



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

5<sup>th</sup> National Conference on Ecosystem Restoration  
August 1, 2013

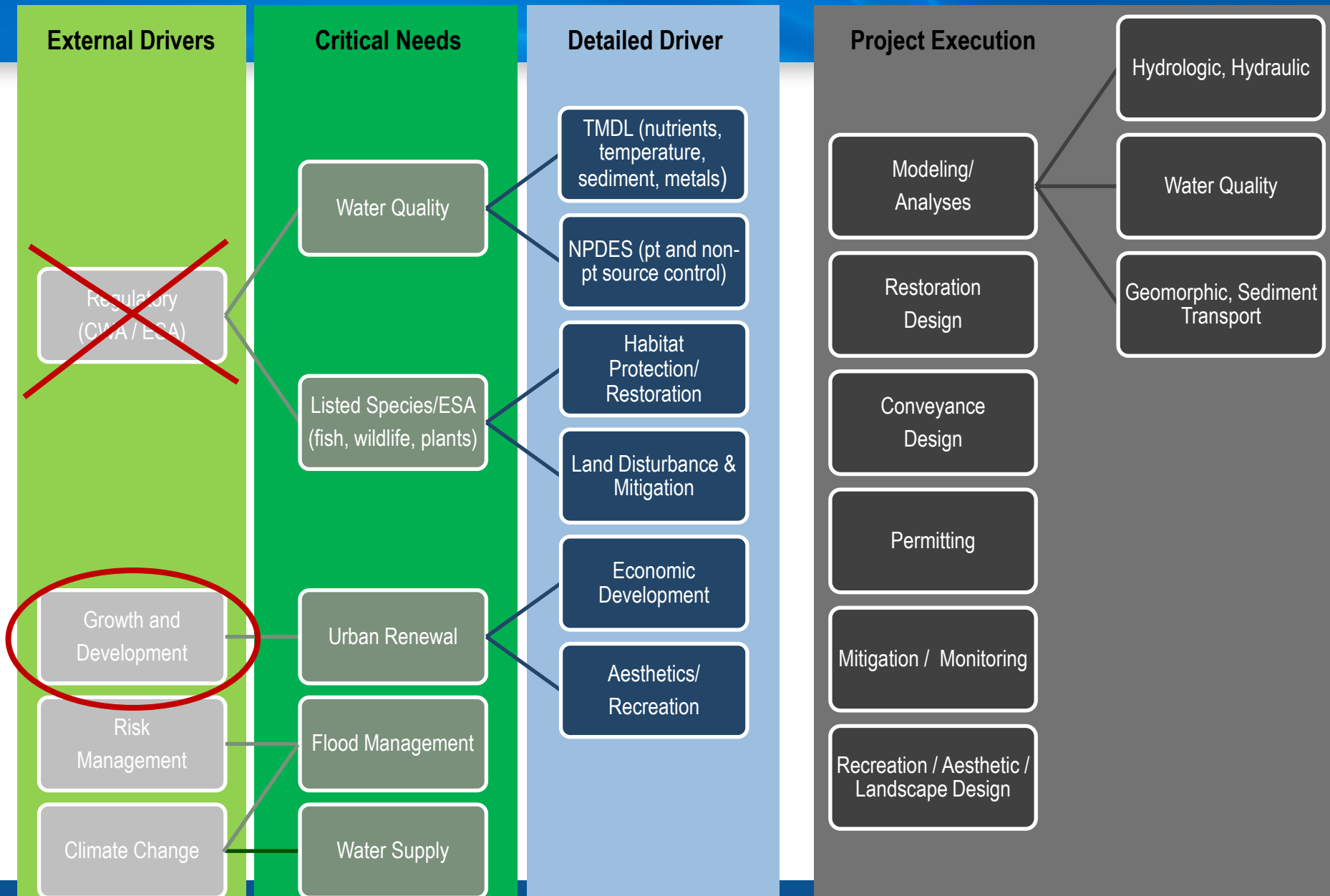
Joel Tillery, P.E.

# Clear Need for Restoration

- 2008 – 2009 National River and Stream Assessment (NRSA)
  - Nitrogen and phosphorus are at excessive levels
  - Streams and rivers are at an increased risk due to decreased vegetation cover and increased human disturbance
  - Increased bacteria levels
  - Increased mercury levels
  - Habitat rated as poor in over half of surveyed stream miles in 2008
  - Habitat declined 7% since 2004

*“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



# Finite Resources Available for Restoration

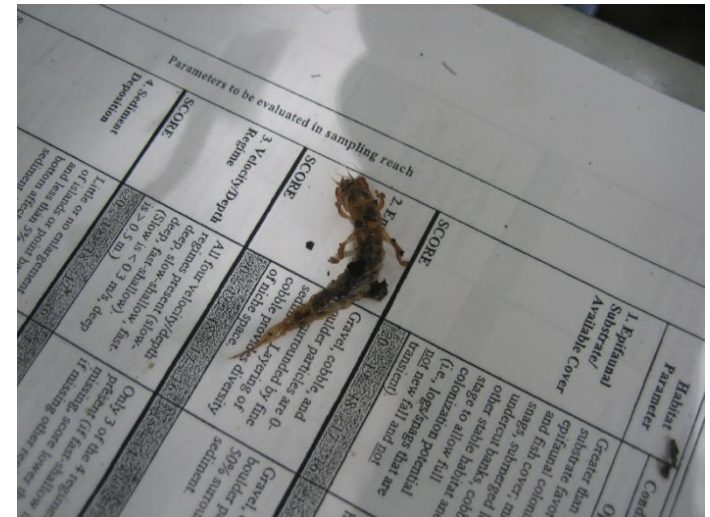
- Funding Programs
  - Federal (319h, USACE 206, FEMA HMGP, CDBG, Urban Waters Grants)
  - State (transportation)
  - Local (tax revenue, utility fees)
  - Nonprofit
  - Private
  - Community Improvement Districts (CIDs)
  - Mitigation Banking



*Multi purpose / objective projects increase the priority for use of local funds.*

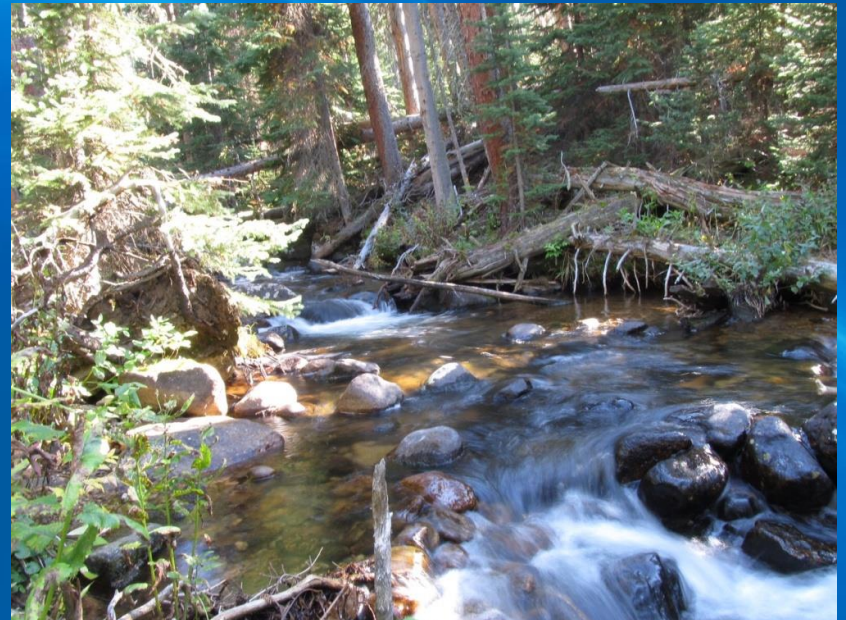
# Do the Benefits of Projects Justify Urban Restoration?

- Typical Goals of Urban Stream and River Restoration
  - Water quality improvement (nutrient reduction, TSS reduction)
  - Protecting infrastructure, reducing erosion
  - Improving habitat
  - Increasing biomass and biodiversity
  - Flood attenuation and reduced flood risk
  - Hydrologic improvements
  - Stream function (nutrient cycling, carbon sequestration)?





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*“...reach scale efforts do not appear to be effectively mitigating the physical, hydrological, or chemical alterations that are responsible for the loss of sensitive taxa and the declines in water quality that typically motivate restoration efforts.” (Bernhardt and Palmer, 2011)*

# So Why Conduct Urban Restoration?

- Urban waterways are the most heavily impacted...
- Doing nothing not an option...
- Public education, partnerships, and a sense of community are required to have a lasting impact...
- Access and recreation opportunities are limited...
- Create economic growth opportunities...
- ...
- ...
- ...
- *Cumulative benefits of multiple restoration projects become effective at the watershed scale*

# EPA Urban Waters Program Adopts a Similar Approach

## URBAN WATERS STRATEGIC FRAMEWORK: AT-A-GLANCE

POTENTIAL ACTIVITIES	OBJECTIVE	OUTCOME	VISION
<p><b>1</b></p> <ol style="list-style-type: none"> <li>1. Have events to bring populations to urban waters</li> <li>2. Link land revitalization efforts with community plans</li> <li>3. Facilitate creation of safe, inviting urban water environments</li> <li>4. Help schools use urban waters as outdoor classrooms</li> </ol>	<p>Encourage and, when possible, create better and more equitable access to urban waters.</p>	<p><i>Connection to Urban Waters</i></p>	
<p><b>2</b></p> <ol style="list-style-type: none"> <li>1. Identify opportunities for communities to partner</li> <li>2. Help community organizations address urban water issues</li> <li>3. Provide funding opportunities</li> <li>4. Engage tribal, state, and local governments</li> <li>5. Sponsor Urban Water Partnership events</li> <li>6. Provide access to information</li> </ol>	<p>Partner with community-based organizations, as well as states and tribes, to link existing environmental programs and goals with other urban priorities.</p>		<p>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 centerpieces of urban revival</p>
<p><b>3</b></p> <ol style="list-style-type: none"> <li>1. Develop a water-related "learning-to-earning path"</li> <li>2. Help groups create opportunities to learn about urban waters</li> <li>3. Partner with trade organizations</li> <li>4. Promote use of urban waters-related educational materials</li> </ol>	<p>Create better awareness of the potential of urban waters to enhance the quality of urban life, drive economic growth, and improve public health.</p>	<p><i>Understanding of Urban Waters</i></p>	
<p><b>4</b></p> <ol style="list-style-type: none"> <li>1. Educate communities on how to protect drinking water</li> <li>2. Help guide community participation in projects</li> <li>3. Improve exchange and access to environmental information</li> <li>4. Educate about tools to improve water conditions</li> <li>5. Use EPA tools to develop training opportunities</li> </ol>	<p>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.</p>	<p><i>Sense of Ownership of Urban Waters</i></p>	
<p><b>5</b></p> <ol style="list-style-type: none"> <li>1. Identify funding sources and fund projects</li> <li>2. Focus CWA compliance on urban areas</li> <li>3. Develop a federal strategy</li> <li>4. Ensure compliance with regulatory requirements</li> <li>5. Address stormwater permits, guidance, and enforcement</li> </ol>	<p>Align and target EPA, federal, state, and tribal government investments and regulatory programs to help communities better protect and restore urban waters.</p>	<p><i>Restoration and Protection of Urban Waters</i></p>	
<p><b>6</b></p> <ol style="list-style-type: none"> <li>1. Support use of existing programs or new funding incentives</li> <li>2. Enable green infrastructure and Smart Growth</li> <li>3. Co-sponsor multi-agency grants workshops</li> <li>4. Identify programmatic changes needed for federal funding</li> <li>5. Develop partnerships with the private sector</li> <li>6. Promote urban waters in community planning efforts</li> </ol>	<p>Promote equitable community improvements that capitalize on the social and economic benefits derived from improved urban waters and adjacent lands.</p>	<p><i>Community Revitalization</i></p>	



# 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-degraded ecosystems.
- **Willingness to Pay (contingent valuation method)** – Value arrived at 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 such as general obligation bonds, 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 and maintenance of roadways)
- **Travel Cost Method** – Environmental valuation that examines people's travel expenses incurred in visiting 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**

\*Source: Hurd, Josh. 2009. Economic Benefits of Watershed Restoration. In The Political Economy of Watershed Restoration Series. Missoula, MT: Wildlands CPR. [http://www.wildlandscpr.org/files/Economic\\_Benefits\\_o.pdf](http://www.wildlandscpr.org/files/Economic_Benefits_o.pdf)

# 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 Examples



MILL CREEK

PHENIX CITY, ALABAMA

RIVER REACH PROPOSED TO BE RESTORED  
(APPROXIMATELY 2 MILES)

EAGLE & PHENIX DAM  
(REMOVAL PROPOSED)

OLIVER DAM  
(GEORGIA POWER)

NORTH HIGHLANDS DAM  
(GEORGIA POWER)

COWETA FALLS ~ HISTORICALLY THE FIRST  
FALLS OF THE CHATTAHOOCHEE RIVER

BIBB CITY

CITY MILLS DAM  
(REMOVAL PROPOSED)

COLUMBUS, GEORGIA

# Chattahoochee River Restoration, Columbus, GA



## City Mills Dam

850 ft long; 10 ft high; 1.4 mile, 110-acre run-of-river impoundment; normal pool elevation is 226 ft NGVD



# Chattahoochee River Restoration, Columbus, GA



## Eagle and Phenix Dam

900 ft long – 512 ft overflow spillway; 17 ft high;  
0.8 mile, 45-acre run-of-river impoundment;  
normal pool elevation is 215 ft NGVD



# Fall Line Shoals Habitat

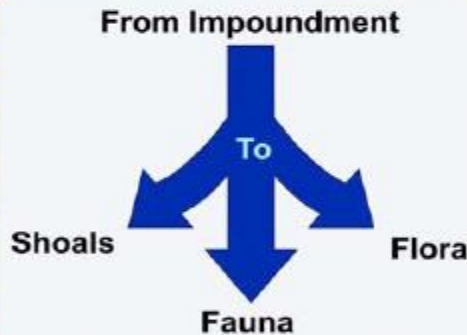


## *Ecosystem Restoration Benefits*

- 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.

# Project Vision





# Chattahoochee River Restoration, Columbus, GA



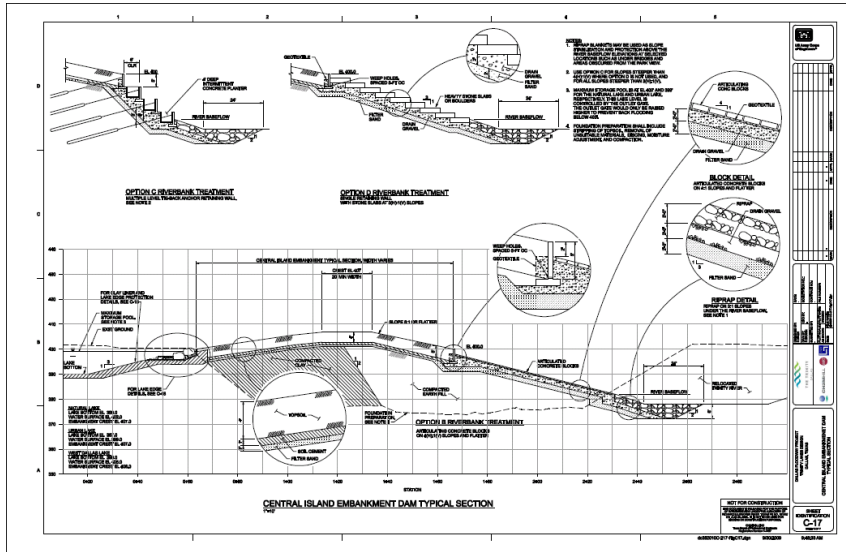
# Trinity River Restoration, Dallas, TX



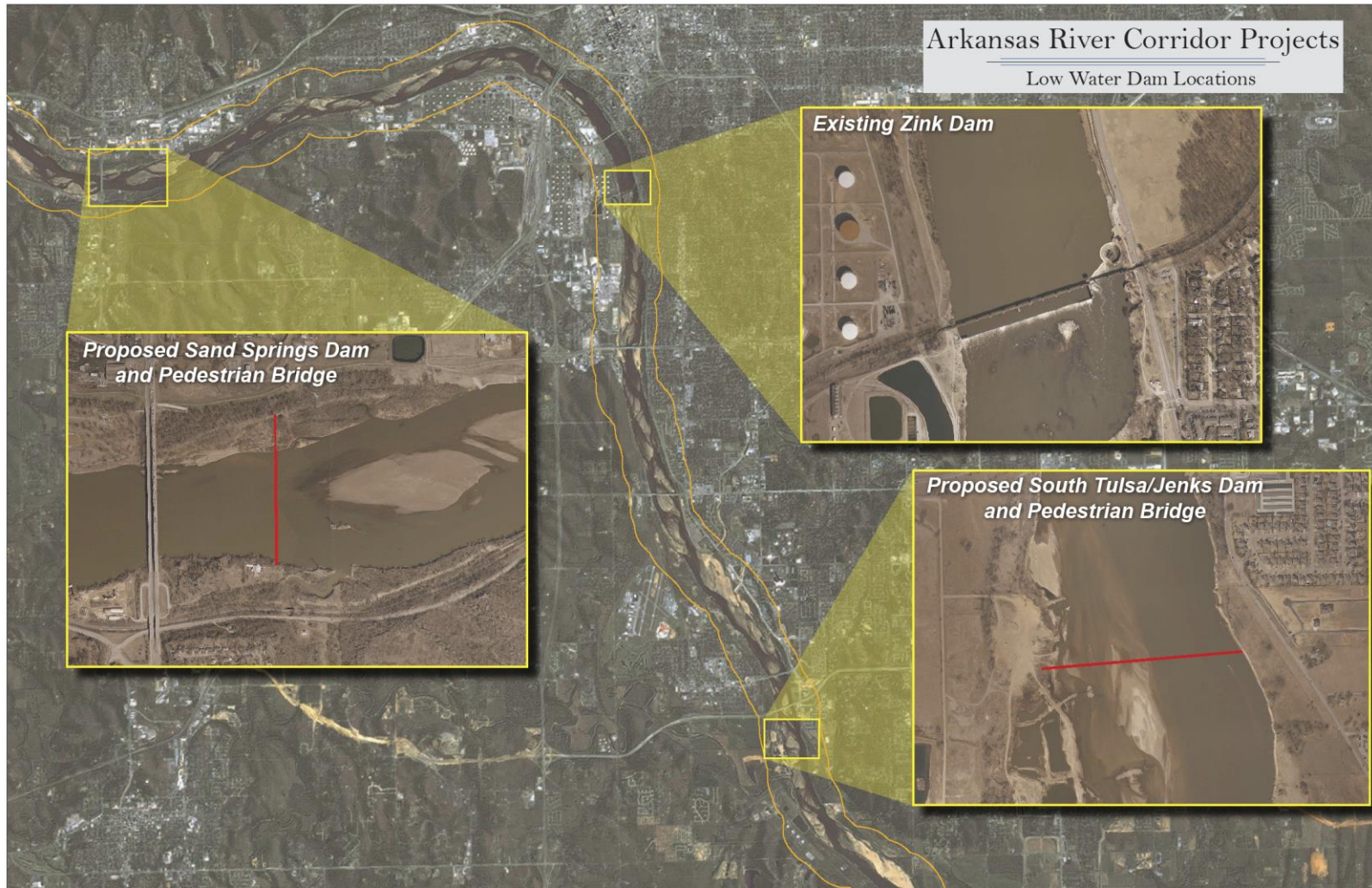
# Trinity River Restoration, Dallas, TX



# Trinity Lakes & Amenities



# Arkansas River Corridor Restoration, Tulsa, OK



# Arkansas River Corridor Restoration Project



# Kallang River – Bishan Park, Singapore



# KALLANG RIVER BISHAN PARK



Kallang River  
2008

SEPARATION BETWEEN  
CANAL AND PARK

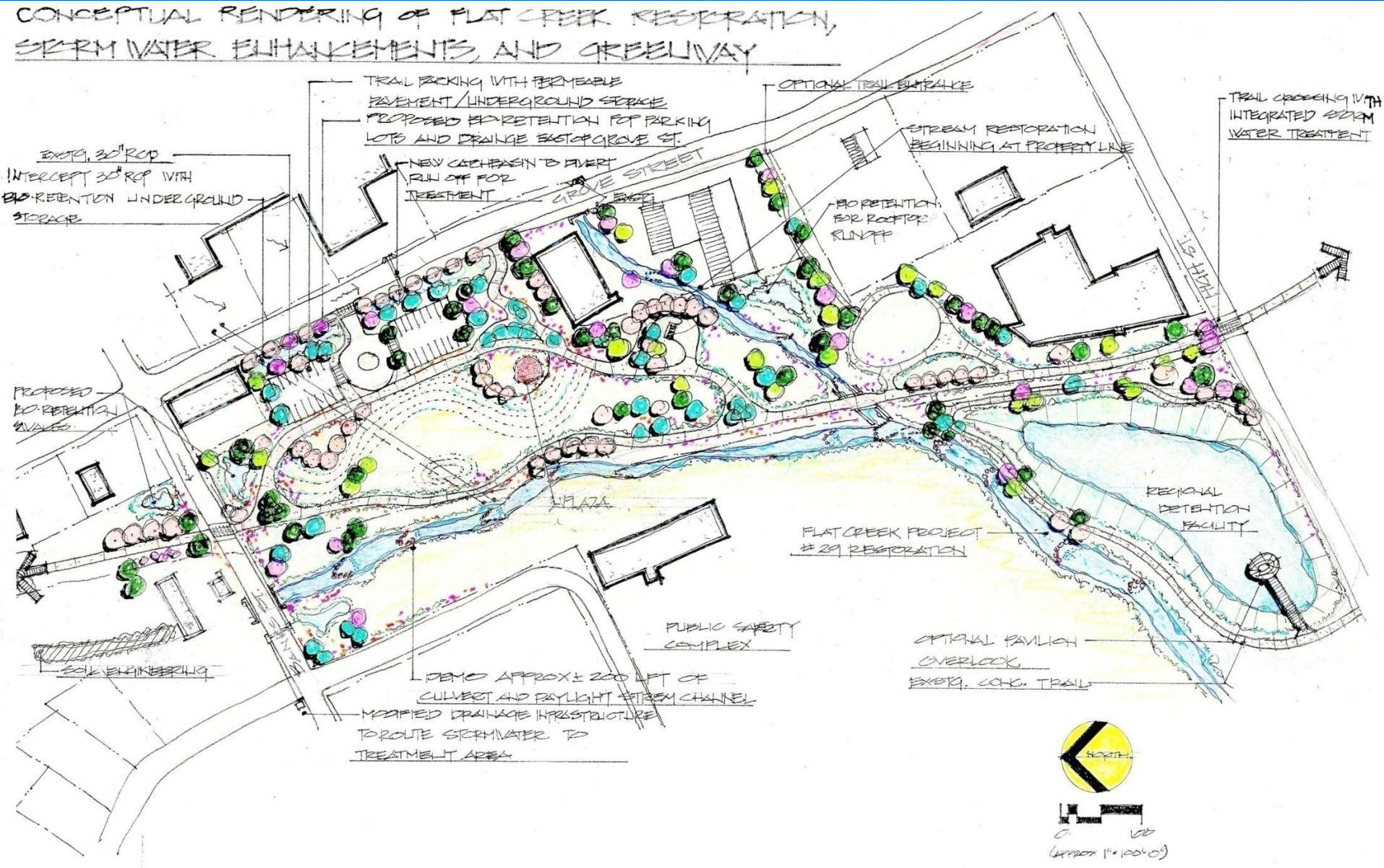






# Flat Creek Restoration, Gainesville, GA

## CONCEPTUAL RENDERING OF FLAT CREEK RESTORATION, SEWAGE WATER ENHANCEMENTS, AND GREENWAY









# Multi Purpose Urban Restoration Projects have Multiple Benefits

- Projects were built
- Public was pleased
- Political support solidified
- Future projects were built
- Justified use of available funds by creating a human element
- Promoted green / sustainable city which attracts growth / redevelopment / stewardship of natural resources
- Created the opportunity for water quality and habitat improvement at reach and watershed scale
- Many others

# Questions

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