Final Report

Expanding Green Infrastructure to Southeast Arkansas
Project 19-1300, CWA Section 319(h)

Executive Summary

1. **Title of Project:** Expanding Green Infrastructure to Southeast Arkansas

2. **Project Goals/Objectives:** To implement recommendations from the ANRC nonpoint pollution reduction plan to reduce NPS sediment and nutrient loads going into Bayou Bartholomew through the creation of 10 demonstration green infrastructure features, demonstrate their benefits and educate the community about best management practices. The Jefferson County Cooperative Extension Service will educate and involve the community on the key aspects. It is anticipated water quality improvements will be achieved through introducing elements of green infrastructure as a water quality Best Management Practice (BMP) for voluntary implementation by municipalities and universities within the project area.

3. **Project Tasks:**
   Task #1: Financial Review
   Task #2: Site Selection
   Task #3: Implementation
   Task #4: Reporting

4. **Measures of Success:** Ten Green Infrastructure implementation projects installed with educational signage, two training workshops conducted, additional green infrastructure elements being incorporated throughout and after the project by community stakeholders, and pollution reduction.

5. **Project Type:** Statewide ( ) Watershed (X) Demonstration (X)

6. **Waterbody Type:** River (x) Groundwater (x) Other ( )

7. **Project Location:** Bayou Bartholomew Watershed

8. **NPS Management Program Reference:** Section 11 from the 2018-2023 NPS management plan

9. **NPS Assessment Report Status:** Impaired (X) Impacted ( ) Threatened ( )

10. **Key Project Activities:** Hire Staff ( ) Education (X) BMP Implementation (X) Technical Assistance (X) Demonstration Project (X) Planning ( )

11. NPS Management Program Elements: Section 3 and Section 8 from 2018-2023 NPS management plan

12. Project Costs: Federal: $100,926 Non Federal: $76,251 Total: $177,177

13. Project Time Frame: October 1, 2019 – October 1, 2021

14. Project Management:

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Introduction

This project sought to help meet the goals of the 2018-2023 ANRC nonpoint source pollution reduction plan in an economically depressed and socially disadvantaged portion of the Bayou Bartholomew Watershed where public and private resources to protect water quality have historically been extremely sparse and approaches are poorly understood. The concepts of green infrastructure that were introduced and the practices installed as part of this project will benefit water quality and have increased watershed literacy and stewardship in southeast Arkansas moving forward.

The goal of this project was to demonstrate green infrastructure practices and to encourage thoughtful growth and development to minimize hydrologic modification of the watershed to help reduce non-point source sediment and nutrient loads into the Bayou Bartholomew through educational programming.

The Bayou Bartholomew watershed is known as the longest bayou in the world and the second most ecologically diverse waterway in North America. The Bayou Bartholomew is located in southeast Arkansas in portions of 7 counties, with Jefferson County being the headwaters. The watershed contains a variety of landscapes ranging from rolling forested hills in in the western portions to relatively flat farmland along much of the eastern section, and urbanized areas in the headwaters. The project area is subject to flooding, sanitary sewer overflows, and aging sanitary sewer and water utility infrastructure. Several stream segments within the watershed are listed on the ADEQ's 2016 303(d) list for impairments from bacteria, nutrients, sediment, and heavy metals. Reducing non-point source sediment and nutrient inputs associated with land use change by incorporating green infrastructure projects into the Bayou Bartholomew watershed will improve water quality.

Green Infrastructure elements have been proven to reduce sediment, nutrients, and metals from nonpoint source runoff across the United States and in Arkansas, but in Arkansas a majority of green infrastructure best management practices are in the northwest portion of the state. Lack of immediate need to this point and general knowledge of what green infrastructure is and why an individual, organization, or community might want to install certain elements are likely reasons why green infrastructure in SE, SW, and NE Arkansas have not yet been utilized.

This project proposed to increase the awareness and use of green infrastructure in southeast Arkansas through implementing 10 green infrastructure elements (rain gardens, bioswales, permeable pavers, green roofs, green walls) in highly visible locations around the watershed, and by providing educational workshops for citizens of Southeast Arkansas to help initiate the occurrence of green infrastructure.

The introduction and application of green infrastructure has and will continue to help address water quality pollution and flooding in the project area.

Project Promotion

The Expanding Green Infrastructure in Southeast Arkansas Grant was announced via press release in November 2019. In addition to promotion in the immediate project area it received promotion across the state of Arkansas. The press release explained the project and included requests for mini-grant applications. Demonstration installation opportunities through mini-grants were published in the local news and local decision makers and facility directors were approached through personal communication about the opportunities.

Date	Media Placement	Article
11/9/19	Seark Today	Grant Expands GI into SEA
11/14/19	Newton Co. Times	Grant Expands GI into SEA
11/15/19	Pine Bluff Commercial	Grant Expands GI into SEA
12/9/19	Mitchell Williams Law Blog	Grant Expands GI into SEA
11/15/19	Democrat Gazette	Grant Expands GI into SEA https://www.nwaonline.com/news/2019/nov/15/grant-expands-green-infrastructure-into-southeast/
5/18/20	Magnolia Reporter	Free webinar teaches rain gardening basics
5/20/20	Ashley Co Ledger	Rain gardens gather interest across state
5/20/20	Eudora Enterprise	Rain gardens gather interest across state
5/20/20	Stone Co. Leader	Free webinars to be offered on rain gardens
5/21/20	Clay Co. Courier	Free webinar teaches do it yourself basics
5/27/20	Paris Express	Free webinar teaches do it yourself basics
5/27/20	Booneville Democrat	Free webinar teaches do it yourself basics
10/15/20	Stuttgart Daily Leader	Sustainable solutions to stormwater management: webinar to discuss green infrastructure design, construction, maintenance https://www.stuttgartdailyleader.com/sustainable-solutions-to-stormwater-management-webinar-to-discuss-green-infrastructure-design-construction-maintenance/
10/17/20	Arkansas Online	Webinar to address stormwater runoff https://www.arkansasonline.com/news/2020/oct/17/webinar-to-address-stormwater-runoff/
5/12/21	Arkansas Online	https://www.arkansasonline.com/news/2021/may/12/beautiful-rain-gardens-eco-friendly/

5/14/21	Stuttgart Daily Leader	https://www.stuttgartdailyleader.com/upcoming-webinar-benefits-of-rain-gardens-extend-beyond-the-back-yard/
5/21/21	Magnolia Reporter	Rain gardens can improve local water quality http://www.magnoliareporter.com/living_and_learning/education/article_beffac34-b2c5-11eb-9f32-d7625b2ba778.html
8/13/21	The Daily Citizen	https://www.thedailycitizen.com/community/sherri-sanders-try-out-a-rain-garden/article_b6653183-ea6f-5913-aa8c-b00a010519bf.html
9/22/21	Batesville Daily Guard	Low Impact Development to be Discussed https://www.guardonline.com/news/low-impact-development-to-be-discussed/article_613cfc8a-9ed7-5232-bf58-dcfe3527bc7f.html
9/22/21	Walnut Ridge Times	Webinar set on LID stormwater approach
9/23/21	Stuttgart Daily Leader	Cooperative Extension Service providing webinar to explain low-impact development approach https://www.stuttgartdailyleader.com/cooperative-extension-service-providing-webinar-to-explain-low-impact-development-approach/
9/23/21	Arkansas Online	Webinar to show off low impact plans https://www.newsbreak.com/news/2381178162141/webinar-to-show-off-low-impact-plans
9/23/21	Pine Bluff Commercial	Webinar to show off low impact development plans https://www.newzgroup.com/PDFs/9-28/22106-09-23_027002.pdf
9/23/21	Madison County Record	to Stream on Sept. 28 (low impact development)
9/25/21	Paragould Daily Press	Webinar set on LID stormwater approach

Demonstration Projects:

After visiting 18 potential locations in Pine Bluff, Star City and Jefferson County in December 2020 ten locations for projects were identified in the Bayou Bartholomew watershed that were also located at municipal properties. Locations with the highest public visibility and strongest long-term commitment were selected.

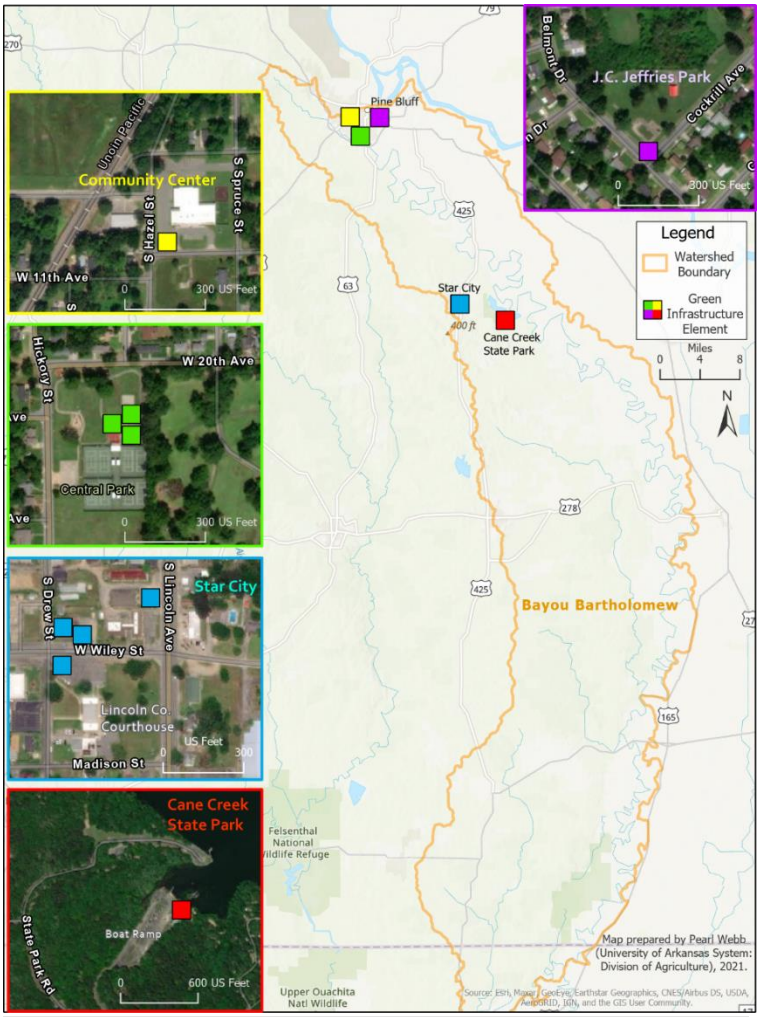
Site	Address	Municipality	Locations Proposed	Locations Accepted
1	Cane Creek State Park	Arkansas State Parks	3	1
2	County Extension Office	Lincoln County	2	2
3	County Courthouse	Lincoln County	1	1
4	Reynolds Center	Pine Bluff	1	1
5	Arts Center		0	0
6	County Street/Right of Way	Star City	1	1
7	JC Jeffries Park	Pine Bluff	1	1
8	City Hall	Pine Bluff	0	0
9	Byrd Lake Natural Area	Pine Bluff	0	0
10	Oak Park	Pine Bluff	0	0
11	Aquatic Center	Pine Bluff	0	0
12	SEARK	Pine Bluff	0	0
13	City Hall Park	Pine Bluff	0	0
14	GSC Gardens	Pine Bluff	0	0
15	W 3rd Ave	Pine Bluff	0	0
16	Indiana St. Park	Pine Bluff	0	0
17	Princeton Pike/ Barraque Ave	Pine Bluff	0	0
18	Central Park	Pine Bluff	3	3

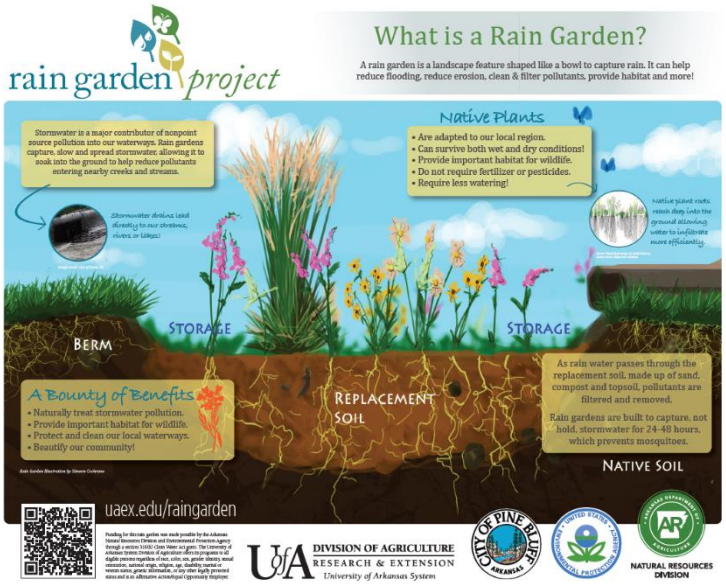
Installation Sites:

The demonstration green infrastructure elements included rain gardens and bioswales installed in 4 of 5 municipalities in the project area.

Site	**Municipality**	**GI Elements at Location**
Cane Creek State Park	Arkansas State Parks	1
County Extension Office	Lincoln County	2
County Street/Right of Way	Star City	1
JC Jeffries Park	Pine Bluff	1
Central Park	Pine Bluff	3
Lincoln County Courthouse	Star City	1
Community Center	Pine Bluff	1

BMPs Implemented





Educational Programming

Educational programming consisted of 14 programs and utilized local demonstration sites. 785 people participated in the programs and the programs varied to meet needs for municipal leaders, planners, and other staff, and also for homeowners and private-sector contractors and engineers. 1,348 unique viewers accessed project information on the UA website rain garden page.

Date	Program	Participants	Number
10/16/19	Green Infrastructure Introduction	Jefferson Co Master Gardener Training	13
11/4/19	Green Infrastructure Introduction	Jefferson Co Master Gardener General Meeting	21
3/10/20	Rain Garden Exploration	JC Boys and Girls Club	27
11/16/20	Rain Garden Maintenance		35
5/29/20	Rain Gardening and Green Infrastructure	Homeowners	363
6/18/20	Rain Gardens a Beautiful Solution to Stormwater Pollution	Faulkner Co Master Gardeners	35
9/22/20	Rain Garden Maintenance		2
10/22/20	Sustainable Solutions for Stormwater Management	Engineers, Municipal Staff	62
5/10/21	Pine Bluff Rain Garden Maintenance and Native Plant Harvest		7
5/18/21	Rain Garden Plants and Particulars	Homeowners, gardeners	162
6/10/21	Little Rock Rain Garden Maintenance	Pulaski County Master Gardeners	3
6/29/21	Pine Bluff Rain Garden Tour	Jefferson Co Master Gardeners	7
9/28/21	LID for Water Quality and Community		46
9/29/21	Rain Garden Maintenance Native Plant Harvest		2

Obstacles Encountered

The onset of Covid 19 Pandemic created many obstacles to the completion of this project including time lag, limited plant stock, travel restrictions, program restrictions,

including inability to conduct in-person programming for all but 3 months of the project. The ability of project partners to assist with aspects of the project were also diminished. However, the obstacles were able to be overcome and the project goals were able to be achieved.

Measures of Success

The completion of the Green Infrastructure implementation projects during the covid 19 pandemic was a basic success. Having the installed rain gardens be accepted by the communities, and having public participation and feedback were great measures of success. Reports from volunteers, community decision makers and influencers, and/or agencies regarding establishment of rain gardens and/or improved management of their own rain gardens or in their own communities throughout the state are excellent measures of success.

Lessons Learned

Weather conditions and emergent novel viruses are somewhat unpredictable. When these occurrences take place it is very important to utilize all windows of opportunity to get things done.

The desire for people to learn more about and to use green infrastructure extended Beyond the project area of Jefferson and Lincoln Counties in southeast Arkansas. The Covid 19 pandemic did produce an opportunity and a need to deliver educational programming virtually which may have resulted in a greater project reach.

Technology Transfer

The successes of this project would not have happened without dedicated funding to EPA section 319. The practices installed and information distributed to the general public of Arkansas have been helpful to grow interest of green infrastructure throughout the state. The aspects of this grant will continue in other communities throughout the state with money from other sources due to the interest this project created outside of the project area.