No Mow, Let it Grow!

The Need for Vegetated Stormwater Protection in Columbia County

Brittney Hartzell, Watershed Specialist

Kendra Craig, Ag Resource Conservationist/DGLVR Specialist

COLUMBIA COUNTY CONSERVATION DISTRICT

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Today's Agenda

- 'No Mow Zones'/Reduced Mowing
- Riparian Buffers
- Cover Crops
- CREP program
- Q & A
- Hand out 'No Mow Zone' yard signs

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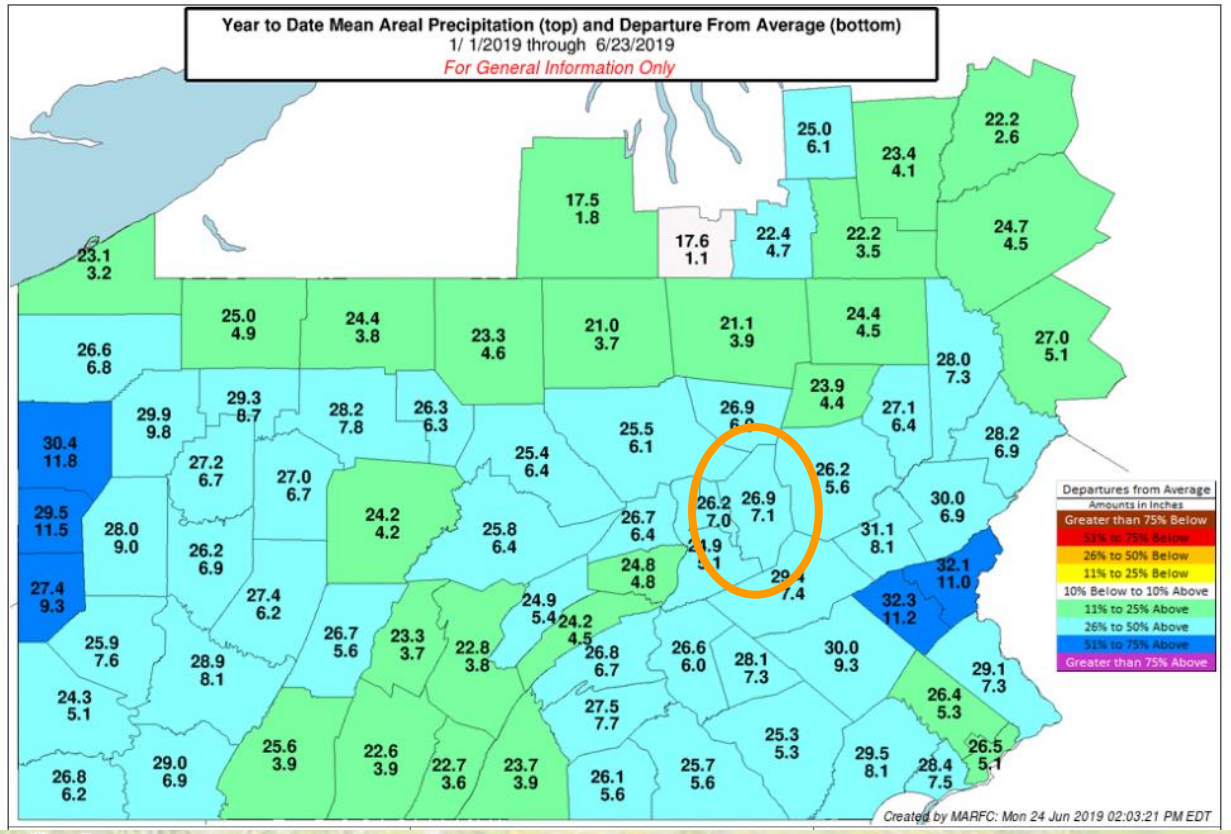
Need for Stormwater Control

- Annual Rainfall:(Columbia County)
  - Historical annual average- **44”**
  - 2018- **61”**
  - 2019- **26.9” SO FAR (19.4” this time last year..)**
- Need for stormwater control to prevent flooding/flash flooding, NPS pollution, major erosion and landscape change, debri deposits, etc.
- **“Everyone lives downstream”**
- Increased rainfall + land use are largely part of the problem



NATIONAL WEATHER SERVICE

www.weather.gov/marfc/Precipitation_Departures

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Why is the Conservation District concerned?

***PLEASE NOTE**:
"Flash Flooding" is different than "Flooding"





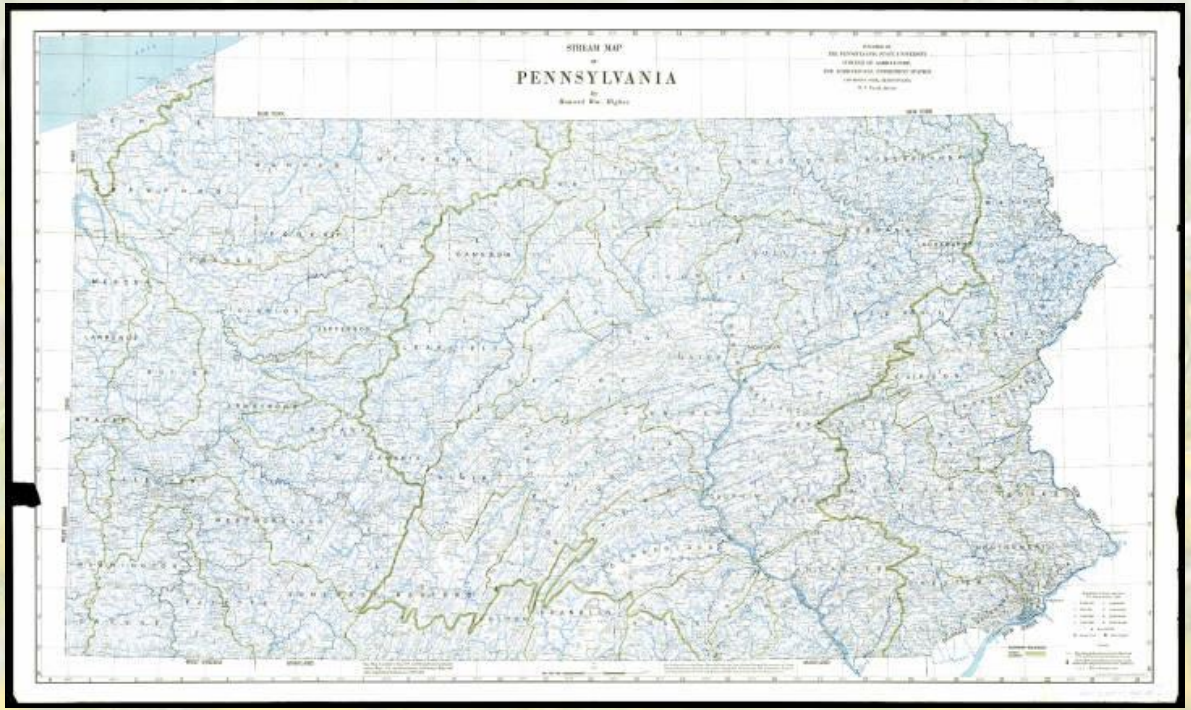





Pennsylvania Streams

- **85,000 miles** of streams in PA (2nd only to Alaska!)
- Over **18,000 miles** of streams are impaired (over **20%**)
- The USDA Forest Service estimates that over **30%** of rivers and streams in PA have had their riparian buffers degraded, removed, or altered due to development

Every BLUE line on this map represents a stream or river in Pennsylvania (the yellow line indicates watershed boundary)



What does this tell us?

*Having **plants** established along streams SIGNIFICANTLY reduces stormwater runoff, pollution in streams, erosion + many more benefits for fish and wildlife!*

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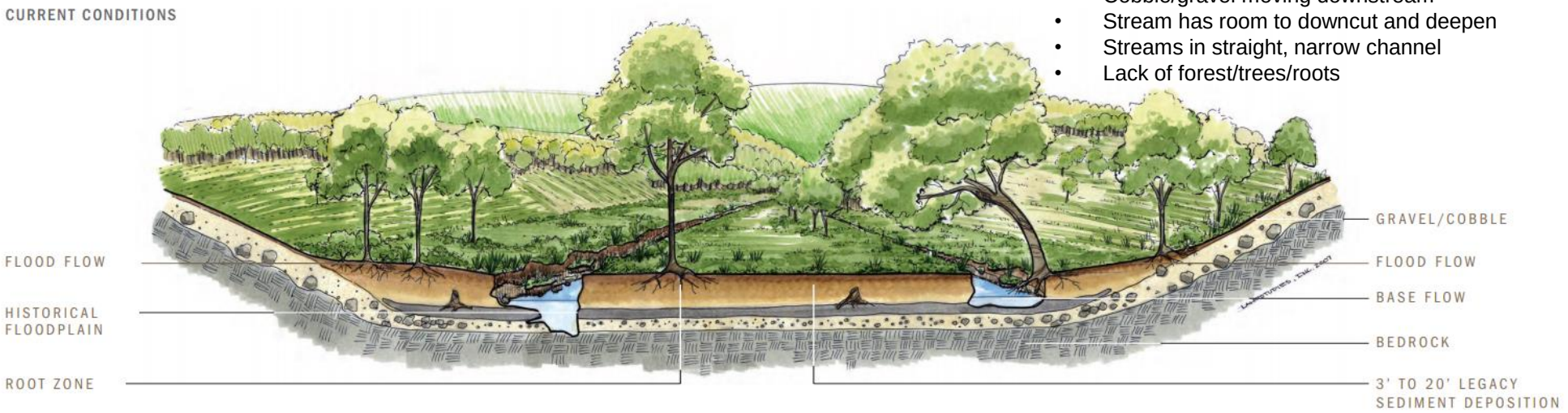
Pennsylvania's Landscape Over Time

What changed?

- 3-20' fine sediment buildup from mills form new stream banks, easily eroded
- Raised and developed floodplain
- Tree roots not stable in soil, cannot reach cobbles
- Cobble/gravel moving downstream
- Stream has room to downcut and deepen
- Streams in straight, narrow channel
- Lack of forest/trees/roots



3 major changes during settlement in late 1600's:

1. Timber harvesting
2. Clearing land for agriculture
3. Mill dam construction on streams

In 1840, Columbia County *alone* had 130 water-powered mills according to census data.

In 1895, PA had 9 million forested acres; just 30% of the acreage forested before Europeans arrived. (Today it's ~60%)

For more information about historical land use and changes, check out the LandStudies "Floodplain Restoration" publication: landstudies.com/floodplain-restoration/

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Permeable/Pervious Surfaces

- Surfaces that allow water to percolate into the soil to filter out pollutants and recharge the water table
  - i.e. floodplains, grassy or forested areas, raingardens, wetlands, etc.
- **Impervious surfaces** are solid surfaces that don't allow water to be absorbed, forcing it to runoff
  - i.e. roads, roof tops, turf grass, sidewalks, paved driveways, parking lots, tilled cropland, etc.

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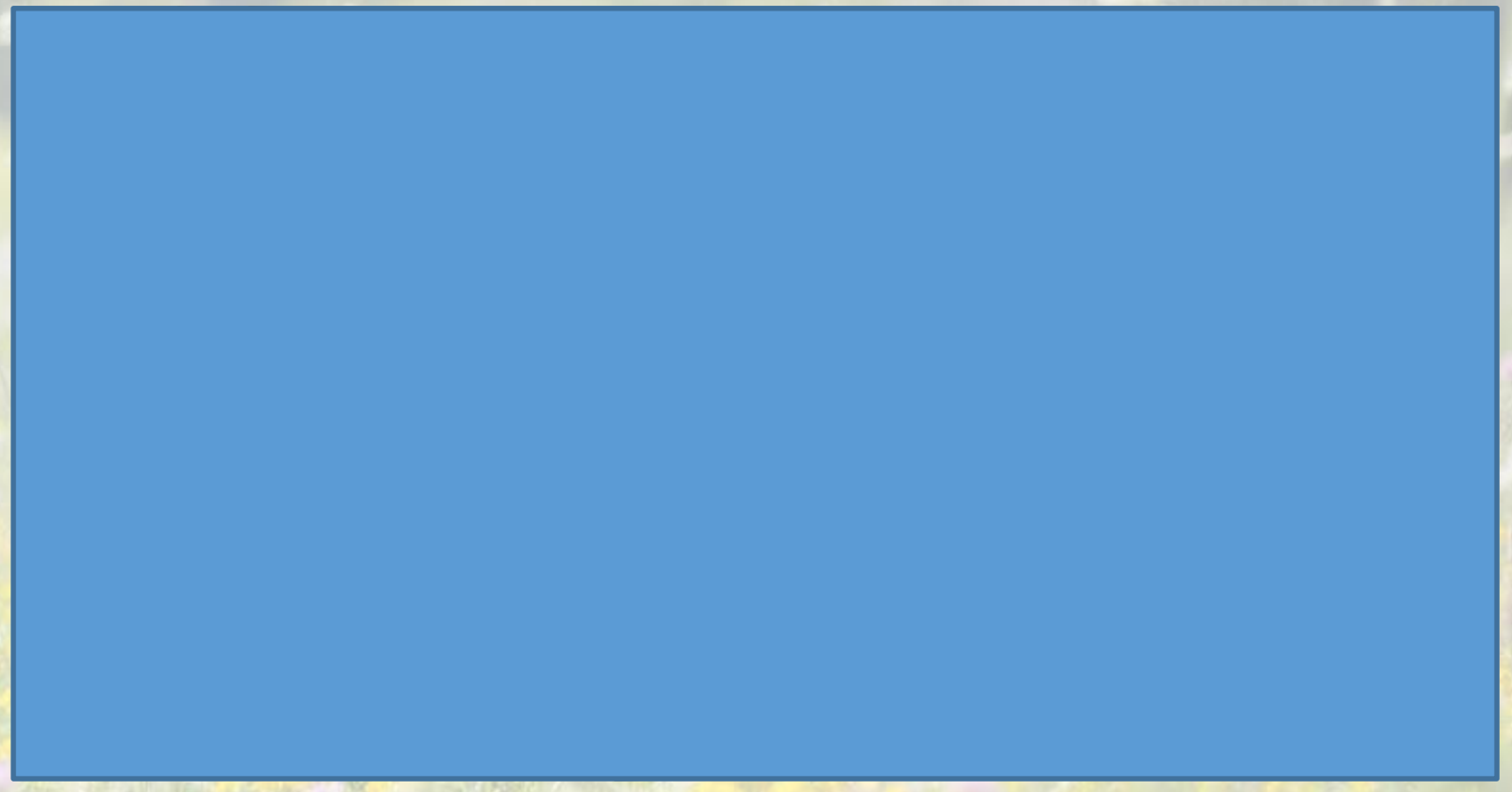


What can we do as landowners in Columbia County to help?

SLOW IT DOWN,

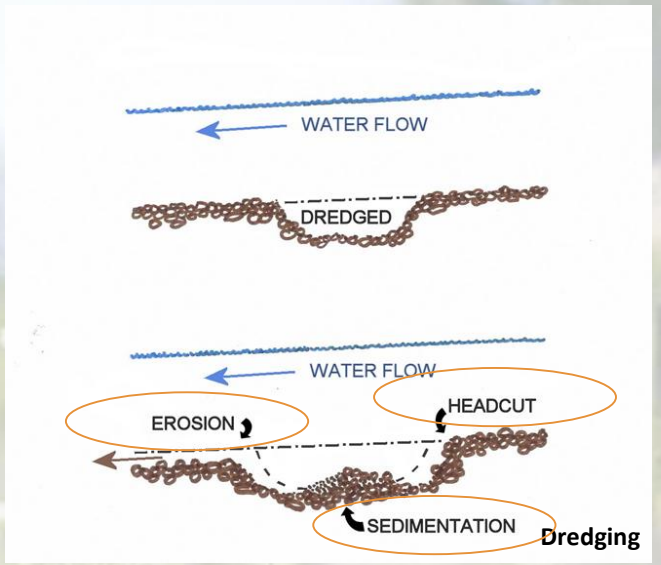
SPREAD IT OUT,

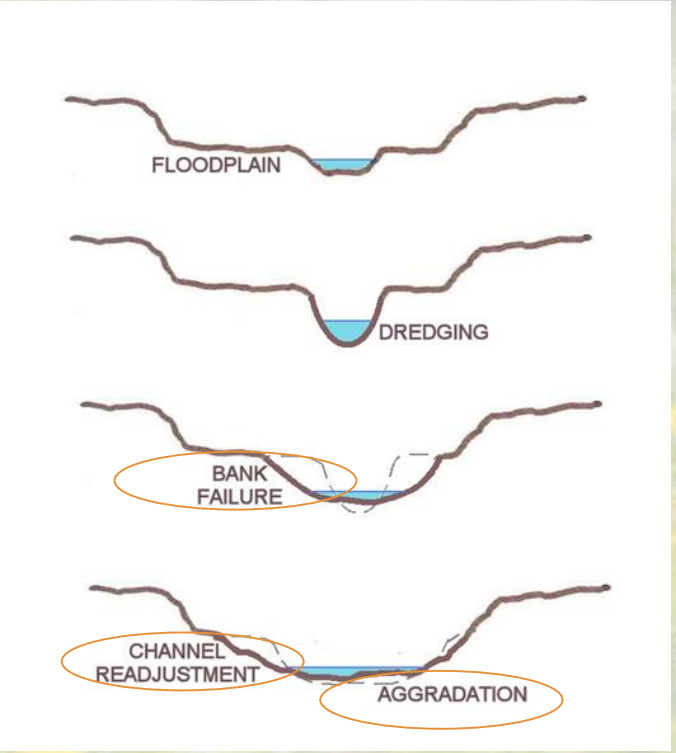
SOAK IT IN!

- Establish “No Mow Zones” at homes and businesses
- Plant riparian buffers along streams
- Use cover crops and no-till practices on farms
- Encourage forest cover and smart land-development in our communities
- Set aside floodplain for streams to spread out on

Why Not Dredge? (a really brief overview)

- **Deeper + Steeper = Faster = More energy**
- **Streams are DYNAMIC** systems- always seeking an **"equilibrium"**
- Dredging may actually increase flood damage!
  - Some of the problems we see today are a result of past disturbances of stream channels by humans
- Floodplains, meanders, and riffle-pool sequences are **natural features that manage the stream's energy**
  - Disrupting these features disrupts the system's balance and causes the stream to react





“No Mow Zone” vs. “Riparian Buffer”

- No Mowing/Reduced Mowing/Minimal Mowing
  - **Encouraging grasses, wildflowers** in open spaces or areas of concentrated flow (i.e. road ditches, swales)
- Riparian Buffers
  - Riparian= streamside
  - **Encouraging trees and shrubs** in addition to grasses, wildflowers, **along streamsides**

Unused land


Along roadsides


Along large streams and rivers


Along small streams


Backyard Landscaping

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No Mow Zones

The American Lawn

A 2012 study from NOAA & NASA scientists estimated a total of **63,248 sq. miles of "lawn"** in America

— **about the size of Texas!**

(That's a lot of extra runoff!)

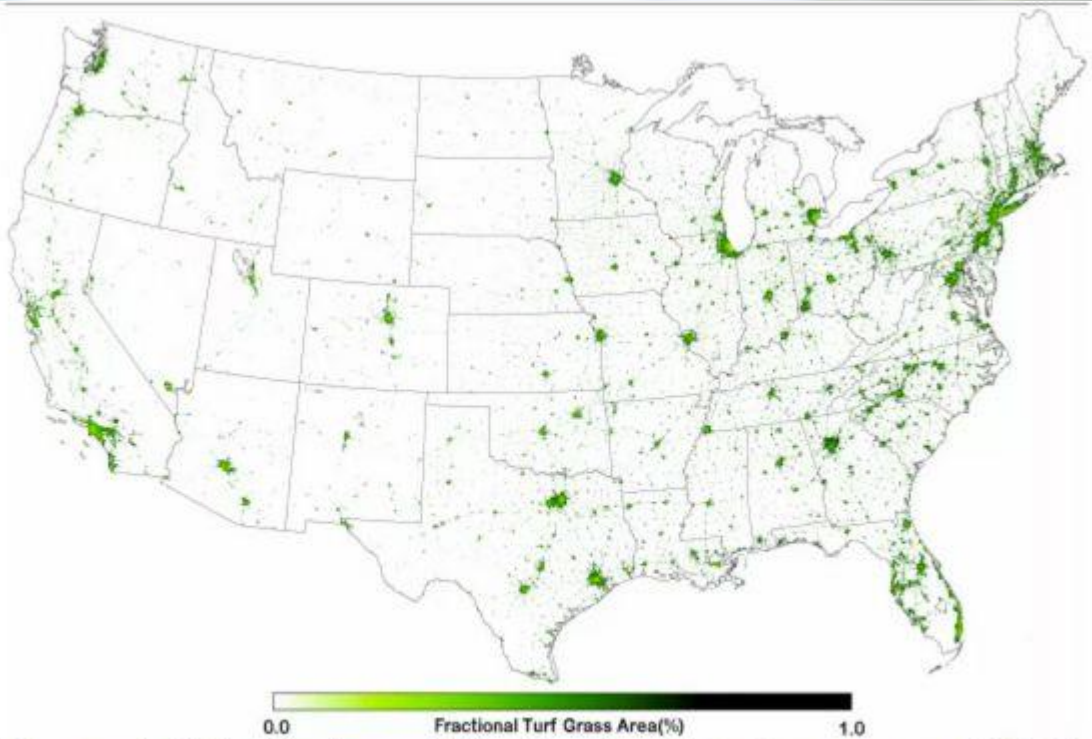

Figure 1. Distribution of the fractional turf grass area (%) in the conterminous U.S.

"Maintaining a well-manicured lawn uses up to 900 liters of water per person per day and reduces sequestration effectiveness by up to 35 percent by adding emissions from fertilization and the operation of mowing equipment."

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History of the American Lawn

- **First New England colonists** found mostly annuals- like broomstraw, wild rye, and marsh grass
  - Had a lower nutritional value than the grasses of northwest Europe for their cattle, sheep and goats
- **17th century**- imported European grasses and clovers + "weeds" such as dandelions and plantains
  - Invasive grasses quickly spread across U.S.
- **18th century**- the use of green, expansive spaces began to appear in landscape design for the wealthy in France and England
  - Previously used "English Garden" style
- **Thomas Jefferson**, who was among the few to see these changes firsthand, was greatly impressed by the large swaths of green turf that were common to English country estates and tried to emulate this style at Monticello
- **Lawns became a sign of wealth in America**- the lower class devoted yards to woodlots, veggies/herbs, grazing land for livestock
- **1876 World's Fair**- USDA display focusing on how to start new lawns, brought idea to the masses
- **Rise of the American suburbs and "middle class"** in the mid-19th century
- **Invention of pesticides, fertilizers, sprinklers, lawn mowers for lawn care**
- **Today- turf grass is America's #1 irrigated crop**
  - **an area 3x bigger than the American corn crop!**

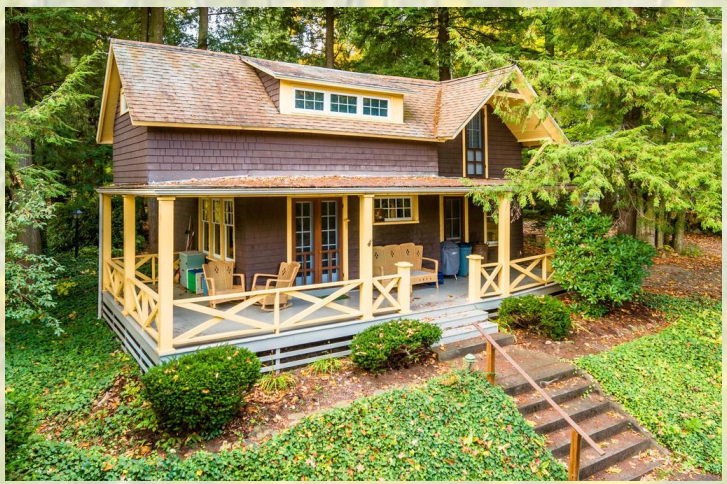
The ‘American Lawn’ isn’t the only option!

Homestead

English Garden style

American Lawn style

Forested

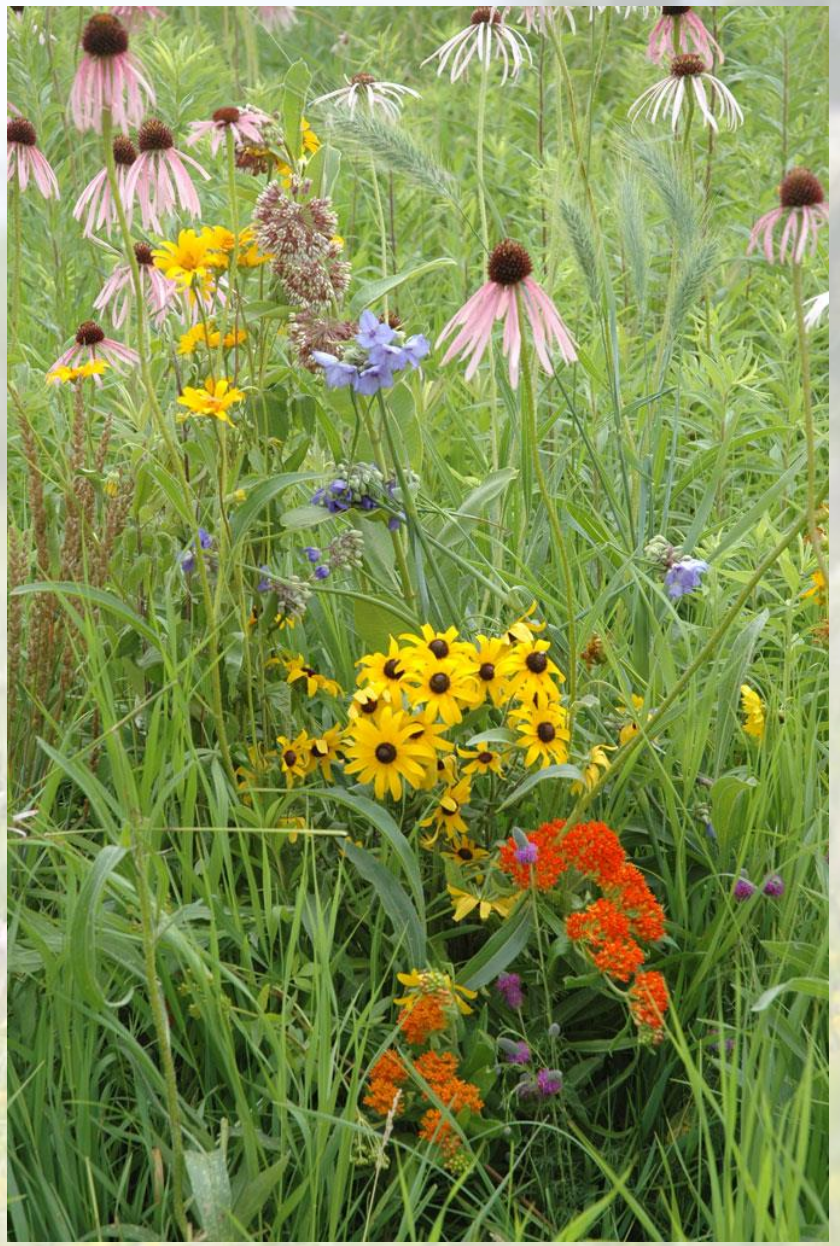


No Mow Zones

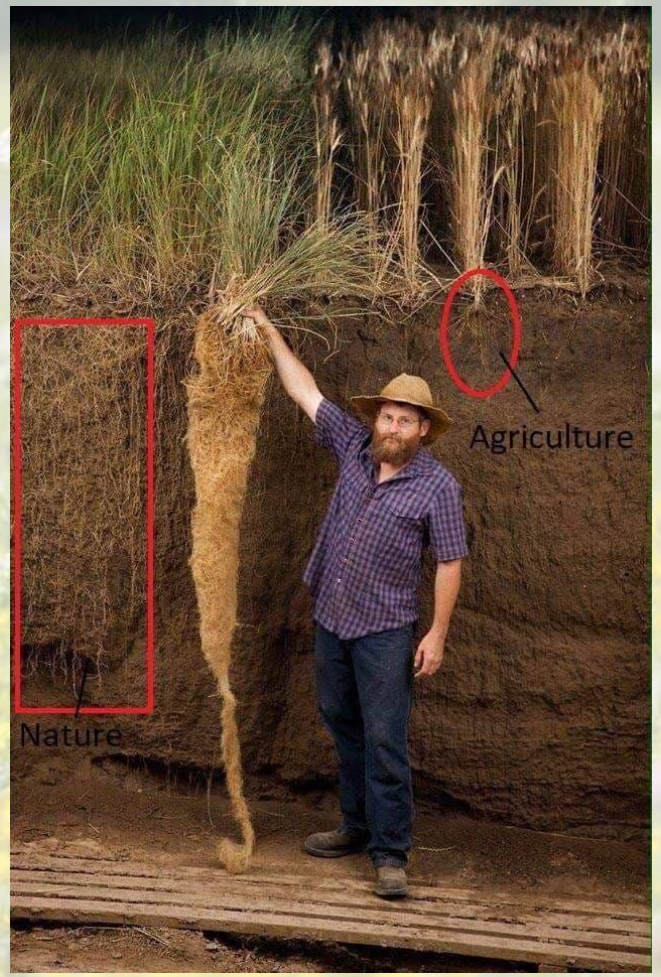
Reduced Mowing

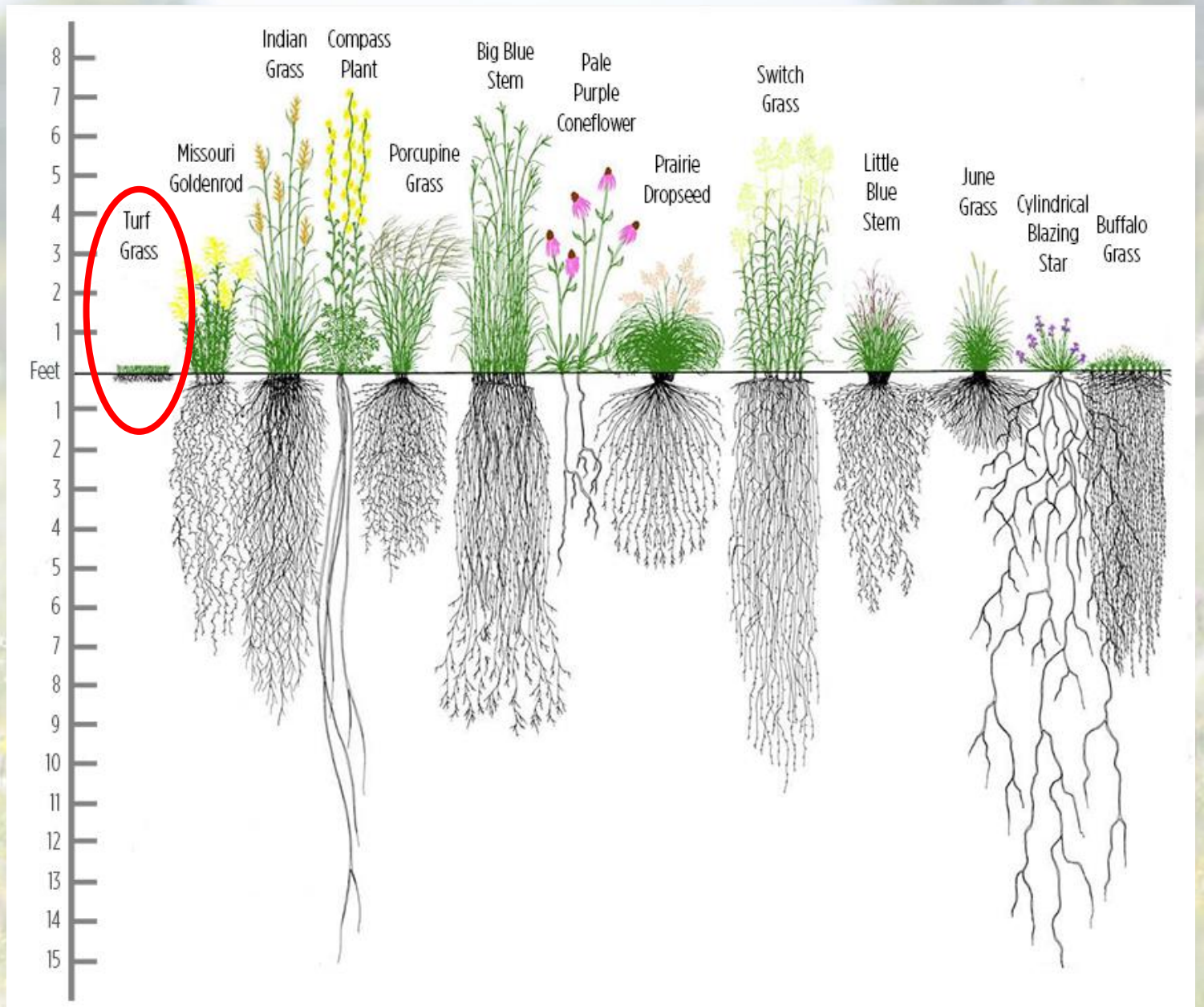
How Plants Help

- Act as a natural **sponge**
- **Slows the flow** of stormwater, allowing more time for soil and roots to **absorb excess water**, preventing it from entering nearby streams
- **Spreads** water, preventing flow channelization
- Roots **hold soil** in place, preventing excess erosion
- **Filter** out metals, nutrients, and other chemicals from runoff via plant uptake
- Provide **habitat** and **food** for wildlife
- **Cooling effect** for soil, air, and water
- **Sequester Co2** from atmosphere
- **Native plants** especially reduce need for fertilizer/pesticides; benefit native wildlife; are non-invasive

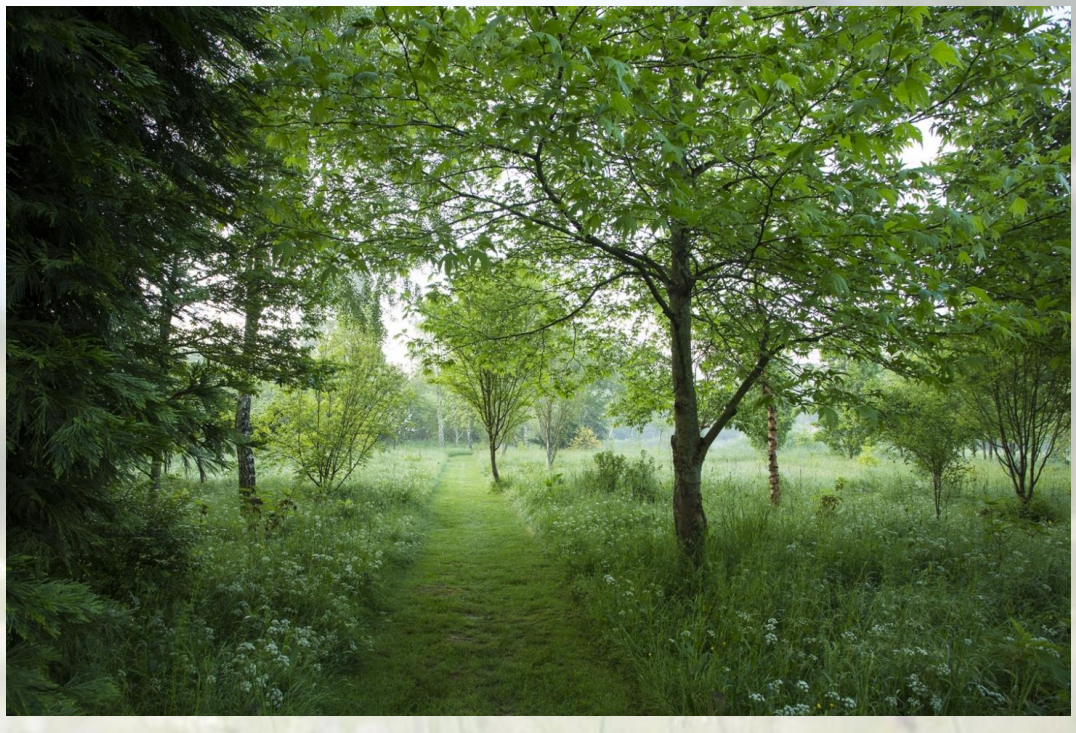


Native vs. Non-native Grasses





TREES!



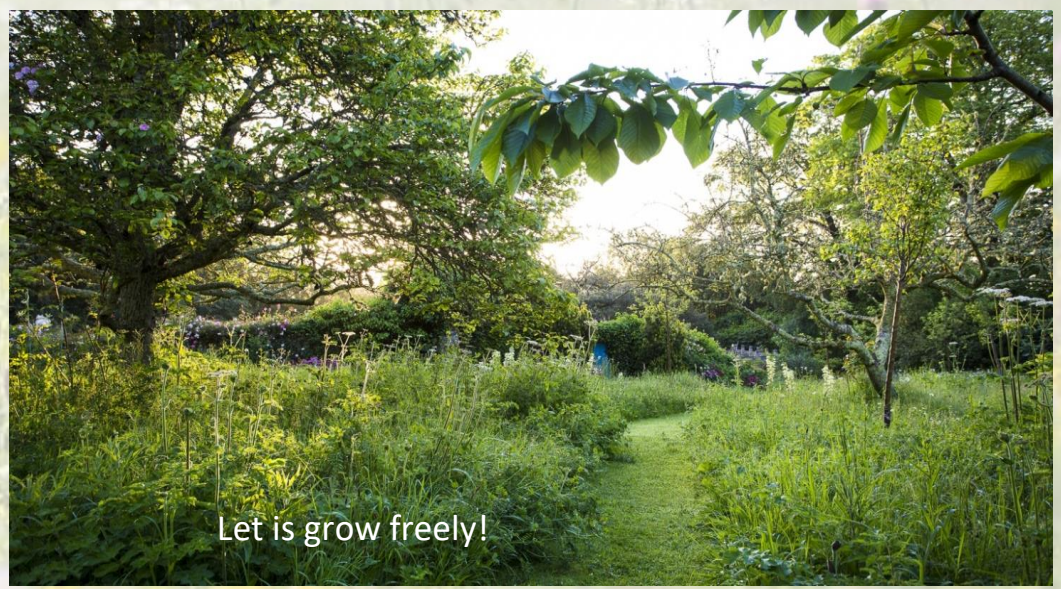
- Reduction in air temperature by blocking sunlight
- Water evaporating from leaf surface removes heat energy from the air.
- Shade reduces surface heat – a natural air conditioner.
- Evergreen trees can reduce wind speeds – reduce heat loss from a home.
- Trees absorb and block noise and reduce glare.
- Trees help settle out, trap dust, pollen and smoke in the air.
- Trees absorb carbon dioxide and potentially harmful gasses (sulfur dioxide , carbon monoxide).
- Fallen (decaying) leaves provide nutrients, reduce soil temperature and soil moisture loss.
- Trees create an ecosystem – providing habitat and food for birds and animals.
- Tree canopy reduce water temperature in streams, ponds to enhance aquatic life and improve water quality
- ...THE LIST GOES ON!!

- 1 **Deciduous** tree can intercept **700-1,000 gallons** of rain water annually
- 1 **Evergreen** tree can intercept **>4,000 gallons** of rain water annually
- Average of **60% of rainfall in PA forests is taken up by trees** and transpired back into the atmosphere
  - When a forest is removed or harvested, evaporation declines while a stream receives additional water each year
  - The ever increasing conversion of forests to lawns and impervious surfaces (buildings, roads, and parking lots) continues to cause stream bank erosion and flooding that causes millions of dollars in damages
- In one study, **a single maple growing roadside removed 60 mg of cadmium, 140 mg of chromium, 820 mg of nickel, and 5200 mg of lead in a single growing season**- storing those pollutants in their wood.

How does a “No Mow Zone” work?

1. Set aside an area of unused land
2. Identify and address invasive species (if any)*
3. Establish and encourage new plants
4. Let them grow!
5. Reduce mowing frequency
   -Never mow below violets, clover, or under 3”!
   -Mow once every 2 weeks= good for pollinators
   -Mow 2-3x/year= good for habitat, prevents tree and shrub growth
   -Either frequency will help improve stormwater retention

A healthy lawn with a diverse array of plants will **absorb water** better and faster, **slow stormwater** runoff from entering streams, reduce and **filter NPS pollutants** in water supply, **attract pollinators** & **build soil**



Urban/Suburban Yards

- Limited by township ordinances
- **TALK TO TOWNSHIP/BOROUGH TO SEE WHAT YOU CAN & CANNOT DO**
- Example:
  - Town of Bloomsburg
  - 6” or higher is in violation
  - Set your mower to max. height allowable
    - White Dutch Clover grows up to 5-8”
    - Meadow Villet grows 4-6”
    - Dandelion grows 2-10”
  - Set aside a pollinator garden area; Raingarden
  - Plant groundcovers, florals, shrubs, trees

Where do I get the plants?

Let those "weeds" grow!

The free and easiest option

OR

Speed up the process/Encourage more diversity/Establish "native" species by purchasing:

- Native wildflower seed mixes Ernst Seeds
- Native grass seed mixes Ernst Seeds
- "No mow" lawn seed ($) Prairie Moon Nursery
- Plant trees & shrubs CCCD annual plant and tree sale

Where can I put a “No Mow Zone”?

✦In unused open spaces ✦Along roadsides ✦Along streams ✦Along swales, ditches

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Reduced Mowing for Pollinators

Pollinators are required to produce **1 out of every 3** bites of food we eat & produce ½ of the world's oils, fibers and raw materials!

2017 USDA study found that lawns cut every **2 weeks** **supported 30% more bees** than lawns cut weekly:

- More abundant floral resources (compared with weekly-cut yards)
- Easier access to lawn flowers due to shorter grass (compared with 3-week cut yards)

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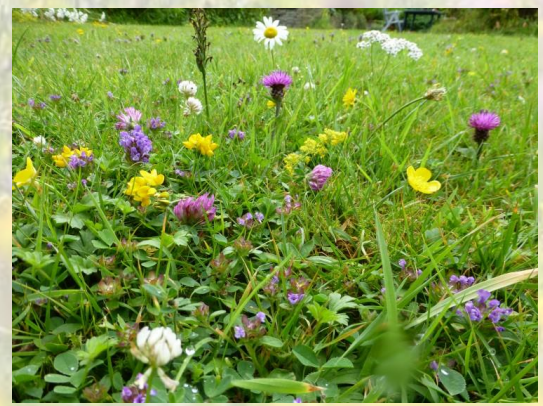
What about wildlife, mosquitos, aesthetics?

- **Wildlife**
  - Attracts beneficial insects, songbirds, terrestrial turtles, etc.
  - *May* come across other unwanted animals
- **Mosquitos**
  - Primarily breed in stagnant, “organic” freshwater
    - Fill in ruts & don’t mow when soil is wet to prevent ruts w/ lawn clippings
    - Well established plants will absorb excess water; less likely to create pools
  - A diverse ecosystem encourages beneficial insects and predators
    - A single dragonfly can eat 30 to 100 mosquitoes per day!
- **Aesthetics**
  - Encouraging perennial, native wildflowers ensures year-round blooming and colors



Working with neighbors and municipalities

- Talk to your local municipal office about your plans
- Talk with you neighbors and encourage them to participate
  - Connect “no mow zones” between yards, neighborhood
- Certificate Programs
  - National Wildlife Federation Certified Wildlife Habitat®
  - Penn State Extension Pollinator Garden Certification
  - Xerces Society Pollinator Protection Pledge

Put up a sign!! (take one home today!)

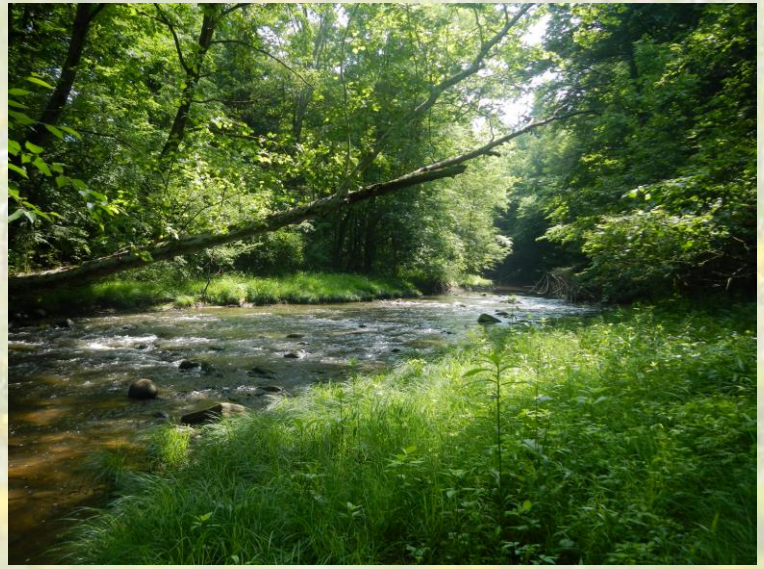
Riparian Buffers

Does this look “stable”?

Nope →

← Closer

Much better →

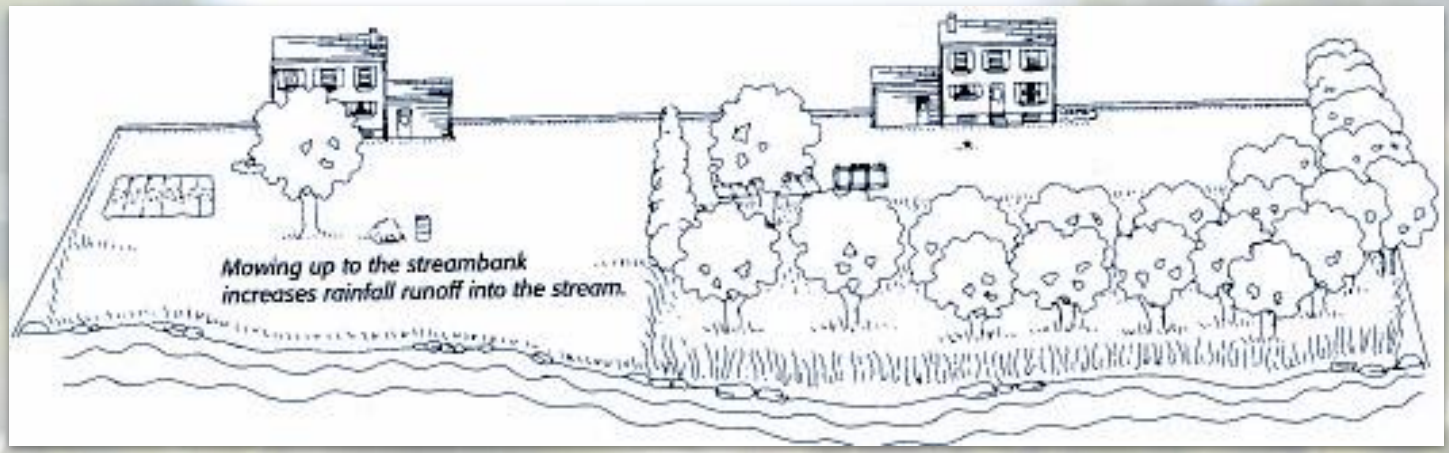


← Yes!!

What do you see?

-TREES! (roots)
-Riffles, rock
-No erosion on banks
-Shallow and wide
-Fish, macros
-Floodplain

Riparian Buffers

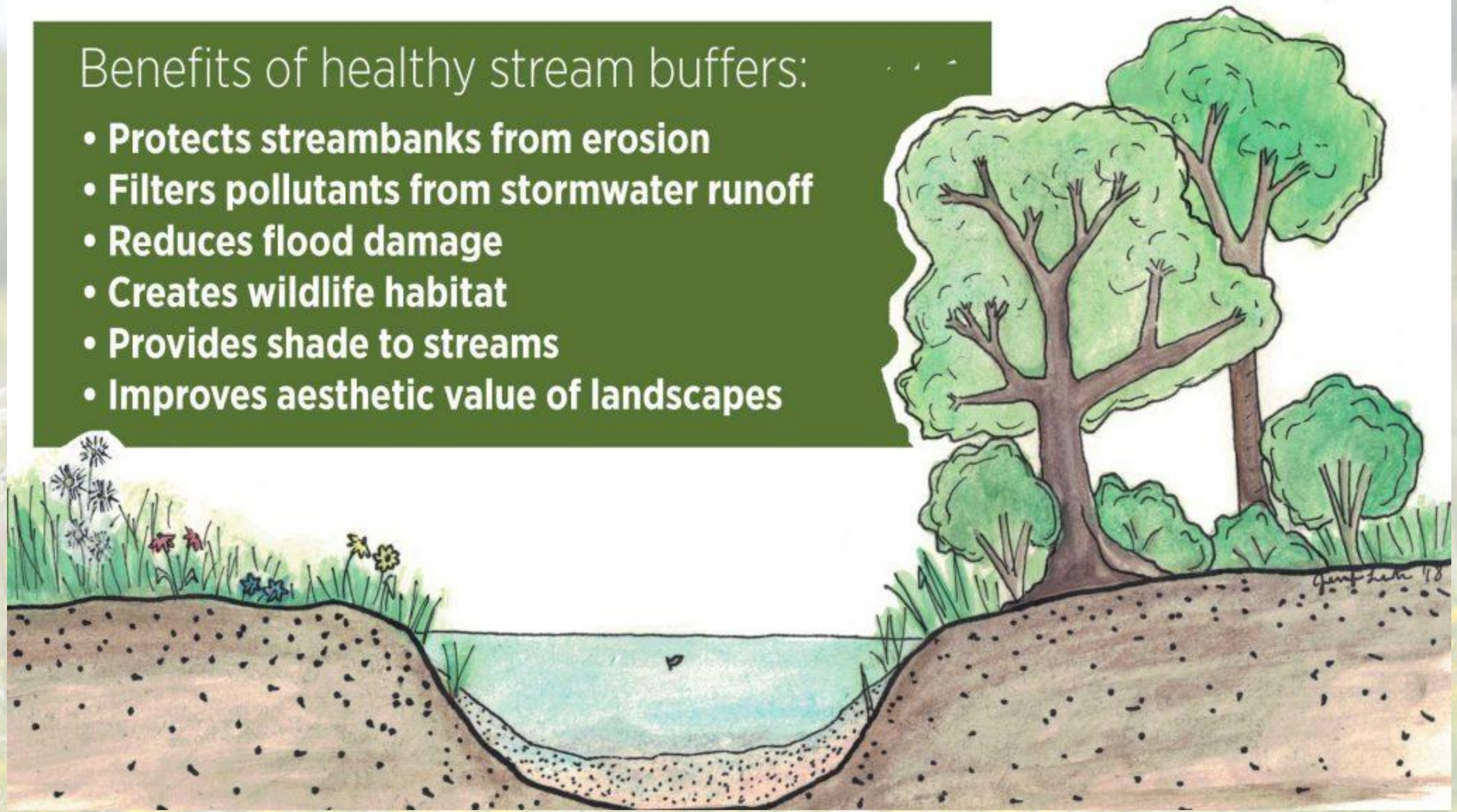


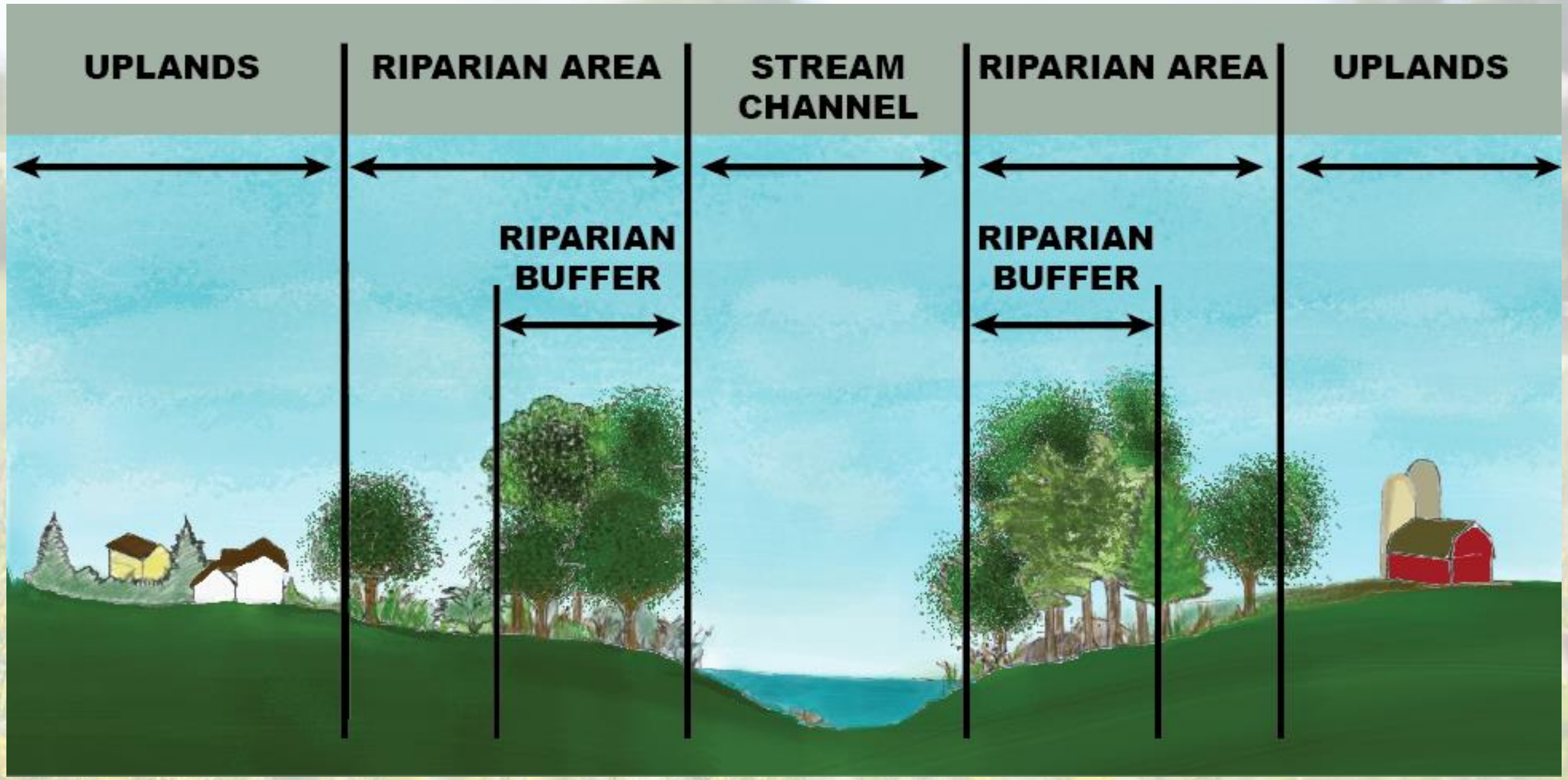
Riparian buffers, and wetlands in general, act as a buffer against floods

- Slow down run-off that enters the stream
- Stabilize stream banks with root systems
- Absorb water with root systems
- Intercept rainfall before it can reach the ground

Benefits of healthy stream buffers:

- **Protects streambanks from erosion**
- **Filters pollutants from stormwater runoff**
- **Reduces flood damage**
- **Creates wildlife habitat**
- **Provides shade to streams**
- **Improves aesthetic value of landscapes**



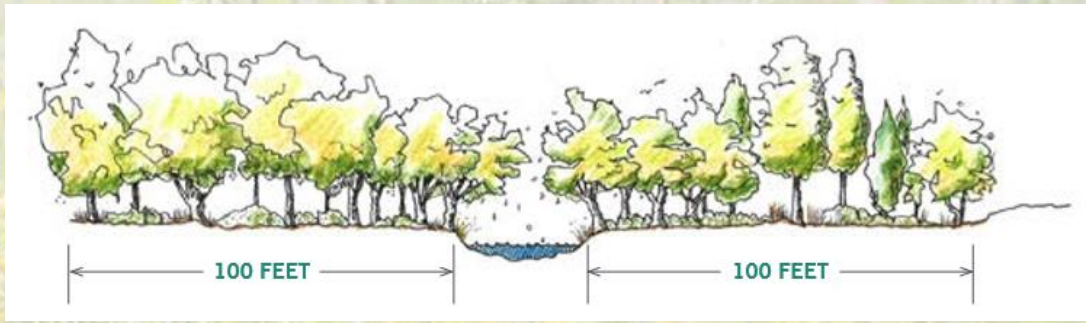

UPLANDS
RIPARIAN AREA
STREAM CHANNEL
RIPARIAN AREA
UPLANDS
RIPARIAN BUFFER
RIPARIAN BUFFER

Stroud Water Research Center studies

- Forested streams
  - remove 2-9x more Nitrogen pollution
  - have 2-5x more biological activity
  - 2-4x wider (more surface area, shallower)
    - ↑biofilm, ↑habitat, ↑food, cooler temps in summer, warm temps in winter

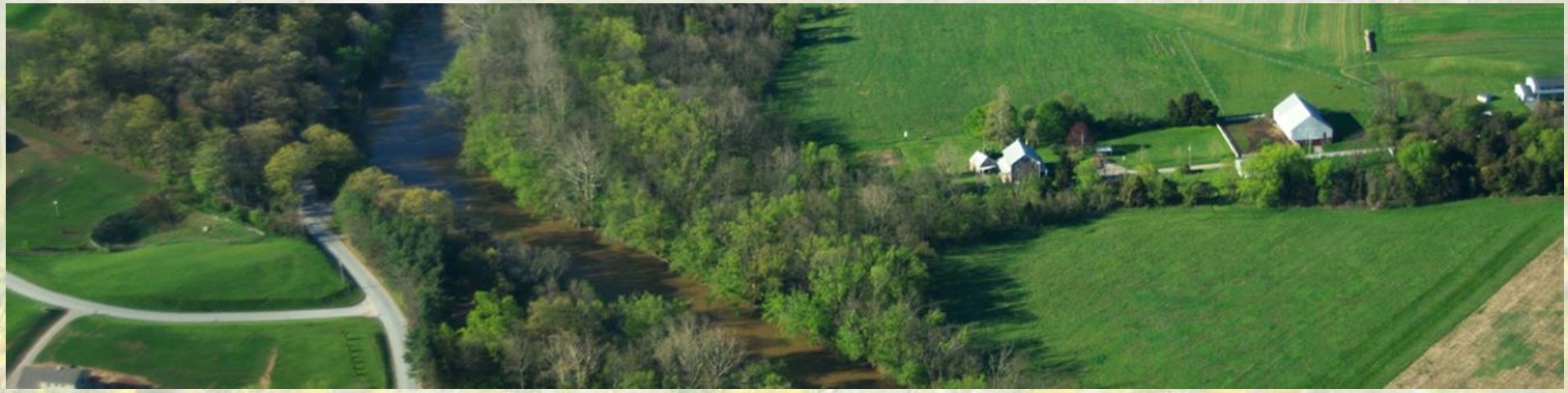
    = ↑ ecosystem services

- 33’ buffer- traps 64% of sediment
- 100’ buffer- traps 84% sediment



PA Buffer Initiative

The commonwealth has a goal of planting **95,000 acres** of riparian forest buffers statewide **by 2025** to improve waterways in Pennsylvania and the Chesapeake Bay



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Multi-functional Riparian Buffers

A type of riparian forest buffer that provides opportunities for harvesting products such as nuts, berries, and woody florals

Potential Funding Opportunities

- **PACD 2018-2021 Multi-functional Riparian Buffer Sub-Grant Program**
- DEP Growing Greener Grant Funding
- Conservation Reserve Enhancement Program (CREP)
- Chesapeake Bay Foundation Buffer Bonus Program
- Pollinator Partnership
- DCNR
- etc.

Ask us to look at your property and add your site to our potential project list!

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Other Backyard Practices

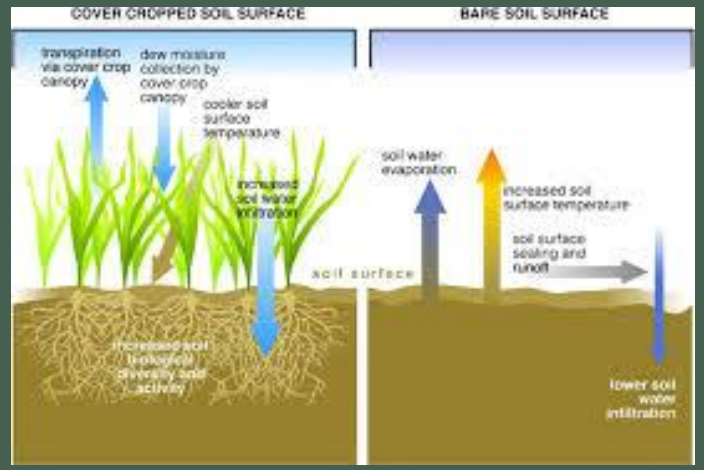
- Plant a **rain garden**
- Install a **rain barrel**
- Use **permeable surfaces** for sidewalks, driveways
- Pass on **pesticides**
- Be frugal with **fertilizer**
- **Compost** yard and kitchen wastes
- Let **grass clippings, leaves** stay on lawn, leaves - natural fertilizer
- **PLANT NATIVES**

Cover Crops and CREP: NPS Pollution and Flooding Mitigation

By: Kendra Craig

Benefits of Cover Crops

- Prevent erosion
- Improve soil structure: compaction
- Organic matter
- Suppress weeds
- Moisture: soil water capacity, infiltration
- Nutrients; management & filtration
- Less work: no need for mulching
- Some species can provide an edible harvest
- Biodiversity
- Insect Management



Disadvantages to Cover Crops

- Upfront Cost
- Delay in benefits; soil health results can take a few years

Management Techniques

- Cover crops
- No-Till
- Planting green/ Inter-seeding
- Rotational grazing
- Contour strip cropping
- Crop rotations
- Nutrient management
  - Nitrogen
  - Phosphorus
  - Potassium

- Tying multiple management techniques together in one system can help with water retention and NPS pollution prevention!

CREP

- Conservation Reserve Enhancement Program
- Address resource concerns by removing land that is environmentally sensitive from production
- 10 – 15 year contracts
- Landowners can receive an annual rental payment and other incentives based on their individual contracts
- Farm Service Agency program (FSA)
- NRCS does the field work for this program
- Pheasants Forever Wildlife biologist also does field work
- Columbia County Conservation District provides education and outreach on the program

FSA FARM SERVICE AGENCY

NRCS Natural Resources Conservation Service

Columbia County Conservation District
Conserving Natural Resources for Our Future

PHEASANTS forever The Habitat Organization

Who

- Landowners have to meet certain criteria to be eligible for CREP.
  - Slope, distance to water, cropping history, etc.
- This criteria is re-evaluated with each Farm Bill
- You can contact Farm Service Agency to determine if you are eligible
- You will receive a rental payment for each acre that is put into the program. Again check with FSA to determine how much $$

What: Practices

- Warm season grasses
- Cool season grasses
- Riparian buffers
- Field borders
- Wetland restoration
- Grassed waterways
- Wildlife food plots
- Filter strips
- Wildlife habitat

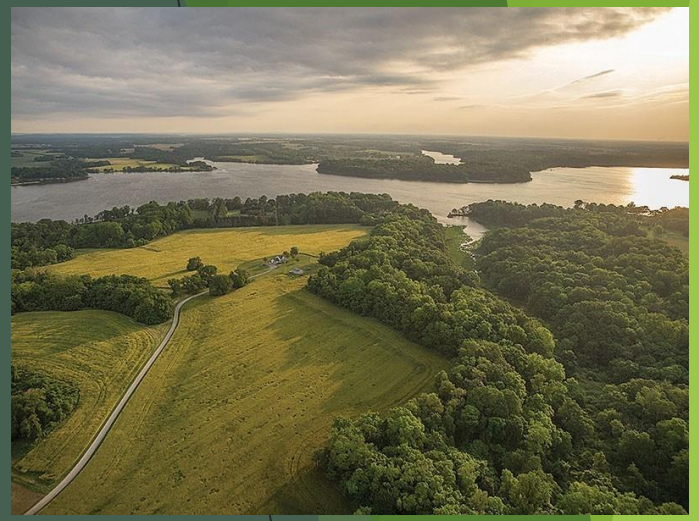
Pollinator Field Borders

Strips for habitat

Why: Goals

- Reduce erosion
- Reduce pollutants: sediment, nutrients, etc. from entering waterways
- Restore and enhance riparian habitat corridors next to streams, estuaries, and wetlands
- Restore and enhance grassland habitats
- Improve water quality
- Improve soil health

- These practices can promote cleaner water, increase water holding capacity and increase water filtration within the areas of establishment.



Big Picture

- Flooding Mitigation
  - Hold water in the ground longer
  - Slow down the water getting to our main streams and water bodies
  - Increase the water holding capacity in the ground
- Non Point Source Pollution Prevention
  - Filter water before enter waterways: keep clean water clean and filter contaminants
  - Help hold nutrients in the ground
- Soil Health
  - Better soil structure, increased filtration, increased water holding capacity for crops, help to put nutrients back in the ground,

Contact Information

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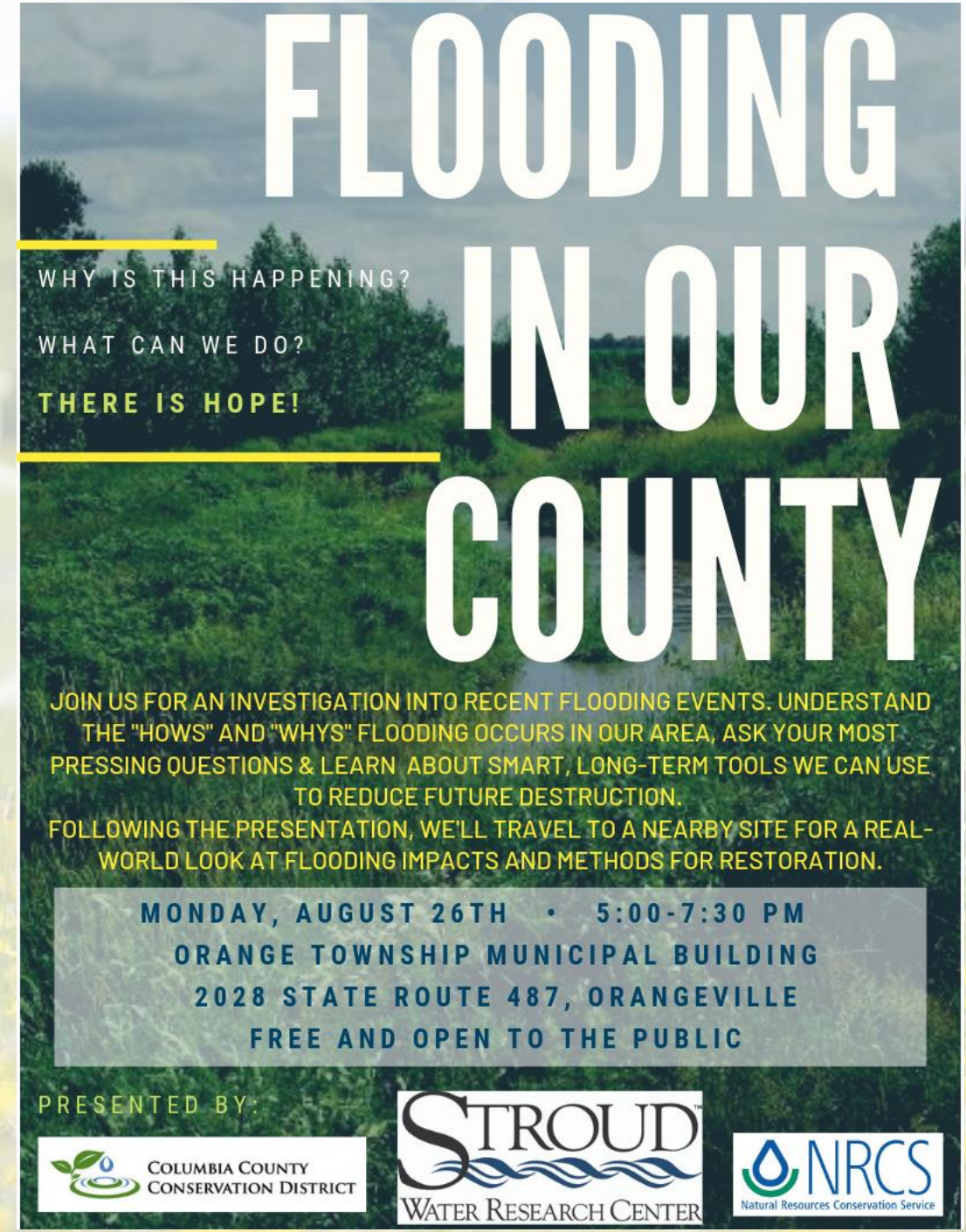
FLOODING IN OUR COUNTY
WHY IS THIS HAPPENING?
WHAT CAN WE DO?
THERE IS HOPE!
JOIN US FOR AN INVESTIGATION INTO RECENT FLOODING EVENTS. UNDERSTAND THE "HOWS" AND "WHYS" FLOODING OCCURS IN OUR AREA, ASK YOUR MOST PRESSING QUESTIONS & LEARN ABOUT SMART, LONG-TERM TOOLS WE CAN USE TO REDUCE FUTURE DESTRUCTION.
FOLLOWING THE PRESENTATION, WE'LL TRAVEL TO A NEARBY SITE FOR A REAL-WORLD LOOK AT FLOODING IMPACTS AND METHODS FOR RESTORATION.
MONDAY, AUGUST 26TH • 5:00-7:30 PM
ORANGE TOWNSHIP MUNICIPAL BUILDING
2028 STATE ROUTE 487, ORANGEVILLE
FREE AND OPEN TO THE PUBLIC
PRESENTED BY:
COLUMBIA COUNTY CONSERVATION DISTRICT
STROUD WATER RESEARCH CENTER
NRCS
Natural Resources Conservation Service

Definitions

- **NPS Pollution** – Pollution caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into bodies of water. Examples: sediment, ag runoff, road salt, oils, fertilizers, etc.
- **Flood vs. Flash Flood** - Flooding is a longer term event than flash flooding: it may last days or weeks. Flash floods are usually characterized by raging torrents after heavy rains that rip through river beds, urban streets, or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall.
- **Erosion** – The removal of sediment from a landform
- **Deposition** – The addition of sediment to a landform
- **Riparian** – The zone between land and a river or stream. "Streamside"
- **Dredge** – The process of removing sediment and other materials from the bottom of a stream channel
- **Meander** – The natural winding, "s" curved shape a stream creates when left untouched 
- **Floodplain** – An area of low-lying ground adjacent to a river, formed mainly of river sediments and is naturally subject to flooding
- **Equilibrium** – A balancing process of erosion and deposition, discharge, slope, and other complex factors
- **Sequestration** – A natural process by which carbon dioxide is removed from the atmosphere and held, in this case, in soil and plant matter
- **Interception** – Precipitation that never reaches the ground, and is instead captured by the leaves, branches of plants and evaporated
- **Invasive** - An organism that causes ecological or economic harm in a new environment where it is not native
- **Non-native** – An introduced species living outside of it's native distributional range
- **Native** – A species that have historically occurred as part of an ecosystem in a specific location
- **Stormwater** – Runoff that is generated from rain and snowmelt events that flow over land or impervious surfaces
- **Ecosystem services** – The direct and indirect contributions of ecosystems to human well-being
- **CREP** – "Conservation Resource Enhancement Program"
- **Cover Crop** – A crop of a specific plant that is grown primarily for the benefit of the soil rather than the crop yield