

**Project Title:** Northwest Arkansas Wet Prairie Restoration for Arkansas Darter and Grassland Birds

**Project Summary:** The Northwest Arkansas Prairie Restoration Project is part of an on-going, community-based restoration effort at two historical prairie sites, Wilson Springs Conservation Area and Beaver Prairie. Both sites are located in the Ozarks Ecoregion and within the Illinois River watershed. Restoration at both sites addresses the 2012 Arkansas Wildlife Action Plan priorities of 1) managing landscapes for native grasslands and grassland birds and 2) increasing patch size and quality of wetlands and prairies. Restoration at Wilson Springs is specifically focused on restoring open-space conditions, which is expected to improve aquatic habitat for the Arkansas darter and grassland habitat for Henslow's Sparrow. Beaver Prairie restoration efforts will not only increase availability of native grasslands in a pasture-dominated area of the watershed, but also provide a demonstration site for restoration best management practices and headwater stream protection. Biological surveys and soil/water quality conditions will also be assessed to measure restoration effectiveness.

**Project Leaders:**

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**Project Partners:**

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**Project Budget:**

	<u>At 35% match</u>	<u>At 50% match</u>
Total cost of project:	\$72,800	\$83,800
Total amount of SWG request:	\$47,600	\$46,600

Amount and source of matching funds or in-kind services:

- |                                 |          |          |
|---------------------------------|----------|----------|
| • NWALT Match (in-kind):        | \$4,200  | \$20,700 |
| • BWD Match (in-kind and cash): | \$21,000 | \$21,000 |

**Project Statement:**

**Need:** Many impacts to the natural environment in Northwest Arkansas have resulted from rapid urbanization in the region, including degraded water quality and loss of habitat. Wetland prairies are some of the most threatened habitats in the United States, and Arkansas is estimated to have lost 95% of its native grassland and/or prairie habitats.

This project will address the following conservation action priorities of the 2012 Arkansas Wildlife Action Plan at two Northwest Arkansas sites: managing landscapes for native grasslands and grassland birds, restoring habitat for the Arkansas darter, and increasing patch size and quality of wetlands and prairies. Site 1, the Wilson Springs Conservation Area, is one of the largest wetland prairie remnants in Washington County. In previous ornithological surveys at the site, identified species included Henslow's Sparrow, Bell's Vireo, Willow Flycatcher, Sedge Wren, Grasshopper Sparrow, and Painted Bunting. The Arkansas Darter, a candidate for Endangered Species listing, has also been identified at the site in two recent studies (Brown, 2011 and Wagner et al., 2011). Site 2, Beaver Prairie will provide an opportunity for the prairie owner, Beaver Water District, to expand availability of grassland habitat while also demonstrating best management practices for prairie restoration management and headwater stream protection.

The Northwest Prairies Restoration Project is part of an on-going, community-based restoration effort that was spearheaded by Audubon Arkansas and in part funded by a 2010 AGFC SWG grant. As part of that grant, management plans for both sites were created with the input of the Project Steering Committee and initial restoration actions were implemented at both sites. This grant application builds upon these initial restoration efforts and further implements the Committee's management plan.

**Location:** Both restoration locations, Wilson Spring and Beaver Prairie (Figure 1), are located in the Ozark Highlands Ecoregion, in Washington County and within the Illinois River watershed. Wilson Spring is a 121-acre property that contains a mix of habitats, including emergent wetlands, post oak savannah, and upland prairie and native grassland. The riparian areas (including the Spring itself, part of Clabber Creek, and an unnamed tributary at the north end of the property) are perennial streams, and the west end of the property contains a mix of perennial and ephemeral wetland areas. Beaver Prairie is a 36 acre parcel, at the headwaters of Puppy Creek. The site was historically tall grass prairie with upland and wetland characteristics, but most recently was used as a livestock pasture and hay meadow. The stream channel remains wet most of the year, but only flows during precipitation events. Wilson Springs and Beaver Prairie are found, respectively, in the Clear Creek and Osage Creek tributaries of the Illinois River Watershed.

**Objective:** The long-term objective of this restoration project is to increase patch size and availability of open wetland prairie habitat in Northwest Arkansas. There are three short-term goals for this project, as defined by the management plan: 1) increasing light levels at Wilson Springs through targeted canopy removal, 2) prescribed burning, herbicide application, and native seed planting at Beaver Prairie, and 3) continued monitoring of floral communities, aquatic communities, and water quality changes at both sites.

**Approach:**

Restoration at Wilson Springs: The goal of restoration activities for this project will address the restoration of open canopy conditions. Invasive species and early successional native tree species have established along the riparian and savannah areas of the site. In order to prevent erosion of the riparian waterway (approximately two acres), trees less than 12 inch d.b.h. and invasive woody species will be removed by-hand using a chain-saw and water-soluble herbicide will be applied directly to remaining stumps. Within the savannah area (approximately 19 acres), trees less than 12 inch d.b.h will be removed using a timber mulcher.

Restoration at Beaver Prairie: Two-year restoration activities will begin with herbicide application in the Spring and Fall of 2012. A prescribed burn is planned for October 2012. In early 2013, soil disking will occur in preparation for native seed planting. Native plant species to be planted include Big Bluestem (*Andropogon gerardii*), Little Bluestem (*Schizachyrium scoparium*), and Indian Grass (*Sorghastrum nutans*) on upland sites, and Cordgrass (*Spartina pectinata*) and various Sedge species (*Carex spp.*) on wet sites. Native trees will be established in riparian areas where appropriate.

Biological, soil content, and water quality studies: Monitoring at both sites serves a two-fold function: 1) to evaluate baseline conditions in order to determine next steps in the restoration process, and 2) to identify measurable effects of restoration through time. The approach for each type of monitoring is described as follows:

Floral community composition was previously surveyed at eight plots at Wilson Springs and five plots at Beaver Prairie, with both sites evaluated in the spring and late summer. Five meter circular plots were established, and vegetation was identified to genus and species, when possible. Percent cover was also visually evaluated for each of the four strata: canopy, sub-canopy, shrub, and herbaceous.

Aquatic communities were evaluated annually at two sites within the Wilson Spring Conservation Area and two sites upstream of the Conservation Area (but still part of the Wilson Springs reach). At each site, multiple kick-net collections were taken over an area of ten meters or more and visually examined for fish and invertebrate species. All samples were identified, recorded, and released. Fish, decapods, and insects that were observed but not collected in the kick-net sample were also recorded.

Soil moisture analyses will continue at Beaver Prairie and water quality will continue to be evaluated at Wilson Springs. Soil moisture monitoring at Beaver Prairie will be conducted using a theta probe. Five sites within each of two major soil series will be monitored at four different depths and replicated monthly. Water quality analyses will occur monthly at two stream locations on Wilson Springs. Soil infiltration rates are evaluated annually within each soil type using an infiltrometer at Beaver Prairie.

Steering Committee participation: The all-volunteer steering committee will continue to meet to provide restoration updates, make necessary adaptive management decisions as they relate to the Management Plan, and to prioritize next steps for restoration activities. The Steering Committee

will meet two times per year, for a total of four times during the duration of the grant. Steering committee members in the past have included prairie restoration experts/consultants, faculty from the University of Arkansas and Northwest Arkansas Community College, and staff from Audubon Arkansas.

**Expected Results and Benefits:** At Wilson Springs, removal of tree canopy in the savannah and riparian area will significantly increase light levels, which will benefit the site in three ways: 1) promote growth of aquatic vegetation, which is used as cover for the Arkansas Darter, 2) will allow germination and growth of any wetland or prairie plant species found in the seed bank, and 3) will increase the number of acres available to open-space bird species. On-going restoration will facilitate seed bank germination, with anticipated increases in percent cover of target native wetland prairie species.

At Beaver Prairie, targeted herbicide applications will reduce growth of fescue, clover, Johnson grass, and Bermuda grass. Subsequent prescribed burning will reduce cover and detritus of these pasture grasses. Native seed planting will assist in establishment of target native grasses and forbs. Upon successful establishment of a diversity of wet and upland prairie plant species, it is expected that faunal diversity will also increase, creating functional habitat for open-space birds, mammals, and invertebrates.

On-going biological surveys will assist in measuring community change as restoration at both sites progresses, and will be used as an indicator of restoration success. Evaluation of soil characteristics and water chemistry, when paired with biological surveys, will enable prioritized decision-making regarding hydrological conditions and the effect of restoration.

**Budget:** 35% match requirement (please see attached Table 1 for budget at 50% match):

Item	NWALT Match	BWD Match	SWG	Total
<b>Personnel Expenses</b>				
Salary	\$2,500	\$9,000	\$2,500	\$14,000
Travel	\$500	\$1,000		\$1,500
Steering Committee Mtgs	\$1,200			\$1,200
<b>Total personnel:</b>	<b>\$4,200</b>	<b>\$10,000</b>	<b>\$2,500</b>	<b>\$16,700</b>
<b>Restoration Expenses</b>				
WS Contracting			\$23,000	\$23,000
BP Contracting		\$11,000	\$17,600	\$28,600
<b>Total restoration:</b>	<b>\$0</b>	<b>\$11,000</b>	<b>\$40,600</b>	<b>\$51,600</b>
<b>Research Expenses</b>				
Floral Surveys			\$3,000	\$3,000
Aquatic Surveys			\$1,500	\$1,500
<b>Total research:</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,500</b>	<b>\$4,500</b>
<b>Total:</b>	<b>\$4,200</b>	<b>\$21,000</b>	<b>\$47,600</b>	<b>\$72,800</b>
		Total Match:	\$25,200	35%

**Qualifications:**

Nicole Hardiman, Ph.D., Northwest Arkansas Land Trust, Executive Director

Nicole will serve as project manager for the purposes of this grant, to include working with restoration and biological monitoring contractors, organizing and leading Steering Committee meetings, and organizing volunteer work days. Nicole has been involved with the Wilson Springs Restoration Project for nearly two years, working initially as a project manager with Audubon Arkansas and currently as the Executive Director for new Wilson Springs landowner, the Northwest Arkansas Land Trust. She holds a doctorate in biology from the University of Cincinnati, with a focus on conservation biology and environmental law and policy.

Bradley Hufhines, Beaver Water District, Environmental Technician

Brad will conduct all of the water quality and soil water content monitoring, will manage restoration contractors at Beaver Prairie, and is a Steering Committee member. As an environmental technician at Beaver Water District, Mr. Hufhines conducts water quality monitoring regularly. He received his B.S in Animal Science and his M.S. in Crop, Soil, and Environmental Science at the University of Arkansas. He has over twelve years of water and wastewater experience as well as numerous school projects related to water quality.

Robert Morgan, Ph.D., Beaver Water District, Manager of Environmental Quality

Dr. Morgan will provide technical expertise on monitoring and analysis of parameters related to ground and surface water quality, and also serves as a Steering Committee member. Bob is a registered professional engineer in Arkansas with expertise in ecological processes as applied to stream restoration, water quality management, water supply, and wastewater treatment. He has a Ph.D. in Engineering from the University of Arkansas, College of Engineering, a MS in Civil Engineering, and BS in Civil Engineering and Education from the University of Arkansas. Research interests include watershed management with emphasis on stakeholder involvement and stream restoration. Dr. Morgan currently serves as Adjunct Faculty in the Biological and Agricultural Engineering Department at the University of Arkansas.

Tim Snell, The Nature Conservancy, Associate State Director

Tim is a Board member at the Northwest Arkansas Land Trust and will provide technical expertise and guidance on the restoration process at both Wilson Springs and Beaver Prairie. At TNC, he is responsible for Arkansas's Water Resources Initiative which develops and implements Water Resource strategies that protect Arkansas's aquatic habitats while providing the water that people and businesses need to thrive and prosper. He has previously worked to develop and implement conservation strategies that reduce stresses to cave ecosystems, working with landowners, government agencies, corporations, and researchers to protect rare species living in priority cave systems and groundwater quality of the Ozarks.

**Deliverables Timeline:**

July – September, 2012:

Steering committee meeting

WS: Water quality analyses

BP: Herbicide application, fire line installation, soil moisture and infiltration

WS and BP: Floral survey

October – December, 2012:

WS: Two volunteer work days, riparian plant removal, water quality analyses

BP: Prescribed burn and soil moisture monitoring

January – March, 2013:

Steering committee meeting

BP: Soil preparation, seed planting, soil moisture and infiltration monitoring

WS: Timber mulcher in savannah management unit, water quality analyses

WS and BP: Floral survey

April – June, 2013:

WS: Aquatic survey, two volunteer work days, water quality analyses

BP: Herbicide application, soil moisture monitoring

July – September, 2013:

Steering committee meeting

WS and BP: Floral survey

BP: Herbicide application, soil moisture and infiltration monitoring

WS: Water quality analyses

October – December, 2013:

WS: Two volunteer work days, water quality analyses

BP: soil moisture monitoring

January – March, 2014:

Steering committee meeting

WS: Water quality analyses

BP: soil moisture and infiltration monitoring

April – June, 2014:

WS: Water quality analyses, two volunteer work days

BP: soil moisture monitoring

Figure 1: Location of both sites within Washington County and Illinois River Watershed. Beaver Prairie is in the upper inset, and Wilson Springs is in the lower inset. Numbered areas of Wilson Springs indicate management units; associated acreage is in upper, right-hand corner.

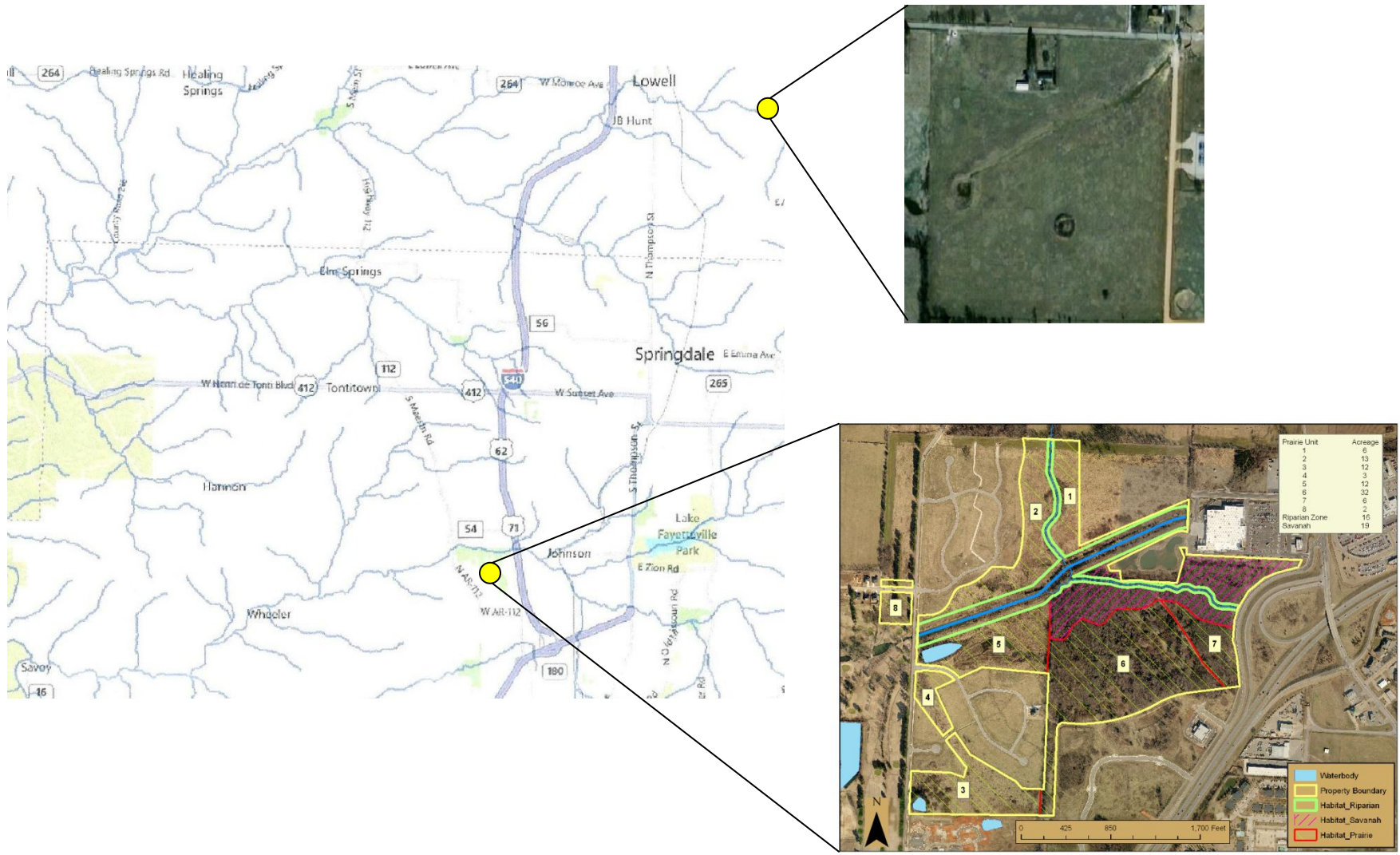


Table 1: Project budget at 50% match

<b>Item</b>	<b>NWALT Match</b>	<b>BWD Match</b>	<b>SWG</b>	<b>Total</b>
<b>Personnel Expenses</b>				
Salary	\$4,500	\$9,000	\$2,500	\$13,500
Travel	\$500	\$1,000		\$1,500
Steering Committee Mtgs	\$1,200			\$1,200
<b>Total personnel:</b>	<b>\$6,200</b>	<b>\$10,000</b>	<b>\$2,500</b>	<b>\$16,200</b>
<b>Restoration Expenses</b>				
Volunteer Events	\$14,500			\$14,500
WS Contracting			\$20,000	\$20,000
BP Contracting		\$11,000	\$17,600	\$28,600
<b>Total restoration:</b>	<b>\$14,500</b>	<b>\$11,000</b>	<b>\$37,600</b>	<b>\$63,100</b>
<b>Research Expenses</b>				
Floral Surveys			\$3,000	\$3,000
Aquatic Surveys			\$1,500	\$1,500
<b>Total research:</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,500</b>	<b>\$4,500</b>
<b>Total:</b>	<b>\$20,700</b>	<b>\$21,000</b>	<b>\$44,600</b>	<b>\$83,800</b>
		Total Match:	\$41,700	50%

**References Cited:**

Brown, A. (2011) Annual Report - Wilson Springs Project. Presented to Northwest Prairies Restoration Steering Committee. August 2, 2011

Wagner BW et al. (2011) Developing a conservation action plan for two darters: Arkansas Darter (*Etheostoma cragini*) and Least Darter (*Etheostoma microperca*) in Arkansas. Arkansas Game and Fish Commission.