



Canopies and Stream Health

**Friends of Baker Park
Green Neighbor Forum**

Drew Ferrier

Hood College

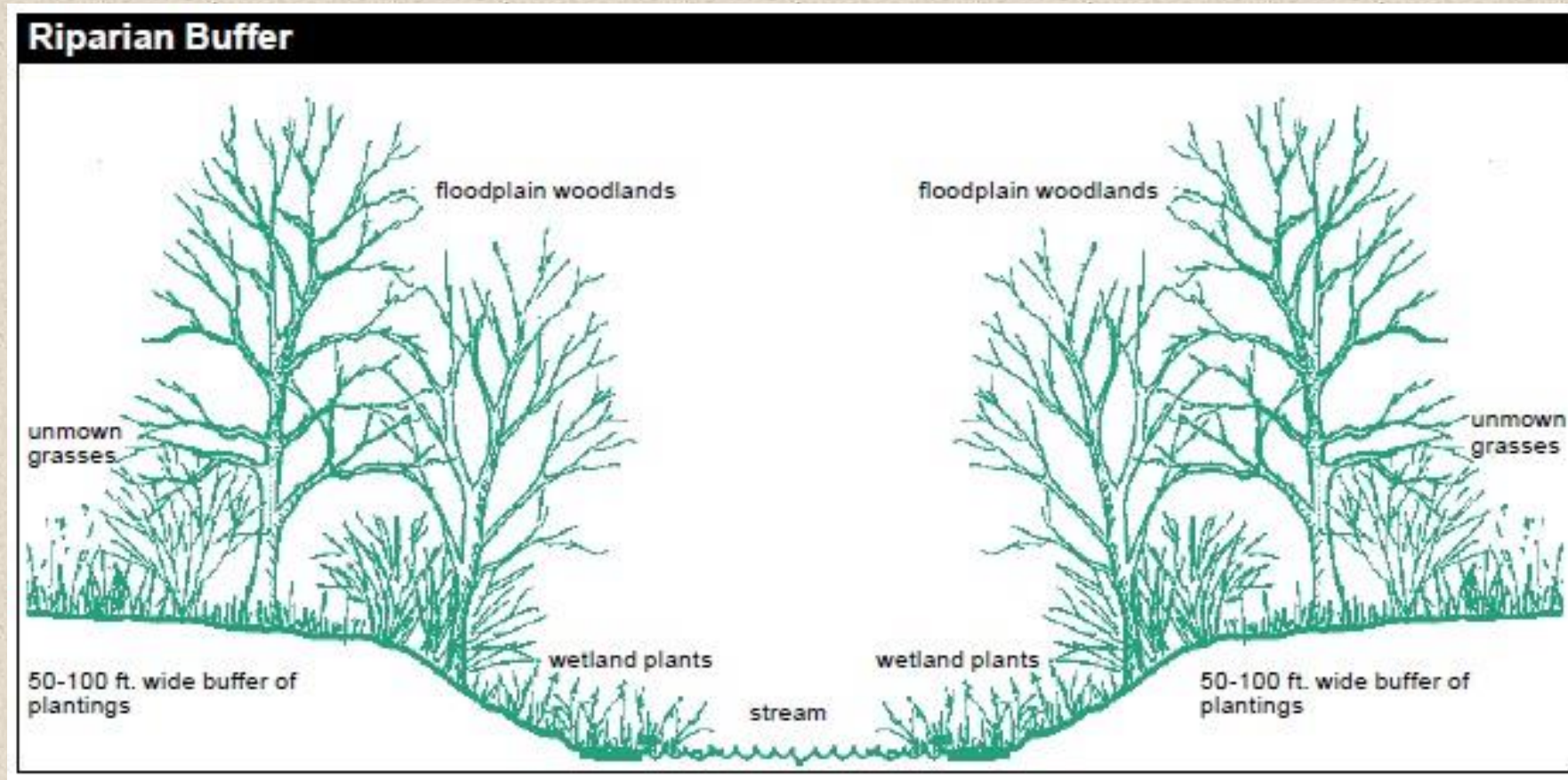
Director, Center for Coastal and Watershed Studies

Professor of Biology

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The Riparian Buffer

A **riparian buffer** is a vegetated area (a "**buffer strip**") near a stream, usually forested, which helps shade and partially protect a stream from the impact of adjacent land uses.



Urban Stream Buffers

Protect streambanks from erosion – Tree roots consolidate the soil.



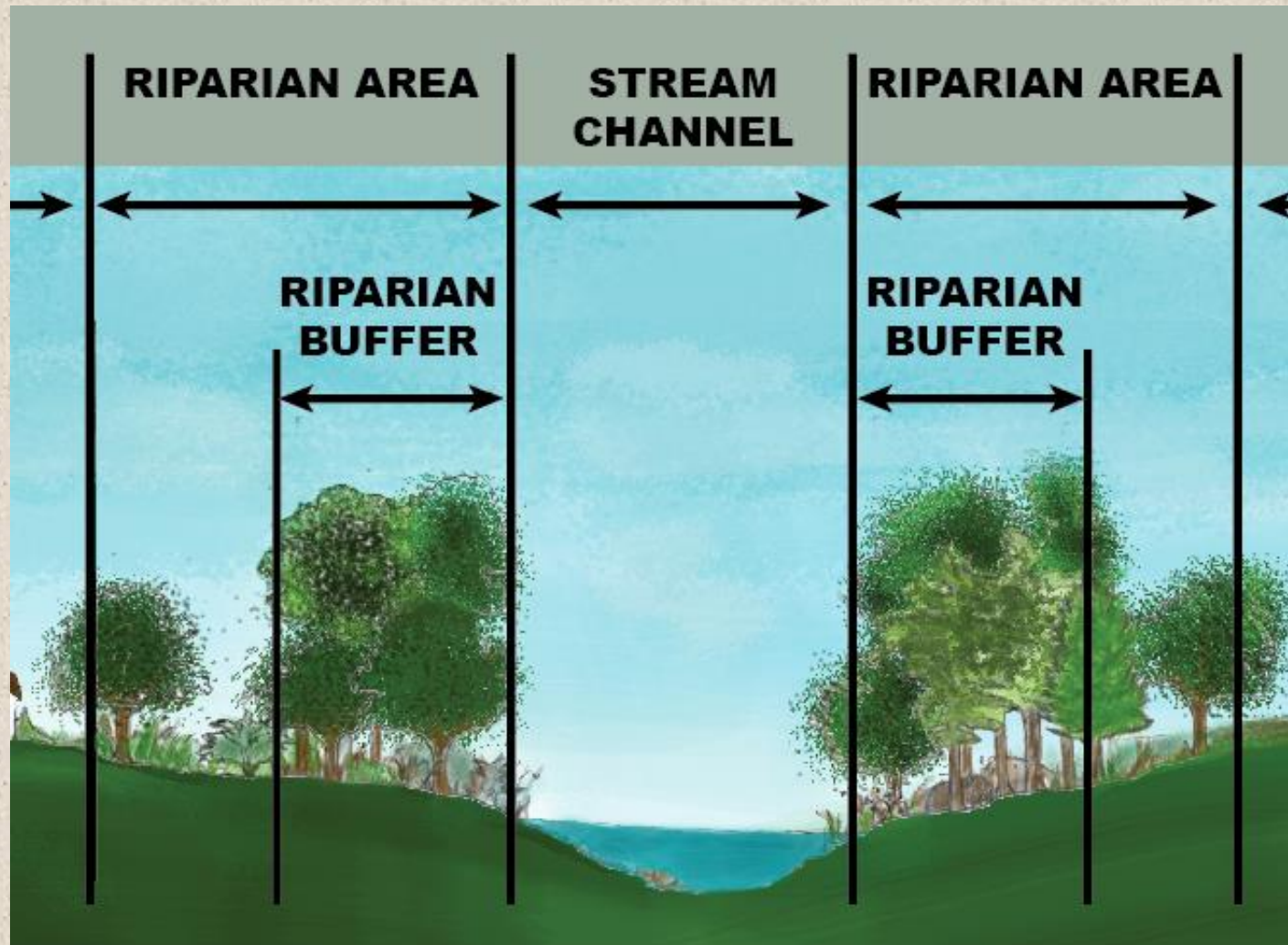
The Riparian Buffer

Mitigates against stream warming



The Riparian Buffer

Increases pollutant removal from runoff and shallow infiltration.



Nitrogen

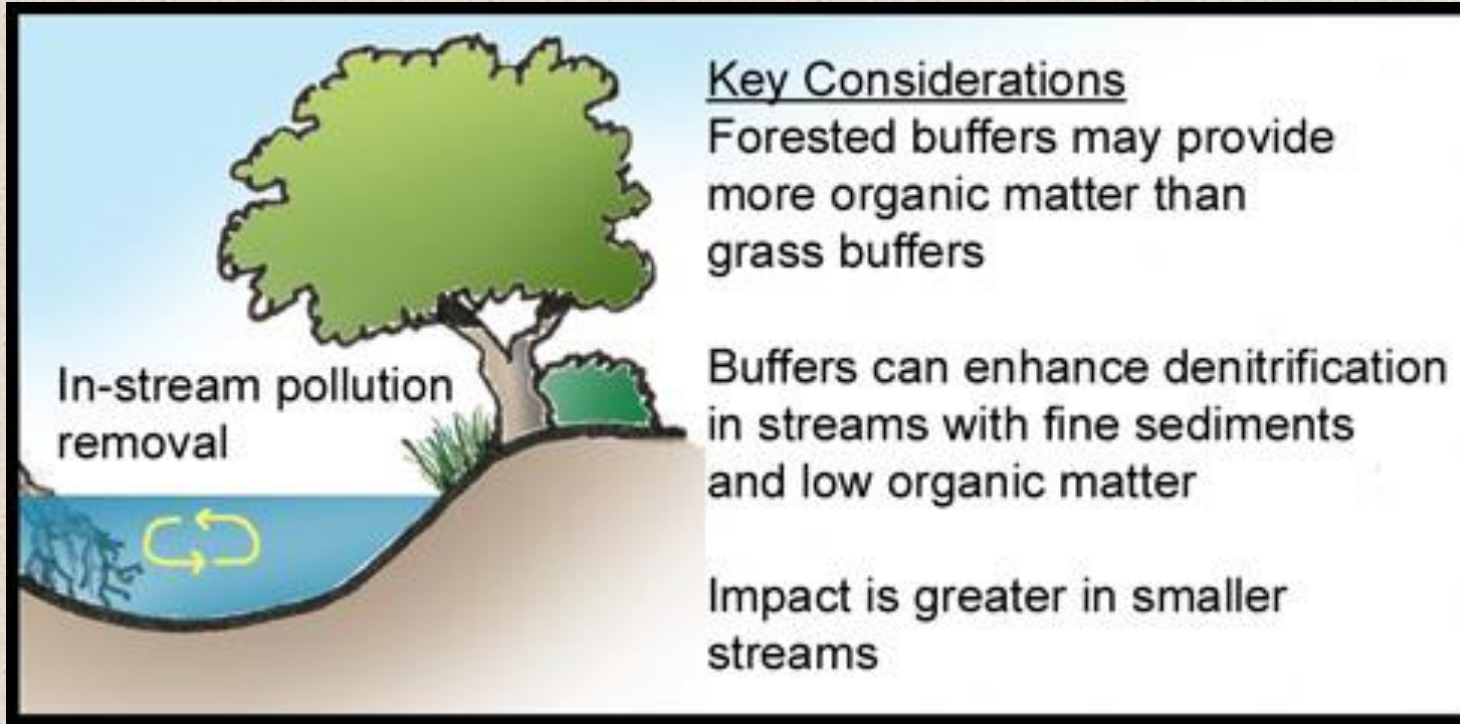
- taken up and stored in vegetation
- denitrification in the soil

Phosphorus

- taken up and stored in vegetation
- particle-bound P accumulates in the buffer

The Riparian Buffer

Increases pollutant removal from within the stream itself.



Nitrogen

- taken up and stored in vegetation
- denitrification in the soil

Phosphorus

- taken up and stored in vegetation
- particle-bound P accumulates in the buffer



**Provide habitats for enhanced
bacterial nitrogen removal.**

Step Pool Conveyances



The Riparian Buffer

Provides food and habitat for stream-side wildlife.



The Riparian Buffer

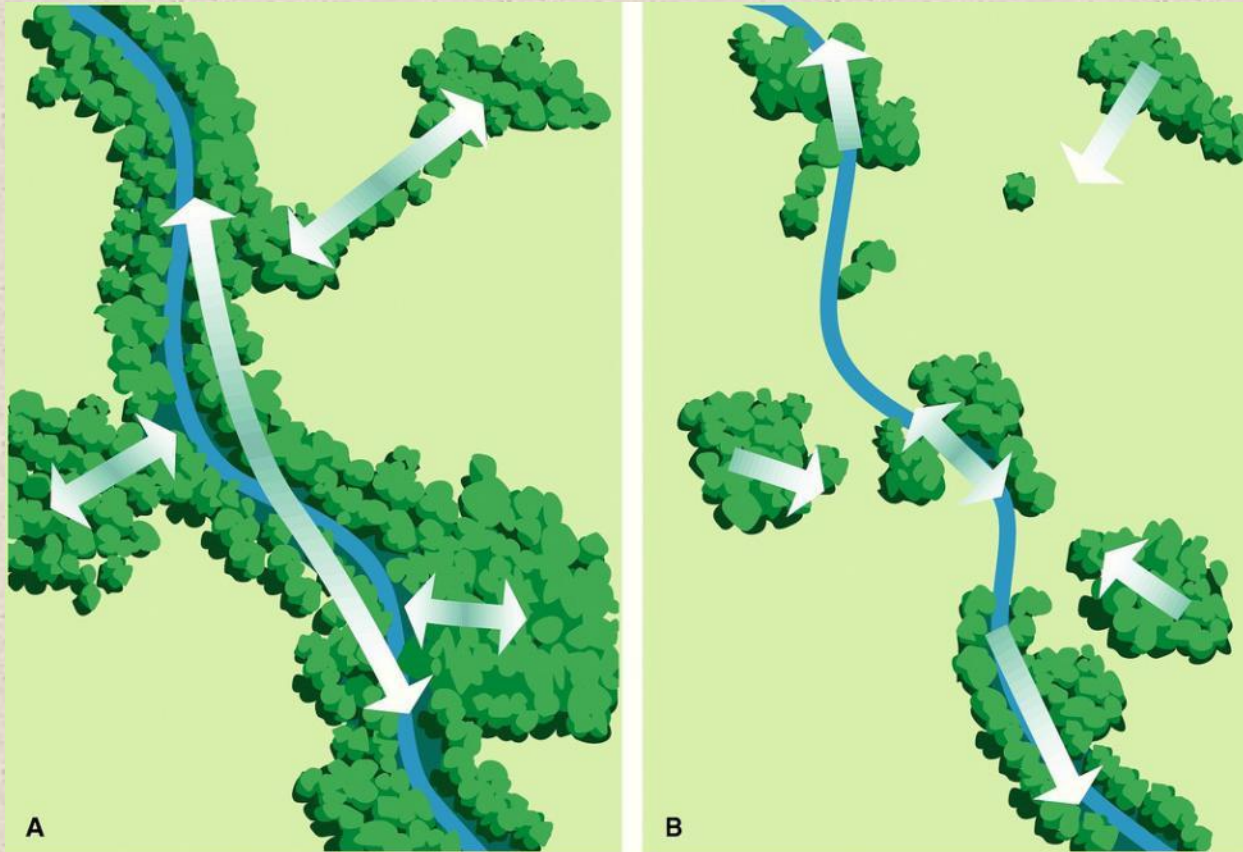
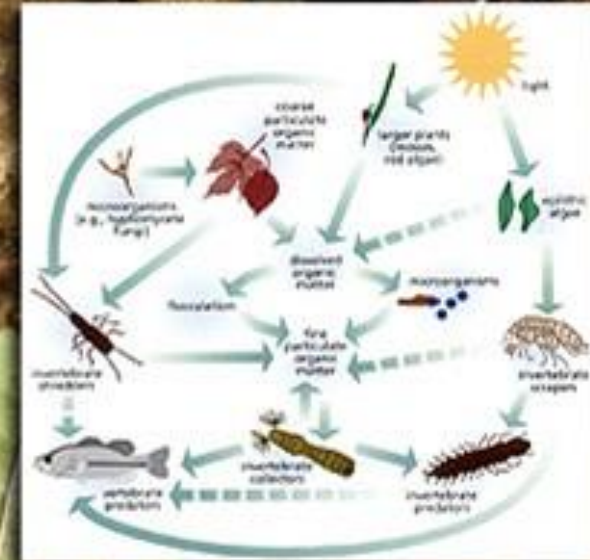


Fig. 2.38 -- Landscapes with (A) high and (B) low degrees of connectivity. A connected landscape structure generally has higher levels of functions than a fragmented landscape.
In Stream Corridor Restoration: Principles, Processes, and Practices (10/98)
by the Federal Interagency Stream Restoration Working Group (FISRWG) (15 Federal agencies of the U.S.)

Provides extended natural habitat for wildlife and “highways” for animal and plant movements.

Feeds the stream ecosystem.

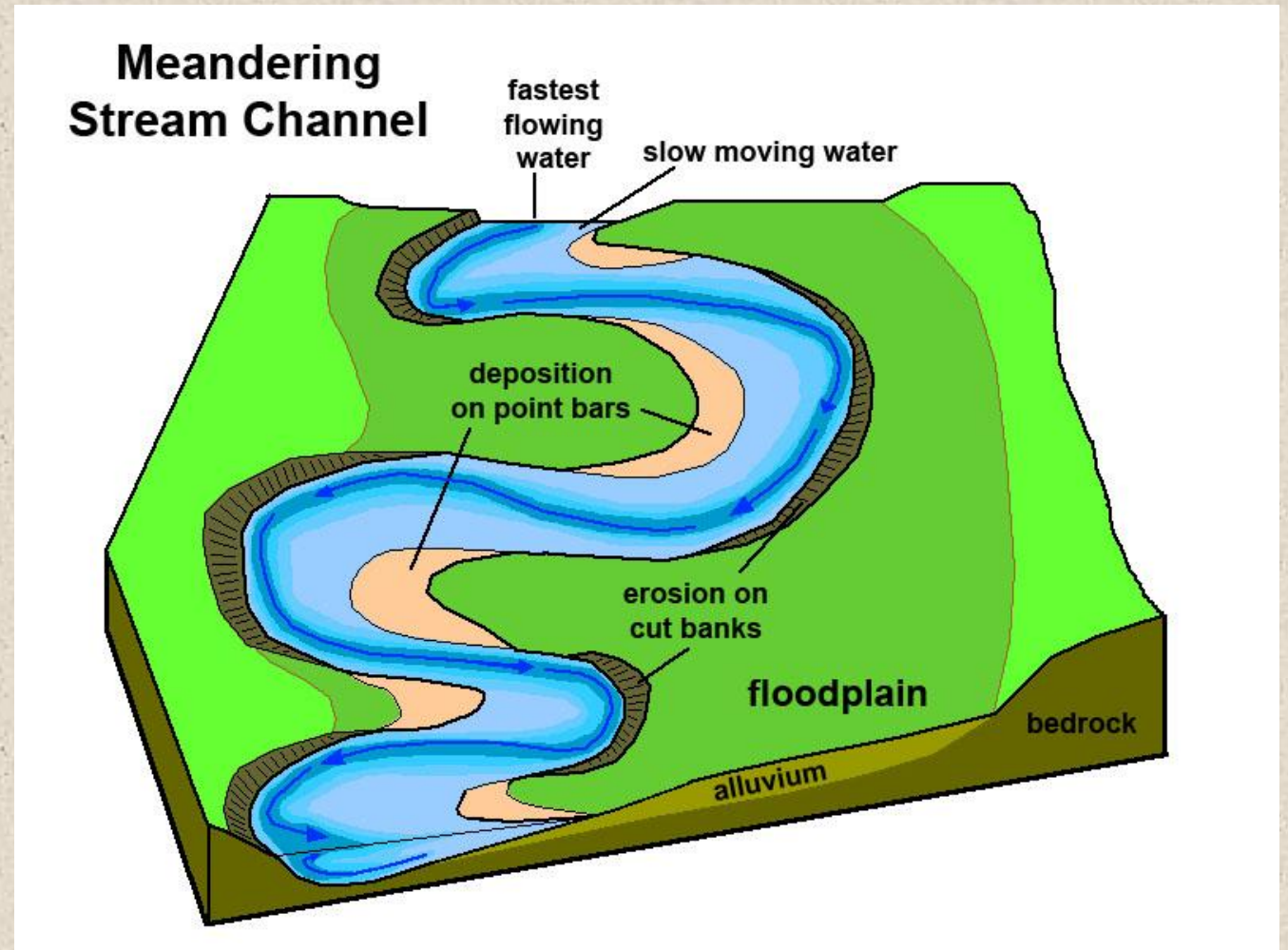
Why are they important?



The Riparian Buffer

Provides some room for natural shifts in the stream channel.

Provides room for periodic rises in water level.



The Riparian Buffer

Provide a foundation for present or future greenways.



The Riparian Buffer

Improves property values in areas nearby.

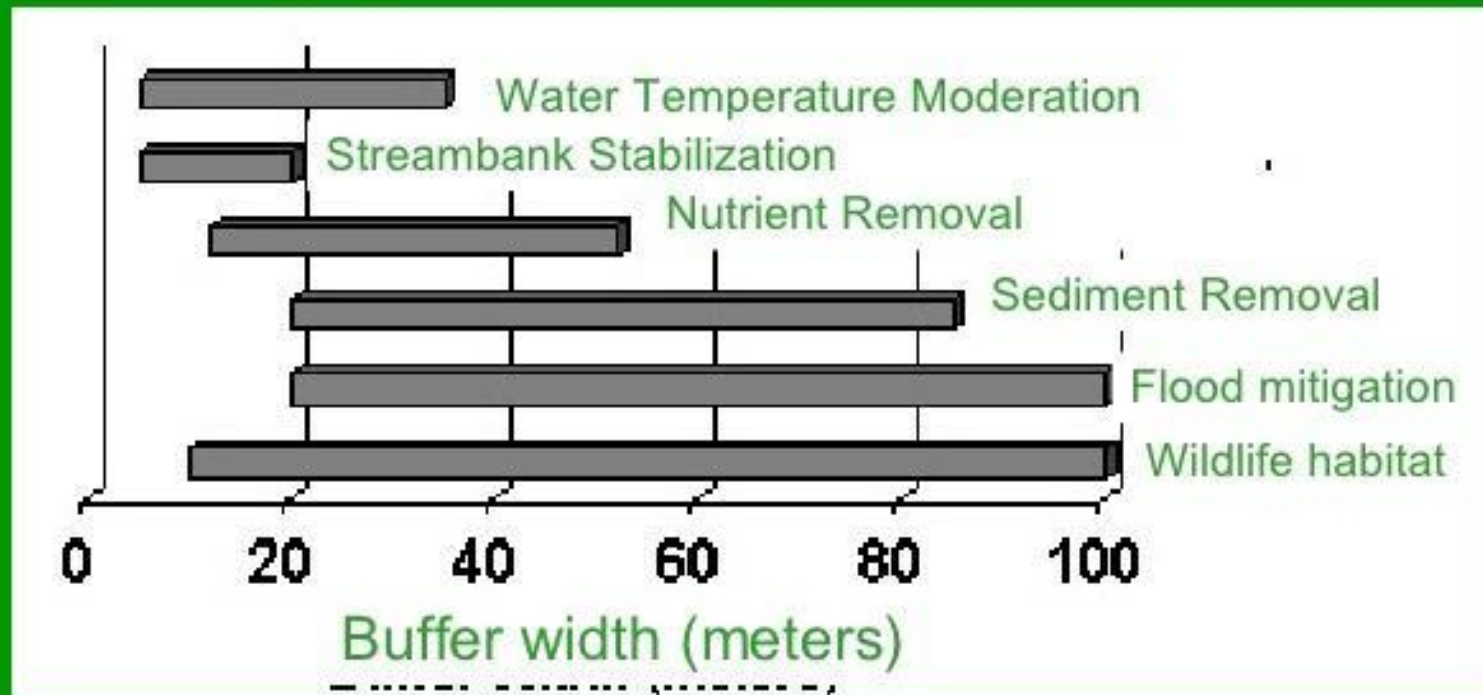
These are cool, quiet, aesthetically pleasing places for passive recreation.



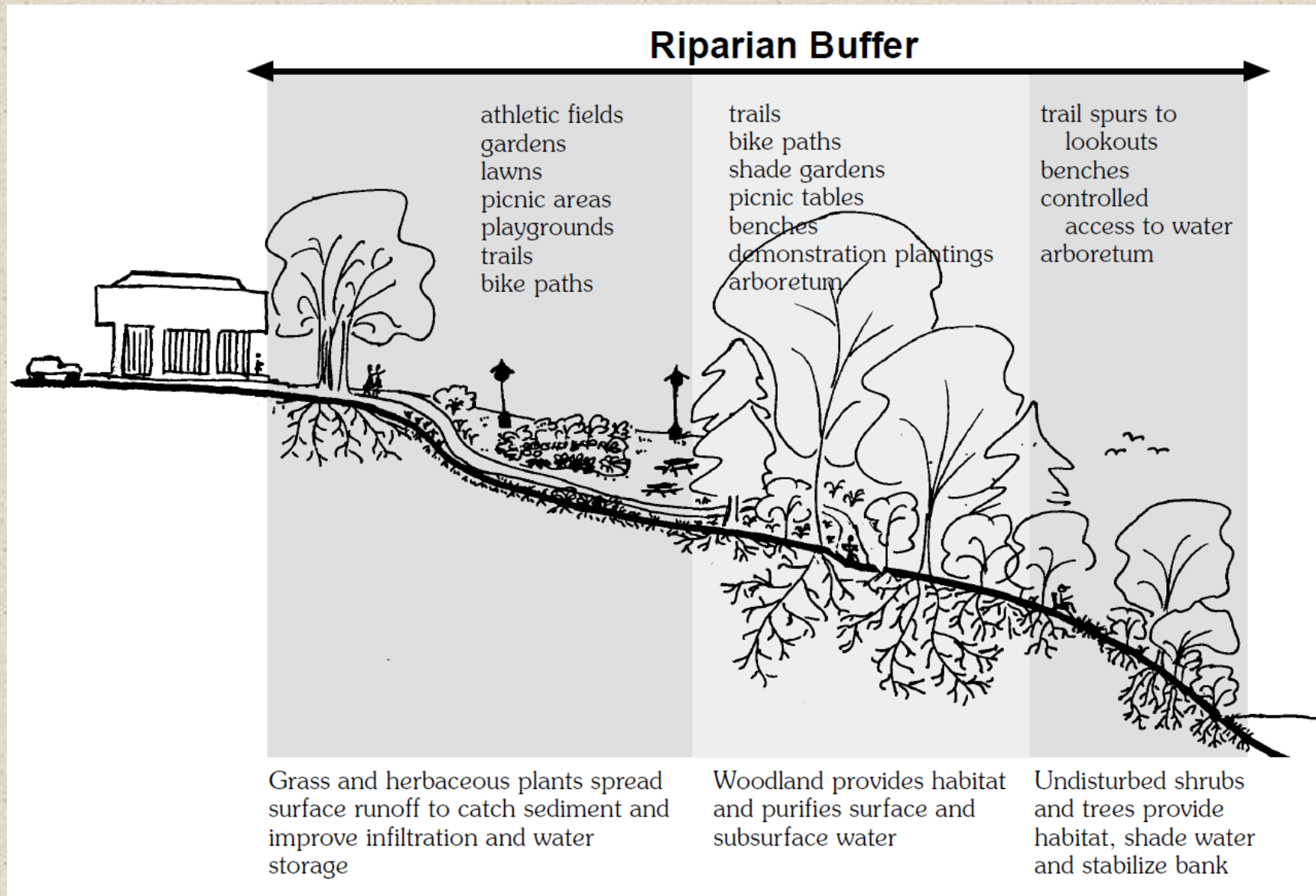
How wide a Riparian Buffer?

Buffer width

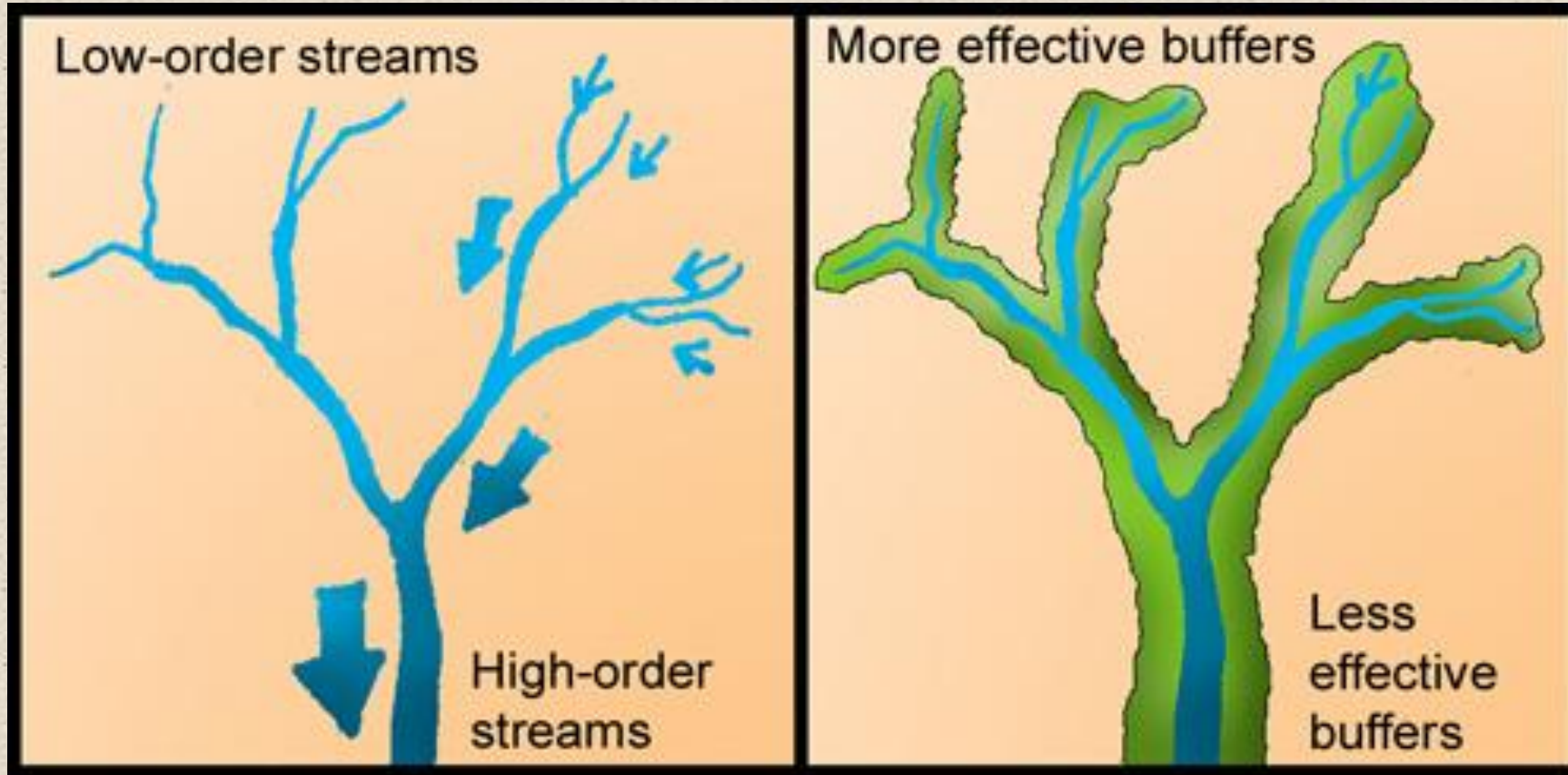
Buffer width is function of desired function
(after A.H. Todd, 2000)



The Structure of an Ideal Urban Riparian Buffer



How many Riparian Buffers?



Riparian buffers work more effectively at protecting small streams. Than larger ones.

How many Riparian Buffers?

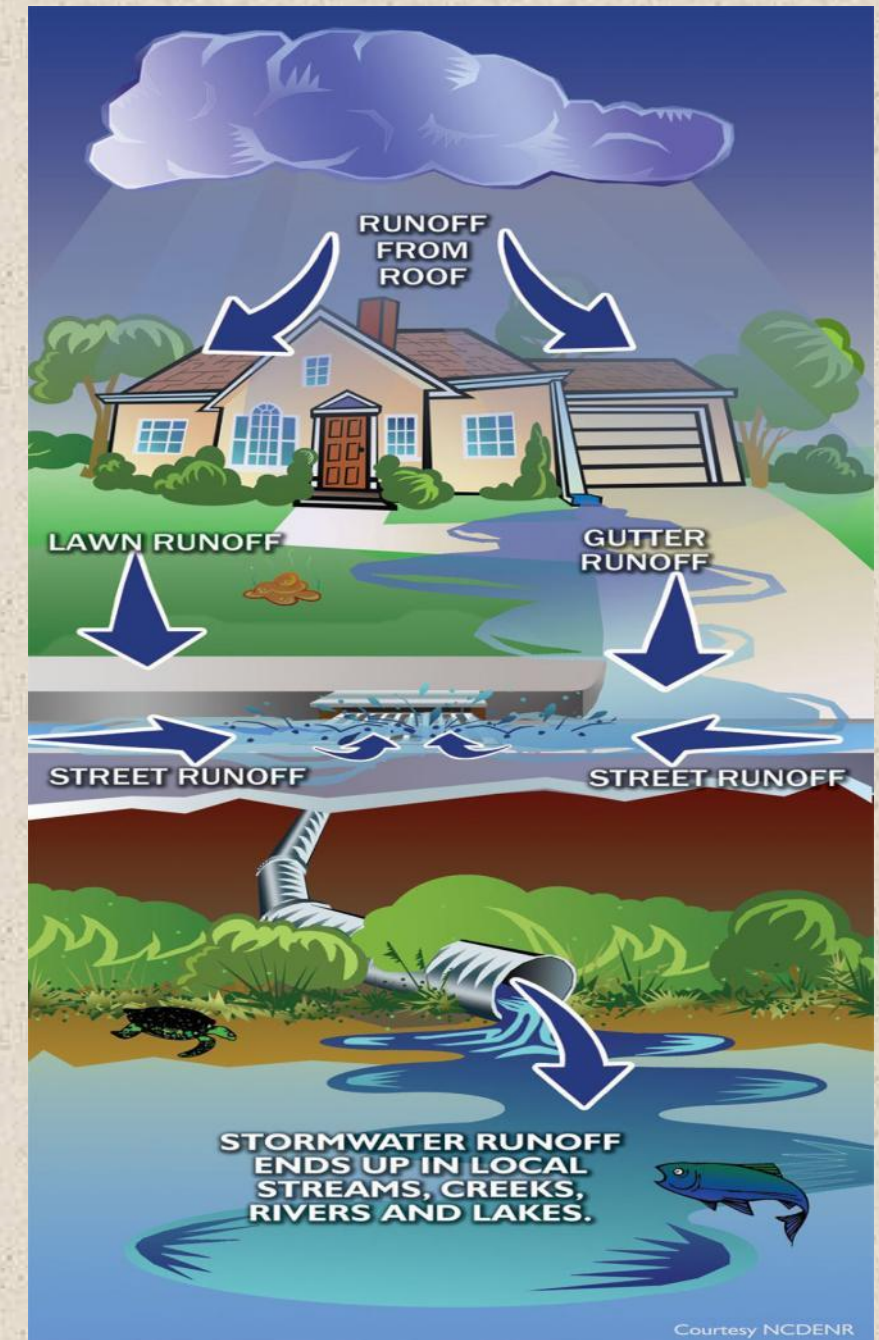
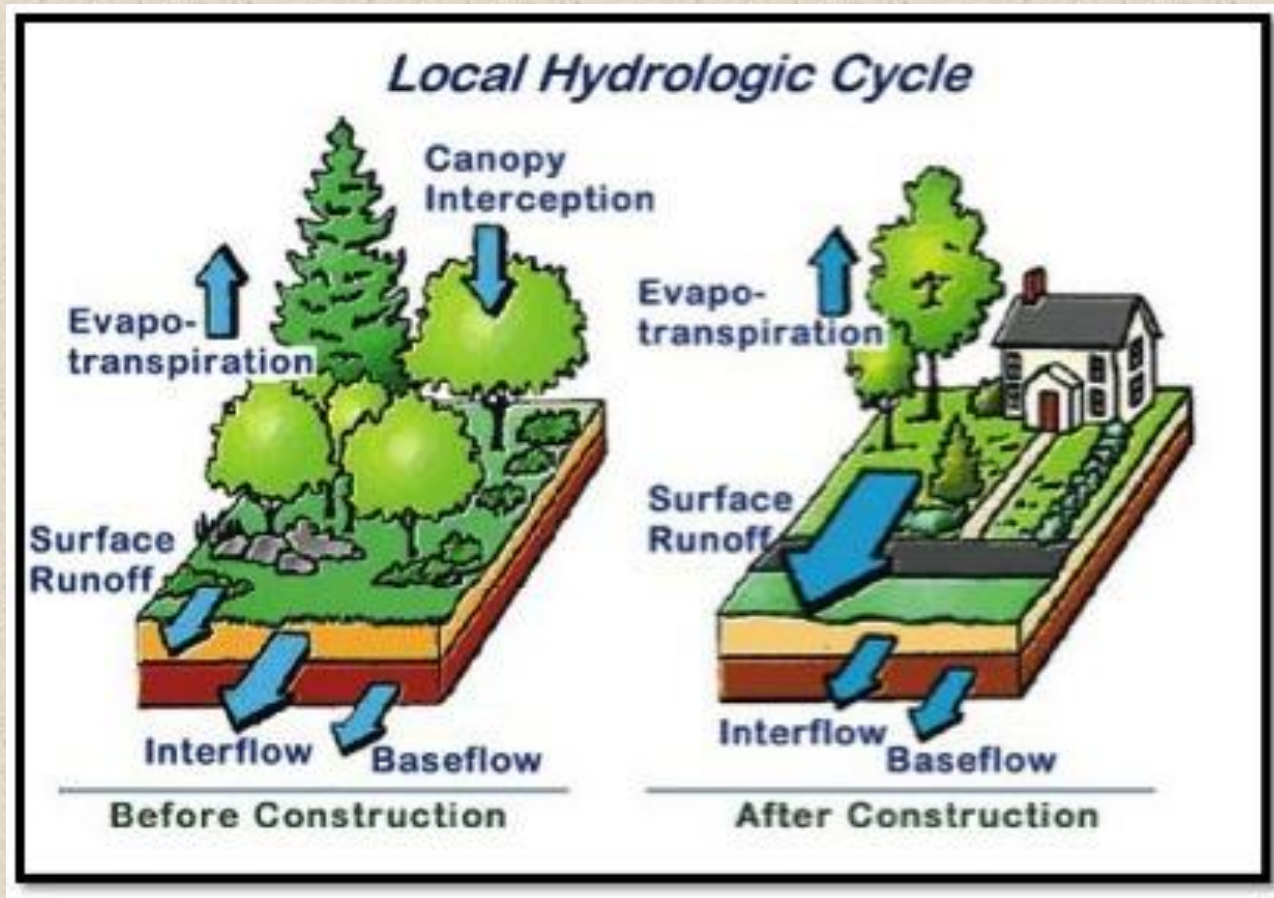
We need riparian buffers on as many of our streams as possible – small, headwater streams especially.

How wide a Riparian Buffer?

We need riparian buffers as wide as can be practical BUT a narrow buffer is always better than no buffer at all.



Traditional Stormwater Management Often Bypasses Riparian Buffers



Traditional Stormwater Management Often Bypasses Riparian Buffers

The effects of urbanization on stream ecosystems are largely driven by impervious cover. There are two general ways to quantify impervious cover:

Total impervious area (TIA) = all impervious area in a catchment

Effective impervious area (EIA) = impervious area in the catchment that is directly connected to stream channels (i.e., precipitation falling on that area is effectively transported to the stream quickly and untreated)



Problem:

The most well-developed riparian buffer cannot mitigate the effects of runoff from effective impervious areas.

Solution:

As much as practical, disconnect impervious surfaces from the stormwater management system. Look for ways to:

“Spread it out.”

“Slow it down.”

“Sink it in.”

Local Opportunities to Improve Streams by Enhancing their Riparian Buffers

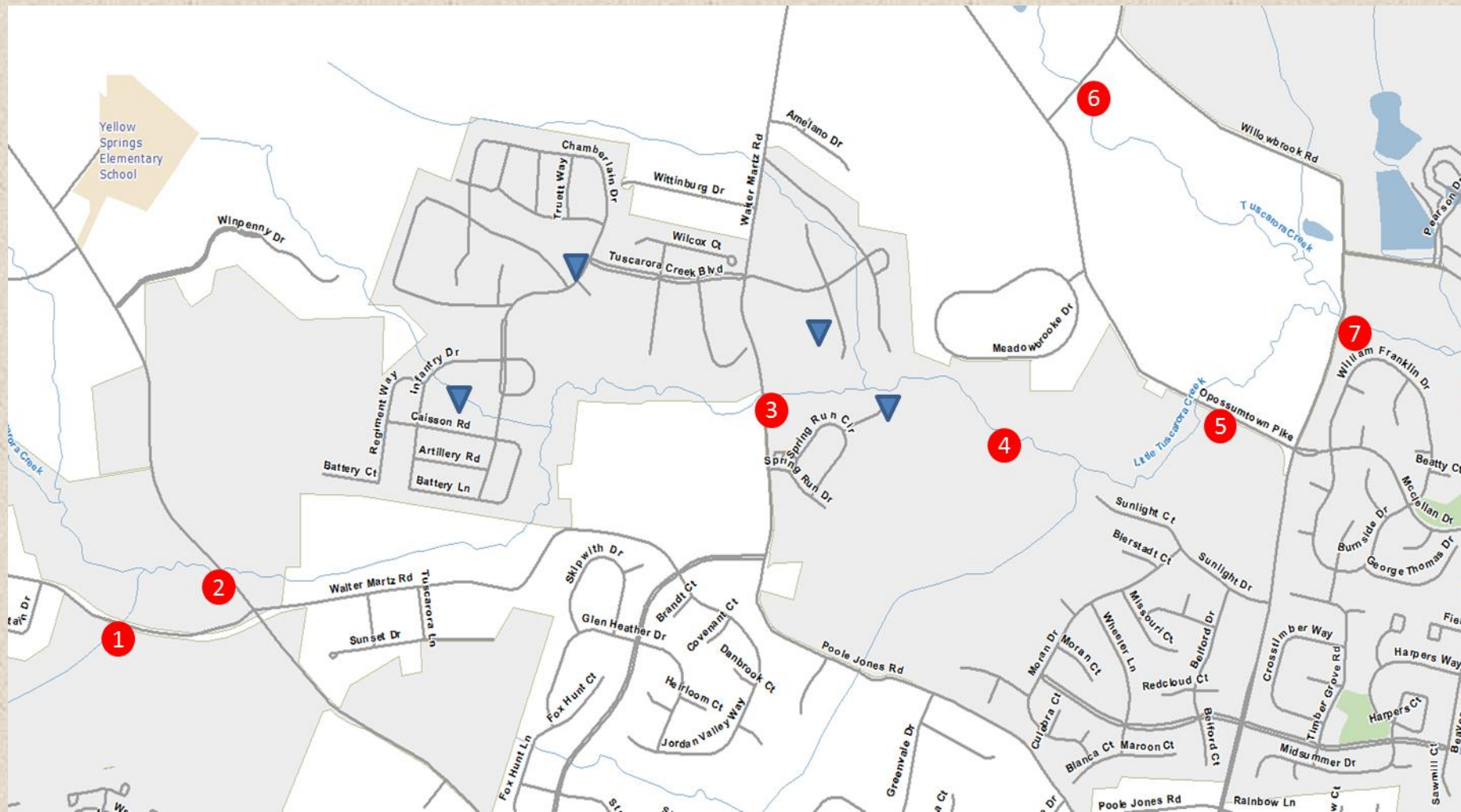
Some Examples



Brook Trout

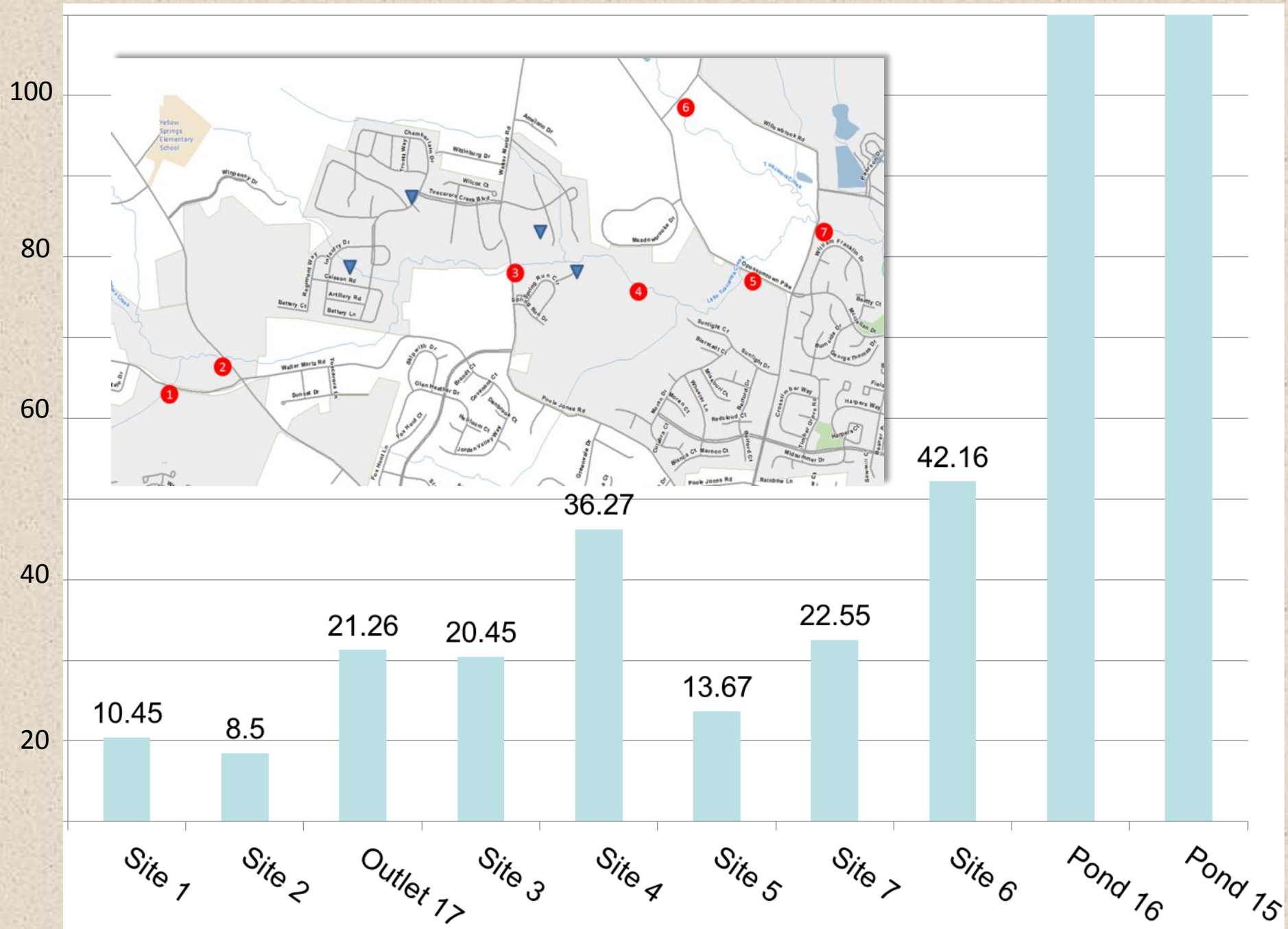
**Maryland's only native trout species
and a resident of Frederick City**

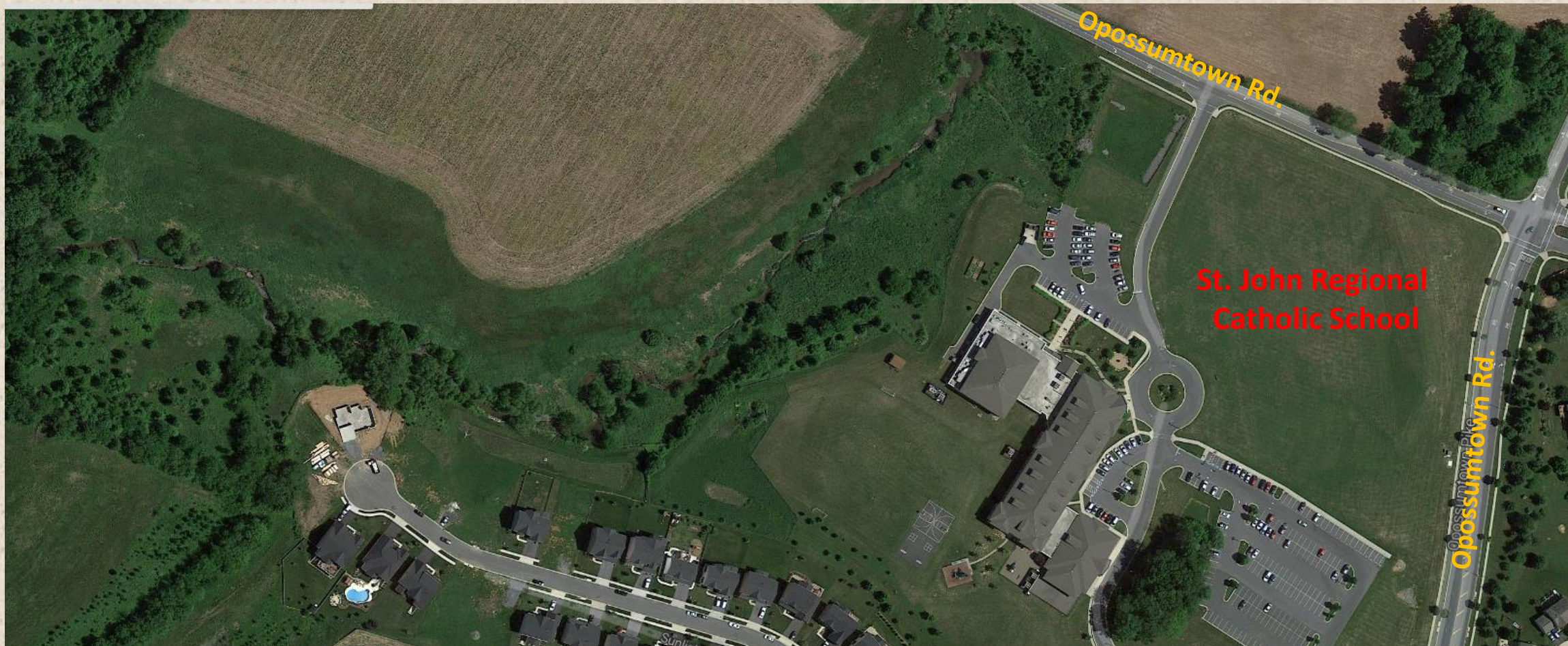




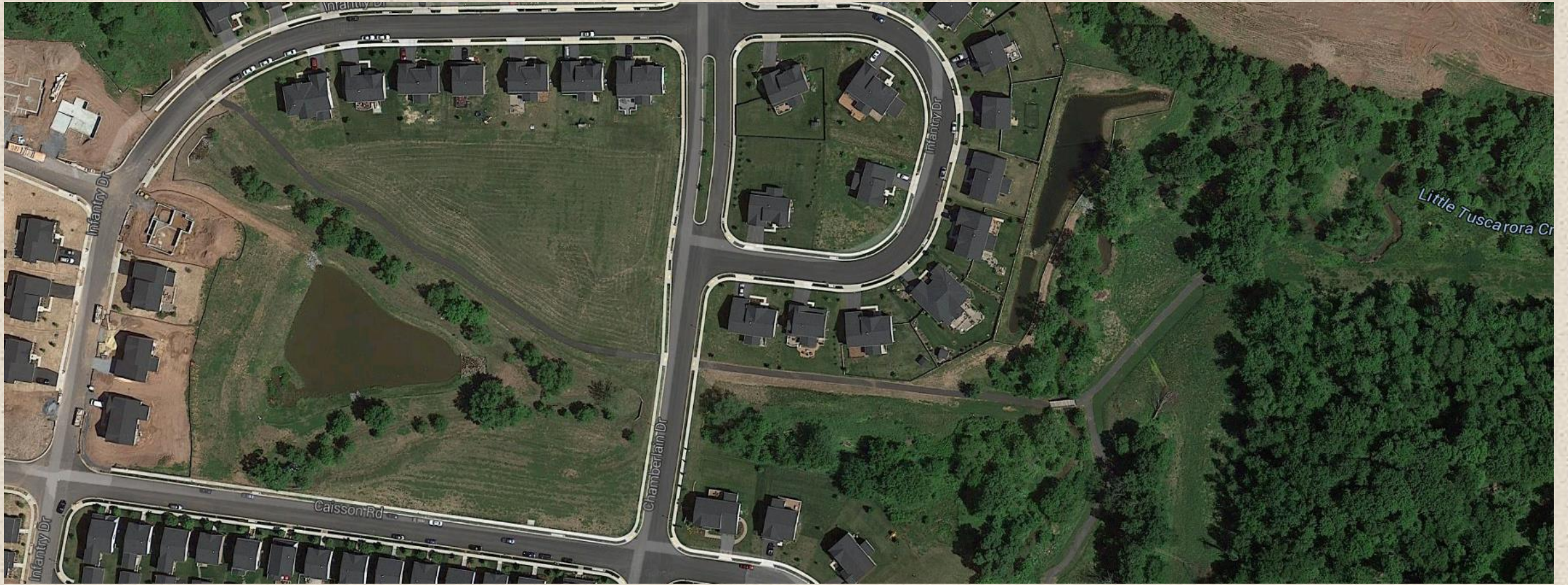
**Little Tuscarora Creek
Northern Frederick City**

Percent of Time Water Temperature Exceeds Optimum for Brook Trout





Little Tuscarora Creek



Little Tuscarora Creek

Project BOOST: BrOOkie Science and Technology



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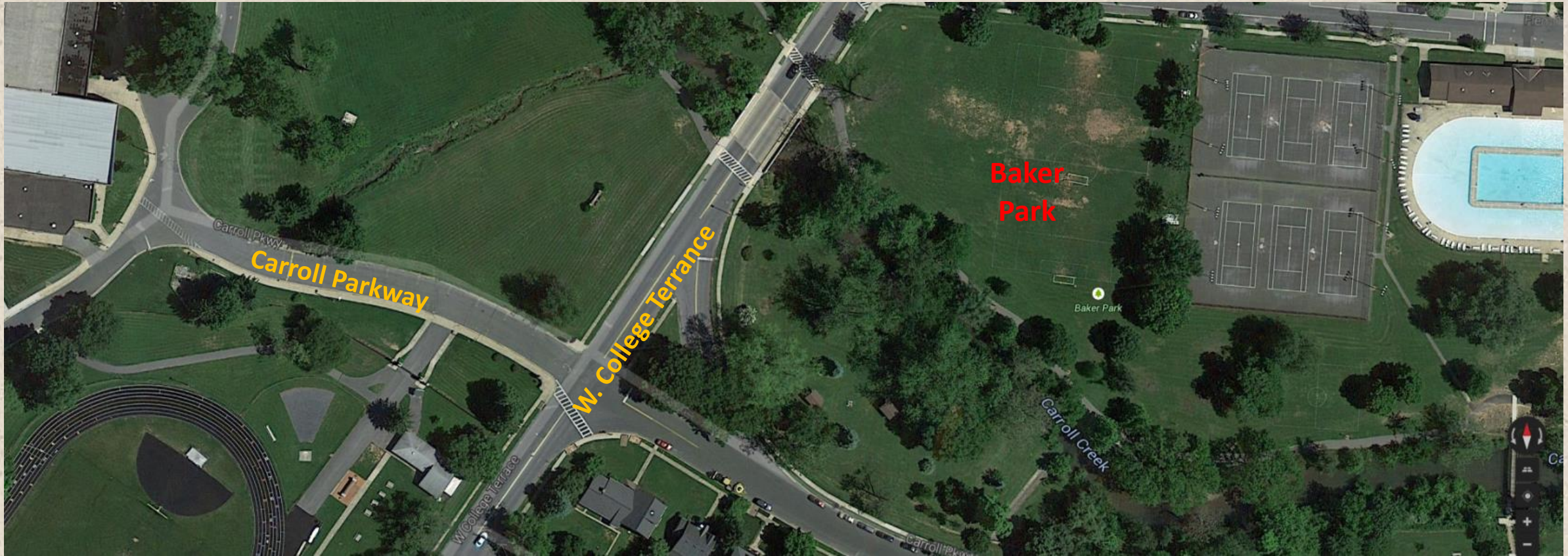


Frederick County Public Schools
Reach. Challenge. Prepare.





Rock Creek



Unnamed Tributary to Carroll Creek



Unnamed Tributary to Tuscarora Creek





Look for locations on your property or in your community where riparian buffers can be created or enhanced.

Community resources are available to help.

Get involved.

Improve our local environment.