1. Cover Page: 2012 State Wildlife Grant Pre-Proposal

a. Title of Project:

Stream Restoration of Tanyard Creek in the Little Sugar Creek Watershed

b. Project Summary:

A 2,500 foot section of Tanyard Creek will be enhanced and restored. Unstable streambanks and excessive woody debris are compromising the aquatic and terrestrial habitat of this Karst area, and accelerated streambank erosion is contributing approximately 1,600,000 lbs/yr of sediment and 200 lbs/yr of total phosphorus to the Little Sugar Creek basin. Aquatic habit is limited from severe sedimentation which 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 area and aquatic habitat for 13 SGCNs.

c. Project Leader:

Sandi Formica, Executive Director
Watershed Conservation Resource Center
380 West Rock, Fayetteville, AR 72701
formica@watershedconservation.org, 501-352-5252

d. Project Partners:

Darrell Bowman, Lake Ecology/Fisheries Manager, **Bella Vista Village Property Owners Association (Bella Vista POA)**; DarrellB@BVVPOA.com, (479) 855-5068

Drew Holts, Executive Director, **Elk River Watershed Improvement Association (Elk River WIA),** HoltDM@missouri.edu, (417) 223-3414

Steve Filipek, Assistant Chief Special Programs, **Arkansas Game & Fish Commission (AG&FC),** sfilipek@agfc.state.ar.us, 501- 223-6369

David Casaletto, President, **Ozark Water Watch** and **Multi-Basin Regional Water Council,** dlcasaletto@gmail.com, (417) 739-4100

e. Project Budget:

Amount of SWG Funds Requested: $70,000 (37%)
Total Matching Funds Provided: $121,000 (63%)
Total Project Cost: $191,000

2. Project Statement

a. Need:

Tanyard Creek flows to the Little Sugar Creek watershed which is a major tributary of the Elk River watershed that lies in both Arkansas and Missouri (Figure 1). Unstable streambanks and excessive woody debris are compromising the aquatic and terrestrial habitat of this Karst area, and accelerated streambank erosion is contributing approximately 1,600,000 lbs/yr of sediment and 200 lbs/yr of total phosphorus for an average flow year to the Little Sugar Creek basin. This project addresses several priorities in the Arkansas Wildlife Conservation Action Plan and the 2012 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.

2) Addresses Emerging Issue under Habitats: Karst Native Terrestrial Habitat. Tanyard Creek is located in a Karst area and is filled with Karst features, such as, limestone bluffs and ledges in the stream. The project will restore and enhance 2500 stream feet of riparian area and will improve in-stream water quality.

3) Addresses Emerging Issue under Habitats: Aquatic Habitat and Water Quality. The Bella Vista POA has developed a stream management plan for Tanyard Creek to protect and improve aquatic habitat and water quality by restoring streambanks, riffles, pools, and runs and implementing ongoing stewardship to protect the site into the future. Also, Little Sugar Creek watershed is considered the primary source of sediment and phosphorus in the Elk River watershed, a Missouri 303 (d) listed stream. This project ties in well with a regional effort by both Arkansas and Missouri to work together to address issues within shared watersheds and will help to meet Elk River watershed plan elements.

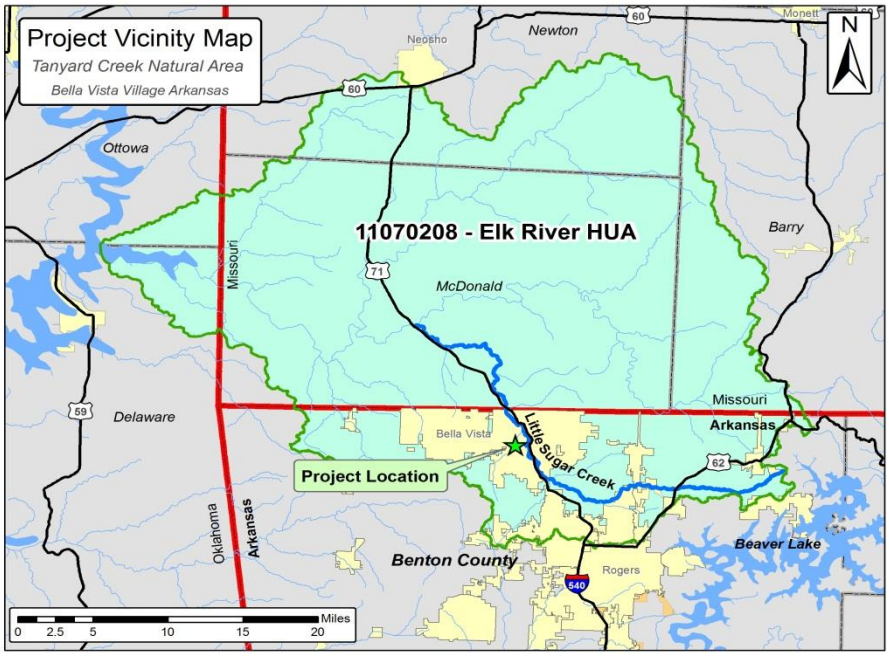

Figure 1 Project Location: Tanyard Creek flows to Little Sugar Creek.

b. Location:

Tanyard Creek is located in Benton County (Figure 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.

c. Objectives:

1) Create a 2,500 ft stream restoration demonstration site that is visible and will increase public awareness and improve habitat for 13 SGCNs listed below.
1) Restore and maintain healthy riparian areas in a Karst area that support aquatic and terrestrial wildlife and filter sediment and nutrients from stormwater run-off.
2) Improve water quality by reducing sediment and nutrient loadings.
3) Improve water quality by creating a stable stream that re-oxygenates the water column.
4) Improve the site hydrology by creating a stable channel and flood plains to reduce stream power at high flows.
5) Strengthen local and regional partnerships and provide hands-on education and outreach to citizens.

d. Approach

The Bella Vista POA stream management plan identified several areas in need of restoration and woody debris problems along 2500 ft of Tanyard Creek and a major tributary (Figure 2). Natural channel design principles will be used to address eroding streambanks and other problem areas shown as sites R1-R6. Woody debris creating streambank instability (W1-W5) will be removed and reused to improve aquatic habitat. Where appropriate, the channel will be reshaped to a dimension, pattern and profile that will create a stable, sustainable stream channel and will improve pool, riffle, run, and glide bed features. Floodplains will be constructed out of trees with root wads, to maximize aquatic habitat and protect streambanks. Grasses, shrubs, and trees native to the restoration site will be planted and native grass and wildflower seeds will be dispersed in the riparian area following construction. Biological sampling will be conducted before and after implementation of the restoration activities. A native planting and invasive plant removal day will be organized with project partners. Also, project results will be presented to local and regional groups.

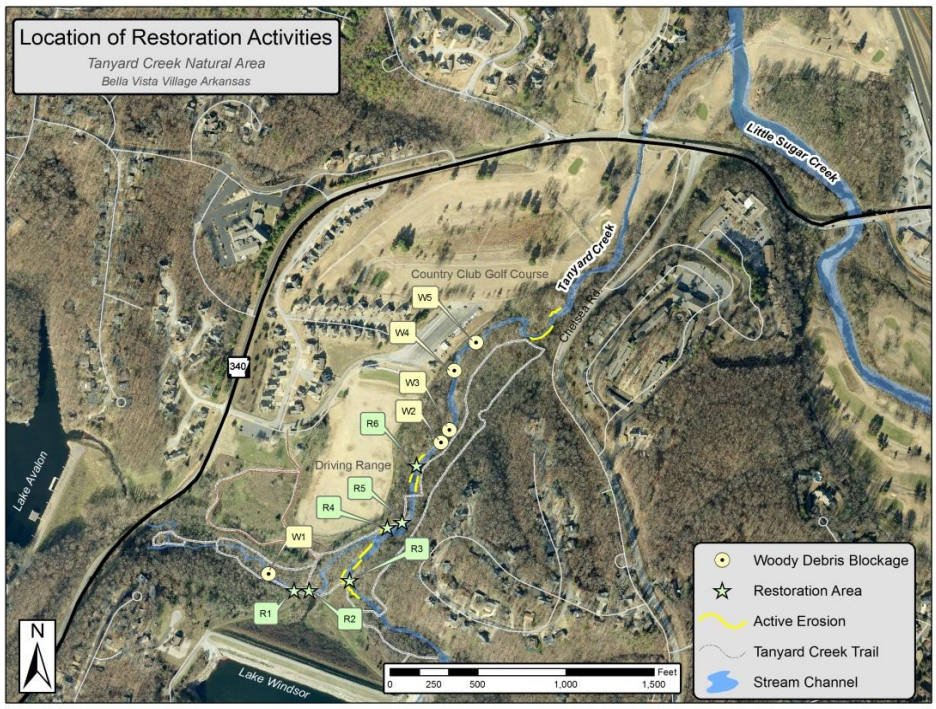

Figure 2 Identified problem areas along Tanyard Creek.

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
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)
These species are found in groundwater systems. Tanyard Creek is located within a Karst landscape and there is a 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.

Found in Ozark Highlands Ecoregion near the Little Sugar Creek Basin
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
Habitats are 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.

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 the in-stream water quality. Flow from a limestone ledge along Tanyard Creek is an ideal condition to support several SGCNs. The activities propose 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 total phosphorus loads by approximately 700 and 100 lbs/yr.
- 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 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.

f. Budget

The total project cost is $191,000 with $70,000 federal and $121,000 or 63% matching funds.

	Federal	POA Cash Match	In-Kind Match				Totals
			WCRC	POA	AGFC	Elk River	
Personnel	$0	$0	$0	$23,000	$5,000	$0	$28,000
Supplies	$4,000	$0	$0	$0	$0	$0	$4,000
Contract	$10,000	$40,000	$0	$0	$0	$0	$50,000
Construction	$56,000	$0	$0	$42,000	$0	$0	$98,000
Volunteer Time	$0	$0	$10,000	$0	$0	$1600	$10,000
Indirect	$0	$0	$0	$0	$0	$0	$0
Totals	$70,000	$40,000	$10,000	$65,000	$5,000	$1600	$191,000

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 is engaged in several stream restoration projects.

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.

Drew Holts is the Executive Director of the Elk River Watershed Improvement Association. The Association is responsible for watershed planning and implementing actions that will improve the water quality within the basin. The Association will assist with outreach and education and will coordinate meetings to present findings to both Arkansas and Missouri organizations.

Steve Filipek of Arkansas Game & Fish Commission is one of the leading biologists in Arkansas for protecting and conserving aquatic species. He has been introducing stream restoration and riparian improvement techniques to environmental professionals for over ten years and is responsible for improvements in aquatic habitat throughout the state.

David Casaletto is the President of both the Ozark Water Watch and Multi-Basin Regional Water Council. These organizations helped to protect water quality in the upper White River Basin and 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 meeting to present project results to project partners and other interested citizens of both Arkansas and Missouri.