

City of Fayetteville Item Review Form

2013-0136

Legistar File Number

11/19/13

City Council Meeting Date - Agenda Item Only

N/A for Non-Agenda Item

David Jurgens

Submitted By

Utilities

Department

Action Required:

A resolution approving Task Order No. 5 with the Watershed Conservation Resources Center (WCRC) to provide \$195,705 to restore approximately 1,250' of White River streambank at the Noland Wastewater Treatment Facility (WWTF). WCRC has received a \$329,016 grant from the Arkansas Natural Resources Commission (ANRC) and \$45,000 in matching funds or in-kind efforts from several other sources for this project

Does this item have a cost? Yes

\$195,705.00

Cost of this request

\$1,382,850.00

Category or Project Budget

WWT/Water Quality Improvements

Program or Project Name

5400.5800.5315.00

Account Number

\$0.00

Funds Used to Date

Water/Sewer

Program or Project Category

13018-1001

Project Number

\$1,187,145.00

Remaining Balance

Water/Sewer

Fund Name

Budgeted Item? Yes

Budget Adjustment Attached? No

V20130812

Previous Ordinance or Resolution # 5341

Original Contract Number: _____



Comments:

Dr. Kelly 11-4-13

Paul a. Behm 11-7-2013



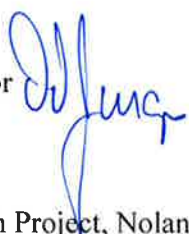
Don Man 11-4-13

David Jurgens 11/5/13

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To: Fayetteville City Council

Thru: Mayor Lioneld Jordan
 Don Marr, Chief of Staff

From: David Jurgens, Utilities Director 

Date: October 31, 2013

Subject: White River Stream Restoration Project, Noland Wastewater Treatment Plant Site

RECOMMENDATION

Staff recommends approval approving Task Order No. 5 with the Watershed Conservation Resources Center (WCRC) to provide \$195,705 to restore approximately 1,250' of White River streambank at the Noland Wastewater Treatment Facility (WWTF). WCRC has received a \$329,016 grant from the Arkansas Natural Resources Commission (ANRC) and \$45,000 in matching funds or in-kind efforts from several other sources for this project.

BACKGROUND

The White River is on the ADEQ Arkansas impaired streams list for excess total suspended solids, much of which comes from sediment from stream bank erosion. The erosion also places significant amounts of phosphorus to the White River and Beaver Lake. By restoring this section of the river bank, studies indicate that the phosphorus loading would be reduced by 1,600 pounds per year which equates to 121 days of average discharge from the Noland WWTF in current conditions.

DISCUSSION

This task order, executed under the City's Memorandum of Understanding with the WCRC (ordinance 5341), will be used for the restoration of stream banks along the White River (shown in the attached aerial photo) in order to reduce annual phosphorus and sediment loads entering the river. It also includes monitoring of several specific banks in the area to evaluate longer term impacts of such restoration. The Environmental Protection Agency is increasingly focused on non-point source pollution entering the watersheds in Northwest Arkansas. This project is another quality example of the City's ongoing commitment to watershed protection, and will count as matching funds to the Beaver Water District Nutrient Reduction Agreement.

The work to be executed using these City funds, the grant, and the matching funds, is similar to the very successful stream restoration project at completed two years ago ¾ mile downstream from this site. The work can be entirely completed on land owned by the City of Fayetteville as part of the Noland WWTF. All City funds will be expended on work on City property. The grant requires a \$195,705 City match, which staff proposes to be paid for using Water/Sewer funds in a project set aside for water quality improvements. This grant includes cost shares from several organizations, shown below:

Source	Total
ANRC Grant	\$ 329,016
City of Fayetteville	\$ 195,705
Beaver Water District	\$ 20,000
ADEQ	\$ 10,000
Beaver Watershed Alliance	\$ 10,000
WCRC Software Match	\$ 7,500
Volunteer Planting Day	\$ 5,000
Total Project	\$ 577,221

BUDGET IMPACT

\$195,705 is available in project 13018, Wastewater Treatment/Water Quality Improvements.

RESOLUTION NO. _____

A RESOLUTION APPROVING TASK ORDER NO. 5 WITH THE WATERSHED CONSERVATION RESOURCES CENTER (WCRC) FOR THE CITY TO PAY \$195,707.00 TO RESTORE WHITE RIVER STREAM BANK NEAR THE NOLAND WASTEWATER TREATMENT FACILITY

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF FAYETTEVILLE, ARKANSAS:

Section 1: That the City Council of the City of Fayetteville, Arkansas hereby approves Task Order No. 5 with the Watershed Conservation Resources Center (WCRC) for the City to pay \$195,707.00 to restore White River stream bank near the Noland Wastewater Treatment Facility.

PASSED and APPROVED this 19th day of November, 2013.

APPROVED:

ATTEST:

By: _____
LIONELD JORDAN, Mayor

By: _____
SONDRA E. SMITH, City Clerk/Treasurer



City Of Fayetteville

(Not a Purchase Order)

Requisition No.: _____ Date: **11/11/2013**

P.O. Number: _____ Expected Delivery Date: **12/11/2013**

Vendor No: **16441** Vendor Name: **Watershed Conservation Resources Center**

City: **Fayetteville** State: **AR** Fob Point: **1400 N Fox Hunter Rd, Fayetteville, AR**

City: **Fayetteville** State: **AR** Zip Code: **72701** Ship to code: _____

Requester's Employee #: **490** Extension: **224**

Requester: **Clayton Partain** Account Numbers: _____

Requester's Employee #: **490** Extension: **224**

Request Description: **WCRC Task Order No. 5, for White River Streambank Restoration, Noland WWTF**

Quantity: **1** Unit of Issue: **Job** Unit Cost: **195,705.00** Extended Cost: **\$195,705.00**

Item #	Request Description	Quantity	Unit of Issue	Unit Cost	Extended Cost	Account Numbers	Project/Subproject #	Inventory #	Fixed Asset #
1	WCRC Task Order No. 5, for White River Streambank Restoration, Noland WWTF	1	Job	195,705.00	\$195,705.00	5400.5800.5315.00	13018-1001		
2									
3									
4									
5									
6									
7									
8									
9									
10									
	Shipping/Handling		Lot		\$0.00				


Special Instructions: _____

Subtotal: **\$195,705.00**

Tax: _____

Total: **\$195,705.00**

Approvals:

Mayor: _____ Department Director: 

Finance & Internal Services Director: _____ Budget Manager: _____

Dispatch Manager: _____ Utilities Manager: _____

Purchasing Manager: _____

IT Manager: _____

Other: _____



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TASK ORDER NO. 5

NOLAND PLANT WHITE RIVER RESTORATION PROJECT

STATE OF ARKANSAS

COUNTY OF WASHINGTON

This Task Order is written pursuant to the Memorandum of Understanding (MOU) as described in Ordinance No. 5341 executed on August 3, 2010. The referenced MOU pertains to potential stream restoration projects and associated services with the Watershed Conservation Resource Center. This Task Order entered into and executed on the date indicated below the signature block, by and between the City of Fayetteville and Watershed Conservation Resource Center (WCRC) sets forth the project description, project schedule and associated fees for these services related to the White River Restoration Project located at the City's Noland Wastewater Treatment Plant.

Section I – Project Description

This project consists of streambank restoration activities including grant administration, pre- and post-monitoring of the affected river section, design, construction, and community outreach.

Section II – Project Timeframe

The Arkansas Natural Resources Commission has issued the following grant schedule to WCRC for the completion of the project and expenditure of funds.

<u>Task</u>	<u>Timeframe</u>
A. ANRC Grant Period	October 2013 – December 2016

Section III – Scope of Services

- Grant administration includes financial tracking and reporting, procurement of materials, quarter reporting, developing final report, matching funds tracking and reporting, and coordination among project partners and contractors.
- Pre- and post-monitoring of the streambank includes sampling and analysis of bank materials, installing toe pins and measuring erosion rates, and evaluating the streambank for bank erosion hazard index and near bank shear stress.
- Develop streambank restoration design which includes collecting reference fluvial geomorphology data on a stable riffle, surveying geomorphic features of the existing site, developing a stabilization design based on data collected, and developing construction drawings.
- Streambank restoration construction includes obtaining 404 permit and ADEQ authorization, coordinate construction material deliveries, developing heavy equipment construction bid packet, selecting contractor, overseeing heavy equipment construction, performing minor construction, and re-vegetate site.
- Conduct outreach which will include working with the City to host a planting day, conducting site tours, and developing project fact sheet.

Section IV – Fees and Payments

WCRC will utilize \$195,705 as matching funds from the City of Fayetteville, \$329,016 in grant funds from the Arkansas Natural Resources Commission, and other funds as shown below. See Attachments 1-6 of the enclosed project submittal for more detail of the estimated project budget.

Source	Total
ANRC Grant	\$ 329,016
City of Fayetteville	\$ 195,705
Beaver Water District	\$ 20,000
ADEQ	\$ 10,000
Beaver Watershed Alliance	\$ 10,000
WCRC Software Match	\$ 7,500
Volunteer Planting Day	\$ 5,000
Total Project	\$ 577,221

Section V – Memorandum of Understanding in Effect:

Except as amended specifically herein, the Memorandum of Understanding as executed with the City of Fayetteville shall remain in full force as originally approved.

IN WITNESS WHEREOF, the parties hereto have caused this TASK ORDER to be duly executed as of the date and year first herein written.

FOR THE CITY OF FAYETTEVILLE

By: _____

Attest: _____

Date: _____

FOR WATERSHED CONSERVATION RESOURCE CENTER

By: *Jondi B*

Attest: *Louisa*

Date: *NOV 4, 2013*

Nonpoint Source Summary Page
Project 13-### FY 13 CWA Section 319(h)

- 1. Title of Project:** White River Bank Restoration and Monitoring Project
- 2. Project Goals/Objectives:** The goal of the project is to reduce erosion along a minimum of 1,250 feet of riverbank including approximately 750 feet of bank reconstruction using toe-wood techniques on the White River near the City of Fayetteville waste water treatment plant. The project will reduce sediment and phosphorus loads from eroding riverbanks, improve water quality, and enhance aquatic and terrestrial habitat. Project objectives include
 - 1) Reduce sediment and phosphorus loadings by restoring and enhancing 1,250 feet riverbank on the White River
 - 2) Develop a site specific, riverbank restoration plan which addresses stream instability; landowner and local objectives; maximizes sediment & phosphorus reduction; maximizes habitat restoration.
 - 3) Restore riparian and protect existing riparian along with enhancement of terrestrial habitat and increase aquatic habitat in the stream watershed
 - 4) Evaluate the effectiveness of riverbank restoration as a means to not only reduce sediment and nutrient loads but to improve aquatic habitat and fish communities
 - 5) Increase awareness and promote the use of natural channel design among landowners and the public
- 3. Project Tasks:** 1) Financial Audit; 2) Develop QAPP; 3) Collection of Pre and Post Implementation Erosion Data; 4) Develop Riverbank Restoration and Implementation Plan; 5) Conduct Outreach; 6) Reporting
- 4. Measures of Success:** This project will be considered successful if there is an 80% reduction of sediment from the selected restoration site and an increase in near-bank aquatic habitat quality.
- 5. Project Type:** Statewide () Watershed (X) Demonstration (X)
- 6. Waterbody Type:** River (X) Groundwater () Other ()
- 7. Project Location:** White River (11010001)
- 8. NPS Management Program Reference:** The proposed project would help to meet key elements that the state non-point source program must address. Specific elements that are addressed include: Element #3 (Strong working partnerships with appropriate state, Tribal, regional, and local entities, private sector groups, citizens groups, and Federal agencies.) and Element #4The state program (a) abates water quality impairments from existing sources and (b) prevents significant threats to water quality from present and future activities.
- 9. NPS Assessment Report Status:** Impaired (X) Impacted () Threatened ()
- 10. Key Project Activities:** Hire Staff () Monitoring () Technical Assistance () Education () BMP Implementation (X) Demonstration Project (X) Other () Planning ()
- 11. NPS Management Program Elements:** Section 7 – Sediment; Objectives 7.6, 7.10, & 7.13

12. Project Costs: Federal (\$329,016) State/Local (\$248,205) Total (\$577,221)

13. Project Management: Watershed Conservation Resource Center will be responsible for grant administration and coordinating all activities related to the project.

14. Project Period: September 2013 – December 2016

Project 13-### White River Bank Restoration and Monitoring Project FY 2013, CWA Section 319(h)

Background

The White River, located in Northwest Arkansas, drains into Beaver Lake, which is the primary drinking water source for over 350,000 people in Northwest Arkansas (Figure 1). The White River is located in the Beaver Reservoir Hydrologic Unit Area (HUA) – 11010001 and is part of Arkansas Department of Environmental Quality's (ADEQ) planning Segment 4K – Upper White River and Kings River. As described by Regulation Number 2, the White River is designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural and industrial water supplies. Sections of the White River are on the State's 303 (d) list of impaired streams (ADEQ, 2008). The White River is a "priority watershed" and is located in a "nutrient surplus area" as described in the Arkansas 2011-2016 NPS Pollution Management Plan.

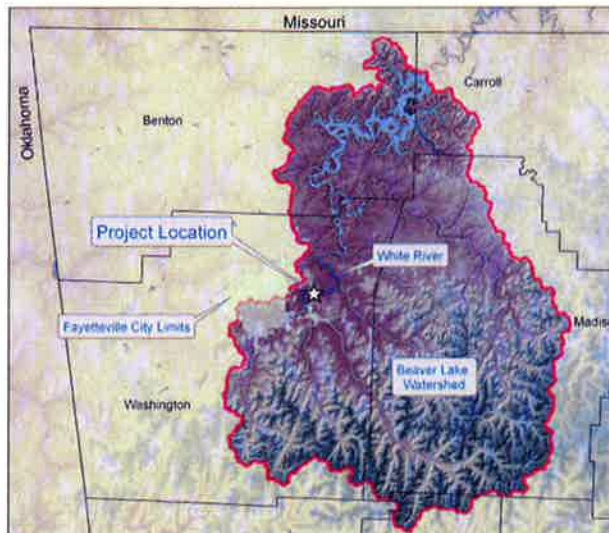


Figure.1 The White River begins in Madison County and flows north into Beaver Lake

The White River begins in NW Arkansas and winds through SW Missouri, and then back to Arkansas where it eventually converges with the Mississippi River. A dam in the upper section of the White River in Northwest Arkansas was initiated in 1959 and completed in 1966, creating Beaver Lake, which serves as the public water supply to the fastest growing region of the state. Water quality of Beaver Lake directly impacts treatment costs and future plant upgrade requirements. There are many potential water quality concerns affecting Beaver Lake including elevated bacteria counts, high concentrations of phosphorus and sediment, and elevated turbidity levels (Beaver Water District, 2008). Streambank erosion is the major contributor of sediment in the West Fork White River, a

tributary to the White River/Beaver Lake. Restoration of streambanks in the West Fork White River has proven to reduce both sediment and nutrient loadings to the river, thus reducing loads generated in the Beaver Lake Watershed (Formica and Van Eps, 2010).

Beaver Lake watershed has an area of approximately 1,190 square miles and is located within two ecoregions, the Boston Mountains and Ozark Highlands. The land uses in the watershed are 71% forest, 22% agriculture, 3% urban and 4% water. The mean annual precipitation in the basin is approximately 46 in/yr (Beaver Water District, 2008).

General Project Description

The Watershed Conservation Resource Center (WCRC) in partnership with the City of Fayetteville propose to implement a project to reduce riverbank erosion along 1,250 linear feet of riverbanks along the White River using an approach that relies heavily on natural channel

design principles and the use of materials and techniques that will improve aquatic habitat. Restoration of eroding riverbanks will include restoring approximately 750 feet of bank using toe-wood stabilization techniques. The bank restoration and enhancement will help to meet multiple local and regional objectives relating to stream channel instability, water quality, and habitat. The objectives of the project include:

- 1) Reduce sediment and phosphorus loadings by restoring and/or enhancing 1,250 feet riverbank on the White River
- 2) Develop a site specific, riverbank restoration plan which addresses stream instability; landowner and local objectives; maximizes sediment & phosphorus reduction; maximizes habitat restoration.
- 3) Restore riparian and protect existing riparian along with enhancement of terrestrial habitat and increase aquatic habitat in the stream watershed
- 4) Evaluate the effectiveness of riverbank restoration as a means to not only reduce sediment and nutrient loads but to improve aquatic habitat and fish communities
- 5) Increase awareness and promote the use of natural channel design among landowners and the public

A restoration plan will be developed that stabilizes 1250 feet of eroding bank using natural channel design techniques, which will include rebuilding land mass along 750 feet of the eroding bank using toe wood and developing an inter-berm and bankfull benches. If necessary, structures such as stacked rock vanes may be incorporated into the design to divert flow away from the eroding area. The utilization of both the toe wood and structures will enhance the aquatic habitat at the site. The riparian area will be re-vegetated to enhance wildlife habitat and provide additional erosion control. The channel cross section in the area of the bank restoration will be adjusted through excavation to create sufficient area to transport bankfull discharge through the restoration area. Suitable channel dimensions will be determined based upon reference reach conditions for a river located in the same physiographic region. Reference reach data will be collected to provide basic information needed for the site design. Construction level design plans will be developed and a construction bid package will be prepared for soliciting bids from qualified contractors. In addition to the myriad of environmental benefits, the restoration plan will help to protect vital city infrastructure located at the Noland waste water treatment plant by preventing encroachment of the river resulting from lateral bank erosion (Figure 2). The City of Fayetteville is the owner of all of the potential restoration sites considered for restoration as part of this project. Final site selection will be based on suitability and feasibility of restoration of the



Figure 2 Eroding river bank near Noland Waste Water Treatment Plant

selected riverbank and availability of sufficient funding to implement the design according to proposed specifications.

In coordination with the bank restoration efforts, several sites will be evaluated and monitored in order to qualify and quantify benefits to water quality, habitat, and the community of fish. Two sites having similar bank instability conditions will be monitored before and after restoration to document improvements associated with the restoration efforts. Two additional sites that will serve as reference conditions will also be monitored to assist in the evaluation of the improvements associated with the project. Monitoring at each of the sites will be conducted before and after implementation of the bank restoration activities. Parameters to be evaluated include the bank erosion potential, river bank profiles, river bank habitat, and electro-sampling along the monitored river banks. The fish community will be sampled during critical flow periods during late summer.

Success of the constructed restoration will be evaluated based on sediment and nutrient reduction and long-term stability of the restored site. The restoration will be designed and constructed to function through a wide variety of stream discharges. However no natural channel design restoration can be guaranteed to withstand flood events that are catastrophic or unforeseen changes in the watershed upstream or downstream of the restored site. Also, maintenance following flood events may be required to ensure functionality of the restoration into the future.

The general project site is located near the City of Fayetteville Noland Waste Water Treatment Plant just east of Fayetteville (see Figure 2). Preliminary estimates of contaminant loadings resulting from erosion of the riverbank with the greatest apparent instability for an average flow year are 1,600 tons of sediment and 1,600 lbs of phosphorus are generated from this site annually.

The proposed project will help to meet key elements of the Upper White River Watershed Management Strategy. Specific elements that are addressed are: 1) "Identification of Causes and Sources of NPS Pollution" – streambank erosion; 2) "Milestones and Criteria for Loading Reduction Effectiveness" – turbidity; and 3) "Schedule of Implementation" (Action Items addressed) – urban runoff, action item "Conduct Technology Transfer Workshops for City Planners, County Officials, Developers, Students, and Property Owners on Proper Installation and Maintenance of Erosion and Sediment Control".

Success of the project will be documented by evaluating the site condition prior to and following the implementation of restoration activities. This project will be considered successful if an 80% reduction in sediment loads resulting from riverbank erosion are estimated.

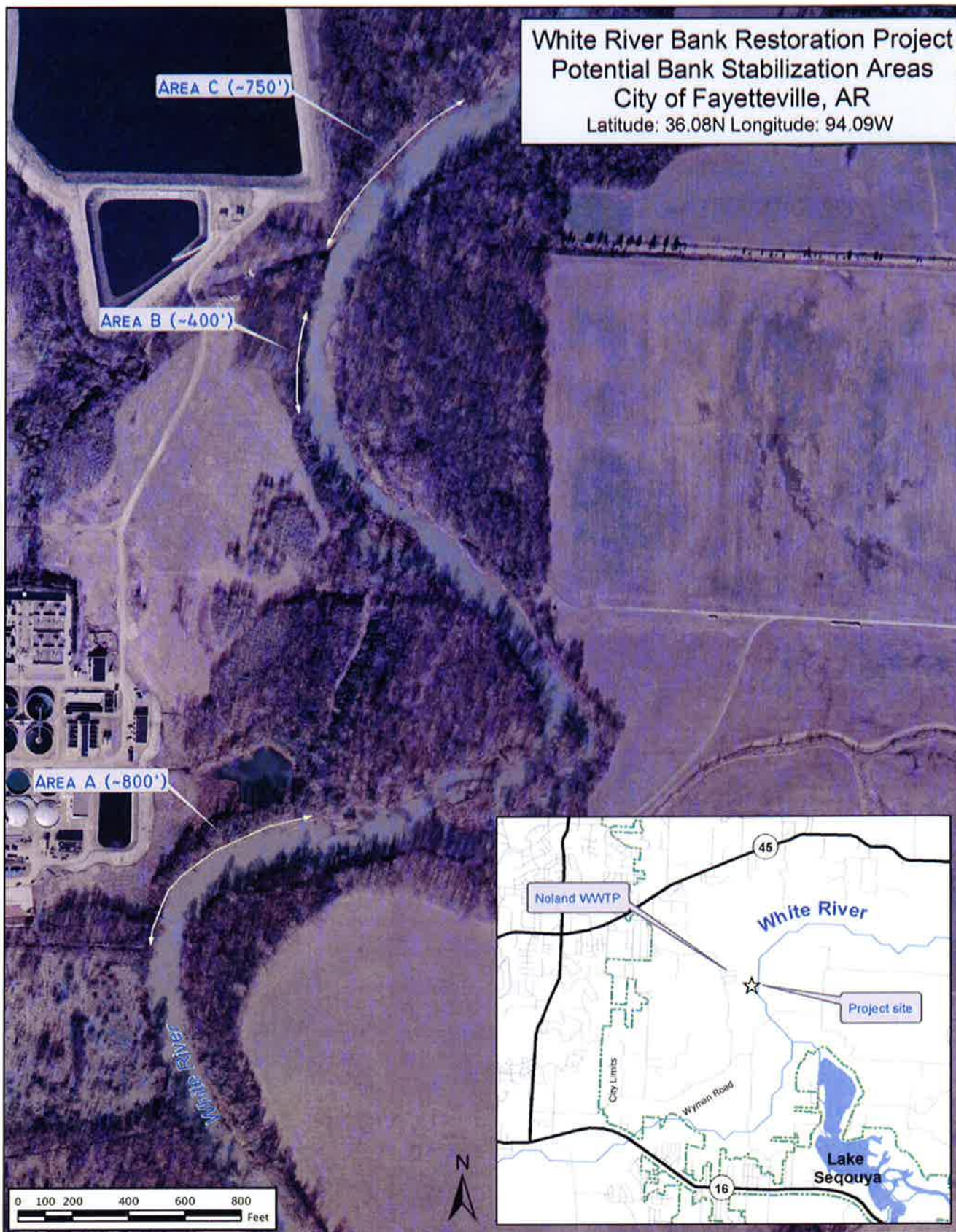


Figure 3 Proposed River Bank Restoration Sites on the White River near Fayetteville, Arkansas

Schedule

This project will be initiated September 1, 2013 and will conclude December 30, 2016. A general project schedule with milestones follows:

October, 2013 – March 2014: QAPP developed & approved
March 2014 – July 2014: Collect field data and evaluate bank erosion potential
August 2014 – September 2014 Conduct pre-restoration fish sampling effort
October 2014 – May 2015: Bank Restoration plan developed
June 2015 – September 2015: Implement restoration plan
October 2015 – February 2015: Collect post-construction survey data
August 2016 – Collect fish samples after one year following implementation
October 2016 – Resurvey site and evaluate effectiveness
December 2016 – Complete final report

Specific project tasks and description are as follows:

Task 1: Financial Audit: A financial review of all financial records following agreed upon procedures.

Task 2: Develop QAPP: A QAPP document will be developed to insure that all data collection activities are performed in accordance with documented and approved techniques. Data collection consists of geomorphic data associated with the river area to be restored, reference reach conditions, and gage stations. Riverbank erosion data and samples of riverbank materials will be collected to document sediment and phosphorus loading reductions.

Task 3: Pre and Post Implementation Monitoring: In order to document the success of the bank restoration efforts in reducing non-point source pollution, the condition of eroding river bank in the proposed restoration area, in addition to control and reference sites will be documented. A Bank Erosion Hazard Index (BEHI) and an evaluation of Near Bank Shear Stress (NBSS) will be used to determine the erosion potential of the riverbank in the restoration area. Using the BEHI values and NBSS observed, the amount of sediment generated by erosion of the riverbank will be estimated. Detailed cross sections will be surveyed using a total station to detect lateral erosion of the riverbanks over a one-year period. The lateral erosion rates measured during the observation period will allow determination of the volume of sediment eroded from the riverbanks. Samples of the riverbank material will be collected and analyzed for fine particle fractions and nutrient concentrations. Results of the riverbank material sampling effort will assist in determining the amount of sediment and nutrient load reductions that will be achieved through Restoration of the eroding riverbank ultimately selected for treatment. Immediately following implementation, monitoring activities that are needed to document the pollutant load reduction improvements associated with the implementation of the bank restoration plan will be initiated. Post-implementation erosion monitoring, consisting of detailed cross-section surveys, will be conducted at the restoration site. Cross-section measurements will also be collected at the control and reference sites to document the erosion at these sites. Results from the monitoring will be compared to erosion rates prior to restoration to determine sediment and nutrient load reductions for the selected site.

An evaluation of biological and habitat improvements associated with implementation of riverbank Restoration efforts will be conducted. This effort will include collection of fish

samples and associated habitat index information from the restoration site, control site, and two reference sites prior to implementation of the restoration plan. The samples will be collected during the critical flow period that occurs in late summer. One year following implementation, samples from all four sites will be collected. The results of the data will be analyzed and then compared to the pre-restoration condition to identify improvements.

Task 4: Develop and Implement Streambank Restoration Design: A restoration design for the site will be developed and implemented that will stabilize the selected eroding riverbank and greatly reduce the amount of erosion occurring at the site. A reference pool located on the White River upstream of Beaver Lake will be identified and surveyed. This data will be used to assist in the development of the restoration design. Bankfull discharge and other information for the selected site will be determined from regional relationships between bankfull discharge or channel geometry verses watershed area for the local physiographic region. A complete survey of the site's geomorphic features will be conducted including bankfull channel area, flood prone area, water surface/bankfull slope, channel geometry, and sediment size distribution. Using this data, along with reference reach and regional curve data, a bank restoration plan will be developed. Construction drawings will be generated for the design and an implementation schedule will be determined based upon site conditions and other constraints. Permits from the US Army Corps of Engineers, ADEQ, and Washington County will be obtained. Bid specifications will be developed and requests for qualified bids will be solicited.

Task 5: Implement Restoration Design: The restoration design will be implemented by the selected contractor with direct oversight from the WCRC staff. Materials and equipment for the implementation phase will be procured. WCRC will coordinate with ADEQ inspectors. The site will be re-vegetated using in-house and volunteer labor. After implementation, the site will be inspected following flood events and prescriptions for maintenance will be made, if needed.

Task 6: Conduct Outreach: Public awareness activities including two site tours, one fact sheet, and a volunteer planting day will be conducted to promote awareness of the project. Following the implementation of the riverbank Restoration activities, the site will be used as a tool for transferring the technology and concepts of river Restoration to a wide audience in order to encourage the use of sustainable technologies when addressing riverbank erosion on large rivers. The outreach component will serve to demonstrate the effectiveness of using natural design concepts when addressing bank instability on large rivers.

Task 7: Reporting: All reports will be prepared and submitted (hard copies and electronically) according to the grant requirements.

1. Quarterly reports will be submitted utilizing the format/forms provided electronically by ANRC and will briefly state accomplishments made for each subtask. Quarterly reports will also include implementation documentation (forms provided electronically by ANRC) that contains the following information: Name and USDA-NRCS practice number, farm number in which BMP was implemented, GPS or latitude/longitude of the BMP, number or acres affected and the date BMP implementation was completed.
2. Annual reports will be submitted to ANRC by October 1 of each year in which the project is/was active. The Annual Report will contain a summary of the BMP implementation documentation utilizing a form provided (electronically) by ANRC. This requirement will be in addition to a narrative summary of the project activities that occurred in the previous Federal Fiscal year (October 1 – September 30).

3. Attendance at annual project review meetings is required. The project manager is responsible for presenting an overview of the project, status, activities to date and any data collected. A copy of the presentation and/or documentation of project activities will be provided to ANRC at the meetings.
4. A Final Report will be submitted to ANRC at the completion or the end date for the project based on final report guidance provided by ANRC. The guidance will be in outline form. The Final Report should be a narrative description and will encompass all activities, from start to finish, related to the project. An executive summary as well as a final outcome and/or conclusion section shall be contained in the Final Report.

Tasks, Objectives, Subtasks, Schedules, Deliverables, and Estimated Costs

Task 1, Financial Review

	Costs		
Federal	Non-Federal Match	Total	
\$1,000	\$0	\$1,000	

Objectives: A financial review of all financial records following agreed upon procedures.

Subtask 1.1 Financial review for project period

Deliverables:

1. Report of Financial review

Task 2: Develop QAPP

	Costs		
Federal	Non-Federal Match	Total	
\$10,000	\$0	\$10,000	

Objectives: Develop a QAPP document to insure that all data collection activities are performed in accordance with documented and approved techniques.

Subtask 2.1 Develop QAPP for submittal to ANRC

Subtask 2.2 Edit QAPP per ANRC comments

Subtask 2.3 Submit final QAPP for approval

Deliverables:

1. Draft QAPP
2. QAPP approved by ANRC and EPA

Task 3: Pre and Post Implementation Monitoring

	Costs		
Federal	Non-Federal Match	Total	
\$40,000	\$20,000	\$60,000	

Objective: To estimate the pre-restoration sediment and phosphorus load from the site and to quantify the improvements resulting from implementation of the restoration plan.

Subtask 3.1 Conduct erosion potential inventory prior to restoration at restoration site, control site, and reference sites

Subtask 3.2 Collect detailed cross section measurements

Subtask 3.3 Collect and analyze riverbank materials for sediment and phosphorus

Subtask 3.4 Collect detailed cross-section measurements one year after initial measurements

Subtask 3.5 Collect fish samples at restoration site, control site, and reference site

Subtask 3.6 Collect detailed cross section measurements immediately after construction

Subtask 3.7 Collect fish samples one year after implementation at all sites

Subtask 3.8 Collect detailed cross-section measurements one year following the post implementation measurements

Subtask 3.9 Analyze data and prepare summary of results

Deliverables:

1. Results of erosion potential inventory and predicted erosion rates prior to restoration
2. Graphs of detailed measurements before restoration and map of measurement locations
3. Results of pre-restoration fish sampling
4. Results of detailed measurements after restoration monitoring period

Task 4: Develop Restoration Design

	Costs		
Federal	Non-Federal Match		Total
\$40,000	\$17,500		\$57,500

Objective: To a riverbank restoration plan using the natural channel design techniques

Subtask 4.1 Collect and/or review reference reach data

Subtask 4.2 Survey project site morphology

Subtask 4.3 Develop bank restoration design plan

Subtask 4.4 Develop bid specifications, prepare bid request, select contractor

Subtask 4.5 Apply for permits

Deliverables:

1. A summary of reference reach data that will be used for Restoration design

2. A summary of the site geomorphology
3. A copy of the Restoration design plan
4. 404 permit application

Task 5: Implement Restoration Design

	Costs	
Federal	Non-Federal Match	Total
\$197,810	\$208,435	\$406,245

Objective: To implement a riverbank restoration plan using natural channel design techniques

Subtask 5.1 Implement restoration design and provide construction oversight

Subtask 5.2 Complete site re-vegetation and finishing activities

Subtask 5.3 Inspection and maintenance

Deliverables:

1. Photographs of construction activities and completed work
2. Photographs of the re-vegetated site
3. Written documentation of inspection results

Task 6: Conduct Outreach

	Costs	
Federal	Non-Federal Match	Total
\$12,000	\$2,000	\$14,000

Objective: The objective of the public outreach task will be to promote awareness of riverbank restoration techniques using the natural channel design approach.

Subtask 6.1 Develop and distribute information fact sheet

Subtask 6.2 Conduct two site tours

Subtask 6.3 Conduct a volunteer planting day

Deliverables:

- 1) One project informational fact sheet
- 2) List participants who attend site tours
- 3) List of volunteer planting day participants

Task 7: Reporting

	Costs	
Federal	Non-Federal Match	Total
\$27,848	\$0	\$27,848

Objective: Provide ANRC information regarding the progress of this project on a quarterly and annual basis and provide a Final Report detailing the project.

Subtask 7.1 Quarterly Reports that include implementation documentation

Subtask 7.2 Annual Reports

Subtask 7.3 Attend and participate in annual project review meetings

Subtask 7.4 Final Report

Deliverables:

1. Quarterly Reports with implementation documentation
2. Annual Reports submitted by October 1 each year of the project
3. Presentation and a copy of presentation/documentation of project activities provided at annual review meetings
4. Final report summarizing project activities and presenting NPS reduction results

Overall Schedule of Tasks and Outputs:

Task	Subtask Number	Description	Start Date	Completion Date
1	1.1	Project Financial Review	Oct 2013	Dec 2016
2	2.1	Develop QAPP for submittal to ANRC	Oct 2013	Nov 2013
	2.2	Edit QAPP per ANRC comments	Nov 2013	Dec 2013
	2.3	Submit final QAPP for approval	Jan 2014	Mar 2014
3	3.1	Conduct erosion potential inventory prior to restoration at restoration site, control site, and reference sites	Mar 2014	Jun 2014
	3.2	Collect detailed cross section measurements	Mar 2014	Jun 2014
	3.3	Collect and analyze riverbank materials for sediment and phosphorus	Mar 2014	July 2014
	3.4	Collect detailed cross-section measurements one year after initial measurements	Mar 2015	Jun 2015
	3.5	Collect fish samples at restoration site, control site, and reference site	Aug 2014	Sept 2014
	3.6	Collect detailed cross section measurements immediately after construction	Aug 2015	Sept 2015
	3.7	Collect fish samples one year after implementation at all sites	Aug 2016	Sept 2016
	3.8	Collect detailed cross-section measurements one year following the post implementation measurements	Aug 2016	Sept 2016
	3.9	Analyze data and prepare summary of results	Mar 2014	Dec 2016
4	4.1	Collect and/or review reference reach data	Mar 2014	July 2014
	4.2	Survey project site geomorphology	Mar 2014	July 2014
	4.3	Develop restoration design plan	Aug 2014	Apr 2015
	4.4	Develop bid specifications, prepare bid request, select contractor	Feb 2015	May 2015
	4.5	Apply for permits	Feb 2015	May 2015
5	5.1	Implement restoration design and construction oversight	Jun 2015	Sept 2015
	5.2	Complete site re-vegetation and finishing activities	Oct 2015	Feb 2016
	5.3	Inspection and maintenance	Aug 2015	Dec 2016
6	6.1	Develop and distribute fact sheet	Oct 2015	Dec 2016
	6.2	Conduct two site tours	Oct 2015	Dec 2016
	6.3	Conduct volunteer planting day	Oct 2015	Feb 2016
7	7.1	Quarterly Reports	Oct 2010	Dec 2016
	7.2	Annual Reports	Oct 2014	Oct 2016
	7.3	Annual Project Review Meeting	Sept 2014	Sept 2016
	7.4	Final Report	Nov 2016	Mar 2016

Schedule of Tasks and Outputs to be completed within 12 months of project start date

Task	Subtask Number	Description	Start Date	Completion Date
1	1.1	Project Financial Review Year 1	Oct 2013	Oct 2014
2	2.1	Develop QAPP for submittal to ANRC	Oct 2013	Nov 2013
	2.2	Edit QAPP per ANRC comments	Nov 2013	Dec 2013
	2.3	Submit final QAPP for approval	Jan 2014	Mar 2014
3	3.1	Conduct erosion potential inventory prior to restoration at restoration site, control site, and reference sites	Mar 2014	Jun 2014
	3.2	Collect detailed cross section measurements	Mar 2014	Jun 2014
	3.3	Collect and analyze riverbank materials for sediment and phosphorus	Mar 2014	July 2014
	3.5	Collect fish samples at restoration site, control site, and reference site	Aug 2014	Sept 2014
4	4.1	Collect and/or review reference reach data	Mar 2014	July 2014
	4.2	Survey project site geomorphology	Mar 2014	July 2014

Schedule of Tasks and Outputs to be completed within 24 months of project start date

Task	Subtask Number	Description	Start Date	Completion Date
1	1.1	Project Financial Review Year 2	Oct 2014	Oct 2015
3	3.4	Collect detailed cross-section measurements one year after initial measurements	Mar 2015	Jun 2015
	3.5	Collect fish samples at restoration site, control site, and reference site	Aug 2014	Sept 2014
	3.6	Collect detailed cross section measurements immediately after construction	Aug 2015	Sept 2015
4	4.3	Develop restoration design plan	Aug 2014	Apr 2015
	4.4	Develop bid specifications, prepare bid request, select contractor	Feb 2015	May 2015
	4.5	Apply for permits	Feb 2015	May 2015
5	5.1	Implement restoration design and construction oversight	Jun 2015	Sept 2015

Schedule of Task and Outputs to be completed within 36 months of project start date

Task	Subtask Number	Description	Start Date	Completion Date
1	1.1	Project Financial Review Year 3	Oct 2015	Dec 2016
3	3.7	Collect fish samples one year after implementation at all sites	Aug 2016	Sept 2016
	3.8	Collect detailed cross-section measurements one year following the post implementation	Aug 2016	Sept 2016

		measurements		
	3.9	Analyze data and prepare summary of results	Mar 2014	Dec 2016
5	5.2	Complete site re-vegetation and finishing activities	Oct 2015	Feb 2016
	5.3	Inspection and maintenance	Aug 2015	Dec 2016
6	6.1	Develop and distribute fact sheet	Oct 2015	Dec 2016
	6.2	Conduct two site tours	Oct 2015	Dec 2016
	6.3	Conduct volunteer planting day	Oct 2015	Feb 2016
7	7.4	Final Report	Nov 2016	Mar 2016

Coordination, Roles and Responsibilities:

The Watershed Conservation Resource Center will be responsible for coordinating all activities associated with the project. The WCRC will insure that project milestones will be met according to the workplan schedule. WCRC staff Sandi Formica and Matt Van Eps will be co-principle investigators. Sandi Formica will be project manager and Matt Van Eps will be project engineer. Part-time staff and/or possible full-time employees will assist in the collection of field data, data analyses, and site preparation. The WCRC is responsible for project oversight, data collection, design, site preparation, public outreach, and all reporting.

The City of Fayetteville will be providing cash and in-kind matching contributions to the project. The City’s funding is currently projected. City Council approval is required to guarantee this funding. If the grant is selected, then the City staff will present the project to the City Council for funding consideration. Matching funds will be utilized throughout the project. In-kind contributions will consist of materials, equipment, and labor for portions of the preparation, construction, and re-vegetation activities. Additionally, the City of Fayetteville will be providing staff time to assist with project planning, coordination, carrying out site tours, assisting with volunteer days, and other project management functions. The City of Fayetteville’s contractor for operating the Noland Waste Water Treatment Plant is CH2M Hill and will providing some of the in-kind services described above.

Beaver Water District (BWD) was created under Arkansas Act 114 of 1957 for the purpose of providing inexpensive domestic water for the cities of Rogers, Bentonville, Springdale and Fayetteville, Arkansas. The water treatment industry utilizes a multiple barrier approach for public health protection. The first step in the multiple barrier approach is to protect the source of raw water for the drinking water utility. This source water protection program assures that the water entering the utility’s water treatment facilities is suitable for use as a drinking water source. Other barriers incorporated in the approach include disinfection, treatment, distribution system monitoring and maintenance, and public education. Sedimentation and its associated contaminants are the primary cause of impairment in the Upper White River watershed and of degraded water quality in Beaver Reservoir. The White River Restoration Project will contribute to BWD’s source water protection program by reducing significant sources of sediment from the watershed. BWD will contribute to the project by:

- Conducting public awareness activities, including water quality education and outreach events for both WFWR and Beaver Lake, media coverage, preparation of fact sheets and other materials, and in-person presentations that are related to streambank erosion,

- streambank stabilization and restoration, Beaver Lake water quality, Non Point Source (NPS) pollution – causes and solutions;
- Participating in project management and technical committees associated with the White River Restoration Project, water quality, NPS pollution, and best management practices; and
- Providing engineering review of project elements

Program personnel include Manager of Environmental Quality, Bob Morgan, PE; Staff Attorney, Colene Gaston, JD; Environmental Technician, Brad Huffhines; Environmental Technician, Ray Avery, EIT; Manager of Media Relations, Amy Wilson; and an Engineering Intern.

Beaver Water District and Staff activities may include:

- Watershed based citizen science and education events that provide public education activities that include information of streambank erosion, NPS pollution, best management practices, and water quality.
- Cooperative agreement with the City of Fayetteville to reduce NPS nutrients within Beaver Lake Watershed that includes two stream restoration projects.
- Training for volunteer scientists and environmental educators that include White River watershed.
- Presentations to interested groups regarding protection of Beaver Lake that includes streambank erosion, NPS pollution, and stream restoration.
- Participate in technical advisory committee and board of Directors of Beaver Lake Water Alliance.
- Provide technical support to the WCRC in data collection and implementation of the White River Restoration Project

The Arkansas Department of Environmental Quality will be providing in-kind match to the project by conducting fish sampling activities. ADEQ will provide equipment, labor, and data analysis that will help the project achieve stated outputs.

The Beaver Watershed Alliance will provide volunteer assistance primarily associated with harvesting native plants that will be utilized as part of the river bank restoration project. They may also assist in the implementation of certain phases of the project.

Public Participation

Public participation will be encouraged through outreach activities that will provide education opportunities related to restoration of large rivers.

Measures of Success and Performance

Success of this project will be established through the documentation of sediment loading and erosion rates. If sediment loads reductions are determined to be greater than 80%, the project will be considered a success.

Reference to Project in the NPS Management Program

The proposed project would help to meet key elements that the state non-point source program must address. Specific elements that are addressed include: Element #3 (Strong working partnerships with appropriate state, Tribal, regional, and local entities, private sector groups,

citizens groups, and Federal agencies.) and Element #4 (The state program (a) abates water quality impairments from existing sources and (b) prevents significant threats to water quality from present and future activities.)

Project Lead

The Watershed Conservation Resource Center is the lead on this project. The contact for this project is:

Sandi J. Formica, Executive Director
Watershed Conservation Resource Center
380 W. Rock Street
Fayetteville, AR 72701
Phone: (501) 352-5252; Fax: (928) 396-2546
formica@watershedconservation.org

List of Attachments

Attachment 1	Estimated Project Budget
Attachment 2	Estimated "Other" Budget – City of Fayetteville
Attachment 3	Estimated "Other" Budget – ADEQ
Attachment 4	Estimated "Other" Budget – Beaver Water District
Attachment 5	Estimated "Other" Budget – Beaver Watershed Alliance
Attachment 6	Project Budget Justification Worksheet

Literature Cited:

ADEQ (ADEQ, 2008b), List of Impaired Waterbodies (303d List), 2008.
http://www.adeg.state.ar.us/water/branch_planning/pdfs/303d_list_2008.pdf

ADEQ (ADEQ, 2004), Environmental Preservation Division, S.J. Formica, M.A. Van Eps, M.A. Nelson, A.S. Cotter, T.L. Morris, J.M. Beck, *West Fork - White River Watershed - Data Inventory and Non-point Source Pollution Assessment*, ANRC – EPA 319(h) Project Final Report, 2004.

Beaver Water District, A.R. Lowell, 2008, *Beaver Lake and Its Watershed 2008*

Formica, S.J., Van Eps, M.A., 2010, *West Fork White River Watershed Restoration of Priority Stream Reaches Project Plan*, Watershed Conservation Resource Center

Attachment 1 Estimated Project Budget

Personnel

	Salary	m/yrs	Cost	Federal	Non Federal
Project Manager	\$99,000	0.2867	\$28,387	\$28,387	\$
Project Engineer	\$82,000	0.3936	\$32,278	\$32,277	\$
Resource Specialist	\$33,600	0.4691	\$15,762	\$15,763	\$
Total, Personnel			\$76,427	\$76,427	\$
Fringe Benefits 44%			\$33,628	\$33,628	
Total Personnel including Fringe			\$110,055	\$110,055	\$

Travel

In State			\$5,000	\$5,000	
Out of State			\$0	\$0	\$0
Total Travel			\$5,000	\$5,000	\$0

Equipment

Total Equipment			\$	\$	\$
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Supplies

Misc. Supplies			\$2,000	\$2,000	
Office PC			\$2,000	\$2,000	
Software			\$7,500		\$7,500
Total Supplies			\$11,500	\$4,000	\$7,500

Contractual

Financial Records Review			\$1,000	\$1,000	
Total Contractual			\$1,000	\$1,000	

Construction

The construction funds will cover a portion of the contractor expenses incurred for construction activities. It is estimated that the contractor costs for in-stream activity will approach \$225,000 for heavy construction activity.

			\$168,294	\$168,294	
Total Construction			\$168,294	\$168,294	\$

Other

City of Fayetteville			\$195,705		\$195,705
Beaver Water District			\$20,000		\$20,000
ADEQ			\$10,000		\$10,000
Beaver Watershed Alliance			\$10,000		\$10,000
Volunteer Planting Day			\$5,000		\$5,000
Total Other			\$240,705	\$0	\$240,705

Total Direct Charges	\$536,554	\$288,349	\$248,205
Indirect	\$40,667	\$40,667	\$0
Grand Total	\$577,221	\$329,016	\$248,205

**Attachment 2
 Estimated "Other" Budget: City of Fayetteville**

Personnel

	Salary	m/yrs	Cost	Federal	Non Federal
Total, Personnel			\$0	\$0	\$0
Fringe Benefits %			\$0		\$0
Total Personnel including Fringe			\$0	\$0	\$0
Travel					
Total Travel			\$	\$	\$
Equipment					
Total Equipment			\$	\$	\$
Supplies					
Total Supplies			\$	\$	\$
Contractual					
Total Contractual			\$	\$	\$
Construction					
Total Construction			\$	\$	\$

Other

City of Fayetteville – Cash Match Funding for implementation and maintenance activities including the portion of contractor expenses not covered by federal funds, purchase of materials and other construction expenses. Materials purchased with these funds include rock, plants, seed, and erosion control.

In-Kind Match will be provided in the form of equipment, labor, and materials that will be used for obtaining and transporting construction materials and assisting with site preparation, construction, and revegetation. In-Kind match will also be provided by the city's wastewater treatment plant contractor that manages the facility and former land application sites. Staff will assist with site access, technical assistance, project planning, and outreach activities.

Total Other			\$195,705	\$	\$195,705
Total Direct Charges			\$195,705	\$	\$195,705
Indirect			\$0	\$0	\$0
Grand Total			\$195,705	\$	\$195,705

Attachment 3
Estimated "Other" Budget: Arkansas Dept. Environmental Quality

Personnel

	Salary	m/yrs	Cost	Federal	Non Federal
Total, Personnel			\$0	\$0	\$0
Fringe Benefits %			\$0		\$0
Total Personnel including Fringe			\$0	\$0	\$0
Travel					
Total Travel			\$	\$	\$
Equipment					
Total Equipment			\$	\$	\$
Supplies					
Total Supplies			\$	\$	\$
Contractual					
Total Contractual			\$	\$	\$
Construction					
Total Construction			\$	\$	\$
 Other					
ADEQ – In-Kind Match will be provided in the form of equipment, labor, and materials that will be required for collection of fish samples and analysis of collected data to determine improvements in the fish community associated with river bank restoration activities.			\$10,000		\$10,000
Total Other			\$10,000	\$	\$10,000
Total Direct Charges			\$10,000	\$	\$10,000
Indirect			\$0	\$0	\$0
 Grand Total			\$10,000	\$	\$10,000

Attachment 4
Estimated "Other" Budget: Beaver Water District

Personnel

	Salary	m/yrs	Cost	Federal	Non Federal
Manager of Environmental Quality	\$86,112	0.0697	\$6,000	\$0	\$6,000
Environmental Technician	\$49,261	0.1893	\$9,326		\$9,326
Total, Personnel			\$15,326	\$0	\$15,326
Fringe Benefits 30.5%			\$4,674	\$	\$4,674
Total Personnel with Fringe			\$20,000		\$20,000
Total Travel			\$	\$	\$
Equipment					
Total Equipment			\$	\$	\$
Supplies					
Total Supplies			\$	\$	\$
Contractual					
Total Contractual			\$	\$	\$
Construction					
Total Construction			\$	\$	\$
Other					
Total Other			\$0	\$	\$0
Total Direct Charges			\$20,000	\$	\$20,000
Indirect			\$0	\$0	\$0
Grand Total			\$20,000	\$	\$20,000

Attachment 5 Estimated "Other" Budget: Beaver Watershed Alliance

Personnel	Salary	m/yrs	Cost	Federal	Non Federal
Total, Personnel			\$0	\$0	\$0
Fringe Benefits %			\$0		\$0
Total Personnel including Fringe			\$0	\$0	\$0
Travel					
Total Travel			\$	\$	\$
Equipment					
Total Equipment			\$	\$	\$
Supplies					
Total Supplies			\$	\$	\$
Contractual					
Total Contractual			\$	\$	\$
Construction					
Total Construction			\$	\$	\$
 Other					
Beaver Watershed Alliance – In-Kind Match will be provided in the form of equipment and labor for collection and planting of native species in the restoration area as part of the re-vegetation effort.			\$10,000		\$10,000
Total Other			\$10,000	\$	\$10,000
 Total Direct Charges			\$10,000	\$	\$10,000
Indirect			\$0	\$0	\$0
 Grand Total			\$10,000	\$	\$10,000

Attachment 6 PROJECT BUDGET JUSTIFICATION WORKSHEET

BUDGET CATEGORIES INFORMATION (FROM SF424A, SECTION B TOTALS) Enter Total Program Costs, i.e., Federal and Non-Federal Funds Combined (Attach Separate Sheet(s) if necessary)				
OBJECT CLASS CATEGORIES:				
a. Personnel: (Program Staffing – include and indicate vacant positions) Position Title	Number in Position Class	Annual Salary Rate	Work Years	Personnel Costs
(1)	(2)	(3)	(4)	(5)
Project Manager		\$99,000	0.2867	\$28,387
Project Engineer		\$82,000	0.3936	\$32,277
Resource Specialist		\$33,600	0.4691	\$15,763
Personnel Category Totals				\$76,427
b. Fringe Benefits: Total				\$33,628
c. Travel: Include estimates of In-State and Out of State travel including if appropriate, mileage in State or private vehicles, Per Diems, air fare and conference fees.				
In State				\$5,000
TRAVEL: TOTAL				\$5,000
d. Equipment:				
(1) List each item costing \$5,000 or more to be purchased for this project:				
(2) List items costing less than \$5,000. You may list items by groups, as appropriate.				
COMBINED EQUIPMENT TOTAL				\$0
e. Supplies: List by groups, as appropriate				
Misc. Supplies (rebar, stakes, flagging, wading boots, tools)				\$2,000
Office PC				\$2,000
Software (Rivermorph and Autocad Civil3D)				\$7,500
SUPPLIES TOTAL				\$11,500
f. Contractual: List each planned contract separately, type of service to be procured, proposed procurement method (i.e. small purchase, formal advertising, competitive negotiations or non-competitive negotiations) and the estimated cost. Also, please indicate if the proposed contract performance period will go beyond the budget period of assistance for which this application is submitted.				
Financial Records Review				\$1,000
COMBINED CONTRACTUAL TOTAL				\$1,000
g. Construction:				
Contractor Expenses: The construction funds will cover a portion of the contractor expenses incurred for construction activities. It is estimated that the contractor costs for in-stream activity will approach \$140,000 for heavy construction activity.				\$168,294
TOTAL CONSTRUCTION				\$168,294

h. Other: Explain by major categories any items not included in above standard budget categories. <u>Caution:</u> Do not include or propose as a direct project cost, any cost that is indirect in nature (see OMB Circular A-87) or is included in the indirect cost pool on which the indirect cost rate (item j) is based.	
City of Fayetteville Cash Match	\$195,705
Beaver Water District In-kind Match	\$20,000
ADEQ Fish Sampling	\$10,000
Beaver Watershed Alliance In-kind Match	\$10,000
Volunteer Day	\$5,000
OTHER TOTAL	\$240,705
i. TOTAL DIRECT CHARGES: (Sum of Items a. through h.)	\$536,554
j. INDIRECT COSTS: (Attach a copy of your latest indirect cost agreement)	\$40,667
k. TOTAL PROPOSED PROGRAM COSTS (Sum of Items I and j.)	\$577,221
SHARE: FEDERAL 57%	\$329,016
GRANTEE 43%	\$248,205

Project Personnel Justification Summary:

Sandi J. Formica, executive director of the WCRC has B.S. and M.S. degrees in Chemical Engineering, with an emphasis on the transport of contaminants in the water, soil, and air. She will be the overall project manager. She will oversee the data collection, evaluation, and analysis portions of the project. Ms. Formica has been the project manager of numerous 319 projects developed to address non-point source pollution on a watershed basis. She was the principal investigator and developed the overall approach to assessing nutrients and sediment on a watershed basis that will be utilized for this project. Ms. Formica possesses unique technical skills developed over many years experience in the field of environmental and watershed management. Ms. Formica has extensive training in the area of fluvial geomorphology and stream restoration and has assisted in the development and instruction of basic field techniques to determine stream morphology course.

Matthew A. Van Eps, associate director of the WCRC is a registered Professional Engineer in the State of Arkansas who holds a M.S. Degree in Environmental Engineering. He will be responsible for managing field data collection activities, data analysis, development of the natural channel design, and implementation of the design. He has 8 years of technical and practical experience utilizing the watershed approach. He has been the project engineer for numerous successfully completed studies including watershed assessments. He has extensive experience in collecting and analyzing fluvial geomorphology data for estimating streambank erosion and stream stability. Mr. Van Eps has extensive training in the area of fluvial geomorphology and stream restoration and has assisted in the development and instruction of basic field techniques to determine stream morphology course.

The resource specialist will have a degree or be in the process of fulfilling the requirements for a degree in natural sciences or in an engineering discipline. The resource specialist will provide assistance for field data collection activities and during data analysis.