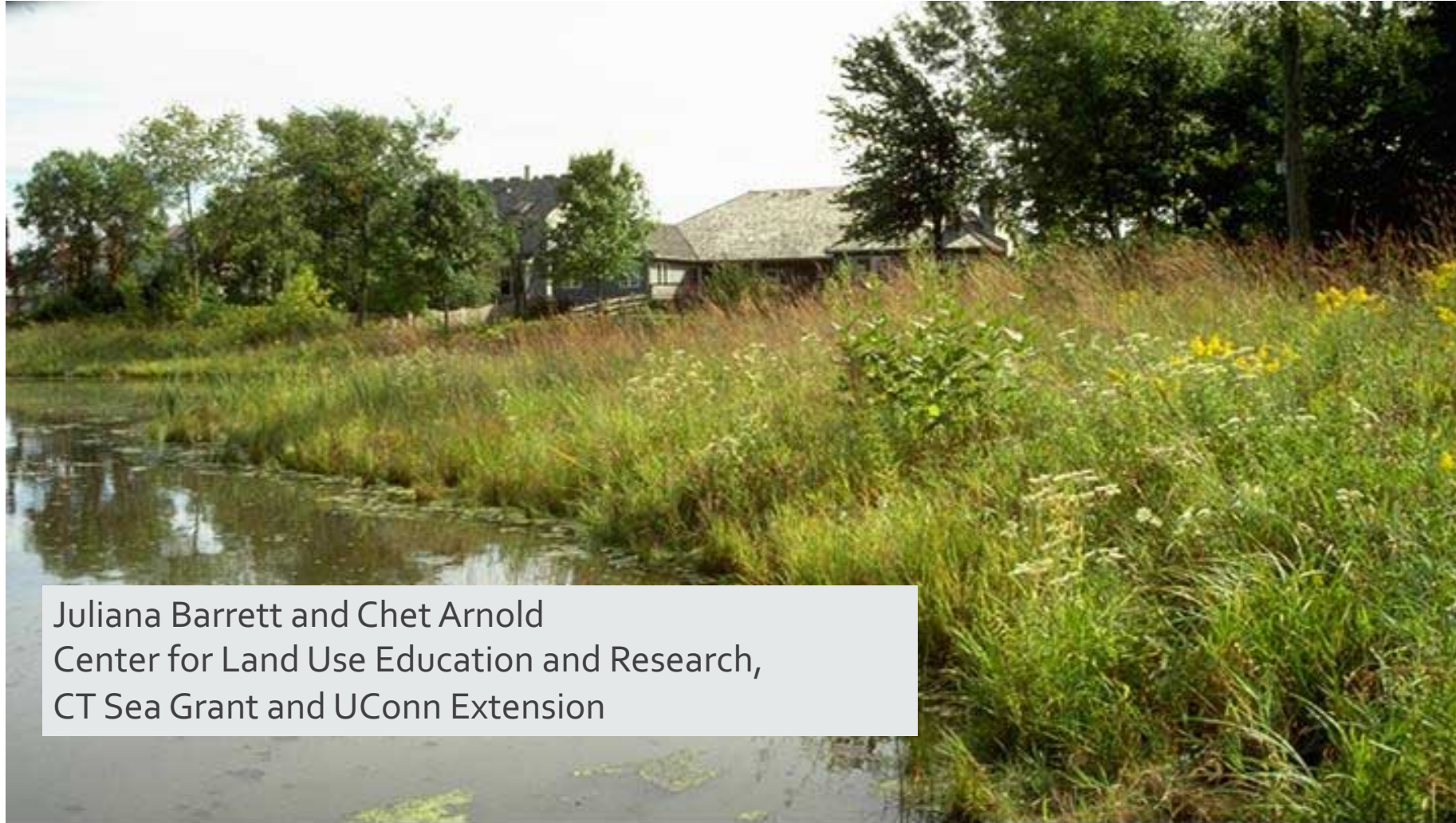


The Role of Riparian Buffers in Watersheds and in your Local Landscape



Juliana Barrett and Chet Arnold
Center for Land Use Education and Research,
CT Sea Grant and UConn Extension

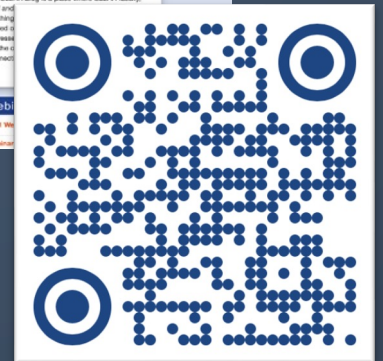
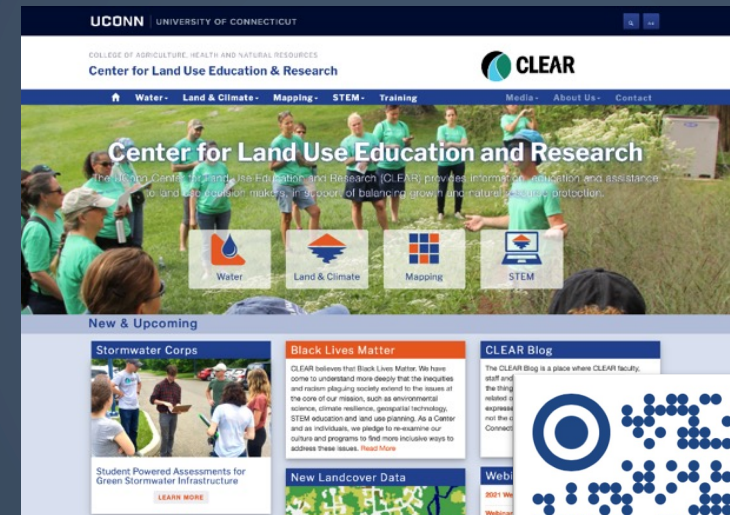


*provides research, tools, training, information,
and assistance to community decision makers
and other audiences in support of:*

- better land use decisions
- healthier natural resources
- more resilient communities



Center for Land Use Education and Research (CLEAR)



<https://clear.uconn.edu>

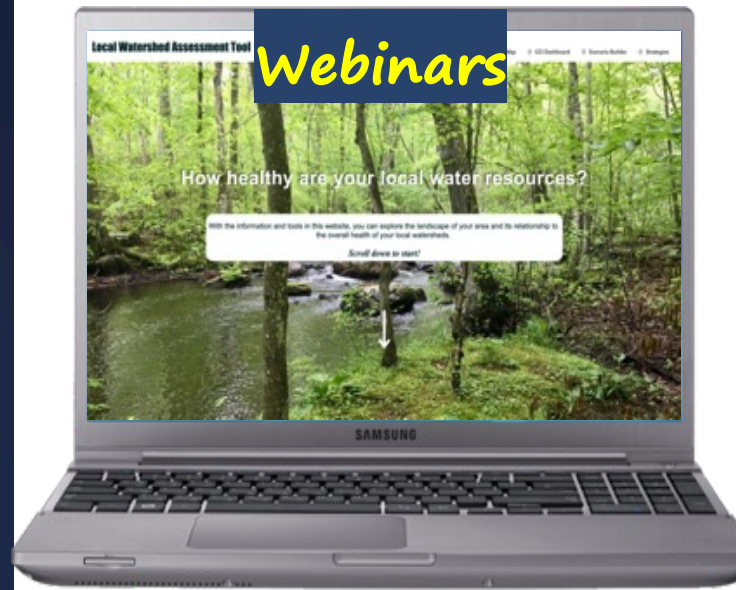
A renewed focus on riparian areas

- **Water Quality**
- **Resilience**
- **Biodiversity**
- **Recreation**
- **Economic development**



Support for Protecting and Restoring Riparian Buffers

Webinars



Riparian Restoration Tools



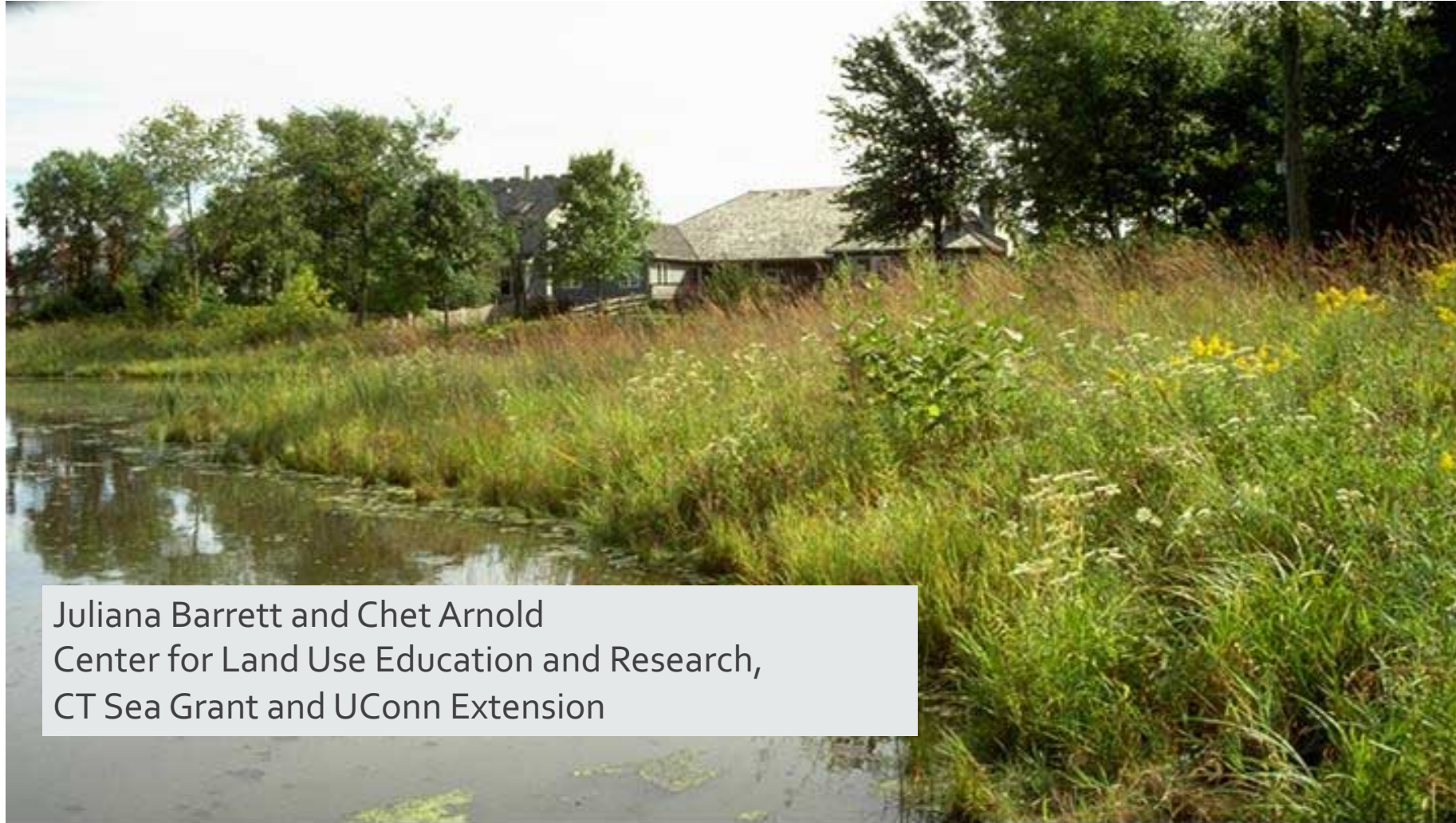
Geospatial Analysis & Tools



Workshops



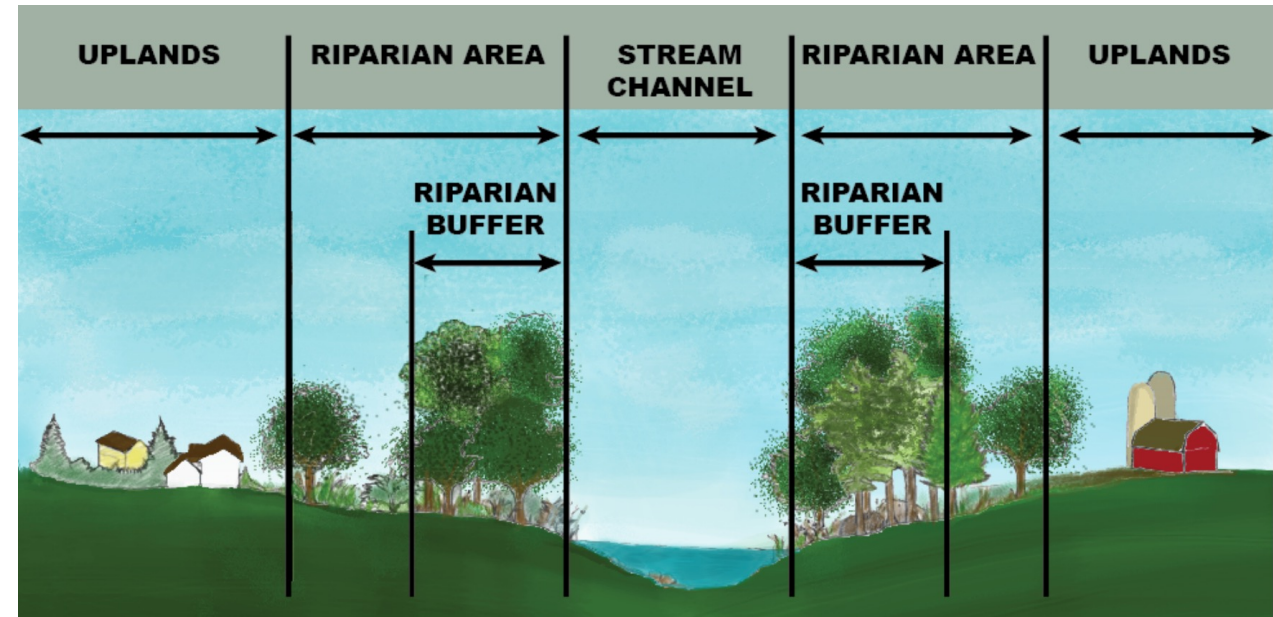
The Role of Riparian Buffers in Watersheds and in your Local Landscape



Juliana Barrett and Chet Arnold
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What is a riparian corridor (buffer)?

- “Riparian” refers to the area by the banks of a river, stream, or other body of water.
- “Corridor” refers to a designated zone or strip of land of a specified width along the border of an area
- So a “Riparian Corridor” is the natural vegetation *and soil cover* adjacent to a river, stream, or other body of water.





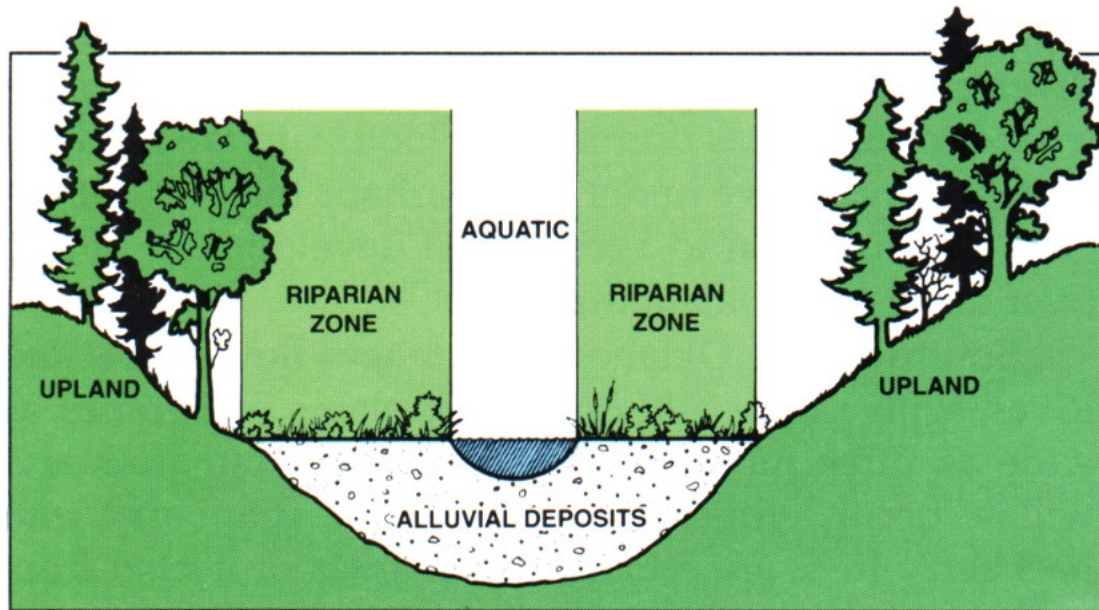
Blaire County Conservation District, PA





Riparian Zones and Context

- Riparian zones are the interface between land and water
- Includes the floodplain as well as the riparian buffers adjacent to the floodplains.



Oklahoma State Univ

Riparian buffers rarely take into account riparian and aquatic ecosystem functions.

Riparian buffers – focus on water quality

- Buffers used in agriculture practices to protect water quality pre-1960's
- Buffers used in forestry practices since at least the 1960's



Credit: Lynn Betts



A new multifunctional riparian buffer planting at Village Acres Farm in Mifflintown, Pennsylvania. They planted a combination of silvopasture-supporting trees, high-shade trees near the water, and underplantings that can be used by florists or harvested for profitable crops. Image courtesy of Angela Brubaker.

- Scientists and regulators in Pennsylvania are working with farmers to plant trees along streams in an effort to reduce the amount of pollutants entering the water.
- Farmers are cultivating fruit trees and flowers in the riparian zone for additional income.
- This represents an agroforestry system that is a win-win for ecological outcomes and community livelihoods.

Sarah Derouin, Stroud Water Research Center

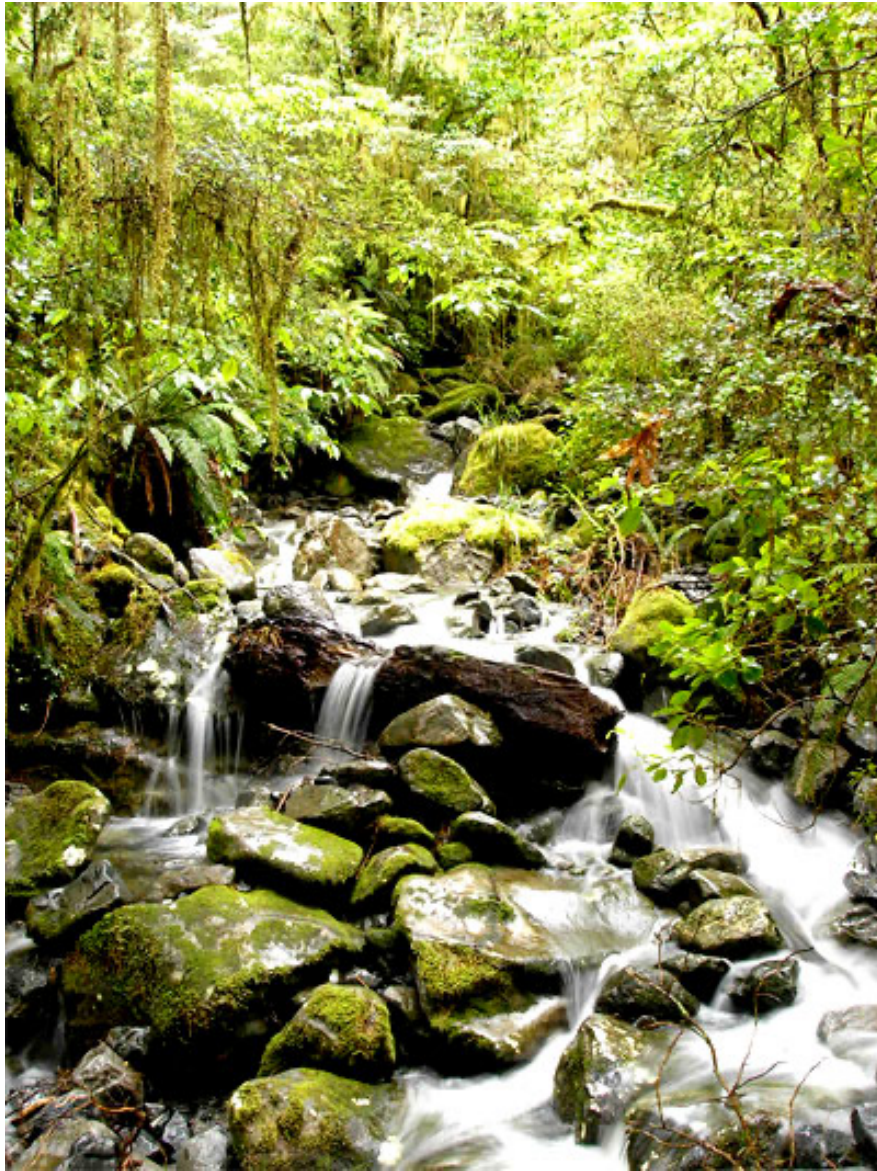
Why should we care about creating, managing or restoring riparian buffers?



Riparian Buffer Ecological and Societal Functions

- Water Quality
- Biodiversity
- Protection and Safety
- Economic Opportunities
- Productive Soils
- Aesthetics and Visual Quality
- Outdoor Recreation





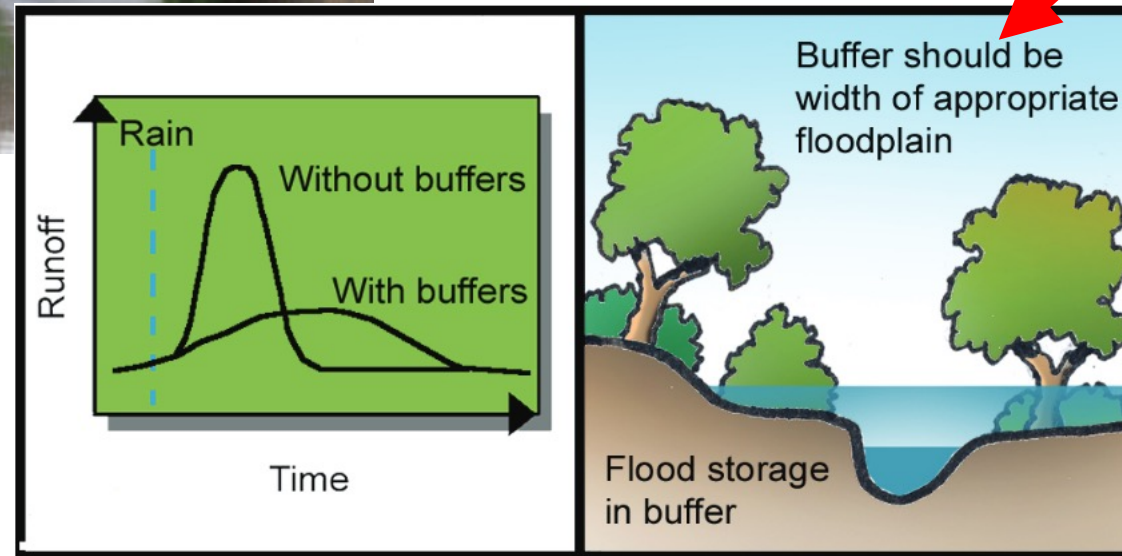
Water quality – especially important for headwater streams

Streambank stabilization/erosion control





Flood control

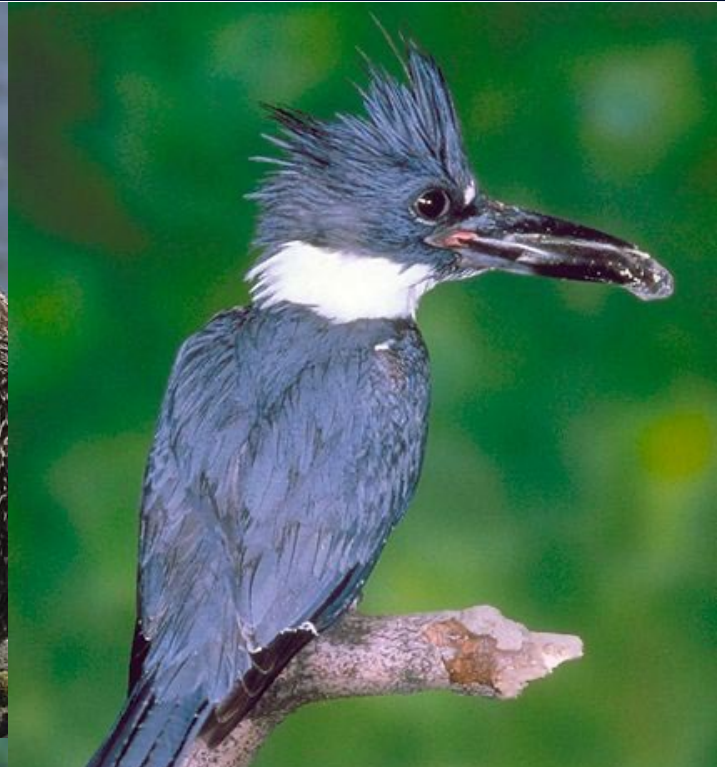


Biodiversity Buffer Functions

- Increase aquatic and terrestrial habitat areas
- Protect sensitive habitats
- Restore connectivity
- Increase access to resources for animals
- Provide shade to maintain water temperature



NEBRASKALAND MAGAZINE, NEBRASKA GAME AND PARKS COMMISSION



Riparian Buffers for aquatic species

- Provide woody debris for aquatic habitat structure
- Maintain in-stream microclimate
- Provide food for aquatic species
- Protect water quality





Woody debris very important for the larval stages of many insects.



Adding woody debris to a pool for amphibians and turtles.

CT DEEP fact sheet on large woody debris

<https://portal.ct.gov/-/media/DEEP/fishing/restoration/LargeWoodyDebrisFactSheetpdf.pdf>



Fisheries – water quality and water temperature



American Rivers' report, *The Economic Value of Riparian Buffers*

<https://www.americanrivers.org/resource/economic-value-riparian-buffers/>

The reported findings include:

- Riparian buffers have a positive economic value in terms of public and private benefits.
- The economic value of riparian buffers generally increases with width and length.
- Riparian buffers generate a price premium for residential property
- The public is willing to pay for watershed restoration with riparian buffers.



Riparian Buffer Online Tool

Coastal Riparian Landscaping Guide for Long Island Sound

Riparian corridors are the segments of land along our rivers, streams and wetlands including the natural vegetation and soil cover. These areas can provide multiple benefits, particularly as the first line of defense against the impacts of surrounding land uses. Corridors slow runoff from precipitation, aid in flood control, and filter or trap pollutants. These areas can also provide habitat and corridors for wildlife as well as scenic value and privacy. Within coastal areas, vegetated corridors can also be of significance in reducing the impacts of waves and overwash on properties. Recently, several major storms have caused extensive damage along the coast of Long Island Sound in both Connecticut and New York from erosion, scouring and salt spray.



In order to capture the benefits of coastal riparian corridors, lessen the impacts from storm events while still allowing for view sheds and water access, we offer the following tool as a resource for those living on or near the waters and tributaries of Long Island Sound. Instead of having lawn and turfgrass exclusively between the home and water, we suggest plantings that can withstand this harsh environment and show how plantings can be placed to still provide view sheds and water access, while incorporating the ecological benefits of riparian plantings. This tool includes a series of fact sheets describing the functions and values of coastal riparian corridors, how to prepare an area for planting, and how to plant. We provide a listing of native plants and indicate their ability to withstand salt spray and inundation. Additionally, we provide a series of landscaping diagrams to get you started including both plan views and cross sections.

Contents

Introduction

[Fact Sheet 1](#)

[Fact Sheet 2](#)

[Fact Sheet 3](#)

Plants

[Zone 1](#)

[Zone 2](#)

[Zone 3](#)

Key to the Plant List

Soils

Availability from Nurseries

Which Landscaping Option is Right for your Property?

Does your property experience:

- ☐ salt spray on a regular basis?
- ☐ salt spray only during storm events?

Does your property have:

- ☐ a seawall present?
- ☐ no seawall?

The slope of your property is:

- ☐ 5% (almost flat).
- ☐ 20% (slight incline).
- ☐ 35% (moderately steep).
- ☐ 50% (steep).

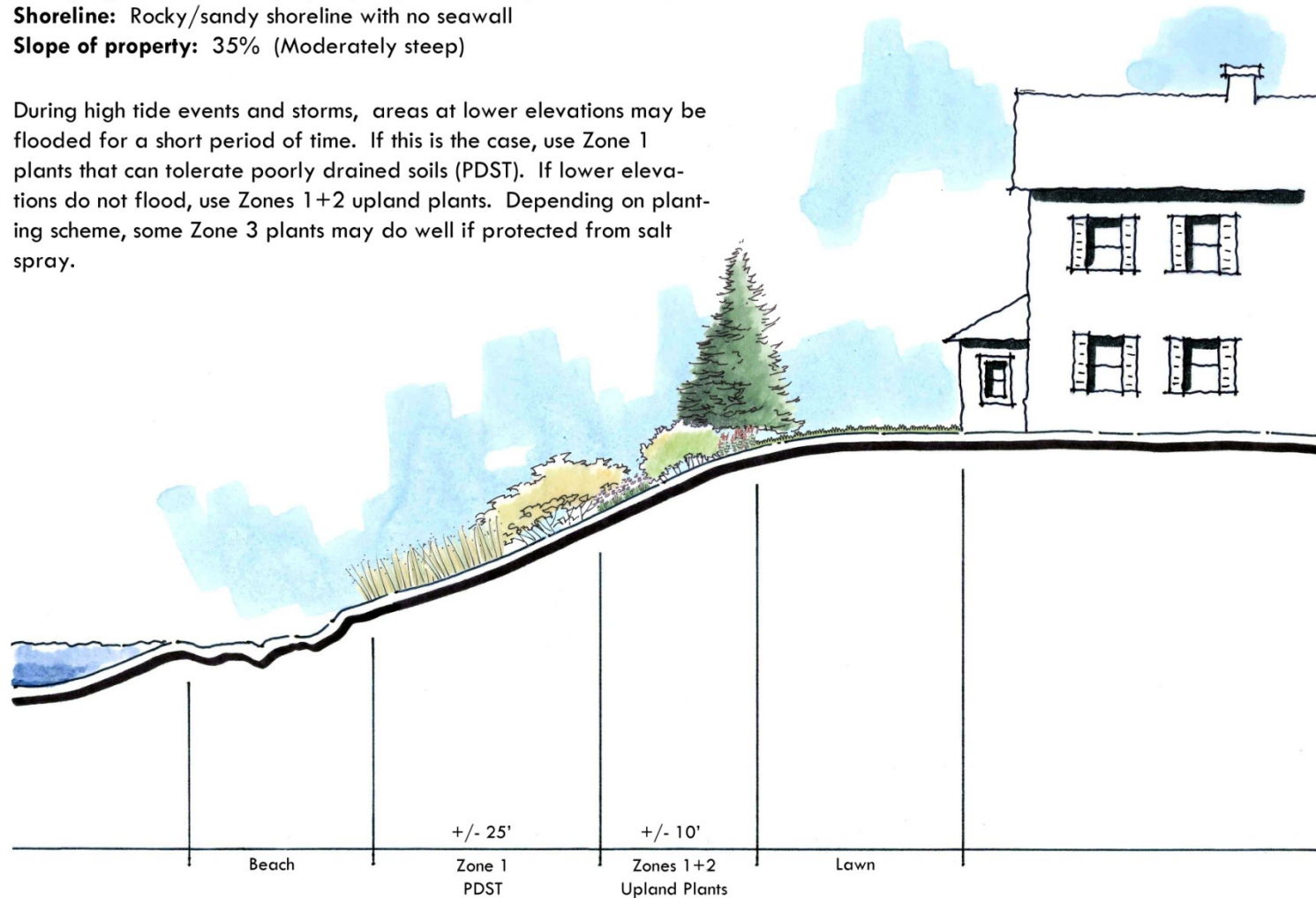
Cross Section: K

Salt spray: Occurs often (property adjacent to Long Island Sound)

Shoreline: Rocky/sandy shoreline with no seawall

Slope of property: 35% (Moderately steep)

During high tide events and storms, areas at lower elevations may be flooded for a short period of time. If this is the case, use Zone 1 plants that can tolerate poorly drained soils (PDST). If lower elevations do not flood, use Zones 1+2 upland plants. Depending on planting scheme, some Zone 3 plants may do well if protected from salt spray.



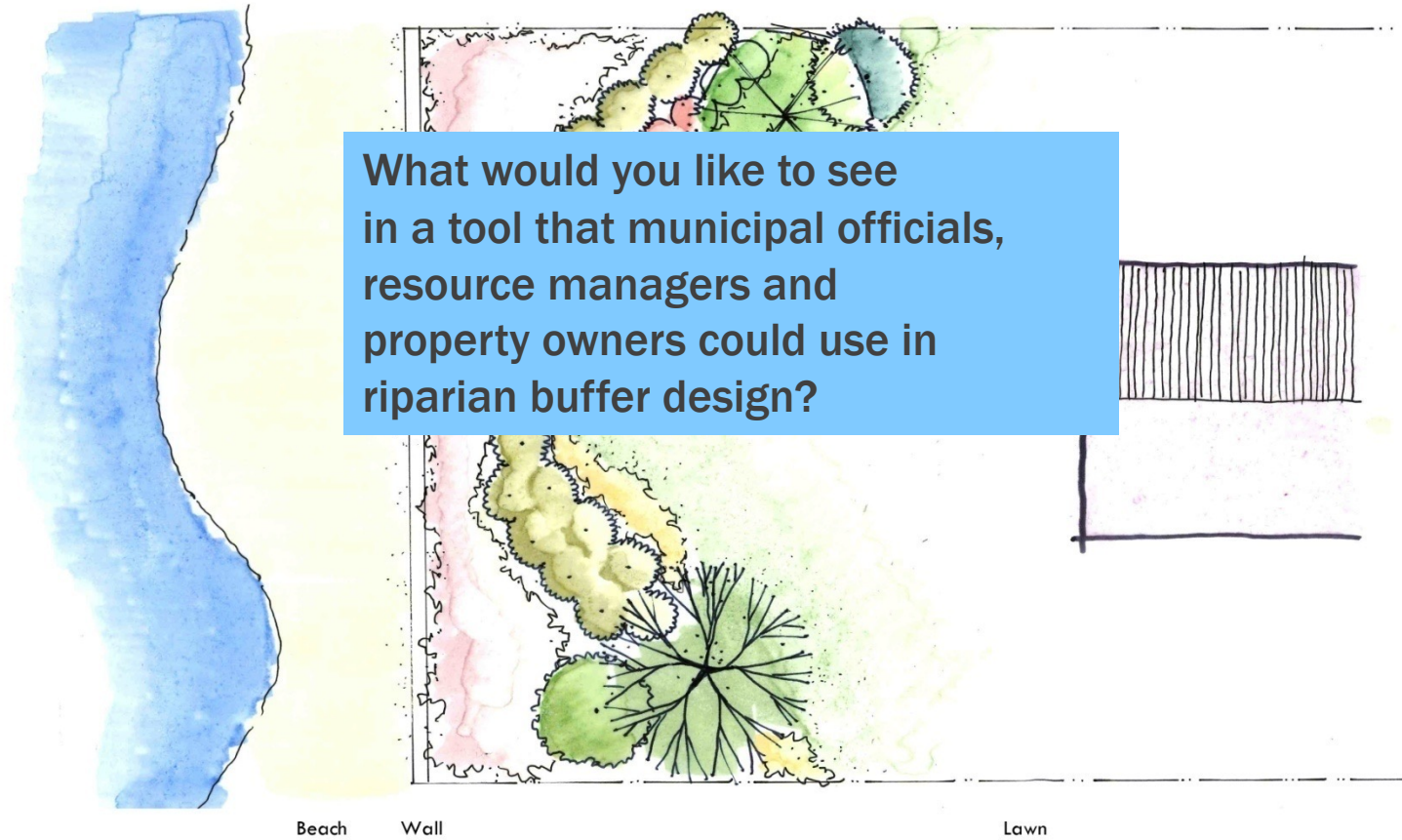
Plan view: A

Salt spray: Occurs rarely (only during major storm events)

Shoreline: Seawall present

Slope of property: Gentle slope

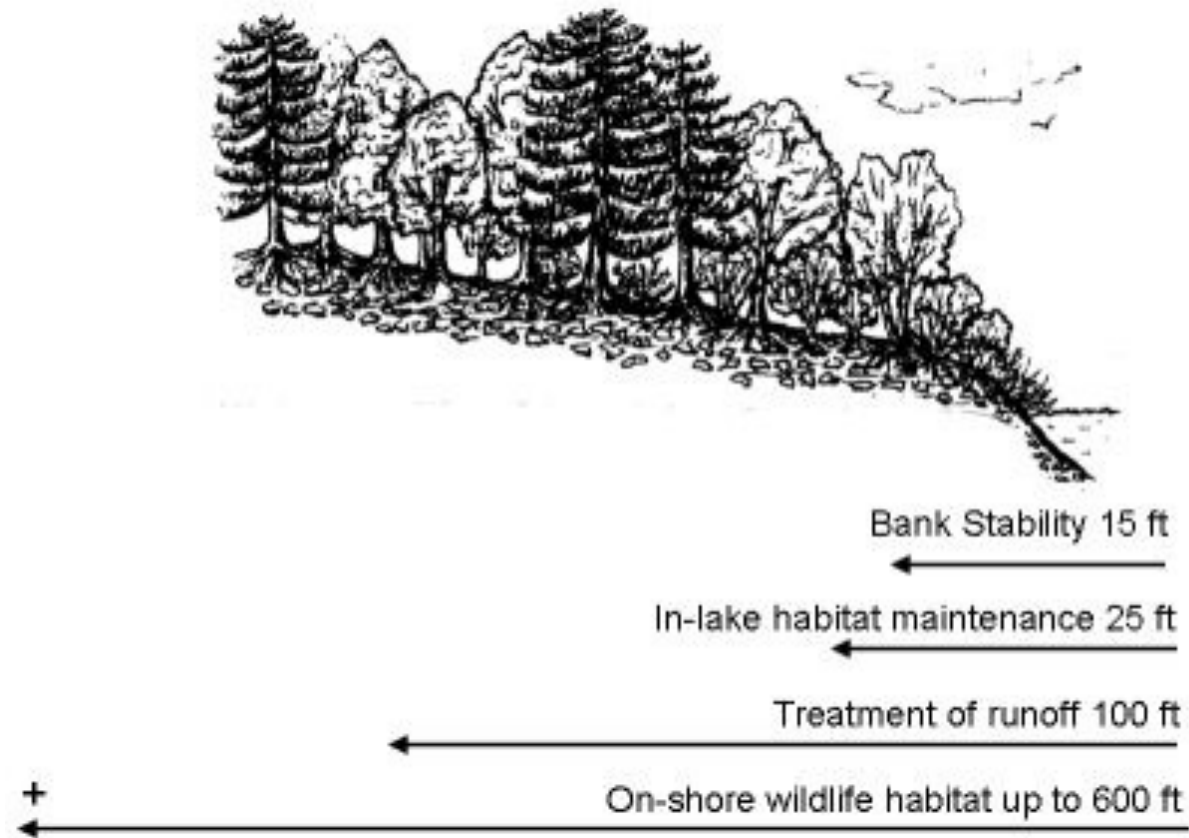
Plan view indicates how water access, views and lawn can be retained with a riparian buffer.



Whether coastal or inland – same ideas apply for water access and viewsheds

How big should a buffer be to provide water quality improvement and other services?





It depends.... on site conditions: location within the watershed, soil type and slope, hydrology AND what the function of the buffer is.

Riparian Corridor Widths for Specific Objectives

Bottom line: bigger is better

Small riparian corridors

(25 – 50 ft)

- Help to protect water quality
- Streambank stabilization
- Provide small scale travel routes
- May provide nesting/basking sites

Large riparian corridors

(> 50 ft)

- Provide habitat components to more species
- Help to reduce secondary inputs
- Increased water quality protection
- Flood control
- Provide large scale corridors

Climate Change and Riparian Ecosystems

- Air and surface water temperatures increasing
- Changes in the magnitude and seasonality of precipitation and run-off
- Shifts in reproductive phenology and plant and animal distribution



Why are riparian ecosystems important with regard to climate change?

Riparian Systems are naturally resilient to extreme weather events

Riverine habitats function as corridors for many plants and animals (cc causing distributional shifts in organisms)

Expanding thermal refugia - riparian areas absorb heat (water has high heat capacity) and protect riparian corridor organisms against extreme temperatures

Hydrologic Benefits (cc – increased frequency of extreme ppt events, and altered seasonal patterns of ppt and runoff). Riparian vegetation increases infiltration; mitigates flood impacts

WHERE DO WE BEGIN?





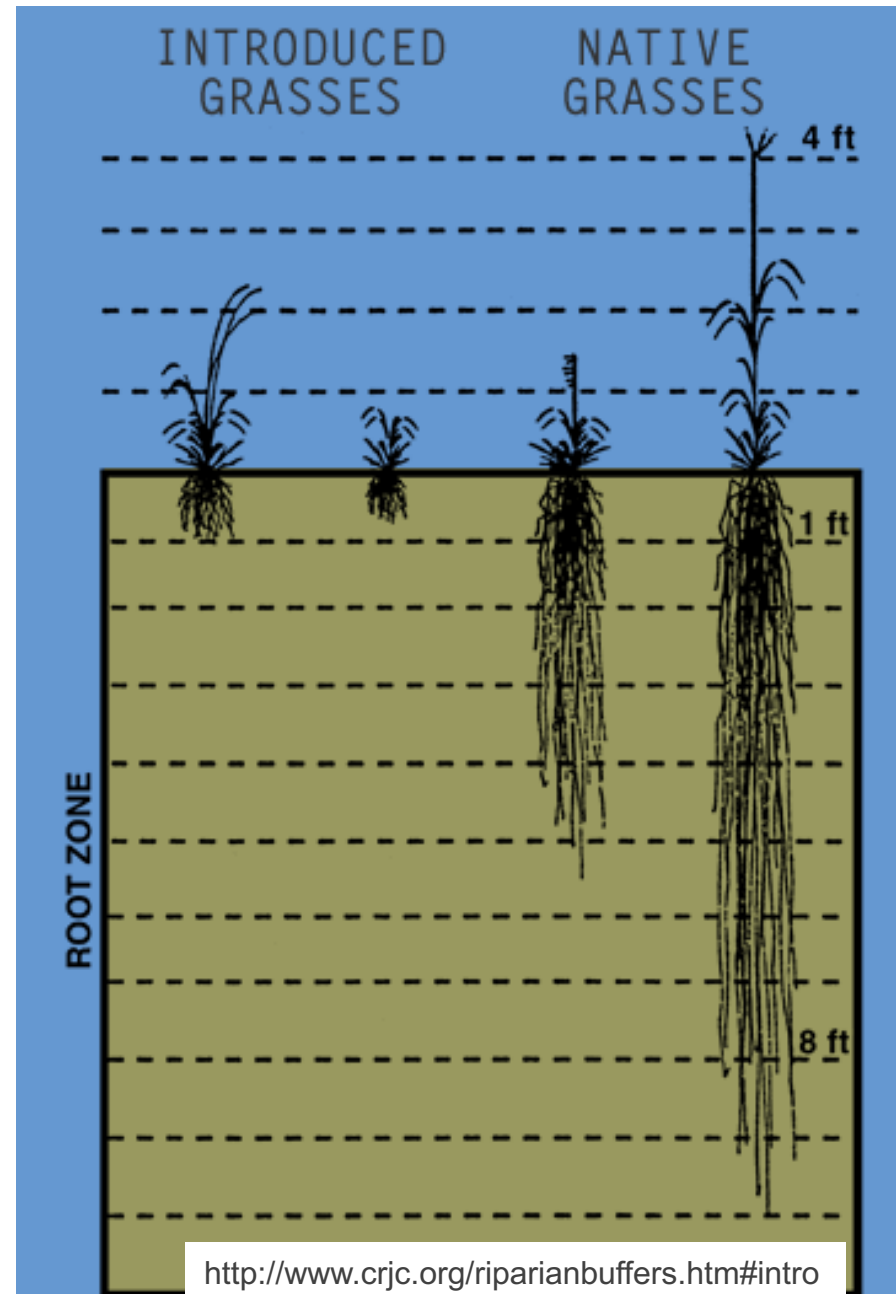
From this....





To this....

Why using native plants is important



Trees

What can you plant in riparian buffers?



Red maple



Tulip tree



Black gum



Sweetgum



Sycamore



Silver maple



Swamp white oak

Small Trees



Alternate-leaved dogwood



Serviceberry species

Shrubs



Common alder



Silky dogwood

Buttonbush



Swamp azalea

Herbaceous Plants



Jack in the pulpit



White turtlehead

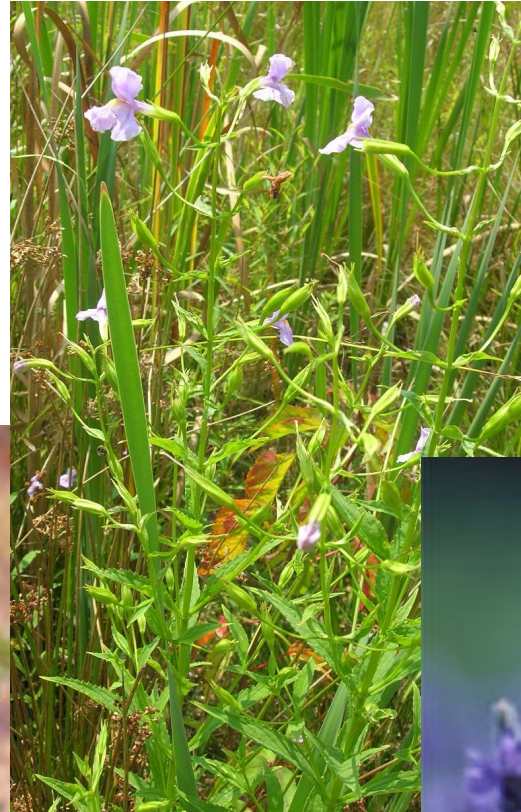


Swamp milkweed

Cardinal flower



Monkey flower



Great blue lobelia

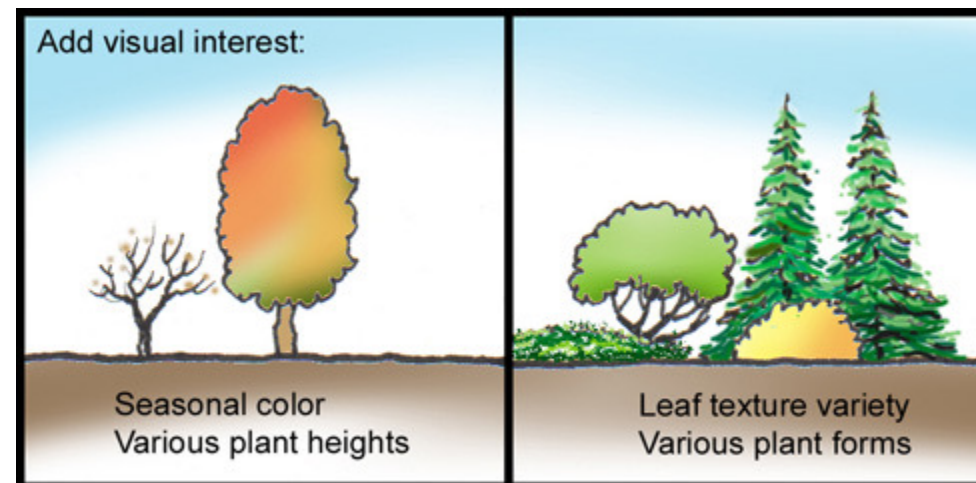


Pickerel weed

Strategies for enhancing visual preference of corridors

- Design the viewable part of the corridor to be visually pleasing while the interior can be designed to achieve the desired ecological functions.
- Use selective mowing to indicate stewardship without greatly reducing the ecological functions.
- Use bold planting patterns to indicate a designed landscape.

Enhance visual interest and diversity by increasing seasonal color and by varying plant heights, textures, and forms.



- Provide visual frames to contain and provide order around the corridor (such as a wooden fence).
- Provide simple habitat improvements such as nesting boxes and feeders.



Signage



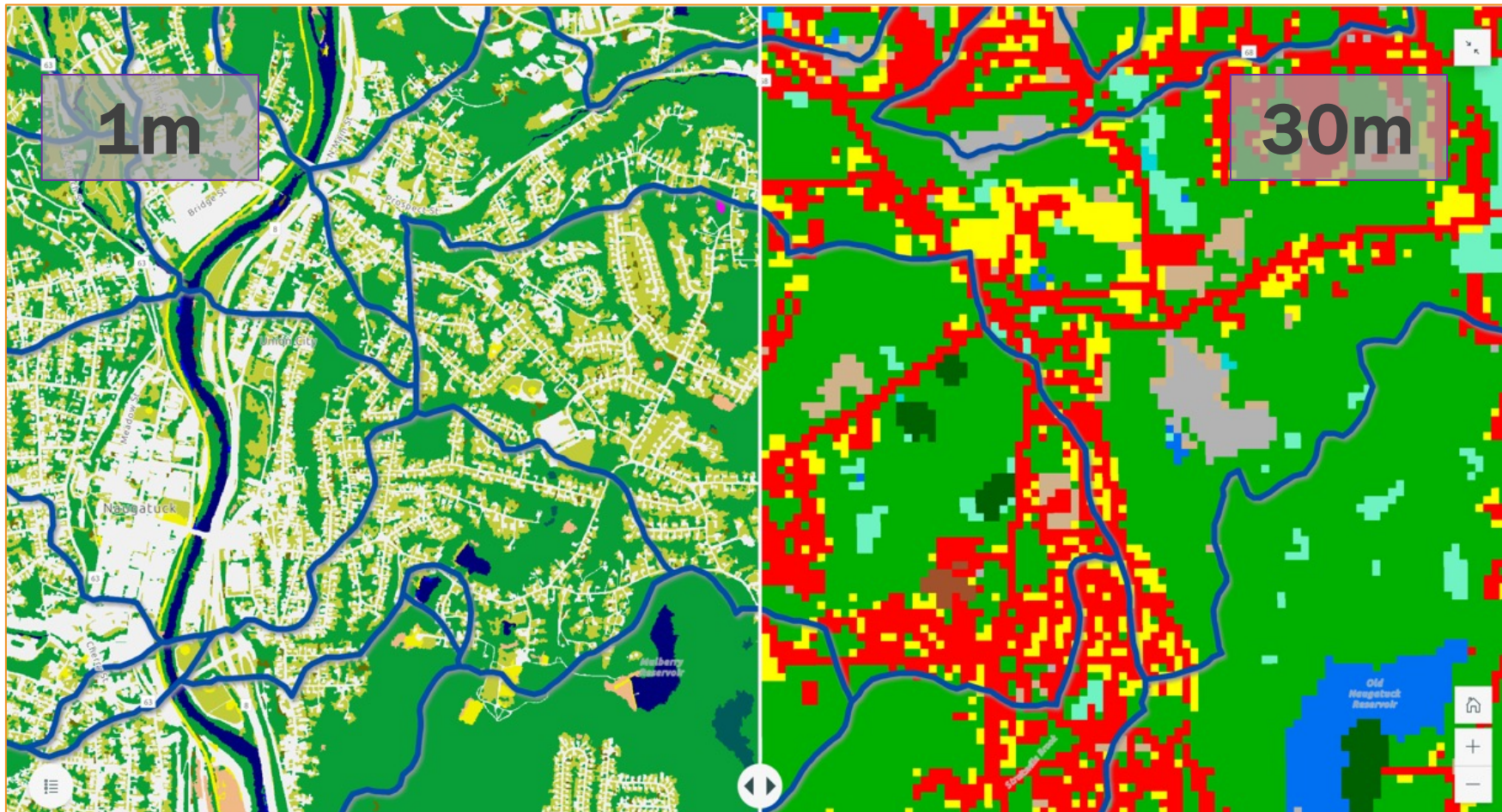
Land use is
the prime
determinant
of watershed
health



*And we are in an
urbanizing region*

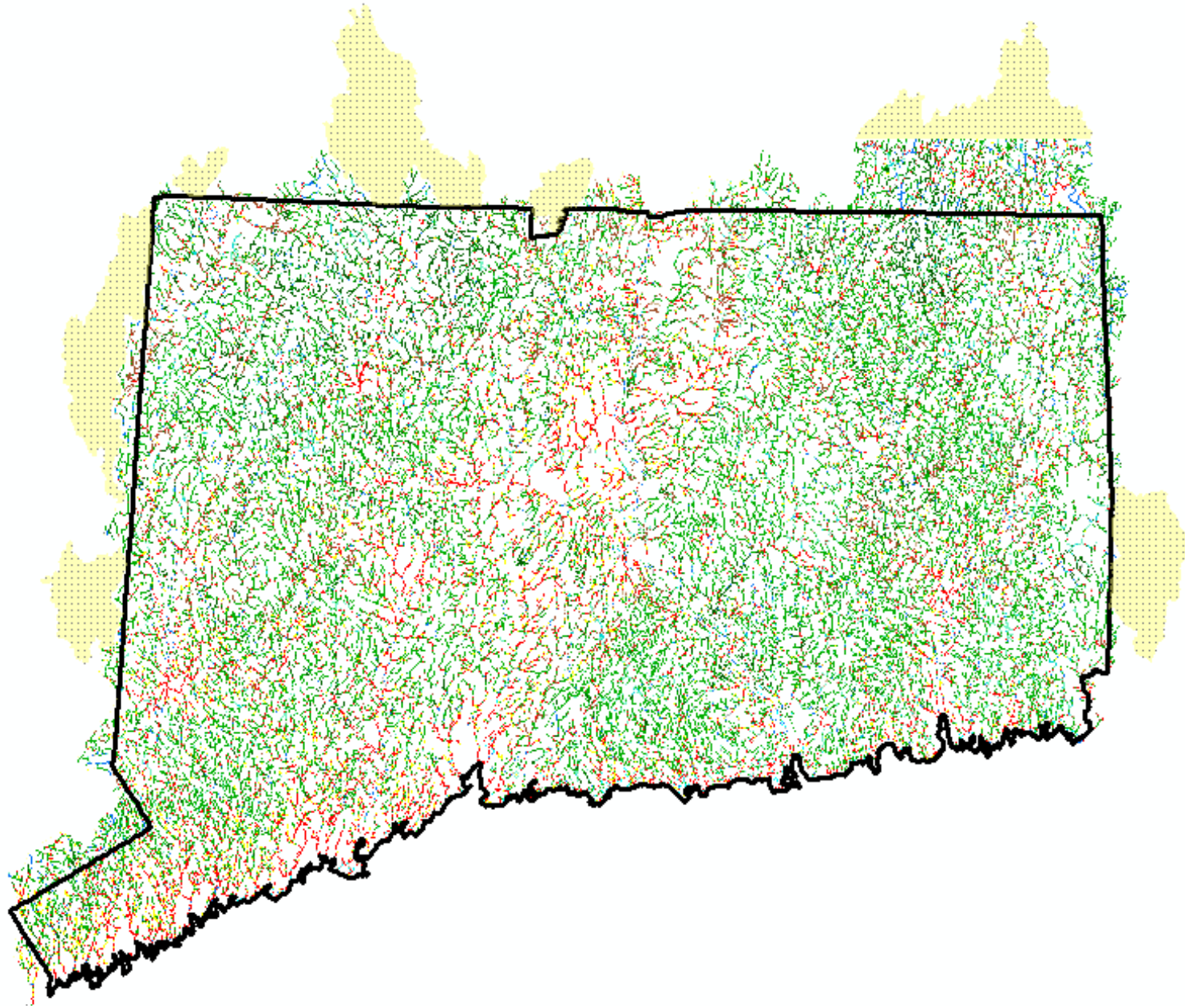
A leap in land cover resolution (2020)

New **1m resolution** NOAA C-CAP land cover enables us to explore our landscape at a level of geographic detail that was previously impossible.

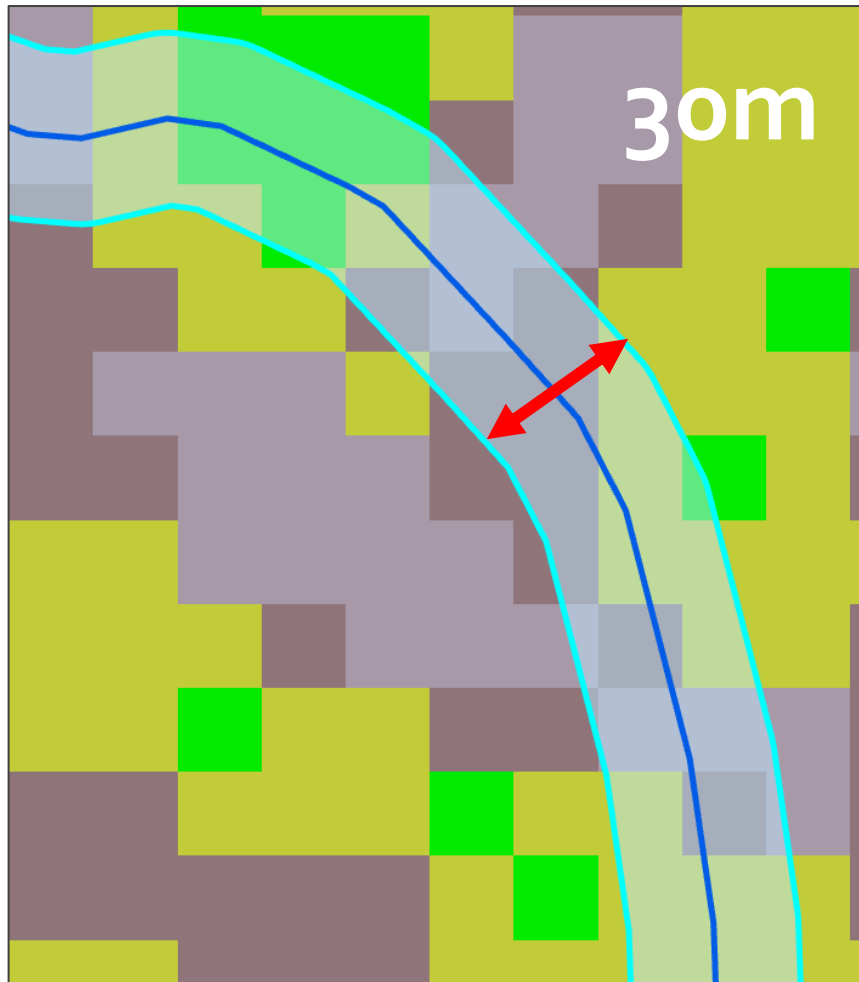


Our first thought:

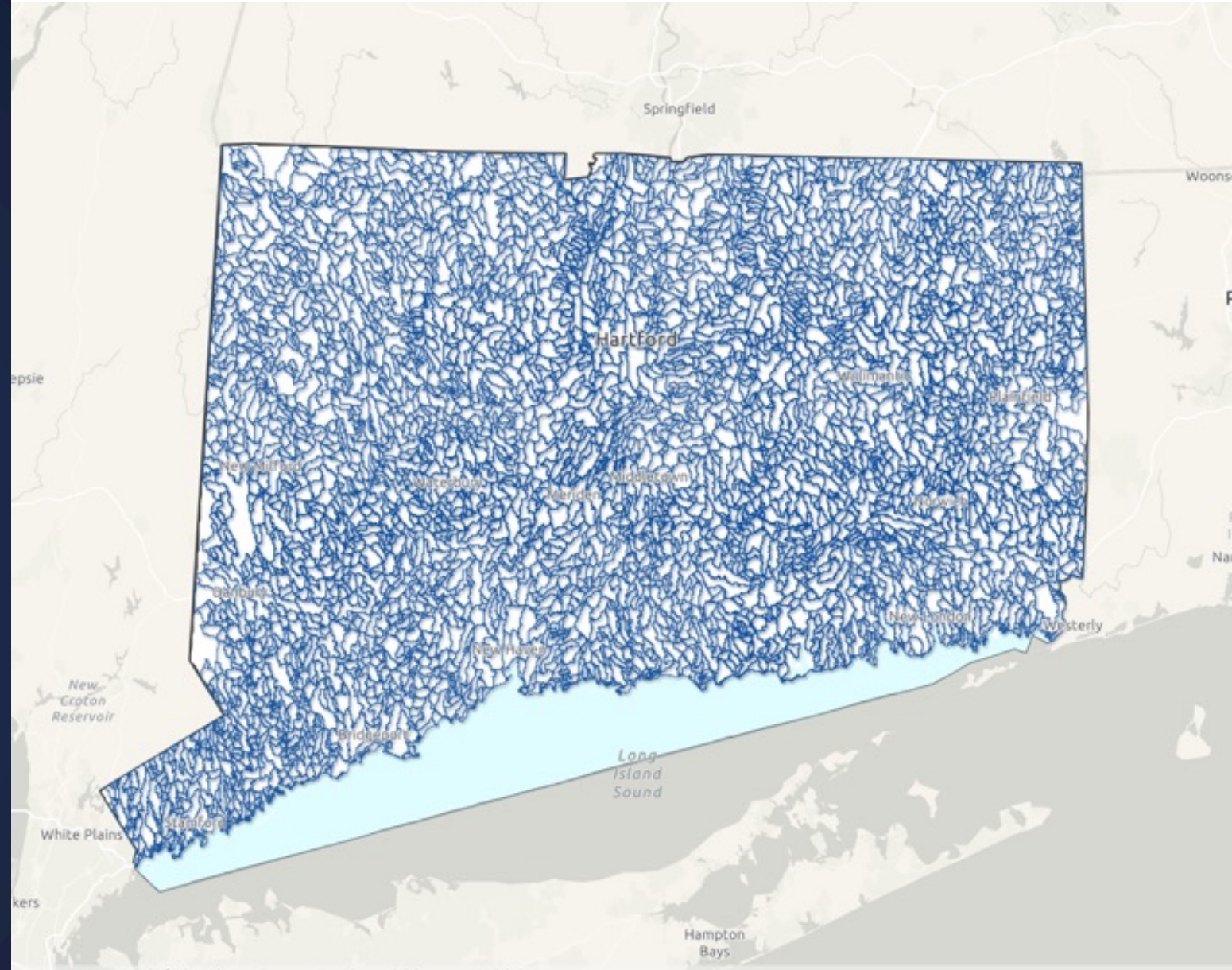
**RIPARIAN
CORRIDORS!**



A more detailed look at riparian corridors



**Looking at the
land use –
watershed health
connection at a
finer scale.**



4,364 basins, average size = 786 ac

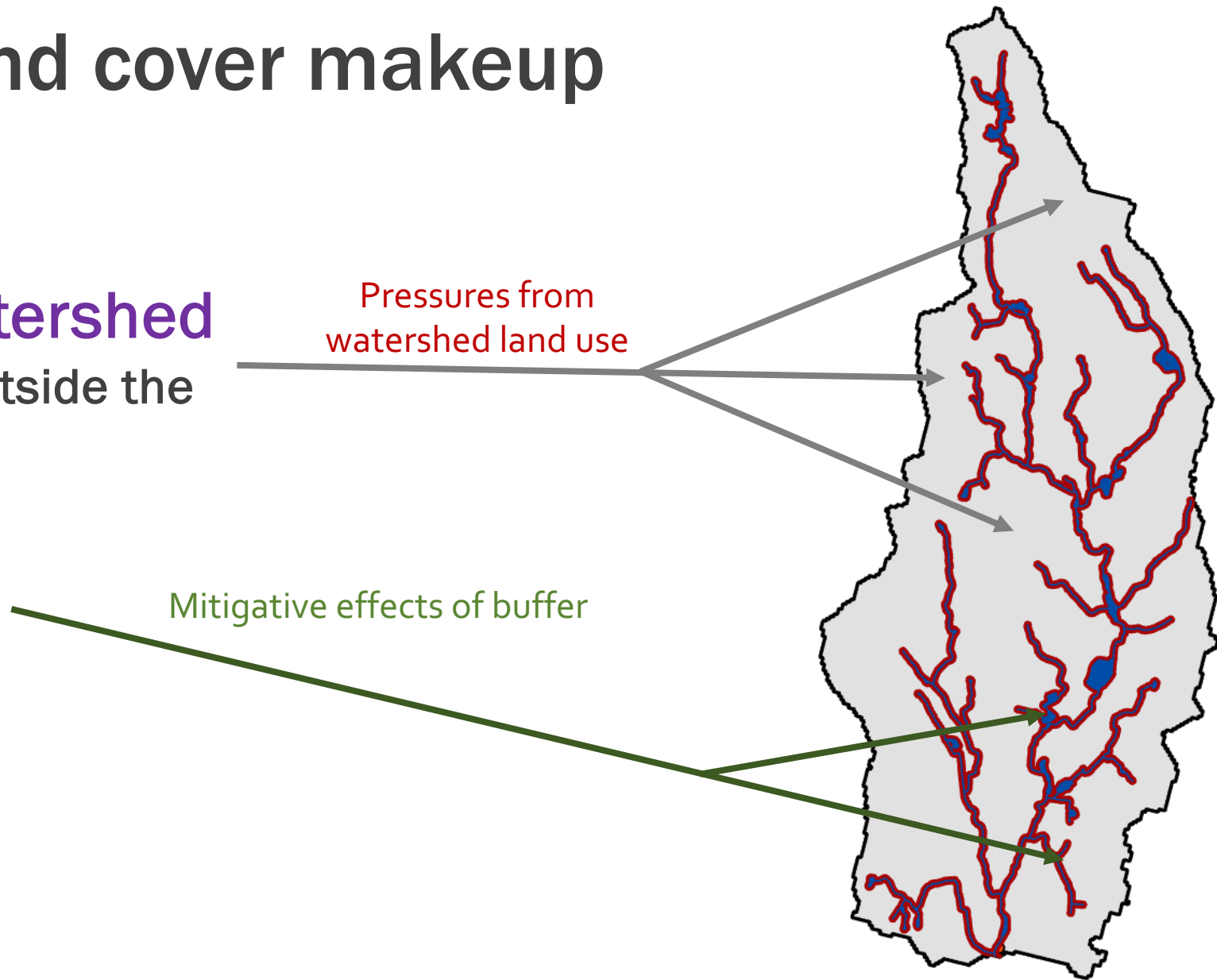
The Combined Condition Index (CCI)



- CCI is a **land cover-based metric** that describes the probable health of a watershed
- CCI is based on the land cover of both the **upland watershed** and the **riparian buffer**
- CCI is **correlated with long-term watershed health** as indicated by the CT DEEP Macroinvertebrate Multi-metric Index (MMI)
- CCI is calculated for each of the **>4,300 local basins** in Connecticut

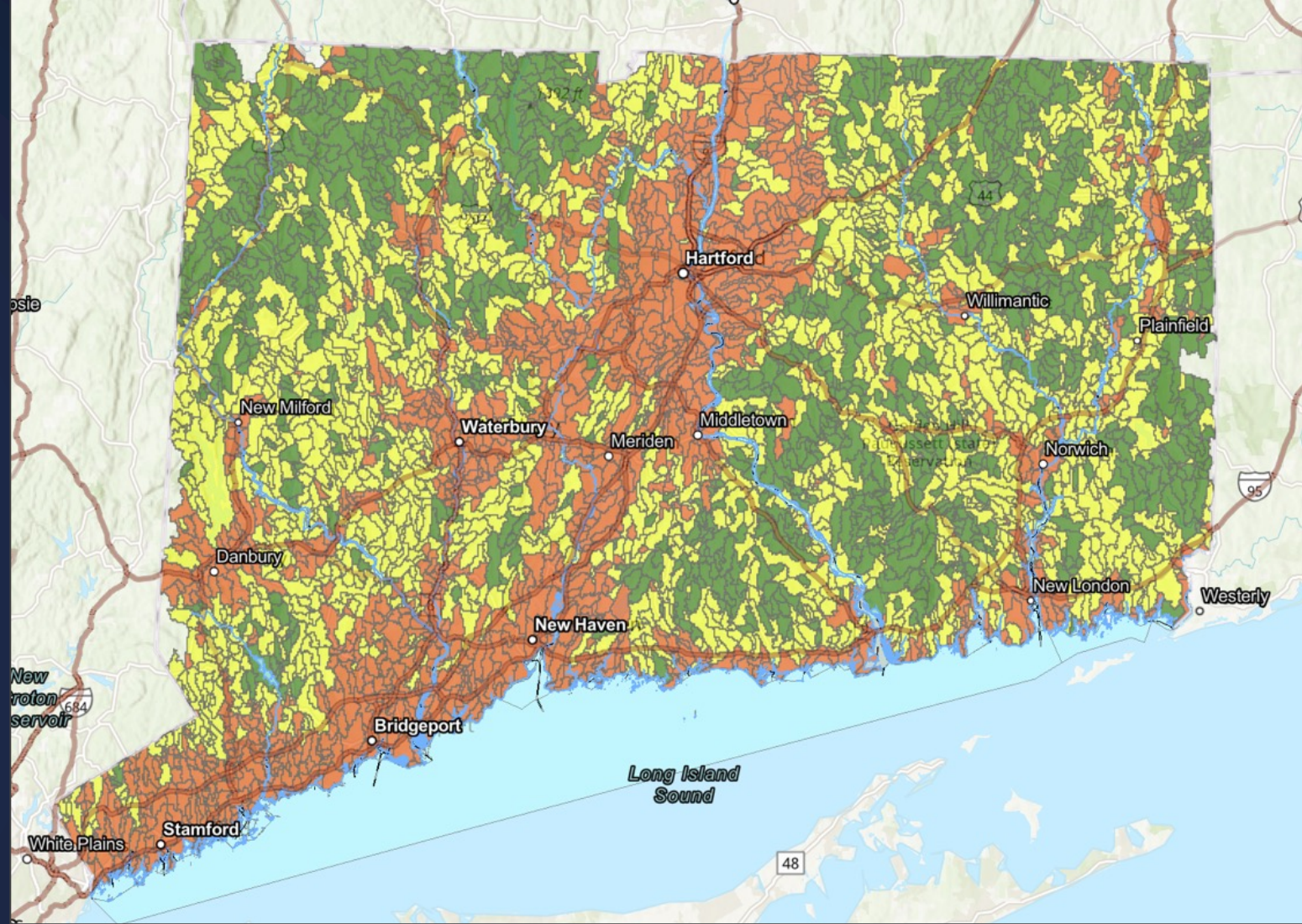
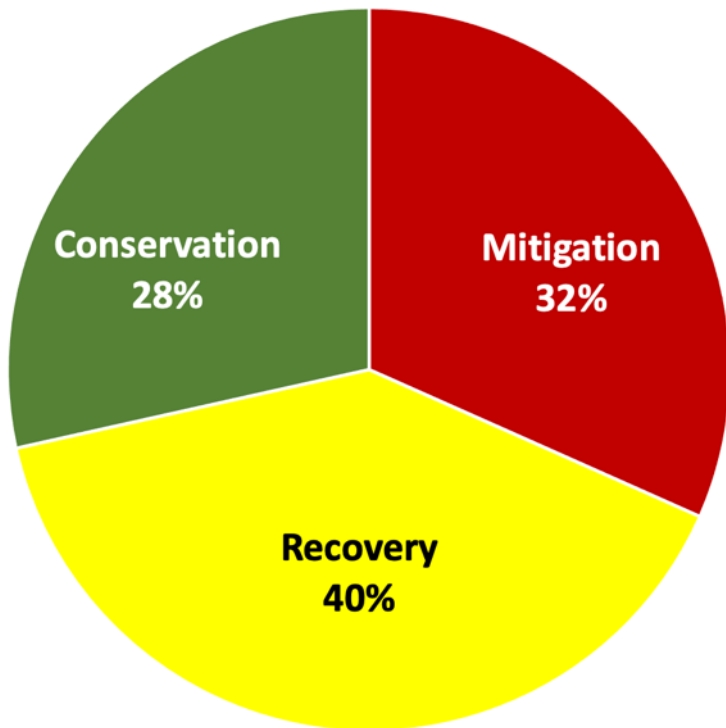
Comparing land cover makeup of two zones:

- **upland watershed**
(everything outside the buffer)
- **100' riparian buffer**



CCI map of CT

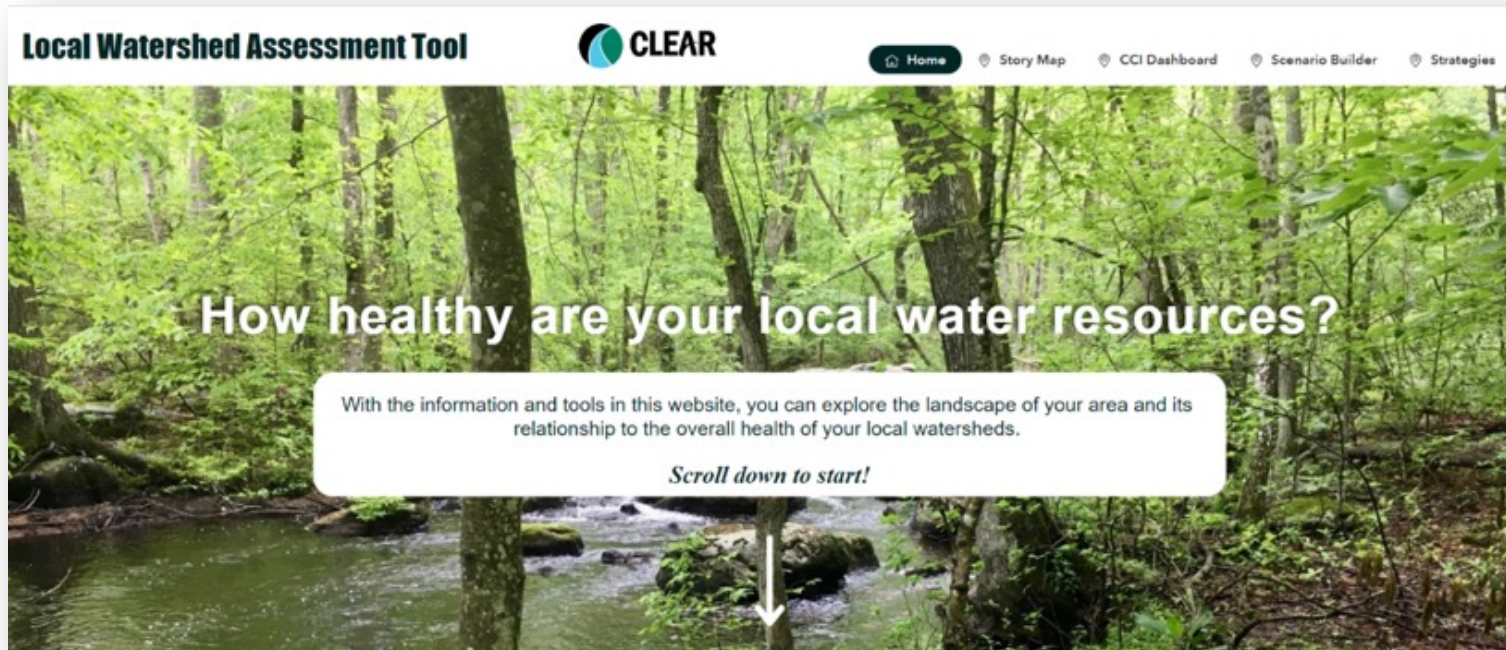
Management Category



CCI indicates the state of, and **suggested land use strategies** for, a local basin

Local Watershed Assessment Tool

- <https://s.uconn.edu/wshedtool>
- integrates a Story Map, Dashboard, and Scenario Builder



Coming up...

*Webinars, workshops,
& tools training*



Online Tool
Training

Watershed
Protection
Strategies



Watershed Protection Strategies

*Land
Conservation*



Watershed Protection Strategies

Green Stormwater Infrastructure



Rain garden on UConn campus

Watershed Protection Strategies

*Riparian protection
through local land
use regulations
(zoning)*

THE CASE FOR RIPARIAN CORRIDOR PROTECTIONS



Zoning Strategies to Reduce Pollution of Inland Waters
and Resultant Hypoxia of Long Island Sound

August 10, 2021
Western Connecticut Council of Governments
1 Riverside Road, Sandy Hook, CT 06482
<http://westcog.org>



Watershed Protection Strategies

Riparian restoration





Comments & Questions?