Avoiding and Resolving Land Use Conflicts for Comprehensive Ecological Restoration

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res
Restoring a resilient earth for a modern world

Introduction

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Restoring a resilient earth for a modern world

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Our teams cover the project lifecycle

Behind the Scenes

- Land acquisition
- GIS specialists
- Environmental, health, safety and security
- Regulatory project managers
- Project controls
- Government affairs
- Public and community relations
- Financial
- Legal

On the Ground

- Certified foresters
- Construction managers
- Engineers
- Field crew members
- Field ecologists
- Hydrologists
- Landscape architects
- Nursery managers
- Stream designers
- QA/QC oversight teams
- Superintendents
- Wetland scientists
- Wildlife biologists

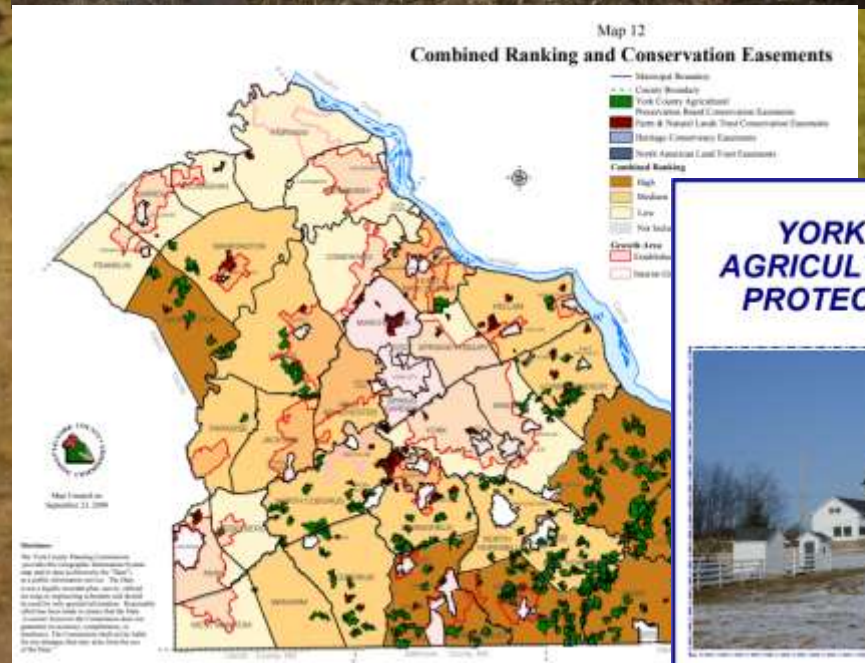


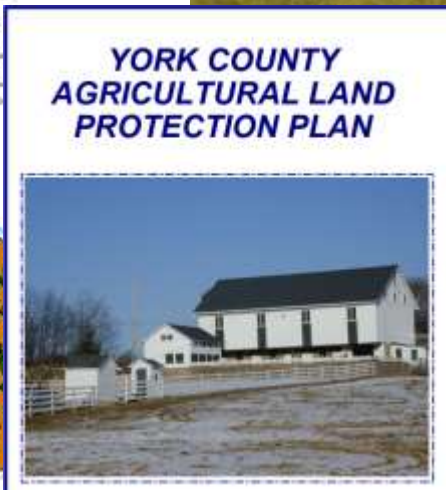




Agenda

1. Introductions
2. Purpose
3. Problem Statement
4. Case Studies
5. Solutions
6. Discussion





As-Built Conditions - October 2019

Purpose

1. **Promoting increased collaboration to manage land resources in an increasingly complex industry.**

2. **Compare projects that restore a broader suite of functions to those that aim to restore fewer functions.**

"Watershed-scale features, such as aquatic habitat diversity, habitat connectivity, and other landscape scale functions"

CATEGORY	Environmental mitigation	Stormwater management and water quality	Climate adaptation and flood resilience
MEANING	*Offset the unavoidable impacts of development by preserving, enhancing or restoring an ecosystem such as a stream, wetland, or species habitat.*	*Supplement or replace traditional "grey" infrastructure with natural processes that better manage the negative impacts of stormwater.*	*Dissipate impacts of heavy storm events, rising sea levels and ongoing climate degradation through nature-based infrastructure.*
KEYWORD PHRASES	• 404 Clean Water Act (CWA) mitigation • Endangered Species Act (ESA) mitigation, • National Environmental Policy Act (NEPA) • Wetland and stream mitigation • Species habitat mitigation • Native vegetation and pollinator habitat • Large-scale environmental restoration (LSER, landscape-scale restoration)	• 401 Clean Water Act (CWA) • Municipal Separate Storm Sewer System (MS4) • Total Maximum Daily Loads (TMDL) mandates • Stormwater management • Nutrient reduction • Nutrient trading, credit • Stream restoration • Green infrastructure • Green Best Management Practices (BMPs)	• Climate resiliency and adaptation • Coastal restoration and resiliency • Flood or floodplain resiliency • Carbon sequestration • Watershed resiliency • Aquifer recharge
RESULT	• Prevention of habitat loss • Biodiversity • Self-sustaining habitats • Improved water quality	• Reduced algae blooms and low oxygen "dead zones" • Less flooding • Cleaner, healthier water for aquatic species and local communities	• Reduced flooding from large storms • Reduced shoreline erosion • Diminished impacts from storm surges • Carbon removal from native grasses and tree plantings
RES' long-term stewardship of these projects, through turnkey delivery and guaranteed performance assures:			
	• Establishes protected ecosystems and habitats in watersheds where development is active, creating offsets where they are needed the most. • Mitigation provides ecological restoration that typically would not otherwise happen.	• Mimics and boosts natural systems for safely recharging groundwater and preventing/reducing toxic runoff. • Nature-based green infrastructure provides public amenities like street trees and green spaces that traditional stormwater treatment does not.	• For coastal projects, can be paired with built infrastructure for speed, cost effectiveness and low maintenance.

Stewardship A long game, with resiliency as the prize

406
Mitigation sites

Designed and Built
since 2007

294
Mitigation sites

Under
Active Stewardship

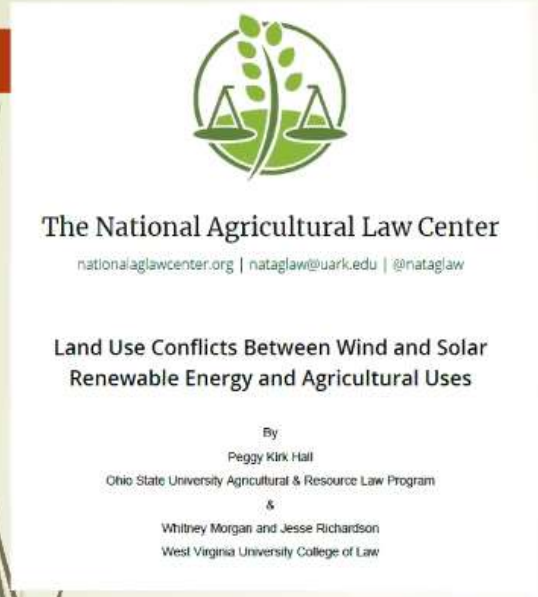
112
Mitigation sites

Self Sufficient,
Permanently Preserved

Property Considerations

- Parcel Size & Boundaries
- Ownership, Chain of Title
- Existing Encumbrances
- Existing Improvements
- Access, Physical and Rights
- Mineral Rights
- Timber, Crop, Artifact Value
- Existing Land Use
- Site Protection
- Zoning
- Local Opposition

Land Consumption



Peggy Kirk Hall
Ohio State University Agricultural & Resource Law Program

Whitney Morgan
West Virginia University College of Law
Land Use and Sustainable Development Clinic

Jesse J. Richardson
West Virginia University College of Law
Land Use and Sustainable Development Clinic

Paper and webinar recording available at:
https://nationalaglawcenter.org/webinars/windsolarlandconflicts/

Functions and Values (Services) of Aquatic Resources

Functions and Values (Services)

- Upland Buffers/Riparian Areas
  - "help improve or maintain local water quality" (40 CFR Part 230)
  - "helps protect terrestrial wildlife habitat, aquatic habitat, and water quality"
  - "e.g., flood storage, temperature moderation, nutrient filtering" (enviroatlas.epa.gov)
- Wetlands & Streams
  - "water quality, flood control, shoreline protection"
  - "water quality, habitat creation, species recovery and recreation"
  - "Public interest factors, such as water quality, flood hazards, and fish and wildlife protection" "water quantity" (40 CFR Part 230)
  - "food and habitat for fish and wildlife, including threatened and endangered species; water quality improvement; flood storage; shoreline erosion control; **economically beneficial natural products for human use**; and opportunities for recreation, education, and research" (www.epa.gov/watertrain)

Land Use & Hydromodification, "Urbanization Impacts"

Hey wait!
The "Rural / Undeveloped" starting point might **already be ditched**...

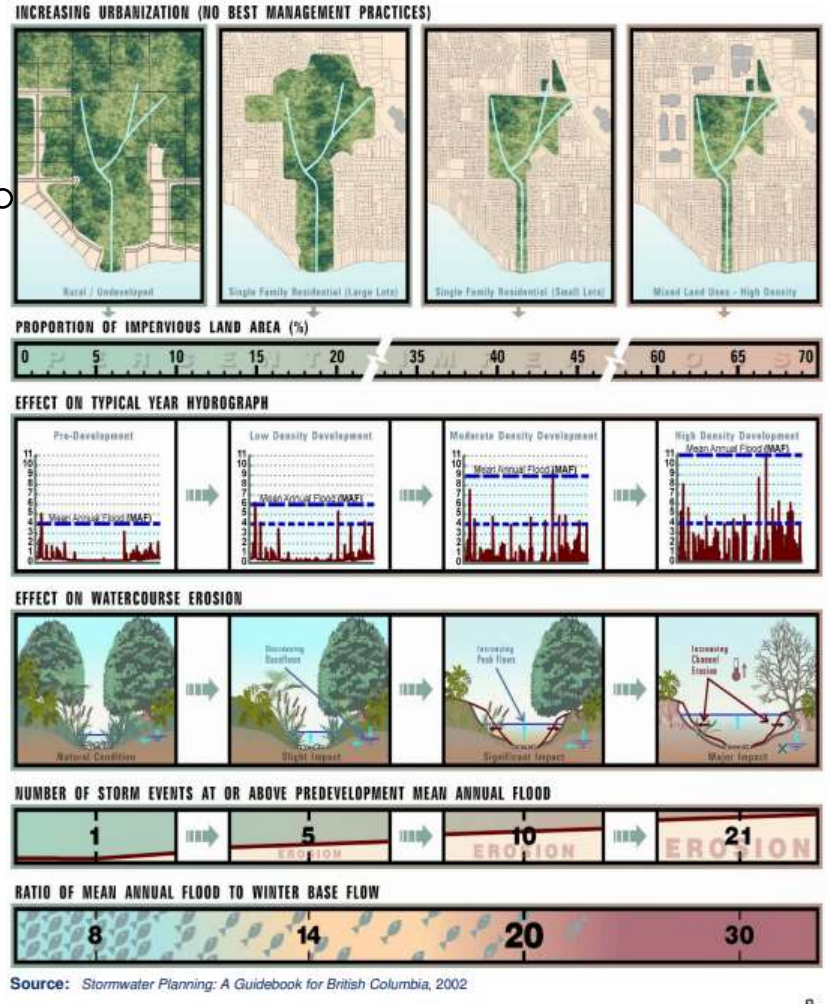
"US Scientists Establish that Stream Biodiversity Declines at Extremely Low Levels of Urban Development"

July 2, 2011 - Posted in **Pollution Prevention**, **Protecting Water Quality and Ecology**, **Uncategorised**

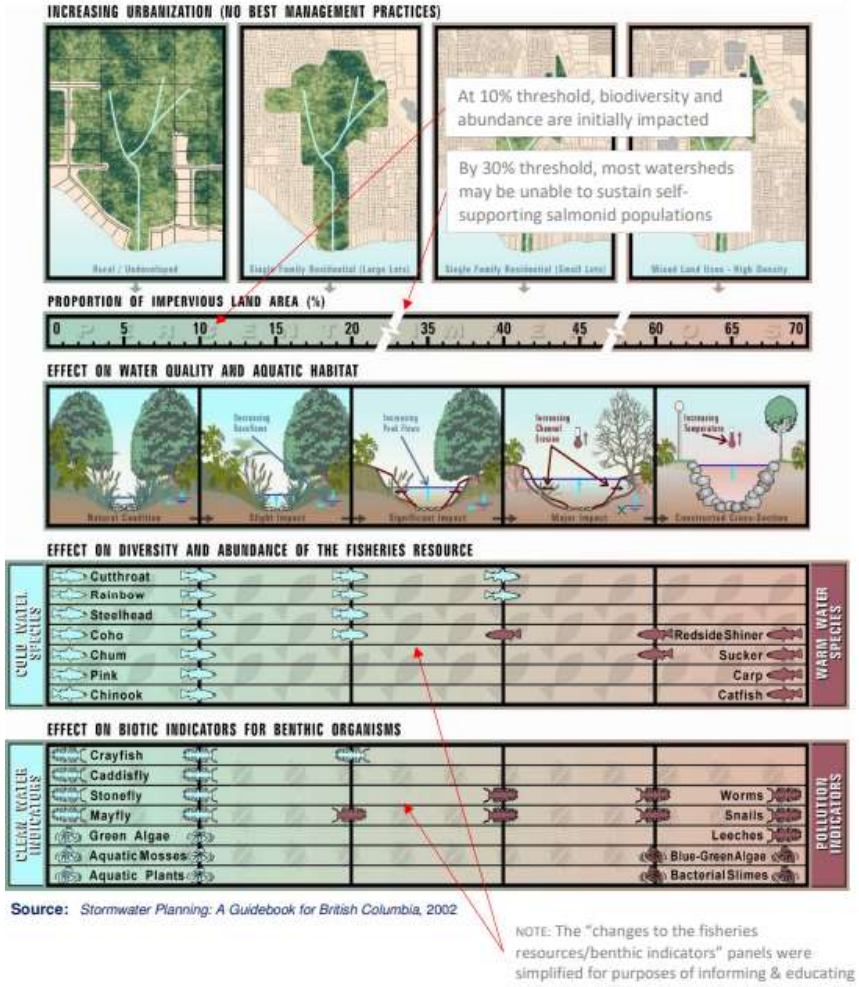
https://waterbucket.ca/

Impact of Ditching and Changes in Hydrology

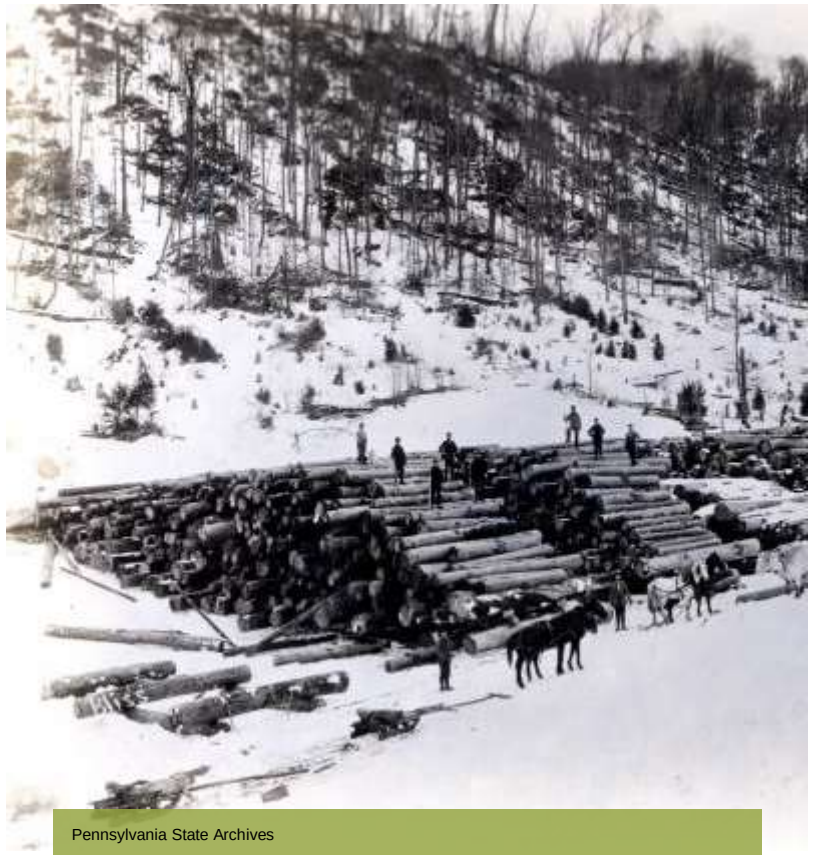
on Stream Corridor Ecology



on Watercourse Erosion and Base Flow



Land Use Change & Hydromodification, Pre-Industrial Era



Pennsylvania State Archives

Deforestation & Logging Roads

University of Minnesota Extension

Tillage

"The heroic effort it took to finally drain the Black Swamp merited a state historical marker, which is located at Archbold. Ditching and tiling helped transform the 1,500 square miles of swamp into productive farmland."

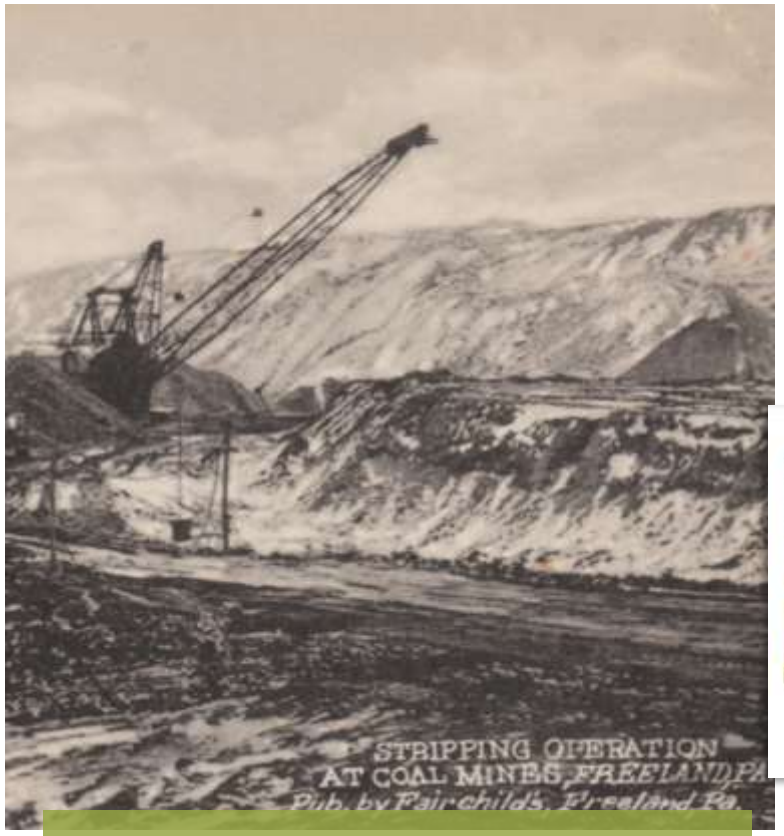
HISTORIC WETLANDS	AREA IN ACRES	DATE DRAINED	SOURCE
Black Swamp	3,072,000	1859–1885	Ohio Dept. Nat. Res., 1988
Pickaway Plains	4,800	1821	Gordon, 1969
Scioto Marsh	16,000	1859, 1883	Gordon, 1969
Other marshes, Hardin County	9,000	1860's	Howe, 1900
Hog Creek Marsh	8,000	1868–1874	Gordon, 1969
Cranberry Marsh	1,000	Unknown	Gordon, 1969
Lake Erie Marshes	300,000	1936–1974	Bednarik, 1984
Dougan's Prairie	Unknown	1827	Middleton, 1917
TOTAL	3,410,800		

National Water Summary on Wetland Resources
United States Geological Survey Water Supply Paper 2425

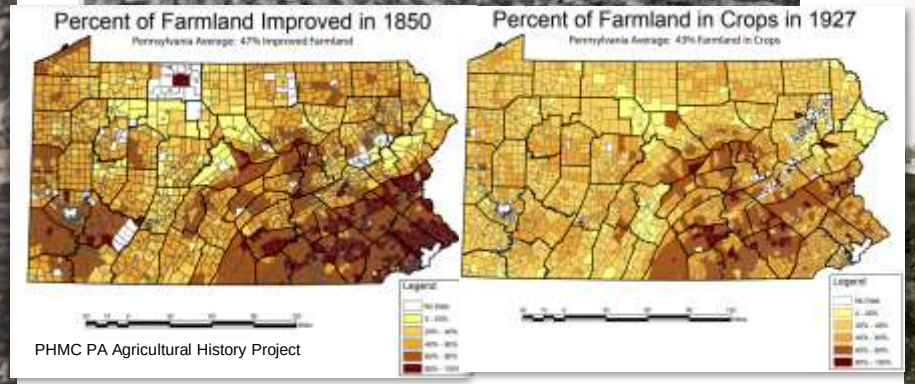
Ven Wert, Ohio Times Bulletin

Ditching & Drainage

Land Use Change & Hydromodification, Industrial Era



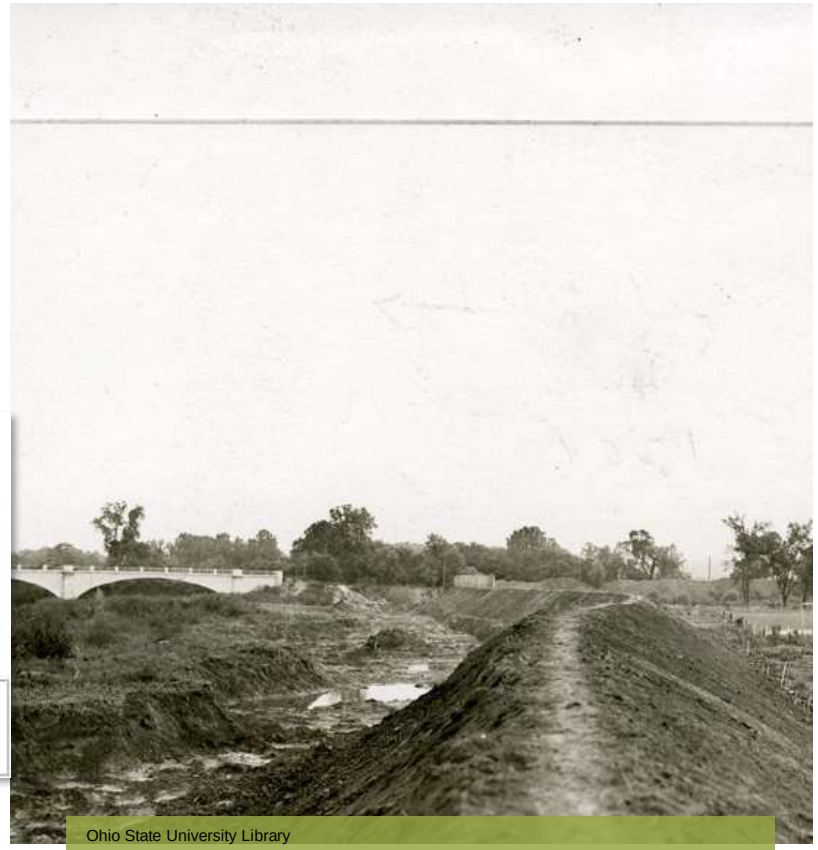
Extractive Industries



PHMC PA Agricultural History Project

Pennsylvania State Archives

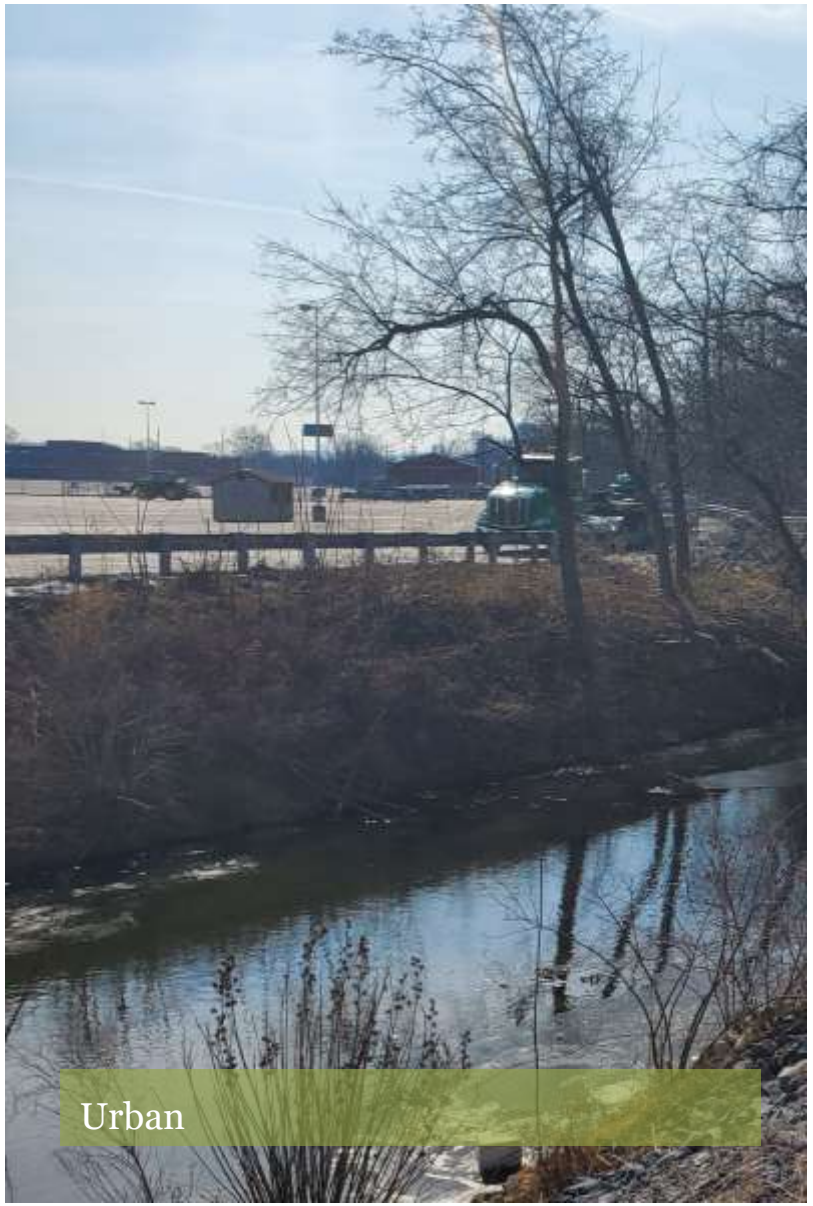
Tillage, Erosion, & Sedimentation



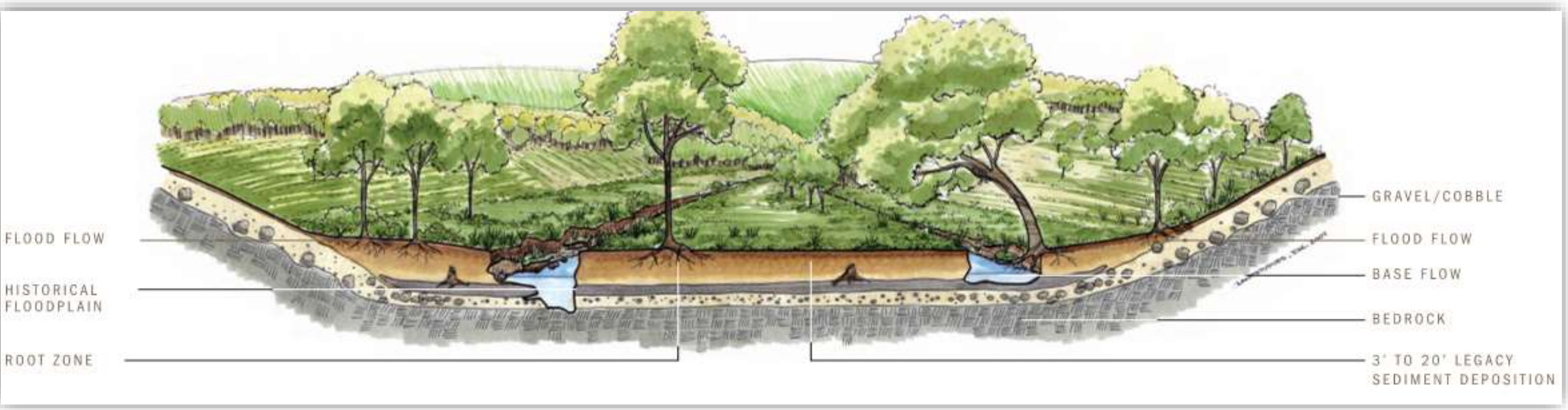
Ohio State University Library

Drainage & Channelization

Land Use Change & Hydromodification, Modern Perception

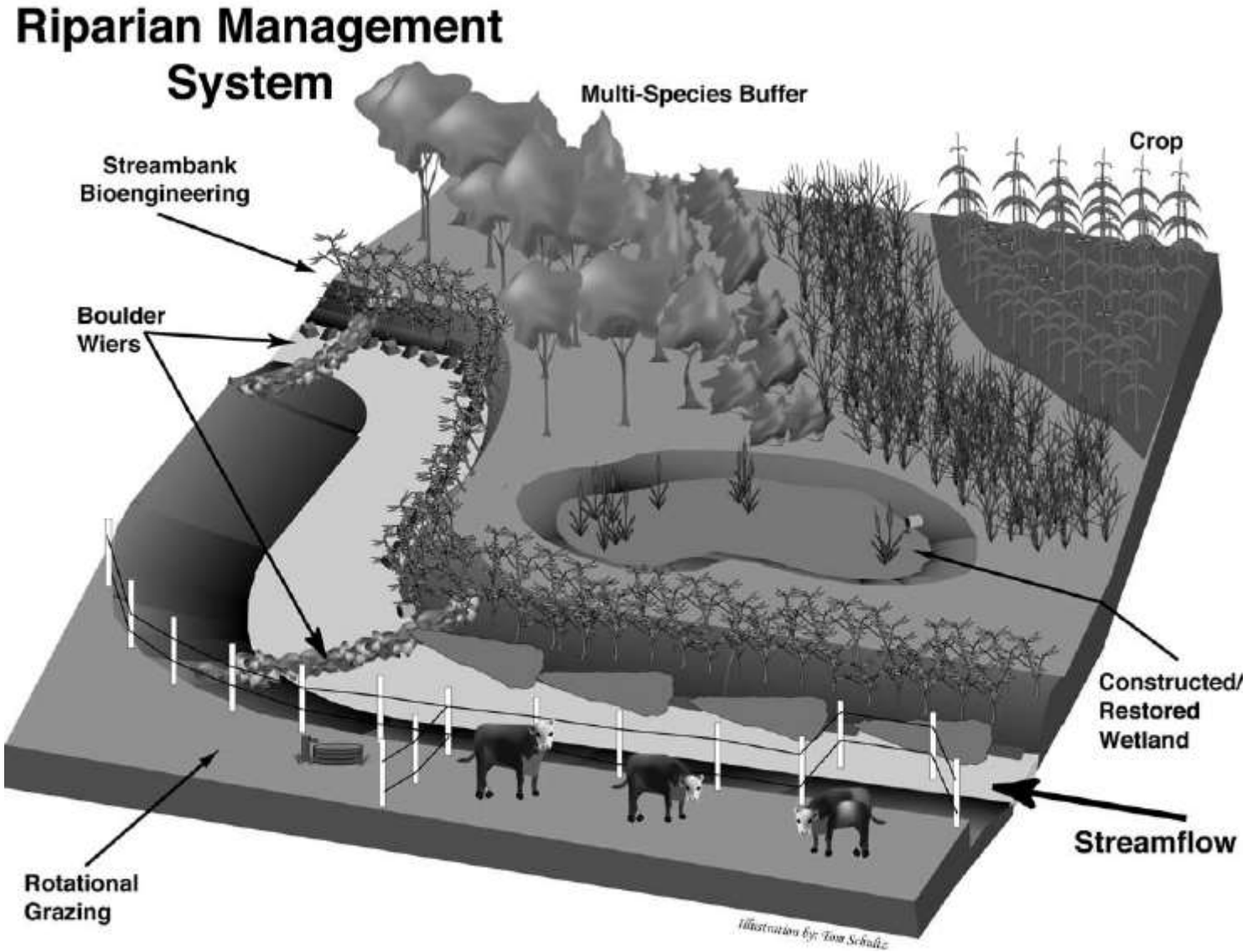


Land Use Change & Hydromodification Illustration



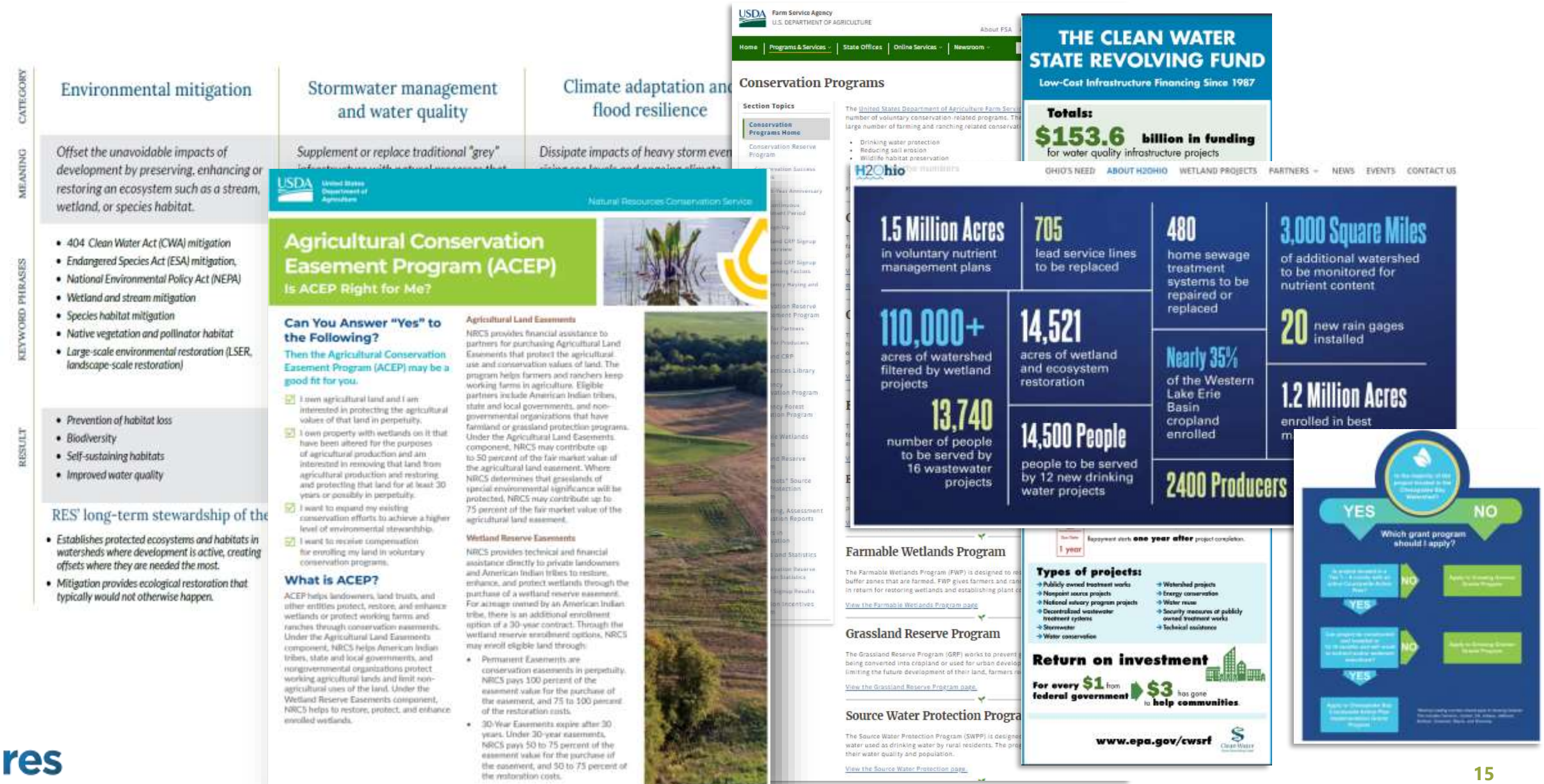
IMPACT OF INCREASING URBANIZATION ON STREAM CORRIDOR ECOLOGY

Less Integrated Approach



Riparian Forest Buffers in Agroecosystems - Lessons Learned From the Bear Creek Watershed, Central Iowa, USA; July 2004; Agroforestry Systems 61(1):35-50, DOI:10.1023/B:AGFO.0000028988.67721.4d

Expanding Land-Based Conservation & Restoration Programs



The Watershed Approach

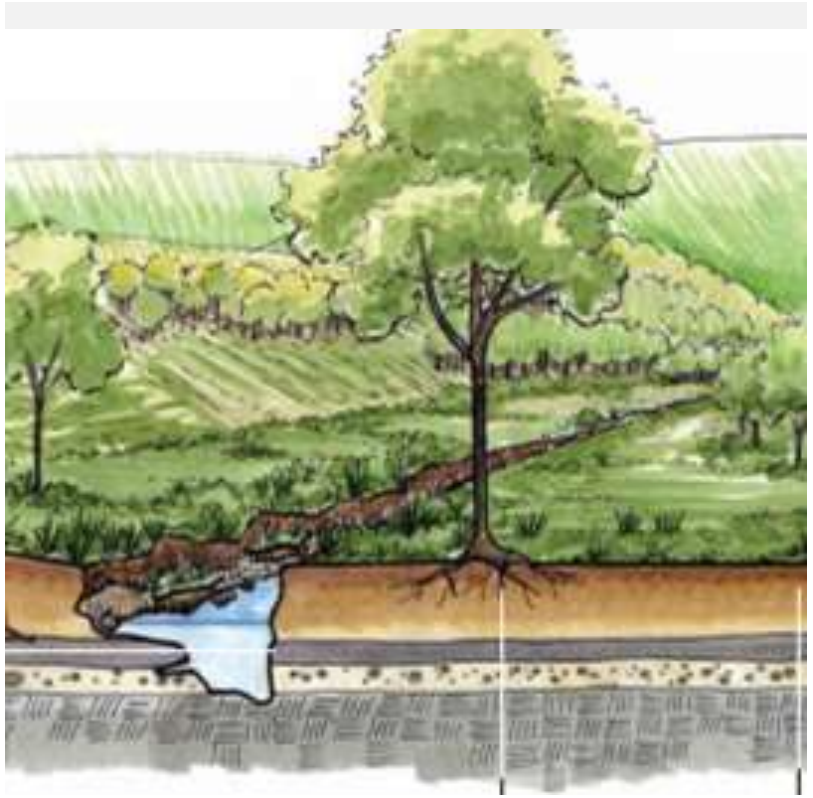
The Watershed Approach

- "requirements determined through the watershed approach should not focus exclusively on specific functions (e.g., water quality or habitat for certain species), but should provide, where practicable, the **suite of functions typically provided by the affected aquatic resource**" (40 CFR Part 230)

- "the approach can result in cost savings by leveraging and building upon the financial resources and the willingness of the people with interests in the watershed to take action. Through improved communication and coordination the watershed approach can **reduce costly duplication of efforts and conflicting actions**." (Watershed Approach Framework EPA 840-S-96-001)

The Watershed Approach

Causes of Impairment



Pre-Restoration Conditions

Restoration Approach

Restoration Types

Definitions

Preservation means the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Restoration means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation

Enhancement Tributary

Rehab. Tributary

Rehab. Large Stream

Restoration Medium to Large Stream

Alluvial Fan Restoration

Headwaters Restoration

Wetland Enhancement

Wetland Reestablishment

Case Study No. 1 – Pollutant Reduction Project

Land Use Conflict: Local Opposition

"Is the watershed approach causing excessive temporary harm by clearing existing trees and temporarily releasing construction-related sediment and nutrients, and would a riparian buffer preservation or enhancement project reduce a material amount of pollutants while avoiding the temporary disturbance?"

Existing Conditions

Post Construction

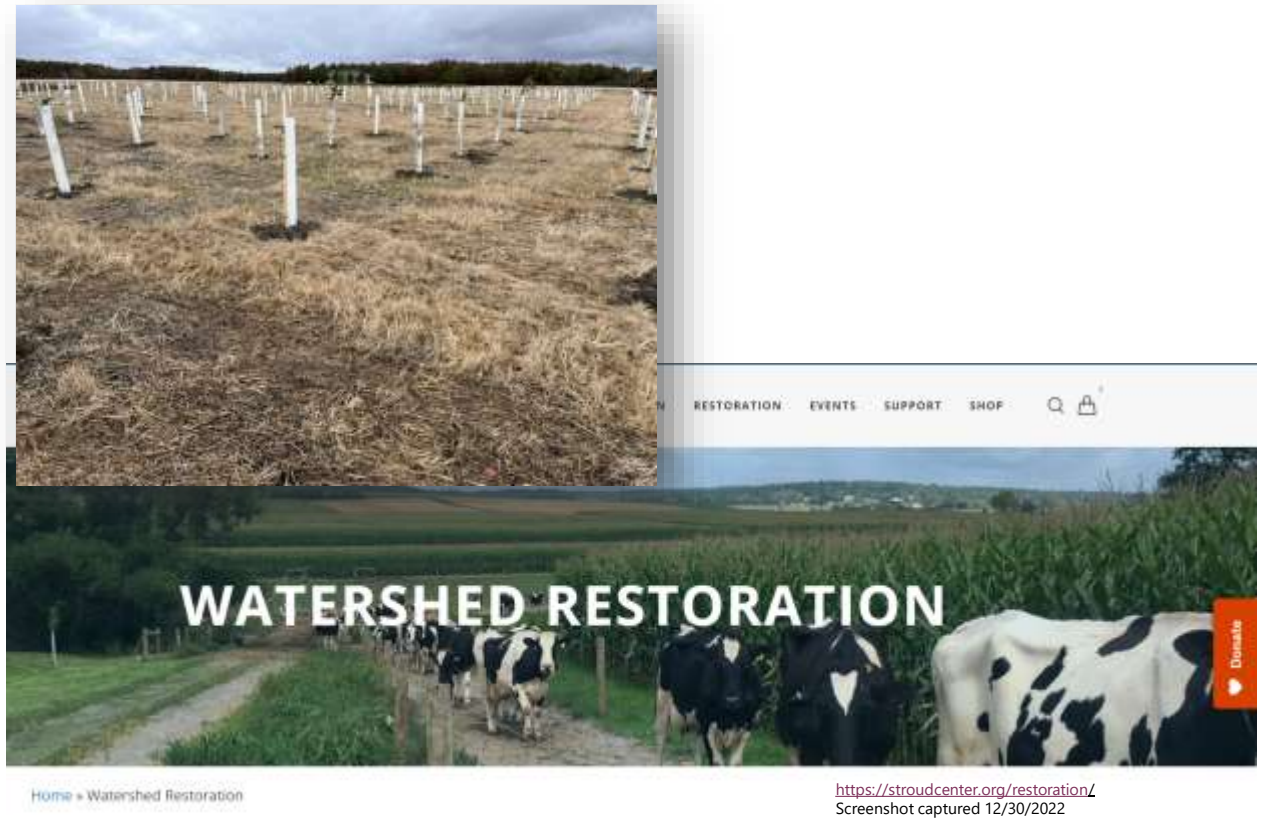
Case Study No. 1 – Pollutant Reduction Project

Alternative 1 – Providing a Suite of Functions

On the order of 1,000,000 lb/yr reduction in sediment loading

Alternative 2 – Focusing Exclusively on Specific Functions

On the order of 1,000 lb/yr reduction in sediment loading



https://stroudcenter.org/restoration/
Screenshot captured 12/30/2022

Case Study No. 2 – Stream and Wetland Mitigation Bank

Land Use Conflicts: Existing Mitigation & Farmland Preservation

- Existing Stream-Only, Enhancement-Only Compensatory Mitigation
- Existing County Farmland Preservation

"Is there a compliance concern in overlaying site protection instruments to implement the watershed approach?"

"Is there meaningful harm done or material uplift created in removing prior stream enhancement efforts to a construct an integrated stream and wetland restoration project?"

https://huntingdoncd.org/
Screenshot Captured 4/4/2023

Case Study No. 2 – Stream and Wetland Mitigation Bank

Case Study No. 3 – Stream and Wetland Mitigation Bank

Land Use Conflicts: local opposition and co-location with agricultural uses

- Local Zoning: Master Plan, Floodplain Overlay, "Lawn Mowing" Ordinance
- Existing Agricultural Preservation
- Tenant Farmer, Loss of Productive Land
- Existing Stream Enhancement

"Is there harm done in removing prior small scale enhancement efforts and overlaying site protection instruments in application of the watershed approach?"

“So What”

Well-Intentioned Projects, Long-term Complications

- Example average cost per project
  - One non-profit organization reports, “24 projects Totaling $4,923,270”, or about $205,000 per project
  - H2Ohio’s 2022 Annual Report includes 88 wetland projects launched and $91.7M committed, or about $1,042,000 per project
- Do small-scale or incremental projects include site protection? In what form?
- Do these programs’ goals result focusing exclusively on specific functions?

Test for Unintended Land Competition

1. Does your project or program focus exclusively on specific functions?
2. Is a long-term site protection instrument necessary and if so, could it be written to permit future projects using the watershed approach?
3. Could restoration ecology advance or grow in a way that would provide a broader suite of functions on the same land?

Mike Sachs

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