



WATERSHED CONSERVATION
RESOURCE CENTER

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Restoration of the West Fork White River near Fayetteville, AR. Survey, design, construction oversight, native vegetation establishment and maintenance by Watershed Conservation Resource Center

**Professional Services for
Engineering, Architectural Services
including Consulting, Planning, Design
& Stream/River Restoration
2024**

Statement of Qualifications

**Watershed Conservation
Resource Center**
Non-Profit 501 (c)(3)

Sandi Formica
Executive Director

Matthew Van Eps, P.E.
Associate Director



Before:
Rock Creek-
West Fork,
Arkansas



2 Years after
completion:
Rock Creek,
West Fork,
Arkansas



WATERSHED CONSERVATION
RESOURCE CENTER

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Overview

The Watershed Conservation Resource Center (WCRC), a 501(c)(3) non-profit organization, recognizes that safeguarding our nation's natural resources requires initiative from capable personnel, strategic funding mechanisms, and broad community support. Scientific information and effective communication of environmental data are necessary for protection and conservation of our rivers, lakes, wetlands, forest and drinking water.

With this in mind, Sandi J. Formica and Matthew Van Eps, P.E. founded the WCRC in 2004 to provide technical support to communities to address watershed and river challenges. With over 80+ years of combined staff experience, the WCRC are experts in watershed management, planning, design, stream and ecological restoration projects.

Establishing strong partnerships, the WCRC has conducted a variety of watershed-based assessments focused on addressing sediment and nutrients sources from river instability, off-road vehicles, urbanization, and agriculture.

The WCRC has successfully completed over 30 projects that include over 50,000 feet of restoration and stabilization, ranging from small urban streams to large rivers throughout Northwest Arkansas (NWA).

Understanding the natural tendencies of Ozark streams and utilizing natural materials, like trees and rocks, that would otherwise be disposed of, they incorporate these materials into their projects. This prevents, tens of thousands of tons of sediment and pounds of phosphorus from entering streams and rivers annually, protecting Beaver Lake and the Illinois River.

Beyond the Arkansas state borders, the WCRC has worked in other bordering states and as far as the Jemez River in New Mexico.

Our Mission:

Protecting and restoring natural resources utilizing the watershed approach and providing technical assistance to landowners, communities, and government.



Restored reach of West Fork White River at Drake Field

Qualifications and Experience

WCRC's dedicated professionals will provide the client the technical expertise needed to design and implement stream restoration projects using the natural channel design approach and secure grants or utilize other funding mechanisms to help finance these projects.



Principal Areas of Expertise

- Watershed assessment, planning, and management
- Stream morphology assessment; streambank erosion, monitoring, sediment & nutrient load determination
- Stream restoration design and implementation emphasizing natural channel design principles, wetland and riparian areas restoration, the local ecology & pollutant load reduction
- Urban stream restoration & other green infrastructure with emphasis on interfacing with parks and urban areas, including wetland and riparian restoration
- Native vegetation establishment & invasive plant species removal
- GIS mapping and natural resource database development
- Best managements practice (BMP) planning
- Water quality monitoring and reporting
- Project design and grant development
- Mitigation bank development, implementation, & monitoring
- Education & outreach, capacity building, facilitation and collaboration

WCRC staff are experts in watershed assessment, planning, stream restoration design, and management. They have assembled a highly qualified team of technical specialists and professional staff who have experience and training to implement successful projects using the above areas of expertise. Resumes that include relevant experience are provided in [Attachment 2 - Resumes](#) section.

Key Staff

Other WCRC staff will provide additional engineering, assessment, and administrative support.

Sandi Formica

Executive Director/Co-founder of WCRC



Sandi oversees and manages the WCRC, and is responsible for project design and management, technical support and review, and carrying-out watershed based projects. She has a proven administrative ability in the development, implementation and management of environmental programs; grant development; and establishment of working relationships with a variety of government agencies, industries and the public resolving environmental issues, while providing technical expertise in fluvial geomorphology; river stability, stream restoration; watershed management approach; sediment and nutrient watershed assessment.

Matthew Van Eps, P. E.

Associate Director/Co-founder of WCRC



During Matt's professional career, he has received over 200 hours of training in fluvial geomorphology studies and has over 20+ years of direct experience in the field. He is the lead design engineer and project engineer, for numerous successful stream restoration projects utilizing a "natural channel design" approach, and is involved in stream assessments in both urban and rural settings. His experience and training allow him to analyze existing river conditions and conceptualize potential restoration scenarios. He is an occasional guest lecturer at the University of Arkansas for ecological engineering and natural sciences courses.

Graham Thompson, P.E.

Senior Engineer



Graham brings over 29 years of experience in, watershed & estuary planning, river assessment & restoration, stormwater management, floodplain & fluvial hazard mapping, water quality assessment, and quality assurance. He has had many successes designing and implementing natural channel restoration projects. Graham seeks a balanced, multidisciplinary approach to design that incorporates hydraulic engineering, geomorphology, and ecosystem function including riparian vegetation and aquatic habitat while integrating aesthetics and recreation.

Knowledge of Funding Sources

As a non-profit organization, the WCRC can apply for and administer grants, relieving the client from the administrative burdens associated with grant management.

WCRC has been writing, acquiring, and managing grants that fund environmental assessment and stream restoration projects since its founding in 2003. WCRC has been awarded numerous grants that have allowed entities, such as, the Cities of Bentonville, Fayetteville, Rogers, and Fort Smith to partner with the WCRC to conduct watershed-based assessments and stream restoration projects. These projects have provided valuable information on city planning and pollution reduction and have supported several stream restoration projects. Over \$8 million federal dollars have been brought to Arkansas through the WCRC's efforts. Federal grants have covered as much as 50% to 75% of the total project costs, and were obtained through a competitive process from local, regional, and national grant programs administered by entities, such as, the U.S. Environmental Protection Agency, USDA Natural Resources Conservation Service, and Arkansas Natural Resources Commission. The WCRC has been successful in obtaining grants, because of the numerous partnerships they have developed and maintained in the environmental community, which is a key element most grant programs are seeking. The WCRC has written summary documents on funding sources and requirements for stream restoration projects and is currently working with local private foundations and other entities to find support to conduct more stream restoration of priority sites on the West Fork White River to improve water quality in Beaver Lake watershed.

The WCRC is also knowledgeable in the area of stream mitigation banking and understands the potential customer base in Arkansas. The WCRC has developed mitigation banks in both the Illinois River and Beaver Lake watersheds. Funding received from these banks is used to maintain, enhance, and repair existing stream restoration projects and help fund new ecological-based projects.



Presentation, Outreach Experience and Awards

WCRC's numerous stream restoration and watershed planning projects attract a lot of attention. The WCRC staff have given project tours and presentations to citizen groups, municipalities, government agencies, landowners and environmental professionals.

The WCRC has extensive experience presenting and effectively communicating environmental data and information to non-technical people as well as environmental professionals. It is part of the WCRC's mission to provide outreach and education on watershed planning and stream restoration using a natural channel design approach to the general public, landowners, watershed practitioners, and environmental professionals. Ms. Formica has helped to develop and coordinate several stakeholder groups associated with watershed planning projects the WCRC has conducted or provided assistance. WCRC staff has given numerous tours and presentations on their stream restoration and watershed-based projects to citizen groups, municipalities, government agencies, landowners, and environmental professionals. They have helped to develop and coordinate volunteer efforts in planting native plants, removing invasive vegetation, and removal of trash from rivers.

Recognizing the limited availability of watershed training in the mid-south region of the United States and through a competitive process, the WCRC was awarded a U.S. EPA national grant to address regional training needs. The WCRC created the Mid-South Watershed Training Program, which was a series of courses in Northwest Arkansas that provided environmental professionals and watershed stakeholders the scientific and technical tools needed to understand and apply the watershed approach. From 2005 to 2010, over 700 environmental professionals and watershed practitioners throughout the country attended one or more of the hands-on training courses that focused on developing comprehensive watershed plans and providing sound, scientific methods for identifying, assessing, and prioritizing water quality problems and sources of NPS pollution.



Mullins Branch

AWARDS

- 2022 NRCS - Arkansas State Conservationist's Partnership Award
- 2019 Arkansas Game & Fish Commission - Conservation Award in recognition of extraordinary dedication and contributions to the conservation of Arkansas's fish, wildlife and natural resources and a conservation leader in NWA.
- 2015 Illinois River Watershed Partnership - Golden Paddle Award for Conservation
- 2016 Beaver Watershed Alliance - Watershed Guardian Award for Beaver Lake watershed.

Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

Tanglewood Branch and Tributary Restoration at the Ramble

Location:	Fayetteville, Arkansas
Project Owner:	City of Fayetteville
Point of Contact:	Peter Nierengarten, Environmental Director ~ 479.575.8272
Completed:	2022
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring and Maintenance
Key Staff:	Sandi Formica, Matthew Van Eps, Jordan Holt

WCRC's design approach for Tanglewood Branch utilized natural channel design principles and was based on on-site existing fluvial geomorphologic conditions data. The techniques proposed in the design plan help to stabilize and beautify the stream. The three major techniques utilized in restoring Tanglewood Branch were channel shaping and sloping, the addition of grade control structures, and rock revetment to protect exposed streambanks. Throughout the restoration reach, banks were shaped to create bankfull benches and inner berms to allow high flow waters space to spread out, lowering stream velocity and shear stresses near the streambanks. The bench elevations were based on surveyed geomorphic features found on site. Reconstructed banks had erosion control fabric mattresses installed and filled with top soil to provide a medium for the native vegetation to grow. The erosion control fabric holds the soil and gravel fill in place for several years and will eventually biodegrade over time. Some of the high terrace floodplains are graded and replanted with native trees, shrubs, grasses, and flowers. Grade control structures were installed through the reach to maintain pool depth, riffle slopes, and provide aquatic and terrestrial habitat throughout the year. The structures were built with medium to large boulders mechanically placed to maintain elevations of bed features through the stream. Rock structures will help to dissipate excess stream energy and concentrate flows away from sensitive streambanks. Length: 1,000 feet Cost: \$750,000



Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

Little Sugar Creek Stream Restoration

Location:	Bentonville, Arkansas
Project Owner:	City of Bentonville
Point of Contact:	Byran Wick, CPESC, CFM, Engineering Project Manager ~ 479.271.3168
Completed:	2020
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps

The Watershed Conservation Resource Center (WCRC) in partnership with the City of Bentonville proposed to implement a project to reduce riverbank erosion along 1,500 linear feet of riverbank along Little Sugar Creek using an approach that relies heavily on natural channel design principles and the use of materials and techniques that will improve aquatic habitat. Restoration of eroding riverbanks included restoring a portion of the bank using toe-wood stabilization techniques. The bank restoration and enhancement helped meet multiple local and regional objectives relating to stream channel instability, water quality, and habitat. Additionally, a large saturated area on the flood plain that was being mowed, was restored to a herbaceous wetland area. The wetland provides biological habitat and filter out urban pollutants. The wetland have an area of approximately 2 acres. The wet depression was transformed through vegetation management by eliminating mowing, removing invasive plants, and introducing wetland and flood plain plant species to create a herbaceous wetland. WCRC's extensive knowledge and experience with the streams, rivers, and creeks in Northwest Arkansas, provide the most innovative solutions to streambank erosion and environmental impact in the area. Previous work on Little Sugar Creek gives WCRC the insight it needs, to design the creek to become a beautiful healthy environment for the community.

Project Cost: \$407,150



Little Sugar Creek before restoration



Little Sugar Creek after restoration

Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

Osage Creek Stream Restoration

Location:	Rogers, Arkansas
Project Owner:	City of Rogers
Point of Contact:	Lance Jobe, Deputy Director Engineering ~ 479.621.1186
Completed:	2020
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps

With the goal of reducing total phosphorus, total nitrogen, and sediment loadings, the WCRC designed and directed the implementation of an urban stream restoration project on Osage Creek as it flows from east to west along the southern border of the proposed park. Approximately 2,000 feet of stream channel and riparian property were restored along with 800 feet of Stoney Brook that flows through the center of the park. Several small wetland areas in the adjacent floodplain were enhanced through native plantings. Bed features such as riffles and pools were designed and constructed based on the stream morphology. Both rock vanes and toe wood structures were used to stabilize the streambanks and create aquatic habitat. Also, the riparian areas were re-vegetated with native species of plants and invasive vegetation were removed. WCRC's extensive knowledge and experience with the streams, rivers, and creeks in Northwest Arkansas, provide the most innovative solutions to streambank erosion and environmental impact in the area. Familiarity with Osage Creek and surrounding watersheds, help the WCRC provide the best design solutions for the Osage Creek. Cost: \$335,305



Osage Creek before restoration



Osage Creek after restoration

Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

West Fork Stream Restoration at Fayetteville Executive Airport

Location:	Fayetteville, Arkansas
Project Owner:	City of Fayetteville
Point of Contact:	Alan Pugh, Engineer ~ 479.575.8208
Completed:	2017
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps

The WCRC utilized a natural channel design approach to create a stable channel that reduced streambank erosion and sediment and phosphorus loads to the river. The restored channel moves the river away from severely eroding banks and eliminates abrupt bends in the channel. Structures made of natural materials were constructed to deflect higher velocity flow toward the center of the channel, reducing stress on the banks and reducing erosion potential. An entirely new channel was excavated to create a path for the river that would prevent accumulation of gravel. A portion of the old channel was converted into a series of riverine wetlands. The wetland areas provide water storage, create unique habitat, and filter water that passes through them. The preservation and addition of vegetation was a key component of the restoration project. During construction, disturbance to existing vegetation was minimized to keep mature root mass intact for additional streambank stability. Over 15,000 bare root seedlings, 5,000 live stakes, and 4,000 pounds of seed were used to re-vegetate the project site. Over 10 acres of land was planted, including adjacent riparian terraces and near-channel areas. This stream restoration project was implemented to help meet multiple local and regional objectives relating to stream channel instability, water quality, and habitat. Through this project, accelerated streambank erosion has been eliminated; aquatic habitat has been improved; riparian areas have been enhanced; and sediment loading to the WFWR has been reduced by over 98% improving the WFWR and Beaver Lake's water quality. WCRC's extensive knowledge and experience with the streams, rivers, and creeks in Northwest Arkansas, provide the most innovative solutions to streambank erosion and environmental impact in the area. Work on the West Fork White River shows WCRC can design and execute work on a large scale. Project Cost: \$1,109,114



West Fork White River before restoration at the airport



West Fork White River after restoration at the airport

Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

Regional Conservation Partnership Program - West Fork White River Watershed Initiative

Location:	Northwest Arkansas Region
Project Owner:	Natural Resource Conservation Service
Point of Contact:	Gary Bennett ~ 501.301.3141
Completed:	2021
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps

The West Fork of the White River is a major tributary that flows to the White River which forms Beaver Lake, the primary drinking water source for one in seven Arkansans. The National Resource Conservation Service (NRCS) selected the WCRC's "West Fork White River Watershed Initiative" project to receive \$4.3 million in federal dollars to conduct river restoration and implement other best management practices (BMPs) on agricultural lands through their Regional Conservation Partnership Program (RCPP), an initiative of the U.S. Department of Agriculture (USDA). An array of partners joined the WCRC to support this effort. Partners' contributions total over \$4.5 million dollars in both cash and in-kind matching funds. The WCRC was responsible for river assessment and restoration work and the central organization managing funds and implementation. Other outcomes of the project included an environmental assessment of the West Fork Watershed; up to 21,000 feet of riparian vegetation restoration; the creation of 150 conservation and forest management plans; the implementation of up to 300 BMPs on area farms; and the creation of five "perpetual" conservation easements. WCRC's extensive knowledge of the West Fork White River, and its many partners with the same goal in mind, we were entrusted with a multi-million dollar contract and able to execute multiple practices and plans within the given timespan. Total project value: \$8.8 million

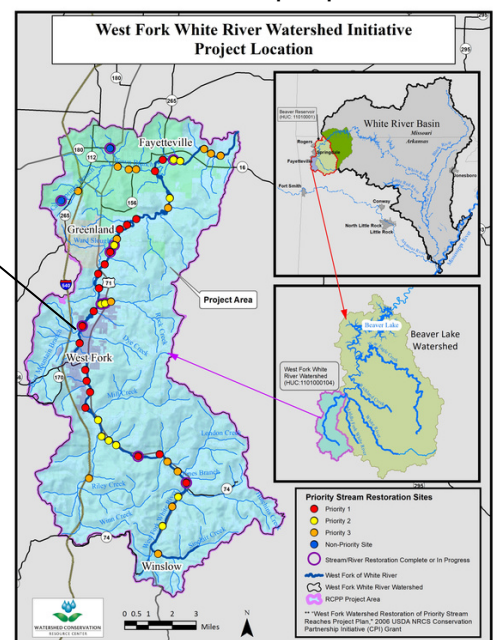


Dye Creek PL-566 before restoration



Dye Creek PL-566 after restoration

Dye Creek - Priority 1 site,
Tributary to the
West Fork White River



Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

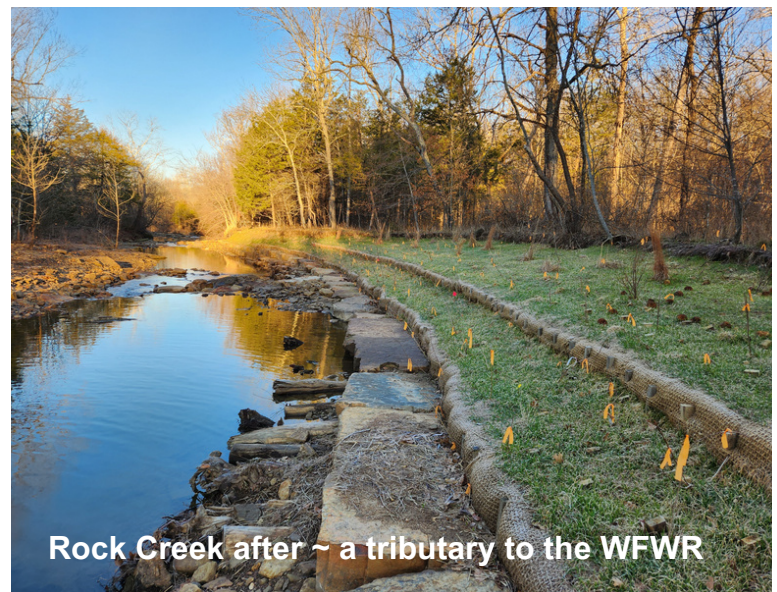
Rock Creek Streambank and Aquatic Restoration

Location:	West Fork, Arkansas
Project Owner:	Natural Resource Conservation Service
Point of Contact:	Josh Fortenberry, District Conservationist ~ 479.521.4520 x 3
Completed:	2022
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps, Tyler Anderson

The WCRC implemented a streambank stabilization plan, which was presented to the Landowner prior to construction, along a minimum of 250 linear feet along Rock Creek. The stabilization plan included the installation of a rock and wood toe to protect the streambank. The floodplain above the rock and wood toe was reconstructed using coir fiber and soil. A riparian area of a minimum of 35 feet was planted with native riparian trees, shrubs, grasses and wildflowers. Grade control structures consisting of large boulders were constructed to prevent channel down-cutting and degradation. The grade control structures were situated at the most appropriate locations in order to provide grade control and desired back-water effects to create pool habitat through increasing pool depths. WCRC's expertise and knowledge of the West Fork White River (WFWR) in Northwest Arkansas, this watershed project, on Rock Creek, provides a solution to erosion and helps improves aquatic life to the West Fork White River. Project cost: \$125,000



Rock Creek before ~ a tributary to the WFWR



Rock Creek after ~ a tributary to the WFWR

Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

Mullins Branch Restoration on the University of Arkansas Campus

Location:	Fayetteville, Arkansas
Project Owner:	University of Arkansas
Point of Contact:	Jay Huneycutt ~ 479.575.6601
Completed:	2012
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps

Watershed Conservation Resource Center(WCRC), designed and implemented a plan to reduce sediment erosion. The design included critically placed rock structures that deflect flow away from the banks and improved riffles and pool features along the stream channel. These features increased pool habitat and water and aeration within the system, which results in better assimilation of nutrients into the ecosystem. The use of native vegetation is a critical component of the stabilization design. Soil mattresses, a soil layer consisting of topsoil wrapped in a coconut fiber blanket, were constructed in benches to minimize floodplain erosion during vegetation establishment. The soil layer provides a medium for plants to take root and grow and provide additional weight to secure the trees used in the structure. The soil mattresses or lifts were seeded with a mix of native riparian seed types. The stream corridor was also re-vegetated with native grasses, shrubs, and trees. As the plants continue to mature, they will help to bind the soil through root growth and reduce scour of the banks along the channel. They will also aid in dissipating water velocity and act as a buffer to improve the removal of pollutants as the leaves, branches, and stems of the plants interact with runoff and rainfall events. The project has been very successful in meeting established goals and is a learning center for the students of the University of Arkansas.

Length of project: 1,000 feet Cost: \$350,000.00



Mullins Branch before restoration



Mullins Branch after restoration

Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

Bulldog Branch Restoration on University of Arkansas Campus

Location:	Fayetteville, Arkansas
Project Owner:	University of Arkansas
Point of Contact:	Jay Huneycutt ~ 479.575.6601
Completed:	2022
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps, Jordan Holt

The WCRC designed and restored, approximately, 550 feet of Bulldog Branch located on the campus of the University of Arkansas. The upstream area of the project did not require heavy equipment construction. The area was treated to eliminate invasive plants and native vegetation was incorporated along the riparian. The remaining portion of the channel, from the 30" stormwater outfall to the box culvert underneath Stadium Drive, required heavy equipment construction and the installation and construction of stacked rock at the toe of some of the streambanks, rock structures, and flood plains features. The area was finished with the installation of coir fiber soil encapsulation blocks and erosion control fabric that was planted during construction. Slopes and terraces were planted with native vegetation.

Large river or small stream, WCRC's extensive knowledge and experience of watersheds throughout Northwest Arkansas, allows us to provide the most innovative solutions to streambank erosion and environmental impact in the area. Cost: \$110,000.00



Bulldog Branch before restoration



Bulldog Branch after restoration

Stream Restoration and Other Related Projects

Examples of WCRC projects showing qualifications and expertise being requested.

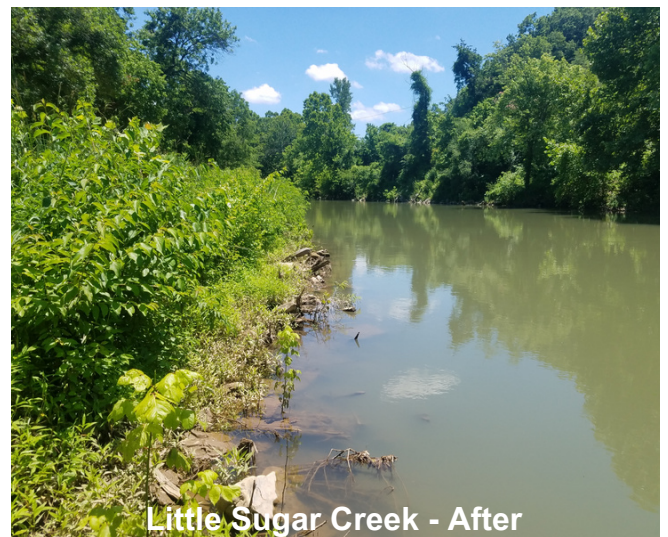
Little Sugar Creek NWA @ Razorback Greenway Trail

Location:	Bella Vista, Arkansas
Project Owner:	NWA Trailblazers+ETHIC
Point of Contact:	Daniel Marley, Senior Director of Trails ~ 479.462.9644
Completed:	2018
Relevant Services:	Stream Assessment, Stream Morphology Survey, Engineering Design, Permitting, Materials Acquisition, Bidding and Procurement, Construction Oversight, Riparian Revegetation, Post Construction Monitoring
Key Staff:	Sandi Formica, Matthew Van Eps

The Watershed Conservation Resource Center (WCRC) was contacted by the NWA Trailblazers to evaluate streambank erosion conditions along a proposed section of Razorback Greenway that is planned to run adjacent to Little Sugar Creek in Bentonville Arkansas. The property is owned by the City of Bentonville. The site is located approximately 1,000 feet downstream of the Lake Bella Vista Dam and has a watershed area of 86. The NWA Trailblazers staff concern was about ongoing streambank erosion and its impact on the proposed trail due to the close proximity of the trail alignment with Little Sugar Creek. The streambank restoration project protects the trail from scour or loss, while at the same time helps to prevent streambank erosion and the negative effects of sedimentation. Prior to visiting the site, the WCRC evaluated the magnitude of erosion over a ten-year period (2007 to 2017) using aerial imagery and found the streambank in question had eroded as much as 24 feet, in some places. The erosion rate posed a threat to the proposed trail alignment. Based on the site visit, the primary mechanism for the bank failure is erosion of the toe with subsequent cantilever failure of the upper banks. Restoration involved fortifying the toe of the streambank using natural materials and creating floodplain features. The restored streambank was created with a resistive revetment of logs, brush, gravels, and boulders. Such an approach provides resistance to scour during a vegetation re-establishment period (3-5 years) after which, the area should remain stable, barring catastrophic flooding. Cost: \$278,927



Little Sugar Creek - Before



Little Sugar Creek - After

City of Fayetteville, Arkansas

Peter Nierengarten
Environmental Director
Phone: 479.575.8272

Natural Resources Division, Arkansas Department of Agriculture

Tate Wentz
Water Quality Section Manager
Phone: 501.682.3914

Arkansas Game and Fish Commission

Darrell Bowman
Assistant Chief, Fisheries Division
Phone: 501.978.7322

City of Fayetteville Parks, Natural Resources and Cultural Affairs

Alison Jumper
Director
Phone: 479.444.3471

Beaver Water District

James McCarty
Manager of Environmental Quality
Phone: 479.756.3651



Ms. Formica is the co-founder and executive director of the Watershed Conservation Resource Center. She has a proven administrative ability in the development, implementation and management of environmental programs; supervision and evaluation of professional staff; grant development, writing and budgeting; and establishment of working relationships with a variety of government agencies, industries and the public. Demonstrated technical expertise of the watershed management approach; sediment and nutrient watershed assessment; nonpoint and point source pollution; development, execution and management of special environmental projects; data evaluation and interpretation; animal-waste management system design and BMPs; identification of effective best management practices; water quality monitoring; pollution prevention; and environmental chemical processes. Experienced and knowledgeable in fluvial geomorphology, stream stability and restoration; environmental model development and assessment; TMDL development and implementation; chemical analysis; environmental regulations; NPDES and state permitting; and technical report writing. Ms. Formica has special skills of effectively communicating scientific/engineering data and natural environmental processes to non-technical people and coordinating stakeholders to resolve environmental issues. She has created the Mid-South Watershed Training Program, which has been providing training courses instrumental to watershed management to environmental professional throughout the country since 2005. Instrumental in implementing the watershed approach in Arkansas by working directly with local communities and natural resource agencies. Principal Investigator on several applied research projects including watershed assessments which include data inventories, pollutant load estimates, source identification and prioritization, development of potential solutions, and watershed monitoring; evaluation of waste management systems and BMP implementation in protecting water, soil, and air quality; and development of local, volunteer-based programs which share resources to provide improved manure handling and utilization to minimize impact to environment and costs to farmers.

DETAILED EXPERIENCE

Executive Director (December 2004 to Present), Watershed Conservation Resource Center (WCRC), Fayetteville, AR. Oversee and manages the environmental non-profit organization. Responsible for project design; grant writing; developing budgets; providing technical assistance; and carrying-out watershed based projects. Current projects include a regional watershed education program for environmental professionals; unpaved road survey and sediment evaluation; stream bank erosion evaluation and prioritization; stream restoration design and implementation; and watershed sediment source and load estimate evaluation.

Watershed Conservation Resource Center

Executive Director

Years of Experience

Forty-three

Education

M.S., 1984, Chemical Engineering.
University of Arkansas, Fayetteville, AR.

B.S., 1982, with Honors. Chemical Engineering, University of Arkansas, Fayetteville, AR

Special Recognition

Partnership for Environmental Excellence Award EPA Region VI (Project Manager & Co-Principle Investigator for 319 Projects conducted in Buffalo River watershed)

Recipient of the 2010 Ginger Tatom Award for conservation achievement presented by the Arkansas Watershed Advisory Group

Synergistic Activities

2000 – 2004; chair, Arkansas Watershed Advisory Group (AWAG): Initiated and help developed this multi-agency & organization working group that assists watershed partnerships in Arkansas

2002 and 2004; co-chair and chair, AWAG Watershed Conference: Developed, organized, and carried-out two state watershed conferences which focused on environmental training and education

October 2004; Arkansas Geomorphology Assessment Group: Initiated the forming of this group of professionals to encourage collaboration on assessment techniques and projects in Arkansas

1992 – 2009; instructor, presenter, & coordinator, Environmental Outreach: Throughout Arkansas, has developed presentations and training materials along with coordinating meetings & training on watershed management, BMPs, and assessment

Employment History

Watershed Conservation Resource Center, December 2004 to present. Arkansas

Department of Environmental Quality, 1992 to 2004 FTN Associates, LTD., 1989 to 1992

Aluminum Company of America, 1989

St. Catherine's Indian School, 1986 to 1988

Badische Corporation, 1984 to 1985

University of Arkansas, Chemical Engineering Department, 1981 to 1984

Environmental Preservation Division Chief (May 2001 to December 2004), Arkansas Department of Environmental Quality, Little Rock, AR.

Managed non-regulatory, technically-based Division of 11 employees with an annual budget of \$1 million. The Division consisted of three sections, Environmental Projects, Environmental Outreach, and Program Development. Programs and projects from these sections include applied research on effectiveness of best management practices at confined animal operations; watershed assessments which include evaluations of stream stability; development and implementation of watershed approach which includes providing both planning and technical assistance to watershed groups; providing water quality training to both high school teachers and students statewide; and the development of an agency pollution prevention program. All programs and projects emphasize implementation, education, and awareness. Over 9000 public contacts were made in 2002 from Division technical transfer workshops, information meetings, presentations, poster sessions, organizational meetings, and public outreach events.

Program Support Manager (January 1999 to April 2001), Arkansas Department of Environmental Quality, Little Rock, AR, Section Manager, Watershed and Technical Support Section (WTSS), Environmental Preservation Division. Responsible for the development, management, and administration of the WTSS program to 1) provided technical expertise and planning through proactive environmental projects that investigate both the environmental and economic benefits of potential solutions and 2) developed and implement state watershed strategies which focus on voluntary participation, local stakeholder involvement, and identifying viable solutions. Coordinated, supervised and evaluated the WTSS professional staff of five engineers and scientists. Secured funding for special projects including approximately two million dollars of environmental grant monies to help improve and protect the state's natural resources. Represented the ADEQ on several state environmental task force committees and has developed two committees to address swine and dairy manure management issues. Coordinated with other ADEQ divisions, state and federal agencies, universities, citizens and other groups to address environmental issues and, specifically, initiated and chairs the Arkansas Watershed Advisory Group whose mission is "to assist interested citizens and organizations by promoting local voluntary approaches to watershed management and conservation." Developed and coordinates information workshops to provide an avenue of education and communication between government agencies, scientists and the public. Principal investigator, project manager, and technical expert for five nonpoint source pollution projects which involve watershed assessment; evaluation of waste management systems and BMPs in protecting water, soil and air quality; implementation of BMPs through education, training, community programs and cost-share assistance; and coordination of project technical teams, participants, and stakeholders. Developed new special projects and programs to address environmental concerns. Provides technical and planning expertise to other divisions,

Watershed Conservation Resource Center Executive Director

Selected Publications:

S.J. Formica, M.A. Van Eps, M.A. Nelson, A.S. Cotter, T.L. Morris, J.M. Beck. "West Fork White River Watershed - Sediment Source Inventory and Evaluation." Proceedings from ASAE Conference "Self-Sustaining Solutions for Streams, Wetlands, and Watersheds," held September 12-15, 2004, St. Paul, MN.

M.A. Van Eps, **S.J. Formica**, T.L. Morris, J.M. Beck, A.S. Cotter. "Using a Bank Erosion Hazard Index (BEHI) to Estimate Annual Sediment Loads from Streambank Erosion in the West Fork White River Watershed." Proceedings from ASAE Conference "Self-Sustaining Solutions for Streams, Wetlands, and Watersheds," held September 12-15, 2004, St. Paul, MN.

Brye, K.R., T.L. Morris, D.M. Miller, **S.J. Formica**, M.A. Van Eps. 2004. "Estimating Bulk Density in Vertically Exposed Stoney Alluvium Using a Modified Excavation Method." *Journal of Environmental Quality*. In Press.

Formica, S.J.; Giese, J.; Kresse, T.M.; Morris, T.; and Van Eps, M.A. 2001. "Using Data, Communication, and Education to Improve Swine Waste Management to Improve Buffalo River Watershed." Published in the proceedings of the 2nd National Conference, "Nonpoint Source Pollution Information & Education Programs," to be held May 15-17, Chicago, IL.

Formica, S.J.; Anderson, W.M.; Van Eps, M.A.; Morris, T.; and Srivastava, Puneet. 2001. "A Community Approach to Handling and Utilizing Dairy Manure in the Buffalo River Watershed." Published in the proceeding of the Natural Resource, Agriculture, and Engineering Service, "Dairy Manure Systems: Equipment and Technology," held March 20-22, Rochester, NY.

Formica, S.J.; Giese, J.; Kresse, T.M.; Morris, T.; Van Eps, M.A.; and Anderson, W.M. 2001. "Buffalo National River Watershed: Partnerships to Improve Swine Waste Management." EPA Section 319 Success Stories, Vol. 3.

Srivastava, Puneet; **Formica, S.J.**; and Van Eps, M.A. 2001. "A Watershed Approach to Assess the West Fork of the White River." Abstract published in the proceedings of Arkansas Water Resource Center, "TMDL and Related Water Quality Issues Conference" held April 3-4, Fayetteville, AR.

Pote, D.H.; Reed, B.A.; Daniel, T.C.; Nichols, D.J.; Moore, P.A., Jr.; Edwards, D.R.; and **Formica, S.J.** 2001. "Water-Quality Effects of Infiltration Rate and Manure Application Rate for Soils Receiving Swine Manure." *Journal of Soil and Water Conservation*, Vol. 56, No.1.

government agencies, farmers, conservation districts and industries. Projects have been recognized locally, regionally, and nationally for their technical integrity and success in partnership building among stakeholders.

Engineer II and Project Manager (November 1994 to December 1998), Arkansas Department of Pollution Control and Ecology, Little Rock, AR. Environmental Preservation Division: Responsible for the development and management of a proactive technical support group focusing on solving environmental problems through investigating the environmental and economic benefits of potential solutions. Managed nonpoint source pollution projects (\$1.8 million) in which animal-waste management practices are evaluated for their effectiveness in protecting water quality and provides technical assistance to individuals, industries, and agency personnel. Coordinated with all state, federal, and/or private agencies involved in nonpoint source projects. Provides technical support to projects by performing the following:

- 1) Reviewed and evaluates existing waste management systems and designs, current waste management practices, and water quality data.
- 2) Developed water quality sampling plans, performs water quality evaluations, and assists with water quality modeling. Recruits funds to support the technical group and supervises two project field personnel and one engineer. Initiated the expansion of this group to include watershed management planning and modeling.

Inspection Engineer II (February 1992 to September 1994), Arkansas Department of Pollution Control and Ecology, Little Rock, AR. Water Division: Reviewed and evaluated engineering plans for the treatment/utilization of animal waste at agricultural facilities and wastewater at commercial facilities. Drafted State Water Permits and performed site visits at facilities. Assisted with the development of educational programs for operators and evaluation of water quality impacts from nonpoint source pollution.

Chemical Engineer (July 1989 to February 1992), FTN Associates, LTD., Little Rock, AR. Experience in environmental model development, modeling, and model assessment. Performed several waste-load allocation studies, which involved water quality modeling. Participated in the development, design, and evaluation of a pilot-constructed wetland treatment system used to treat acid mine drainage. Participated in water quality assessment and evaluation studies, Toxicity Reduction Evaluation, and a wastewater treatment evaluation. Gained experience in NPDES permitting and knowledge of environmental regulations.

Chemical Engineer (January 1989 to June 1989), Aluminum Company of America, Bauxite, AR. Designed experiments and performed testing for the development of new products in the Product Development Group. Supervised the research and development of an anion-absorbing chemical product for use in wastewater treatment process.

Secondary Mathematics and Science Teacher (August 1986 to May 1988), St. Catherine's Indian School, Santa Fe, NM. Taught Geometry, Pre-Calculus, Chemistry and Physics to upper level high school students. Duties included daily class preparation, presentation of class material,

Watershed Conservation Resource Center Executive Director

Selected Publications:

Funkhouser, J., Little, P., Brahana, V., Kresse, T., Anderson, M., **Formica, S.J.**, and Huetter, T. 1999. "Methodology to Study the Effects of Animal production in Mantled Karst Aquifers of the Southern Ozarks." Proceedings from the AWRA Annual Summer Specialty Conference, "Science Into Policy: Water in the Public Realm/Wildland Hydrology" held June 30 - July 2, Bozeman, Montana.

Van Eps, M.A.; **Formica, S.J.**; Kresse, T.M.; Czarnomski, A.; Morris, T.; VanSchaik, E.; Giese, J. 1998. "Survey of Arkansas Swine Liquid Waste Systems." Proceedings from "International Conference on Agricultural Engineering" held in Oslo, Norway. Paper No. 98-E-017. (presentation by **Formica**)

Formica, S.J., Giese J., Kresse, T.M., Morris, T., VanSchaik, E. 1996. "A Review of Existing Liquid Waste Management Systems at Confined Swine Farms and their Effectiveness in Protecting Water Quality." Proceedings from the 9th Annual AWRA/AGWA Symposium. Little Rock, AR. (presentation by **Formica**)

Kresse, T.M., VanSchaik, E., **Formica, S.J.**, and Morris T. 1996. "Ground Water Quality from Confined Swine Operations." Proceedings from the Conference on Diversity of Arkansas Water Resource Research. Arkansas Water Resources Center Publication No. MSC-195, p.30-36

Formica, S.J., Giese J., Kresse, T.M., Morris, T. April, 18-20, 1995. "Nonpoint Source Watershed Activities in the Buffalo River Watershed." Proceedings from U.S. EPA Watershed Success in Region 6, Part 1, p. 251-255.

Gross, M.A.; **S.J. Formica**; L.C. Gandy and J. Hestir. 1991. "A Comparison of Local Waste Materials for Sulfate Reducing Wetland Substrate." Proceedings from Constructed Wetlands for Water Quality Improvement, An International Symposium, Oct. 21- 24, Pensacola, Fl.

Gandy, L.C.; **S.J. Formica** and M.A. Gross. 1991. "An Evaluation of Vertical Flow Sulfate Reducing Wetlands to Treat Low pH, Low Sulfate Acid Mine Drainage Using Column Experiments." Proceedings from XII Annual National Symposium on Mining, p. 81-93.

Formica, S.J.; J.A. Baron; L.T. Thibodeaux and LT Valsaraj. 1988. PCB Transport into Lake Sediments: Conceptual Model and Laboratory Simulation. Env. Science and Tech., Vol. 22, No. 12, p. 1435.

Kresse, T.M.; L.J. Thibodeaux, and **S.J. Formica**. 1985. Desorption of PCB from Lake Sediment: Abstracts with Programs. South-Central section, Geol. Soc. Amer., Vol. 17, p. 163.

evaluation of student's performance, and organization of physics and chemistry laboratory experiments.

Chemical Engineer (May 1984 to August 1985), Badische Corporation, Freeport, TX.

Designed projects to improve plant operations. Organized, coordinated and performed cost analysis of plant projects. Supervised work teams of 2-5 people for project installation. Performed design calculations and economic evaluations of potential chemical production processes. Performed quality control study by simulating chemical plant process in the laboratory.

Research and Departmental Assistant (August 1981 to April 1984), Chemical Engineering Department, University of Arkansas, Fayetteville, AR.

Designed and performed laboratory simulation of PCB-contaminated lake system while obtaining graduate degree. Developed and tested mathematical model of the system. Corrected student assignments in mass-transfer, kinetics, and thermodynamics during senior year of undergraduate school.

Matthew Van Eps, PE, is the associate director and co-founder of the Watershed Conservation Resource Center. Mr. Van Eps possess a diverse and unique work experience history that has facilitated the development of specialized watershed assessment, conservation and restoration skills. He is the project engineer for several stream restoration designs and implementation projects in Arkansas. His background has served to develop his understanding of the physical, chemical, biological, and anthropogenic processes affecting watershed resources. He has been a project engineer on numerous watershed assessment projects in both rural and urban settings. He was also the project engineer for several projects that evaluated the implementation of BMPs to reduce the impact of confined animal operation on water quality in Arkansas. Mr. Van Eps has a broad background in watershed management and has expertise in many aspects of the field including assessment, regulatory issues, stream stability analysis, stream restoration design practices, integration of stakeholder involvement, nutrient management, non-point source pollution; and BMP identification and implementation.

Associate Director (December 2004 to Present), Watershed Conservation Resource Center (WCRC), Fayetteville, AR.

Provides technical, engineering, and project design expertise for recognized environmental nonprofit organization. Stream restoration design development and implementation project engineer. Responsible for all GIS applications; restoration design; and field data collection. Assists with budgeting; grant development; and project development.

Engineer PE, Environmental Projects Section Manager, AR Dept. of Environmental Quality September 1997- December 2004. West Fork White River Watershed Assessment.

Project engineer for a watershed assessment of the West Fork White River in Northwest Arkansas. Surveyed the West Fork White River (WFWR) and tributaries evaluating the erosion potential of stream banks using a Bank Erosion Hazard Index. Developed and implemented a progressive and efficient data collection and presentation process utilizing a GIS interface and hand-held computing technology. Selected suitable locations for the installation of permanent cross-section locations to assist in evaluating stream stability of the WFWR. Performed computations and analysis of geomorphology data collected for the WFWR assessment. Collected data to develop a bank erosion sediment delivery model. Reviewed Quality Assurance Project Plans (QAPP) to be submitted to the EPA addressing stormwater and biological sampling methods in the watershed.

Urban Watershed Assessment.

Principal investigator for assessing the condition of the Rock Creek watershed in Little Rock, Arkansas. Developed project proposal, work

Watershed Conservation Resource Center Associate Director

PE License #: 10661

Years of Experience

Thirty

Education

University of Arkansas- Fayetteville, Arkansas
Master of Engineering Degree in Environmental Engineering, December 1996

Virginia Polytechnic Institute and State University - Blacksburg, Virginia
Bachelor of Science Degree in Chemical Engineering, May 1993

Professional Training

Dr. Rosgen's Wildland Hydrology Courses:
-Applied Fluvial Geomorphology
-River Morphology & Applications
-River Assessment & Monitoring
-River Restoration & Natural Channel Design

Special Recognition

Partnership for Environmental Excellence Award
EPA Region VI

Employment History

Watershed Conservation Resource Center 2004
- present
Arkansas Department of Environmental Quality
1997 - 2004
Challenge Environmental Laboratories 1997
University of Arkansas Civil Engineering
Department 1994 to 1996

Synergistic Activities

Member of Green Infrastructure Environmental Subcommittee for Fayetteville Green Infrastructure Project 2009

Guest Lecturer for Ecological Engineering course at the University of Arkansas 2009

Guest Lecturer for Environmental Soil and Water Science course at the University of Arkansas 2009

Presented Stream Morphology concepts to attendees of the Region 6 MS4 annual meeting in 2007

Selected Publications:

M.A. Van Eps, S.J. Formica, T.L. Morris, J.M. Beck, A.S. Cotter. "Using a Bank Erosion Hazard Index (BEHI) to Estimate Annual Sediment Loads from Streambank Erosion in the West Fork White River Watershed." Proceedings from ASAE Conference "Self-Sustaining Solutions for Streams, Wetlands, and Watersheds," held September 12-15, 2004, St. Paul, MN.

plan, budget, and EPA approved QAPP documentation for urban watershed assessment. Supervised and coordinated the collection and analysis of data including; land use, impervious surface analysis, and delineation of watershed and sub-watershed boundaries utilizing GIS; utilization of visual watershed assessment methods and handheld PC GIS interface for rapid assessment and prioritization; evaluation of historical flow data to determine changes in local hydrology; development of a flow weighted storm water quality sampling program; and collected and evaluated fluvial geomorphology data to determine stream stability and restoration potential.

Fluvial Geomorphology Data Collection and Evaluation.

Collected and analyzed fluvial geomorphology data to establish relationships between watershed area and stream channel geometry for the Boston Mountain physiographic region. Obtained and evaluated historical USGS gage station records to determine flood return frequency as well as gage height and channel geometry relationships. Collected stream bank erosion data to develop relationship between stream bank erosion variables and erosion rates. Performed a bank erosion survey for the City of Rogers, Arkansas for 15 miles of Osage Creek and headwater tributaries. Provided comment, critical review and technical assistance on proposed stream bank stabilization projects to increase success and reduce costs.

Received over 200 hours of fluvial geomorphology training from Dave Rosgen, P.H., Ph.D. Assisted Dr. Rosgen during training courses conducted in Northwest Arkansas, including selection of sites for students to observe geomorphologic process and providing assistance to students performing assessments in the field. Provided field based instruction of basic fluvial geomorphology concepts to attendees of the 1st Arkansas Watershed Advisory Group Conference in October 2002. He is an instructor for the Basic Field Techniques to Determine Stream Morphology training course presented by the WCRC Mid-South Watershed Training Program.

Watershed Conservation Resource Center Associate Director

Selected Publications:

S.J. Formica, **M.A. Van Eps**, M.A. Nelson, A.S. Cotter, T.L. Morris, J.M. Beck. "West Fork White River Watershed - Sediment Source Inventory and Evaluation." Proceedings from ASAE Conference "Self-Sustaining Solutions for Streams, Wetlands, and Watersheds," held September 12-15, 2004, St. Paul, MN.

Brye, K.R., T.L. Morris, D.M. Miller, S.J. Formica, **M.A. Van Eps**. 2004. "Estimating Bulk Density in Vertically Exposed Stoney Alluvium Using a Modified Excavation Method." Journal of Environmental Quality. In Press.

Formica, S.J.; Giese, J.; Kresse, T.M.; Morris, T.; and **Van Eps, M.A.** 2001. "Using Data, Communication, and Education to Improve Swine Waste Management in the Buffalo River Watershed." Published in the proceedings of the 2nd National Conference, "Nonpoint Source Pollution Information & Education Programs," held May 15-17, Chicago, IL.

Formica, S.J.; Anderson, W.M.; **Van Eps, M.A.**; Morris, T.; and Srivastava, Puneet. 2001. "A Community Approach to Handling and Utilizing Dairy Manure in the Buffalo River Watershed." Published in the proceedings of the Natural Resource, Agriculture, and Engineering Service, "Dairy Manure Systems: Equipment and Technology," held March 20-22, Rochester, NY.

Formica, S.J.; Giese, J.; Kresse, T.M.; Morris, T.; **Van Eps, M.A.**; and Anderson, W.M. 2001. "Buffalo National River Watershed: Partnerships to Improve Swine Waste Management." To be published in U.S. EPA Section 319 Success Stories, Volume 3.

Srivastava, Puneet; Formica, S.J.; and **Van Eps, M.A.** 2001. "A Watershed Approach to Assess the West Fork of the White River." Published in the proceedings of the Arkansas Water Resource Center, "TMDL and Related Water Quality Issues Conference" held April 3-4, Fayetteville, AR.

Graham's career spans 29 years with expertise in watershed planning, hydrology and hydraulics, geomorphology, river assessment and restoration design, stormwater management, and water quality. He has completed numerous comprehensive watershed master planning efforts addressing complex, interdisciplinary issues to provide integrated solutions from asset condition/resource assessment and stakeholder engagement to project planning and design, to actionable capital improvement programming. He has led projects to develop stormwater infrastructure master plans, river corridor restoration plans, watershed management plans, post-wildfire flood and debris studies, stormwater criteria/policy documents, and programmatic strategic plans with a focus on multi-objective, stakeholder-driven solutions that enhance conservation and facilitate capital improvements for built infrastructure and restoration of natural systems. Graham has provided consulting engineering services to municipalities and utilities, military installations, watershed districts, and estuary programs and he was the officer-in-charge for several on-call engineering services contracts. Graham has had many successes designing and implementing natural channel restoration projects from steep, step-pool streams on West Monument Creek at the U.S. Air Force Academy, to smaller riffle-pool reaches on Rock Creek in Boulder County, to large, sand-bed systems like Fountain Creek. Graham seeks a balanced, multidisciplinary approach to design that incorporates hydraulic engineering, geomorphology, and ecosystem function including riparian vegetation and aquatic habitat while integrating aesthetics and recreation. Graham has advanced training in applied river morphology assessment and restoration design having completed over 300 hours of training through Wildland Hydrology and the U.S. Army Corps of Engineers.

DETAILED EXPERIENCE

Choctawhatchee Bay Estuary Coalition Capacity Building and Strategic Plan | Okaloosa County, Florida

Matrix was contracted by Okaloosa County to support and facilitate capacity building and strategic planning for the Choctawhatchee Bay Estuary Coalition. Graham served as the Project Manager and Senior Consultant to build upon previous technical reviews and metrics and evaluate key guiding documents to establish a "state of the estuary" and a common understanding of issues for estuary program development. Matrix conducted a web-based survey of Coalition members and key local, state, and federal stakeholders to identify concerns and opportunities, and coordinated efforts with the UF-UWF Center of Excellence project. Graham led a series of targeted work sessions to formulate a strategic plan for the Coalition. Matrix also developed a website for posting Coalition and program information.

Watershed Conservation Resource Center Senior Engineer

PE License #: 0037776
PSC #50
NCEES #47407

Years of Experience

Twenty-Nine

Education

M.S. - Environmental Engineering,
2000, New Mexico State University
B.S. - Agronomy - Soil Science,
1994 University of Arkansas

Professional Training

Dr. Rosgen's Wildland Hydrology Courses:
-Applied Fluvial Geomorphology
-River Morphology & Applications
-River Assessment & Monitoring
-River Restoration & Natural Channel Design
-U.S. Army Corps of Engineers Streambank
Erosion and Protection
-National Highway Institute HEC-River Analysis
System Training
-U.S. Army Corps of Engineers Wetland
Delineation Training

Areas of Expertise

Watershed & Estuary Planning
River Assessment & Restoration
Stormwater Management
Floodplain & Fluvial Hazard Mapping
Water Quality Assessment
Quality Assurance

Employment History

Watershed Conservation Resource Center 2022
- present
Feb07 – May22: Matrix Design Group,
Colorado Springs, CO & Niceville, FL
Jan01 – Feb07: URS Corporation,
Colorado Springs, CO
Aug98 – Dec00: Civil Engineering Department,
New Mexico State University, Las Cruces, NM
May96 – Aug98: Thompson Soil Services,
Jonesboro, AR
May94 – May96: FTN Associates,
Little Rock, AR

Professional Societies/ Affiliations

-Trustee – Matrix Employee Stock Ownership
Program
-Past President - Douglas County Conservation
District Board of Supervisors
-Past Chair – Matrix Employee Stock Ownership
Program Committee
-Colorado Association of Stormwater and
Floodplain Managers
-Colorado Watershed Assembly

Monument Creek Watershed Restoration Master Plan, Fountain Creek Watershed Flood Control and Greenway District | Colorado Springs and El Paso County, Colorado

Project Manager and Officer-in-Charge of this restoration master planning effort along reaches in the Monument Creek watershed following the flood events that occurred in the summer of 2013 and Black Forest Fire of 2012. The floods that occurred in August and September of 2013 had a dramatic effect on the channels, infrastructure, in stream structures, banks, and floodplains. This work included assessing impacts to the stream corridors and developing conceptual plans for mitigation of flooding and sedimentation, and restoration of the corridors. Study tasks included hydrologic, hydraulic, and geomorphic analysis, alternatives screening and analysis, conceptual plan and prioritization, cost estimation, and reporting.

Fountain Creek Realignment, Colorado Springs Utilities | Colorado Springs, Colorado

Project Manager responsible for the design of approximately ½-mile of natural channel restoration just upstream of Old Pueblo Road. The design approach includes implementing natural channel design techniques such as restoring the bankfull channel, connecting the bankfull channel to the adjacent floodplain, utilizing vegetation and biodegradable materials for stabilization, and using mild-sloping riffle structures to provide grade control. Additionally, rock toe protection was designed on the outside bend of the bankfull channel to provide additional protection in this extreme hydraulic environment. Technical analysis consisted of detailed stream morphology assessment, developing a flow duration curve, developing a sediment load histogram, calculating effective discharge, HEC-RAS hydraulic modeling, sediment transport modeling, and scour analysis.

Monument Creek Stream Stabilization Upstream of Pikeview, Colorado Springs Utilities | Colorado Springs, Colorado

Officer-in-Charge for project reach of Monument Creek beginning on the upstream end at the approximate intersection of northbound Interstate Highway 25 and ending downstream approximately 4,450 feet at the Pikeview diversion. Project objectives included utility infrastructure protection, aquatic and terrestrial habitat enhancements, erosion reduction and corresponding downstream sediment supply, and providing opportunities to enhance City of Colorado Springs MS4 compliance. The design approach combined both conventional and natural channel design methods.

Stormwater Infrastructure Master Plan | Colorado Springs, Colorado

Officer-in-Charge for assembling and prioritizing a completed Stormwater Infrastructure Master Plan for the City of Colorado Springs. The project entailed assembling identified infrastructure needs from multiple sources and formulated under differing criteria, timeframes, and cost structures so that projects could be incorporated into the City's annual capital planning process. In addition, the plan included development of a program strategic plan and prioritization of capital projects. Finally, development of a stormwater digital asset management system, web interface, and public information brochures were key deliverables for the project.

Upper Clear Creek Wildfire Resiliency Planning | Clear Creek County, Colorado

Officer-in-Charge for this project to identify key areas at greatest risk of suffering a catastrophic wildfire and evaluate assets at risk to facilitate strategic capital spending and mitigation to enhance resiliency. The assessment further involved the identification and prioritization of water supply diversions, water and wastewater treatment facilities, high hazard dams, and roadway crossings at high-risk locations where pre-disaster mitigation efforts will have significant effect. The project involved the collection and synthesis of existing data to leverage its value and identify critical gaps.

Restoration of Rock Creek at Zaharias and Carlson-Lastoka Open Spaces| Superior, Colorado

Project Manager responsible for design and construction observation for the restoration of Rock Creek in Boulder County the Mile High Flood Control District (District). The Zaharias project reach was the first application of geomorphology-based, natural channel design for the District. Matrix used an innovative approach to filling a large, eroded gully and restoring the historic channel alignment while accomplishing a cut / fill balance on-site. The natural design incorporated native vegetation and integrated log and rock grade control.

State Highway 47 Bank Restoration, Fountain Creek Watershed Flood Control and Greenway District | Pueblo, Colorado

Officer-in-Charge for 4,000' reach of Fountain Creek at SH 47 in Pueblo. The design approach included a stable meander planform, profile and channel geometry, as well as rock bend and scour protection. Extensive floodplain revegetation was included with the design including approximately 9 acres of erosion control fabric and riparian seeding, and planting of over 35,000 willow and cottonwood trees.

Masciantonio Trust Bank Restoration, Fountain Creek Watershed Flood Control and Greenway District | Pueblo County, Colorado

Officer-in-Charge for 1,500' reach of Fountain Creek approximately 4 miles south of the El Paso County line. The design approach including placing state of the art in-channel diversion structures (bendway weirs) along an outside bend of Fountain Creek. The structures function to divert high channel velocities and associated shear stresses away from the highly eroding bank. Design elements included constructing a bankfull bench along the toe of the eroding bank and implementing a robust revegetation plan.

Trout Creek Restoration and Habitat Enhancement, Middle Creek Ranch | Oak Creek, Colorado

Officer-in-Charge for 60% design sufficient for design-build implementation. The design focused on stabilizing approximately 1,700 feet of a highly incised channel and enhancing fisheries habitat. Design elements included “fish-friendly” boulder grade control structures, large wood and sod mats for bend protection, a stable meander planform, and a reconnection of the bankfull channel with a functional floodplain. The effort included leading the 404-permitting effort. Construction is anticipated to begin in June 2020.

U.S. Air Force Academy Natural Stream Channel Restoration | Colorado Springs, Colorado

Graham was the Project Manager and Lead Designer for this unique project which provided restoration design for six highly degraded channels on the Academy including West Monument Creek, Middle Tributary, Black Forest Creek, Kettle Creek, Monument Branch and Black Squirrel Creek using geomorphology-based, natural channel design to restore riparian function.

Monument Branch Channel Restoration | Colorado Springs, Colorado

Officer-in-Charge for 1,300' project reach of Monument Branch between I-25 and Voyager Parkway. Improvements provide utility infrastructure protection, channel stabilization, and riparian habitat restoration. Project elements included sculpted concrete hydraulic drop structures, a construction riffle, and a reconfiguration of the existing channel and adjacent floodplain.

U.S. Air Force Academy Stormwater Best Management Practices | Colorado Springs, Colorado

Project Manager responsible for the development of best management practices to address both existing stormwater issues, erosion, and planned facilities projects in the Cadet Area, Community Center, Jacks Valley, and Main Airfield areas of the Academy using sustainable and low impact development techniques.

Waldo Canyon Area Post-Fire Hydrology, Inundation Mapping, and Debris Assessment | El Paso County, Colorado

Project Manager responsible for the assessment of post-fire flood hydrology, inundation, and debris flow along Upper Fountain Creek, Williams Canyon, Camp Creek, and North and South Douglas Creeks for multiple clients. Detailed hydrologic modeling included calibration of pre-fire flows to streamgage records and comparison of post-fire flows to BAER studies and other wildfires. Inundation modeling was completed for five rainfall events from ½-inch to 2-inch rainfalls. Debris blockage and deposition potential was evaluated at culvert crossings.

Tesla Culvert Replacement and Stream Stabilization Design/Build Project, U.S. Air Force Academy | Colorado Springs, Colorado

Matrix was hired by Colorado Springs Utilities in conjunction with Wildcat Construction Co., Inc. to provide design/build services to address post fire damages and concerns resulting from the Waldo Canyon Wildfire of June 2012. Due to the enormous increase in sediment loading and precipitation runoff as a consequence of this fire, concern regarding significant impact on Utilities' infrastructure prompted a vigorous need for repair and precautionary measures to prevent further degradation of essential structures including the Pine Valley Water Treatment Plant, Tesla Hydro Electric Plant and West Monument Creek Road.

City of Colorado Springs Drainage Criteria Manual and Stormwater Management Assessment | Colorado Springs, Colorado

Project Manager leading a team of consultants to provide the City of Colorado Springs with a new Drainage Criteria Manual adopted by City Council in May 2014. Matrix completed a comprehensive assessment of the City's stormwater management policies and practices and revised manual documents to introduce an integrated, “watershed-wise” approach with principles that promote stormwater as an asset and lay the groundwork for runoff reduction best management practices (BMPs) including Full Spectrum Detention, Green Infrastructure and Low Impact Development. The project further advanced watershed stewardship through the implementation of stormwater planning and design that incorporates forward-thinking, yet proven methods to enhance stream corridors and promote them as amenities that provide improved flood protection and water quality, create aesthetic and habitat significance, and offer recreational opportunities to augment the City's quality of life and economic vitality. The project effort included extensive stakeholder involvement with focused subject-matter work groups, stormwater policy and criteria benchmarking against cities in the region and around the U.S., and technical evaluation of local climate, geomorphology, hydrology, and soils to develop design parameters unique to Colorado Springs.

Watershed Management Planning, Colorado Springs Utilities | Colorado Springs, Colorado

Project Manager responsible for providing comprehensive planning support for the protection of source watersheds supplying drinking water to 500,000+ utility customer-owners. Tasks included benchmarking policies and practices against other municipal utilities; identifying and mapping issues, risks, challenges, and opportunities encompassing infrastructure, operations, and natural resources; identifying and prioritizing organizational interests, values and goals in the context of the Utility's strategic plan; identifying high-priority focus areas and recommending management strategies and resource requirements; preparing a guidance document for developing watershed-specific plans; and, defining external funding and partnership opportunities for capital projects and planning efforts.

Okaloosa County Healthy Beaches Water Quality Analysis | Okaloosa County, Florida

Graham was the Project Manager for this multi-phase water quality assessment to identify sources of potential bacteria contamination at public beaches and stormwater outfalls in Okaloosa County using water quality and waste sampling, microbial source tracking (MST), data analysis, and geospatial information systems. Water quality samples were analyzed using MST biomarkers including human, canine, gull, and other avian DNA along with human chemical tracers. Select samples were analyzed for Enterococcus indicator bacteria. As part of the multi-year effort, Matrix conducted stakeholder coordination with local jurisdictions, state agencies, the Choctawhatchee Basin Alliance (CBA), and The Nature Conservancy. Matrix coordinated stormwater outfall sampling with CBA and laboratory analysis with Florida Department of Environmental Protection and Source Molecular laboratories.

Choctawhatchee Bay Estuary Program Development Grant | Okaloosa County, Florida

Graham was the Project Manager for this effort to support Okaloosa County in establishing the Choctawhatchee Bay Estuary Coalition and develop an EPA grant application to stand-up a placed-based estuary program for the Choctawhatchee Bay.

Cheyenne Mountain Air Force Station, Disaster Recovery & Emergency Stormwater Infrastructure Planning | Colorado Springs, Colorado

Officer-in-Charge on disaster recovery and emergency stormwater infrastructure planning for Cheyenne Mountain Air Force Station (CMAFS). CMAFS sustained major damage from severe flash flooding and debris flow events in September 2013. Matrix was contracted to provide services for disaster recovery efforts at the North Portal followed by stormwater planning base-wide. The project included field assessment, data compilation, condition ranking, emergency planning, and recommendations for repair or improvement along with final construction documents for over 120 stormwater infrastructure components and a summary technical report.

Potable Water Storage Tank Program, Colorado Springs Utilities | Colorado Springs, Colorado

Graham was the Officer-in-Charge for this asset management program to assess the condition of potable water storage tank facilities and prioritize cost-effective improvements and repairs to maximize service life. Matrix assessed 12 potable water storage tanks ranging from 0.25MG steel to 10MG buried concrete tanks. Matrix prepared drawings and specifications, supported bidding, and provided construction management to address deficiencies.

Existing Conditions Assessment and Infrastructure Master Plan Kansas Army Ammunition Plant | Parsons, Kansas

Project Manager responsible for evaluating the condition of existing infrastructure across the 13,773-acre site including raw water supply and treatment plant, finished water storage tanks, water distribution lines, sanitary sewers and manholes, sanitary lift stations, wastewater treatment plant, septic systems, and industrial treatment facilities, as well as permitting conditions. The project team then estimated service life and established needs for the aging water and wastewater systems and prepared an infrastructure master plan incorporating prioritization, phasing, and capital improvement strategies. The master plan included modeling of demands and system capacities along with losses and infiltration and inflow to determine line sizing, storage requirements, and necessary improvements. The efficacy of treatment facilities was evaluated to define needs for upgrade, expansion, or replacement of unit operations and processes. Finally, future water supply and permitting requirements were appraised.

Wastewater Treatment Facility Optimization Study, U.S. Air Force Academy | Colorado Springs, Colorado

Project Manager responsible for completing a findings and recommendations study to analyze and address NPDES permit exceedances at the Academy's 2.2MGD wastewater facility. Work included an evaluation of the facility's units to optimize operations and processes and improve effluent quality. The project team reviewed plant design data, evaluated influent wastewater characteristics, interviewed operators and reviewed associated operational data, completed process field sampling, and analyzed the biological nutrient removal processes. The team then developed and evaluated alternatives and prepared a report to document findings and recommend capital, operations, and maintenance efforts to solve the problem and meet immediate and long-term goals.

Alcoa Arkansas Remediation | Bauxite, Arkansas

Project Scientist responsible for providing technical support to ALCOA to complete multi-year pilot scale mine waste and process tailings reclamation projects, process water treatment studies, acid mine drainage monitoring, and lake restoration projects. Also responsible for the evaluation of mining waste contributions to downstream water quality. Duties included project management scheduling, experimental design, soil remediation design, vegetation selection and monitoring, construction observation, field monitoring, data collection, laboratory analysis, data analysis, and document preparation.

J. Jordan Holt, PE, completed his Bachelor of Science in Civil Engineering with a minor in Sustainability of Built Systems in May of 2016 and began working with Watershed Conservation Resource Center as an Intern, and then accepted the Water Resources Engineer position. Jordan’s leadership and volunteer work has stretched from the local community to overseas.

Water Resources Engineer (September 2016 to Present), Watershed Conservation Resource Center (WCRC), Fayetteville, AR.

He conducts stream restoration analysis, design, implementation, and monitoring, stream stability inventory and assessment, and water quality data analysis. He has experience in WEPP modeling, hydrologic analysis, GIS analysis and cartography, sediment transport modeling, project permitting and documentation, and sediment and nutrient lab work and analysis. He performs stream site surveys operating an RTK and total station as well as 3d design, machine control, and analysis. He has experience in identifying native and invasive species, along with vegetation management and documentation. He has also lead and coordinated outreach events for volunteers and students.

Engineering Intern (May 2016 to April 2017), City of Springdale Engineering Dept., Springdale, AR.

Performed ArcGIS and pavement software utilization to build a street condition database for roadways, construction site storm water evaluation, and other civil works.

Arkansas Highway and Transportation Dept. Intern (December 2015 to May 2016), Arkansas Highway and Transportation Dept., Bentonville, Arkansas

Assisted with project site surveying operating a total station. Performed job site supervision of construction material quality according to design specifications, and other civil works

Watershed Conservation Resource Center

Watershed Engineer

PE License: #20336

Years of Experience

Nine

Education

University of Arkansas – Fayetteville, Arkansas
Bachelor of Science Degree Major: Agricultural
Engineering Civil Engineering, Minor:
Sustainability of Built Systems. May 2016

Professional Training

Dr. Rosgen’s Wildland Hydrology Courses:
-Applied Fluvial Geomorphology
-River Morphology & Applications
-River Assessment & Monitoring
-River Restoration & Natural Channel Design
UARK CTTT: Unpaved Roads Workshop:
Drainage Control & Mitigation of Erosion

Professional Organization Membership

Licensed Professional Engineer
Arkansas Native Plant Society Member
National Society of Collegiate Scholars, Chi
Epsilon

Special Recognition

Aquaponics Design Team Leader
-Dangriga, Belize
Project design and construction team leader for
a study abroad service project in coordination
with the U of A, Peacework, and the
community of Dangriga, Belize.

South Korea
Volunteered to lead outreach to South Korean
students to read and speak English

West Fork White River Cleanup Volunteer
Coordinator
Make a Difference Day Rep. for WCRC
Secchi Day Rep. for WCRC
Homegrown Music Festival Rep. for WCRC
White River Seed Collection Volunteer
Coordinator
Arkansas Native Plant Society Volunteer Rep.
War Eagle Creek Spring River Cleanup
Beaver Watershed Association Volunteer
North West Arkansas Land Trust Volunteer
Art Ventures Northwest Arkansas Volunteer
U6 Soccer Coach Volunteer
Habitat for Humanity Volunteer

Employment History

Watershed Conservation Resource Center,
Fayetteville, Arkansas
- May 2016 – present
City of Springdale, Springdale, Arkansas
-May 2016-April 2017
Arkansas Highway and Transportation Dept.,
Bentonville, AR -December 2015 -May 2016

Tyler Anderson is a Water Resources Engineer for the Watershed Conservation Resource Center. Mr. Anderson has assisted with all aspects of natural channel stream restoration design during his time at the WCRC. His experiences include project design, technical support, construction oversight, field data collection, and site assessment. He is currently an Engineer in Training and is on track to become a Professional Engineer.

Water Resources Engineer (July 2013 to Present), Watershed Conservation Resource Center (WCRC), Fayetteville, AR.

He has experience with stream restoration project design and implementation. He assists with construction drawings, permit applications, floodplain modeling, GIS analysis, and report writing. He oversees stream restoration construction. He leads field data collection and surveying efforts for restoration projects. He assists with restoration implementation and maintenance including site finishing, re-vegetation, and invasive control. He collects and analyzes streambank soil samples. He helps coordinate clean-ups and other volunteer outreach activities. He previously compiled and analyzed water quality data associated with the Buffalo National River.

Research Assistant (May 2011 to May 2013), USDA ARS National Soil Erosion Research Lab, West Lafayette, IN.

Performed model simulations on crop management files in soil erosion prediction software packages. Calibrated and validated two watersheds for runoff and sedimentation within the Water Erosion Prediction Project (WEPP) model. Created a nationwide database of over 1,800 crop management files to be used to predict erosion.

Watershed Conservation Resource Center

Water Resources Engineer

Years of Experience

Thirteen

Education

Purdue University - West Lafayette, Indiana

Bachelor of Science Degree Major: Agricultural Engineering, Minor: Environmental and Ecological Engineering. May 2013

Engineer in Training - April 2013

Professional Training

Dr. Rosgen's Wildland Hydrology Courses:

- Applied Fluvial Geomorphology
- River Morphology & Applications

Special Recognition

Eagle Scout- Boy Scouts of America Troop 166
Arlington Heights, Illinois

Synergistic Activities

West Fork White River Clean-up Planning Committee, 2014 - Present

Beaver Lake Clean-up Planning Committee, 2022 - Present

Employment History

Watershed Conservation Resource Center
July 2013 – Present

National Soil Erosion Research Lab, West Lafayette, Indiana - USDA ARS Research Assistant
May 2011-May 2013