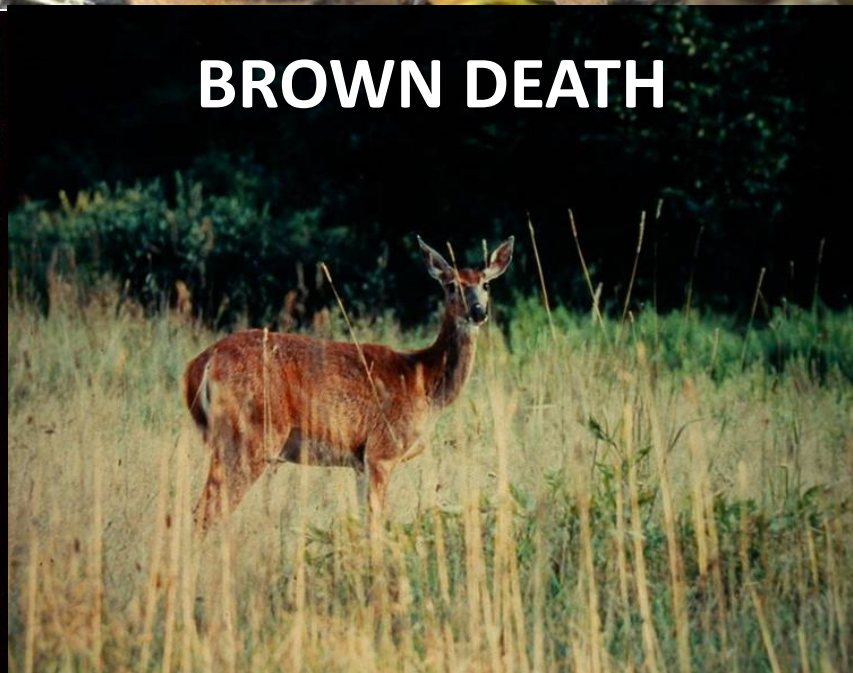
Joe Kosack/PGC Photo



FLOODS



BROWN DEATH



NEGLECT



WHAT THREATS?



Our Context for Buffers

- SE PA farms
- pastures, cropland
- many invasive plants
- deer and rodents
- rich soils, fast growth
- “neat look” expected



We use more container seedlings than bare root stock:

- Longer planting window
 - Easier to plant properly
 - More rapid take off
-
- Plants are only 20% of project cost
 - 125-200 stems/ac
 - 15' x 15' ft spacing typical

5' Tree Shelters Drive the System

- Help us find and protect trees
- Early and long term protection
- Use brands with track record
- Center-hole nets for birds, trees



This ^

Not

< That

STROUD
WATER RESEARCH CENTER

Tree shelters aren't the only means of protecting trees from deer, but shelters are a widely adaptable, replicable technique



One of Stroud's double fence trials, 2011

Key Step: 1. Pick the right plants for the site

Our “go-to
workhorses”
for SE PA

TREES

- Sycamore
- Black Willow
- River Birch
- Swamp White Oak
- Pin Oak
- Black Gum
- Red Maple
- Silver Maple
- Hackberry
- Tulip Poplar
- Basswood/Linden
- Willow Oak
- Sweet Gum

Many Others!

SHRUBS/SMALL TREES

- Red/Silky/Gray
- Dogwood
- Arrowwood
- Black, Red
- Chokeberry
- Serviceberry
- American Plum
- Redbud
- Hornbeam
- Elderberry
- Alders
- Ninebark
- Shrub willows

For this list and other info: <https://stroudcenter.org/restoration/resources>

2. “Clean Culture” (orchards, tree farms) for first 3-5 years

Typically achieved by mowing
and 3’ diameter spot with
herbicide (aquatics-approved
form of glyphosate)



Stone mulch is becoming Stroud's standard method (with more learning yet to be done)



Typical Maint. Schedule in SE PA

Using of 3' Herbicide Spots (vs. stone)

Late Feb/Early March:

- Fix tubes/stakes/nets
- If invasive plants are an issue:
Sprinkle pre-emergence
herbicide (ex. Snapshot™)
INSIDE shelters
- Cost: ~\$80/acre (mostly labor)

Late April: Spray 3' herbicide spots

- Want grass active, conveniently short
- Remove nets if tree is <10" of top of shelter
- Cost: \$120/acre by contractor

Early May:

- First mowing – can be ‘high’
- Done *after* herbicide application

- Cost: Often by landowner
(~\$150/ac if contractor must mobilize)

Late May/Early June:

For sites with invasive plants pressure:

- 2nd dose of Snapshot™ (easy after mowing)
- Or lift tubes, weed by hand
- Cost: \$80/ac

July/August:

- 2nd mowing: mow *first*, then...
- 2nd applic of 3' herbic. spot (needed?)
- Stakes, shelters, nets
- Check mortality for possible replant in spring

In a really wet year, may need another mowing in July/August

Late fall:

- final mowing (especially if voles)
- final stake, shelter, net check

- Restart schedule in late winter through year 3 *at least*

The Shrub “Dilemma”

- Great for Diversity
- Great for Pollinators

But how to protect??





Shrubs in 5 ft Shelters?



Tree Form
Shrubs Are
Well Adapted
to 5 ft
Shelters



Multi-Stem Shrubs
Can Work in Shelters
with Management

Final Thought: Leave those tree shelters on!
Protect from buck rub until trees reach 4" caliper



Buck Rub Damage After 1
Week of Removing Shelter



Thank you!

Lamonte Garber
lgarber@stroudcenter.org

David Wise
dwise@stroudcenter.org

