



Wetlands, Floodplains, & Watershed Resilience

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Presentation Outline

- Watershed Context
- Functions of Wetlands & Floodplains
- Impacts to Wetlands & Floodplains
- Strategies to Protect & Restore Wetlands & Floodplains
- Questions

What is a wetland?

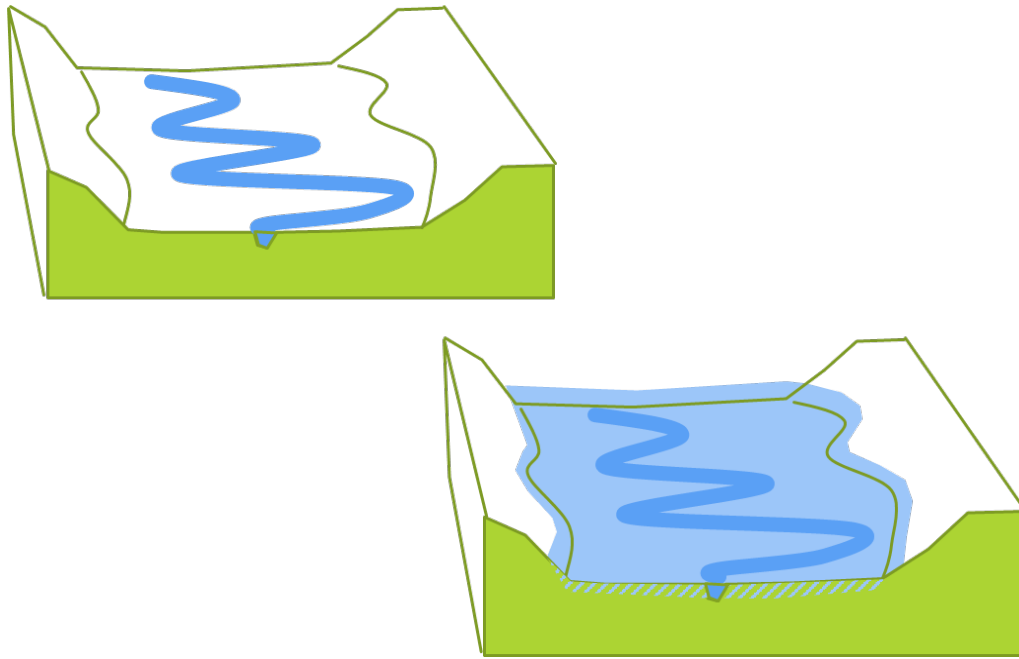


- Places where land and water meet
- Occur in association with lakes, ponds, rivers, and streams
- Range from seasonal to year-round saturation
- Contain hydrology, wet soils, and water-loving plants
- The state protects significant Class II wetlands and their 50-foot buffer zones based on the significant functions and values they provide





What is a floodplain?



- Low-lying, relatively flat areas of land next to a waterbody that periodically floods
- Floodplains naturally provide space for rivers to meander and change over time — also known as “river corridors”
- FEMA maps the boundaries and flood heights of a specific sized flood for regulatory and flood insurance purposes
 - Special Flood Hazard Area: Land calculated to be under water (inundated) during the 1% annual chance flood — also known as the “base-flood” or “100-year flood”



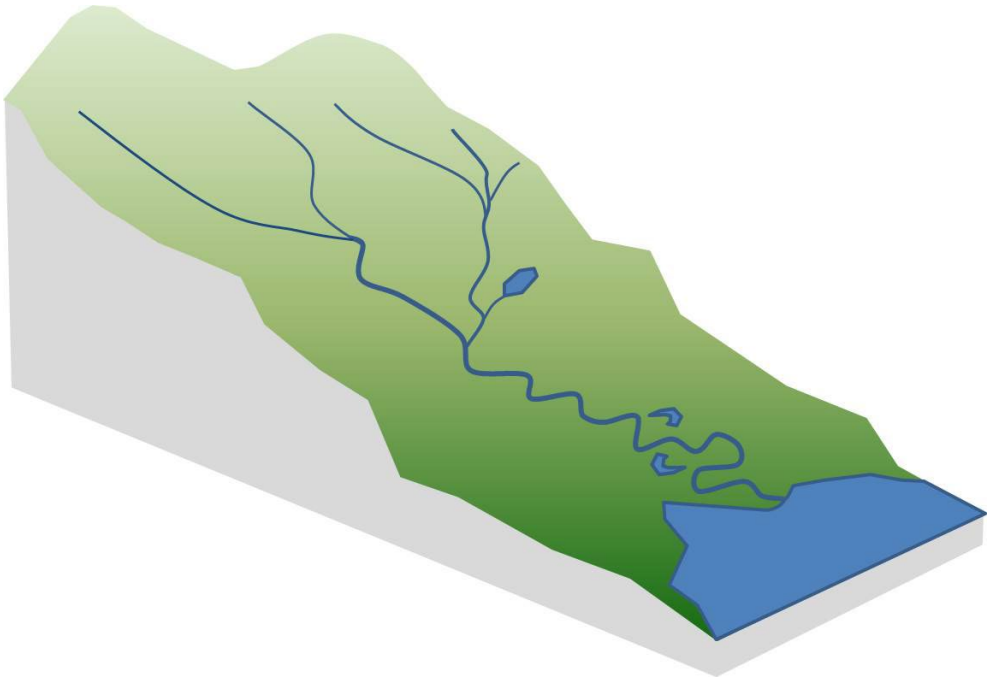


Do wetlands and floodplains overlap?



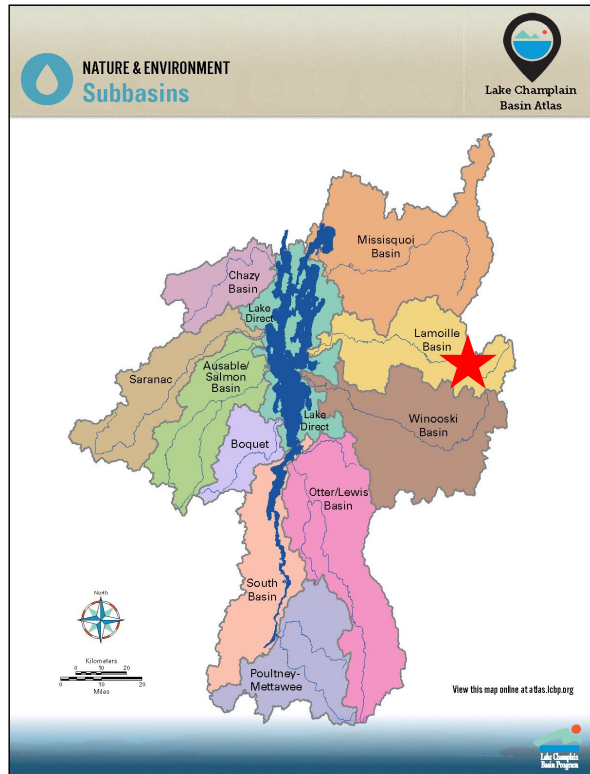
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What is a watershed?



- The entire area of land that catches precipitation and funnels it into a single body of water, like a river, lake, or ocean.
- A healthy watershed is one in which natural land cover supports:
 - Dynamic hydrologic and geomorphologic processes within their natural range of variation
 - Habitat of sufficient size and connectivity to support native aquatic and riparian species
 - Physical and chemical water quality conditions able to support healthy biological communities

Hardwick's Watershed Context



Lake Champlain Basin

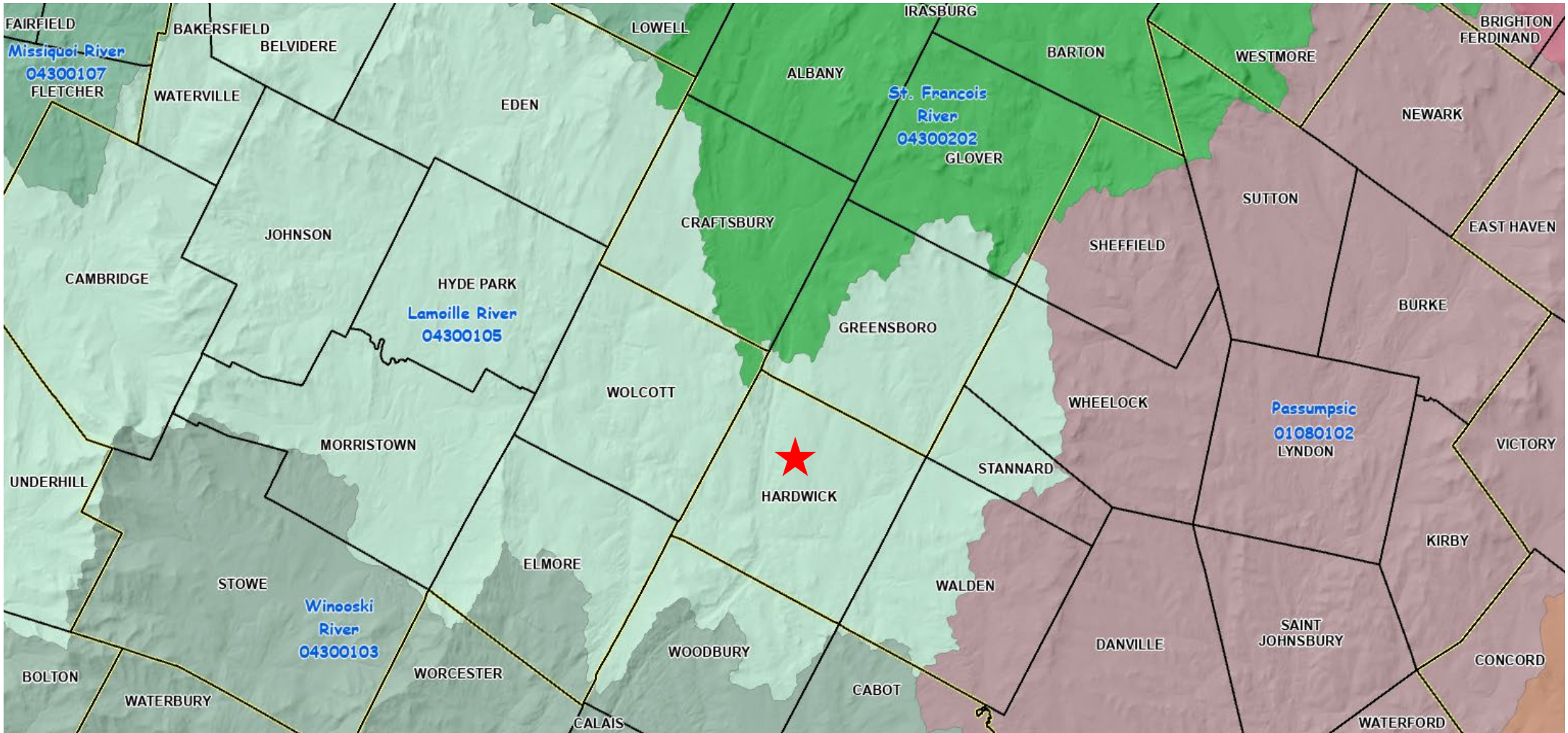


Lamoille River Watershed

★ = Hardwick



Upper Lamoille River Watershed
Headwaters: Horse Pond, Greensboro

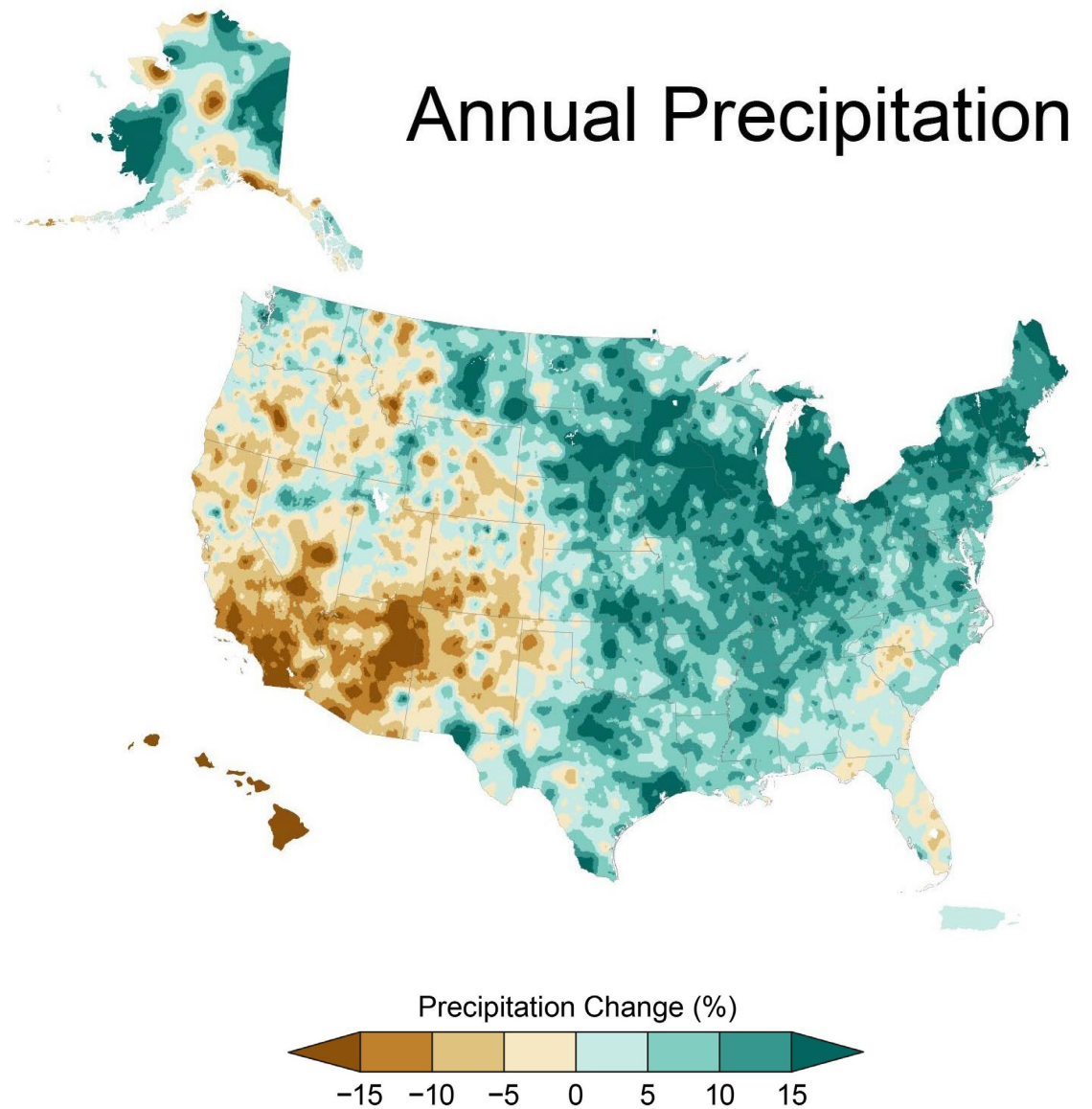


Light green = Lamoille River Watershed | ★ = Hardwick

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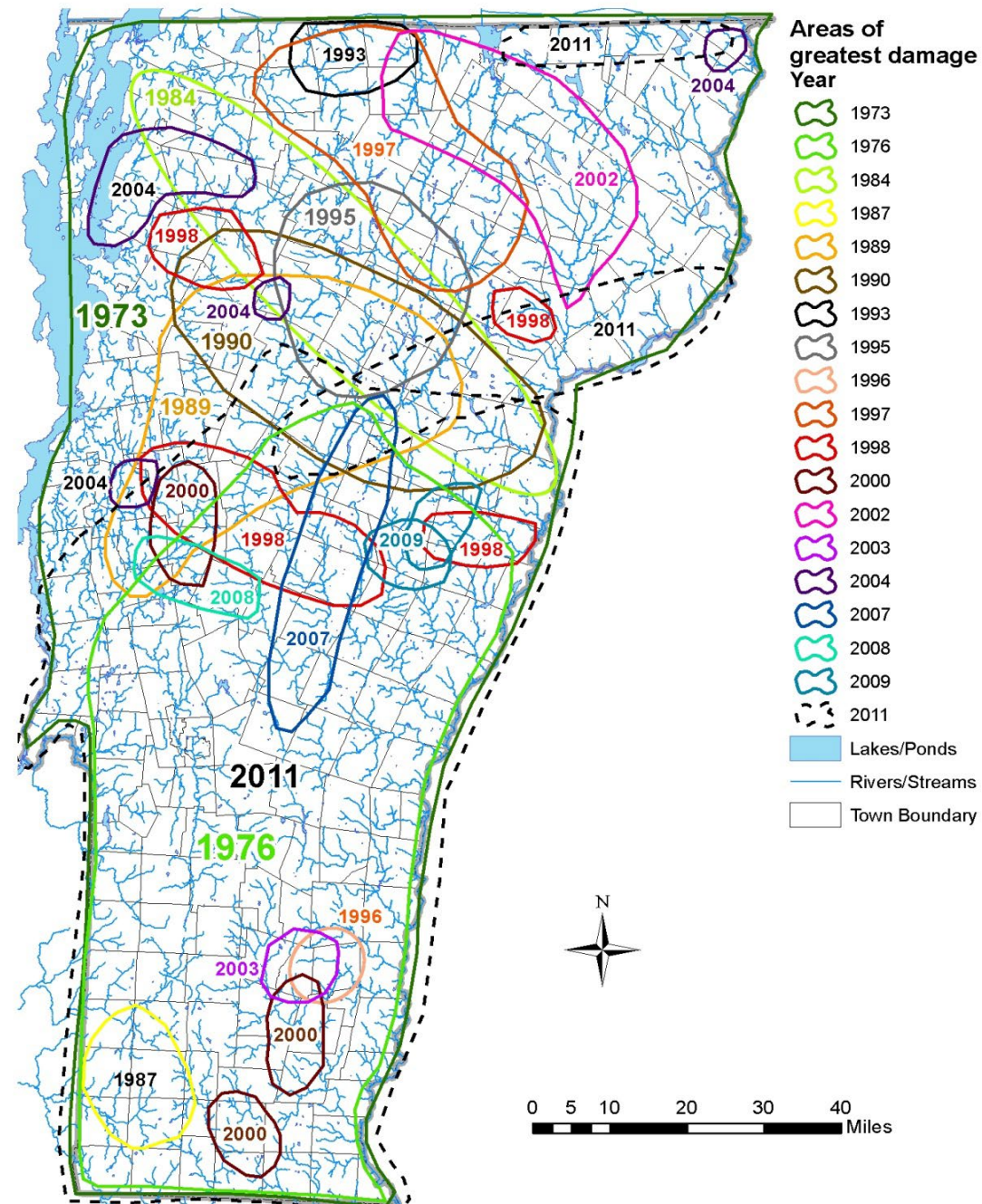
Precipitation Changes





Flood History

Map of flood disaster areas in
Vermont 1973-2011



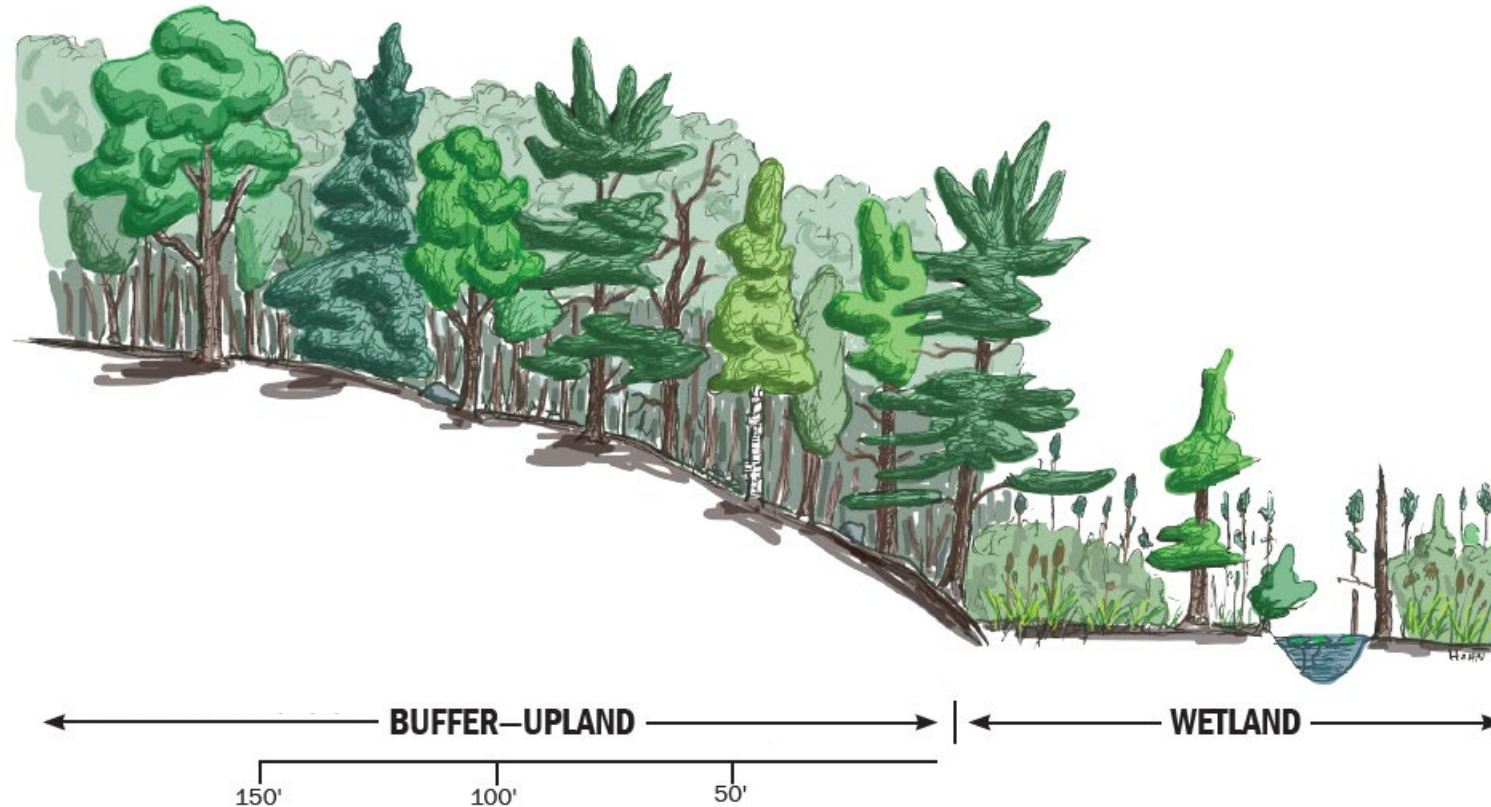
Selected flood disasters - Areas of greatest damage

Functions of Wetlands and Floodplains



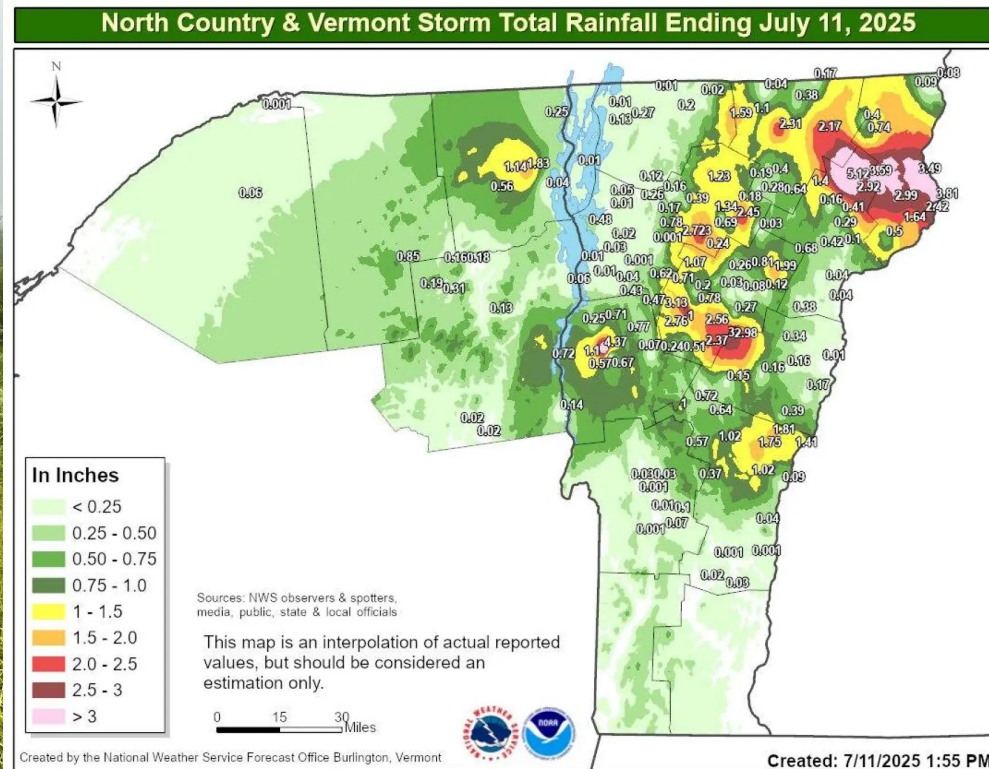
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Imaginary Floodplain/Wetland & Buffer



Wetland & Floodplain Function

Water Storage



- Wetlands and floodplains provide water storage for flood water and storm runoff
- Especially critical during high runoff events, like Tropical Storm Irene in 2011 and the severe flooding of 2023, 2024, and 2025

Wetland & Floodplain Function

Surface & Ground Water Protection



- Wetlands and floodplains store and keep water clean, both above the ground surface, and below
 - Store and recycle sediment and nutrients
 - Provide groundwater recharge that supports drinking water resources, like wells and source protection areas



Wetland & Floodplain Function

Erosion Control



- Bind and stabilize soil
- Dense, persistent vegetation along a streambank



Wetland & Floodplain Function

Fish & Wildlife Habitat



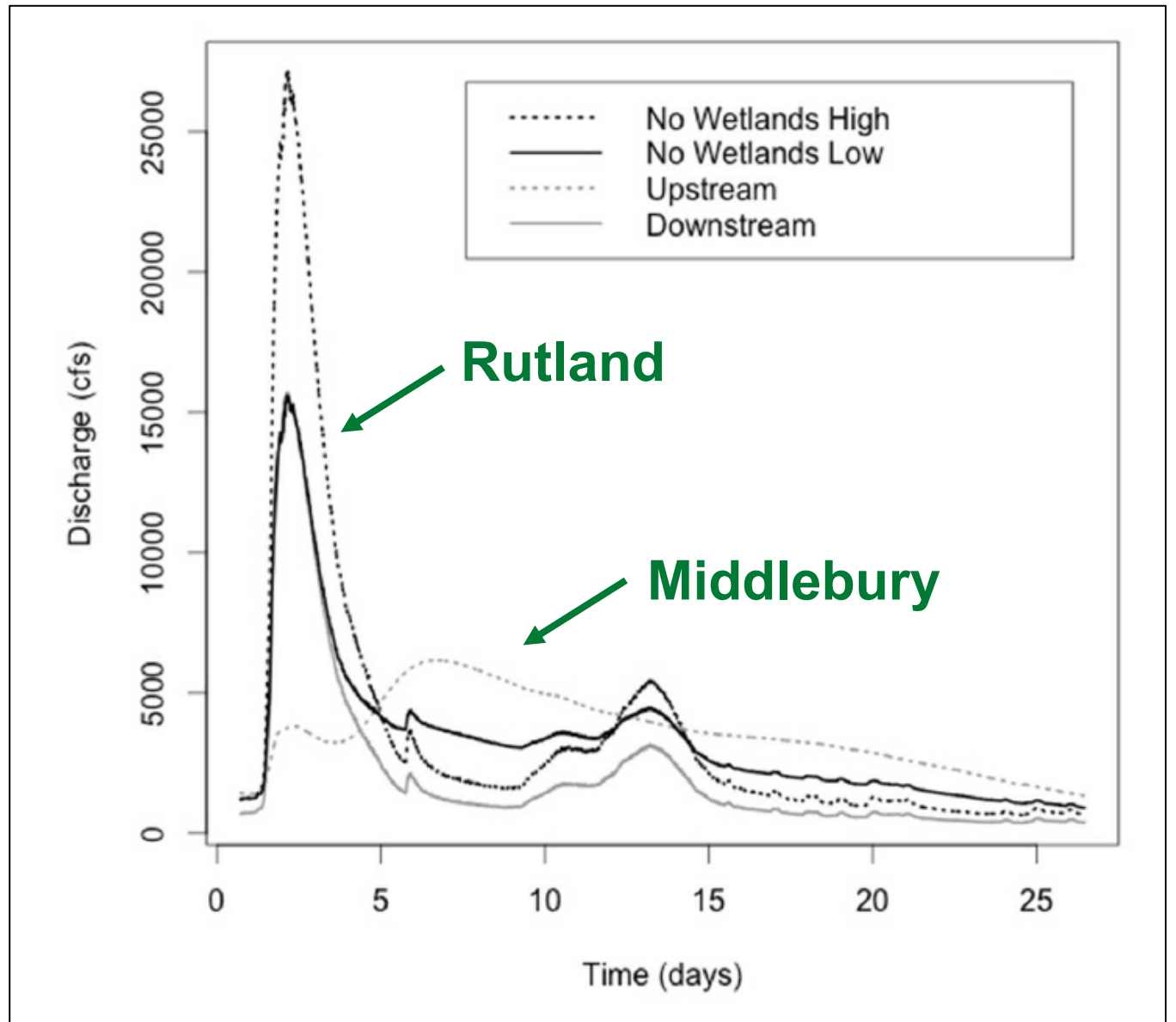
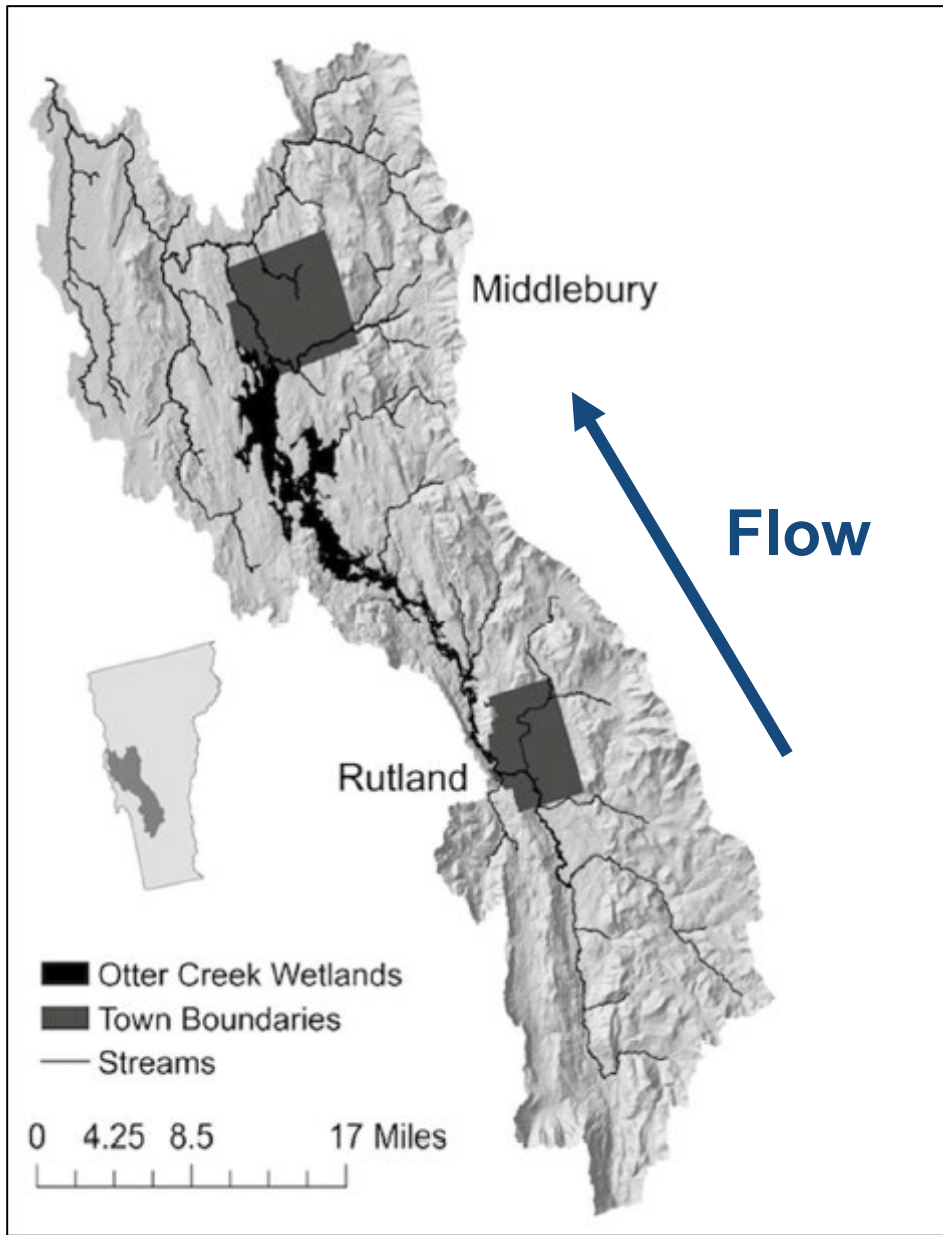


Wetland & Floodplain Function *Flood Dampening*



Wetland complexes in the Otter Creek floodplain saved Middlebury \$1.8 million during Irene flooding.

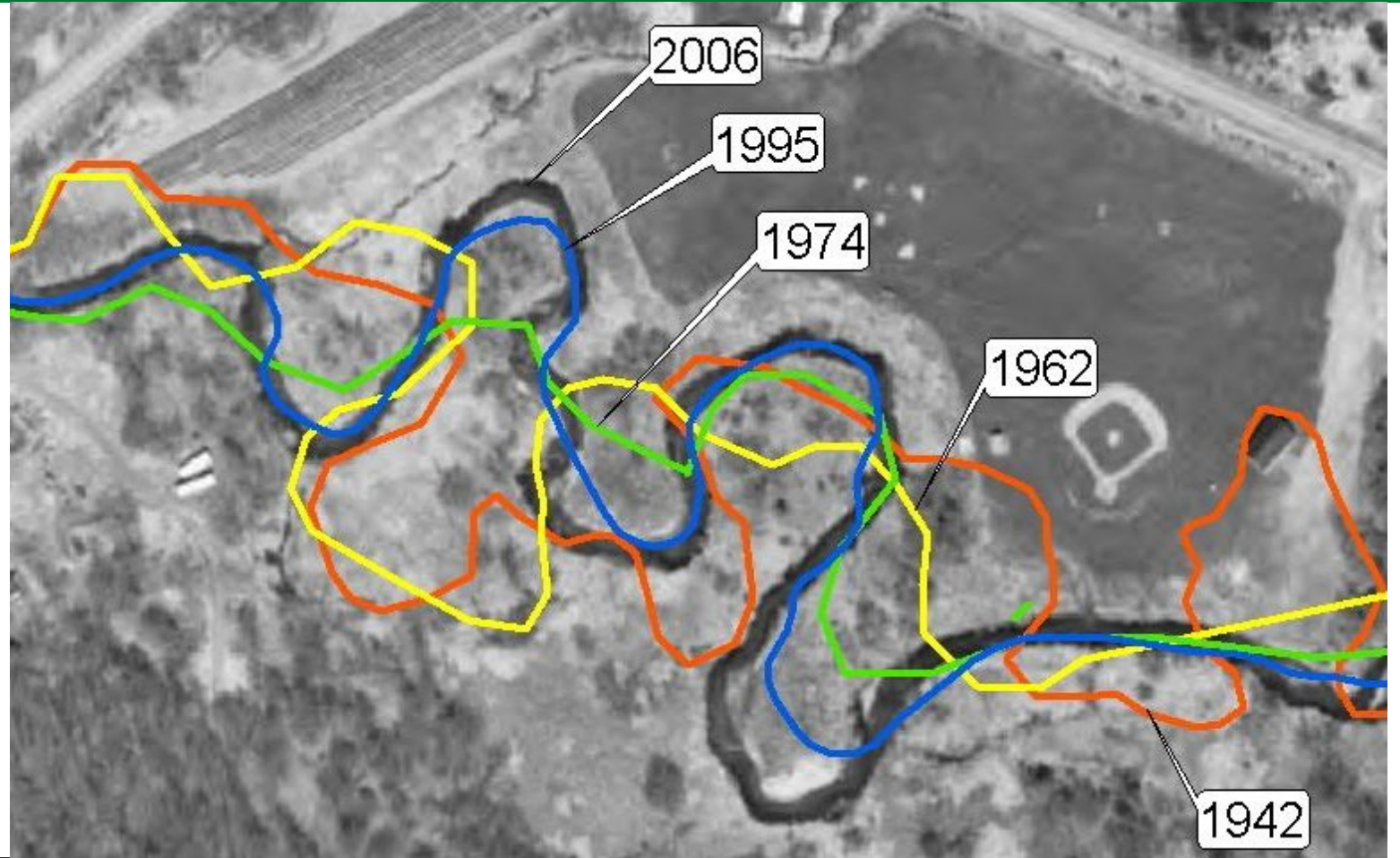
Watson et al. 2016

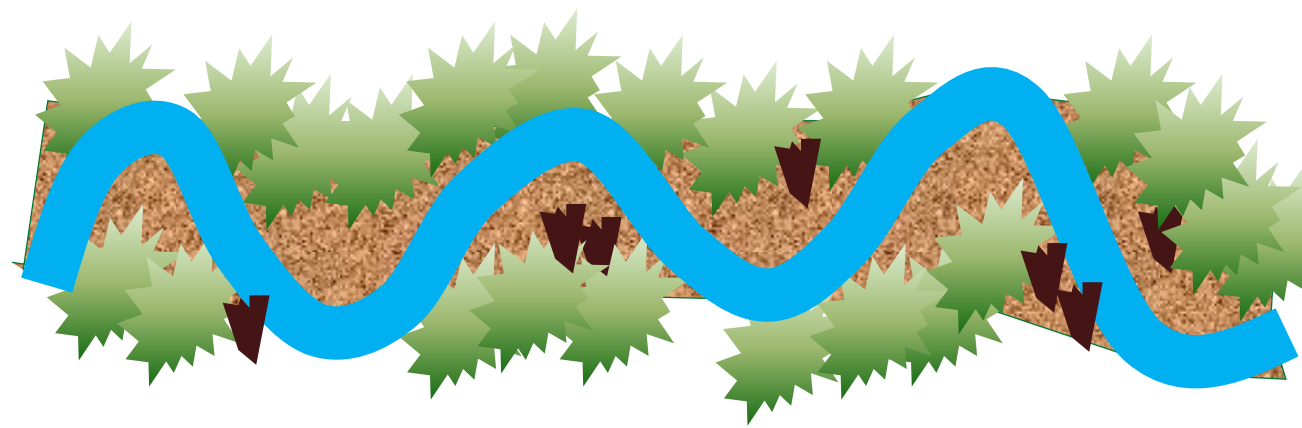




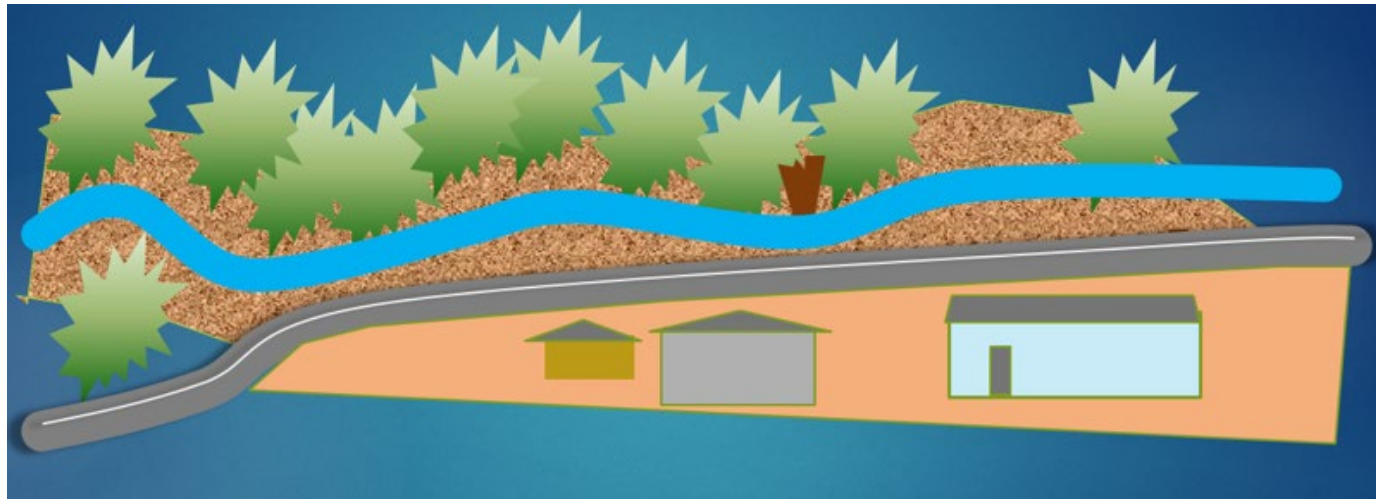
Wetland & Floodplain Function

Room for Streams to Move





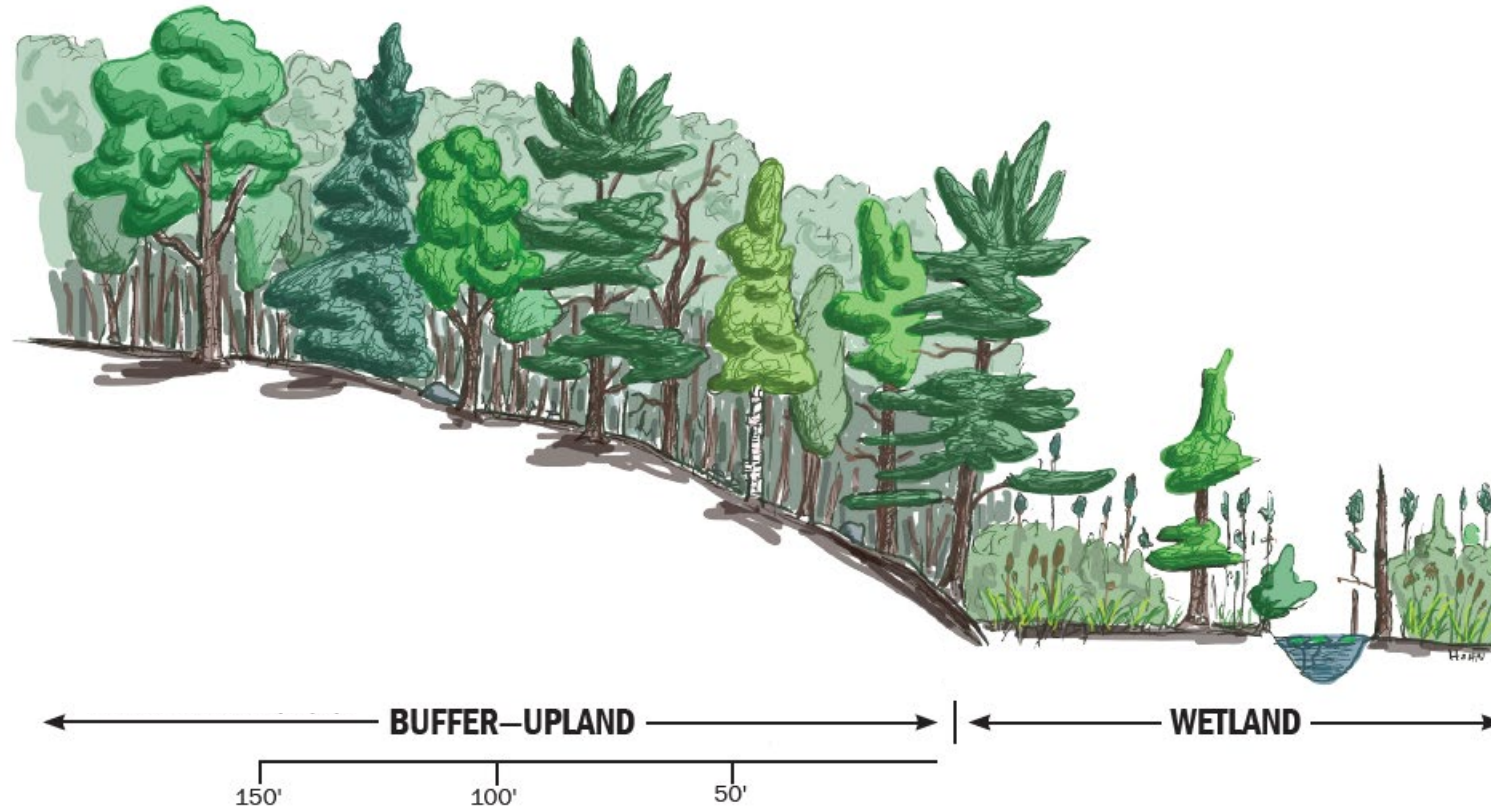
More room: Naturally stable



Less room: Steeper, more powerful



Imaginary Floodplain/Wetland & Buffer

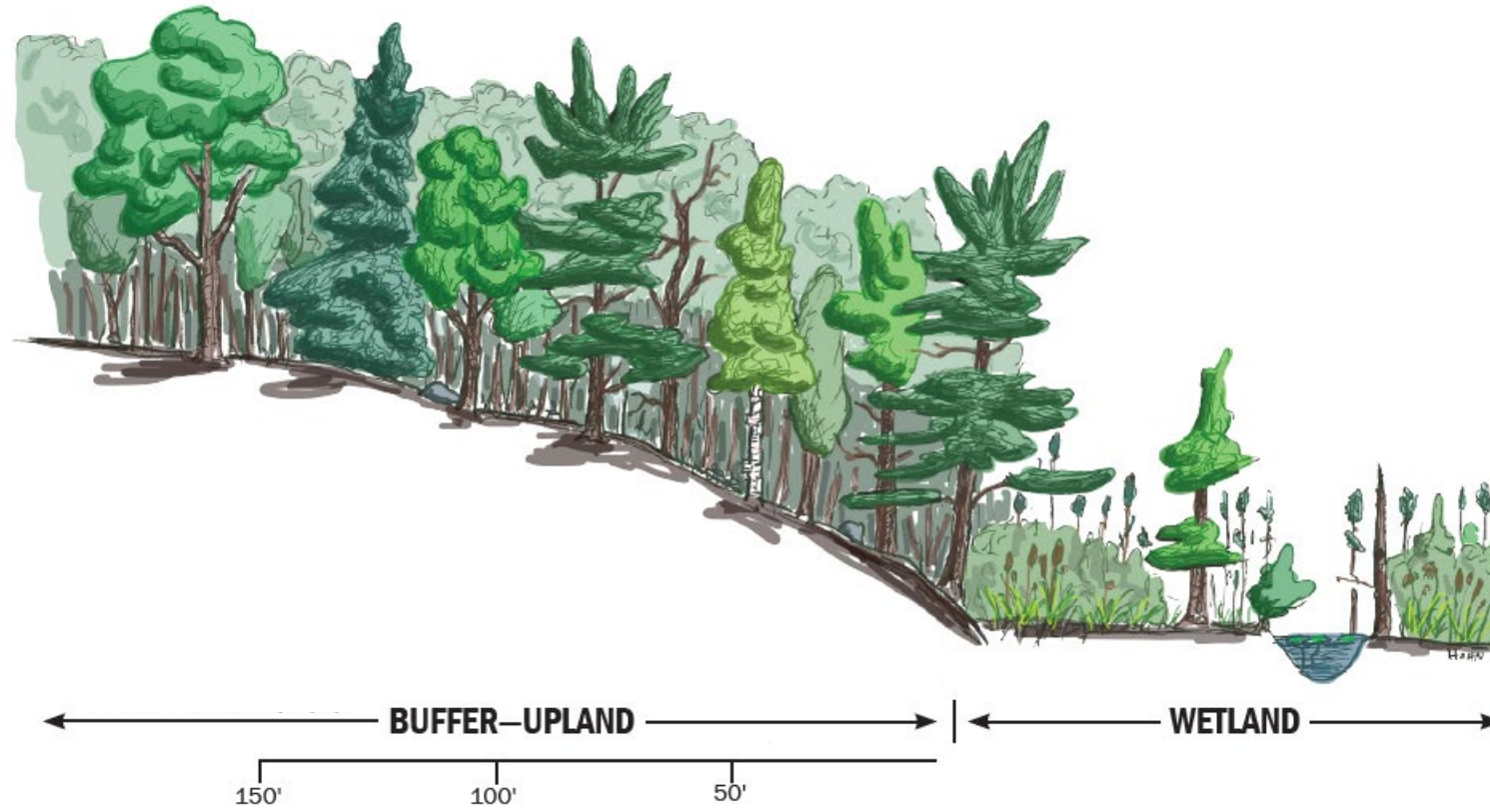


Impacts

Examples

- Cutting of woody vegetation
- Draining (ditching)
- Straightening
- Grading
- Filling (soil, gravel, buildings, utilities)
- Altering hydrology via undersized bridges and culverts
- Building too close

Imaginary Floodplain/Wetland & Buffer





What can we do?

Strategies

- Conservation & Preservation
- Regulations
- Restoration of wetland and floodplain functions



What can we do?

Watershed Restoration

- Floodplain and wetland restoration upstream, downstream, and in Hardwick
- Passive reconnection
- Active reconnection

Wetland & Floodplain Restoration

Passive Approaches



Reduce or eliminate the sources of degradation and allow the wetland time to recover naturally

- Establish “no mow” zones, which encourages natural revegetation
- Discontinue ditch maintenance in wetlands
- Exclude livestock from wet areas

Wetland & Floodplain Restoration

Passive Approaches



River Corridor and Wetland Easement

- Voluntary Program to conserve land in perpetuity with a land trust
- Allows channel to move
- Provides native plantings along river
- Restores key wetlands
- Landowner retains ownership

Wetland & Floodplain Restoration

Active Approach: Ditch Plugs

Ditch Plug Example



Wetland & Floodplain Restoration

Active Approach: Revegetation



Bare root and
container planting
Katie Kain, USFWS





Wetland & Floodplain Restoration

Active Approach: Remove Sediment & Fill

Fill Removal



Finding native soil
and removing sediment from a filled
wetland





Wetland & Floodplain Restoration

Before & After





What can we do?

Community Participation

- Observe how water moves in your backyard or places you care about
- Participate in town and regional plans
- Continue to talk with each other
- Have a potential restoration project in mind?
Contact Caledonia County Natural Resources Conservation District, other NRCD, or watershed organization



Thank you. Questions?

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Allowed Use 6.26 for Residential Housing Projects in Designated Areas



- Registration is open for projects that qualify for Allowed Use 6.26 for Residential Housing Projects in Designated Areas. Please refer to the [Summary of Allowed Use 6.26 for Residential Housing Projects in Designated Areas](#).
- To qualify for the housing Allowed Use, the project must be located in one of the designated areas. Use the [Wetland Designated Area Determination](#) tool for assistance.

