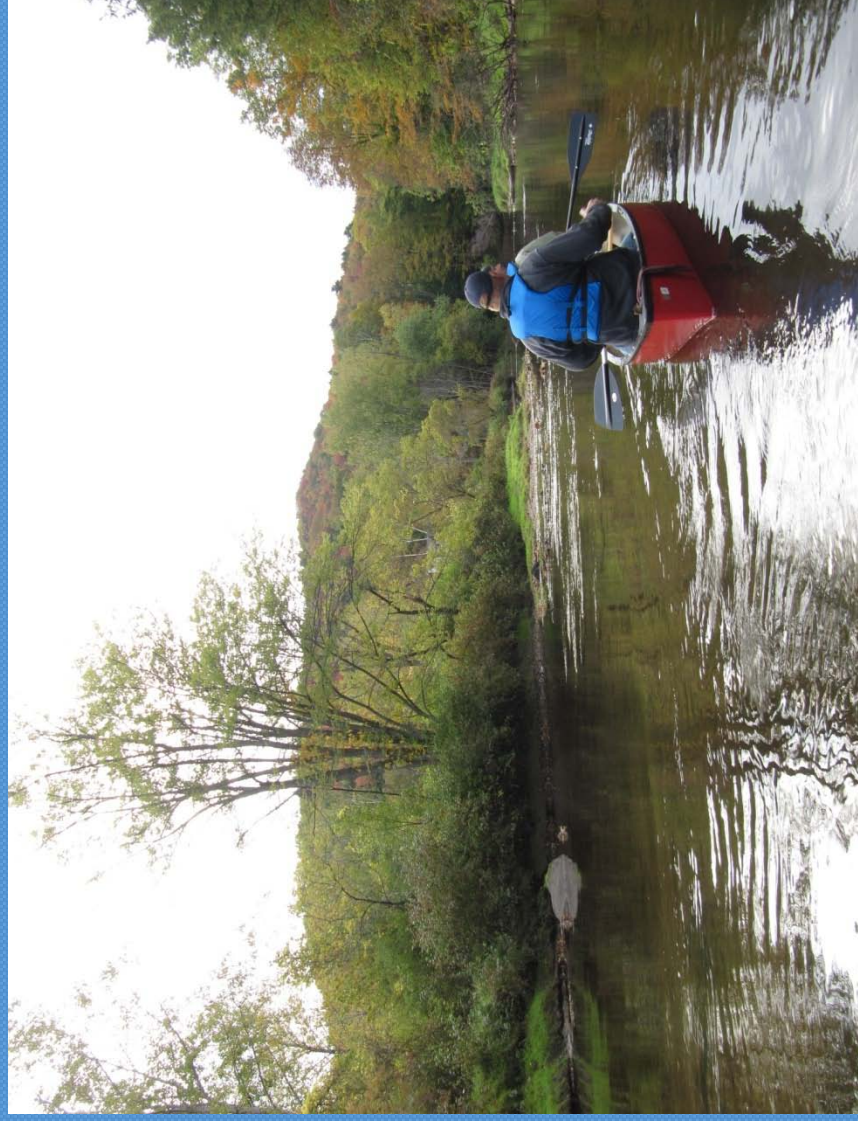


Ecological Restoration: Perspectives and Applications for the Housatonic River



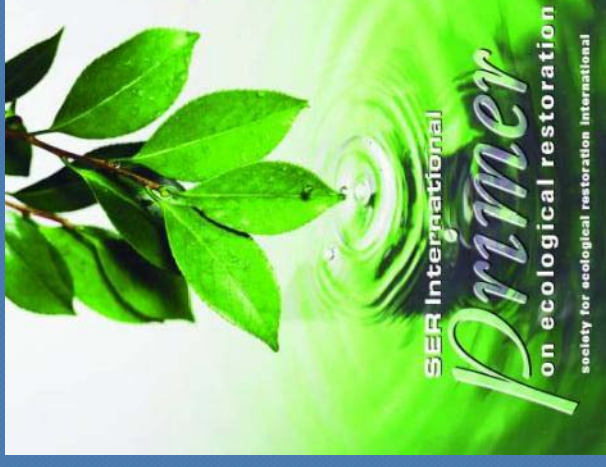
Keith Bowers
Biohabitats, Inc.

Defining Ecological Restoration

What is *Ecological Restoration*?

“Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.”

Initiates and accelerates recovery of an ecosystem along an intended trajectory that supports critical ecological processes.

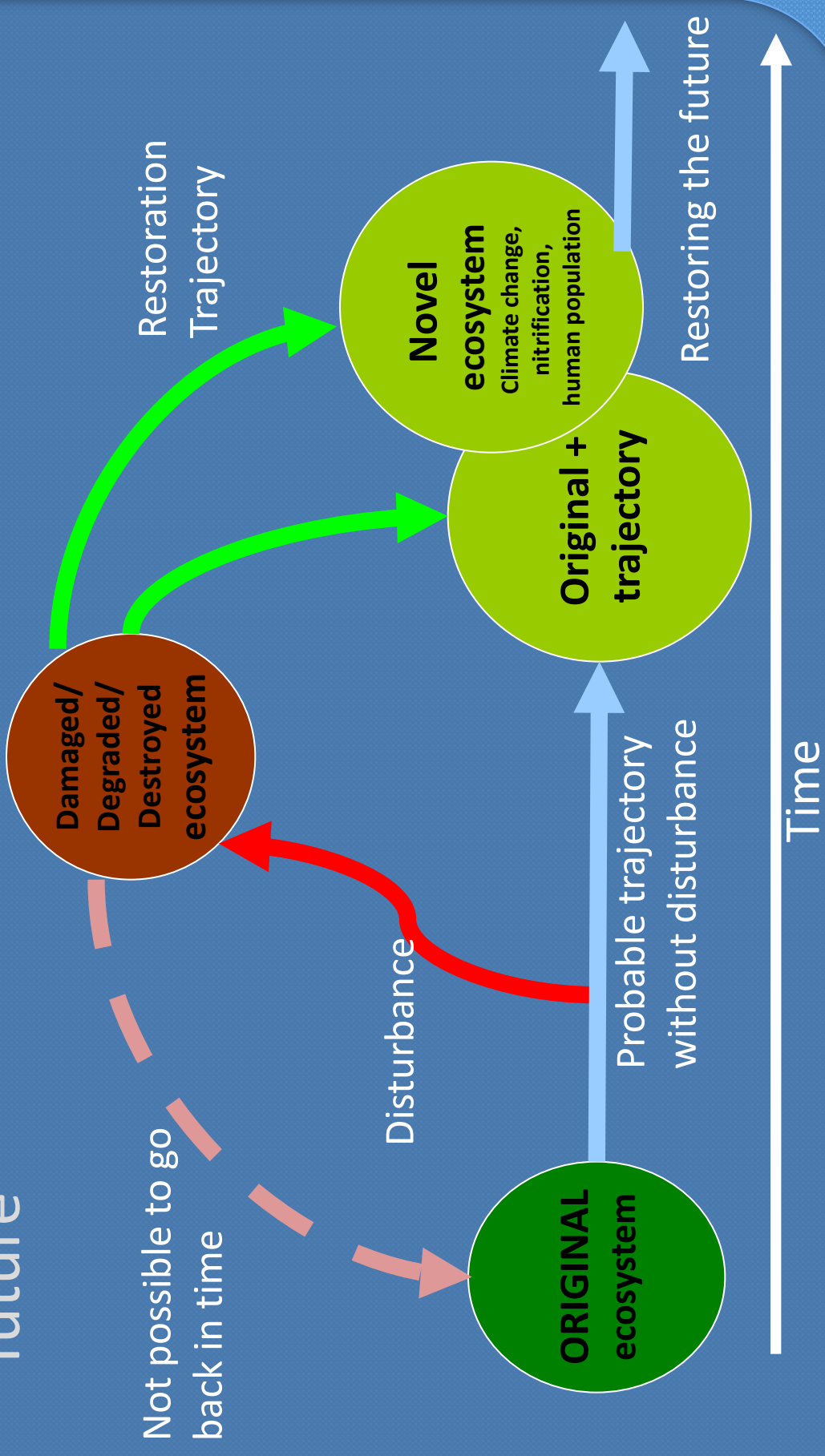


Society for Ecological Restoration

www.ser.org

Defining Ecological Restoration

Ecological Restoration is about restoring the future



Defining Ecological Restoration

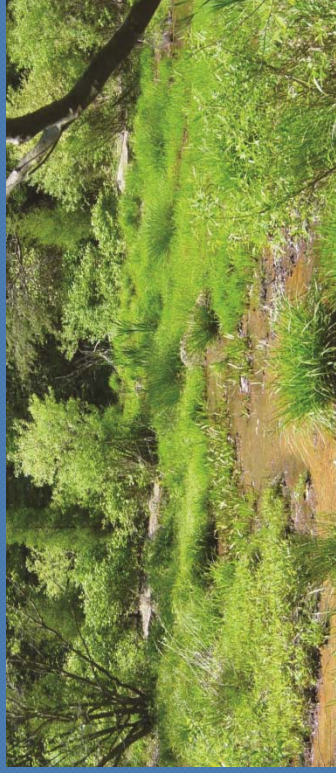
Good restoration should embrace...

- Processes -> function -> form
- Diversity, complexity and resiliency
- Clear trajectory towards success
- Adaptive



Good restoration relies on templates

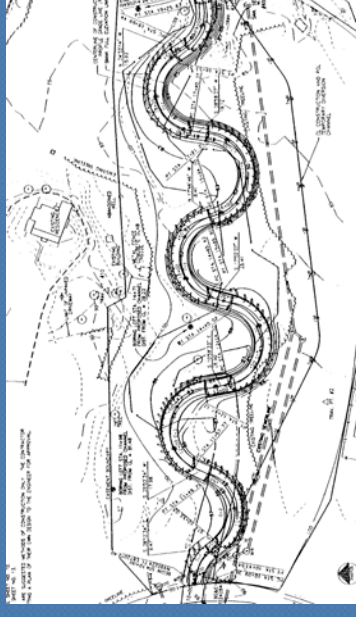
- Analysis of historical and existing conditions can help inform the restoration conceptual design
- Processes (hydrology, hydraulics, nutrient cycles, trophic flows) that provide ecosystem functions
- Form (dimensionless ratios) provides a template for landscape structure (channel shape, floodplain morphology)
- Vegetation composition and structure
- Human engagement and use



Defining Ecological Restoration

Recipe for Success

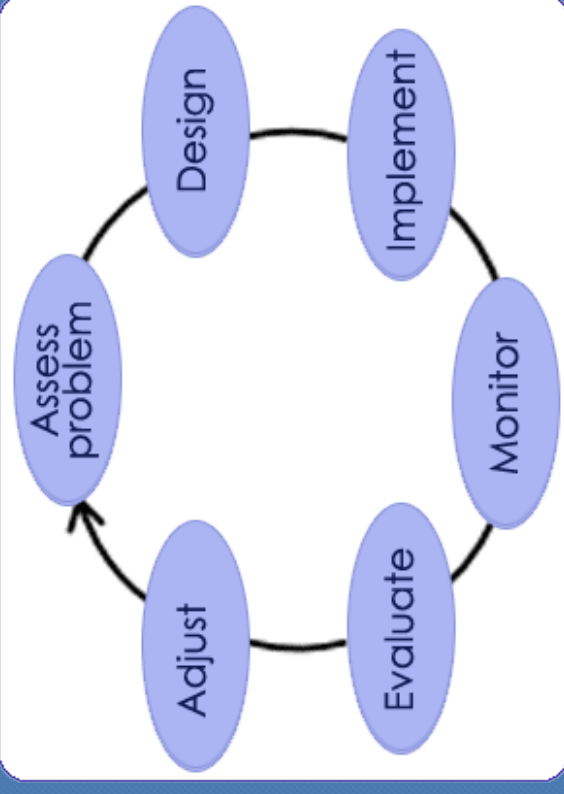
- Clear rationale (remediation)
- Goals & trajectory for success
- Thorough ecological description of the site (and surrounding ecosystem)
- Sound science and engineering
- Designation & description of a reference system – (Stretches of the Housatonic perhaps)
- Integration with the surrounding landscape
- Explicit plans, schedules, budgets...



Defining Ecological Restoration

Recipe for Success

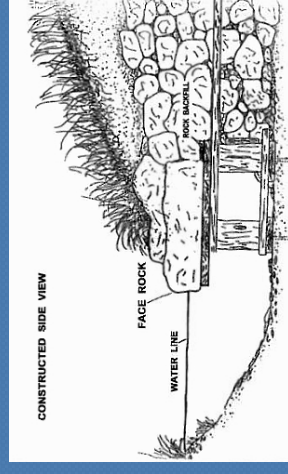
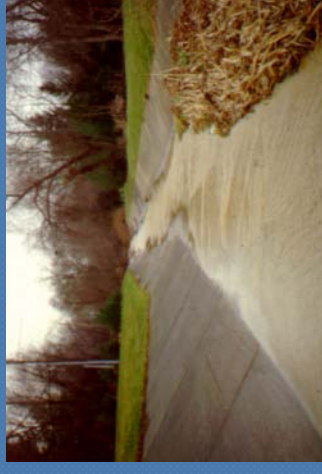
- Monitoring and evaluation
- Adaptive Management
 - openly acknowledges uncertainty about how ecological systems function and how they respond to management actions
 - is designed to improve our understanding of how a system works, so we can achieve management objectives
- is about taking action in pursuit of desired outcomes



River Restoration

River restoration has come a long way...

- 1600s – Agriculture/Forestry – ditching, straightening
- 1950s – Urbanization – more of the same + flood control
- 1960s – Sport fishery – habitat enhancements
- 1970-80s – Age of rip-rap – emphasis on stream bank stabilization, some habitat enhancement

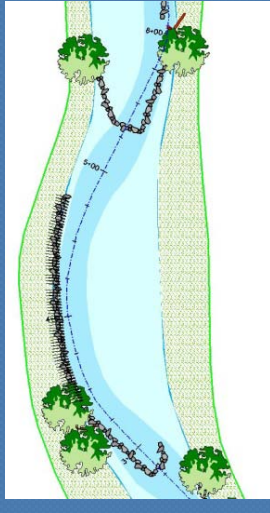


<http://www.co.vernon.wi.gov/LWCD/lunkers.htm>

River Restoration

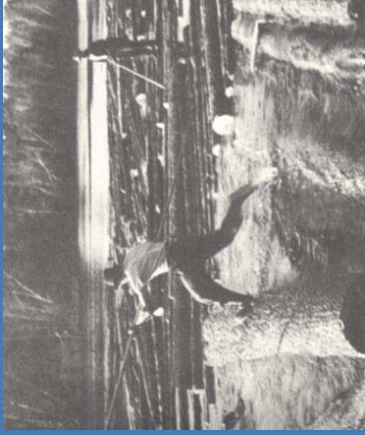
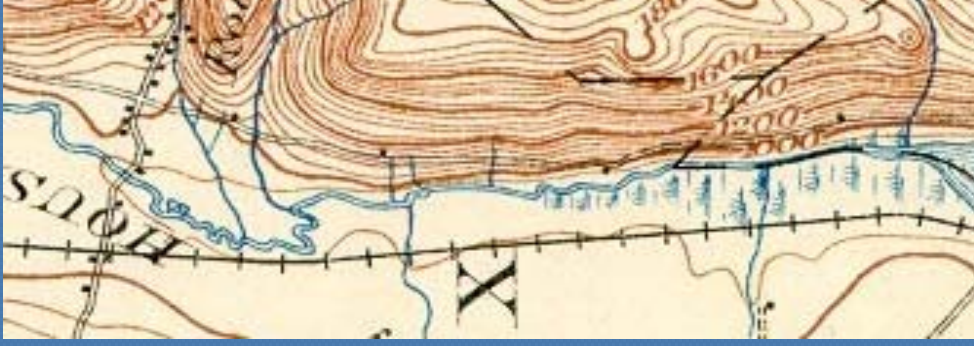
River restoration has come a long way...

- 1980s – current emphasis is on river processes and how they shape, form and influence the river
 - ✓ Integrating the river with the surrounding landscape
 - ✓ Integrating cultural and recreation attributes
 - ✓ Taking into account future changes
 - ✓ Establishing a more resilient & self-sustaining river/floodplain system



River Restoration

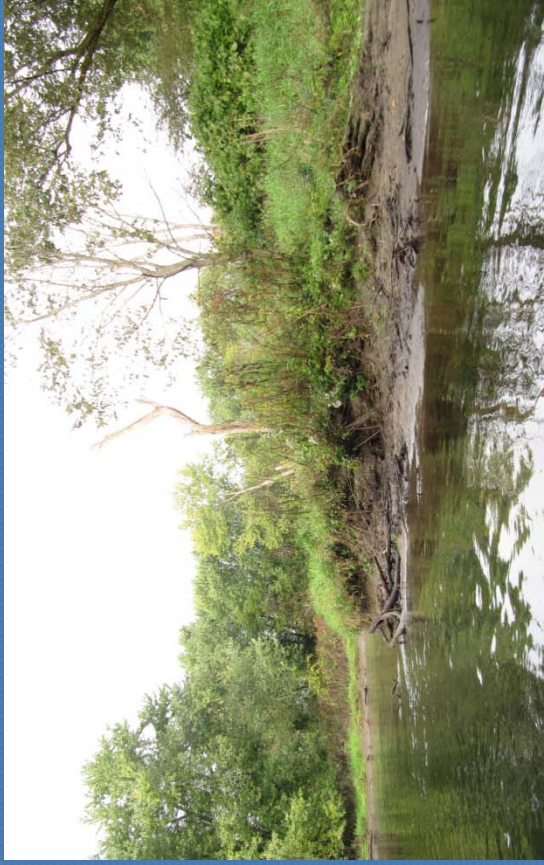
Housatonic – a recovering river



Gove, B., 2003, Log Drives on the Connecticut River

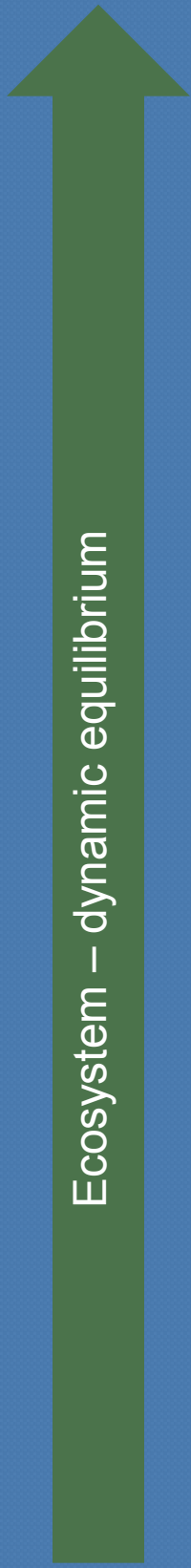


City of Pittsfield Department of Public Works & Utilities

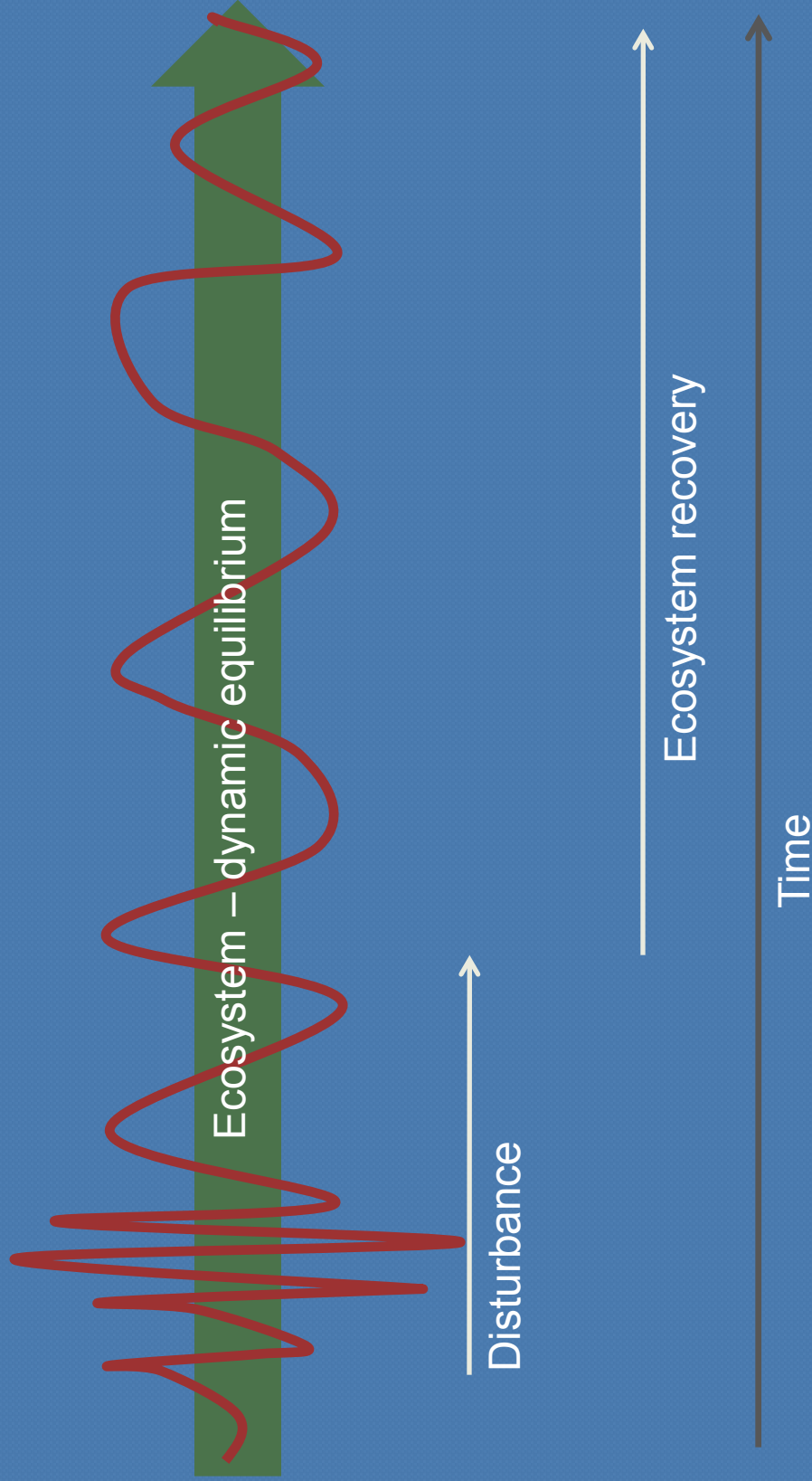


River Restoration

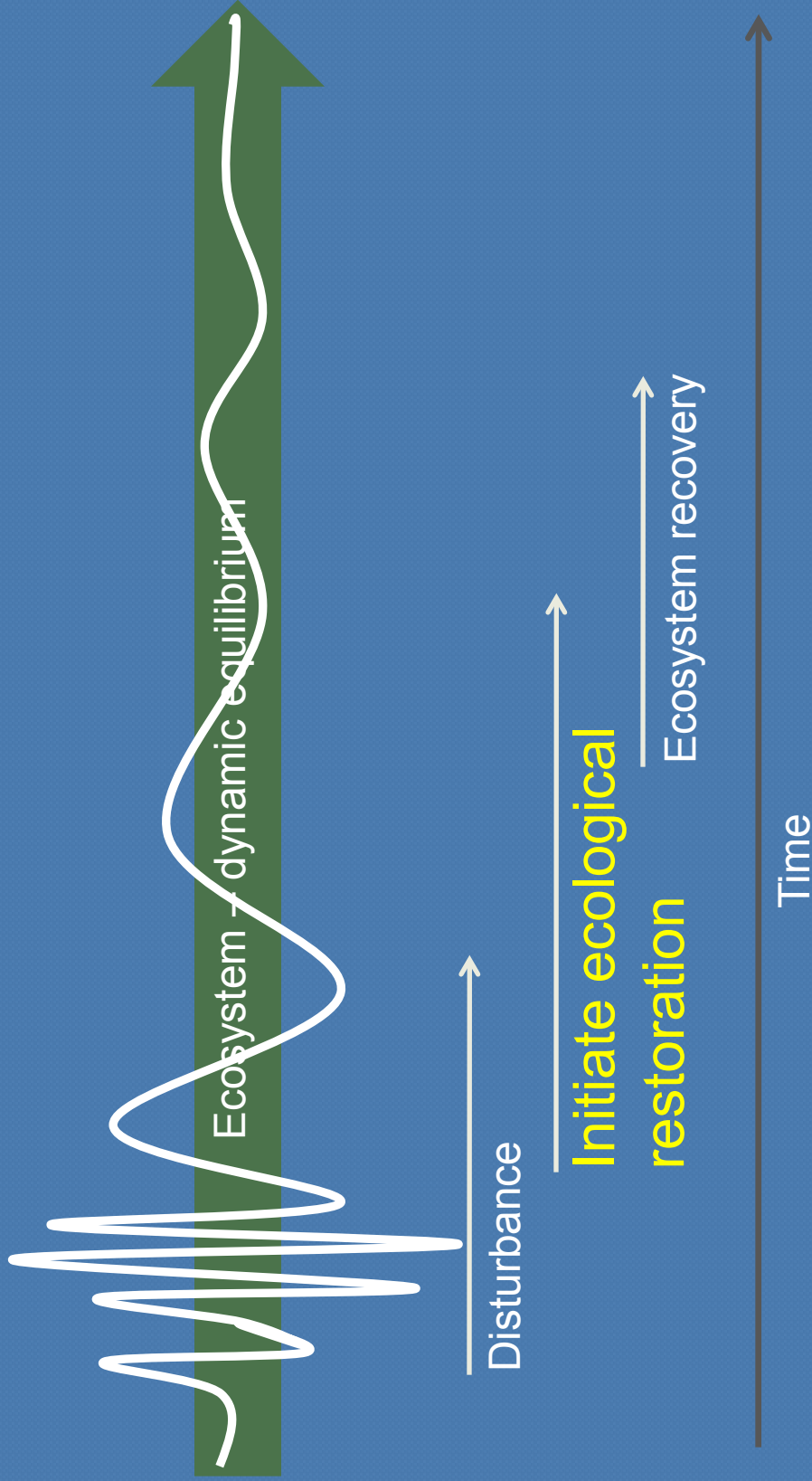
Accelerating the recovery process



Accelerating the recovery process

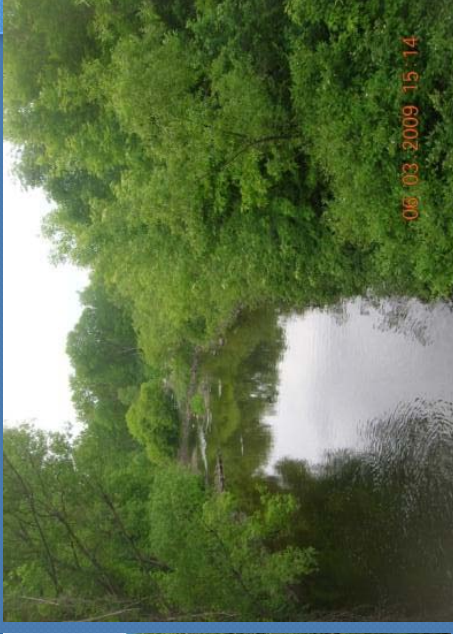
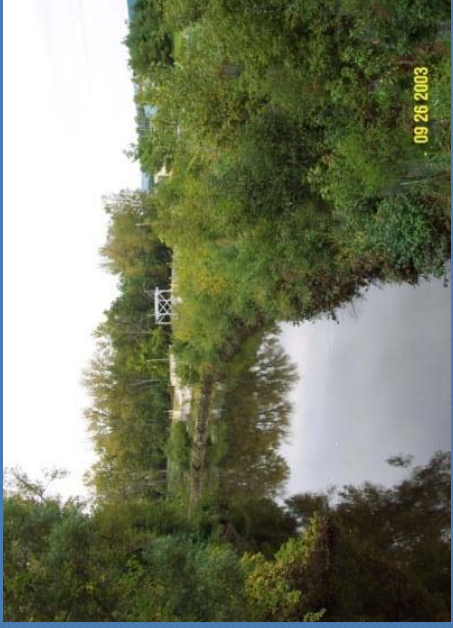


Accelerating the recovery process



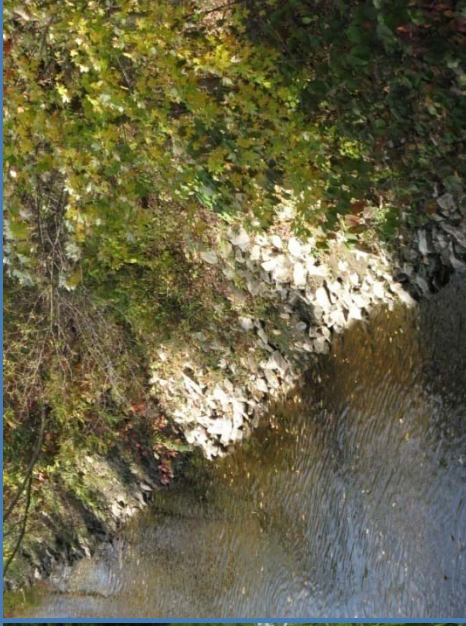
River Restoration

Housatonic – Upper 2-Mile Reach Remediation



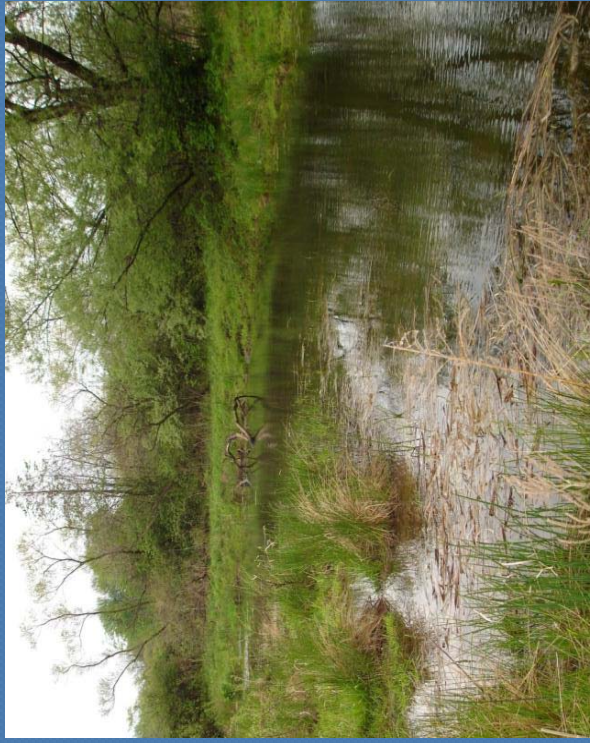
River Restoration

Housatonic – Upper 2-Mile Reach Remediation



River Restoration

River restoration success stories



River Restoration

River restoration success stories



River Restoration

River restoration success stories



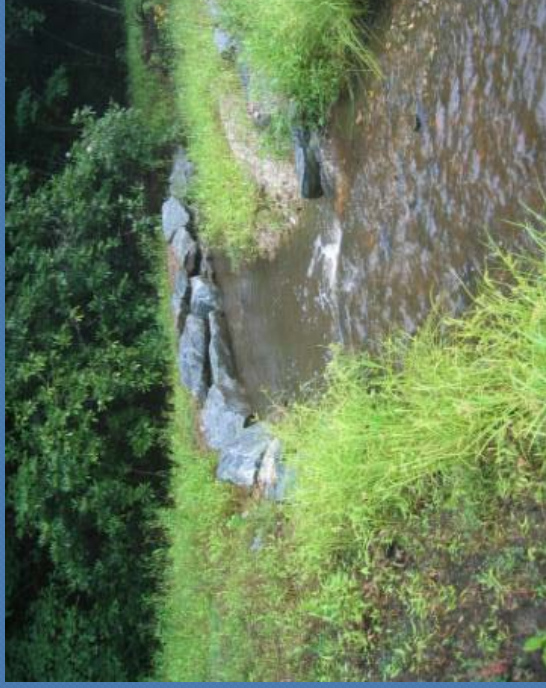
River Restoration

River restoration success stories



River Restoration

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River Restoration

River restoration success stories



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River Restoration

River restoration success stories



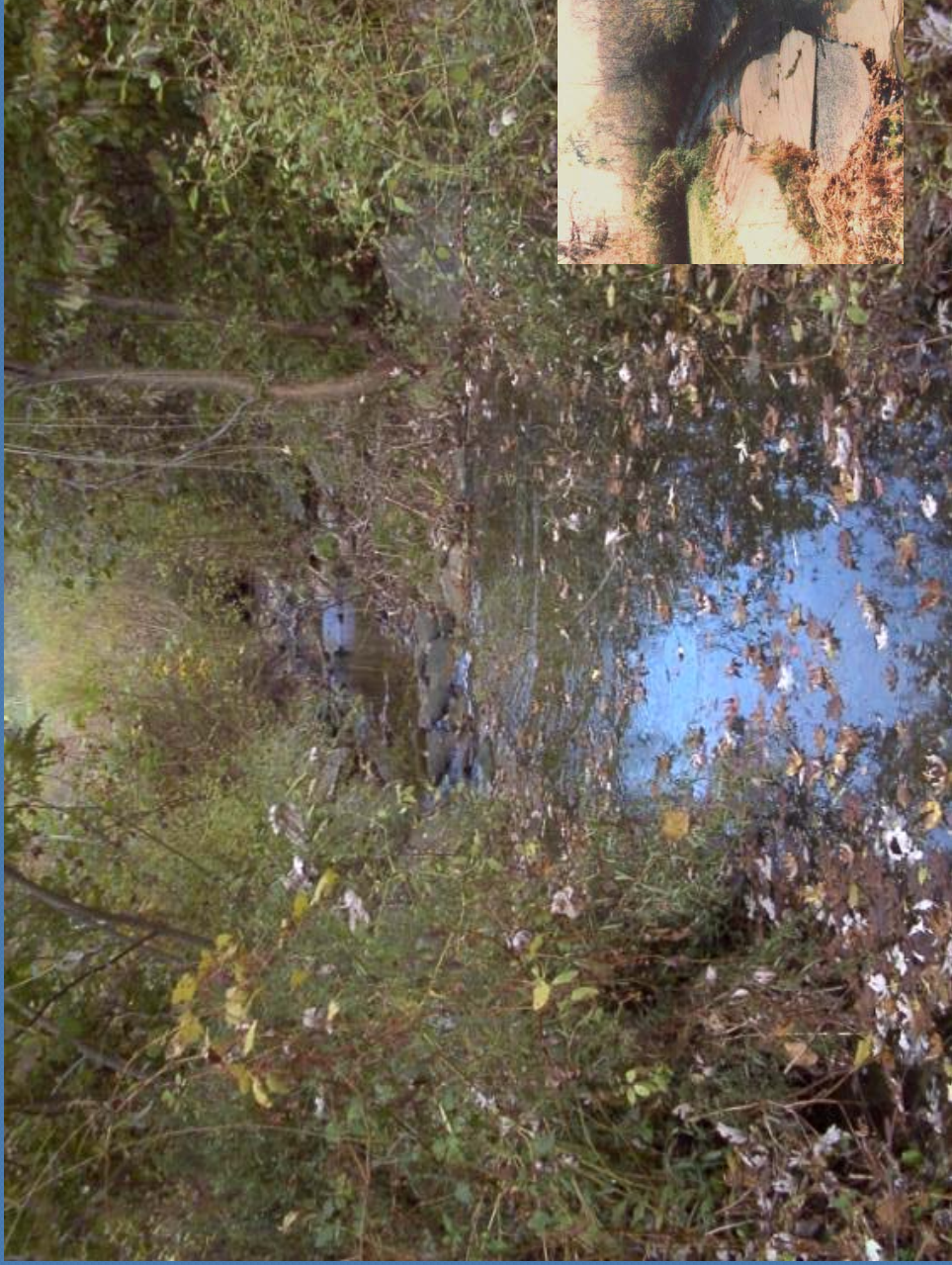
River Restoration

River restoration success stories



River Restoration

River restoration success stories



River Restoration

River restoration success stories



River restoration success stories

Loring AFB ME

- Contaminated soil & sediment remediation
- Restored stream and wetland/floodplain habitats
- Restored native plant communities
- Restored instream habitat to support trout fishery

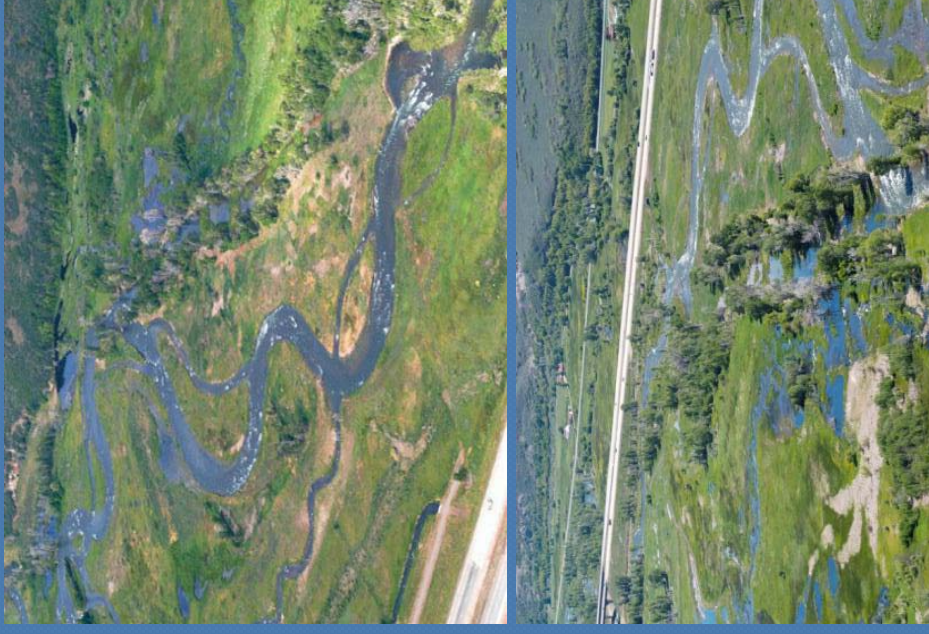


River restoration success stories

Provo River

Salt Lake City, Utah

- Restore river form & ecological function
- Multiple-thread channel with complex floodplain features, oxbows, side channels and floodplain wetlands
- Levee setbacks and reconnected floodplain



Utah Reclamation, Mitigation and Conservation Commission

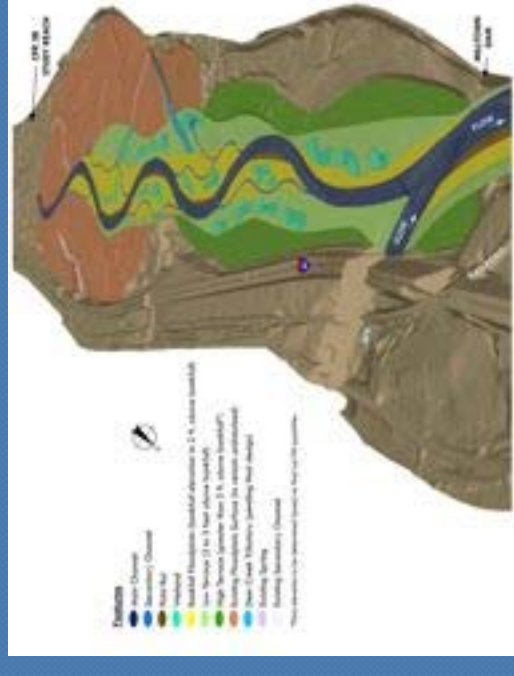
River restoration success stories

Upper Clark Fork Restoration MT

- Consent decree – State vs ARCO - Superfund cleanup to remove toxic metals from streambeds, streambanks and the floodplain along 43 river miles
- Community outreach, restoration vision and scientific learning serve as the foundation for the project.
- Goal – to provide a vibrant model for integrated restoration that provides long-term ecological, economic, and cultural assets for the watershed.



Clark Fork River Technical Assistance Committee



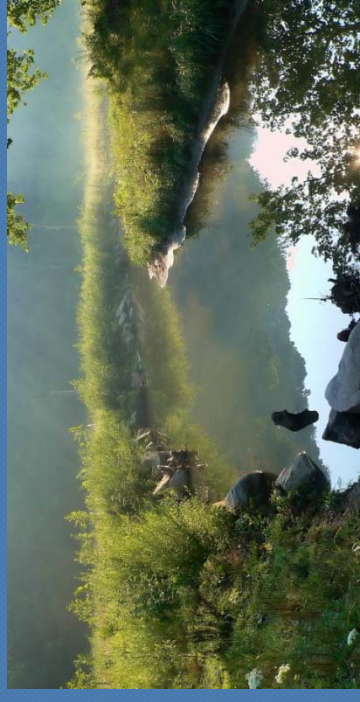
A graphic of the state's restoration plan for Clark Fork River flood plain.

River restoration success stories

Nine Mile Run

Pittsburgh, PA

- Large, urban channel with adjacent contaminated soils
- Channel stabilization
- In-stream aquatic habitat enhancement
- Floodplain reconnection & wetland creation



Copyright John Moyer

River restoration success stories

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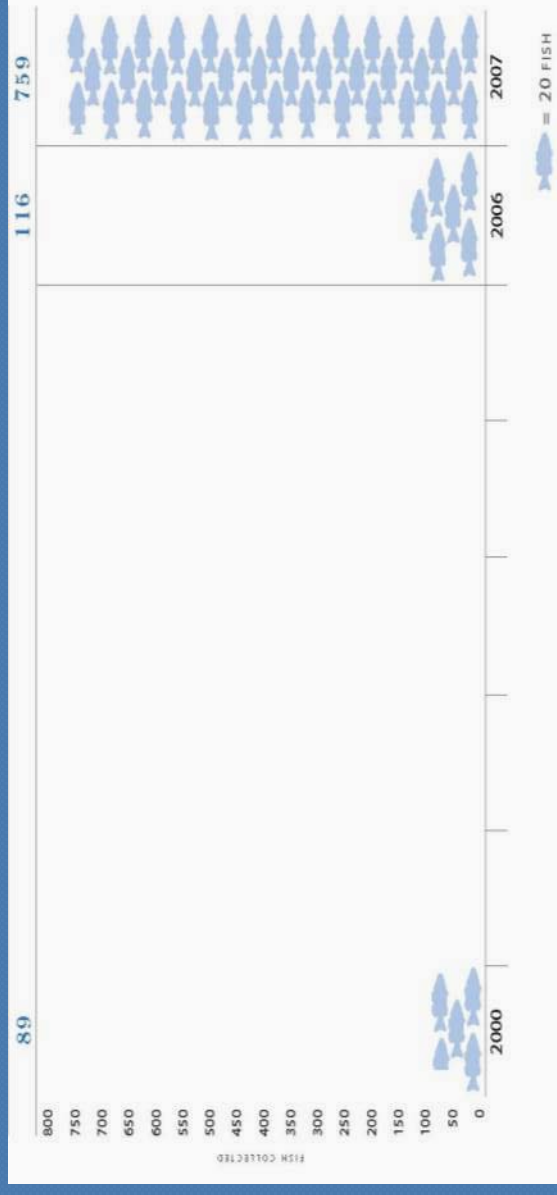
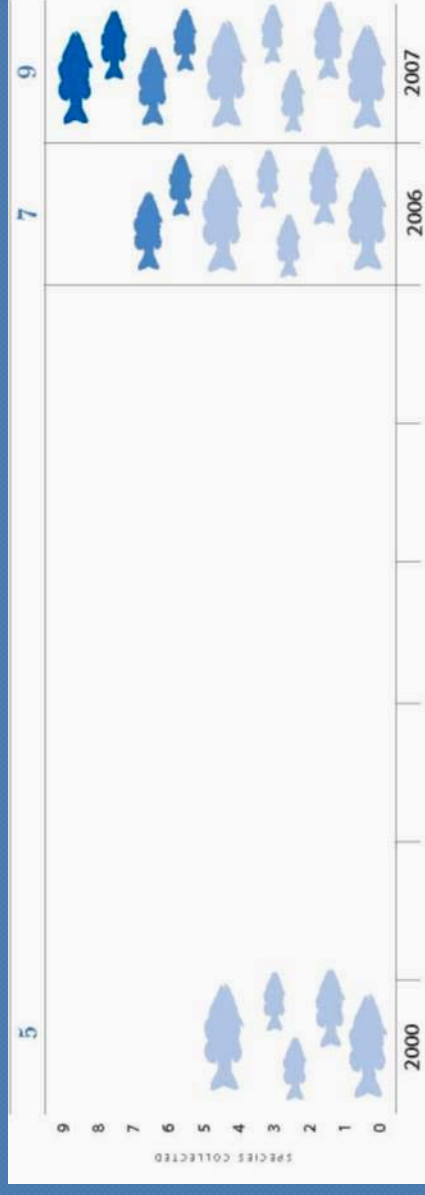


River Restoration

River restoration success stories

Nine Mile Run

Pittsburgh, PA



Nine Mile Run Watershed Association

River restoration success stories

North Gray's River Restoration

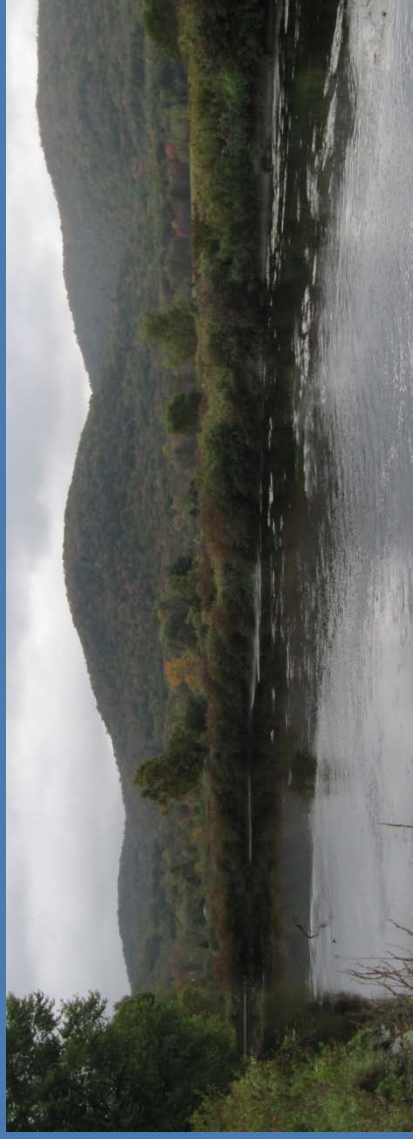
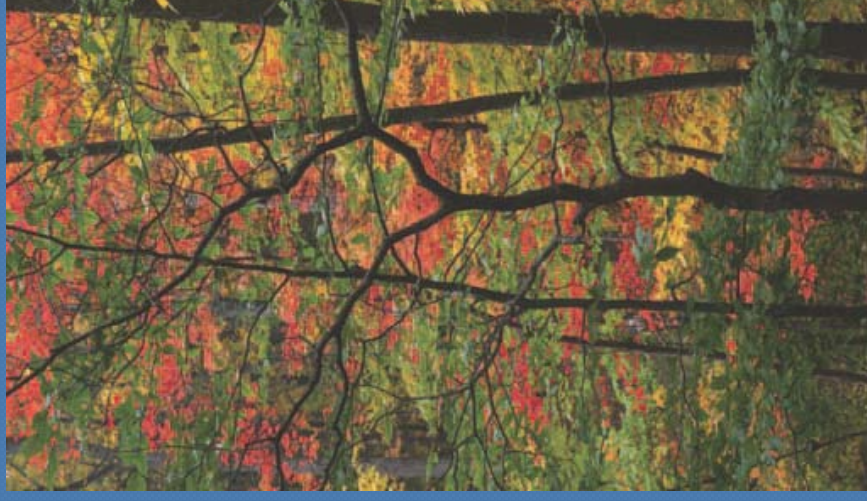
MD

- Restored complex of riparian wetlands/bogs and vernal pools
- Restored stream and wetland/floodplain habitats
- Restored native plant communities
- Restored habitat to support RT&E species

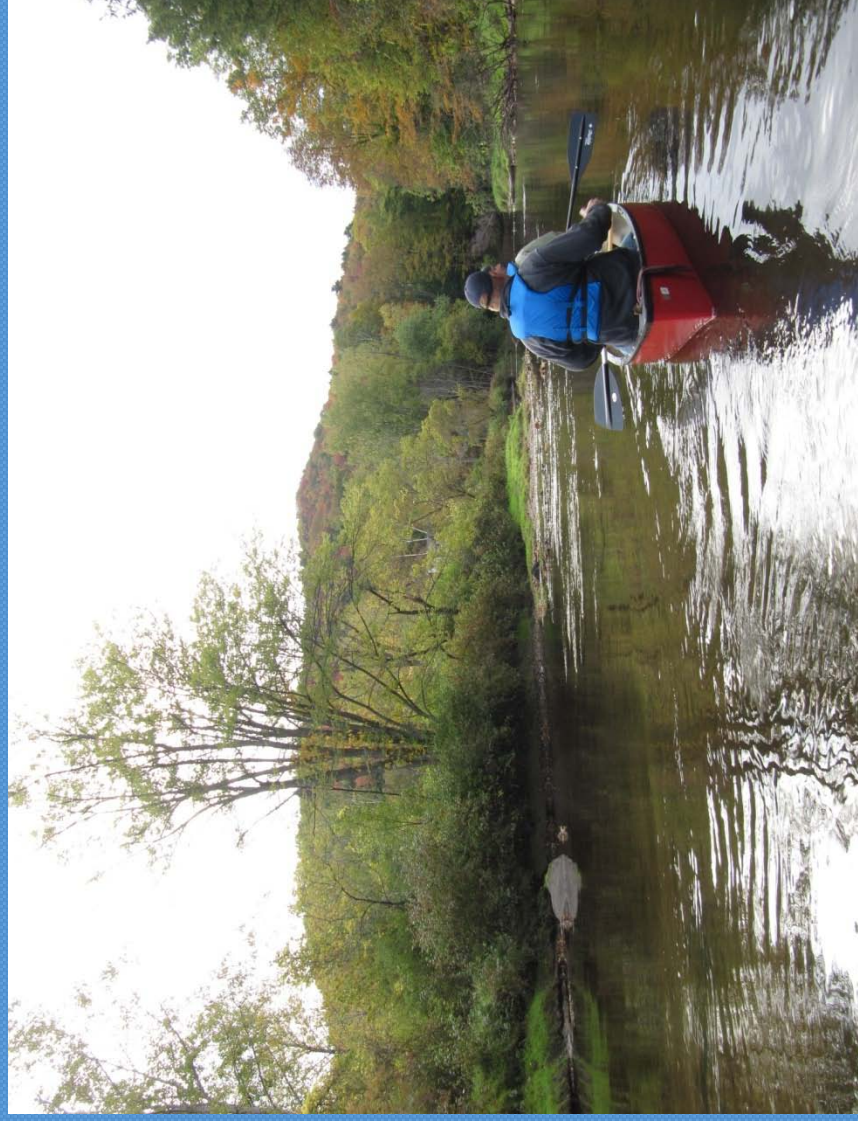


River Restoration

What would a restored Housatonic River look like to you?



Ecological Restoration: Perspectives and Applications for the Housatonic River



Keith Bowers
Biohabitats, Inc.

THANK YOU