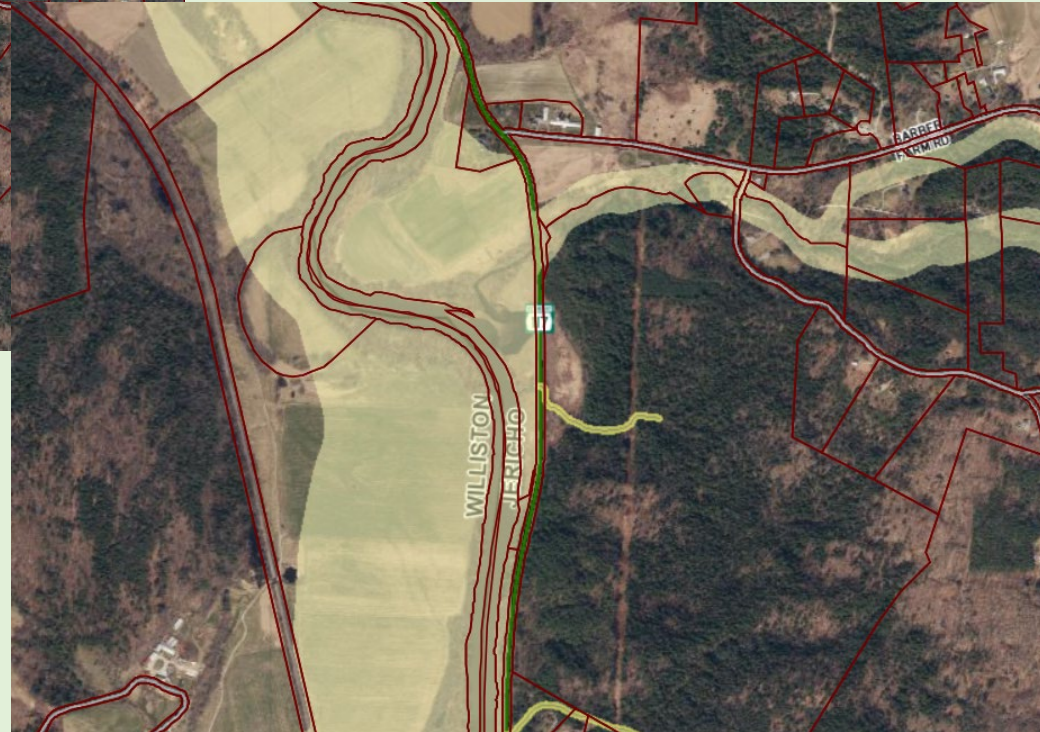
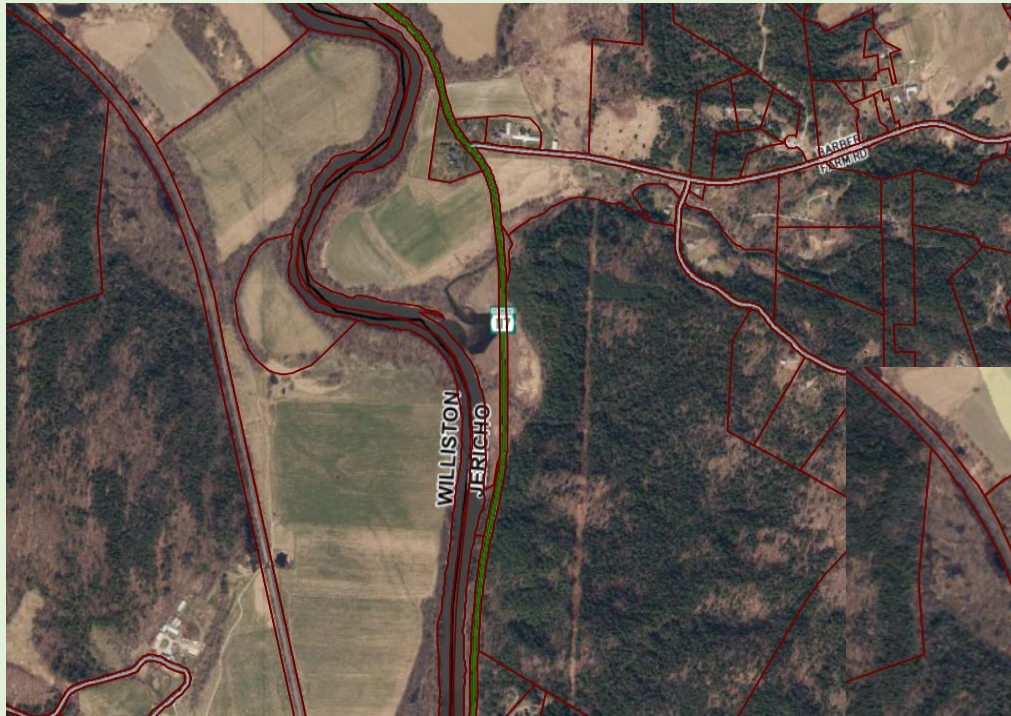
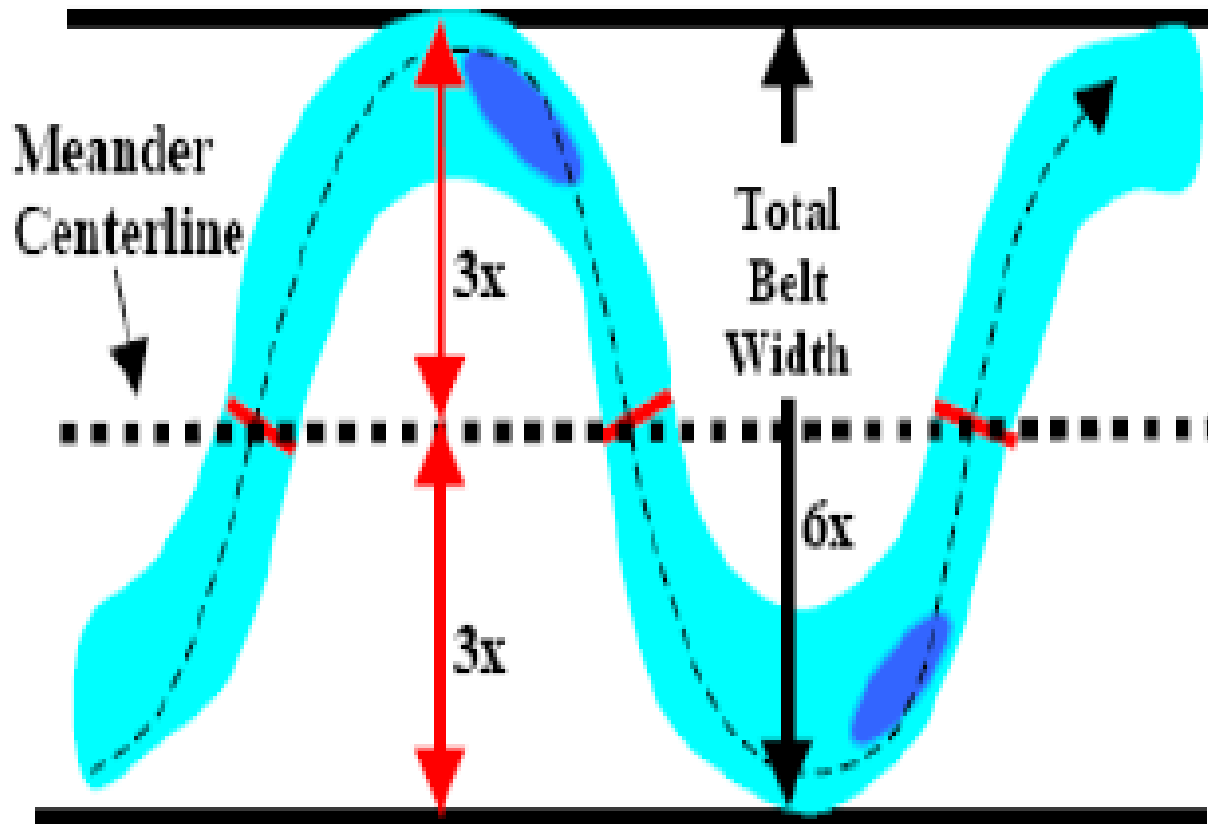


# Giving Our Rivers Room to Move: Rivers and their Corridors



# Meander Belt



*Figure 3: Depiction of meander centerline and belt width delineation.*

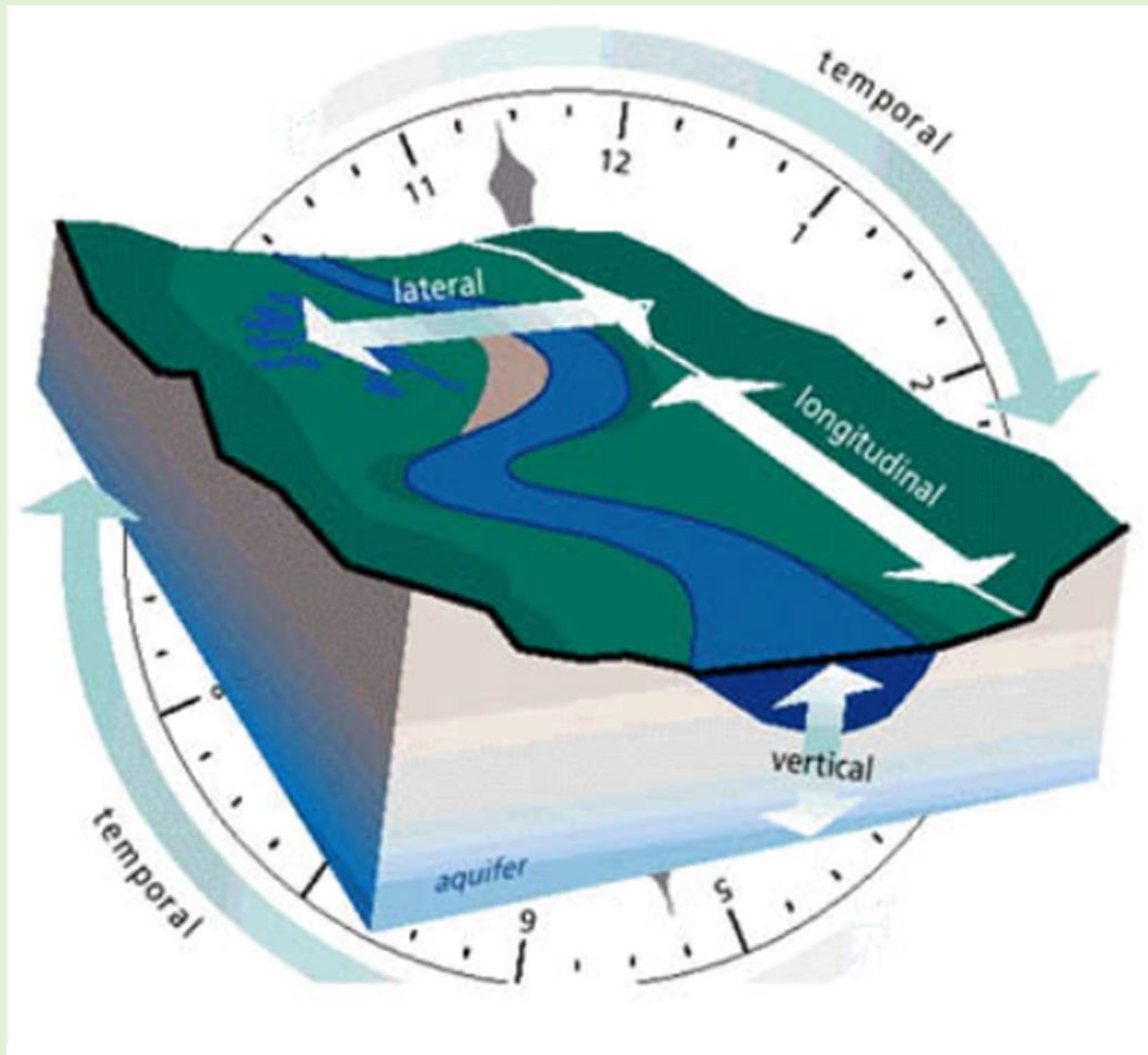


# Intact Fresh Water Systems Build Climate Resilience





# WATERSHED SCIENCE



# Freshwater Ecosystems & Climate Resilience

VT CLIMATE ACTION PLAN (CAP) RECOMMENDATIONS INCLUDE:

- PROMOTE HEALTHY, CONNECTED RIVER CORRIDORS, FLOODPLAINS, AND WETLANDS.
- PROTECT THE ADAPTIVE CAPACITY OF NATURAL RESOURCES.
- SUSTAIN, RESTORE AND ENHANCE THE HEALTH AND FUNCTION OF VERMONT'S LANDS AND WATERS TO ADAPT TO CLIMATE CHANGE.
- SHAPE LAND USE AND DEVELOPMENT THAT SUPPORTS CARBON SEQUESTRATION AND STORAGE, CLIMATE RESILIENCE AND ADAPTATION AND NATURAL AND HUMAN COMMUNITIES.
- INCREASE FLOOD RESILIENCE IN THE NATURAL AND BUILT ENVIRONMENT





# River Corridors & Riparian Areas

River Corridors - are the land area adjacent to a river that is required to accommodate river movement and reduce fluvial erosion hazards - the “meander belt”.

Delineated river corridors define the development setback necessary to maintain a least erosive condition.

Riparian Areas - are the grasses, shrubs and trees that grow along streams. In natural conditions these plants colonize along the streambanks, controlling erosion and helping to filter and clean stormwater runoff.



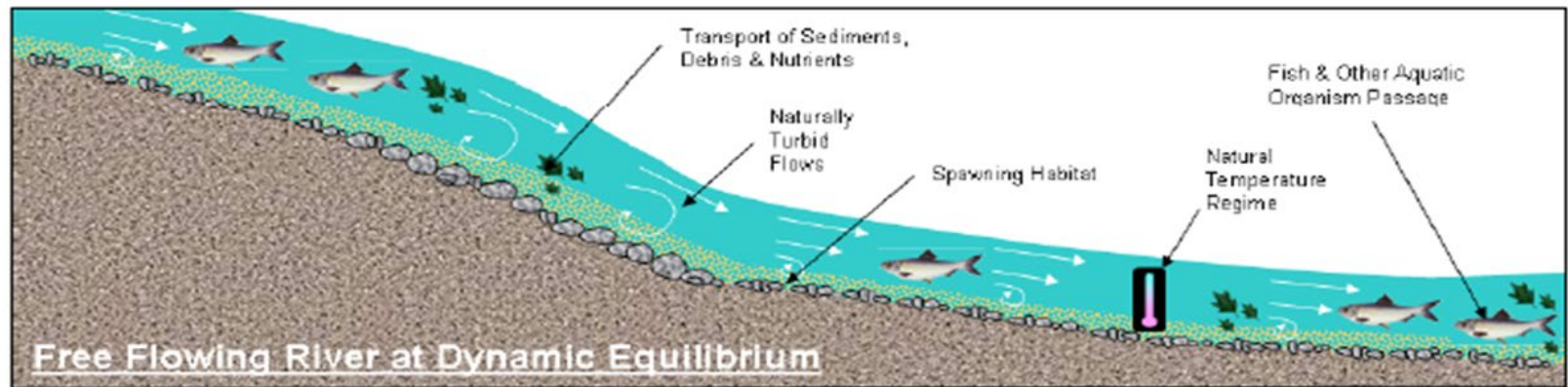


# Riparian Areas:

- Regulate water temperature
- Moderate flood water
- Control sediment and nutrient filtration and retention
- Provide large wood recruitment
- Provide habitat and travel corridors for a diversity of species



# The River Continuum Concept



## UPSTREAM IMPACTS:

### Reduced:

Natural Function, Water Quality, Oxygen, Turbid Flow, Circulation, Available Habitat  
Rivers ability to adjust horizontally and vertically (reduced resilience to change)

### Increased:

Pollutant Accumulation, Stratification, Temperatures, Algae Blooms

### Loss of:

Natural Transport Processes of Sediments, Nutrients and Debris  
Fish & Other Aquatic Organism Passage  
Self-sustaining Nature

## DOWNSTREAM IMPACTS:

### Reduced:

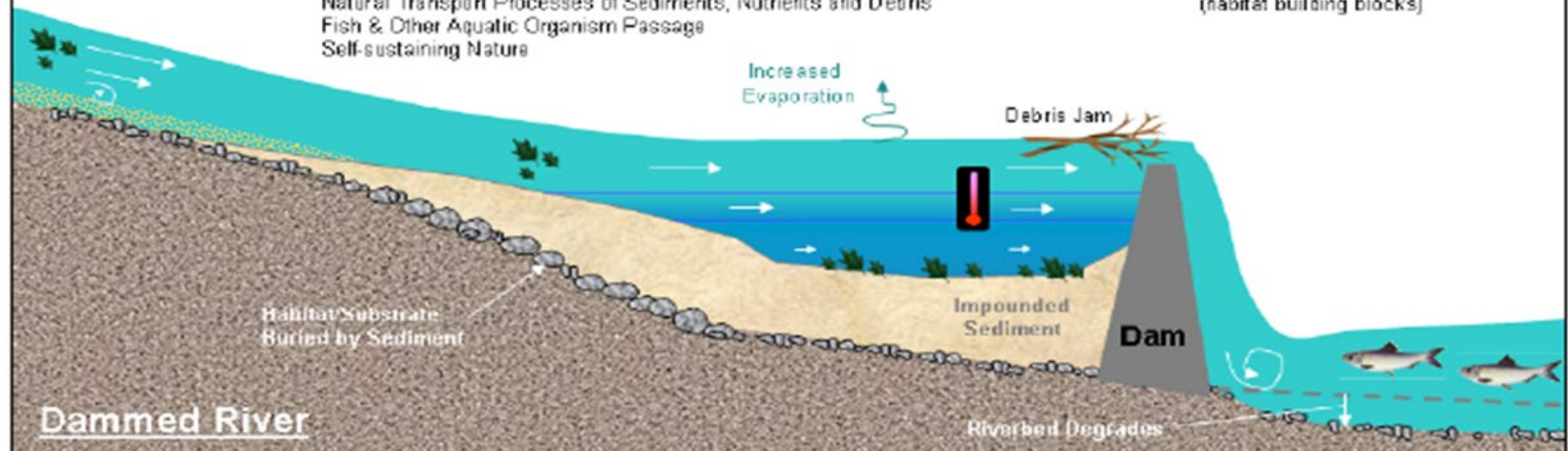
Water Quality & Riverbed Elevation

### Altered:

Flow Regime & Temperatures

### Starved of:

Sediment, Nutrients & Debris  
(habitat building blocks)



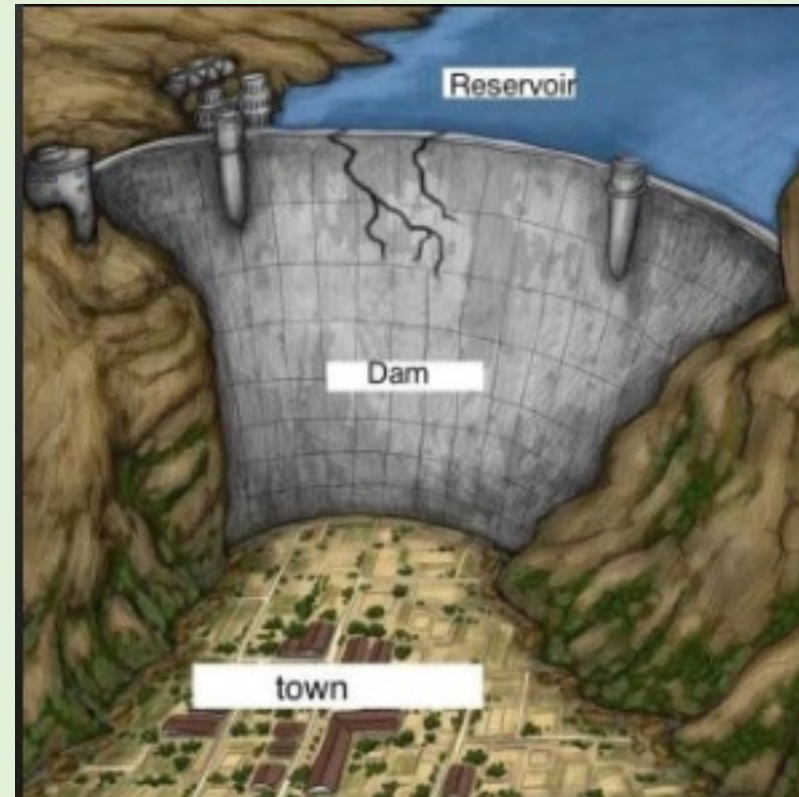




	<b>Free-flowing river</b>	<b>Dammed river</b>
Temperature	Natural temperature regime	Greater surface area of impoundment and surface release often results in higher water temperatures in impoundment and downstream
Dissolved oxygen	Turbulent flow and shallower water depths result in high dissolved oxygen concentration	Loss of turbulent flow may reduce dissolved oxygen concentration; impoundment may stratify, further reducing dissolved oxygen
Habitat	Riverine coldwater habitat	Habitat is more lake-like and often unsuitable for coldwater fish species
Fish movement	Fish and other organisms free to move upstream and downstream, including migratory fish such as Atlantic salmon	Access to habitat blocked or fragmented
Flow regime	Natural flow regime	Modified flow regime
Sediment	Natural transport processes maintained	Trapped in impoundment—natural substrate buried by sediment in impoundment, downstream channel erosion may result to “replace” trapped sediment
Pollutants	Metals and organics are distributed downstream	Metals and organics are concentrated in fine sediments trapped in impoundment
Nutrient transport	Nutrients are transported downstream	Portion of nutrients trapped in impoundment
Woody debris	Woody debris is transported downstream to create habitat	Portion of woody debris trapped in impoundment

# Aging Dams are a Problem – July 2023 and 2024 Floods

- Hundreds of ageing dams obstructing our waterways
- Public safety risk as well as ecological impact
- Small dams (avoid State oversight)
- Changing climate
- Dam Safety Program limited resources
- July 2023 Flood – 5 dams failed, 53 with major damage, and 57 were overtopped following 7in of rain
- Timing is critical, urgency is real



Reddit.com

“Unstable dam has town on edge”

[Times Argus, July 18, 2023](#) – Rouleau Pond Dam

“Dam Scary: Intense Storms Push Vermont’s Aging Structures to the Brink” [Seven Days, July 26, 2023](#)



# Reconnected Freshwater System



Connolly Pond Dam Removal and Wetland Restoration, Photo by Marc Cimonetti



# Lowering the Flood Elevation on the Dog River



Before



After



Thinking at a watershed scale....

