

# Harpeth River Low Head Dam Removal and River Restoration Project



**HARPETH RIVER**  
WATERSHED ASSOCIATION

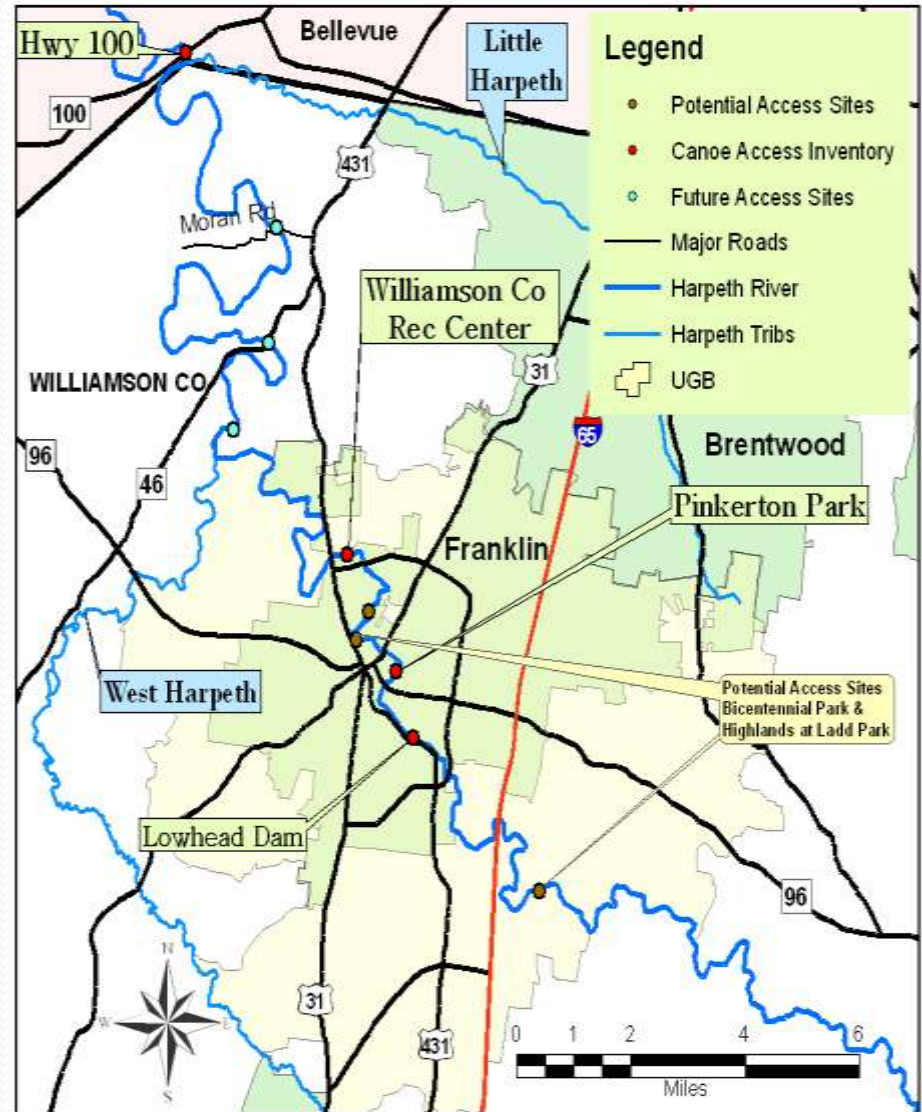


Beaver Creek Hydrology, LLC.  
Franklin, Tennessee

# The Harpeth River Blueway



## HARPETH RIVER BLUEWAY WILLIAMSON CO. CANOE ACCESS



### TENNESSEE BLUEWAY | Harpeth River

The Harpeth River Blueway was initiated by the Harpeth River Watershed Association, in partnership with Tennessee State Parks, Tennessee State Parks Foundation, Tennessee Wildlife Resources Agency, Harpeth River State Park, Tennessee Parks and Recreation Foundation and others, with the goal of establishing access points, signage, risk assessment, maps and other information that will make the Harpeth River a safe, fun recreation destination for the entire region.

The Harpeth River Blueway project relies on contributions from individuals, funds collected through the Association and by direct contributions to Harpeth River Watershed Association via events like:

- Acquire land for new access points
- Build, improve and maintain access structures
- Develop trail and signage
- Develop trail signage
- Develop trail signage

**Safe Water Levels**

The Harpeth River has different water levels at different times and is not designed for white water rafting. There are no rescue points on the Harpeth River and water level fluctuations can be dangerous. The Harpeth River is a Class II-III river and is not recommended for rafting. The Harpeth River is a Class II-III river and is not recommended for rafting. The Harpeth River is a Class II-III river and is not recommended for rafting.

**Safety Tips**

- Use proper technique for all activities on the river and always wear your seat belt.
- Use proper technique for all activities on the river and always wear your seat belt.
- Use proper technique for all activities on the river and always wear your seat belt.

**Stewardship Principles**

- Practice Leave No Trace. Stay on the trail and do not disturb the natural resources.
- Practice Leave No Trace. Stay on the trail and do not disturb the natural resources.
- Practice Leave No Trace. Stay on the trail and do not disturb the natural resources.

This map was created for HRWA by Michael Cain using ESRI software and data from tgis.org and from data generated by HRWA staff



# Problems with Harpeth River

- EPA's 303(d) Listed for siltation, habitat alteration, nutrient enrichment and low dissolved oxygen
- Impaired due to Watershed Disturbances:
  - Agricultural Activities
  - Stormwater runoff
  - Eroding stream banks
  - Restricted fish passage
  - Lack of fish habitats
- Primary In-Stream Impact: Low Head Dam
  - 6.2 feet high, 66 feet across
  - Almost stagnant during low flow
  - DO = 1 mg/l (TN state standard is 5 mg/l) in the pool, study by HRWA
  - Aquatic habitat loss
  - Adds to downstream bank instability
  - Sedimentation issues



# Restoration Goals & Objectives

## Primary Goals

- Increase Fish Habitats and Remove Fish Passage Barriers
- Improve Channel Stability
- Improve Recreational Activities

## Primary Objectives

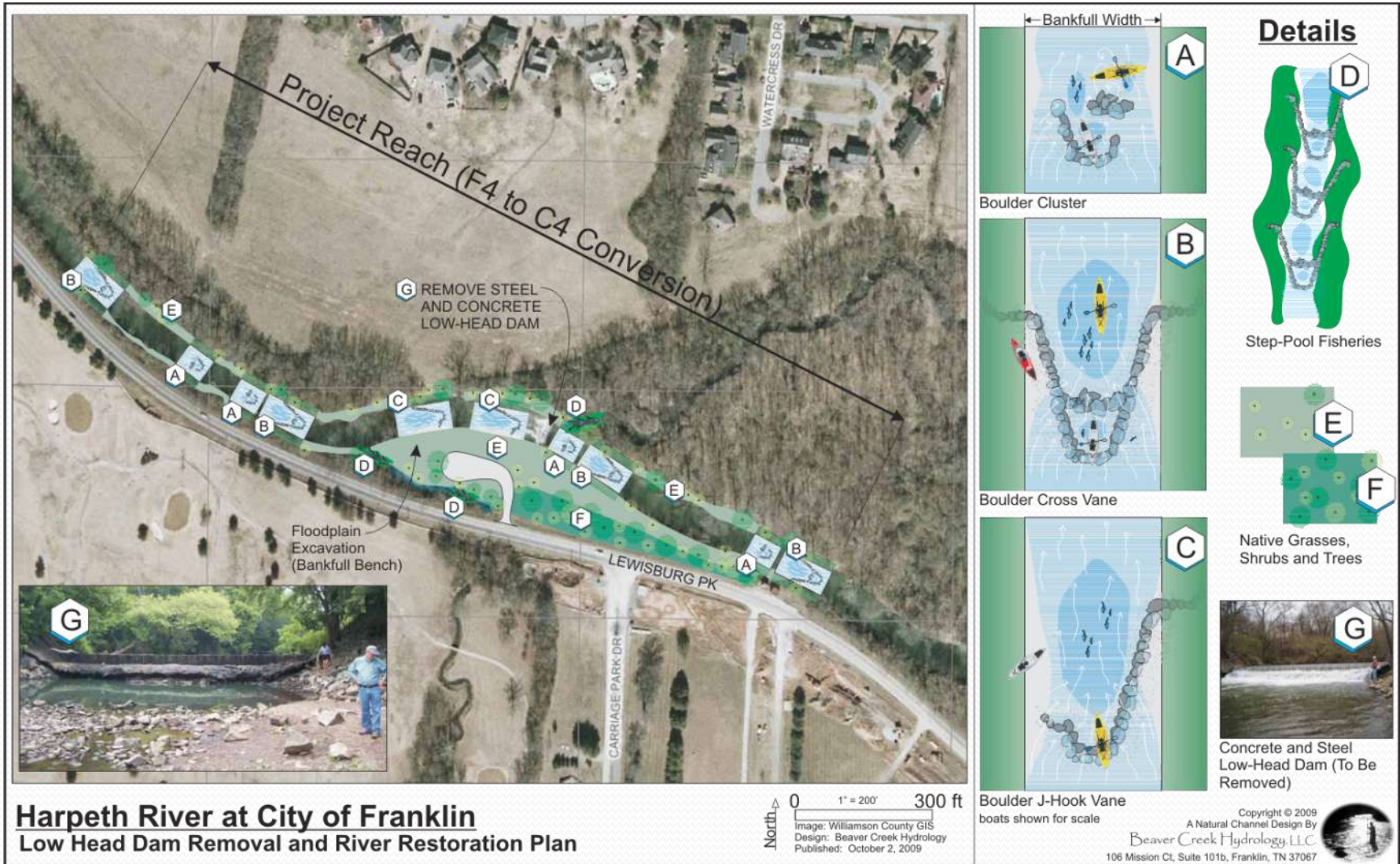
- Remove Low Head Dam
  - Reconnect 36 miles upstream (meet southeast aquatic habitat plan)
  - Restore freshwater passage and habitats (physical)
  - Increase dissolved oxygen level (chemical) (help meet Franklin's stormwater permit requirements)
- Install "Natural" In-Stream Habitats
  - recreate a more natural river channel which is stable with respect to plan, profile and cross section without accelerated aggradation or erosion
  - stabilize vertical stream banks and prevent erosion
  - create riffle/run/pool/glide habitats for native species (meet southeast aquatic habitat plan)
  - Address impairments listed by State
  - Improve this TWRA winter trout stocking site



# Restoration Methodology

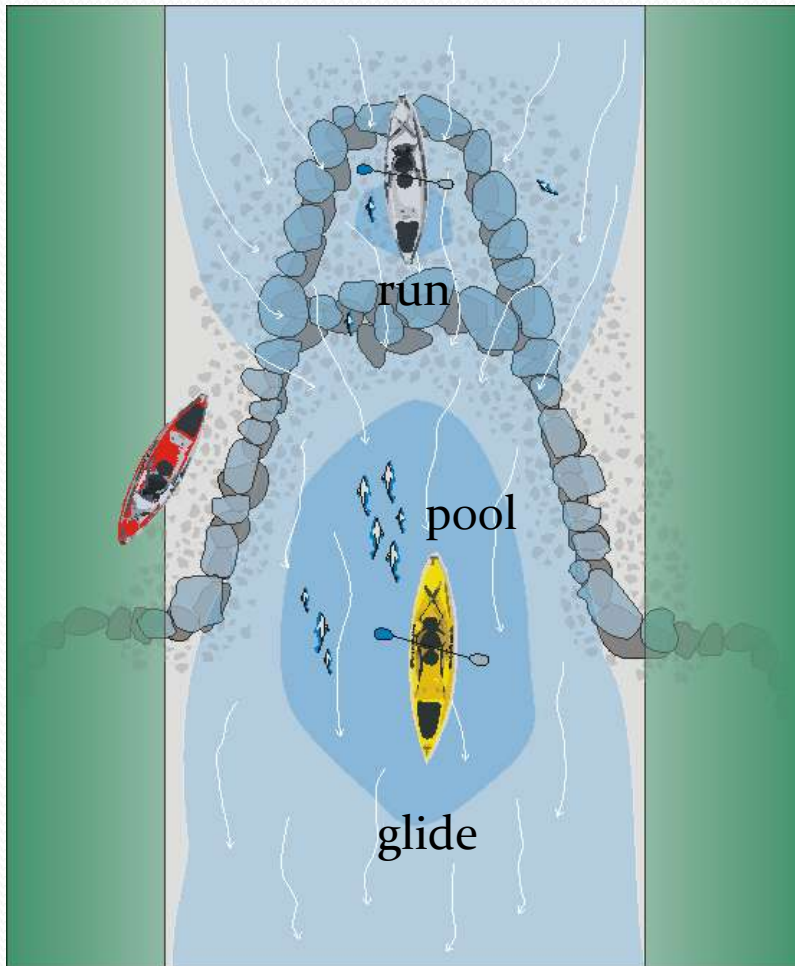
- Priority II River Restoration Using Natural Channel Design/Build Techniques:
  - Excavation of a **bankfull bench** along the south side of the site and hauling the material offsite and out of 100-year floodplain
  - Installation of **native boulder structures** cross vanes and j-hook weirs for grade control and for fisheries/habitats
  - Installation of **coir matting and live stakes** for bank stabilization
  - Planting of **native trees, shrubs and grasses** to increase the riparian buffer
  - **Removal of low-head dam** and placement of a modified cross-vane structure to accommodate the existing water intake feature

# River Restoration Concept Plan

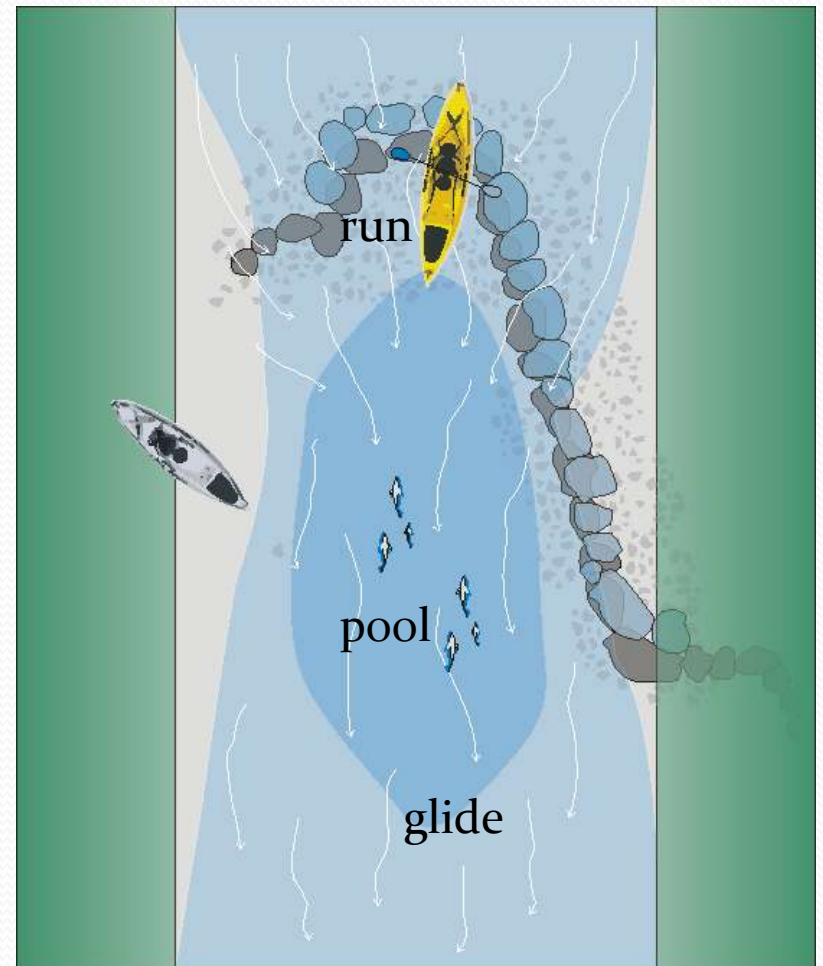


**Harpeth River at City of Franklin**  
Low Head Dam Removal and River Restoration Plan

# Vanes – 3D Flow Control Structures

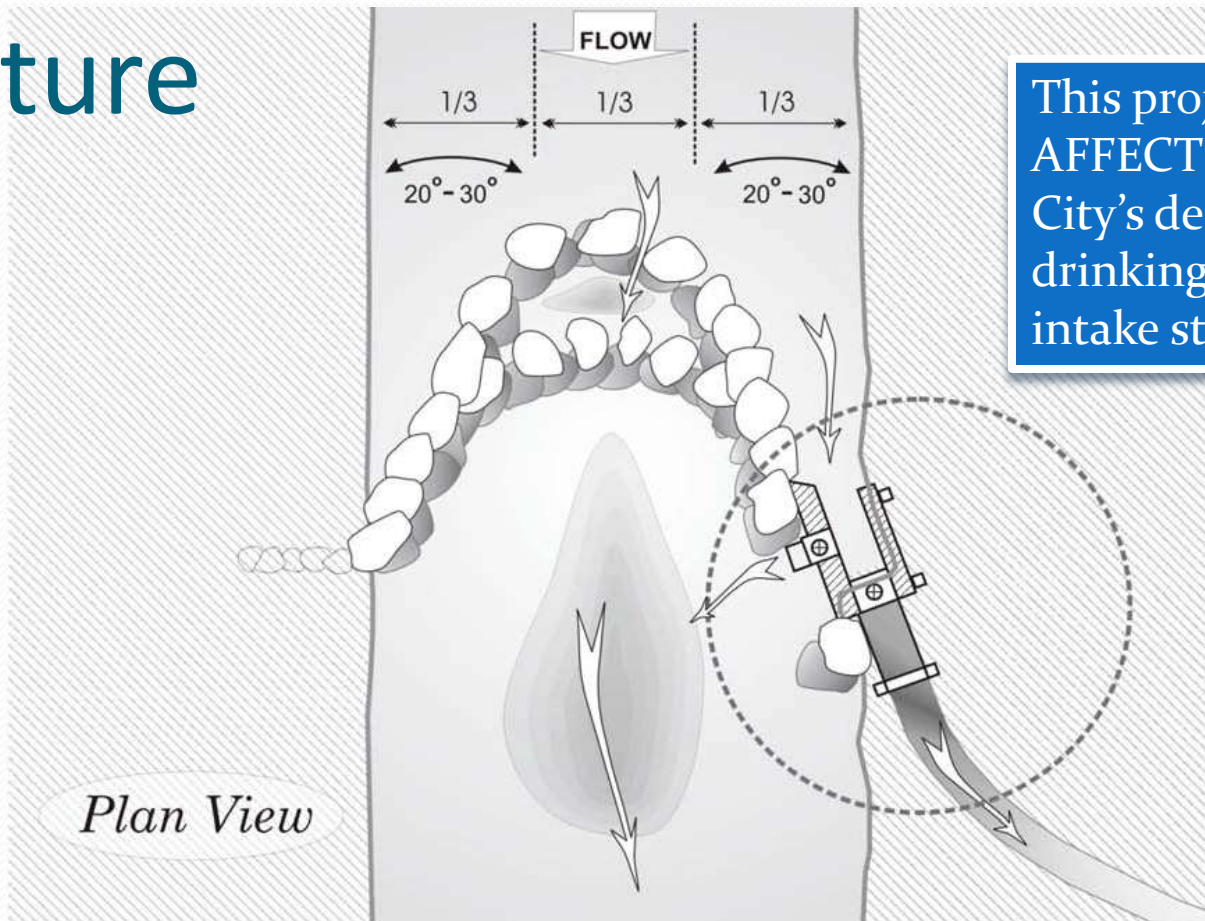


Cross Vane



J-Hook Vane

# Example Cross Vane with Water Diversion Channel to Intake Structure



This project does NOT AFFECT or FORCE City's decision on the drinking water plant intake structure.

# Example Boulder Structures Designed by Beaver Creek Hydrology



A Winter Trout Stocking Reach in **Clear Creek**, Golden, Colorado (after one growing season)



Restoration of **Murfrees Fork of the West Harpeth River**, Williamson County, TN (during construction)

# Example Boulder Structures Designed by Beaver Creek Hydrology



Endangered Crawfish Habitats in Restoration of **Mill Creek**, Nolensville, Tennessee (after one growing season)



Upstream Pool Control, **Mill Creek**, Nolensville, Tennessee (after one growing season)

# Benefits and Significance of Project

- Enhances **aquatic species habitats** and **fish passage issues**
  - Darters habitat and Mussel reestablishment
- Helps alleviate some of the low **dissolved oxygen** issues
  - Studies by HRWA and TDEC (2006 and 2007)
- Assists in mitigating sediment supply due to **bank instabilities**
  - Restore appropriate natural supply and balance of **sediment transport**
- Improves Recreation and Tourism
  - **Harpeth River Blueway (Upper to Lower)**
  - Promote rivers for tourist and recreational activities
  - Increase public awareness about importance of rivers
  - Natural Resource Heritage
  - Be flagship project for **Harpeth River Restoration Initiative** (TDEC, Franklin, Will. County)
  - Upgrade access and signage as part of entire river system.
  - Part of Franklin's **Greenways and Parks Master Plans**.
- Demonstration of Modern Civil Infrastructure Design
  - How modern intake and withdrawals are done to maintain natural aquatic habitat and in stream flows
  - use of modern, natural looking river in-stream restoration features that can easily be used for on-site education for field trips
  - Meet State withdrawal **ARAP** permit to remove lowhead dam with upgrade of intake.

# Project Team Organization

## Steering Group

- **HRWA:** grant proposals, overall project management, reporting, design
- **Beaver Creek Hydrology:** grant proposals, concept planning, design, hydraulic and sediment transport modeling, engineering, and construction project management/observation
- **City of Franklin:** implementation, in-kind, capital dollars

## Committees

- **Steering Committee**
  - Formed of members from each partner group and others to make a broad stakeholder committee (e.g. TDOT, businesses, Williamson County, other conservation entities)
  - This committee oversees each partner's commitment, reviews final design from technical committee, input on fund allocations, secure in-kind contributions, communications (press, public meetings)
- **Technical Committee**
  - U.S. Geological Survey, partner agencies, other experts, AECOM (city drinking water plant consultants)
  - Committee will discuss existing body of work on Harpeth and lowhead dam feasibility study, review final design, help address issues that arise during project

# Preliminary Project Budget

1. Project Mgmt., Engineering Design, Construction Mgmt.,  
Post-Const. Monitoring and Maintenance - **\$300,000**
2. Construction - **\$700,000**
3. **USFW Grant Funds + \$350,000**
4. Capital and In-Kind Matching Funds Required + \$650,000

## **U.S. Fish and Wildlife Service:**

Awarded \$350,000 from Southeast Aquatic Resources Projects (SARP)  
#1 project!

## **Initial Partners in Addition to Steering Group:**

- U.S. Fish and Wildlife Service: Grant funds, mussel monitoring
- TN Wildlife Resources Agency: fish monitoring
- TN Dept of Environment and Conservation: capital dollars for dam removal
- TN Scenic Rivers Association: volunteers, access design, Blueways enhancement

# Project Schedule

- Funding officially secure in April with agreement with FWS and HRWA
- End date: September 2012
  - 3 low flow seasons
  - Can get 1 year extension
- Phase I: in-stream restoration below lowhead dam
  - Conduct this summer/fall
- Phase II: lowhead dam removal and instream restoration above
  - Design/engineering this year, conduct next summer

