Here Comes the Rain Again:
Stormwater Management to Meet a Changing Climate

Kevin Fitzpatrick, P.E.

East of Hudson Watershed Corporation

Fitzpatrick Engineering and Consulting

Presentation Overview

- EOHWC
  - Stormwater Management Through Collaboration
- Stormwater Basics
  - Hydrologic cycle
  - What is in our stormwater runoff?
- Changing Weather Patterns
- How Professionals Need to Adapt
- Tyler Lake Case Study
- Broader Solutions
- Questions

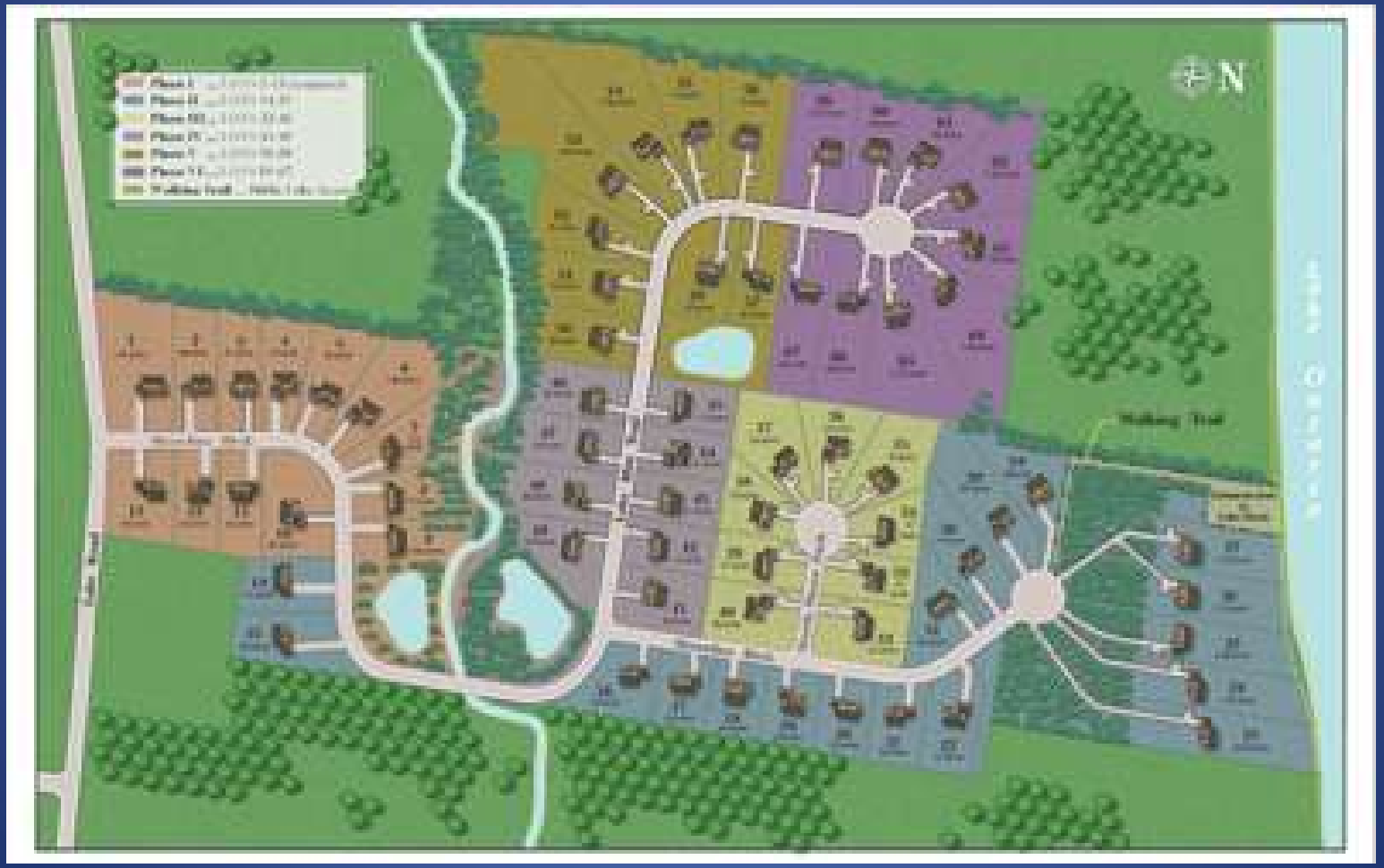
Stormwater Management Through Collaboration

- Formed to address heightened P-Reduction
  - Regional Stormwater Entity (RSE).
  - 1380 kg over a 15-year period.
  - Bubble compliance for the members

- Carmel (T)
- Putnam Valley (T)
- Kent (T)
- Southeast (T)
- Patterson (T)
- Bedford (T)
- Cortlandt (T)
- Lewisboro (T)
- Mt. Kisco (T/V)
- New Castle (T)
- North Castle (T)
- North Salem (T)
- Pound Ridge (T)
- Somers (T)
- Yorktown (T)
- Brewster (T)
- Pawling (T/V)
- Putnam County

Stormwater Basics

Stormwater Basics



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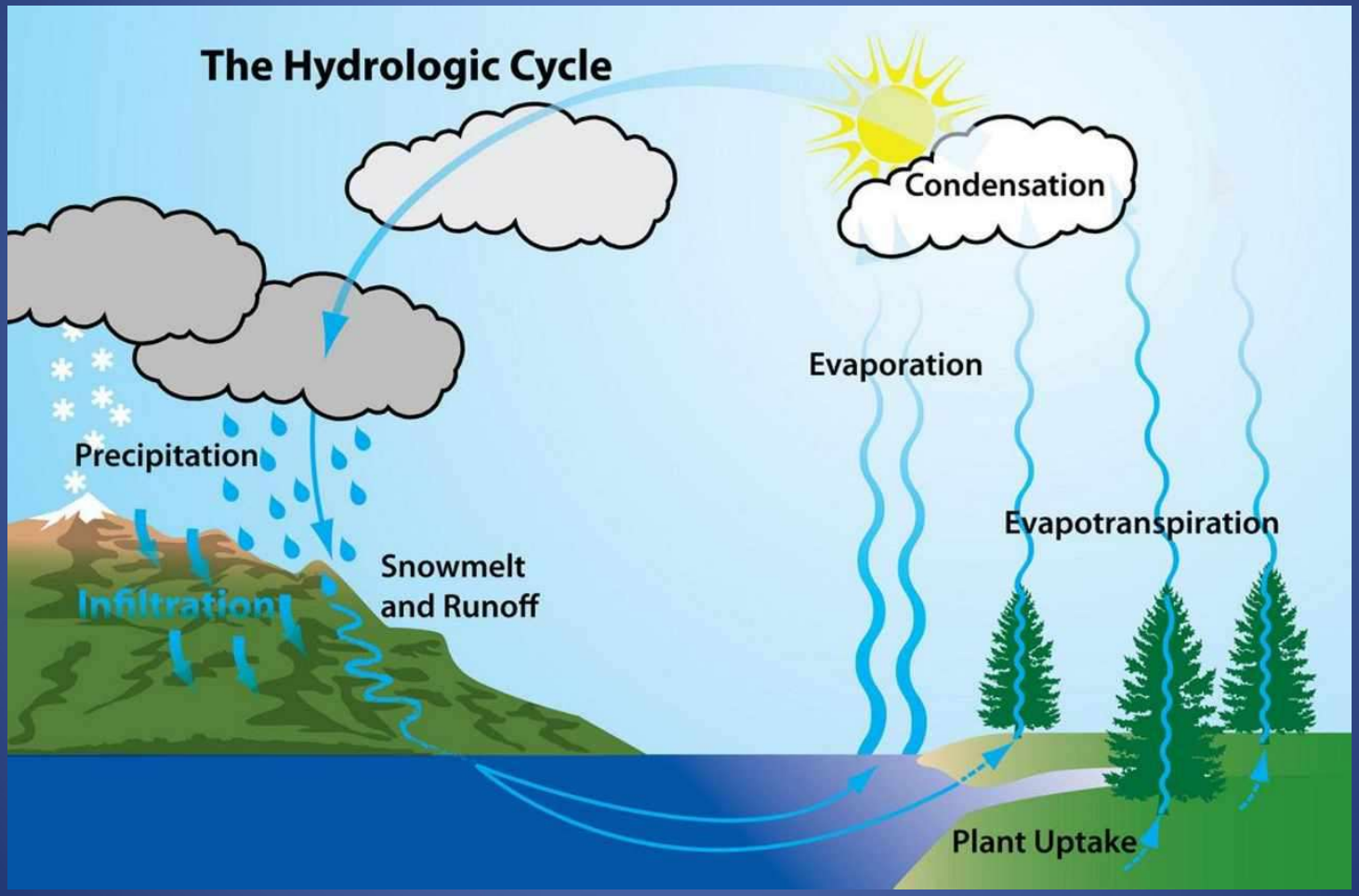


It’s Just Rainwater, Right?

It’s Just Rainwater, Right?

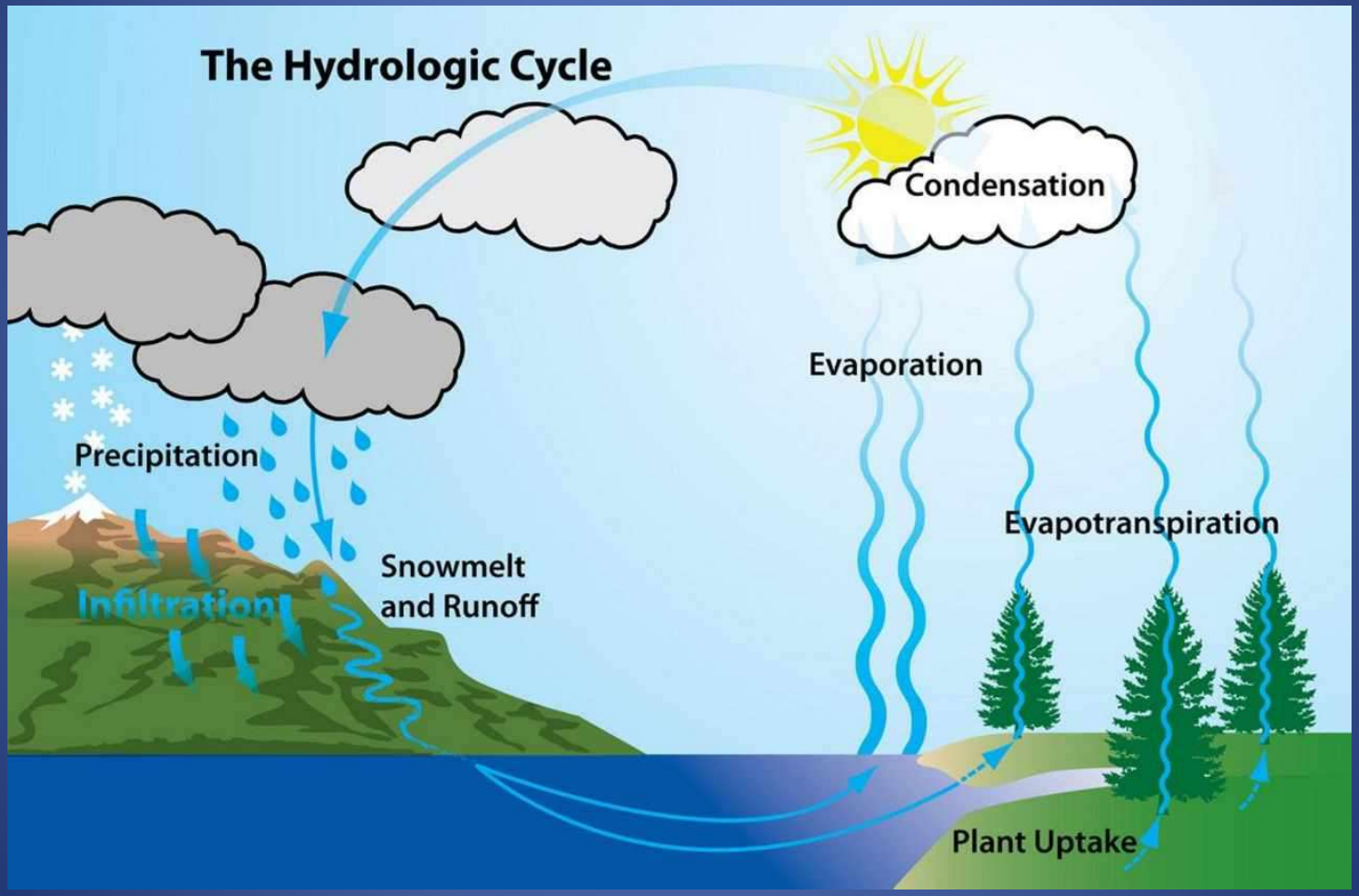
- What we can see
  - Lawn debris
    - Cut grass
    - Leaves
    - Sediment
  - Life debris
    - Trash
    - Toys
    - Pets?
- What we can’t see
  - Oil/Grease
  - Fertilizer
  - Pesticides
  - Nitrogen/Phosphorus
  - Heavy Metals
  - Organic Carbon
  - Bacteria
  - Road Salt

Changing Currents

- Whether man-made or natural, things are changing around us!
  - Since 1970, avg. temperatures have increased by 0.60 deg F/decade (winter temps by 1.1 deg F)
    - More winter rain, less snow
  - Northeast has seen 70% increase in heavy rainfall since 1958
    - Design standards are often unable to catch up to changing conditions in our region
    - Longer and more frequent storms are coming

*Observed and Projected Climate Change in NY State, 2021 NYSDEC

Stormwater Basics



NYSDEC Design Storms

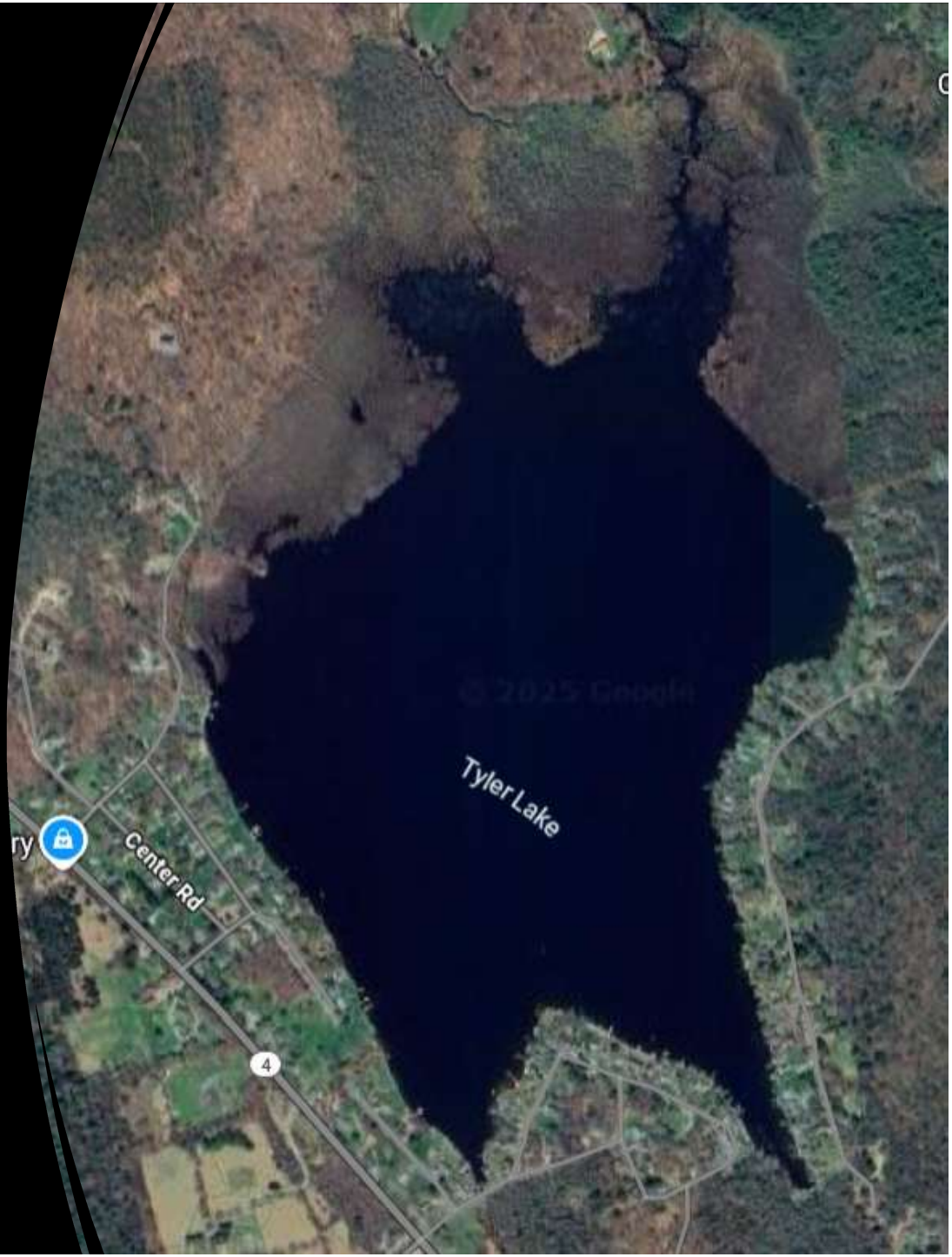
- Water Quality Volume (WQv)
  - The storage needed to capture and treat 90% of the average annual storm runoff
    - These storms are considered the “first flush” and carry the unseen contaminants more frequently
- Water Quantity Storms
  - Flooding events and routing of large capacity storms
    - These storms are occurring more frequently then in the past and for longer durations

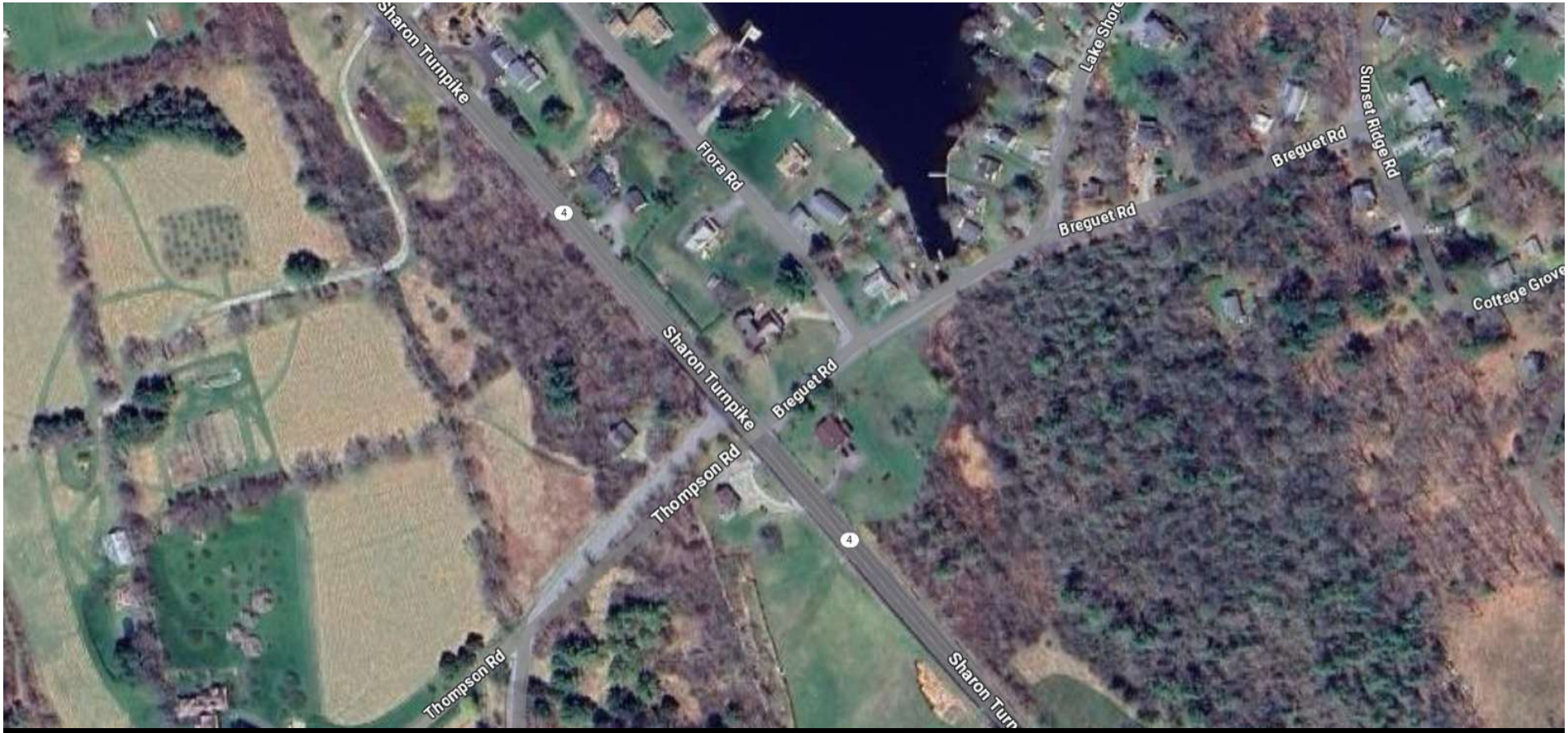
Community Impact

- Trademarks of Lake Communities
  - Old if not missing infrastructure
    - Often stormwater conveyance systems that were installed decades ago
      - Metal pipes
      - Undersized catch basins
      - Undersized swales
  - Steep sloping hills
    - Stormwater flows quickly get concentrated and can be damaging

Tyler Lake, Goshen CT

- Small lake community in Litchefield County, CT
- Limited infrastructure
- Connected to other local lakes within the Waterbury Watershed



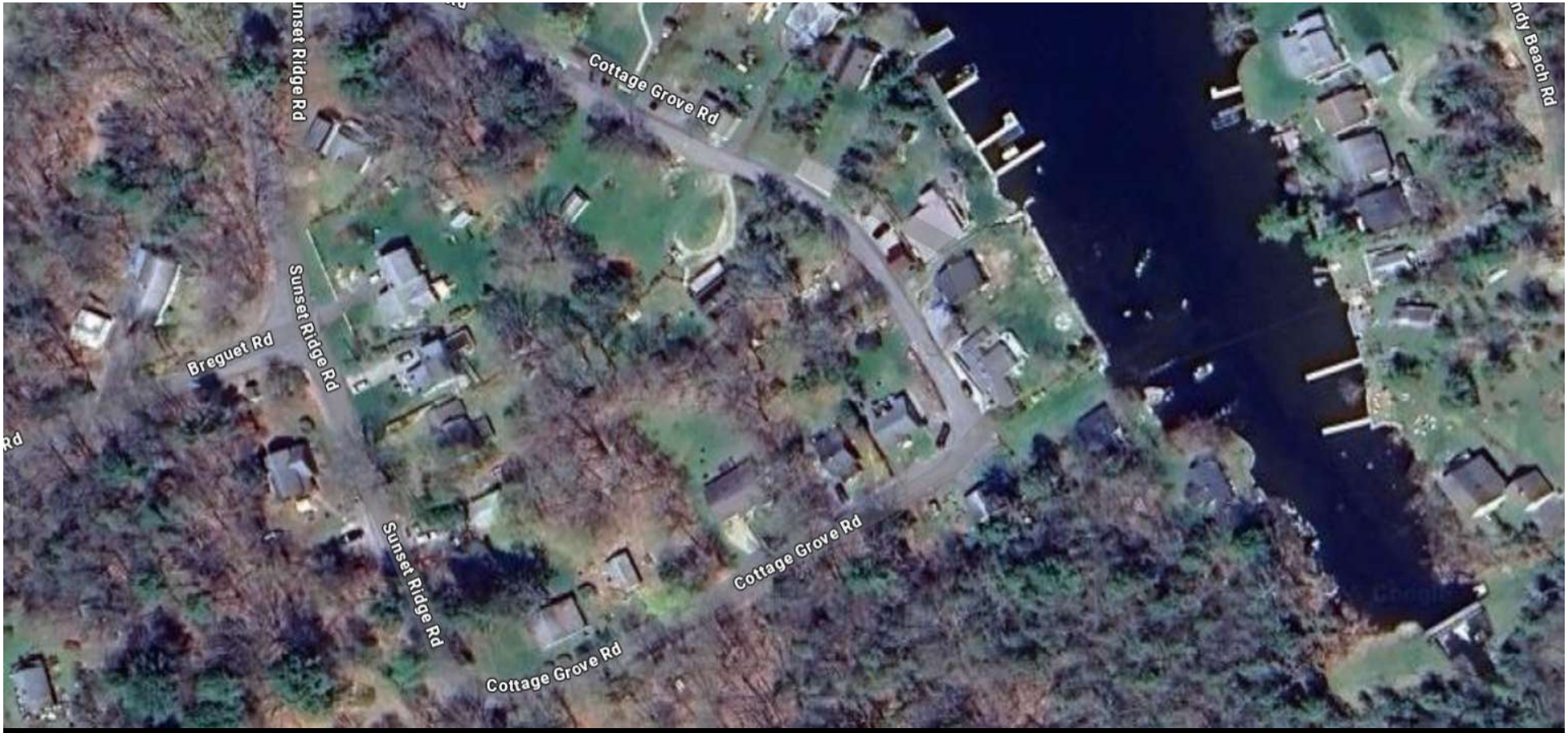


Quantity and Quality Problems

- Local agriculture and State Highway drain directly into the Lake system
  - Increased storm flows will bring extra contamination and flood waters
- Limited real estate to offer a solution

Quantity and Quality Solutions

- Well manicured roadway with infrastructure lends itself well to curbside solutions
- Bio-infiltration and catch basin solutions!



Quantity and Quality Problems

- Forested ROW allows for vegetation and leaf debris to reach the lake during heavy storms
- Sloped roadway leads to heavy flows

Quantity and Quality Solutions

- Swales and a piped system installed along the roadway
- Currently no quality controls
  - Subsurface system!
  - Filtration tanks in the roadway!
- Community action days to help clear the drainage path of debris
- At the local homes, it is imperative to have proper footing drains in place

Quantity and Quality Problems

- Tyler Lake is connected to other local sources as well!
  - Treating upstream helps the lake!
  - Treating the outflow helps the neighbors!
- Individual property owners can address their own yards

Quantity and Quality Solutions

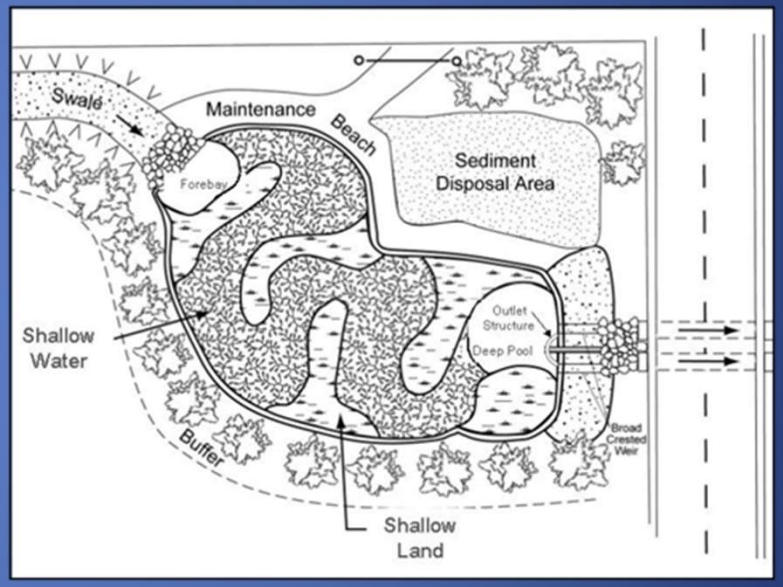
- Establishing a longer flow path for the inlet provides more nutrient uptake and a broader flood plain
- Individual property owners can move away from well manicured lawns at the waters edge
  - Establish Riparian Buffers!

Stormwater Solutions

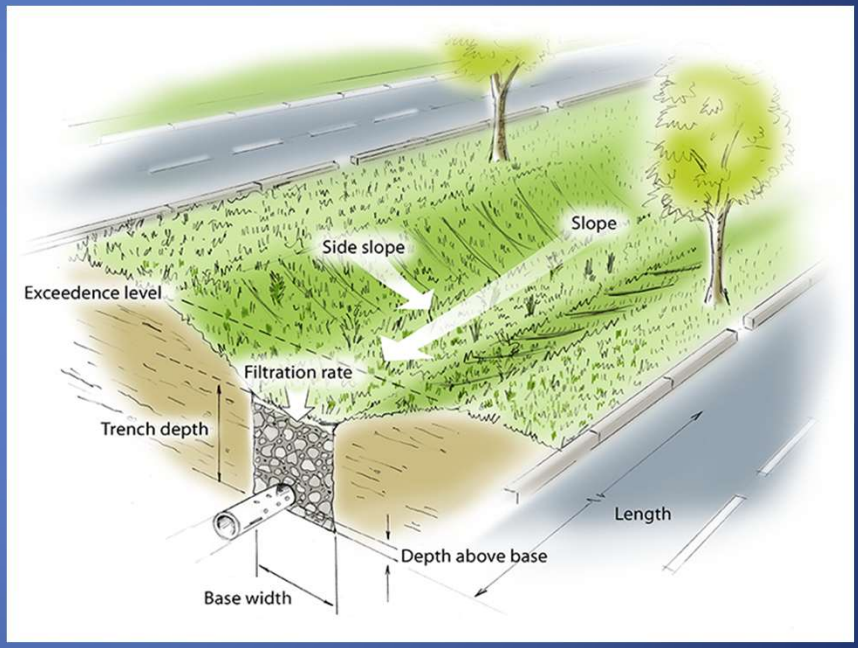
- Stormwater Ponds
  - Practices that have either a permanent pool of water or a combination of permanent pool and extended detention
- Stormwater Wetlands
  - Practices that include significant shallow marsh areas, and may incorporate small permanent pools and extended detention
- Infiltration Practices
  - Practices that capture and temporarily store the WQv before allowing infiltration into the ground
- Filtering Practices
  - Practices that capture and temporarily store the WQv, and pass it through a filter bed of sand/organic matter/soil/engineered media
- Open Channel Practices
  - Practices designed to capture and treat the full WQv within dry or wet cells formed by check dams or other means

Stormwater Ponds

Stormwater Wetlands



Open Channel Practices



Finding Solutions

- A new General Permit for discharge was issued in 2024
  - Significant burden on the Municipalities
  - Resources are thin
- Many of your local issues may be best handled by your own community!
- NYSDEC Manuals and Guidelines
  - Stormwater Toolbox

Engaging the Community

- Education!
  - Needs to be more than a pamphlet in the mail
- Community action days!
  - A healthy BMP is an attraction
  - An engaged, responsible community can be our biggest asset.

Questions?


Wappinger
Beekman
Village of Pawling
Sherman
East Fishkill
Pawling
Fishkill
Beacon
Patterson
New Fairfield
Brookfield
Kent
Philipstown
Putnam Valley
Carmel
Southeast
Village of Brewster
Danbury
North Salem
Somers
Ridgefield
Redding
Peekskill
Lewisboro
Yorktown
Cortlandt
Bedford
Mt Kisco
Pound Ridge
Wilton
New Castle
Ossining
New Canaan
North Castle
Clarkstown
Stamford
Mount Pleasant
Greenwich
Greenburgh
Harrison
Legend
East of Hudson Watershed
Watersheds
County Line
Town Line
Water Body
Non Participating Municipality
Participating Municipality
East of Hudson Watershed Corporation