Advancing Urban Watershed Renewal through the Benefits of Multi Purpose Stream and River Restoration Projects

Georgia Association of Floodplain Management

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Presentation Outline

• Drivers for restoration
• Challenges with completing restoration
• Potential benefits of multi-purpose urban restoration
• Methods to maximize value and measure benefits of multi-purpose urban restoration
• Project case studies
Clear Need for Restoration

• 2008 – 2009 National River and Stream Assessment (NRSA)
  
  – 46% of nation’s river and stream length is in poor biological condition
  
  – Nitrogen and phosphorus are at excessive levels
  
  – Streams and rivers are at an increased risk due to decreased vegetation cover and increased human disturbance
  
  – Excess levels of streambed sediments
  
  – Increased bacteria levels
  
  – Increased mercury levels

“The health of our Nation’s rivers, lakes, bays and coastal waters depends on the vast network of streams where they begin, and this new science shows that America’s streams and rivers are under significant pressure,” said Office of Water Acting Assistant Administrator Nancy Stoner. “We must continue to invest in protecting and restoring our nation’s streams and rivers as they are vital sources of our drinking water, provide many recreational opportunities, and play a critical role in the economy.”
Multiple Project Drivers Yield Project Execution

External Drivers
- Regulatory (CWA/ESA)

Critical Needs
- Water Quality
- Listed Species/ESA (fish, wildlife, plants)
- Urban Renewal
- Flood Management
- Water Supply

Detailed Driver
- TMDL (nutrients, temperature, sediment, metals)
- NPDES (pt and non-pt source control)
- Habitat Protection/Restoration
- Land Disturbance & Mitigation
- Economic Development
- Aesthetics/Recreation

Project Execution
- Hydrologic, Hydraulic
- Water Quality
- Geomorphic, Sediment Transport
- Restoration Design
- Conveyance Design
- Permitting
- Mitigation / Monitoring
- Recreation / Aesthetic / Landscape Design

External Drivers
- Growth and Development
Finite Resources Available for Restoration

• Funding Programs
  – Federal (319, USACE 206, FEMA HMGP, EPA, Urban Waters Grants)
  – State (transportation)
  – Local (tax revenue, utility fees)
  – Nonprofit
  – Private
  – Community Improvement Districts (CIDs)
  – Mitigation Banking

*Multi purpose / objective projects increase the priority for use of local funds.*
Typical Objectives of Urban Restoration

- Water quality improvement (nutrient reduction, TSS reduction)
- Reduce erosion
- Improve habitat
- Increase biotic integrity
- Restore or enhance riparian buffers
- Improve stream function
Multipurpose Objectives for Urban Watershed Restoration

• Protect infrastructure
• Reduce nuisance flooding
• Increase access and recreation opportunities
• Create economic growth opportunities
• Increase opportunities for public education, partnerships, and a sense of community

“With 80% of the U.S. population currently residing in urban communities, the challenge to ensure our natural resources are conserved and valued by the American people has become complex” USFWS Urban Wildlife Conservation Program
EPA Urban Waters Program Adopts a Similar Approach

<table>
<thead>
<tr>
<th>POTENTIAL ACTIVITIES</th>
<th>OBJECTIVE</th>
<th>OUTCOME</th>
<th>VISION</th>
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<tbody>
<tr>
<td>1. Have events to bring populations to urban waters</td>
<td>Encourage and, when possible, create better and more equitable access to urban waters.</td>
<td>Connection to Urban Waters</td>
<td>Communities have equitable access and opportunity to experience and enjoy their waterways. Communities view their urban waters and adjacent lands as intrinsically valuable. Community members are motivated, informed and engaging with a broad range of government, non-profit and private sector partners to transform previously degraded urban waters and adjacent lands into community assets. Urban waters are no longer undervalued, but treasured as centers of urban renewal.</td>
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<td>2. Link land revitalization efforts with community plans</td>
<td>Partner with community based organizations as well as states and tribes to link existing environmental programs and goals with other urban priorities.</td>
<td>Understanding of Urban Waters</td>
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<td>3. Facilitate creation of safe, inviting urban water environments</td>
<td>Create better awareness of the potential of urban waters to enhance the quality of urban life, drive economic growth, and improve public health.</td>
<td>Sense of Ownership of Urban Waters</td>
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<td>4. Help schools use urban waters as outdoor classrooms</td>
<td>Provide expertise, technical assistance, resources and innovative ideas, and best practices to help communities build the capacity they need to protect and restore urban waters.</td>
<td>Restoration and Protection of Urban Waters</td>
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<tr>
<td>1. Identify opportunities for communities to partner</td>
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<td>2. Help community organizations address urban water issues</td>
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<td>3. Provide funding opportunities</td>
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<td>4. Engage tribal, state, and local governments</td>
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<td>5. Sponsor Urban Water Partnership events</td>
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<td>6. Provide access to information</td>
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<td>1. Develop a water-related “learning to earning path”</td>
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<td>2. Help groups create opportunities to learn about urban waters</td>
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<td>3. Partner with trade organizations</td>
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<td>4. Promote use of urban waters-related educational materials</td>
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<td>1. Educate communities on how to protect drinking water</td>
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<td>2. Help guide community participation in projects</td>
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<td>3. Improve exchange and access to environmental information</td>
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<td>4. Educate about tools to improve water conditions</td>
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<td>5. Use EPA tools to develop training opportunities</td>
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<td>1. Identify funding sources and fund projects</td>
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<td>2. Focus CWA compliance on urban areas</td>
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<td>3. Develop a federal strategy</td>
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<td>4. Ensure compliance with regulatory requirements</td>
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<td>5. Address stormwater permits, guidance, and enforcement</td>
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<td>1. Support use of existing programs or new funding incentives</td>
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<td>2. Enable green infrastructure and Smart Growth</td>
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<td>3. Co-sponsor multi-agency grants workshops</td>
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<td>4. Identify programmatic changes needed for federal funding</td>
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<td>5. Develop partnerships with the private sector</td>
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<td>6. Promote urban waters in community planning efforts</td>
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Valuing Economic Benefits of Urban Restoration

• **Damage Function Method** – An economic technique that quantifies the worth of potential improvements in environmental health by analyzing the economic damages caused in similar and already-degrade ecosystems.

• **Willingness to Pay (contingent valuation method)** – Value arrived by surveying people, usually those who live within the area of restoration activities, and measuring how much they would be willing to pay for restoration.

• **Political Referendum Method** – Local and state governments put fundraising measures in front of the public for approval. Occasionally, the public votes on measures to fund watershed restoration (i.e., stormwater utilities).

• **Averted Expenditure Method** – Quantifies the prevention of potential future damage (i.e., reduced erosion, maintenance of roadways and sewer infrastructure).

• **Travel Cost Method** – Environmental valuation that examines people’s travel expenses to visit natural areas.

• **Hedonic Price Method (property values)** – Technique assumes that the implicit societal value for environmental / recreational amenities is manifested in real estate prices.

• **Employment Opportunities** – During and after restoration.

• **Population Growth and New Business Opportunities**
Economic Benefits of Urban Restoration

• Economic and societal benefits of stream and river restoration can provide the key link to execution of projects.
• Incorporating economic benefits / recreation / aesthetic features allows for multiple funding sources to be leveraged and to garner political support
• Contributes to benefit cost analysis (BCA)
• Economic benefits enable projects = ecological improvement

Potential Drawbacks…
- Prerequisite for economic benefit is to provide access / promote recreation
- Additional features = additional cost $$$
- Additional cost justified by return on investment
Project Case Studies

• Sweetwater Creek
• Flat Creek
• Chattahoochee River
Sweetwater Creek Stream and Wetland Restoration Project, GA

**Owner:** Gwinnett County Department of Water Resources, GA

**Status:** Construction completed May, 2013

**Drivers:** water quality and habitat, regulatory compliance (TMDL, 303d listed stream, MS4, Metro North Georgia Water Planning District, etc.),

**Funding Sources:** County, Mitigation Bank

**Outcomes/Results:**
- 2,000 feet of stream restoration
- 6 acres of wetland restoration
- 20 acres of riparian ecosystem protection
- Creation of a USACE approved mitigation bank
Sweetwater Creek Pre-Project Conditions

- Streambank erosion and degraded habitat
- Sewer infrastructure concerns
- Instream sedimentation
- Limited public access
Sweetwater Creek Post-Project Conditions

• “Natural Channel Design” provides stable stream habitat for aquatic biota, and additional stability against erosive stream forces.

• Protection of on-site sewer infrastructure

• Partnership with the Georgia Piedmont Land Trust to ensure long-term, sustainable watershed stewardship
Sweetwater Creek Additional Benefits

• Accessible from public sidewalk along Old Norcross Road and access paths throughout project

• Provides educational opportunities for the public

• Provides green space in an urbanized environment

• USACE Mitigation bank generates revenue to support future project implementation
Flat Creek Stream Restoration, Regional Detention Facility, and Midtown Greenway Project, GA

**Owner:** City of Gainesville, GA  
**Status:** Construction completed in 2013  
**Drivers:** water quality and habitat, flooding, regulatory compliance (TMDL, 303d listed stream, MS4, Metro North Georgia Water Planning District, etc.), urban revitalization  
**Funding Sources:** City, 319, HUD, GDOT, others  
**Outcomes/Results:**  
- 2 acre regional detention facility  
- 1,500 feet of stream restoration  
- 2 acres of riparian buffer enhancement  
- Bioretention, permeable pavement  
- Midtown greenway and access including amphitheater
Flat Creek Pre-Project Conditions

- Streambank erosion and degraded habitat
- Sewer infrastructure concerns
- Nuisance flooding
- Limited space for public access and recreation
Flat Creek Post-Project Conditions

- Stream restoration to stabilize banks and improve habitat
- Sewer infrastructure protected
- Regional detention facility
- Greenway access with integrated bioretention and pervious paver parking lot
Flat Creek Additional Project Benefits

- Ribbon cutting ceremony and 5K road race
- Increased access to water resources by community
- Improved recreation opportunities
- Increased presence of local businesses and public assets including churches and community garden
Chattahoochee River Dam Removal in Columbus, GA and Phenix, AL

**Project Sponsor:** USACE, Phenix City, AL and Columbus, GA

**Project Summary:** Removal of sections of the City Mills and Eagle and Phenix Dams on the Chattahoochee River

**Status:** Construction completed 2014

**Drivers:** Ecosystem restoration and economic development

**Funding Sources:** USACE 206, Local and Private Investment

**Outcomes/Results:**
- 2.3 miles of Chattahoochee River to unimpounded condition
- Restore shoal habitat for aquatic species
- Water conservation and flood protection
- Provide whitewater recreation opportunities
Project Site

Eagle Phenix Dam

City Mills Dam
City Mills Dam and Impoundment

- 850 feet long, 10 feet high.
- 1.4 mile, 110-acre run-of-river impoundment
- 350 feet breach width.
Eagle & Phenix Dam and Impoundment

- 0.8 mile, 45-acre run-of-river impoundment
Eagle and Phenix Dam

- 900 feet long
- 17 feet high
- 450 feet breach width
Fall Line Shoals Habitat

**Ecosystem Restoration Benefits**

- Proposed restoration of a portion of the Chattahoochee River will create a habitat for unique fish, invertebrates, and plant communities adapted to Fall Line Shoals.

- Many of these plants and animals are intolerant of the impounded river conditions present today.

- Two of the most important species that will be restored to the Fall Line Shoals Habitat are the Shoal Bass and the Shoals Spiderlily.

- Lower water levels will expose rocky outcrops and result in the return of species like the Shoals Spiderlily.
City Mill Dam Breaching

- March, 2013
Urban Whitewater Columbus, Georgia

- Named one of USA Today’s top 12 manmade adventures in the world
Summary

• The benefits of a multi-purpose urban watershed restoration approach are clear:
  – Promotes awareness about conservation of watershed resources
  – Develops citizen support for the restoration to leverage multiple funding sources
  – Meets environmental goals while addressing community needs and economic activity
  – As a result, develops political support for continued restoration activities

• Creates opportunity to improve urban watershed conditions through project implementation.
Thank You

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USACE
McLaughlin Whitewater
CH2M Staff