Working with Nature Throughout the Watershed

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Natural & Nature-based Shorelines

- What they are:
  - Using natural features, topography, and vegetation to restore function and resilience of floodplains and shorelines

Benefits of natural shorelines:

- Increased Water Storage
- Functional Floodplains
- Natural Beauty
- Greenspace & Access

Image courtesy US Army Corps of Engineers

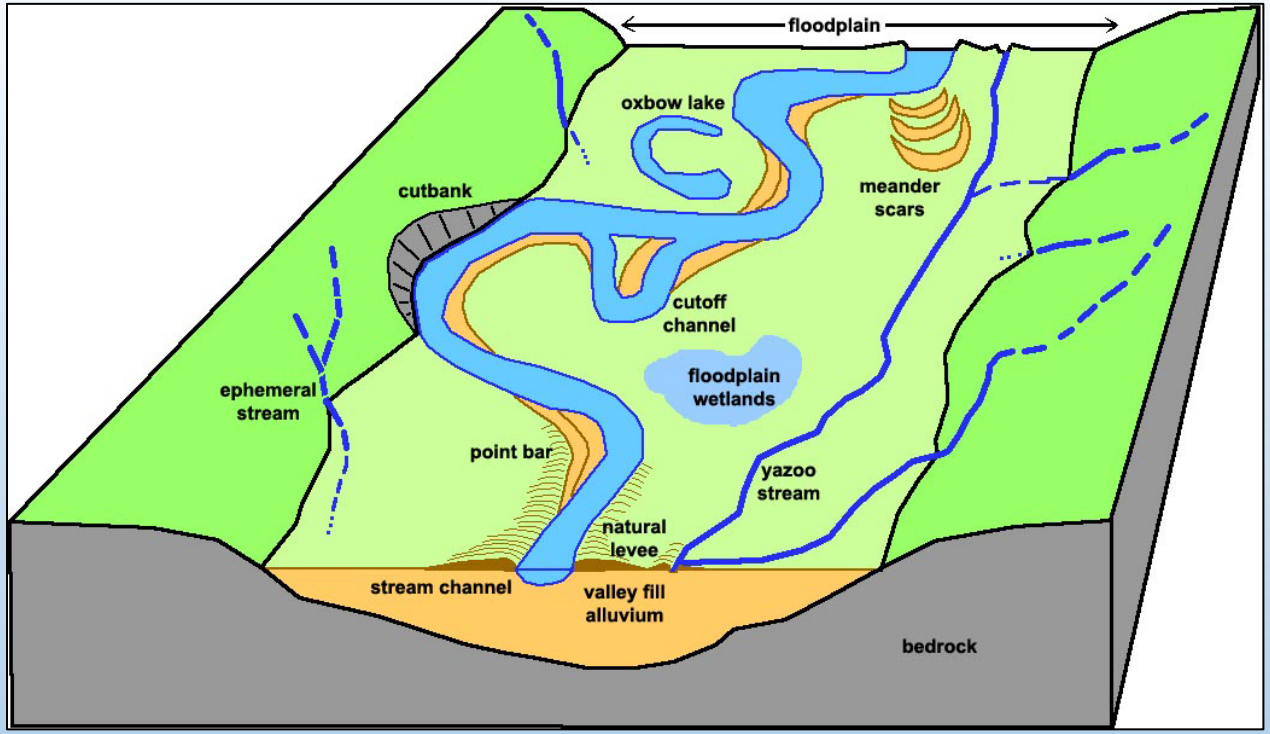
Thinking Like a Watershed

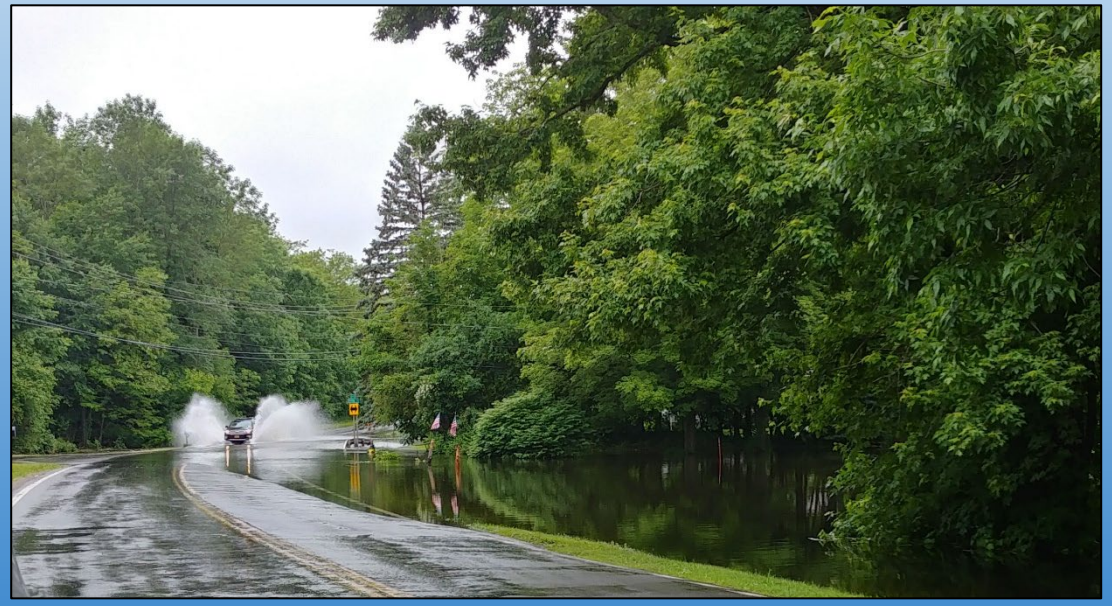
- When considering nature-based features throughout watersheds:
  - Think of your location as well as neighboring properties, municipalities and land usage
  - Watersheds are heavily connected, issues can compound as water travels from high to low – conservation and planning practices should reflect that

Port Bay, New York

Floodplain Function

- Natural features help restore the function of floodplains
- Floodplains exist in nature for a reason
- While a stream can usually handle the day-to-day movement of runoff, the floodplain keeps water at manageable levels at times of heavy rain, spring melt, and other storm events
- *All of these are likely to become more common or more intense throughout the Great Lakes Watershed*

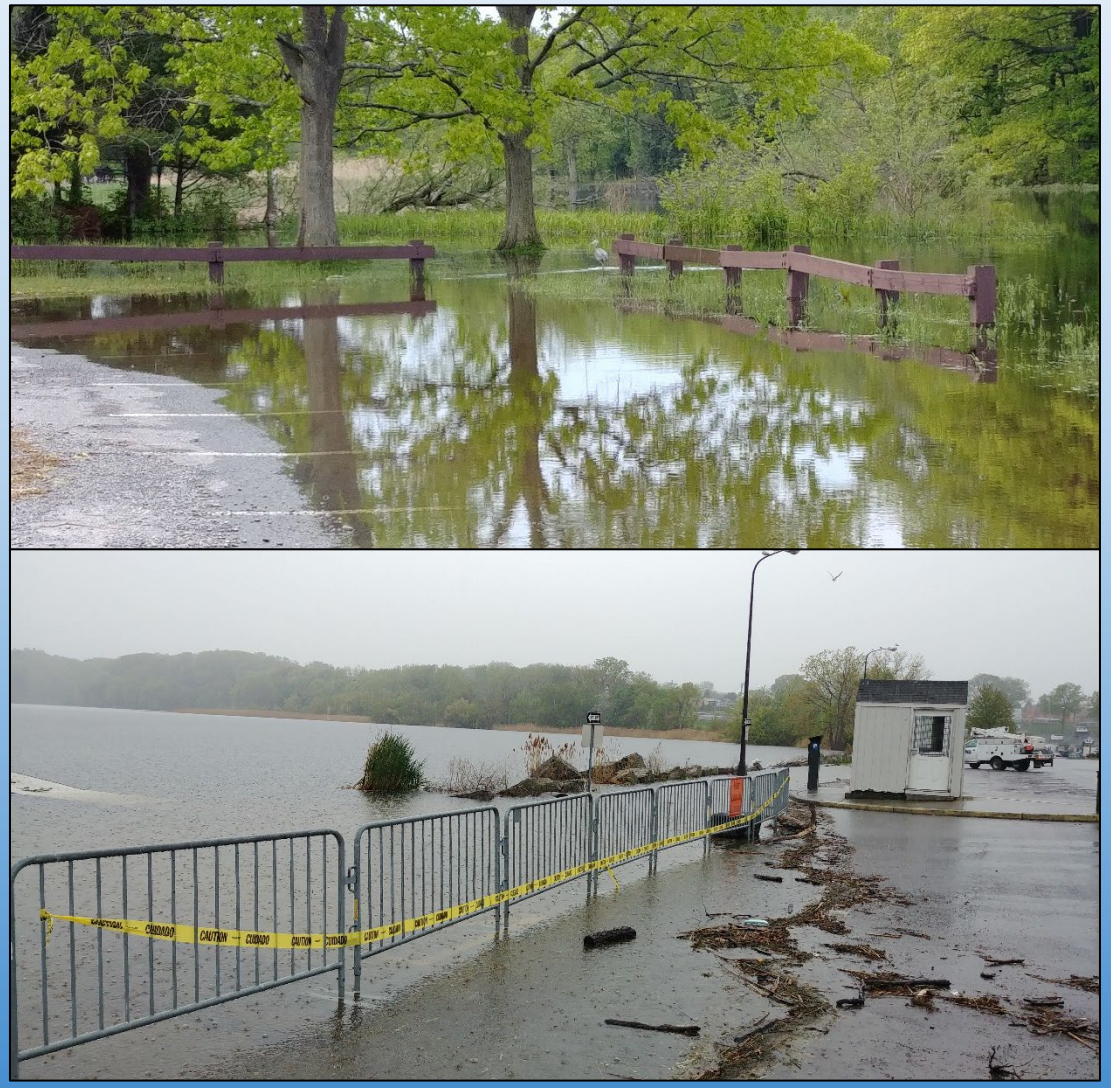




Development Stressors

Moving Water Through People

- Floodplain Settlements, a balancing act between moving water, storing water, and keeping people and property safe from hazard
- We can accomplish this with intense engineering, but we can also pursue naturalizing methods: using nature



Managing Water on the Land

- Goals
  - Absorption – Reduce the Amount
  - Reducing Velocity of Runoff
  - Co-benefits include habitat restoration, shading rivers and recreation
- Q=aV
  - Where Q is the stream discharge, a is the stream area, and **V is stream velocity**

Resource: USGS Streamflow - https://www.usgs.gov/special-topics/water-science-school/science/how-streamflow-measured#:~:text=Discharge%20is%20the%20volume%20of%20water%20moving%20down,that%20cross%20section%3A%20discharge%20%3D%20area%20x%20velocity

River Shape and Stream Bank Restoration

- Controlling “a” and “V”
  - Match the culvert or bridge to the floodplain (not necessarily green!)
  - Mimic the shape and function of the floodplain
  - Use nature to:
    - Maintain channel characteristics (a)
    - Reduce velocity (V)
    - Improve absorption
    - Improve Floodplain Function

Photo taken from Jefferson County Soil & Water, Patrick Crast, Executive Director

Greening Floodplains

- Not just natural shorelines
- **Green Infrastructure Improvements**
  - Not just an urban thing
- Examples
  - Rain gardens, permeable pavers, vegetated swales, green roofs, riparian buffers, porous pavement, **conservation of natural areas**
  - Reduced or suspended mowing*
- Issues
  - Design expertise
  - Maintenance
  - Snow and Ice

Natural & Nature-based Shorelines

- Taking this same approach of riparian restoration and floodplain function, applied to coastal zones
- Examples
  - Terracing, slope reduction, revegetation
- Issues
  - Maintenance
  - Design Considerations
  - Applicability

Resources for Natural & Nature-based Features

- Engineering Resources
  - Engineering with Nature (USACE)
  - https://ewn.erdc.dren.mil/
- Local Guidance
  - Local, state resources coming soon
- Vegetation Options
  - Working with Nature – NYSG
  - https://seagrant.sunysb.edu/Images/Uploads/PDFs/GreatLakes-ShorelinePlantsGuide.pdf
  - (Don’t worry, I brought some)

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