

Land Learning Foundation • The Nature Conservancy • Midwest Waters

# SHOAL CREEK WATERSHED INITIATIVE

## Aquatic Resource Restoration and Capacity Building

Along Central and Upper Reaches of Shoal Creek, Southwest Missouri



2021 - 2024

This project is designed and managed through [Riverlaw.org](http://Riverlaw.org).  
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MidwestWaters.Org

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## **Aquatic Resource Restoration and Capacity Building Initiative for the Shoal Creek Watershed**

Land Learning Foundation (LLF), The Nature Conservancy (TNC), and MidwestWaters.Org (Midwest Waters) (“Consortium Lead Organizations”) are working to build a program in Southwest Missouri in the Shoal Creek Watershed that will restore critical aquatic habitat and other natural resources and engage local stakeholders and community members through outreach and environmental education.

### **I. Background**

#### **A. Consortium Approach**

Consortium Lead Organizations and partner organizations (“Shoal Creek Resources Consortium” or “Consortium”) have formed a diverse, multidisciplinary team of over a dozen experts and entities to deliver an integrated, sustainable aquatic habitat and natural resource program centered on riparian and wetland areas along reaches of Shoal Creek and tributaries within priority areas of central and upper Shoal Creek.

#### **B. Consortium Objectives**

The Consortium’s aquatic restoration projects will target significantly degraded riparian areas to directly address four interrelated objectives: (1) reduce erosional loss; (2) reduce nutrient run-off; (3) reduce nutrient inputs from livestock; and (4) reduce stream sediment inputs. The combined benefits will, in turn, advance a fifth priority, (5) benefit freshwater mussels, by integrating habitat reconstruction elements directly into construction planning, and by improving water quality in critical areas of the watershed. In addition to these targeted restoration projects, the Consortium will implement programs for community engagement, outdoor education, and research stimulus in collaboration with diverse local and regional partners and constituencies.

#### **C. Sustainability**

The Shoal Creek Resources Consortium will promote long-term sustainability through self-sustaining design elements and the introduction of native riparian and wetland species, and will secure conservation outcomes through a combination of direct property ownership, long-term deed restrictions, and perpetual easements. Equally important, the Consortium’s complementary community engagement, outdoor education, and research stimulus programs will promote sustainability through greater public awareness of aquatic resource benefits and challenges in the Shoal Creek Watershed, and through support for key local stakeholders as long-term resource stewards.

### **II. Initiative Description**

#### **A. Integrated Approach to Restoration and Sustainability**

The Consortium is focused not on a single facet of Shoal Creek restoration, nor an isolated outcome. Instead, our watershed strategy will integrate direct stream and wetland restoration in central and upper reaches of Shoal Creek with local stakeholder engagement, outdoor education, and research stimulus programs. This will ensure a cohesive approach to restoration and long-term conservation, including the integration of past and concurrent efforts. It will also provide resources directly to local constituencies and aquatic system experts who can engage with, replicate, and sustain the work of this project.

The Consortium team has broad experience in all aspects of in-stream, riparian, and wetland restoration – from design and engineering, through permitting and compliance, to construction, planting, and monitoring. We also

have experience in natural resource education, community engagement, capacity building, and resource policy communication, within and among diverse constituencies including all regions of Missouri.

The Consortium initiative includes two complementary and integrated elements:

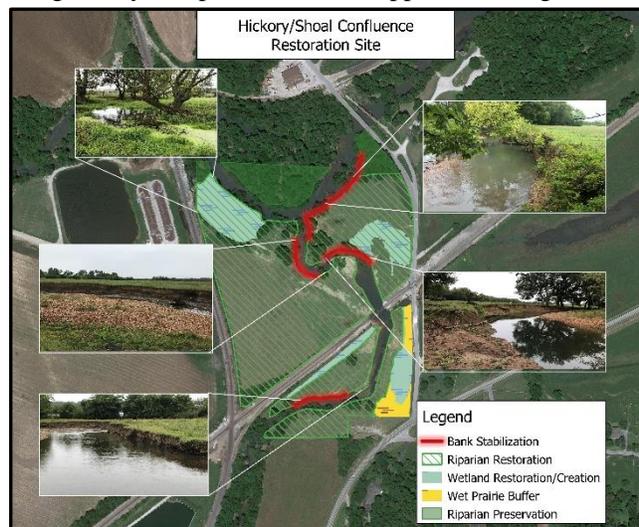
1. Direct restoration interventions along unstable and degraded streambanks
2. Community engagement, outdoor education, and research stimulus programs

Both of these elements are designed to achieve direct and lasting results. Moreover, each will be implemented in a way that is mutually reinforcing. For example, the Hickory/Shoal Confluence site, once restored, will support field research for mussel monitoring and reintroduction. It can also host graduate student studies and biology class field trips, learning opportunities for local 4-H clubs and FFA chapters, and events sponsored by community and service groups such as local stream teams. Our approach not only achieves restoration goals, but also reinforces and sustains outcomes through ongoing research and management as well as community awareness. It will also help to build an even stronger environmental ethos among primary constituencies in the watershed. Each element is described in more detail below.

### 1. Initiative Element One: Direct Restoration Interventions

The Consortium's expertise in biology and ecology, stream morphology, engineering (including bioengineering), riverine and wetland construction, and regulatory compliance, will be applied to design, engineer, and construct streambank stabilization features (both in-stream and riparian) that reduce the erosional loss of land and associated sediment inputs to streams due to unstable streambanks and nutrient run-off.

We have already secured a cornerstone site that offers an excellent opportunity for restoration and conservation at the Confluence of Hickory Creek and Shoal Creek in a critical area of the Shoal Creek Watershed. The Hickory/Shoal Confluence site is uniquely situated in an area of the floodplain that – when properly restored – may have even greater positive environmental lift because it can reduce stream velocity and filter sediment during high flow events. In addition, TNC has identified several sites on the upper reaches of Shoal Creek where landowners will be recruited to host restoration work and record long-term easements. Each is described in more detail below and in attachments that follow.



#### *a) Hickory/Shoal Confluence*

The Consortium has acquired property rights to a restoration site at the confluence Hickory Creek and Shoal Creek (see image above). The 34-acre property on the north side of Neosho, Missouri is presently a cattle operation with livestock allowed direct access to Hickory Creek. It includes approximately .25 mile along Shoal Creek, and .5 mile along both banks of Hickory Creek. It also includes approximately 4 acres of forested and emergent wetland that will be restored or enhanced.

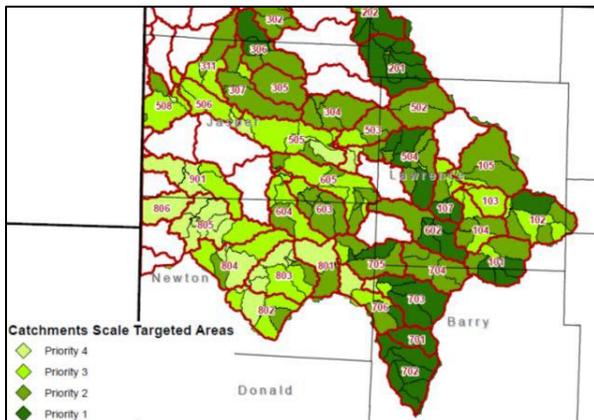
The site has high value for in-stream and riparian restoration and conservation, including cattle exclusion and engineered streambank erosion control features, along with wetland restoration and prairie features. It is also

immediately downstream from a fish passage obstruction removal project<sup>1</sup> that presents opportunities to enhance both the restoration and complementary components of this initiative.

The Consortium has developed a preliminary site restoration plan based on work it has done on other streams and rivers in watersheds throughout Missouri. Complementary programs will be implemented at the site with project funds, with a particular focus on outdoor education and community engagement. In addition, the site will be ideal as a research location for scientists wishing to have an established location at a critical juncture of the Shoal Creek system that will be set aside and protected in perpetuity under a conservation easement.

***b) Upper Shoal – Northwestern Barry County and Eastern Newton County***

Through prior and ongoing work, Lead Consortium Partner TNC has analyzed streambank and riparian



conditions and land ownership patterns along Upper Shoal Creek and headwater tributaries. These sub-watersheds were identified by the ad hoc Shoal Creek Watershed Improvement Group in the December 2012 *Upper Shoal Creek Watershed Non-Point Source (NPS) Watershed Management Plan* as priorities for restoration work and for the implementation of agricultural conservation and Best Management Practices. They were also identified as priorities in the *Upper Shoal Creek 2016 Sampling Summary Report*, which concluded that “this portion of Shoal Creek could benefit greatly from conservation practices including riparian corridor establishment and livestock exclusion from the stream.”<sup>2</sup>

TNC has identified numerous specific properties in four high-priority HUC-12 sub-watersheds of the system. Reducing sediment and nutrient inputs to streams caused by stormwater runoff and streambank erosion at these properties would have a substantial positive benefit to the water quality of Shoal Creek. The figure above shows the catchments of the entire Spring River basin deemed to have the greatest and least impairments from sediments and nutrients.<sup>3</sup> Upper Shoal Creek Watershed is dominated by high priority catchments for sediment and nutrient reduction efforts.

Establishing a riparian corridor protection program will be accomplished through a combination of riparian enhancement, restoration, and streambank stabilization projects, in partnership with private landowners who are willing to enter into conservation easement agreements. Additional cost-share incentives from state and federal government conservation partners will be offered to participating streamside landowners, such as native grass and forb restoration and establishment, alternative watering, cattle exclusion fencing, spring protection, and woodland restoration.

<sup>1</sup> The Consortium site is approximately 200 yards downstream from a fish passage obstruction (Neosho LimeKiln Dam Fish Passage Project) that has been identified and funded as a priority for fish passage through US Fish and Wildlife Service, and thus leverages the work on that project.

<sup>2</sup> Dave Woods, Fisheries Management Biologist, Missouri Dept. of Conservation Fisheries Division-Southwest Region (2018).

<sup>3</sup>Source: MDNR’s 2014 Spring River watershed management plan.

Riparian corridor protection requires corridor restoration and long-term deed restrictions or conservation easements. Riparian buffers of 50-100 feet along Upper Shoal Creek and its tributaries will be established to filter pollutants before entering streams from runoff, to control erosion, and to improve terrestrial and aquatic habitats for the long term. Consortium work will include several nature-based streambank stabilization projects incorporating native trees, shrubs, and grass plantings adjacent to streams and extending outward for 50-100 feet. To the extent possible, this initiative will follow NRCS and SWCD specifications for streambank stabilization and riparian corridor establishment practices, such as Stream Protection (WQ10) Riparian Forest Buffer (N391).

Deed restrictions or conservation easements will be required of participating landowners to assure conservation priorities are met for at least 35 years. Our preference is to obtain donated easements, which may provide private landowners with some tax advantages; however, we have budgeted to purchase restrictions or easements if necessary to encourage landowner to participation.

**c) Additional Site Identification**

Consortium Lead Partners will continue to search for prospective streambank stabilization/conservation and riparian buffer sites between upper Shoal and the Hickory/Shoal confluence, and for a distance below the confluence. This will build a database for future sites, and to identify riparian landowners and stakeholders who might be engaged through the complementary programs component of this project.

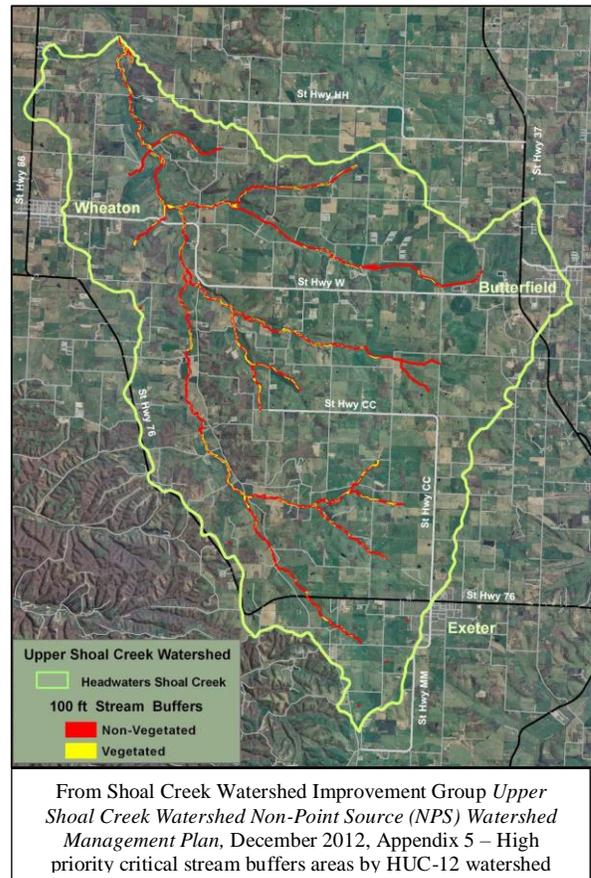
**2. Initiative Element Two: Complementary Outreach and Education Programs**

The Consortium believes that direct restoration interventions are necessary – indeed critical – to address the aquatic resource challenges in the Shoal Creek Watershed. But they are not sufficient.

For this reason, the Consortium will complement the direct restoration work it has proposed, with complementary programs to engage Shoal Creek Watershed constituencies and build awareness of watershed, wetland, and ecosystem values through local and regional partners. The program is designed to encourage youth groups, students, and other key local stakeholders to participate in programs that teach about the importance of aquatic resources and the relationship of those resources to the broader community.

Through community engagement, outdoor education, and research stimulus, the impact of our work will extend well beyond the three-year project timeline and engage a far greater population than those directly involved with implementation. These programs will also create an expansive and positive narrative for aquatic conservation work allowing the larger effort to be understood as a resource legacy for future generations.

The Consortium will take advantage of its cornerstone project site at the Hickory/Shoal Confluence to build out public access and passive education elements as well as a shelter that can be used as an outdoor classroom and research field station. The site will support all three of the following programs.



### ***a) Community Engagement***

A key aspect of the project will be to reinforce the work of local water resource experts and advocates through didactic materials, workshops (including virtual workshops), social media, and a web presence that highlights the value of aquatic resources and the importance of conservation and protection.

We have already reached out to many of these stakeholders and will work together with interested partner to design and host a range of activities, such as:

- Field trips for school and community groups
- Workshops on aquatic resource concerns
- Training on citizen water quality testing protocols
- Integrating citizen water quality monitoring into element one evaluation and reporting
- Float trips that connect school and community groups more directly to Shoal Creek
- Web site devoted to Shoal Creek and broader aquatic resources restoration goals
- Social media support for local stakeholders interested in aquatic conservation priorities
- Traditional media outreach, through radio, television, and print sources to offer story ideas and content related to Shoal Creek, its history, and natural history

Of course, we would not impose formats and ideas on local counterparts, but instead offer ideas and alternatives and then support *their* work through this project. As part of this support, the Consortium will seek funding to provide water quality testing kits and training to interested local stakeholders such as high school science teachers, stream teams, agricultural education groups, master naturalists, and others.

One key to success will be to promote interactions among local constituencies interested in conservation, such as Missouri Stream Teams, with constituencies traditionally associated with agricultural interests, such as 4-H clubs and FFA chapters. Facilitating and reinforcing relationships among participants with diverse experiences and perspectives is important to advancing practical conservation goals in the long term. Consortium partners have deep experience in designing and implementing this sort of “big tent” approach to engagement.

Staffing for these activities will include experts at Land Learning Foundation, The Nature Conservancy, and Midwest Waters who collectively have decades of training and experience in outreach and community engagement. It will also include collaborating experts who wish to participate in our work.

In the upper Shoal, the Consortium has taken note of the December 2012 *Upper Shoal Creek Watershed Non-Point Source (NPS) Watershed Management Plan* prepared by the ad hoc Shoal Creek Watershed Improvement Group which identifies failed septic systems as a significant contributor to water quality impairment. In order to address this concern, we will work with local partners to offer a septic evaluation program in relevant areas of the watershed through Consortium partner On-Site Soils.

### ***b) Outdoor Education***

Outdoor education will build upon the cornerstone location of the Hickory/Shoal Creek Confluence restoration site. As noted above, programs could begin there immediately to study and discuss baseline site conditions. While restoration construction and planting activities are ongoing, additional programs will review and examine aquatic restoration methodologies, consistent with safety considerations. Construction activities themselves may be a useful case study in vocational and technical education courses, and we will use the site – even as a work in progress – to demonstrate restoration construction techniques. As native plantings occur, site activities will present another practical opportunity for field study as well as volunteer efforts with local schools and agricultural groups.

Site design will integrate public access and passive learning components, including boardwalks through and across wetland areas and informational signage with didactic material relevant to aquatic resources throughout the landscape. The Consortium will draw on extensive on-team experience with pedagogy that uses public conservation areas as an immersive learning context. We will also work closely with local experts and our expertise to offer “train the trainer” workshops that expand the potential for long-term impact. In addition, we will engage local and regional resources in graphic design and communication as part of our aquatic resource programs, in particular the outdoor education element where inspiration might be drawn; teaching resource conservation alongside traditional design, graphic arts, and communication methods and introducing another broad and active constituency to the importance of aquatic resource conservation.<sup>4</sup>

Once the Hickory/Shoal Creek Confluence site is complete, it can host ongoing programs with local school groups and conservation organizations beyond the three-year life of the program. The site will be protected by a conservation easement in perpetuity, and Land Learning Foundation will monitor the site with funds from its long-term stewardship account. The Consortium will also endeavor to find partners willing and able to continue both upkeep and programming for the long term and will work with them to secure necessary resources.

### *c) Research Stimulus*

Consortium partners recognize that research related to aquatic resources is critical to a better understanding of aquatic organisms, resource values, and conservation methods as well as a deeper scientific understanding of the dynamics within aquatic ecosystems. We have thus proposed to integrate funds into our project to stimulate and support these research efforts.

We plan to utilize the restoration site for research opportunities, and apply that research to inform our interventions as well as future restoration efforts. At the same time, we will leverage the research and expertise of those conducting the work, to strengthen our community engagement and outdoor education efforts. What better way, for example, to strengthen the outcomes of an aquatic resources workshop than to hold it at a stream confluence site designed to protect those very resources – with presentations from scientists actively using the site to advance their work.

- Consortium Research Activities. The Consortium has expertise in biology and ecology, and will engage those experts in a series of monitoring activities to inform adaptive management at the site as well as future restoration efforts. Water quality monitoring will be conducted for this project with an emphasis on citizen science and building the capacity of local stakeholders to conduct monitoring. LLF will collect baseline water quality data at the Hickory/Shoal Creek Confluence restoration site for the following parameters: Turbidity, total nitrogen, total phosphorus, dissolved oxygen, total dissolved solids, and PH. These parameters will be collected annually for five years along with the other monitoring efforts above. Our water quality monitoring program will also engage local partners and stakeholders, and thus support both community engagement and outdoor education elements of our work. Monitoring fish and aquatic invertebrates can be a useful tool to evaluate the response of aquatic communities to water quality changes associated with restoration projects. None of the proposed sites are large enough to properly evaluate any changes in the fish community as a result of the restoration actions, but local changes in aquatic invertebrates can be seen if projects are successful in reducing sedimentation and stabilizing stream channels. Consortium Lead LLF has implemented a fish monitoring program at some of its mitigation sites. This will be duplicated for the Hickory/Shoal

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<sup>4</sup> At the December 2019 graphic design and print fair Cherokee Street in St. Louis, <https://www.cherokeeprintbazaar.com/> (“More than 100 artists fill Cherokee Street’s storefronts”) dozens of designs were devoted to social and cultural problems – urging increased awareness and engagement. Art and graphic design addressed concerns such as social justice, improved race relations, reproductive rights, LGBTQ concerns, and animal adoption, but not a single graphic artist or print shop displayed work related to environmental issues or natural resource conservation. While this anecdotal observation does not evidence the definitive socio-cultural concerns of the larger Missouri art and design community, it does suggest the importance of raising awareness outside traditional advocacy groups and connecting artists, designers, and “influencers” to conservation priorities.

Confluence Site, and other sites if site length and conditions allow. LLF will seek to use the fish monitoring program as an educational opportunity, inviting local stakeholders to participate or watch, learning about the species that inhabit the waters and their water quality and habitat requirements.

- Collaboration with Missouri State University. The Consortium is pleased to collaborate with scientists at Missouri State University to support research identified by faculty as a priority.
  - Collaboration with Neosho National Fish Hatchery, US Fish and Wildlife Service. The Consortium is also grateful to work with mussel propagation efforts to study and reintroduce the Neosho Mucket (*Lampsilis rafinesqueana*) there.
3. Initiative Impact Monitoring and Evaluation

Monitoring and evaluation is integrated into each aspect of Elements One and Two. With respect to the restoration activities of Element One, it is a fundamental feature of restoration planning to include regular monitoring and maintenance to assure that constructed features, such as stream barbs and stone toe protection, perform as designed and that native plantings achieve a minimum survival rate (80% for trees) in the first five years to assure that site plan standards have been met.

With respect to Element Two, community engagement and outdoor education activities will incorporate participant evaluations to gauge effectiveness and inform future programming. Participants will be invited to critique events and presentations, and where possible measurement tools will be used to assess how much of presented material was retained. This may include, for example, testing for school groups that participate as well as less formal surveys for other participants.

### **III. Initiative Goals and Benefits**

#### **A. Element One Goal and Benefits**

The goal of initiative Element One is to directly advance the objectives of the Springfield Plateau Regional Restoration Plan and Environmental Assessment (SPRRP)<sup>5</sup> through primary restoration at the Hickory/Shoal Confluence Site and at 3-4 Upper Shoal Creek sites.<sup>6</sup> In each case, highly degraded streambanks and riparian zones within agricultural fields will be targeted for in-stream, riparian, and – where relevant – wetland restoration.

Native plants will be introduced and managed for a five-year period (two years beyond the three-year project thanks to Consortium Member LLF’s long-term stewardship fund) and conservation easements will be recorded and monitored to assure long-term protection of the restored resources.

This will directly benefit wildlife present at the sites and downstream through the restoration of habitat including habitat for mussels and obligate species of fish that play an important part in mussel life cycles. It will also improve water quality through the reduction of sedimentation caused by unstable banks and upland runoff.

The Hickory/Shoal Confluence Site offers the unique benefit of lying at the point where Hickory Creek enters Shoal Creek, and includes about half-mile of meander leading to Shoal Creek. By restoring this reach through

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<sup>5</sup> In May 2012, FWS and MDNR published the Springfield Plateau Regional Restoration Plan and Environmental Assessment (SPRRP) “to assist in carrying out their natural resource trust authorities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); the Oil Pollution Act of 1990 (OPA), and the Clean Water Act (CWA).” The plan can be found at <https://www.fws.gov/Midwest/es/ec/nrda/MoTriState/index.html>.

<sup>6</sup> Primary restoration is defined as “any action taken to return an injured natural resource and its services to its baseline condition.” Section 3.3 of the SPRRP.

in-stream and riparian features, and the addition of wetland features, our work will provide a filtering effect and capture some of the nutrient load otherwise entering Shoal Creek.

Restoration on the Upper Shoal Creek sites, and the establishment of riparian corridors along them, will reduce sediment and nutrient loading in one of the most heavily affected parts of the watershed, improving water quality and creating substantial benefits downstream for fish, mussels, and other aquatic organisms. The primary goal of our work at the upper Shoal sites is to establish riparian corridor enhancement and protection to reduce sediment and nutrient inputs to the Shoal Creek system. A separate but related 319-grant project has enabled TNC to identify numerous streamside landowners and to engage these willing landowners in preliminary streambank and riparian enhancement and restoration planning.

Support for expanding existing efforts will allow building on our positive relationships with streamside landowners and other key stakeholders in Upper Shoal Creek and help accelerate the success of this component of the project benefiting the entire Shoal Creek system.

The December 2012 *Upper Shoal Creek Watershed Non-Point Source (NPS) Watershed Management Plan* prepared by the ad hoc Shoal Creek Watershed Improvement Group specifically targeted the reaches identified by the Consortium for restoration work as areas that would benefit from agricultural conservation and Best Management Practices, including:

- Vegetative Filter Strips
- Field Borders
- Riparian Forest Buffers
- Stream Protection - Livestock Exclusion; and
- Alternative Water Sources

The Consortium will address each of these practices through its restoration work, as well as the community engagement and education work detailed as part of initiative Element Two.

In short, Element One will provide five direct benefits:

- 1) Reduce erosional loss;
- 2) Reduce nutrient run-off;
- 3) Reduce nutrient inputs from livestock; and
- 4) Reduce stream sediment inputs
- 5) Benefit freshwater mussels

## **B. Element Two Goals and Benefits**

As discussed above, the Consortium will reinforce instream and riparian work and help assure long-term sustainability through complementary programs that promote community engagement in support of aquatic conservation work, create spaces and opportunities for outdoor education, and support research relating to aquatic resource concerns, including mussel research and reintroduction.

### 1. Community Engagement

The goal of this work is to engage community leaders and emerging leaders, including local officials and others involved in resource planning and development, and increase their awareness of aquatic resource values, watershed concerns, and management frameworks. The Consortium will support local stakeholders who are already engaged in aquatic resource conservation – groups such as local stream teams, science teachers, and

naturalists – and promote the creation of broader networks of knowledge through interactions with diverse constituencies, such as local 4-H clubs and FFA chapters, to promote a greater community awareness of conservation values.

The long-term benefit of these programs will be greater knowledge of the mechanics and importance of aquatic ecosystems, and greater public interest in protecting those ecosystem, strengthening the culture of conservation within the community.

## 2. Outdoor Education

Programs will be adapted depending on the audience and setting and adjusted based on feedback from participants. Consortium partners will work with local and regional educational partners to design and deliver workshops that highlight (a) basic hydrological and ecological functions of wetlands; (b) approaches to conservation; (c) policy foundations of watershed health; and (d) best management practices and other obligations as stewards of the watershed.

Key components of each program will be to deliver specific knowledge and data to participants, to encourage them to identify aquatic ecosystem and watershed issues in which they have an interest, and to facilitate greater community-driven engagement on those issues. This will encourage informed and engaged environmental citizens, who can more meaningfully participate in the long-term conservation of aquatic resources in the Shoal Creek Watershed.

The Consortium, along with its partners will prepare training materials covering workshop topics and providing information regarding local, state, and national agencies responsible for wetland conservation, and highlighting environmental groups that work on wetland issues. The Consortium will encourage its partners to remain connected with participants and build networks that can reinforce learning and support continuing efforts in the watershed.

By integrating opportunities for direct learning with broader awareness of ecosystem and watershed values into the workshop structure, the project will also yield the benefit of engaging constituencies on conservation issues that are salient for them. Introducing key constituencies to the importance of aquatic systems and watersheds, and highlighting the threats to systems posed by unsound management practices, the workshops will promote basic “watershed literacy.” The workshops will also introduce economic concepts such as ecosystem services and support continued community networking and action on aquatic resource issues identified by local constituencies.

## 3. Research Stimulus

The goal of this program is to directly support scientific research regarding critical aquatic resources, and help advance the reintroduction of an important species – the Neosho Mucket (*Lampsilis rafinesqueana*) through direct funding and by providing the Hickory/Shoal Confluence site as a research field station. As noted above, we will also expose the broader community to the importance of, and methodologies used in, this research by integrating our research partners into community engagement and outdoor education.

## 4. Measuring Success

With respect to Element One, success will be measured by the completion of our work at the Confluence site and the Upper Shoal Creek sites in a manner that assures long-term sustainability of the constructed in-stream and wetland features and survivability of adjacent riparian plantings. LLF and TNC will use established benchmarks based on experience with other restoration projects to confirm that the work is complete, and that it will last.

With respect to Element Two, long-term success will be local constituencies that are more aware of aquatic resource conservation concerns, more effectively participating in dialog regarding conservation alternatives and policies, and more readily engaging as stewards of these vital resources throughout the Shoal Creek Watershed. Because these outcomes cannot be directly measured in the course of a three-year project cycle, we will measure success in creating the necessary preconditions to this long-term goal. We will know that we are successful when we have:

- Increased awareness of aquatic resource conservation concerns, alternatives, and practices among participants in our engagement and education activities;
- Motivated participants to monitor and take action regarding aquatic resource concerns, and
- Strengthened local and regional networks for conservation and stewardship.

To measure this outcome, we will ask all key partners and collaborators, including local partners, to report on their interactions during and following project events, to describe any new or additional networking they have done regarding aquatic resource conservation, and to assess the potential for future collaboration or coordination among project partners and others.

This project is designed to be executed in a collaborative manner with partner organizations – most importantly organizations with a local and regional reach and local partners in the counties where the work will occur. Our project budget includes funds for partner travel expenses as well as funds to pay for partner time in contributing to key aspects of the work, such as didactic materials and presentations. For this reason, another measure of success will be the work product that is produced and disseminated through engagement and education activities.

#### **IV. Consortium Participants**

##### **A. Lead Organizations**

The Consortium has three co-lead organizations: **Land Learning Foundation (LLF)**, **The Nature Conservancy (TNC)**, and **MidwestWaters.Org (Midwest Waters)**. Robert Stout for MidwestWaters.Org, Drew Holt for The Nature Conservancy, and Eric Dannenmaier for Midwest Waters and Land Learning Foundation. Eric will manage the initiative, and can be reached at 701 Crown Industrial Ct., Suite D St. Louis, MO 63005, 314-930-9144, or [edan@riverlaw.org](mailto:edan@riverlaw.org).

##### **B. The Shoal Creek Consortium**

Consortium partners are listed below and a description of capabilities is provided at Section VII.

- [A Civil Group](#) (surveyors specializing in riparian and riverine delineation)
- [Land Learning Foundation](#) (nonprofit conservation land trust and youth education)
- [Midwest Streams, Inc.](#) (engineering specialized in stream morphology and restoration)
- [MidwestWaters.Org](#) (nonprofit outreach, dialog, and policy support for watershed health)
- [Mitico, LLC](#) (streambank stabilization and restoration design and land acquisition)
- [On-Site Soils](#) (soil testing; wetland delineation; cultural resource evaluation)
- [The Nature Conservancy](#) (broad expertise in riparian conservation and capacity building)
- [Wildscape Environmental Services](#) (streambank stabilization construction)

### **C. Continuing Engagement**

The Consortium is committed to maximizing local and regional input, collaboration, and participation – in particular with respect to Project Element Two (see Section III (A) (2) below). To that end, as this initiative is pending and thereafter, Consortium partners will be inviting participation and collaboration by key local and regional actors and constituencies, including:

- 4-H clubs in Barry County (three active clubs)
- 4-H clubs in Newton County (nine active clubs)
- Chert Glades Master Naturalists
- City of Neosho Parks Department and Development Services/Planning
- Conservation Federation of Missouri, Conservation Leadership Corps
- County Health Departments from Newton and Barry County
- FFA East Newton (MO0086)
- FFA Neosho (MO0243)
- Harry S Truman Coordinating Council, Joplin, Missouri
- Hill and Hollow Master Gardeners
- Missouri Department of Conservation Private Lands Division and Fisheries Division
- Missouri DNR, Soil and Water Conservation Program, Newton County and Barry County
- Missouri State University: Dr. M. Christopher Barnhart, Distinguished Professor of Biology and Dr. Debra S. Finn, Assistant Professor of Biology
- Neosho National Fish Hatchery, US Fish and Wildlife Service
- Missouri Stream Team Watershed Coalition (Stream Teams United)
- Stream Teams:
  - Neosho JROTC Stream Team 1150 (Shoal Creek: Cherry Corner Access to Limekiln)
  - Other local Stream Teams in the Shoal Creek Watershed will also participate
- University of Missouri Extension Service: Barry County
- University of Missouri Extension: Newton County, County Engagement Nutrition and Health Education
- University of Missouri Extension: State Coordinator, Extension Water Quality
- US Fish and Wildlife Service, Partners for Fish and Wildlife Program, Columbia, Missouri

### **V. Experience and Capabilities**

#### **A. Consortium Lead Partners**

##### **1. The Nature Conservancy**

Founded at its grassroots in the United States in 1951, The Nature Conservancy has grown to become one of the most effective and wide-reaching environmental organizations in the world. Thanks to more than a million members and the dedicated efforts of its diverse staff and more than 400 scientists, TNC advances conservation in 79 countries and territories across six continents. In Missouri, TNC has worked to conserve the lands and waters that make the state unique and beautiful, protecting over 150,000 acres of riparian and upland property.

TNC's staff on this initiative has over 30 years' combined experience in direct implementation and contracting of assessment, design, and implementation of stream restoration including streambank stabilization using NCD and bioengineering practices. Its knowledge and experience in this area includes implementation of state-of-the-art restoration techniques that – while increasingly common nationwide – are rare in the State of Missouri. Notable projects include two dam removal and full stream re-channeling/rehabilitation in the southeastern US<sup>7</sup> and streambank stabilization for protection of critical habitat of federally listed fish and mussels from excessive sedimentation.<sup>8</sup> TNC has also completed an NCD-based technical restoration design for restoring Elm Spring, a historically channelized spring and spring branch in the Gasconade River Basin, MO, improving habitat for two state Species of Special Concern. This project was among the first known full-stream restoration using NCD and bioengineering techniques ever completed in Missouri. Since then, TNC has successfully completed numerous such projects, including along the Huzzah, Kiefer Creek, and lower Elk River in southwest Missouri.

TNC has extensive capacity-building experience with private landowners and other key stakeholders to secure conservation outcomes, along with community education, outreach, and assistance to secure public and private incentives for management. Specific to the Elk River and Shoal Creek systems, TNC staff have directly engaged key local stakeholders in community-based watershed planning and water quality improvement projects for more than a decade in the Shoal Creek and neighboring watersheds.

Additional examples include a two-year project funded by the U.S. Forest Service State and Private Forestry grant program to conduct landowner outreach, education, and activities to secure conservation outcomes and promote and deploy available support programs and resources among landowners in the Current River watershed within the SEMO. From 2009-2013, TNC conducted intensive private landowner outreach and education to secure participation in state and federal conservation support and incentive programs in the Grand River Grasslands, a 70,000 acre grassland conservation landscape spanning northwestern Missouri and southwestern Iowa, through funding from the Doris Duke Foundation, Missouri Department of Conservation, and the Wildlife Conservation Society. Additionally, TNC has a long history of working on an individual basis with private landowners in key priority landscapes throughout the state (including the SEMO) to facilitate enrollment in conservation programs. As a landowner of 34 sites across the state, TNC has also been involved as a participant in a variety of public programs, including Conservation Reserve Program, Wetland Reserve Program, Partners for Fish and Wildlife, and others for over 50 years.

TNC's project manager for the Initiative is **Drew Holt**. Drew has 30 years' experience in environmental resource management in the Ozarks of southwest Missouri and northwest Arkansas. Since 2015, Drew has led The Nature Conservancy's Western Ozark Waters Initiative for the Elk and Spring River systems where he works with farmers & ranchers, canoe & camp operators, other local and regional stakeholders, and state & federal agency conservation partners to find the best ways to keep the unique rivers and streams of the western Ozarks healthy. For fifteen years, Drew has worked with similar constituencies in the Elk River and Shoal Creek Watersheds to improve stream health through MU Extension.

## 2. Land Learning Foundation

LLF is a youth outdoor education and land trust with an established and successful history of restoring, enhancing, preserving and managing more than 8,000 acres of natural resources. The efforts of LLF span more than a decade and include wetland restoration throughout Missouri. Realizing the vital importance of wetlands to many of Missouri's wildlife and plant species, LLF founders began restoring wetland ecosystems in the 1990's. They are restoring more than 8,000 acres of wetlands along the Missouri, Chariton, and Grand Rivers and now use those lands as a part of LLF's effort to educate adults and youth about the important functions and values of wetlands and riparian (along the banks of rivers and streams) ecosystems. LLF projects and programs

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<sup>7</sup> Kelley VII Branch and Puddin Head Lake, see <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/explore/restoring-kelley-branch-and-puddin-head.xml>

<sup>8</sup> <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/howwework/florida-for-love-of-sturgeon.xml>.

involve students, educators, youth groups, and the general public in the restoration and preservation of local wetlands and riparian areas. LLF believes that their efforts to involve and educate people will ultimately lead to a more informed public that will be able to make knowledgeable decisions concerning local natural resources.

Since 2015, LLF has operated an In-Lieu Fee mitigation program in Missouri, providing in-stream, riparian, and wetland restoration and conservation under the oversight and direction of the US Army Corps of Engineers and with oversight from an Interagency Review Team comprised of representatives of US Environmental Protection Agency, US Fish and Wildlife Service, the Missouri Department of Natural Resources, and the Missouri Department of Conservation.

LLF's Executive Director, **Scott Martin**, has substantial experience in both the strategic and technical aspects of stream and wetland conservation and preservations work. Scott has spent much of the past eight years engaged in managing and implementing successful projects throughout multiple watersheds in northern, central, and eastern Missouri. He personally oversees all phases of streambank and wetland restoration construction, both directing on-site work and operating some of the machinery that is needed to accomplish stabilization and preservation work.

LLF's Assistant Director, **Katie Wiesehan**, is a Summa Cum Laude graduate of Lindenwood University with a B.S. in Biology, where her academic work was recognized on the Dean's List every semester, and where she received the Environmental Biology award, and was a member of the University's Honors Society and Honors College as well as the Alpha Chi national Honor Society. She is currently pursuing a Master's in Biology at Southern Illinois University where her thesis involves conducting a population mark-recapture study of the state-threatened Illinois Chorus Frog (*Pseudacris illinoensis*) using Passive Integrated Transponder (PIT) tags. Katie has presented her work at the Esri User Conference, at the Lindenwood University Student Research Conference, the Missouri Academy of Sciences, and the Conservation Leadership Corps. She has been working with The Land Learning Foundation for over two years and has a passion for the outdoors, field biology, and learning.

Lead biologist **Zach Morris** holds a BS in Wildlife Biology from Missouri State University and a master's degree in Natural Resource Science and Management from the University of Missouri. Zach's background in aquatic conservation includes agency, university, and non-profit projects focused on management, scientific research, and advocacy. As lead biologist, Zach is responsible for mitigation planning and coordinating implementation and management of biological and habitat components of Mitico's projects. Zach works closely with Conservation Counsel Eric Dannenmaier to navigate the complex regulatory framework of 404 Clean Water Act (CWA) Mitigation and other CWA programs. He also works closely with conservation partners across Missouri to expand the reach and ecological lift of mitigation and other restoration projects. This includes a focus on native, wildlife friendly vegetation, sustainable restoration practices, and developing management plans that will best enhance the aquatic resources at each project site.

### 3. MidwestWaters.Org

MidwestWaters.Org is a recently-formed nonprofit that seeks to foster dialog among key constituencies in Missouri and surrounding states in a way that will help to frame & implement sustainable watershed-based conservation strategies. The Initiative is committed to cooperate with conservation agencies, nonprofit & business organizations, and rural & agricultural communities and engage them as water resource stewards who can better protect water resources.

Founding Director and Board Chair **Robert Stout** spent more than four decades working with state government in Missouri and counterparts in surrounding states as Chief of Policy for the Missouri Department of Natural Resources negotiating partnerships with federal, state, and local and nonprofit partners on major studies in the Meramec and Lower Grand watersheds. His diverse responsibilities include representing Missouri on the Upper Mississippi River Basin Association, serving as chair in 2016, and coordinating NEPA

consultation for a variety of major projects. Based on his work on watershed issues, he has adopted a collaborative approach to implement watershed-scale strategies engaging stakeholders and public and non-profit resources.

Conservation Counsel **Dr. Eric Dannenmaier** has two over decades of practical and leadership experience in natural resources and water law, regulation, and policy - having represented nonprofit organizations, governments, and businesses on a wide range of conservation policy and environmental compliance concerns in the US and overseas. He worked from the Washington, DC office of St. Louis-based Bryan, Cave LLP before directing the United States Agency for International Development's Environmental Law Program, and later the Tulane Institute for Environmental Law and Policy (now the Tulane Institute for Water Law and Policy) in New Orleans. Eric was also a tenured law professor at Indiana University McKinney School of Law, where he taught from 2007-2016 specializing in Constitutional and Property Law, and founding the Graduate Program in Natural Resources Law. Eric regularly advises Land Learning Foundation and other clients on regulatory and compliance aspects of in-stream, riparian, and wetland restoration projects, conservation easements, and landowner relations. He is Counsel for MidwestWaters, and directs the nonprofit collaborative RiverLaw.Org; supporting resource conservation organizations and agencies in compliance strategy and policy analysis, and facilitating stakeholder dialog and engagement.

Environmental Education Coordinator and Biologist **Stephanie Fenzl**, has a BS in Wildlife Biology and Certificate in Environmental Education from Missouri State University. She has worked to conserve wildlife in different settings through scientific research and public education. Stephanie is a team biologist and landowner liaison, and she supports landowner outreach as well as planning and implementation of riverine and wetland habitat restoration on project sites.

Research Fellow **Stephanie Grathwohl** is a law student and Dean's Scholar at St. Louis University School of Law with a background in agricultural production and conservation, conflict management, and complex inter-jurisdictional governance. Stephanie has worked with Great Rivers Environmental Law Center on a range of legal and policy issues; advancing solutions to the impact of land use practices, and analyzing environmental regulatory developments. She has served as a research assistant for Professor Karen Sanner, interpreting relevant legal precedent in E-discovery, and reviewing and commenting on Legal Research and Writing course materials. Stephanie is focused on the dynamics of local participation and the integration of federal and state regulatory mandates into aquatic ecosystem restoration and management.