Targeted Stream Restoration

2019 ASFPM Conference
May 23, 2019
Agenda

- NEO RSD Program
- What Is “Targeted” Stream Restoration?
- Natural Channel Design
- Case Studies
- Q&A
Northeast Ohio Regional Sewer District

- Political subdivision of the State of Ohio
- Created by Court Order in 1972
- Regional agency separate and distinct from municipalities and counties
- Own, operate 3 wastewater treatment plants
- 1 million customers
Regional Stormwater Management Program

- Service Area: 355 sq. mi.
- Contributing Watershed Area: 1,524 sq. mi.
- Regional Stormwater System (RSS) in Service Area: 445+ mi.
- 300 acre drainage
- Intercommunity drainage
Regional Stormwater Management Program

Inspect & Maintain

SW Master Plans

Construct Projects

Encourage Good Practices
What is “Targeted” Stream Restoration?

- Streams are dynamic, subject to horizontal and vertical adjustments.
- Rate of adjustment can accelerate when disturbed (floodplain loss, hydrologic changes, channel straightening, etc.)
- Asset Protection: utilities, transportation, buildings, recreational amenities (paths, shelters, etc.)
Streams Are Dynamic!

Google Earth, 1994

Google Earth, 2012

250-ft (approx)
Natural Channel Design

- Initial Stream Assessment
- Grade Control Improvements (riffles/ pools, cross-vanes, J-hooks, etc.)
- Reconfigured Channel Sections (re-established floodplains, reduced bank slopes, bankfull benches)
- Permanent and Temporary Stabilization (toe rock, vegetation, erosion control blanket)
Case Study: Beechers Brook

- Site Conditions:
  - Urbanized Watershed, 1.6 mi²
  - Adjacent Residential neighborhood

- Project Goals
  - Protect / Improve Water Resources
  - Address Flood / Erosion Concerns
  - Enhance Water Quality and Aquatic Habitat
  - Asset Protection

- Total Restoration Length 800-ft
Beechers Brook - Existing Conditions
Beechers Brook

- Raised Grade
- Reestablish Floodplain
- Channel Improvements
  - Riffles / Pools
  - Bank Stabilization
  - Headcut Stabilization
  - Grading
  - Rock Toe
- Outfall Stabilization
Beechers Brook - Floodplain

- Floodplain limits
  - Increase
- Code Requirements
  - Permits
  - Variance
Beechers Brook - Restoration
Beechers Brook – Restoration
Beechers Brook - Restoration
Case Study: Pepper Creek

- **Site Conditions:**
  - Urbanized Watershed, 1.36 mi²
  - Existing homes adjacent to stream
  - Entrenched stream

- **Project Goals**
  - Protect / Improve Water Resources
  - Address Flood / Erosion Concerns
  - Enhance Water Quality and Aquatic Habitat
  - Asset Protection

- **Total Restoration Length 900-ft**
Pepper Creek- Existing Conditions
Pepper Creek - Existing Conditions
Pepper Creek

- Raised grade
- Reestablish Floodplain
- Channel Improvements
  - Riffles/ Pools
  - Bank Stabilization
  - Grading
  - Rock Toe
Pepper Creek - Floodplain

- Floodplain limits
  - Increase
- Code Requirements
  - Permit
  - Variance
Case Study: West Creek

- **Site Conditions:**
  - Urbanized Watershed, 9.2 mi$^2$
  - Adjacent Landfill
  - Historic Stream Impacts

- **Project Goals**
  - Asset Protection
  - Protect / Improve Water Resources
  - Address Flood / Erosion Concerns
  - Enhance Water Quality and Aquatic Habitat

- **Total Restoration Length**
  - 6,000-ft
West Creek - Existing Conditions
West Creek - Existing Conditions
West Creek Improvement Options

- Reestablish Floodplain
- Channel Improvements
  - Riffles / Pools
  - Bank Stabilization
  - Headcut Stabilization
  - Grading
  - Rock Toe
- Outfall Stabilization
- Utility Protection
- Flume Restoration
West Creek Flume - Existing Conditions
West Creek Flume - Restoration

Design Considerations

• Eliminate Fish Passage Barrier
• Lower Stream Energy (gradient, floodplain)
• Maintain Conveyance Capacity
• Plan for Public Outreach
West Creek - Floodplain

- Floodplain limits
  - Increase
- Code Requirements
  - Permits
  - Variance