1. Cover Page: 2016 State Wildlife Grant Pre-Proposal

a. **Title of Project:**

Phase II: Stream and Wetland Restoration of Tanyard Creek

b. Project Summary:

1,000 feet of Tanyard Creek, associated riparian, and a wetland area will be restored. Tanyard Creek is known for its natural Karst features of limestone bluffs, in-stream ledges, and adjacent caves. This Ozark Highlands stream is a tributary to Little Sugar Creek where 13 SGCNs have been found in or near the basin. The Bella Vista Village POA proactively developed a "Restoration and Maintenance Plan' for 3,500 feet of Tanyard Creek in an effort to initiate restoration of areas of stream instability that impact both aquatic and terrestrial habitat and degrade water quality. Utilizing a 2012 State Wildlife Grant, 2,500 feet of Tanyard creek was successfully enhanced and restored by stabilizing streambanks using natural channel design techniques, removing woody debris, and enhancing riparian through planting and seeding with native plants and removing invasive vegetation. This proposal addresses the remaining 1,000 feet where there is an extremely unstable streambank and excessive woody debris build-up. Both aquatic and terrestrial habitat of this Karst area are compromised with aquatic habitat limited from sedimentation that has diminished riffle/pool features and from stream instability resulting in degradation of the riparian area. A natural channel design approach will be used to restore and enhance the channel in a manner that reduces streambank erosion, transports sediment efficiently, and improves the riparian and aquatic habitats for 13 SGCNs. Wetland habitats will also be restored as part of this effort.

c. Project Leader: Sandi Formica, Executive Director
Watershed Conservation Resource Center
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d. Project Partners:

Mike Taggart, Director Maintenance and Construction-Water Utility Division, **Bella Vista Village Property Owners Association (Bella Vista POA)**, miket@bvvpoa.com, (479) 855-5064

John Pennington, President, **Multi-Basin Regional Water Council (Multi-Basin Council),** john@beaverwatershedalliance.org, (479) 750-8007

Bill Posey, Assistant Chief, **Arkansas Game & Fish Commission (AG&FC),** William.Posey@agfc.ar.gov, (501) 223-6369

David Casaletto, Executive Director, **Ozark Water Watch,** dcasaletto@ozarkswaterwatch.org, (417) 739-5001

e. Project Budget:

Amount of SWG Funds Requested: $110,000 (46.8%)
Total Matching Funds Provided: $125,000 (53.2%)
Total Project Cost: $235,000

2. Project Statement

a. Need:

Tanyard Creek is rich in Karst features and flows to Little Sugar Creek, a major tributary of the Elk River that lies in both Arkansas and Missouri (Figure 1). Unstable streambanks and excessive woody debris are compromising the aquatic and terrestrial habitat of the stream and accelerated streambank erosion contributes excessive amounts of sediment and phosphorus, annually, to the Little Sugar Creek watershed. Restoration of this Ozark Highlands stream addresses several priorities in the Arkansas Wildlife Conservation Action Plan and the 2016 State Wildlife Grant Priorities:

1) The project has the potential to benefit 13 SGCNs that include Fish, Crayfish, and Other Invertebrates. The project will implement the two highest conservation actions recommended in the Ozark Highlands Ecoregion: 1) Habitat Restoration/Improvement, 2) Habitat Protection along with 3) Threat Abatement, and 4) Public Relations/Education.

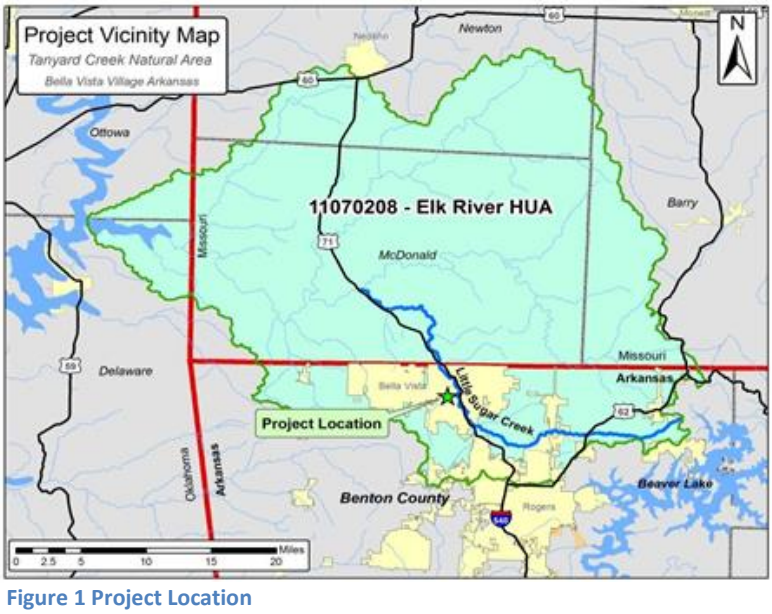

Figure 1 Project Location

2) Addresses Emerging Issue under Habitats: Karst Native Terrestrial Habitat. Tanyard Creek is rich with Karst features, such as, limestone bluffs and ledges in the stream and a nearby cave. The project will restore and enhance 1,000 stream feet of riparian area, restore a wetland, and improve water quality.

3) Addresses Emerging Issue under Habitats: Aquatic Habitat and Wetland Habitat. This project will restore both aquatic and wetland habitats and improve water quality. The Bella Vista POA developed a stream management plan for Tanyard Creek to protect and improve aquatic habitat and water quality by restoring streambanks, riffles, pools, runs and glides, while implementing ongoing stewardship to protect the site into the future. The WCRC was awarded a 2012 SWG grant and successfully restored and enhanced 2,500 feet of Tanyard Creek and its riparian area in 2015. In 2016, the Bella Vista POA committed $12,000 for ongoing stewardship of the site. This project will restore the remaining 1,000 feet of unstable stream as recommended in the Tanyard Creek plan and will include wetland restoration. Restoring stability to the channel will reduce sediment and phosphorus in Little Sugar Creek watershed. Little Sugar Creek is considered the primary source of these contaminants in the Elk River (a Missouri 303 (d) listed stream); therefore, this project meshes with regional efforts by both Arkansas and Missouri to address issues within shared watersheds and creates the opportunity for states to work together.

b. Purpose and Objectives:

The purpose of the project is to restore and maintain a healthy stream, wetland, and riparian areas in a Karst landscape that support aquatic and terrestrial habitat for SGCNs and other wildlife. The project objectives are:

1) Restore 1,000 feet of unstable stream and a wetland area to improve aquatic habitat for 13 SGCNs (listed below).

2) Restore and enhance 2,000 feet of riparian area in a Karst landscape for 13 SGCNs.
3) Improve water quality by reducing sediment and nutrient loadings from streambanks by 80%.
4) Reduce streambank erosion rates by 80% or greater to improve hydrology and create a stable channel and adjacent flood plains.
5) Strengthen local and regional partnerships and provide hands-on outreach by conducting two volunteer native plant events; presenting project results; and coordinating a site tour.

c. Location:
Tanyard Creek is located in Benton County (Figures 1 & 2) and the Ozark Highlands Ecoregion, which has the greatest number of SGCN. The project can benefit 12 SGCNs found either in or near the Little Sugar Creek basin and one that potentially lives in this basin. The two highest ranking terrestrial habitats will be improved and protected: 1) Caves, Mines & Karst Habitat and 2) Ozark- Ouachita Riparian and the 7th highest ranking aquatic habitat: Ozark Highlands – Arkansas River.

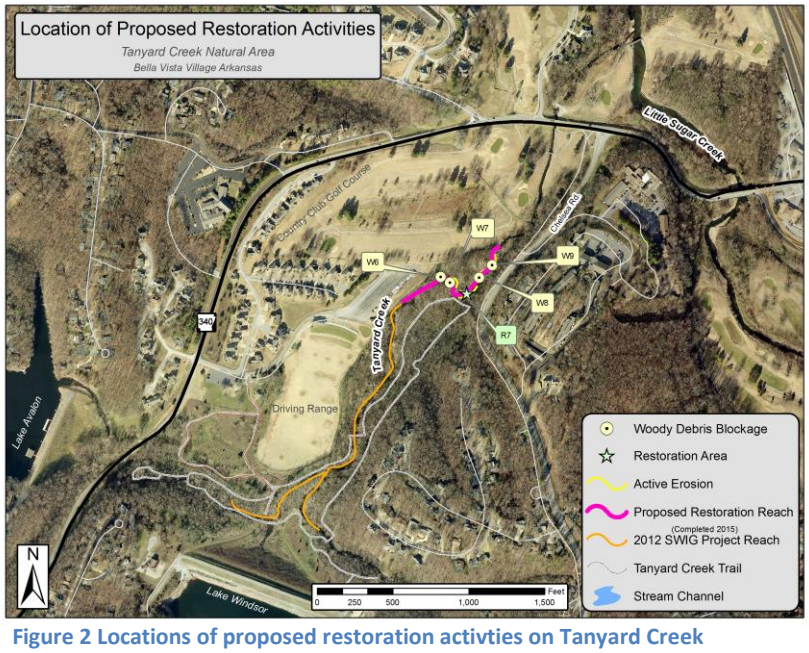

Figure 2 Locations of proposed restoration activties on Tanyard Creek

d. Approach
The Bella Vista POA Tanyard Creek plan identified several areas in need of restoration and woody debris problems for over 3,500 ft of Tanyard Creek and a major tributary (Figure 2). 2,500 feet of the plan was implemented from 2013-2015. The remaining 1,000 feet of stream channel and riparian area will be restored using natural channel design principles to address stream instability at problem area R7. Large woody debris creating streambank erosion (W6-W9) will be removed and reused to improve aquatic habitat. A new channel pattern will be designed and the channel will be reshaped to create a stable, sustainable stream channel that will improve pool, riffle, run, and glide bed features. A toe-wood design that maximizes aquatic habitat and protect streambanks will be utilized, and previous unstable channel areas will be restored into wetlands. Constructed floodplains and other riparian areas will be restored and enhanced by incorporating native grasses, wildflowers, shrubs, and trees and invasive vegetation will be removed. Biological sampling will be conducted before and after restoration activities. Outreach events will be organized with project partners and project results will be presented to the Multi-Basin Council.

e. Expected Results and Benefits

The 13 SGCNs and project area benefits are described as follows:
Found in Little Sugar Creek Basin **1) Caecidotea ancyla – isopod,** PS 31, G3G4, S1?; **2) Stygobromus ozarkensis – Ozark Cave Amphipod,** PS 27, G4, S1; **3) Nocomis asper – Redspot Chub,** PS 23, G4, S2
Found in Ozark Highlands Ecoregion *near the Little Sugar Creek Basin in groundwater systems. Tanyard Creek is located within a Karst landscape and there are cave and limestone*

bluffs throughout the area. The project will improve and protect surface water quality, which is directly tied to the groundwater quality and the habitat of these organisms:

4)Amblyopsis rosae - Ozark Cavefish, PS 34, G3, S1; **5) Cambarus aculabrum – crayfish,** PS 34, G3, S1; **6) Cambarus setosus – Britly Cave Crayfish,** PS 27, G4, S1; **7) Caecidotea steevesi – isopod,** PS 31, G3G4, S1?; **8) Caecidotea stiladactyla – isopod,** PS 31, G3G4, S1?; **9)Dendrocoelopsis Americana – cave obligate planarian,** PS 42, G2G3, S1; **10) Crosbyella roeweri – cave obligate harvestman,** PS 65, G1G2, S1; **11) Gastrocopta rogerensis – land snail,** PS 27, G3G4, S2 (endemic to AR & MO)

Found in Ozark Highlands Ecoregion near the Little Sugar Creek Basin in *small headwater pools, riffles, and spring runs. Tanyard Creek is a headwater stream and the restoration project will improve riffle/pool/run features throughout the site:*

12)Orconectes macrus – Neosho Midget Crayfish, PS 23, G4, S2
No records for Arkansas but thought to be in extreme NW AR
13)Orconectes meeki brevis – crayfish, PS 34, G4T3, S1

Additional expected results and benefits from this project are summarized as follows:

- A karst area will be improved and protected by enhancing the riparian and improving in-stream water quality. Flow from limestone ledges along Tanyard Creek is an ideal condition to support several SGCNs. The activities proposed will not only restore this area, but it will keep the stream and riparian in this karst area from further degradation.
- Water quality will be improved in Tanyard Creek and the Little Sugar Creek watershed by reducing sediment and phosphorus loads by approximately 267,000 and 32 lbs. /yr. respectively.
- The stream restoration will serve as a demonstration site in the Little Sugar Creek watershed, an area within the Ozark Highlands Ecoregion that is in need of restoration and that has the potential to support 13 SGCNs.
- The Tanyard Creek restoration provides the opportunity for local and regional organizations in both Arkansas and Missouri to 1) work together on improving the ecology of Little Sugar Creek watershed, 2) put watershed-based plans into action, 3) share information and data, and 4) strengthen partnerships between organizations and states that share environmental objectives.
- The project will provide needed data on SGCNs in the headwaters of the basin.
- Raise local citizens' awareness of SGCNs, water quality, aquatic habitat, and karst areas.
- The restoration work will be maintained for 5 years to allow for vegetation establishment.

f. Budget:

The total project cost is $235,000 with $110,000 (46.8%) federal & $125,000 (53.2%) matching funds. The project budget follows:

Category	Federal	Bella Vista POA Cash Match	In-Kind Match				Totals
			POA	WCRC	AGFC	Multi-Basin	
Personnel	$0		$5,000	$0	$5,000	$0	$10,000
Supplies	$5,000	$0	$0	$5,000	$0	$0	$10,000
Contract	$8,000	$40,000	$0	$0	$0	$0	$48,000
Construction	$97,000	$0	$55,000	$0	$0	$0	$152,000
Volunteer Time	$0	$0	$0	$10,000	$0	$5,000	$15,000
Indirect	$0	$0	$0	$0	$0	$0	$0
Totals	$110,000	$40,000	$60,000	$15,000	$5,000	$5,000	$235,000

3. Qualifications

The Watershed Conservation Resource Center (WCRC) is a non-profit organization whose mission is "to protect, conserve, and restore natural resources by utilizing the watershed approach, environmental outreach, and providing planning and technical assistance to landowners, communities, and government." The co-founders and principals of the Watershed Conservation Resource Center, Sandi J. Formica and Mathew Van Eps have extensive backgrounds and are leading regional experts in watershed management, watershed assessment, stream stability analysis, natural channel restoration design and the utilization of GIS for inventory and evaluation of natural resource condition. The staff has a broad range of experience with the watershed approach and has spent many years working throughout Arkansas on a variety of issues. The WCRC has designed and successfully implemented several stream restoration projects in NW Arkansas and is known for their careful attention to designing appropriate aquatic habitat and revegetating with native species in riparian areas and removal of invasive vegetation.

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. Ms. Formica will be the project manager. She has been the project manager of numerous 319 projects, including three successful stream restoration 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. Ms. Formica has extensive training in the area of fluvial geomorphology and stream restoration.

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 the project engineer and responsible for managing field data collection activities, data analysis, development of the natural channel design, and implementation of the design. He has 15 years of technical and practical experience utilizing the watershed approach. He has been the project engineer for numerous successfully completed studies including watershed assessments and stream restoration projects. He has extensive experience in collecting and analyzing fluvial geomorphology data for estimating streambank erosion and stream stability.

Mike Taggart of the Bella Vista Property Owners Association worked closely with the WCRC in implementing the 2012 SWG grant. The POA will again provide construction operators, heavy equipment, and labor to assist with the construction of the stream restoration project and Mike will coordinate this effort. The Bella Vista POA will organize outreach events as well.

Bill Posey of Arkansas Game & Fish Commission is one of the leading biologists in Arkansas for protecting and conserving aquatic species. He and his staff are leading experts on conducting biological assessment of streams and rivers in Arkansas. He will coordinate with Jim Wise from the ADEQ on the stream biological assessment for the project.

John Pennington is the President of the Multi-Basin Regional Water Council. They help to protect water quality in watersheds that share state boundaries in Northwest Arkansas, Southwest Missouri, Southeast Kansas, and Northeast Oklahoma. They will assist with organization of planting days and invasive species removal. They will also assist with organizing meetings to present project results to partners and other interested citizens of both Arkansas and Missouri and they will host a tour of the project for members of the Multi-Basin Council.